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Vol. II

Second Generation Pressurized Fluidized-Bed Combustion (PFBC) Research and Development Phase 2 - Task 4 Carbonizer Testing

Volume II - Data Reconciliation

Topical Report

R. Froehlich
A. Robertson
J. Vanhook
A. Goyal
A. Rehmat
R. Newby

November 1994

Work Performed Under Contract No.: DE-AC21-86MC21023

For
U.S. Department of Energy
Office of Fossil Energy
Morgantown Energy Technology Center
Morgantown, West Virginia

By
Foster Wheeler Development Corporation
Livingston, New Jersey

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Phase 2 - Task 4 Carbonizer Testing
Volume II - Data Reconciliation

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Morgantown, West Virginia 26507-0880

By
Foster Wheeler Development Corporation
12 Peach Tree Hill Road
Livingston, New Jersey 07039

November 1994

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J. Van Hook

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EXECUTIVE SUMMARY

A team of companies, led by Foster Wheeler Development Corporation (FWDC) and consisting of Gilbert/Commonwealth, Institute of Gas Technology, the Power Generation Business Unit of Westinghouse Electric Corporation, and the Science & Technology Center of Westinghouse Electric Corporation has been developing an advanced second-generation pressurized fluidized-bed combustion system. A carbonizer is an essential element of this system. The primary responsibility of IGT in this program was to develop a carbonizer model for scale-up which initially utilized data available in the literature and was subsequently updated with actual data generated in the carbonizer pilot plant during the component testing.

Prior to the carbonizer pilot plant testing at FWDC, an extensive literature search was conducted, and correlations were developed for predicting yields of various species as a function of coal properties and carbonizer operating parameters. Based on these correlations, a computer model for the carbonizer was developed. This model could simulate a bubbling or a circulating fluidized-bed reactor with or without fines recycle in which the coal and sorbent could be introduced into the fluidized-bed region and/or into the freeboard region of the carbonizer.

During the period beginning November 1991 and ending September 1992, a series of tests were conducted at FWDC in a fluidized-bed coal carbonizer to determine its performance characteristics. The carbonizer was operated for 533 hours in a jetting fluidized-bed configuration during which 36 set points (steady-state periods) were achieved. Testing was completed with four different fuels, namely, Pittsburgh No. 8 bituminous coal, Illinois No. 6 bituminous coal, Wyoming Eagle Butte subbituminous coal, and petroleum coke; a total of 83 tons of feedstock was consumed. In addition, an exploratory carbonizer test in a circulating fluidized-bed configuration entailing four set points and 9.9 tons of two different fuels (Pittsburgh No. 8 bituminous coal and petroleum coke) was completed. Sorbent (dolomite or limestone) was also fed to the carbonizer during each of the set points to capture sulfur.

Extensive data were collected on the feed and product stream compositions, heating values, temperatures, and flow rates. With this data, elemental and energy balances were computed to evaluate and confirm the accuracy of the data. The carbonizer data were not as self-consistent as could be desired (balance closure imperfection). A software package, called BALAID, has been developed by Science Ventures, Inc., of California, which reconciles the data by applying conservation laws and other equality and inequality constraints. Adjustments are made to all the species flows, temperatures, and variable-species compositions with the adjustments weighted according to the statistical variance of each variable. A maximum-likelihood set of reconciled values is computed in which all the elemental and energy balances close exactly. This approach takes advantage of all the available measurement information as well as information embodied in the conservation laws and in the estimated quality of the measurements. The program utilizes advanced principles in statistics, numerical techniques, and constrained nonlinear optimization theory. This program was successfully applied to reconcile the carbonizer data.

The reconciled data for the carbonizer, while operating in the jetting fluidized-bed configuration, were rigorously analyzed, correlations were developed, and the model was updated accordingly. The model was then used for simulating each of the 36 steady-state periods achieved in the pilot plant.

Many correlations were also developed that were not in the forms present in the existing model. Incorporation of these new correlations in the model would have required significant changes in the computer code, and would have required additional resources. These correlations, if incorporated into the model, could have improved its predictive capabilities.

This report has been divided into two volumes. Volume 1 provides details of the data analysis, data correlations, model update, and model predictions, while Volume 2 provides details of the carbonizer data reconciliation.

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1. INTRODUCTION

A team of companies, led by Foster Wheeler Development Corporation (FWDC) and consisting of -

- Gilbert/Commonwealth
- Institute of Gas Technology (IGT)
- Westinghouse Electric Corporation, Power Generation Business Unit
- Westinghouse Electric Corporation, Science & Technology Center

has been developing an advanced second-generation Pressurized Fluidized-Bed (PFB) combustion system. The targeted goals of this second-generation PFB combustion system are a 45% efficiency and a cost of electricity (COE) that is at least 20% lower than that based on conventional pulverized-coal-fired plants with stack gas scrubbers. In addition, the plant emissions are to be within New Source Performance Standards (NSPS), and the plant should have high availability, be able to process different ranks of coal, and incorporate modular construction technologies. These goals are achieved by shifting power generation to the more efficient gas turbine cycle and away from the steam cycle, while maintaining sulfur capture by sorbent and by providing significantly higher gas turbine inlet temperatures without increasing the bed temperature through the incorporation of a topping combustor in the system (Robertson et al., 1988). In this arrangement (Figure 1.1), a carbonizer generates a coal-derived low-Btu fuel gas from carbonization of coal at approximately 1500° to 1700°F. This is mixed with flue gases from a PFB combustor operating at 1500° to 1700°F and is burned in a topping combustor to increase the gas turbine inlet temperature to approximately 2200° to 2400°F. The combustion air to the topping combustor is provided by high excess air present in the flue gas from the PFB combustor. The carbonizer flue gas yield, composition, and heating value are very important in determining the efficiency of this plant. Therefore, the carbonizer is an essential element of this system. The coal is primarily fed to the carbonizer. The coal char residue from the carbonizer is burned in the PFB combustor along with the balance of the plant coal, if there is any left. A calcium-based sorbent is injected into the carbonizer and PFB combustor to minimize carbonizer tar yield and to desulfurize the gases from both units.

Based on Pittsburgh No. 8 coal containing 2.9 percent sulfur and Plum Run dolomite feeds, and a plant operating with a 1500°F carbonizer, a 2100°F topping combustor exit temperature is optimum; a plant efficiency of 43.6% and a COE about 19% lower than that of a conventional PC-fired plant with a scrubber are projected. Operation with a 1600°F carbonizer temperature increases the optimum topping combustor temperature to 2350°F and the plant efficiency to 44.9%; the COE becomes 22% lower than that for a conventional PC-fired plant (Robertson et al., 1992).

IGT's mission in the overall program is to utilize the data base developed by FWDC from operating a carbonizer, and to reduce the data in a model that could predict the performance of a carbonizer in a scaled-up configuration.

Prior to the carbonizer pilot plant testing at FWDC, an extensive literature search was conducted, and correlations were developed for predicting yields of various species as a function of coal properties and carbonizer operating parameters. At the time of this model development, although there were a lot of data available on the subject of pyrolysis, only a small amount of this information was applicable to

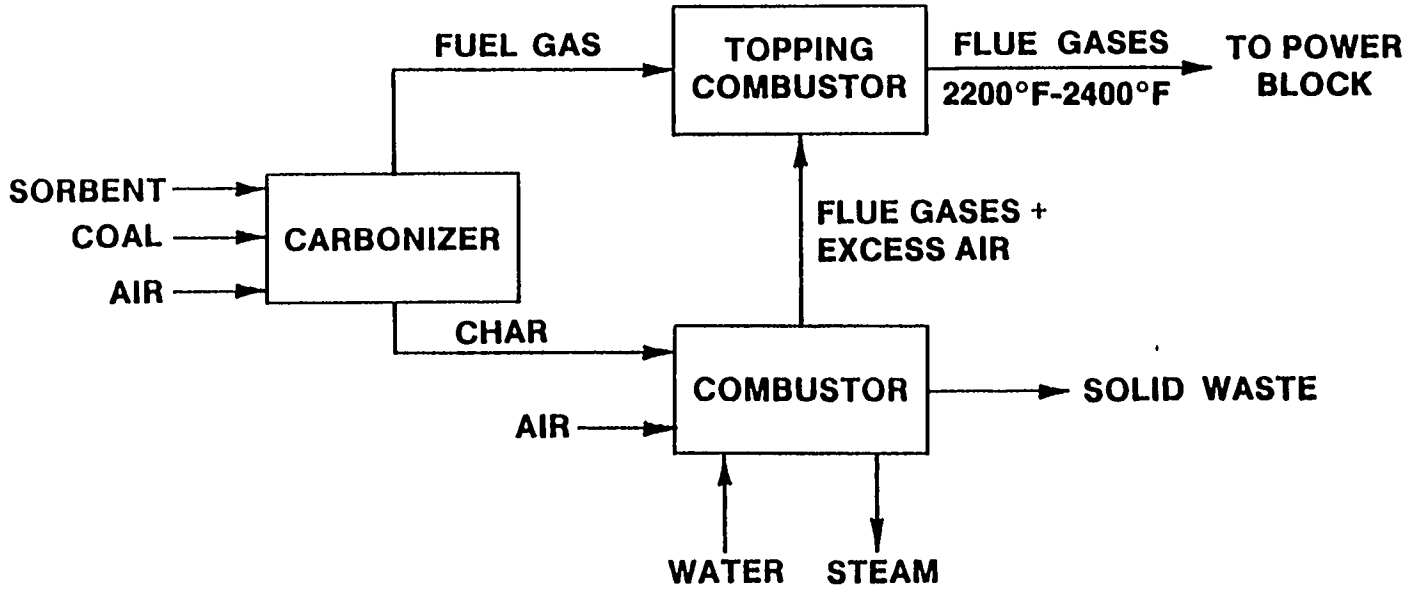

Figure 1.1. ADVANCED PRESSURIZED FLUIDIZED-BED COMBUSTION SYSTEM

the type of coal processing used here. Much of the data for coal pyrolysis were obtained in a heated grid reactor where the coal was subjected to the desired temperature from a fraction of a second to about 2 seconds, usually yielding only a fraction of the pyrolysis product. On the other hand, in a fluidized-bed reactor, coal is subjected to a sufficiently long residence time (a gas residence time over 5 seconds and a solids residence time of several minutes), so the maximum yield is typically obtained. The data available in this category were used to develop the correlation for the coal carbonization product yields and their compositions. These correlations were developed for bituminous coals as well as for lignites to cover a wide range of feedstock properties. Based on these correlations, a computer model for the carbonizer was developed. This model could simulate a bubbling or a circulating fluidized-bed reactor with or without fines recycle in which the coal and sorbent could be introduced into the fluidized-bed region and/or into the freeboard region of the carbonizer. The details of the development of these correlations and the model have been given by Rehmat and Goyal (1987) in a DOE Report.

With the current testing in the carbonizer completed, IGT rigorously analyzed the data, reconciled the data within the given measurement accuracies, modified the correlations used earlier to incorporate the new data, and subsequently updated the predictive model. This report outlines these efforts.

2. RAW CARBONIZER DATA

The data presented in this section are either the direct measurements, or they are derived from these measurements.

2.1. Carbonizer Pilot Plant Description

By November 1991, Foster Wheeler Development Corporation (FWDC) completed the construction of the second-generation Pressurized Fluidized-Bed (PFB) combustion pilot plant at its John Blizard Research Center in Livingston, New Jersey, and completed two shakedown tests. The facility was designed to test a second-generation carbonizer and then follow it with a Circulating Pressurized Fluidized-Bed Combustor/Fluidized-Bed Heat Exchanger (CPFBC/FBHE).

Figure 2.1 is a simplified schematic of the carbonizer pilot plant. The coal and sorbent are pressurized in separate lock hoppers with screw feeders controlling their feed rate into a common, pneumatic transport line that injects these materials into the carbonizer.

The carbonizer is a 30-in.-0D X 34-ft, 6 in.-tall refractory-lined pressure vessel. It has a 19-ft-deep fluidized-bed region and a 9 ft 5-3/4 in.-tall freeboard region (Figures 2.2 and 2.3). The carbonizer ID increases from the bottom to the top in three steps to enhance solids circulation and limit slugging and elutriation. The ID is 10 in. for the first 3 ft, 7 in. of the bed height, 12 in. in the middle section containing most of the bed, and 14 in. in the freeboard. Air, coal, and lime-based sorbent are injected into the unit at a 40 to 60-ft/s jet velocity through a central, vertical, 1-in. Schedule 80 stainless steel feed pipe at the bottom of the unit. Low-Btu fuel gas leaves through a 3-in.-ID radial nozzle at the top. Spent bed material and char drain through the annulus that surrounds the feed pipe, enter the packed-bed cooling section, and are cooled to about 300°F by counterflowing nitrogen before leaving through a 4-in. drain. A pressurized screw feeder in the drain line controls the material drain rate/bed height, and discharges to a lock hopper for depressuring and ultimate drum disposal.

Because a new facility and a new process (carbonization) were involved, the pilot plant was initially operated with a two-cyclone particulate-removing gas cleanup system. To minimize interactions, the stainless steel cyclones were placed in separate, refractory-lined pressure vessels, and provided with separate ash cooling and depressuring systems. After sufficient operating experience was gained and the composition of the carbonizer-generated fuel gas was determined, the second-stage cyclone was removed, and a ceramic cross-flow filter was connected to the system (for Test Runs TR7 and TR8). This cross-flow filter was replaced by a candle filter for Test Runs TR9 and TR10.

The gas leaving the second-stage cyclone (or the ceramic cross-flow filter) is reduced to atmospheric pressure as it passes through a choked-flow orifice. The high-velocity orifice jet discharges into an Incoloy-shrouded refractory-lined chamber, where a nitrogen-atomized nozzle injects spray water to cool the gas to approximately 350°F. Although the cooling is accomplished by a dry quench, a wire mesh demister is provided at the base of the spray tower to remove any water droplets or oil condensate. The cooled gas then passes through a baghouse filter. The low-Btu fuel gas generated by the facility is burned in a natural-gas-fired incinerator before venting to the atmosphere through an elevated stack.

With the exception of the ceramic cross-flow filter, the construction and checkout of the carbonizer pilot plant was essentially completed in fiscal year 1991. The pilot plant was operated from November 1991 through June 1992 in the jetting fluidized-bed configuration. Then the pilot plant was modified to permit one exploratory test run in an 8-in.-ID circulating fluidized-bed carbonizer. The

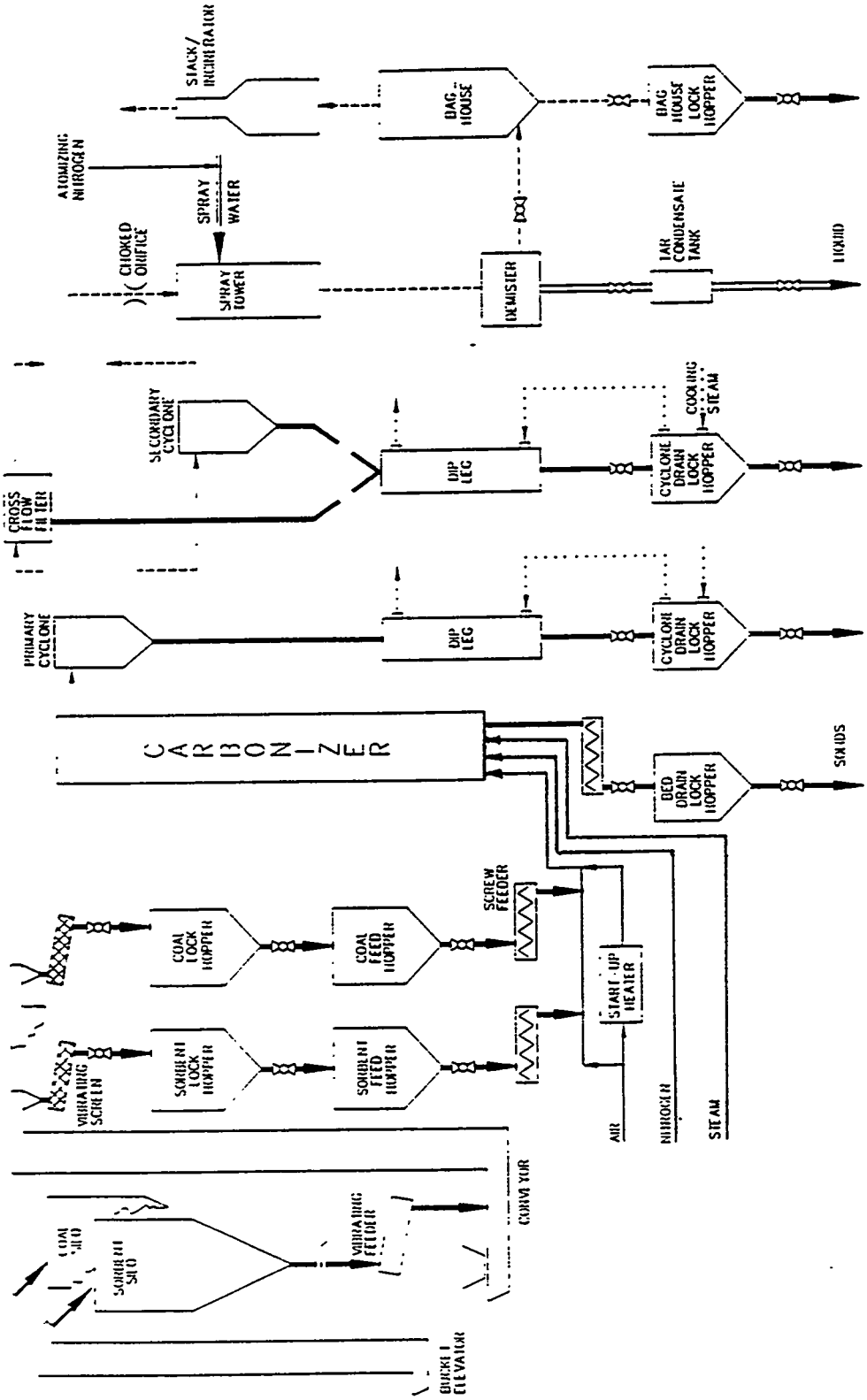

Figure 2.1. JETTING FLUIDIZED-BED CARBONIZER PILOT PLANT SCHEMATIC

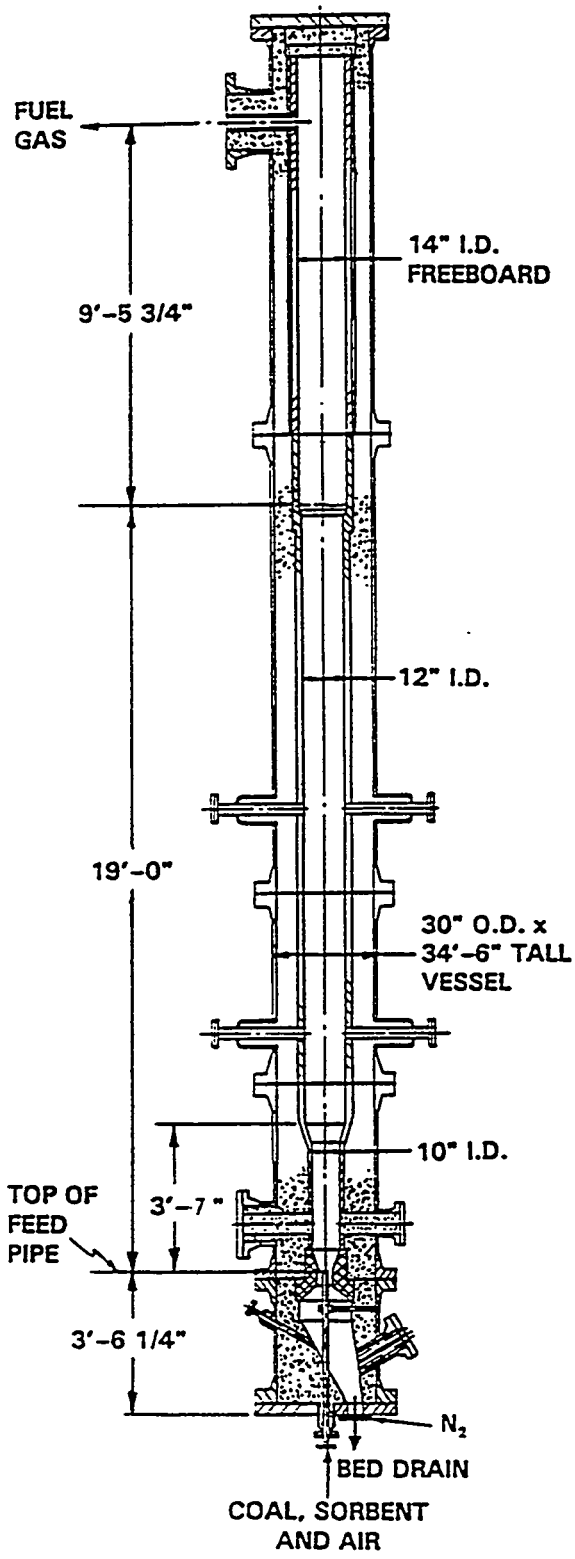

Figure 2.2. JETTING FLUIDIZED-BED CARBONIZER TEST UNIT

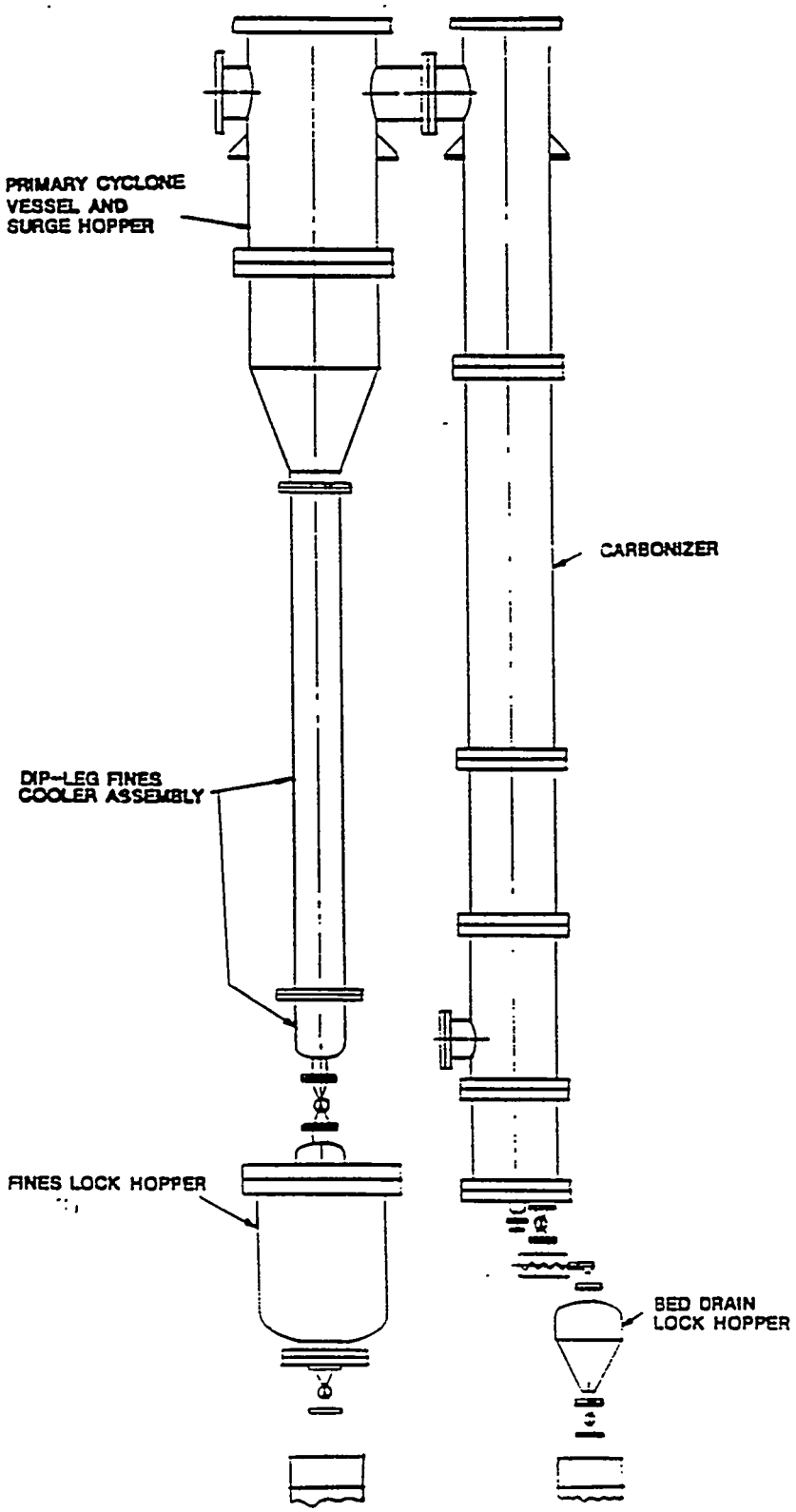

Figure 2.3. CARBONIZER - PRIMARY CYCLONE ARRANGEMENT

primary cyclone dip-leg cooler and drain lock hopper were removed. The 12-in. nozzle plug was removed from the side of the carbonizer, and the double corrugated expansion joint (shown in Figure 2.4) was temporarily installed. The vertical pipe run and cross forming the cyclone fines recirculation L-valve were moved into position, cut to size, and their slip-on flanges were tack-welded in place. While the L-valve piping was being welded and pressure tested, the carbonizer-bed drain screw and lock hopper were removed, and the carbonizer was lowered to the floor section by section. The ceramic inserts that convert the 10, 12, and 14-in.-ID sections of the unit to a constant 8-in. ID were installed, and the unit, together with its bed drain screw and lock hopper, was reassembled. The carbonizer bubbling bed primary cyclone was removed, the larger-capacity (CPFBC) primary cyclone was installed, and the internal piping was appropriately modified. The details of the carbonizer are given in Figure 2.5. A flow schamatic of the pilot plant with the circulating fluidized-bed carbonizer is given in Figure 2.6. Details of the pilot plant are given by Robertson et al. (1992).

The fuel gas generated by the carbonizer is sampled at two different locations in the plant, and analyzed within 24 hours by a gas chromatograph to determine the gas composition. The first sample, taken at the demister outlet, simply allows the slightly pressurized gas to flow into and fill each of the two 3-L Teflon bags. Hydrochloric acid (HCl) is injected into one bag to convert the ammonia in the fuel gas to ammonium chloride (NH_4Cl) to prevent its decomposition while awaiting analysis by the gas chromatograph. Similarly, sodium hydroxide is injected into the other bag to convert hydrogen sulfide to sodium sulfide or sodium hydrosulfide (Na_2S/NaHS). The second sampling involves extracting gas from the top of the carbonizer via the system shown in a simplified schematic (Figure 2.7). Immediately upon leaving the carbonizer, the gas is cooled to 400° to 600°F via a steam-jacketed pipe, and particles are removed by a steam-traced cyclone and porous metal filter. Vapors are condensed by cooling the gas to approximately 60°F in a water-cooled heat exchanger; the gas is then collected in a knockout pot for analysis (to check for the presence of any tars or oils). A valve depressurizes the gas to ambient, sets the sampling rate at 250 sft^3/h, and delivers the gas to a totalizing dry gas meter.

The second gas sample is taken immediately downstream of this meter in a 3-L Teflon bag. The system facilitates determination of the fuel-gas water content and provides a cross check on the gas composition measured at the demister outlet (except for ammonia and hydrogen sulfide, which are water soluble, and possibly partially absorbed by the condensate).

From the standpoint of the solids fed into and withdrawn from the plant during a test/set point, usually material samples are collected for analysis every time a feed system lock hopper is filled and a drain hopper is discharged.

The details of the pilot plant are given by Robertson et al. (1992).

2.2. Carbonizer Pilot Plant Operation

The carbonizer was operated in two modes, first (from November 1991 to June 1992) as a jetting fluidized bed (Figures 2.1 and 2.2), and then (from August 1992 to September 1992) as a circulating fluidized bed (Figures 2.5 and 2.6).

The jetting fluidized-bed carbonizer test program consisted of eight test runs (TR1 through TR8), comprising 36 set points and 533 hours of operation. Two test runs (TR3 and TR7) were aborted during start-up before establishing their first set points because of equipment problems unrelated to the process.

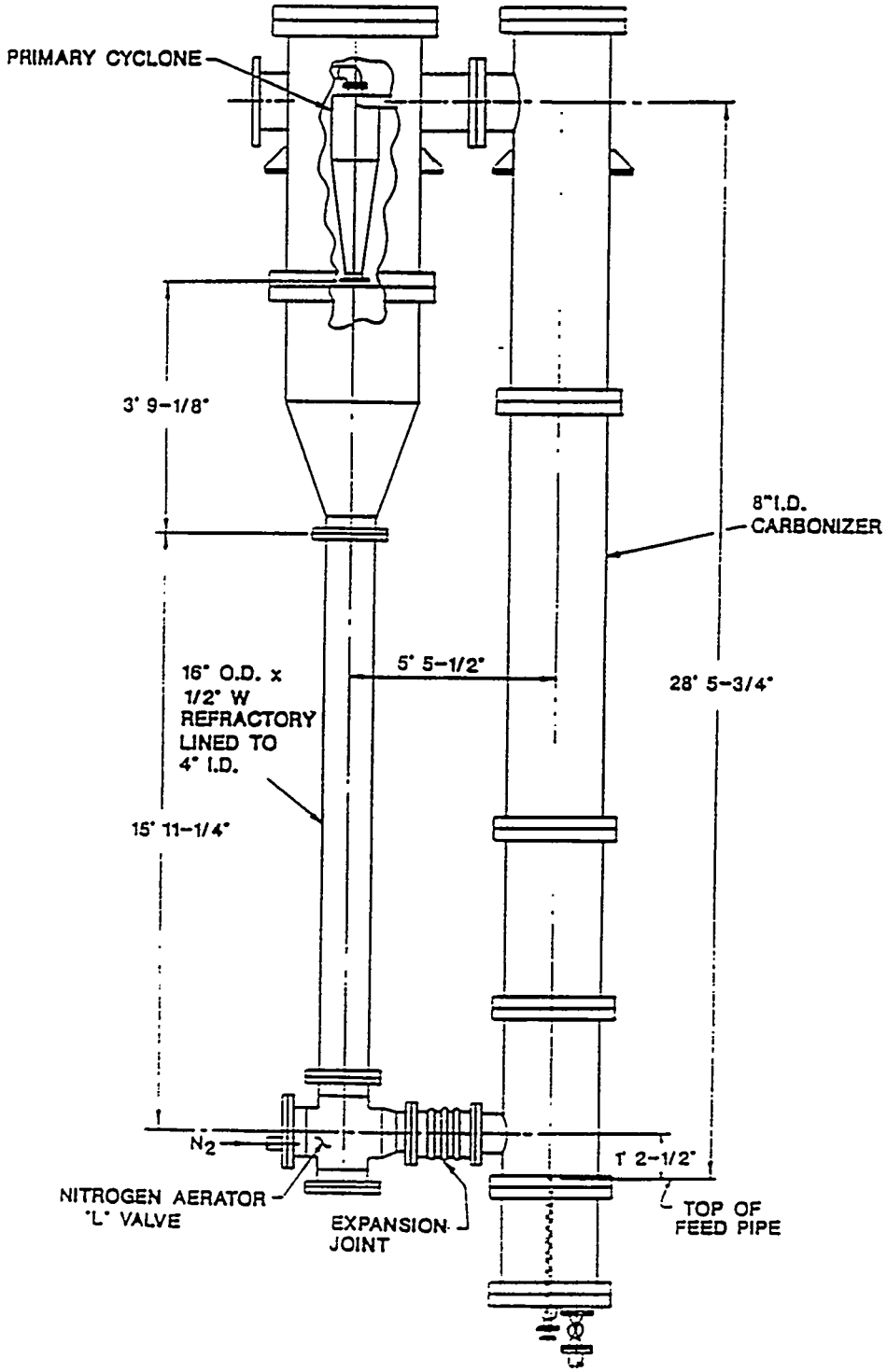

Figure 2.4. GENERAL ARRANGEMENT OF CIRCULATING FLUIDIZED-BED CARBONIZER

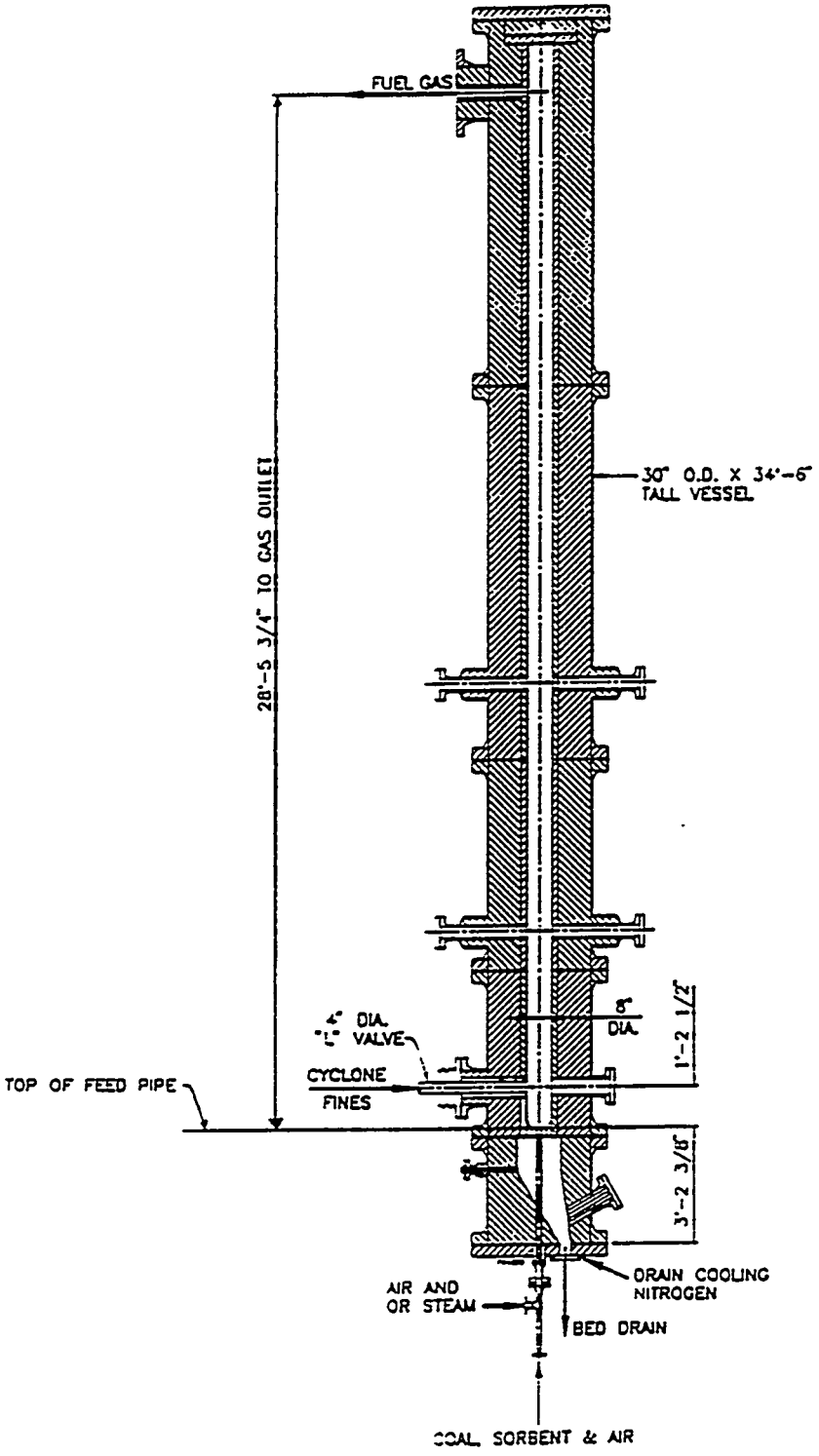

Figure 2.5. CIRCULATING FLUIDIZED-BED CARBONIZER TEST UNIT

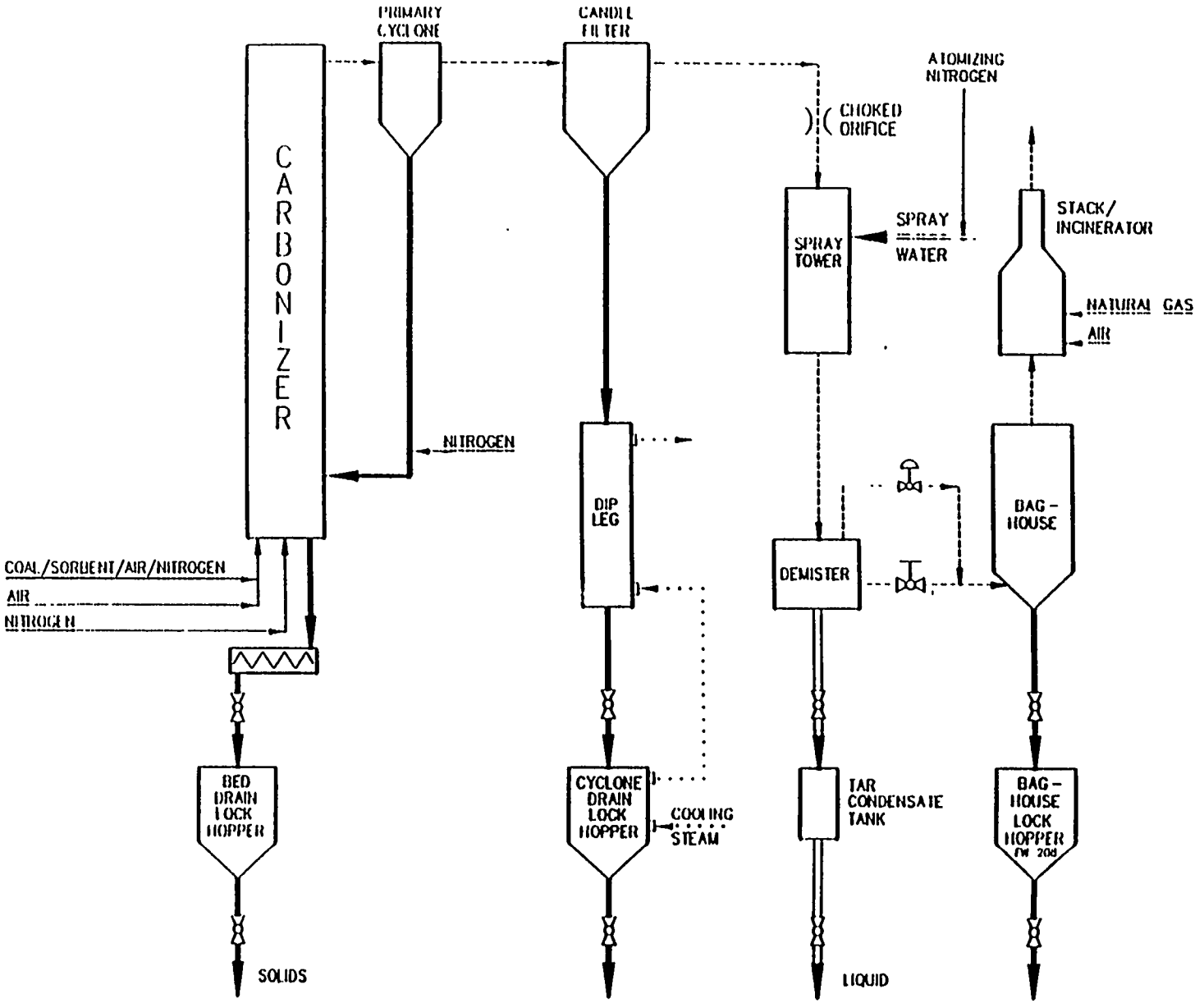

Figure 2.6. CIRCULATING FLUIDIZED-BED CARBONIZER PILOT PLANT SCHEMATIC

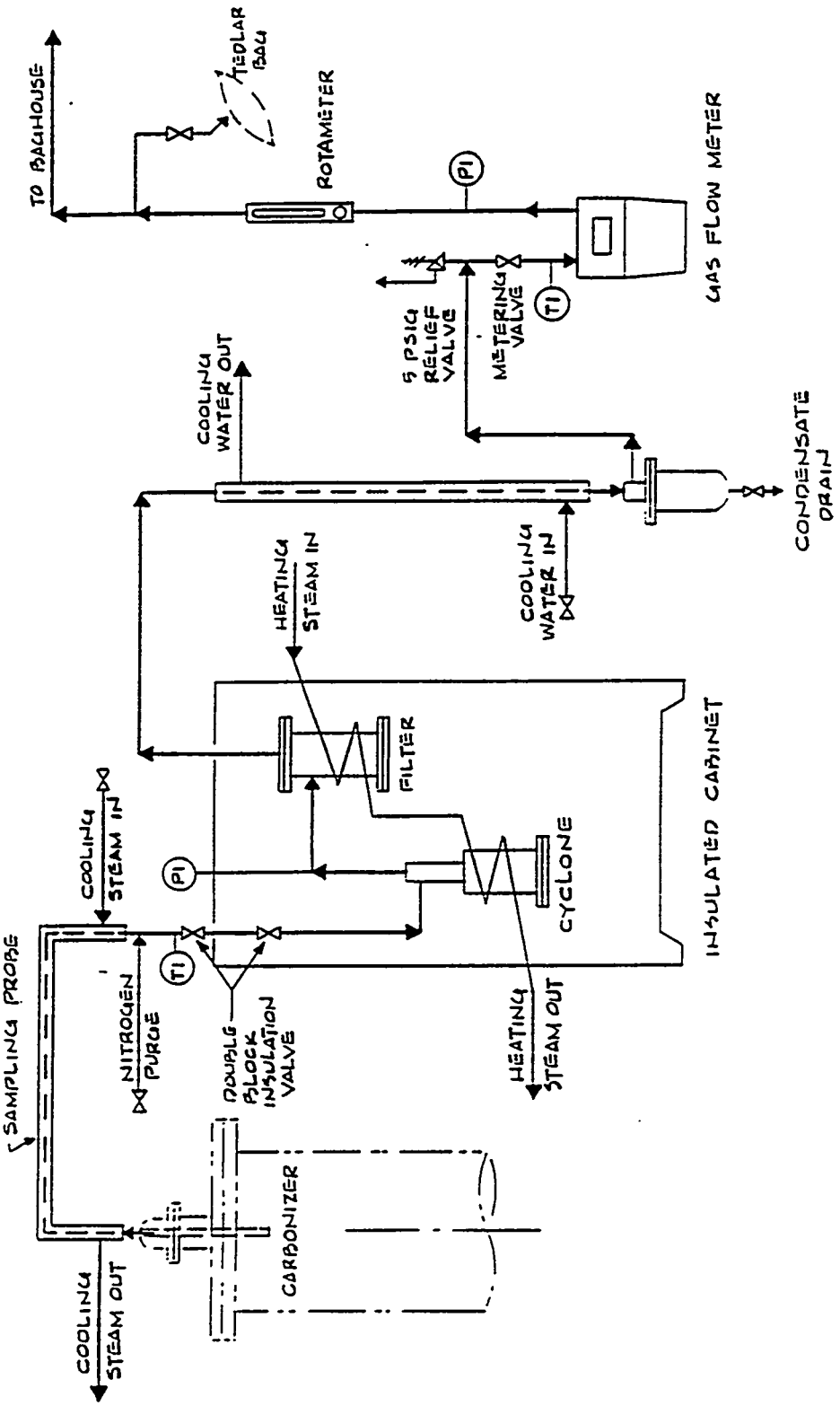

Figure 2.7. SAMPLING SYSTEM FOR CARBONIZER FREEBOARD GAS

Although Pittsburgh No. 8 bituminous coal and Ohio Plum Run dolomite (PR Dolo) were most frequently used, Illinois No. 6 bituminous coal, Wyoming Eagle Butte subbituminous coal, and Alabama Longview limestone (LV Lime) were also tested. As shown in Table 2.1, the Pittsburgh coal typically has a 3.5% sulfur content and a Free Swelling Index of 6.5; it is a highly caking coal that has caused agglomeration problems in other fluidized-bed gasification programs. Thus, it was purposely selected for use in this test program to demonstrate the capability of the carbonizer process. The Wyoming Eagle Butte subbituminous coal typically contains 0.7% sulfur and 27% moisture. To preclude the risk of forming and condensing hydrocarbon vapors at start-up, when the plant "back end" was cold, the carbonizer was started up with a low-volatile petroleum coke. The transition to coal was made after about 4 hours, when the choked-flow orifice temperature reached approximately 1200°F. Typical analyses for the sorbents used in this program are presented in Table 2.2. As shown in Table 2.3, a total of 83.4 tons of four different fuels have been successfully carbonized - 45.3 tons of Pittsburgh No. 8, 15.4 tons of Eagle Butte, 15.3 tons of Illinois No. 6. and 7.4 tons of coke.

The circulating fluidized-bed carbonizer test program entailed two test runs (TR9 and TR10) comprising four set points and 94 hours of operation. The first test run was aborted during start-up before establishing the first set point because of an equipment problem unrelated to the process (leaking bag in the baghouse filter). Pittsburgh No. 8 bituminous coal and Genstar limestone (GS Lime; see Table 2.2) were the feedstocks used during the four set points completed in Test Run TR10. As shown in Table 2.3, 8.8 tons of Pittsburgh No. 8 bituminous coal and 1.1 tons of coke were processed during these tests.

The details of the pilot plant operation are given by Robertson et al. (1992).

2.3. Carbonizer Data and Material and Energy Balances

Carbonizer operation was smooth and controlled throughout the entire test program. A total of 36 set points (steady-state periods) was achieved while operating in a jetting fluidized-bed carbonizer mode, and 4 set points was achieved while operating in a circulating fluidized-bed mode. A set point was typically held for 4 hours, and gas samples were collected at about 1-hour intervals during this period. Allowing time for transition from set point to set point, for establishing steady-state conditions, and for tending to problems, typically a set point was completed every 12 hours. A test run typically involved starting preheat of the facility on Monday and shutting down the plant on Friday, with operation occurring around the clock during this period.

Table 2.4 summarizes the coal and sorbent types used, date, duration, pressure, and bed and freeboard temperatures for each of these set points (steady-state periods). The average bed temperature and pressure for each of the set points are shown in Figures 2.8 and 2.9. respectively. The bed temperatures were measured at the 2.5, 7.5. 12.5, and 17.5-ft levels (measured from the top of the feed pipe); these temperatures are reasonably uniform, and the average bed temperature has been calculated as the average value of these measurements. The coal feed rate and sorbent feed rate for each of the set points are shown in Figures 2.10 and 2.11. respectively.

As shown in Table 2.5. a total of 23 set points was achieved with Pittsburgh No. 8 bituminous coal and dolomite feeds. during which the average bed temperature ranged from 1482° to 1797°F, the pressure ranged from 125 to 199 psig, the coal feed rate ranged from 182 to 508 lb/h, and the sorbent feed rate ranged from 40 to 182 lb/h. Similarly, four set points were achieved with Illinois No. 6 bituminous coal and limestone feeds, during which the average bed temperature ranged from 1599° to 1715°F, the pressure ranged from 113 to 161 psig, the coal feed rate ranged from 232 to 427 lb/h, and the sorbent feed rate ranged from 36 to 104 lb/h. Also. eight set points were achieved with Wyoming Eagle

Table 2.1. TYPICAL CARBONIZER COAL FEED ANALYSES

Feedstock	Petroleum Coke	Coal: Pittsburgh No. 8 Bituminous	Coal: Illinois No. 6 Bituminous	Coal: Wyoming Eagle Butte Subbituminous
Feed Size, in	-1/8	-1/8 to 3/16	-1/8	-1/8
Free Swelling Index	0	6.5	4	0
Proximate Analysis, wt%				
Fixed Carbon	83.96	51.06	45.05	36.16
Volatile Matter	14.97	34.23	33.49	31.39
Ash	0.94	12.61	10.59	5.58
Moisture	0.13	2.10	10.87	26.87
Total	100.00	100.00	100.00	100.00
Ultimate Analysis, wt%				
C	89.89	69.44	62.74	50.76
H	4.42	4.62	4.40	3.60
O	0.73	5.70	6.78	11.49
N	2.30	2.03	1.57	0.98
S	1.59	3.50	3.05	0.72
Ash	0.94	12.61	10.59	5.58
Moisture	0.13	2.10	10.87	26.87
Total	100.00	100.00	100.00	100.00
HHV, Btu/lb	15,743	12,724	11,172	8,729

Table 2.2. TYPICAL CARBONIZER SORBENT FEED ANALYSES

	Plum Run Dolomite	Longview Limestone
Supplier	Highland Stone Div. of Davon, Inc. Hillsboro, Ohio	Longview Lime Saginaw, Alabama
Feed Size, in	-1/8	-1/8
Composition, wt%		
$CaCO_3$	55.96	96.89
$MgCO_3$	42.82	1.91
S	0.19	0.15
Ash	1.03	1.05
Total	100.00	100.00

Table 2.3. CARBONIZER OPERATING SUMMARY

Feedstock	Petroleum Coke	Pittsburgh No. 8 Bituminous	Illinois No. 6 Bituminous	Wyoming Eagle Butte Subbituminous	Plum Run Dolomite	Longview Limestone	Genstar Limestone
A. Jetting Fluidized-Bed Operating Mode							
• Operating Time, hours							
Shakedown Runs 1-2	8	5	--	--	13	--	
Test Runs TR1-TR8	59	289	76	96	317	203	
Subtotal	67	294	76	96			
Total			533		330	203	
• Feedstock Consumption, tons*							
Shakedown Runs 1-2	1.0	0.8	--	--	0.7	--	
Test Runs TR1-TR8	6.4	44.5	15.3	15.4	12.3	5.8	
Subtotal	7.4	45.3	15.3	15.4			
Total			83.4		13.0	5.8	
B. Circulating Fluidized-Bed Operating Mode							
• Operating Time, hours							
Test Run TR9	14	21			35		--
Test Run TR10	4	55			6		53
Subtotal	18	76					
Total		94			41		53
• Feedstock Consumption, tons*							
Test Run TR9	0.7	1.3			0.9		--
Test Run TR10	0.4	7.5			0.2		1.5
Subtotal	1.1	8.8					
Total		9.9			1.1		1.5

*1 ton = 2000 lb.

Table 2.4. SUMMARY OF STEADY-STATE PERIODS FROM CARBONIZER PILOT PLANT OPERATION

Set Point	Coal Feed	Sorbent Feed	Date	Duration, hours	Pressure, psig	Bed Temp., °F	Freeboard Temp., °F
TR1-1	Pittsburgh No 8	Dolomite	11/20/91	0300-0700	152.6	1584	1553
TR1-2	Pittsburgh No 8	Dolomite	11/21/91	0200-0600	132.9	1681	1651
TR1-3	Pittsburgh No 8	Dolomite	11/21/91	1000-1400	144.7	1608	1581
TR1-4	Pittsburgh No 8	Dolomite	11/21/91	2100-2330	125.4	1482	1440
TR2-1	Pittsburgh No 8	Dolomite	12/19/91	0100-0500	139.8	1698	1652
TR2-2	Pittsburgh No 8	Dolomite	12/19/91	1300-1700	128.3	1598	1567
TR2-3	Pittsburgh No 8	Dolomite	12/20/91	0100-0500	138.1	1797	1705
TR2-4	Pittsburgh No 8	Dolomite	12/20/91	1000-1400	191.8	1784	1738
TR2-5	Pittsburgh No 8	Dolomite	12/20/91	1600-1800	198.6	1679	1675
TR4-1	Pittsburgh No 8	Dolomite	3/10/92	2030-0030	153.3	1663	1626
TR4-2	Pittsburgh No 8	Dolomite	3/11/92	0430-0830	155.9	1608	1573
TR4-3	Pittsburgh No 8	Dolomite	3/12/92	0230-0630	125.2	1708	1643
TR4-4	Pittsburgh No 8	Dolomite	3/12/92	1600-2000	129.1	1607	1568
TR4-5	Pittsburgh No 8	Dolomite	3/13/92	0530-0930	193.2	1720	1691
TR4-6	Pittsburgh No 8	Dolomite	3/13/92	1300-1700	175.8	1713	1681
TR4-7	Pittsburgh No 8	Dolomite	3/13/92	2200-0200	177.9	1601	1582
TR4-8	Pittsburgh No 8	Dolomite	3/14/92	0200-0600	182.2	1618	1600
TR5-1	Pittsburgh No 8	Dolomite	3/24/92	1100-1500	134.3	1693	1653
TR5-2	Pittsburgh No 8	Dolomite	3/24/92	1900-2300	154.8	1701	1662
TR5-3	Pittsburgh No 8	Limestone	3/25/92	0500-0900	147.4	1706	1667
TR6-1	Wyoming	Limestone	4/21/92	2100-0100	145.9	1580	1567
TR6-2	Wyoming	Limestone	4/22/92	0430-0830	129.8	1509	1500
TR6-3	Wyoming	Limestone	4/22/92	1400-1800	157.5	1511	1515
TR6-4	Wyoming	Limestone	4/22/92	2100-0100	191.9	1609	1579
TR6-5	Wyoming	Limestone	4/23/92	0400-0800	189.6	1632	1593
TR6-6	Illinois No 6	Limestone	4/23/92	1800-2200	143.5	1600	1573
TR6-7	Illinois No 6	Limestone	4/23/92	2300-0330	122.4	1599	1573
TR8-1	Wyoming	Limestone	6/10/92	2000-0100	128.6	1476	1432
TR8-2	Wyoming	Limestone	6/11/92	0300-0800	132.7	1593	1541
TR8-3	Wyoming	Limestone	6/11/92	1330-1730	156.5	1613	1575
TR8-4	Illinois No 6	Limestone	6/12/92	2100-0200	113.2	1652	1623
TR8-5	Illinois No 6	Limestone	6/13/92	0700-1100	160.6	1715	1680
TR8-6/7	Pittsburgh No 8	Dolomite	6/14/92	2100-0100	156.0	1699	1675
TR8-8	Pittsburgh No 8	Dolomite	6/16/92	0200-0600	143.5	1707	1683
TR8-9	Pittsburgh No 8	Dolomite	6/16/92	0800-1230	135.0	1713	1683
TR8-10	Pittsburgh No 8	Dolomite	6/16/92	1430-1930	126.5	1729	1697
TR10-1*	Pittsburgh No 8	Limestone	9/1/92	0200-0600	113.7	1675	1652
TR10-2*	Pittsburgh No 8	Limestone	9/1/92	1630-2100	68.7	1675	1618
TR10-3*	Pittsburgh No 8	Limestone	9/2/92	0000-0400	72.7	1706	1677
TR10-4*	Pittsburgh No 8	Limestone	9/2/92	0610-1240	55.9	1601	1571

*The carbonizer was operated in a circulating fluidized-bed mode during Test TR10.

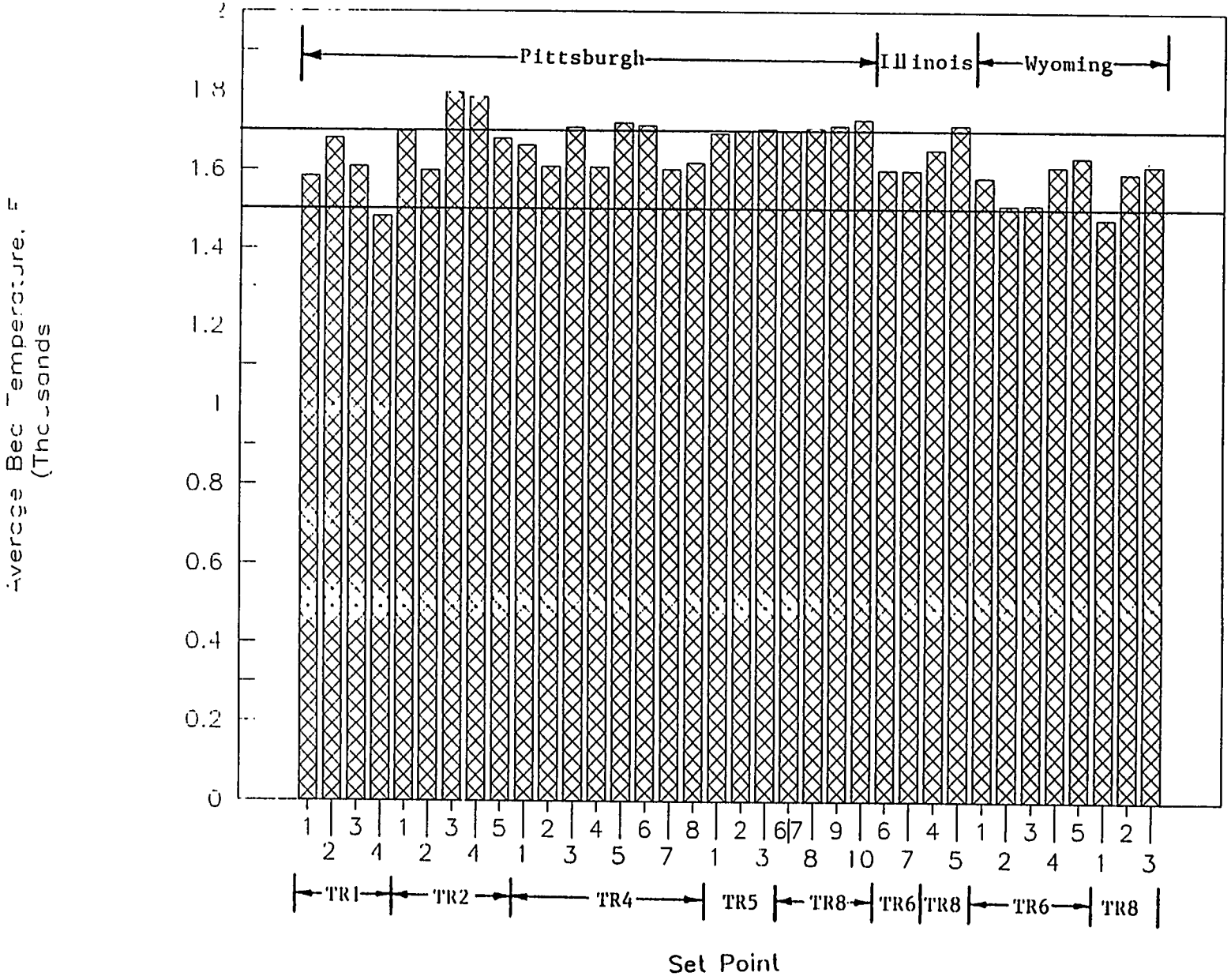

Figure 2.8. CARBONIZER AVERAGE BED TEMPERATURE DURING STEADY-STATE PERIODS

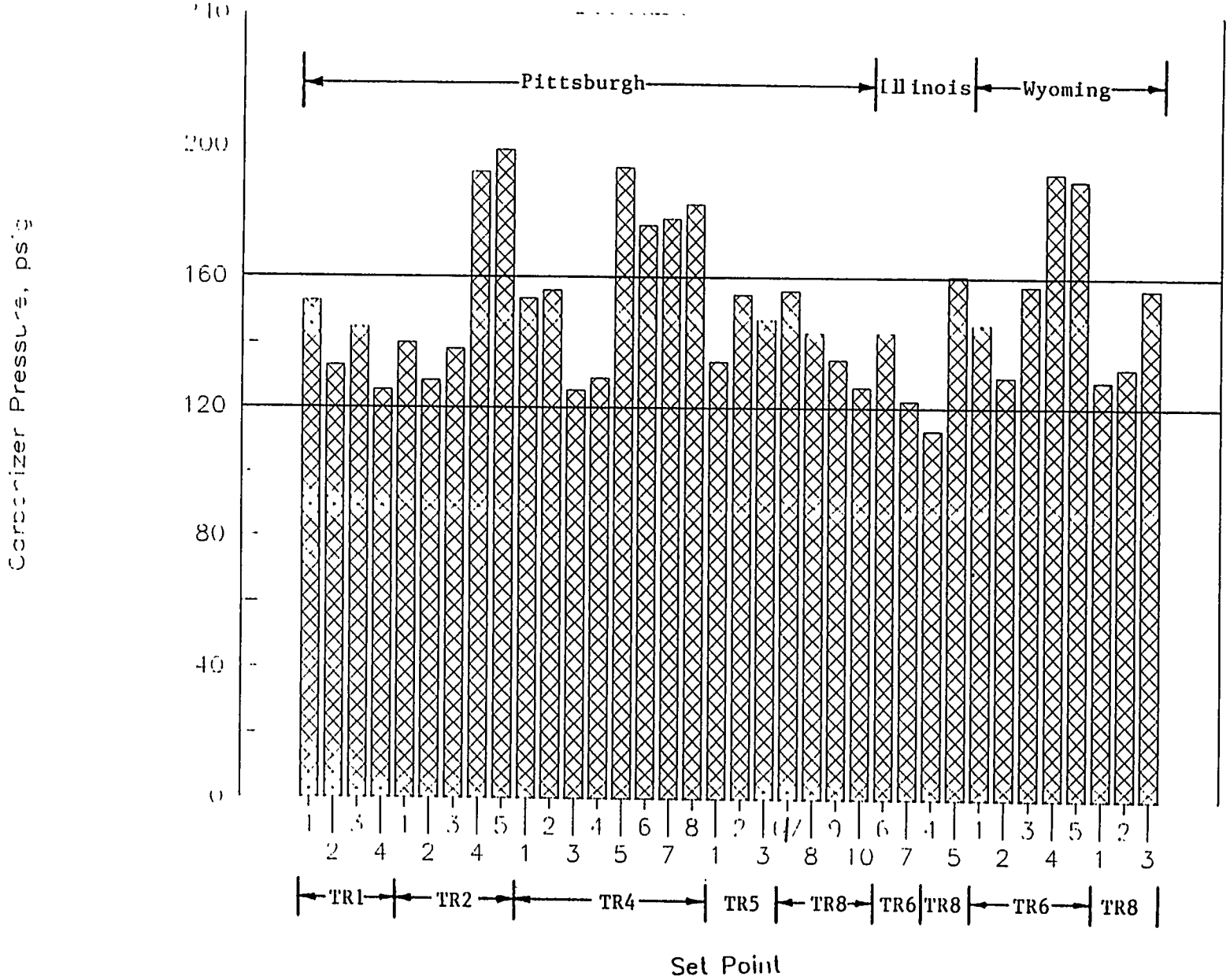

Figure 2.9. CARBONIZER OPERATING PRESSURE DURING STEADY-STATE PERIODS

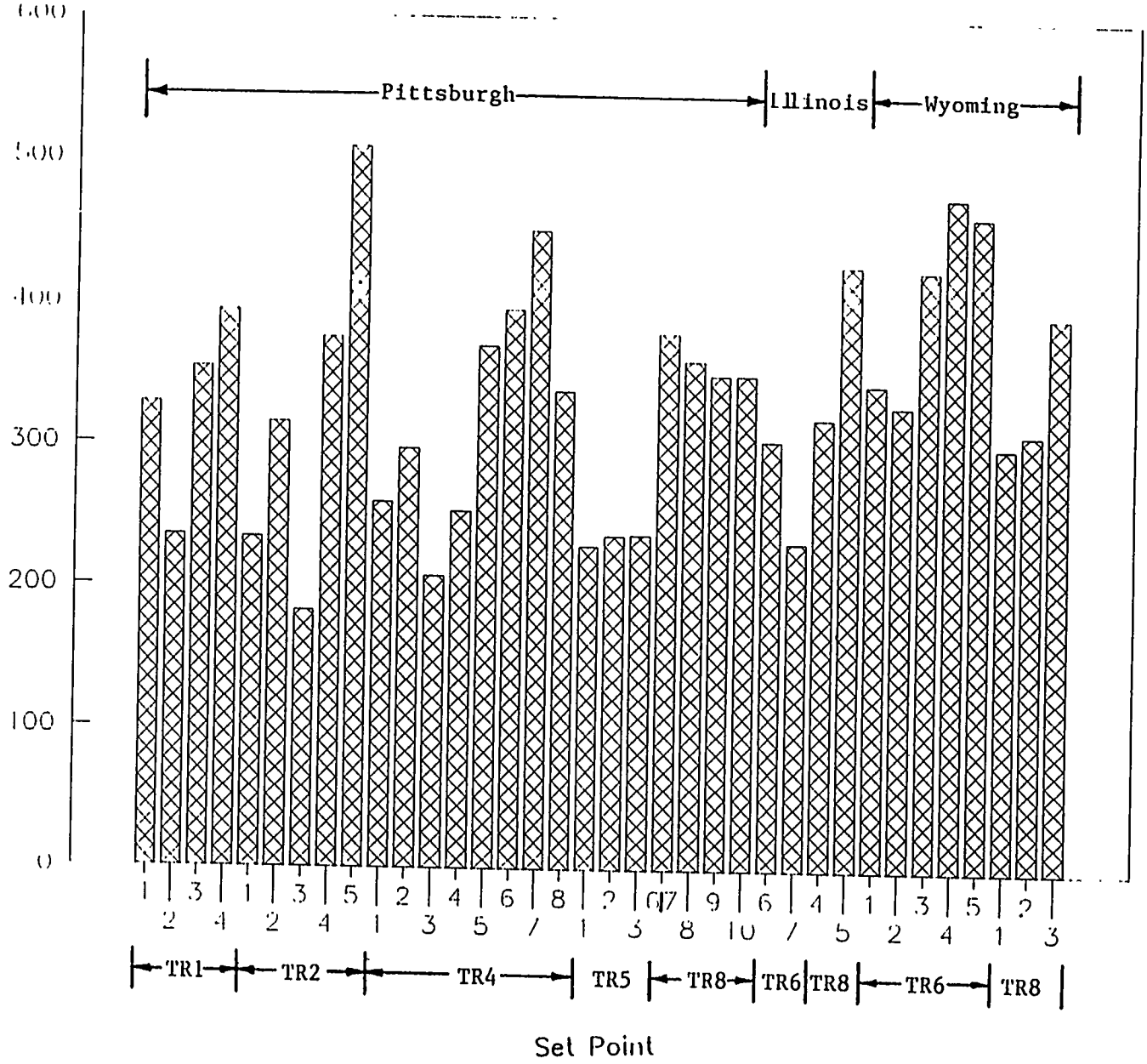

Figure 2.10. COAL FEED RATE DURING STEADY-STATE PERIODS

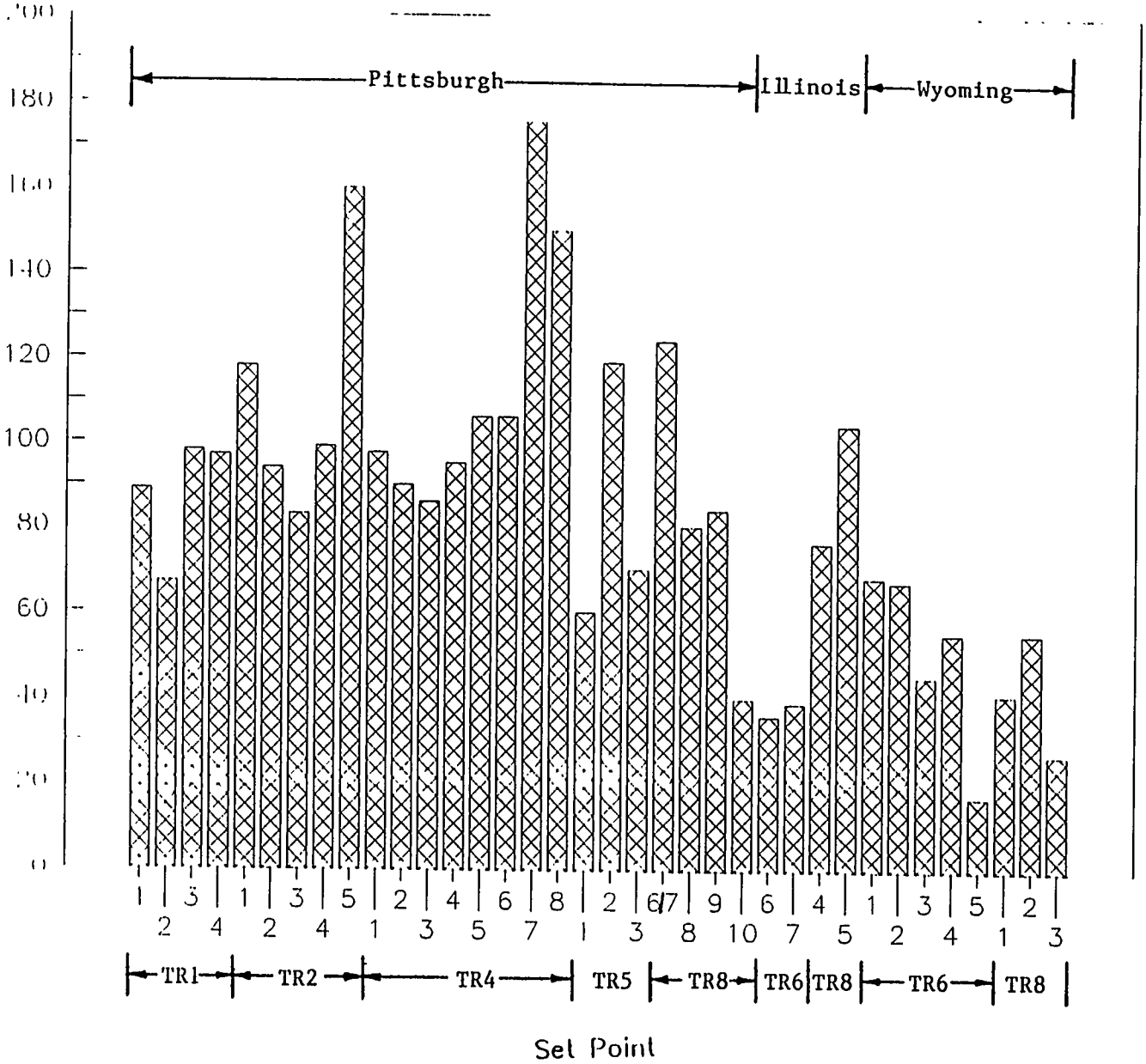

Figure 2.11. SORBENT FEED RATE DURING STEADY-STATE PERIODS

Table 2.5. SUMMARY OF STEADY-STATE PERIODS BY COAL AND SORBENT TYPE

	Coal	Sorbent	Total Set Points	Bed Temperature, °F		Pressure, psig		Coal Feed, lb/h		Sorbent Feed, lb/h	
				Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
A.	Jetting Fluidized-Bed Mode										
	Pittsburgh	Dolomite	23	1482	1797	125	199	182	508	40	182
	Illinois	Limestone	4	1599	1715	113	161	232	427	36	104
	Wyoming	Limestone	8	1476	1632	129	192	300	475	17	68
B.	Circulating Fluidized-Bed Mode										
	Pittsburgh	Limestone	4	1601	1706	56	114	232	525	25	143

Butte subbituminous coal and limestone feeds, during which the average bed temperature ranged from 1476° to 1632°F , the pressure ranged from 129 to 192 psig, the coal feed rate ranged from 300 to 475 lb/h, and the sorbent feed rate ranged from 17 to 68 lb/h.

Four set points were also achieved with Pittsburgh No. 8 bituminous coal and limestone feeds, while operating the carbonizer in a circulating fluidized-bed mode (Table 2.5), during which the average bed temperature ranged from 1601° to 1706°F, the pressure ranged from 56 to 114 psig, the coal feed rate ranged from 232 to 525 lb/h, and the sorbent feed rate ranged from 25 to 143 lb/h.

The data for each of these set points (steady-state periods) are given in this section. These data are arranged by fluidized-bed operating mode (jetting or circulating) and coal feed type. The compositions of the coal and sorbent feed for each of the 24 set points achieved while feeding Pittsburgh coal and operating in the jetting fluidized-bed mode are given in Table 2.6. These compositions are reported here as-measured and referred to as Raw (unreconciled) data. The minimum, maximum, average, and standard deviation for each of the measurements (showing variations among set points) are also given in this table. For example, the carbon content of the coal feed ranged from 68.99% to 75.70% with an average value of 71.55% and standard deviation of 2.23%. The sulfur content of the coal varied a lot; it ranged from 1.91% to 4.61% with an average value of 3.58% and standard deviation of 0.81%. Various measured and derived data for each of the 24 steady-state periods obtained with the Pittsburgh coal feed, while operating in the jetting fluidized-bed mode, are given in Table 2.7. The table also includes statistical information (minimum, maximum, average, and standard deviation) for each of the parameters. As shown in Table 2.7, the average bed temperature ranged from 1482 to 1791°F, the pressure ranged from 125 to 199 psig, the coal feed rate ranged from 182 to 508 lb/h, and the sorbent feed rate ranged from 40 to 182 lb/h. During several set points, steam was also fed to the carbonizer to simulate feeding coal as a paste in a commercial reactor.

The significance of standard deviation is shown in Figure 2.12. As shown in the figure, if the data are normally distributed then the probability is about 68.3% that a given value would agree with the average value within plus or minus one standard deviation value. Thus, the larger the value of the standard deviation, the larger would be the spread of data from its average value.

The coal and sorbent feed compositions for each of the 4 set points achieved while feeding Illinois coal are given in Table 2.8; the measured and derived data are given in Table 2.9. As shown in Table 2.9, the average bed temperature ranged from 1599° to 1715°F, the pressure ranged from 113 to 161 psig, the coal feed rate ranged from 232 to 427 lb/h, and the sorbent feed rate ranged from 36 to 104 lb/h.

The coal and sorbent feed compositions for each of the 8 set points achieved while feeding Wyoming coal are given in Table 2.10; the measured and derived data are given in Table 2.11. As shown in Table 2.11, the average bed temperature ranged from 1476° to 1632°F, the pressure ranged from 129 to 192 psig, the coal feed rate ranged from 300 to 475 lb/h, and the sorbent feed rate ranged from 17 to 68 lb/h.

The coal and sorbent feed compositions for each of the 4 set points achieved with the Pittsburgh coal feed while operating the carbonizer in the circulating fluidized-bed mode are given in Table 2.12; the measured and derived data are given in Table 2.13. As shown Table 2.13, the average bed temperature ranged from 1601° to 1706°F, the pressure ranged from 56 to 114 psig, the coal feed rate ranged from 232 to 525 lb/h, and the sorbent feed rate ranged from 25 to 143 lb/h.

Table 2.6. UNRECONCILED COMPOSITION OF COAL AND SORBENT FEEDS FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

Set Point	TR1-1	TR1-2	TR1-3	TR1-4	TR2-1	TR2-2	TR2-3	TR2-4	TR2-5	TR4-1	TR4-2	TR4-3
Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo
Moisture in Coal Feed, wt %	2.17	2.17	2.17	2.17	2.29	2.29	2.29	2.29	2.29	2.08	2.08	2.08
Coal (MF) Feed Composition, wt %												
C	68.993	68.993	68.993	68.993	69.786	69.786	69.786	69.786	69.786	73.064	73.064	73.064
H	4.680	4.680	4.680	4.680	4.695	4.695	4.695	4.695	4.695	4.775	4.775	4.775
O	6.442	6.442	6.442	6.442	6.197	6.197	6.197	6.197	6.197	5.376	5.376	5.376
N	1.895	1.895	1.895	1.895	1.968	1.968	1.968	1.968	1.968	1.942	1.942	1.942
S	3.244	3.244	3.244	3.244	4.611	4.611	4.611	4.611	4.611	3.427	3.427	3.427
Ash	14.746	14.746	14.746	14.746	12.743	12.743	12.743	12.743	12.743	11.416	11.416	11.416
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
HHV, Btu/lb (MF)	12569	12569	12569	12569	12848	12848	12848	12848	12848	13047	13047	13047
Sorbent Feed Composition, wt %												
CaCO3	56.417	56.417	56.417	56.417	55.123	55.123	55.123	55.123	55.123	53.441	53.441	53.441
MgCO3	41.539	41.539	41.539	41.539	43.773	43.773	43.773	43.773	43.773	45.534	45.534	45.534
CaS*	0.488	0.488	0.488	0.488	0.351	0.351	0.351	0.351	0.351	0.378	0.378	0.378
Inerts	1.556	1.556	1.556	1.556	0.753	0.753	0.753	0.753	0.753	0.647	0.647	0.647
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

* Sulfur in Sorbent is reported as CaS.

Table 2.6 (cont.). UNRECONCILED COMPOSITION OF COAL AND SORBENT FEEDS FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

Set Point	TR4-4	TR4-5	TR4-6	TR4-7	TR4-8	TR5-1	TR5-2	TR5-3	TR8-67	TR8-8	TR8-9	TR8-10
Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	LV Lime	PR Dolo	PR Dolo	PR Dolo	PR Dolo
Moisture in Coal Feed, wt %	2.08	2.08	2.08	2.08	2.08	1.44	1.44	1.44	2.82	2.82	2.82	2.82
Coal (MF) Feed Composition, wt %												
C	73.064	73.064	73.064	73.064	73.064	75.699	75.699	75.699	70.187	70.187	70.187	70.187
H	4.775	4.775	4.775	4.775	4.775	4.748	4.748	4.748	4.329	4.329	4.329	4.329
O	5.376	5.376	5.376	5.376	5.376	4.893	4.893	4.893	5.728	5.728	5.728	5.728
N	1.942	1.942	1.942	1.942	1.942	2.077	2.077	2.077	1.804	1.804	1.804	1.804
S	3.427	3.427	3.427	3.427	3.427	1.910	1.910	1.910	4.188	4.188	4.188	4.188
Ash	11.416	11.416	11.416	11.416	11.416	10.673	10.673	10.673	13.764	13.764	13.764	13.764
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
HHV, Btu/lb (MF)	13047	13047	13047	13047	13047	13289	13289	13289	12767	12767	12767	12767
Sorbent Feed Composition, wt %												
CaCO3	53.441	53.441	53.441	53.441	53.441	64.217	64.217	96.663	57.144	57.144	57.144	57.144
MgCO3	45.534	45.534	45.534	45.534	45.534	34.914	34.914	2.698	41.574	41.574	41.574	41.574
CaS*	0.378	0.378	0.378	0.378	0.378	0.463	0.463	0.303	0.498	0.498	0.498	0.498
Inerts	0.647	0.647	0.647	0.647	0.647	0.406	0.406	0.336	0.784	0.784	0.784	0.784
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

* Sulfur in Sorbent is reported as CaS.

Table 2.6 (cont.). UNRECONCILED COMPOSITION OF COAL AND SORBENT FEEDS FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

Set Point	Minimum	Maximum	Average	Std Dev
Coal	----Pittsburgh No. 8 Bituminous-----			
Sorbent	Plum Run Dolomite/Longview Limestone			
Moisture in Coal Feed, wt %	1.44	2.82	2.18	0.38
Coal (MF) Feed Composition, wt %				
C	68.993	75.699	71.552	2.228
H	4.329	4.775	4.665	0.155
O	4.893	6.442	5.723	0.509
N	1.804	2.077	1.933	0.077
S	1.910	4.611	3.580	0.811
Ash	10.673	14.746	12.546	1.388
Total	100.000	100.000	100.000	
HHV, Btu/lb (MF)	12569	13289	12909	219
Sorbent Feed Composition**, wt %				
CaCO3	53.441	64.217	55.905	2.927
MgCO3	34.914	45.534	42.844	2.958
CaS*	0.351	0.498	0.420	0.061
Inerts	0.406	1.556	0.831	0.347
Total	100.000	100.000	100.000	

* Sulfur in Sorbent is reported as CaS.

** Minimum, Maximum, Average, and Standard Deviation do not include Set Point TR5-3, in which Limestone was fed.

Table 2.7. UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

Set Point	TR1-1	TR1-2	TR1-3	TR1-4	TR2-1	TR2-2	TR2-3	TR2-4	TR2-5	TR4-1	TR4-2	TR4-3
1 Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
2 Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo
3 Begin Date	11/20/91	11/21/91	11/21/91	11/21/91	12/19/91	12/19/91	12/20/91	12/20/91	12/20/91	3/10/92	3/11/92	3/12/92
4 Begin Clock Time, hours	0300	0200	1000	2100	0100	1300	0100	1000	1600	2030	0430	0230
5 End Clock Time, hours	0700	0600	1400	2330	0500	1700	0500	1400	1800	0030	0830	0630
6 Steady-State Period Duration, h	4	4	4	2.5	4	4	4	4	2	4	4	4
7 Reactor Pressure, psig	152.6	132.9	144.7	125.4	139.8	128.3	138.1	191.8	198.6	153.3	155.9	125.2
8 Orifice Pressure, psig	150.0	130.4	142.0	123.1	137.1	125.7	135.3	187.9	194.5	150.1	152.6	122.8
9 Average Bed Temp, F	1584	1681	1608	1482	1698	1598	1797	1784	1679	1663	1608	1708
10 Bed Temp (@7.5 ft), F	1611	1696	1636	1512	1700	1605	1794	1793	1692	1664	1605	1710
11 Freeboard Temp (@22.5 ft), F	1553	1651	1581	1440	1652	1567	1705	1738	1675	1626	1573	1643
12 Freeboard Temp (@27.5 ft), F	1506	1591	1532	1394	1606	1504	1629	1669	1590	1583	1531	1591
13 Orifice Temperature, F	1258	1267	1269	1163	1323	1255	1324	1437	1400	1326	1292	1311
14 Coal Feed Rate, lb/h	329.0	235.0	354.0	395.0	234.0	315.0	182.0	376.0	508.0	259.0	297.0	207.0
15 Sorbent Feed Rate, lb/h	89.0	67.0	98.0	97.0	118.0	94.0	83.0	99.0	160.0	97.6	90.0	86.0
16 Bed Drain Rate, lb/h	74.4	50.7	109.4	88.0	65.7	151.3	29.3	136.1	165.2	59.4	82.2	65.4
17 First Cyclone Rate, lb/h	78.2	72.3	100.9	97.6	97.5	72.8	70.5	82.4	134.1	66.5	81.4	77.3
18 Second Cyclone Rate, lb/h	127.8	43.1	24.0	93.7	4.0	7.1	3.1	2.6	5.7	3.8	4.1	6.5
19 Baghouse Fines Rate, lb/h	0.0	0.0	0.0	0.0	5.0	11.9	8.2	18.8	14.5	15.2	7.7	4.7
20 Total Drains Rate, lb/h	280.4	166.1	234.3	279.3	172.2	243.1	111.1	239.9	319.5	144.9	175.4	153.9
21 Steam Feed Rate, lb/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.8	118.0	96.0
22 Air Feed Rate (Measured), lb/h	627.9	586.5	658.5	559.8	716.7	609.5	696.7	984.5	979.9	684.0	656.0	625.5
23 Air Feed Rate (Ar Forced), lb/h	460.9	487.1	530.2	446.7	586.8	525.7	596.9	847.1	849.6	588.2	556.2	518.3
24 N2 Purges to Carbonizer, lb/h	413.1	327.9	300.9	194.9	388.8	390.4	382.9	389.9	412.2	308.6	293.0	129.9
25 N2 Purges to Cyclones + O.M., lb/h	135.6	144.4	140.1	144.9	54.6	54.4	52.4	40.2	36.8	33.4	33.8	37.0
26 N2 Purge to Spray Tower, lb/h	194.9	211.3	209.2	212.4	204.8	205.8	210.6	197.1	194.1	173.2	173.2	164.2
27 Total N2 Purges to system, lb/h	743.6	683.6	650.2	552.2	648.2	650.6	645.9	627.2	643.1	515.2	500.0	331.1
28 Reactor Exit Gas, lb/h	1073.7	921.1	1006.6	885.7	1055.0	977.7	1048.2	1381.8	1448.5	1156.2	1157.4	935.1
29 Orifice Gas, lb/h	1209.3	1065.4	1146.8	1030.6	1109.6	1032.1	1100.6	1422.0	1485.4	1189.5	1191.2	972.2
30 Demister Gas, lb/h	1404.2	1276.8	1356.0	1242.9	1314.3	1237.8	1311.1	1619.1	1679.5	1362.8	1364.4	1136.4
31 CH4 in Demister Gas, mol %	1.681	0.903	1.889	2.391	1.251	2.221	0.575	1.683	2.423	1.120	1.485	0.751
32 C2H4 in Demister Gas, mol %	0.070	0.019	0.073	0.149	0.009	0.149	0.000	0.002	0.021	0.009	0.029	0.002
33 C2H6 in Demister Gas, mol %	0.026	0.000	0.028	0.225	0.005	0.632	0.010	0.000	0.024	0.005	0.020	0.000
34 Demister Gas HHV, Btu/SCF	49.8	45.6	59.3	67.0	51.8	73.1	41.4	69.6	73.4	48.9	56.3	53.8
35 Bed Density, lb/ft3	14.41	13.70	13.43	15.23	15.45	12.61	14.39	13.53	14.56	17.17	16.17	21.33

Table 2.7 (cont.). UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

Set Point	TR4-4	TR4-5	TR4-6	TR4-7	TR4-8	TR5-1	TR5-2	TR5-3	TR8-67	TR8-8	TR8-9	TR8-10
1 Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
2 Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	LV Lime	PR Dolo	PR Dolo	PR Dolo	PR Dolo
3 Begin Date	3/12/92	3/13/92	3/13/982	3/13/92	3/14/92	3/24/92	3/24/92	3/25/92	6/14/92	6/16/92	6/16/92	6/16/92
4 Begin Clock Time, hours	1600	0530	1300	2200	0200	1100	1900	0500	2100	0200	0800	1430
5 End Clock Time, hours	2000	0930	1700	0200	0600	1500	2300	0900	0100	0600	1230	1930
6 Steady-State Period Duration, h	4	4	4	4	4	4	4	4	4	4	4.5	5
7 Reactor Pressure, psig	129.1	193.2	175.8	177.9	182.2	134.3	154.8	147.4	156.0	143.5	135.0	126.5
8 Orifice Pressure, psig	126.6	189.3	172.2	174.7	178.8	131.8	152.1	144.7	155.2	142.5	134.2	125.8
9 Average Bed Temp, F	1607	1720	1713	1601	1618	1693	1701	1706	1699	1707	1713	1729
10 Bed Temp (@7.5 ft), F	1607	1729	1722	1614	1623	1699	1706	1711	1698	1703	1707	1724
11 Freeboard Temp (@22.5 ft), F	1568	1691	1681	1582	1600	1653	1662	1667	1675	1683	1683	1697
12 Freeboard Temp (@27.5 ft), F	1524	1638	1602	1547	1559	1610	1619	1621	1635	1611	1603	1614
13 Orifice Temperature, F	1268	1429	1409	1347	1367	1324	1353	1364	1232	1225	1206	1199
14 Coal Feed Rate, lb/h	253.0	370.0	396.0	450.0	338.0	229.0	236.0	237.0	380.0	360.0	350.0	350.0
15 Sorbent Feed Rate, lb/h	95.0	106.0	106.0	182.0	150.0	60.0	119.0	70.0	124.0	80.0	84.0	40.0
16 Bed Drain Rate, lb/h	85.6	97.2	112.4	195.9	169.3	45.3	62.9	52.4	82.0	67.5	73.6	93.9
17 First Cyclone Rate, lb/h	49.8	84.6	71.2	64.6	90.6	40.3	62.3	48.2	114.5	93.9	68.2	88.3
18 Second Cyclone Rate, lb/h	5.4	3.2	4.3	25.6	3.3	3.6	16.0	34.1	32.3	10.9	31.6	1.5
19 Baghouse Fines Rate, lb/h	16.5	23.1	18.9	16.9	18.0	6.6	6.4	16.6	41.1	35.1	32.2	16.8
20 Total Drains Rate, lb/h	157.3	208.1	206.8	303.0	281.2	95.8	147.6	151.3	269.9	207.4	205.6	200.5
21 Steam Feed Rate, lb/h	77.4	140.8	84.8	50.8	40.0	90.1	89.8	100.0	99.1	90.0	55.0	55.0
22 Air Feed Rate (Measured), lb/h	564.7	899.9	820.1	772.7	750.9	605.5	698.4	672.1	916.8	837.7	800.4	737.9
23 Air Feed Rate (Ar Forced), lb/h	468.8	766.3	734.4	719.6	730.7	549.2	718.1	616.1	711.1	665.8	643.9	553.9
24 N2 Purges to Carbonizer, lb/h	251.8	170.5	164.7	302.1	303.3	204.6	199.4	213.4	263.0	275.0	277.4	264.0
25 N2 Purges to Cyclones + O.M., lb/h	37.3	27.4	38.8	37.5	35.9	33.1	30.8	13.9	24.9	23.1	22.9	22.5
26 N2 Purge to Spray Tower, lb/h	165.5	149.6	148.5	148.2	135.9	187.0	174.8	180.7	24.2	55.1	59.1	21.2
27 Total N2 Purges to system, lb/h	454.6	347.5	352.0	487.8	475.1	424.7	405.0	408.0	312.1	353.2	359.4	307.7
28 Reactor Exit Gas, lb/h	977.8	1371.5	1257.0	1306.0	1328.7	1001.3	1151.1	1110.3	1465.0	1358.8	1296.8	1210.1
29 Orifice Gas, lb/h	1015.1	1399.0	1295.8	1343.5	1364.6	1034.4	1181.8	1124.2	1489.9	1381.9	1319.7	1232.6
30 Demister Gas, lb/h	1180.6	1548.6	1444.3	1491.7	1500.5	1221.4	1356.7	1304.9	1514.1	1436.9	1378.8	1253.8
31 CH4 in Demister Gas, mol %	1.378	1.287	1.767	1.946	2.049	0.829	1.312	0.946	1.320	1.287	1.367	1.745
32 C2H4 in Demister Gas, mol %	0.049	0.000	0.002	0.045	0.027	0.002	0.000	0.000	0.008	0.008	0.006	0.008
33 C2H6 in Demister Gas, mol %	0.020	0.011	0.000	0.030	0.018	0.000	0.000	0.000	0.008	0.010	0.008	0.013
34 Demister Gas HHV, Btu/SCF	54.3	72.9	73.1	64.6	64.9	57.2	55.2	53.2	65.4	63.6	65.4	72.3
35 Bed Density, lb/ft3	17.31	13.58	14.44	14.04	16.49	11.72	11.88	12.71	16.06	16.68	18.81	16.48

Table 2.7 (cont.). UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

Set Point	Minimum	Maximum	Average	Std Dev
1 Coal	----Pittsburgh No. 8 Bituminous-----			
2 Sorbent	Plum Run Dolomite/Longview Limestone			
3 Begin Date				
4 Begin Clock Time, hours	(No. of Set Points = 24)			
5 End Clock Time, hours				
6 Steady State Period Duration, h	2.0	5.0	3.9	0.6
7 Reactor Pressure, psig	125.2	198.6	151.8	22.6
8 Orifice Pressure, psig	122.8	134.5	149.1	22.0
9 Average Bed Temp, F	1482	1797	1671	69
10 Bed Temp (@7.5 ft), F	1512	1794	1678	63
11 Freeboard Temp (@22.5 ft), F	1440	1738	1635	64
12 Freeboard Temp (@27.5 ft), F	1394	1669	1580	58
13 Orifice Temperature, F	1163	1437	1306	73
14 Coal Feed Rate, lb/h	182.0	508.0	318.3	80.4
15 Sorbent Feed Rate, lb/h	40.0	182.0	99.8	30.8
16 Bed Drain Rate, lb/h	29.3	195.9	92.3	42.1
17 First Cyclone Rate, lb/h	40.3	134.1	79.5	20.6
18 Second Cyclone Rate, lb/h	1.5	127.8	20.7	30.1
19 Baghouse Fines Rate, lb/h	0.0	41.1	13.9	10.9
20 Total Drains Rate, lb/h	95.8	319.5	206.4	60.0
21 Steam Feed Rate, lb/h	0.0	140.8	51.5	45.3
22 Air Feed Rate (Measured), lb/h	559.8	984.5	727.6	123.2
23 Air Feed Rate (Ar Forced), lb/h	446.7	849.6	619.7	115.6
24 N2 Purges to Carbonizer, lb/h	129.9	413.1	284.2	81.5
25 N2 Purges to Cyclones + O.M., lb/h	13.9	144.9	52.3	40.9
26 N2 Purge to Spray Tower, lb/h	21.2	212.4	158.4	57.7
27 Total N2 Purges to system, lb/h	307.7	743.6	494.9	134.4
28 Reactor Exit Gas, lb/h	885.7	1465.0	1161.7	173.4
29 Orifice Gas, lb/h	972.2	1489.9	1214.1	154.2
30 Demister Gas, lb/h	1136.4	1679.5	1372.4	134.3
31 CH4 in Demister Gas, mol %	0.575	2.423	1.484	0.497
32 C2H4 in Demister Gas, mol %	0.000	0.149	0.029	0.042
33 C2H6 in Demister Gas, mol %	0.000	0.632	0.046	0.130
34 Demister Gas HHV, Btu/SCF	41.4	73.4	60.5	9.4
35 Bed Density, lb/ft3	11.72	21.33	15.09	2.20

Table 2.7 (cont.). UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

	Set Point	TR1-1	TR1-2	TR1-3	TR1-4	TR2-1	TR2-2	TR2-3	TR2-4	TR2-5	TR4-1	TR4-2	TR4-3
	Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
	Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo
36	Bed Height, ft	25.7	17.7	25.8	26.5	15.6	16.9	16.5	17.0	22.9	15.1	16.0	14.9
37	Bed Weight, lb	305.62	178.99	286.69	336.30	176.50	156.88	174.43	168.89	265.90	188.35	188.94	231.19
38													
39	Avg Bed T - FB T (@22.5 ft), F	31	30	27	42	46	31	92	46	4	37	35	65
40	Avg Bed T - FB T (@27.5 ft), F	78	90	76	88	92	94	168	115	89	80	77	117
41	Coal Feed (MF), lb/h	321.85	229.89	346.31	386.42	228.65	307.80	177.84	367.41	496.39	253.61	290.81	202.69
42	Carbon in Coal Feed, lb/h	222.06	158.61	238.93	266.60	159.57	214.80	124.11	256.40	346.41	185.29	212.48	148.09
43	Air(Measured)/Coal in Feed, lb/lb	1.909	2.496	1.860	1.417	3.063	1.935	3.828	2.618	1.929	2.641	2.209	3.022
44	Feed Oxygen/Carbon in Feed, mol/mol	0.246	0.322	0.240	0.183	0.391	0.247	0.489	0.334	0.246	0.321	0.269	0.368
45	Feed Steam/Carbon in Feed, mol/mol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.179	0.370	0.432
46	Feed(Steam+Moist)/C in Feed,mol/mol	0.021	0.021	0.021	0.021	0.022	0.022	0.022	0.022	0.022	0.198	0.389	0.451
47	Total Char/MF Coal Feed, lb/lb	0.6783	0.5719	0.5290	0.5356	0.5308	0.6772	0.4160	0.4898	0.5258	0.3554	0.3480	0.4879
48	Orifice Gas/Coal Feed, lb/lb	3.676	4.534	3.240	2.609	4.742	3.276	6.047	3.782	2.924	4.593	4.011	4.696
49	Purge-Free Gas Make/Coal Feed,lb/lb	2.008	2.524	1.994	1.749	2.847	1.864	3.655	2.638	2.040	3.272	2.901	3.890
50	Purge-free Gas Make/Coal Feed,SCF/lb	29.490	36.726	29.031	26.044	39.690	27.276	50.266	37.628	28.960	46.883	44.383	58.705
51	CH4 Yield, % of Feed Carbon	4.736	3.224	4.776	5.043	4.481	5.694	2.623	4.704	5.185	3.659	4.413	2.670
52	C2H6 Yield, % of Feed Carbon	0.146	0.000	0.143	0.948	0.033	3.239	0.093	0.000	0.105	0.031	0.119	0.000
53	C2H4 Yield, % of Feed Carbon	0.397	0.136	0.367	0.629	0.067	0.763	0.000	0.014	0.088	0.062	0.171	0.015
54	HC Yield, % of Feed Carbon	5.280	3.360	5.286	6.619	4.581	9.696	2.716	4.718	5.378	3.752	4.703	2.685
55	Carbon Conv (Based on Solids), %	32.30	39.31	45.14	32.65	49.84	27.34	63.44	52.68	42.49	65.56	66.73	53.24
56	Carbon Conv (Based on Gas), %	31.67	40.55	33.93	26.29	50.25	36.16	59.25	47.64	36.16	41.33	35.61	44.07
57	Diff in C Conv (Solids-Gas), %	0.63	-1.24	11.21	6.36	-0.41	-8.82	4.19	5.04	6.33	24.23	31.12	9.17
58													
59	H2O Content in Freeboard Gas, mol %	11.52	10.38	11.56	14.99	8.70	11.60	7.30	6.75	9.50	12.05	22.05	22.70
60	Water-Gas Shift Temperature, F	1910	2049	1940	1792	2078	1955	2299	1905	2166	1945	1899	2127
61	WGS Temp - Avg Bed Temp, F	326	368	332	310	380	357	502	121	487	282	291	419
62	WGS Temp - Freebd Temp(@22.5 ft), F	357	398	359	352	426	388	594	167	491	319	326	484
63	WGS Temp - Freebd Temp(@27.5 ft), F	404	458	408	398	472	451	670	236	576	362	368	536
64													
65	Coal Nitrogen Released, %	29.37	46.10	45.56	30.62	49.49	30.38	64.75	58.19	44.83	64.51	66.35	53.39
66	Released Nitrogen Going to NH3, %	62.09	42.95	36.36	35.58	13.31	52.51	21.28	54.96	58.44	51.63	61.03	27.36
67	Coal Nitrogen Going to NH3, %	18.24	19.80	16.93	10.90	6.59	15.95	13.78	31.99	26.20	33.30	40.49	14.61
68	NH3 Conc. in Freeboard, ppm	1970	1790	2060	1670	550	1890	880	3210	3380	2680	3590	1100

Table 2.7 (cont.). UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

	Set Point	TR4-4	TR4-5	TR4-6	TR4-7	TR4-8	TR5-1	TR5-2	TR5-3	TR8-67	TR8-8	TR8-9	TR8-10
	Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
	Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	LV Lime	PR Dolo	PR Dolo	PR Dolo	PR Dolo
36	Bed Height, ft	15.9	18.8	18.7	23.4	17.2	17.5	18.2	16.8	18.5	16.1	15.5	17.1
37	Bed Weight, lb	201.39	189.09	199.37	263.62	208.81	151.04	159.23	156.99	219.04	197.22	212.55	207.02
38													
39	Avg Bed T - FB T (@22.5 ft), F	39	29	32	19	18	40	39	39	24	24	30	32
40	Avg Bed T - FB T (@27.5 ft), F	83	82	111	54	59	83	82	85	64	96	110	115
41	Coal Feed (MF), lb/h	247.73	362.29	387.75	440.63	330.96	225.71	232.61	233.60	369.30	349.86	340.14	340.14
42	Carbon in Coal Feed, lb/h	181.00	264.70	283.30	321.94	241.81	170.86	176.09	176.83	259.20	245.56	238.73	238.73
43	Air(Measured)/Coal in Feed, lb/lb	2.232	2.432	2.071	1.717	2.222	2.644	2.959	2.836	2.413	2.327	2.287	2.108
44	Feed Oxygen/Carbon in Feed, mol/mol	0.272	0.296	0.252	0.209	0.270	0.308	0.345	0.331	0.308	0.297	0.292	0.269
45	Feed Steam/Carbon in Feed, mol/mol	0.285	0.355	0.200	0.105	0.110	0.351	0.340	0.377	0.255	0.244	0.154	0.154
46	Feed(Steam+Moist)/C in Feed,mol/mol	0.304	0.374	0.219	0.125	0.130	0.364	0.353	0.390	0.282	0.272	0.181	0.181
47	Total Char/MF Coal Feed, lb/lb	0.4049	0.3242	0.2908	0.4757	0.6341	0.2902	0.4789	0.4178	0.5526	0.4837	0.5159	0.5282
48	Orifice Gas/Coal Feed, lb/lb	4.012	3.781	3.272	2.985	4.037	4.517	5.008	4.744	3.921	3.839	3.771	3.522
49	Purge-Free Gas Make/Coal Feed,lb/lb	2.870	3.246	2.758	2.231	3.034	3.479	4.032	3.785	3.163	3.011	2.913	2.703
50	Purge-Free Gas Make/Coal Feed,SCF/lb	43.512	48.613	40.871	32.884	44.747	52.622	58.976	55.628	48.099	45.872	44.129	42.297
51	CH4 Yield, % of Feed Carbon	4.135	3.492	4.135	4.095	5.781	2.733	4.577	3.168	3.626	3.532	3.680	4.388
52	C2H6 Yield, % of Feed Carbon	0.122	0.060	0.000	0.126	0.102	0.000	0.000	0.000	0.044	0.057	0.046	0.067
53	C2H4 Yield, % of Feed Carbon	0.295	0.000	0.011	0.188	0.153	0.016	0.000	0.000	0.044	0.046	0.034	0.040
54	HC Yield, % of Feed Carbon	4.552	3.552	4.145	4.409	6.036	2.749	4.577	3.168	3.715	3.636	3.760	4.495
55	Carbon Conv (Based on Solids), %	56.41	65.11	67.28	52.81	33.82	71.50	60.48	55.92	43.66	51.02	46.05	41.73
56	Carbon Conv (Based on Gas), %	34.42	44.76	37.95	27.66	38.09	42.37	45.26	46.24	36.54	36.72	36.24	32.70
57	Diff in C Conv (Solids-Gas), %	21.99	20.35	29.33	25.15	-4.27	29.13	15.22	9.68	7.12	14.3	9.81	9.03
58													
59	H2O Content in Freeboard Gas, mol %	20.40	18.15	16.60	15.30	15.00	17.90	17.80	17.80	22.40	21.40	18.90	23.40
60	Water-Gas Shift Temperature, F	1867	1857	1899	1840	1657	1910	2066	2130	2189	2179	2212	2370
61	WGS Temp - Avg Bed Temp, F	260	137	186	239	39	217	365	424	490	472	499	641
62	WGS Temp - Freebd Temp(@22.5 ft), F	299	166	218	258	57	257	404	463	514	496	529	673
63	WGS Temp - Freebd Temp(@27.5 ft), F	343	219	297	293	98	300	447	509	554	568	609	756
64													
65	Coal Nitrogen Released, %	55.48	63.40	67.62	50.00	38.29	77.12	67.85	63.12	61.55	62.55	60.25	58.24
66	Released Nitrogen Going to NH3, %	40.53	27.40	14.67	26.53	40.73	40.47	42.95	45.02	19.48	19.36	23.73	23.25
67	Coal Nitrogen Going to NH3, %	22.49	17.37	9.92	13.26	15.60	31.21	29.14	28.42	11.99	12.11	14.30	13.54
68	NH3 Conc. in Freeboard, ppm	2040	1660	1100	1630	1410	2190	2260	2330	990	1020	1240	1220

Table 2.7 (cont.). UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

	Set Point	Minimum	Maximum	Average	Std Dev
	Coal	----Pittsburgh No. 8 Bituminous-----			
	Sorbent	Plum Run Dolomite/Longview Limestone			
36	Bed Height, ft	14.9	26.5	18.5	3.5
37	Bed Weight, lb	151.04	336.30	209.34	48.28
38					
39	Avg Bed T - FB T (@22.5 ft), F	4.0	92.0	35.5	16.4
40	Avg Bed T - FB T (@27.5 ft), F	54.0	168.0	91.2	23.0
41	Coal Feed (MF), lb/h	177.84	496.39	311.27	78.23
42	Carbon in Coal Feed, lb/h	124.11	346.41	222.17	54.12
43	Air(Measured)/Coal in Feed, lb/lb	1.417	3.828	2.382	0.510
44	Feed Oxygen/Carbon in Feed, mol/mol	0.183	0.489	0.296	0.062
45	Feed Steam/Carbon in Feed, mol/mol	0.000	0.432	0.163	0.150
46	Feed(Steam+Moist)/C in Feed,mol/mol	0.021	0.451	0.184	0.149
47	Total Char/MF Coal Feed, lb/lb	0.2902	0.6783	0.4809	0.1065
48	Orifice Gas/Coal Feed, lb/lb	2.609	6.047	3.981	0.763
49	Purge-Free Gas Make/Coal Feed,lb/lb	1.749	4.032	2.859	0.637
50	Purge-Free Gas Make/Coal Feed,SCF/lb	26.044	58.976	42.222	9.521
51	CH4 Yield, % of Feed Carbon	2.623	5.781	4.106	0.872
52	C2H6 Yield, % of Feed Carbon	0.000	3.239	0.228	0.654
53	C2H4 Yield, % of Feed Carbon	0.000	0.763	0.147	0.201
54	HC Yield, % of Feed Carbon	2.685	9.696	4.482	1.473
55	Carbon Conv (Based on Solids), %	27.34	71.50	50.69	12.25
56	Carbon Conv (Based on Gas), %	26.29	59.25	39.24	7.24
57	Diff in C Conv (Solids-Gas), %	-8.82	31.12	11.44	10.88
58					
59	H2O Content in Freeboard Gas, mol %	6.75	23.40	15.59	5.04
60	Water-Gas Shift Temperature, F	1657	2370	2010	169
61	WGS Temp - Avg Bed Temp, F	39	641	339	139
62	WGS Temp - Freebd Temp(@22.5 ft), F	57	673	375	142
63	WGS Temp - Freebd Temp(@27.5 ft), F	98	756	431	149
64					
65	Coal Nitrogen Released, %	29.37	77.12	54.54	12.71
66	Released Nitrogen Going to NH3, %	13.31	62.09	36.73	14.72
67	Coal Nitrogen Going to NH3, %	6.59	40.49	19.51	8.64
68	NH3 Conc. in Freeboard, ppm	550	3590	1828	785

Table 2.7 (cont.). UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

	Set Point	TR1-1	TR1-2	TR1-3	TR1-4	TR2-1	TR2-2	TR2-3	TR2-4	TR2-5	TR4-1	TR4-2	TR4-3
	Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
	Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo
69	Actual Partial Press. of CO2, psia	12.39	10.86	13.81	12.35	13.93	11.84	11.88	15.75	18.70	14.46	15.30	12.93
70	Equilib. PCO2 (Squires), psia	9.25	20.68	11.23	3.76	21.71	9.75	43.15	42.28	20.76	16.89	10.67	24.01
71	Equilib. PCO2 (IGT/B&K), psia	19.78	45.21	24.14	7.84	47.54	20.87	96.32	94.32	45.39	36.71	22.89	52.72
72	Feed Ca/Feed S Ratio, mol/mol	1.54	1.62	1.58	1.40	1.98	1.17	1.79	1.03	1.23	1.92	1.55	2.12
73	Feed Ca/Released S Ratio, mol/mol	4.78	3.45	3.25	2.75	2.46	1.84	2.24	1.33	1.54	2.48	2.27	2.62
74	H2S Conc. in Freeboard, ppm	240	356	187	251	1860	648	552	108	215	142	955	169
75	Equilib. H2S Conc. (CaO Rxn), ppm	174	217	189	158	185	179	204	188	199	232	353	503
76	Approach to Equilib. Capture, %	97.3	95.2	100.0	98.4	75.0	93.7	93.3	101.0	99.9	102.0	86.2	107.7
77	Equilib. H2S Conc. (CaCO3 Rxn), ppm	233	114	232	519	119	218	56	70	179	199	506	271
78	Approach to Equilib. Capture, %	99.7	92.0	101.0	105.1	74.3	94.2	90.8	99.5	99.7	101.3	89.4	102.2
79	Ca Closure (out/in), %	53.6	63.4	47.3	101.1	51.1	40.2	53.8	69.8	40.5	80.4	108.3	99.2
80	S Closure (out/in), %	131.7	118.4	96.3	82.7	85.3	72.6	84.8	81.7	52.3	70.6	129.1	81.5
81	Sorbent Ca Conversion/Utilization,%	75.94	60.00	59.27	22.89	44.51	66.66	59.45	81.04	61.96	30.30	50.45	28.89
82	Coal Sulfur Released, %	32.24	47.03	48.58	50.89	80.27	63.67	79.71	77.46	79.99	77.62	68.10	81.05
83	Sulfur in Freeboard Gas,% S in Coal	2.97	5.27	2.01	2.19	21.69	5.36	8.16	1.05	1.16	2.25	13.88	2.86
84	S in Disch Solids, % of Tot S Feed	128.82	113.26	94.32	80.51	63.96	67.25	76.78	80.63	50.74	68.40	115.46	78.67
85	Sulfur Capture by Sorbent, % Coal S	61.58	60.56	42.79	31.07	43.59	30.58	56.12	57.92	30.19	45.42	83.80	59.27
86	S in Product Gas, % of Feed S	2.97	5.27	2.01	2.19	21.69	5.36	8.16	1.05	1.61	2.25	13.88	2.86
87	S in Product Gas, % of Released S	-10.31	-39.75	35.44	11.22	60.17	16.36	35.13	5.43	3.27	7.13	-89.78	13.41
88													
89	CLOSURES:												
90	---------												
91	Total Energy (out/in), %	98.0	100.5	86.9	94.6	97.3	110.1	92.0	91.9	89.0	77.9	74.7	93.7
92	Total Mass (out/in), %	93.4	90.5	89.0	94.1	84.7	87.1	86.7	87.9	86.0	93.1	91.8	95.3
93	Carbon (out/in), %	99.3	101.1	89.4	93.8	100.4	108.3	95.9	95.0	94.0	77.3	70.5	91.5
94	Hydrogen (out/in), %	114.9	117.0	106.2	112.9	112.3	128.4	106.1	96.4	92.4	95.6	106.8	112.6
95	Oxygen (out/in), %	106.6	103.6	105.5	112.0	97.7	100.8	95.0	95.2	97.3	98.4	106.8	103.4
96	Nitrogen (out/in), %	88.1	86.1	85.9	93.5	78.3	78.8	83.5	83.6	83.0	96.3	90.7	91.4
97	Sulfur (out/in), %	131.7	118.2	96.3	82.6	85.3	72.5	84.6	81.1	52.2	70.7	129.0	81.4
98	Argon (out/in), %	73.5	83.4	81.0	80.0	82.0	86.4	86.3	86.4	88.2	87.1	85.7	83.4
99	Calcium (out/in), %	49.7	63.5	46.4	99.4	51.0	39.7	53.7	67.1	40.3	80.4	108.3	99.1
100	Magnesium (out/in), %	124.6	85.4	87.5	117.6	74.4	56.2	80.6	100.2	58.3	86.8	122.1	105.6
101	Ash (out/in), %	117.4	83.1	81.6	29.8	123.4	106.3	110.9	113.3	79.7	76.8	75.3	111.7

Table 2.7 (cont.). UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

	Set Point	TR4-4	TR4-5	TR4-6	TR4-7	TR4-8	TR5-1	TR5-2	TR5-3	TR8-67	TR8-8	TR8-9	TR8-10
	Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
	Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	LV Lime	PR Dolo	PR Dolo	PR Dolo	PR Dolo
69	Actual Partial Press. of CO2, psia	12.93	21.34	18.91	17.61	18.94	12.91	16.12	14.80	14.06	12.53	11.18	9.27
70	Equilib. PCO2 (Squires), psia	10.53	26.33	24.43	10.07	11.58	21.46	22.73	23.70	22.30	24.15	24.90	28.35
71	Equilib. PCO2 (IGT/B&K), psia	22.60	57.97	53.66	21.58	24.92	46.96	49.82	52.02	48.87	53.03	54.73	62.53
72	Feed Ca/Feed S Ratio, mol/mol	1.92	1.46	1.37	2.06	2.26	2.86	5.22	4.86	1.47	1.00	1.08	0.51
73	Feed Ca/Released S Ratio, mol/mol	2.47	1.69	1.58	3.34	3.94	3.45	7.40	6.31	2.05	1.43	1.48	0.78
74	H2S Conc. in Freeboard, ppm	376	65	88	294	957	1379	73	6	78	18	3	1085
75	Equilib. H2S Conc. (CaO Rxn), ppm	325	417	370	239	248	379	386	392	482	476	424	553
76	Approach to Equilib. Capture, %	98.9	106.1	104.0	99.1	81.1	59.4	117.0	117.9	107.3	108.3	107.1	90.2
77	Equilib. H2S Conc. (CaCO3 Rxn), ppm	399	338	287	419	406	228	274	245	304	247	190	181
78	Approach to Equilib. Capture, %	100.4	104.7	102.8	102.4	84.6	55.9	110.4	110.3	103.9	104.0	103.1	84.5
79	Ca Closure (out/in), %	51.9	132.4	142.7	69.5	63.4	62.5	41.8	84.7	79.2	63.8	48.7	68.5
80	S Closure (out/in), %	61.3	85.7	78.9	78.1	89.5	86.1	66.7	64.5	67.7	62.8	50.5	65.2
81	Sorbent Ca Conversion/Utilization,%	34.57	37.09	33.27	26.48	24.25	17.48	17.33	10.33	33.50	51.61	45.52	55.18
82	Coal Sulfur Released, %	77.67	86.42	86.51	61.79	57.42	83.05	70.50	77.04	71.46	69.89	73.08	65.87
83	Sulfur in Freeboard Gas,% S in Coal	5.39	0.89	1.03	3.11	13.71	40.04	2.30	0.18	0.92	47.49	0.04	63.43
84	S in Disch Solids, % of Tot S Feed	55.98	84.82	77.92	75.00	76.05	47.18	64.51	64.27	66.76	62.64	50.49	53.47
85	Sulfur Capture by Sorbent, % Coal S	32.83	71.02	64.14	36.29	32.93	28.72	33.29	40.55	37.62	32.08	22.93	19.05
86	S in Product Gas, % of Feed S	5.39	0.89	1.03	3.11	13.71	40.04	2.30	0.18	0.92	0.21	0.04	11.83
87	S in Product Gas, % of Released S	12.26	5.88	4.66	12.44	57.21	75.81	6.49	0.51	2.78	0.56	0.08	25.42
88													
89	CLOSURES:												
90	---------												
91	Total Energy (out/in), %	83.0	79.5	72.2	78.2	107.2	76.2	89.5	88.8	93.5	86.5	91.7	93.1
92	Total Mass (out/in), %	91.6	93.7	93.3	91.7	101.7	92.4	96.8	97.6	97.3	95.4	95.9	97.5
93	Carbon (out/in), %	79.4	80.6	72.0	76.6	104.0	72.0	85.9	90.7	93.3	86.2	90.6	90.9
94	Hydrogen (out/in), %	112.1	95.1	96.6	97.7	132.4	104.9	110.5	99.4	132.0	126.8	134.0	151.6
95	Oxygen (out/in), %	106.9	103.9	108.2	100.8	112.5	104.0	100.3	106.3	110.1	110.9	110.8	123.9
96	Nitrogen (out/in), %	90.7	93.5	95.6	95.3	98.8	94.6	98.7	96.6	93.8	93.3	94.4	92.3
97	Sulfur (out/in), %	61.2	85.7	78.9	78.1	89.5	86.1	66.3	64.5	68.4	62.9	50.5	65.0
98	Argon (out/in), %	83.5	86.1	90.1	93.4	97.9	92.0	104.9	93.9	77.8	80.0	80.6	75.2
99	Calcium (out/in), %	51.1	132.5	143.2	68.4	62.8	62.5	39.2	84.8	79.6	63.6	48.8	62.5
100	Magnesium (out/in), %	136.9	138.6	145.2	69.3	64.1	103.2	59.5	1570.4	84.4	75.9	55.8	72.0
101	Ash (out/in), %	61.2	50.1	35.8	93.7	105.8	60.7	154.1	65.3	97.0	85.7	83.9	73.7

Table 2.7 (cont.). UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

	Set Point	Minimum	Maximum	Average	Std Dev
	Coal	----Pittsburgh No. 8 Bituminous-----			
	Sorbent	Plum Run Dolomite/Longview Limestone			
69	Actual Partial Press. of CO2, psia	9.27	21.34	14.37	2.92
70	Equilib. PCO2 (Squires), psia	3.76	43.15	20.19	9.50
71	Equilib. PCO2 (IGT/B&K), psia	7.84	96.32	44.27	21.38
72	Feed Ca/Feed S Ratio, mol/mol	0.51	5.22	1.87	1.07
73	Feed Ca/Released S Ratio, mol/mol	0.78	7.40	2.79	1.54
74	H2S Conc. in Freeboard, ppm	3	1860	421	478
75	Equilib. H2S Conc. (CaO Rxn), ppm	158	553	311	121
76	Approach to Equilib. Capture, %	59.4	117.9	97.8	12.6
77	Equilib. H2S Conc. (CaCO3 Rxn), ppm	56	519	260	120
78	Approach to Equilib. Capture, %	55.9	110.4	96.5	11.9
79	Ca Closure (out/in), %	40.2	142.7	71.6	27.2
80	S Closure (out/in), %	50.5	131.7	81.0	20.7
81	Sorbent Ca Conversion/Utilization,%	10.33	81.04	42.83	18.95
82	Coal Sulfur Released, %	32.24	86.51	69.47	13.58
83	Sulfur in Freeboard Gas,% S in Coal	0.04	63.43	10.31	16.31
84	S in Disch Solids, % of Tot S Feed	47.18	128.82	74.91	20.43
85	Sulfur Capture by Sorbent, % Coal S	19.05	83.80	43.93	16.25
86	S in Product Gas, % of Feed S	0.04	40.04	6.21	8.84
87	S in Product Gas, % of Released S	-89.78	75.81	10.49	31.59
88					
89	CLOSURES:				
90	---------				
91	Total Energy (out/in), %	72.2	110.1	89.4	9.6
92	Total Mass (out/in), %	84.7	101.7	92.7	4.2
93	Carbon (out/in), %	70.5	108.3	89.1	10.3
94	Hydrogen (out/in), %	92.4	151.6	112.3	14.9
95	Oxygen (out/in), %	95.0	123.9	105.0	6.4
96	Nitrogen (out/in), %	78.3	98.8	90.7	5.8
97	Sulfur (out/in), %	50.5	131.7	80.9	20.6
98	Argon (out/in), %	73.5	104.9	85.8	7.0
99	Calcium (out/in), %	39.2	143.2	70.7	27.6
100	Magnesium (out/in), %	55.8	1570.4	153.1	296.7
101	Ash (out/in), %	29.8	154.1	86.5	28.2

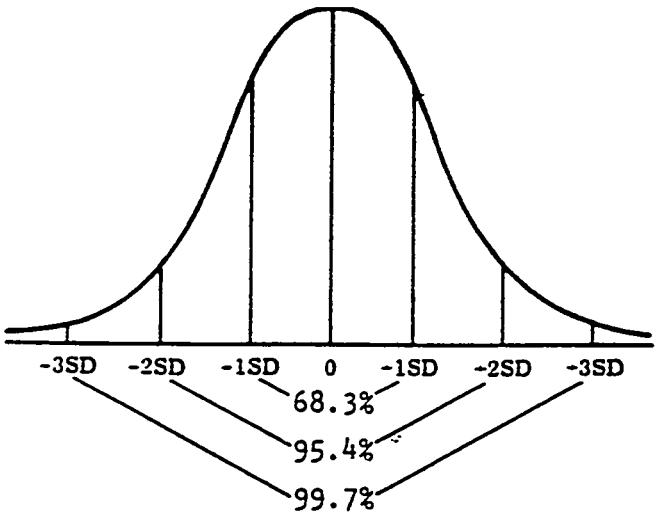

Figure 2.12. STANDARD DEVIATION AND A NORMAL CURVE

Table 2.8. UNRECONCILED COMPOSITION OF COAL AND SORBENT FEEDS FOR STEADY-STATE PERIODS WITH ILLINOIS NO. 6 BITUMINOUS COAL FEED

Set Point	TR6-6	TR6-7	TR8-4	TR8-5	Minimum	Maximum	Average	Std Dev
Coal	Ill Bit	Ill Bit	Ill Bit	Ill Bit				
Sorbent	LV Lime	LV Lime	LV Lime	LV Lime				
Moisture in Coal Feed, wt %	10.87	10.87	9.25	9.25	9.25	10.87	10.06	0.81
Coal (MF) Feed Composition, wt %								
C	70.409	70.409	70.033	70.033	70.033	70.409	70.221	0.188
H	4.931	4.931	4.204	4.204	4.204	4.931	4.568	0.364
O	7.601	7.601	8.716	8.716	7.601	8.716	8.159	0.557
N	1.761	1.761	1.598	1.598	1.598	1.761	1.680	0.082
S	3.416	3.416	3.339	3.339	3.339	3.416	3.378	0.038
Ash	11.882	11.882	12.110	12.110	11.882	12.110	11.996	0.114
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	
HHV, Btu/lb (MF)	12534	12534	12680	12680	12534	12680	12607	73
Sorbent Feed Composition, wt %								
CaCO3	97.089	97.089	97.305	97.305	97.089	97.305	97.197	0.108
MgCO3	1.725	1.725	2.127	2.127	1.725	2.127	1.926	0.201
CaS*	0.333	0.333	0.387	0.387	0.333	0.387	0.360	0.027
Inerts	0.853	0.853	0.181	0.181	0.181	0.853	0.517	0.336
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	

* Sulfur in Sorbent is reported as CaS.

Table 2.9. UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH ILLINOIS NO. 6 BITUMINOUS COAL FEED

	Set Point	TR6-6	TR6-7	TR8-4	TR8-5	Minimum	Maximum	Average	Std Dev
1	Coal	Ill Bit	Ill Bit	Ill Bit	Ill Bit				
2	Sorbent	LV Lime	LV Lime	LV Lime	LV Lime				
3	Begin Date	4/23/92	4/23/92	6/12/92	6/13/92				
4	Begin Clock Time, hours	1800	2300	2100	0700				
5	End Clock Time, hours	2200	0330	0200	1100				
6	Steady-State Period Duration, h	4	4.5	5	4	4.0	5.0	4.4	0.4
7	Reactor Pressure, psig	143.5	122.4	113.2	160.6	113.2	160.6	134.9	18.4
8	Orifice Pressure, psig	140.7	120.2	112.7	159.9	112.7	159.9	133.4	18.4
9	Average Bed Temp, F	1600	1599	1652	1715	1599	1715	1642	48
10	Bed Temp (@7.5 ft), F	1605	1603	1645	1706	1603	1706	1640	42
11	Freeboard Temp (@22.5 ft), F	1573	1573	1623	1680	1573	1680	1612	44
12	Freeboard Temp (@27.5 ft), F	1536	1532	1588	1647	1532	1647	1576	47
13	Orifice Temperature, F	1297	1267	1070	1210	1070	1297	1211	87
14	Coal Feed Rate, lb/h	304.0	232.0	320.0	427.0	232.0	427.0	320.8	69.7
15	Sorbent Feed Rate, lb/h	36.0	39.0	76.0	104.0	36.0	104.0	63.8	28.1
16	Bed Drain Rate, lb/h	50.3	70.1	66.7	51.5	50.3	70.1	59.7	8.8
17	First Cyclone Rate, lb/h	58.8	42.9	57.2	61.4	42.9	61.4	55.1	7.2
18	Second Cyclone Rate, lb/h	5.3	13.1	34.2	36.7	5.3	36.7	22.3	13.4
19	Baghouse Fines Rate, lb/h	28.2	15.5	24.6	34.9	15.5	34.9	25.8	7.0
20	Total Drains Rate, lb/h	142.6	141.6	182.7	184.5	141.6	184.5	162.9	20.8
21	Steam Feed Rate, lb/h	112.4	58.0	96.3	139.7	58.0	139.7	101.6	29.6
22	Air Feed Rate (Measured), lb/h	641.6	561.4	688.5	954.2	561.4	954.2	711.4	147.4
23	Air Feed Rate (Ar Forced), lb/h	511.7	458.1	567.0	800.7	458.1	800.7	584.4	130.7
24	N2 Purges to Carbonizer, lb/h	187.7	185.7	176.9	211.1	176.9	211.1	190.4	12.7
25	N2 Purges to Cyclones + O.M., lb/h	21.9	23.4	18.4	26.6	18.4	26.6	22.6	2.9
26	N2 Purge to Spray Tower, lb/h	120.2	115.8	85.4	93.9	85.4	120.2	103.8	14.6
27	Total N2 Purges to system, lb/h	329.8	324.9	280.7	331.6	280.7	331.6	316.8	21.0
28	Reactor Exit Gas, lb/h	1069.8	936.3	1153.0	1518.6	936.3	1518.6	1169.4	215.9
29	Orifice Gas, lb/h	1091.7	959.7	1171.4	1545.2	959.7	1545.2	1192.0	217.5
30	Demister Gas, lb/h	1211.9	1075.5	1256.8	1639.1	1075.5	1639.1	1295.8	209.1
31	CH4 in Demister Gas, mol %	1.309	1.349	1.264	1.257	1.257	1.349	1.295	0.037
32	C2H4 in Demister Gas, mol %	0.044	0.036	0.031	0.000	0.000	0.044	0.028	0.017
33	C2H6 in Demister Gas, mol %	0.014	0.015	0.025	0.017	0.014	0.025	0.018	0.004
34	Demister Gas HHV, Btu/SCF	63.2	62.3	62.9	63.5	62.3	63.5	63.0	0.4
35	Bed Density, lb/ft3	12.58	11.81	14.63	30.02	11.81	30.02	17.26	7.44

Table 2.9 (cont.). UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH ILLINOIS NO. 6 BITUMINOUS COAL FEED

	Set Point	TR6-6	TR6-7	TR8-4	TR8-5	Minimum	Maximum	Average	Std Dev
	Coal	Ill Bit	Ill Bit	Ill Bit	Ill Bit				
	Sorbent	LV Lime	LV Lime	LV Lime	LV Lime				
36	Bed Height, ft	16.6	18.3	17.8	15.4	15.4	18.3	17.0	1.1
37	Bed Weight, lb	153.39	159.20	192.47	337.90	153.39	337.90	210.74	74.92
38									
39	Avg Bed T - FB T (@22.5 ft), F	27	26	29	35	26.0	35.0	29.3	3.5
40	Avg Bed T - FB T (@27.5 ft), F	64	67	64	68	64.0	68.0	65.8	1.8
41	Coal Feed (MF), lb/h	270.96	206.78	290.42	387.52	206.78	387.52	288.92	64.80
42	Carbon in Coal Feed, lb/h	190.78	145.59	203.39	271.40	145.59	271.40	202.79	45.07
43	Air(Measured)/Coal in Feed, lb/lb	2.111	2.420	2.152	2.235	2.111	2.420	2.229	0.119
44	Feed Oxygen/Carbon in Feed, mol/mol	0.293	0.336	0.295	0.306	0.293	0.336	0.308	0.017
45	Feed Steam/Carbon in Feed, mol/mol	0.393	0.266	0.316	0.343	0.266	0.393	0.330	0.046
46	Feed(Steam+Moist)/C in Feed,mol/mol	0.508	0.381	0.412	0.440	0.381	0.508	0.435	0.047
47	Total Char/MF Coal Feed, lb/lb	0.4567	0.6239	0.4126	0.3176	0.3176	0.6239	0.4527	0.1109
48	Orifice Gas/Coal Feed, lb/lb	3.591	4.137	3.661	3.619	3.591	4.137	3.752	0.224
49	Purge-Free Gas Make/Coal Feed,lb/lb	2.902	3.236	3.050	3.062	2.902	3.236	3.063	0.118
50	Purge-Free Gas Make/Coal Feed,SCF/lb	45.022	49.885	46.499	46.021	45.022	49.885	46.857	1.828
51	CH4 Yield, % of Feed Carbon	3.941	4.685	3.674	3.539	3.539	4.685	3.960	0.443
52	C2H6 Yield, % of Feed Carbon	0.082	0.103	0.143	0.093	0.082	0.143	0.105	0.023
53	C2H4 Yield, % of Feed Carbon	0.266	0.253	0.178	0.000	0.000	0.266	0.174	0.106
54	HC Yield, % of Feed Carbon	4.288	5.040	3.995	3.632	3.632	5.040	4.239	0.518
55	Carbon Conv (Based on Solids), %	52.18	39.82	56.19	66.53	39.82	66.53	53.68	9.56
56	Carbon Conv (Based on Gas), %	38.72	40.01	39.02	41.91	38.72	41.91	39.92	1.25
57	Diff in C Conv (Solids-Gas), %	13.46	-0.19	17.17	24.62	-0.19	24.62	13.77	9.00
58									
59	H2O Content in Freeboard Gas, mol %	23.80	21.60	21.70	21.90	21.60	23.80	22.25	0.90
60	Water-Gas Shift Temperature, F	1875	1992	1817	1748	1748	1992	1858	89
61	WGS Temp - Avg Bed Temp, F	275	393	165	33	33	393	217	133
62	WGS Temp - Freebd Temp(@22.5 ft), F	302	419	194	68	68	419	246	130
63	WGS Temp - Freebd Temp(@27.5 ft), F	339	460	229	101	101	460	282	133
64									
65	Coal Nitrogen Released, %	59.78	48.96	68.73	77.52	48.96	77.52	63.75	10.59
66	Released Nitrogen Going to NH3, %	61.47	95.33	47.19	23.98	23.98	95.33	56.99	25.86
67	Coal Nitrogen Going to NH3, %	36.74	46.67	32.43	18.59	18.59	46.67	33.61	10.09
68	NH3 Conc. in Freeboard, ppm	2850	3290	2360	1380	1380	3290	2470	710

Table 2.9 (cont.). UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH ILLINOIS NO. 6 BITUMINOUS COAL FEED

	Set Point	TR6-6	TR6-7	TR8-4	TR8-5	Minimum	Maximum	Average	Std Dev
	Coal	Ill Bit	Ill Bit	Ill Bit	Ill Bit				
	Sorbent	LV Lime	LV Lime	LV Lime	LV Lime				
69	Actual Partial Press. of CO2, psia	13.48	10.15	11.32	18.61	10.15	18.61	13.39	3.24
70	Equilib. PCO2 (Squires), psia	9.95	9.85	15.04	24.33	9.85	24.33	14.79	5.89
71	Equilib. PCO2 (IGT/B&K), psia	21.30	21.10	32.58	53.44	21.10	53.44	32.11	13.16
72	Feed Ca/Feed S Ratio, mol/mol	1.21	1.72	2.44	2.51	1.21	2.51	1.97	0.54
73	Feed Ca/Released S Ratio, mol/mol	1.56	2.81	2.85	2.77	1.56	2.85	2.50	0.54
74	H2S Conc. in Freeboard, ppm	377	3999	135	19	19	3999	1133	1660
75	Equilib. H2S Conc. (CaO Rxn), ppm	371	335	398	488	335	488	398	57
76	Approach to Equilib. Capture, %	99.8	-11.9	105.1	108.2	-11.9	108.2	75.3	50.4
77	Equilib. H2S Conc. (CaCO3 Rxn), ppm	502	345	300	373	300	502	380	75
78	Approach to Equilib. Capture, %	102.6	-12.0	103.2	106.1	-12.0	106.1	75.0	50.2
79	Ca Closure (out/in), %	59.2	37.3	103.1	84.8	37.3	103.1	71.1	25.0
80	S Closure (out/in), %	45.0	142.1	51.2	46.1	45.0	142.1	71.1	41.1
81	Sorbent Ca Conversion/Utilization,%	23.75	57.47	14.00	17.31	14.00	57.47	28.13	17.30
82	Coal Sulfur Released, %	77.46	61.06	85.63	90.54	61.06	90.54	78.67	11.19
83	Sulfur in Freeboard Gas,% S in Coal	5.59	67.38	2.03	0.28	0.28	67.38	18.82	28.10
84	S in Disch Solids, % of Tot S Feed	39.41	75.29	49.19	45.79	39.41	75.29	52.42	13.66
85	Sulfur Capture by Sorbent, % Coal S	16.51	36.14	34.13	35.59	16.51	36.14	30.59	8.16
86	S in Product Gas, % of Feed S	5.59	67.38	2.03	0.28	0.28	67.38	18.82	28.10
87	S in Product Gas, % of Released S	9.22	272.63	3.99	0.52	0.52	272.63	71.59	116.11
88									
89	CLOSURES:								
90	---------								
91	Total Energy (out/in), %	88.9	106.0	81.7	72.4	72.4	106.0	87.3	12.3
92	Total Mass (out/in), %	94.6	100.1	98.4	92.8	92.8	100.1	96.5	2.9
93	Carbon (out/in), %	86.8	100.2	83.6	76.5	76.5	100.2	86.8	8.6
94	Hydrogen (out/in), %	102.6	126.8	114.3	106.9	102.6	126.8	112.7	9.2
95	Oxygen (out/in), %	101.1	104.1	104.0	103.3	101.1	104.1	103.1	1.2
96	Nitrogen (out/in), %	95.5	97.2	101.3	94.7	94.7	101.3	97.2	2.5
97	Sulfur (out/in), %	44.8	142.2	51.2	46.1	44.8	142.2	71.1	41.1
98	Argon (out/in), %	82.0	82.0	82.5	84.0	82.0	84.0	82.6	0.8
99	Calcium (out/in), %	59.1	37.1	103.1	84.7	37.1	103.1	71.0	25.0
100	Magnesium (out/in), %	241.4	276.6	82.8	58.0	58.0	276.6	164.7	95.5
101	Ash (out/in), %	86.0	145.5	77.0	61.6	61.6	145.5	92.5	31.8

Table 2.10. UNRECONCILED COMPOSITION OF COAL AND SORBENT FEEDS FOR STEADY-STATE PERIODS WITH WYOMING EAGLE BUTTE SUBBITUMINOUS COAL FEED

Set Point	TR6-1	TR6-2	TR6-3	TR6-4	TR6-5	TR8-1	TR8-2	TR8-3	Minimum	Maximum	Average	Std Dev
Coal	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub				
Sorbent	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime				
Moisture in Coal Feed, wt %	26.87	26.87	26.87	26.87	26.87	27.07	27.07	27.07	26.87	27.07	26.95	0.09
Coal (MF) Feed Composition, wt %												
C	69.423	69.423	69.423	69.423	69.423	67.851	67.851	67.851	67.851	69.423	68.834	0.761
H	4.923	4.923	4.923	4.923	4.923	4.561	4.561	4.561	4.561	4.923	4.787	0.175
O	15.707	15.707	15.707	15.707	15.707	18.593	18.593	18.593	15.707	18.593	16.789	1.397
N	1.337	1.337	1.337	1.337	1.337	1.193	1.193	1.193	1.193	1.337	1.283	0.070
S	0.982	0.982	0.982	0.982	0.982	0.923	0.923	0.923	0.923	0.982	0.960	0.029
Ash	7.628	7.628	7.628	7.628	7.628	6.879	6.879	6.879	6.879	7.628	7.347	0.363
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	
HHV, Btu/lb (MF)	11937	11937	11937	11937	11937	12095	12095	12095	11937	12095	11996	76
Sorbent Feed Composition, wt %												
CaCO3	97.089	97.089	97.089	97.089	97.089	97.305	97.305	97.305	97.089	97.305	97.170	0.105
MgCO3	1.725	1.725	1.725	1.725	1.725	2.127	2.127	2.127	1.725	2.127	1.876	0.195
CaS*	0.333	0.333	0.333	0.333	0.333	0.387	0.387	0.387	0.333	0.387	0.353	0.026
Inerts	0.853	0.853	0.853	0.853	0.853	0.181	0.181	0.181	0.181	0.853	0.601	0.325
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	

* Sulfur in Sorbent is reported as CaS.

Table 2.11. UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH WYOMING EAGLE BUTTE SUBBITUMINOUS COAL FEED

	Set Point	TR6-1	TR6-2	TR6-3	TR6-4	TR6-5	TR8-1	TR8-2	TR8-3	Minimum	Maximum	Average	Std Dev
1	Coal	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub				
2	Sorbent	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime				
3	Begin Date	4/21/92	4/22/92	4/22/92	4/22/92	4/23/92	6/10/92	6/11/92	6/11/92				
4	Begin Clock Time, hours	2100	0430	1400	2100	0400	2000	0300	1330				
5	End Clock Time, hours	0100	0830	1800	0100	0800	0100	0800	1730				
6	Steady-State Period Duration, h	4	4	4	4	4	5	5	4	4.0	5.0	4.3	0.4
7	Reactor Pressure, psig	145.9	129.8	157.5	191.9	189.6	128.6	132.7	156.5	128.6	191.9	154.1	23.6
8	Orifice Pressure, psig	143.1	127.3	154.3	188.2	186.0	128.2	132.2	156.1	127.3	188.2	151.9	22.7
9	Average Bed Temp, F	1580	1509	1511	1609	1632	1476	1593	1613	1476	1632	1565	54
10	Bed Temp (@7.5 ft), F	1578	1507	1509	1607	1632	1478	1587	1602	1478	1632	1563	53
11	Freeboard Temp (@22.5 ft), F	1567	1500	1515	1579	1593	1432	1541	1575	1432	1593	1538	50
12	Freeboard Temp (@27.5 ft), F	1517	1455	1462	1549	1563	1396	1492	1533	1396	1563	1496	52
13	Orifice Temperature, F	787	762	1267	1354	1367	769	818	962	762	1367	1011	255
14	Coal Feed Rate, lb/h	344.0	329.0	424.0	475.0	462.0	300.0	310.0	393.0	300.0	475.0	379.6	64.3
15	Sorbent Feed Rate, lb/h	68.0	67.0	45.0	55.0	17.0	41.0	55.0	27.0	17.0	68.0	46.9	17.0
16	Bed Drain Rate, lb/h	46.3	69.4	39.9	57.1	15.0	6.0	26.5	16.8	6.0	69.4	34.6	20.8
17	First Cyclone Rate, lb/h	44.8	46.7	67.8	49.9	60.8	45.7	34.3	33.9	33.9	67.8	46.7	10.0
18	Second Cyclone Rate, lb/h	3.7	5.9	6.8	1.3	4.5	10.9	4.5	7.6	1.3	10.9	5.7	2.7
19	Baghouse Fines Rate, lb/h	8.1	12.4	8.3	25.6	26.2	2.0	1.3	7.7	1.3	26.2	11.5	9.0
20	Total Drains Rate, lb/h	102.9	134.4	122.8	133.9	96.5	64.6	66.6	66.0	64.6	134.4	98.5	28.2
21	Steam Feed Rate, lb/h	0.0	0.0	0.0	0.0	0.0	45.5	46.0	48.7	0.0	48.7	17.5	22.6
22	Air Feed Rate (Measured), lb/h	754.1	642.4	807.9	1000.1	981.6	613.8	704.1	863.5	613.8	1000.1	795.9	135.9
23	Air Feed Rate (Ar Forced), lb/h	779.2	652.2	687.4	792.7	822.0	518.8	594.3	732.1	518.8	822.0	697.3	98.2
24	N2 Purges to Carbonizer, lb/h	188.2	215.7	177.3	152.6	160.3	222.0	213.4	186.8	152.6	222.0	189.5	24.2
25	N2 Purges to Cyclones + O.M., lb/h	26.5	22.0	25.7	18.0	16.1	163.9	173.4	152.4	16.1	173.4	74.8	68.8
26	N2 Purge to Spray Tower, lb/h	135.3	137.1	128.7	105.6	97.7	123.8	137.6	78.8	78.8	137.6	118.1	20.3
27	Total N2 Purges to system, lb/h	350.0	374.8	331.7	276.2	274.1	509.7	524.4	418.0	274.1	524.4	382.4	89.7
28	Reactor Exit Gas, lb/h	1316.2	1207.5	1191.0	1416.7	1389.0	1315.3	1324.9	1490.0	1191.0	1490.0	1331.3	94.4
29	Orifice Gas, lb/h	1342.7	1229.5	1216.6	1434.7	1405.1	1479.2	1498.3	1642.4	1216.6	1642.4	1406.1	133.1
30	Demister Gas, lb/h	1477.9	1366.6	1345.3	1540.4	1502.8	1603.0	1635.9	1721.3	1345.3	1721.3	1524.2	121.1
31	CH4 in Demister Gas, mol %	1.298	1.200	1.620	1.788	1.571	1.031	0.924	1.329	0.924	1.788	1.345	0.279
32	C2H4 in Demister Gas, mol %	0.026	0.036	0.025	0.010	0.009	0.028	0.015	0.009	0.009	0.036	0.020	0.010
33	C2H6 in Demister Gas, mol %	0.019	0.036	0.035	0.016	0.012	0.065	0.027	0.042	0.012	0.065	0.032	0.016
34	Demister Gas HHV, Btu/SCF	69.1	59.5	81.4	87.2	87.1	51.7	50.4	66.8	50.4	87.2	69.2	13.9
35	Bed Density, lb/ft3	55.45	48.06	38.38	43.43	45.80	26.86	55.00	59.69	26.86	59.69	46.58	9.94

Table 2.11 (cont.). UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH WYOMING EAGLE BUTTE SUBBITUMINOUS COAL FEED

	Set Point	TR6-1	TR6-2	TR6-3	TR6-4	TR6-5	TR8-1	TR8-2	TR8-3	Minimum	Maximum	Average	Std Dev
	Coal	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub				
	Sorbent	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime				
36	Bed Height, ft	20.2	20.7	23.7	15.6	14.5	19.7	17.1	18.1	14.5	23.7	18.7	2.8
37	Bed Weight, lb	849.44	762.44	731.84	496.41	480.58	398.16	693.17	798.14	398.16	849.44	651.27	157.57
38													
39	Avg Bed T - FB T (@22.5 ft), F	13	9	-4	30	39	44	52	38	-4.0	52.0	27.6	18.3
40	Avg Bed T - FB T (@27.5 ft), F	63	54	49	60	69	80	101	80	49.0	101.0	69.5	15.8
41	Coal Feed (MF), lb/h	251.55	240.58	310.05	347.35	337.84	218.79	226.08	286.61	218.79	347.35	277.36	47.16
42	Carbon in Coal Feed, lb/h	174.64	167.02	215.25	241.14	234.54	148.45	153.40	194.47	148.45	241.14	191.11	33.68
43	Air(Measured)/Coal in Feed, lb/lb	2.192	1.953	1.905	2.105	2.125	2.046	2.271	2.197	1.905	2.271	2.099	0.117
44	Feed Oxygen/Carbon in Feed, mol/mol	0.376	0.335	0.327	0.361	0.364	0.360	0.400	0.386	0.327	0.400	0.364	0.023
45	Feed Steam/Carbon in Feed, mol/mol	0.000	0.000	0.000	0.000	0.000	0.204	0.200	0.167	0.000	0.204	0.071	0.093
46	Feed(Steam+Moist)/C in Feed,mol/mol	0.353	0.353	0.353	0.353	0.353	0.569	0.565	0.532	0.353	0.569	0.429	0.098
47	Total Char/MF Coal Feed, lb/lb	0.2241	0.2622	0.2405	0.2104	0.2144	0.2498	0.1648	0.1462	0.1462	0.2622	0.2141	0.0378
48	Orifice Gas/Coal Feed, lb/lb	3.903	3.737	2.869	3.020	3.041	4.931	4.833	4.179	2.869	4.931	3.814	0.754
49	Purge-Free Gas Make/Coal Feed,lb/lb	3.278	3.015	2.391	2.661	2.660	3.644	3.586	3.316	2.391	3.644	3.069	0.433
50	Purge-Free Gas Make/Coal Feed,SCF/lb	48.225	43.723	35.601	38.829	39.380	55.062	53.472	49.803	35.601	55.062	45.512	6.746
51	CH4 Yield, % of Feed Carbon	5.018	4.425	4.664	5.207	4.644	5.149	4.513	5.459	4.425	5.459	4.885	0.350
52	C2H6 Yield, % of Feed Carbon	0.146	0.264	0.203	0.091	0.070	0.651	0.261	0.342	0.070	0.651	0.254	0.173
53	C2H4 Yield, % of Feed Carbon	0.201	0.264	0.145	0.061	0.056	0.283	0.145	0.072	0.056	0.283	0.153	0.084
54	HC Yield, % of Feed Carbon	5.365	4.954	5.012	5.359	4.769	6.083	4.919	5.873	4.769	6.083	5.292	0.444
55	Carbon Conv (Based on Solids), %	73.74	70.50	72.51	75.96	76.20	71.69	82.66	83.36	70.50	83.36	75.83	4.53
56	Carbon Conv (Based on Gas), %	62.41	55.84	53.58	61.91	60.98	53.99	60.01	62.05	53.58	62.41	58.85	3.51
57	Diff in C Conv (Solids-Gas), %	11.33	14.66	18.93	14.05	15.22	17.7	22.65	21.31	11.33	22.65	16.98	3.61
58													
59	H2O Content in Freeboard Gas, mol %	11.90	11.70	11.60	10.70	11.00	19.10	17.80	16.70	10.70	19.10	13.81	3.22
60	Water-Gas Shift Temperature, F	1776	1782	1659	1802	1755	1721	1693	1664	1659	1802	1732	52
61	WGS Temp - Avg Bed Temp, F	196	273	148	193	123	245	100	51	51	273	166	70
62	WGS Temp - Freebd Temp(@22.5 ft), F	209	282	144	223	162	289	152	89	89	289	194	65
63	WGS Temp - Freebd Temp(@27.5 ft), F	259	327	197	253	192	325	201	131	131	327	236	64
64													
65	Coal Nitrogen Released, %	68.48	65.65	72.20	78.46	75.56	78.08	89.10	89.70	65.65	89.70	77.15	8.20
66	Released Nitrogen Going to NH3, %	56.46	128.72	77.20	66.68	40.37	77.37	78.30	72.78	40.37	128.72	74.74	23.78
67	Coal Nitrogen Going to NH3, %	38.67	84.50	55.74	52.32	30.51	60.42	69.77	65.29	30.51	84.50	57.15	16.05
68	NH3 Conc. in Freeboard, ppm	1830	4180	3360	3170	1830	2190	2610	2740	1830	4180	2739	760

Table 2.11 (cont.). UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH WYOMING EAGLE BUTTE SUBBITUMINOUS COAL FEED

	Set Point	TR6-1	TR6-2	TR6-3	TR6-4	TR6-5	TR8-1	TR8-2	TR8-3	Minimum	Maximum	Average	Std Dev
	Coal	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub				
	Sorbent	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime				
69	Actual Partial Press. of CO2, psia	13.47	12.21	16.00	19.45	18.26	11.42	13.52	16.26	11.42	19.45	15.07	2.70
70	Equilib. PCO2 (Squires), psia	8.35	4.40	4.47	10.73	13.10	3.12	8.88	10.53	3.12	13.10	7.95	3.35
71	Equilib. PCO2 (IGT/B&K), psia	17.81	9.22	9.36	23.04	28.28	6.47	18.95	22.60	6.47	28.28	16.97	7.33
72	Feed Ca/Feed S Ratio, mol/mol	8.56	8.82	4.60	5.02	1.59	6.33	8.21	3.18	1.59	8.82	5.79	2.49
73	Feed Ca/Released S Ratio, mol/mol	10.90	10.61	5.99	5.65	1.81	6.78	8.92	3.22	1.81	10.90	6.73	3.07
74	H2S Conc. in Freeboard, ppm	185	34	112	108	52	3174	639	262	34	3174	571	1000
75	Equilib. H2S Conc. (CaO Rxn), ppm	173	132	131	172	191	187	264	265	131	265	189	48
76	Approach to Equilib. Capture, %	99.3	108.3	101.5	103.9	109.4	-210.9	58.5	100.5	-210.9	109.4	58.8	103.1
77	Equilib. H2S Conc. (CaCO3 Rxn), ppm	279	365	470	311	267	686	402	410	267	686	399	127
78	Approach to Equilib. Capture, %	110.8	133.7	132.3	114.1	115.2	-439.1	69.0	115.0	-439.1	133.7	43.9	183.5
79	Ca Closure (out/in), %	81.4	121.9	125.3	133.4	164.7	21.5	57.1	138.0	21.5	164.7	105.4	44.7
80	S Closure (out/in), %	45.0	45.5	60.2	46.8	37.6	265.5	68.9	37.5	37.5	265.5	75.9	72.4
81	Sorbent Ca Conversion/Utilization,%	1.90	2.63	5.69	4.65	8.87	6.52	2.92	4.15	1.90	8.87	4.67	2.16
82	Coal Sulfur Released, %	78.54	83.10	76.79	88.85	88.16	93.36	92.13	98.71	76.79	98.71	87.46	7.05
83	Sulfur in Freeboard Gas,% S in Coal	12.09	2.12	5.42	5.48	2.69	259.15	50.36	18.51	2.12	259.15	44.48	82.48
84	S in Disch Solids, % of Tot S Feed	33.40	43.49	54.94	41.45	34.98	15.04	20.69	19.28	15.04	54.94	32.91	12.89
85	Sulfur Capture by Sorbent, % Coal S	9.22	24.22	30.74	28.90	22.64	5.43	9.22	16.57	5.43	30.74	18.37	9.04
86	S in Product Gas, % of Feed S	12.09	2.12	5.42	5.48	2.69	259.15	50.36	18.51	2.12	259.15	44.48	82.48
87	S in Product Gas, % of Released S	18.15	3.75	12.03	9.36	4.13	305.04	63.50	22.93	3.75	305.04	54.86	96.26
88													
89	CLOSURES:												
90	---------												
91	Total Energy (out/in), %	87.1	81.5	83.2	84.4	85.3	87.3	75.9	78.3	75.9	87.3	82.9	3.8
92	Total Mass (out/in), %	104.6	106.8	90.5	92.2	91.7	111.3	104.2	102.2	90.5	111.3	100.4	7.4
93	Carbon (out/in), %	89.2	85.9	81.5	86.3	84.9	82.9	78.3	79.0	78.3	89.2	83.5	3.5
94	Hydrogen (out/in), %	103.0	92.2	84.3	81.1	84.8	126.7	114.8	110.9	81.1	126.7	99.7	15.6
95	Oxygen (out/in), %	97.7	98.4	87.7	89.7	89.3	103.9	101.3	99.0	87.7	103.9	95.9	5.7
96	Nitrogen (out/in), %	113.5	116.5	94.6	95.7	95.3	120.9	111.5	108.9	94.6	120.9	107.1	9.8
97	Sulfur (out/in), %	45.0	45.6	60.1	46.8	37.7	265.5	68.6	37.4	37.4	265.5	75.8	72.4
98	Argon (out/in), %	103.8	103.4	86.4	80.7	84.1	84.9	84.7	84.9	80.7	103.8	89.1	8.5
99	Calcium (out/in), %	81.3	121.9	125.3	133.5	164.9	21.5	57.1	138.0	21.5	164.9	105.4	44.7
100	Magnesium (out/in), %	275.1	202.0	417.3	433.4	1064.7	315.3	123.3	347.4	123.3	1064.7	397.3	270.3
101	Ash (out/in), %	46.0	66.4	55.9	51.6	57.7	76.1	64.2	45.1	45.1	76.1	57.9	10.0

Table 2.12. UNRECONCILED COMPOSITION OF COAL AND SORBENT FEEDS FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED (CIRCULATING FLUIDIZED-BED OPERATING MODE)

Set Point	TR10-1	TR10-2	TR10-3	TR10-4	Minimum	Maximum	Average	Std Dev
Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit				
Sorbent	GS Lime	GS Lime	GS Lime	GS Lime				
Moisture in Coal Feed, wt %	3.21	3.21	3.21	3.21	3.21	3.21	3.21	0.00
Coal (MF) Feed Composition, wt %								
C	72.369	72.369	72.369	72.369	72.369	72.369	72.369	0.000
H	5.083	5.083	5.083	5.083	5.083	5.083	5.083	0.000
O	6.450	6.450	6.450	6.450	6.450	6.450	6.450	0.000
N	2.020	2.020	2.020	2.020	2.020	2.020	2.020	0.000
S	3.317	3.317	3.317	3.317	3.317	3.317	3.317	0.000
Ash	10.761	10.761	10.761	10.761	10.761	10.761	10.761	0.000
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	
HHV, Btu/lb (MF)	13176	13176	13176	13176	13176	13176	13176	0
Sorbent Feed Composition, wt %								
CaCO3	71.180	82.205	82.205	82.205	71.180	82.205	79.449	4.774
MgCO3	26.918	15.732	15.732	15.732	15.732	26.918	18.529	4.844
CaS*	0.556	0.411	0.411	0.411	0.411	0.556	0.447	0.063
Inerts	1.346	1.652	1.652	1.652	1.346	1.652	1.576	0.133
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	

* Sulfur in Sorbent is reported as CaS.

Table 2.13. UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED (CIRCULATING FLUIDIZED-BED OPERATING MODE)

	Set Point	TR10-1	TR10-2	TR10-3	TR10-4	Minimum	Maximum	Average	Std Dev
1	Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit				
2	Sorbent	GS Lime	GS Lime	GS Lime	GS Lime				
3	Begin Date	9/1/92	9/1/92	9/2/92	9/2/92				
4	Begin Clock Time, hours	0200	1630	0000	0610				
5	End Clock Time, hours	0600	2100	0400	1240				
6	Steady-State Period Duration, h	4	4.5	4	6.5	4.0	6.5	4.8	1.0
7	Reactor Pressure, psig	113.7	68.7	72.7	55.9	55.9	113.7	77.8	21.7
8	Orifice Pressure, psig	111.5	67.6	71.3	55.1	55.1	111.5	76.4	21.1
9	Average Bed Temp, F	1675	1675	1706	1601	1601	1706	1664	39
10	Bed Temp (@7.5 ft), F	1682	1688	1714	1601	1601	1714	1671	42
11	Freeboard Temp (@22.5 ft), F	1673	1651	1703	1601	1601	1703	1657	37
12	Freeboard Temp (@27.5 ft), F	1652	1618	1677	1571	1571	1677	1630	40
13	Orifice Temperature, F	1116	868	917	813	813	1116	929	114
14	Coal Feed Rate, lb/h	525.0	232.0	300.0	286.0	232.0	525.0	335.8	112.2
15	Sorbent Feed Rate, lb/h	143.0	32.0	25.0	25.0	25.0	143.0	56.3	50.2
16	Bed Drain Rate, lb/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	First Cyclone Rate, lb/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	Second Cyclone Rate, lb/h	219.7	47.5	107.0	105.2	47.5	219.7	119.9	62.4
19	Baghouse Fines Rate, lb/h	72.4	101.7	41.6	32.0	32.0	101.7	61.9	27.4
20	Total Drains Rate, lb/h	292.1	149.2	148.6	137.2	137.2	292.1	181.8	63.9
21	Steam Feed Rate, lb/h	150.7	0.1	0.3	0.3	0.1	150.7	37.8	65.2
22	Air Feed Rate (Measured), lb/h	1158.5	736.2	845.2	641.6	641.6	1158.5	845.4	194.6
23	Air Feed Rate (Ar Forced), lb/h	946.4	532.8	661.4	453.8	453.8	946.4	648.6	187.2
24	N2 Purges to Carbonizer, lb/h	50.6	183.6	87.7	111.5	50.6	183.6	108.4	48.6
25	N2 Purges to Cyclones + O.M., lb/h	269.3	267.7	267.3	271.5	267.3	271.5	269.0	1.7
26	N2 Purge to Spray Tower, lb/h	105.7	88.1	112.1	112.4	88.1	112.4	104.6	9.9
27	Total N2 Purges to system, lb/h	425.6	539.4	467.1	495.4	425.6	539.4	481.9	41.5
28	Reactor Exit Gas, lb/h	1923.2	1347.8	1381.3	1115.4	1115.4	1923.2	1441.9	296.1
29	Orifice Gas, lb/h	2191.4	1614.8	1647.8	1386.2	1386.2	2191.4	1710.1	295.6
30	Demister Gas, lb/h	2298.2	1703.7	1760.7	1499.3	1499.3	2298.2	1815.5	295.2
31	CH4 in Demister Gas, mol %	1.582	0.699	1.055	1.098	0.699	1.582	1.109	0.314
32	C2H4 in Demister Gas, mol %	0.047	0.058	0.056	0.118	0.047	0.118	0.070	0.028
33	C2H6 in Demister Gas, mol %	0.008	0.000	0.000	0.007	0.000	0.008	0.004	0.004
34	Demister Gas HHV, Btu/SCF	63.9	30.6	43.3	36.6	30.6	63.9	43.6	12.6
35	Bed Density, lb/ft3								

Table 2.13 (cont.). UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED (CIRCULATING FLUIDIZED-BED OPERATING MODE)

	Set Point	TR10-1	TR10-2	TR10-3	TR10-4	Minimum	Maximum	Average	Std Dev
	Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit				
	Sorbent	GS Lime	GS Lime	GS Lime	GS Lime				
36	Bed Height, ft								
37	Bed Weight, lb								
38									
39	Avg Bed T - FB T (@22.5 ft), F	2	24	3	0	0.0	24.0	7.3	9.7
40	Avg Bed T - FB T (@27.5 ft), F	23	57	29	30	23.0	57.0	34.8	13.1
41	Coal Feed (MF), lb/h	508.13	224.55	290.36	276.81	224.55	508.13	324.96	108.57
42	Carbon in Coal Feed, lb/h	367.74	162.50	210.14	200.33	162.50	367.74	235.18	78.57
43	Air(Measured)/Coal in Feed, lb/lb	2.207	3.173	2.817	2.243	2.207	3.173	2.610	0.405
44	Feed Oxygen/Carbon in Feed, mol/mol	0.274	0.394	0.350	0.279	0.274	0.394	0.324	0.050
45	Feed Steam/Carbon in Feed, mol/mol	0.273	0.001	0.001	0.001	0.001	0.273	0.069	0.118
46	Feed(Steam+Moist)/C in Feed,mol/mol	0.304	0.031	0.031	0.031	0.031	0.304	0.099	0.118
47	Total Char/MF Coal Feed, lb/lb	0.4609	0.5616	0.4275	0.4329	0.4275	0.5616	0.4707	0.0540
48	Orifice Gas/Coal Feed, lb/lb	4.176	6.964	5.495	4.849	4.176	6.964	5.371	1.031
49	Purge-Free Gas Make/Coal Feed,lb/lb	3.567	5.018	4.312	3.510	3.510	5.018	4.102	0.616
50	Purge-Free Gas Make/Coal Feed,SCF/lb	54.987	71.584	62.138	51.327	51.327	71.584	60.009	7.732
51	CH4 Yield, % of Feed Carbon	4.716	3.253	3.966	3.708	3.253	4.716	3.911	0.530
52	C2H6 Yield, % of Feed Carbon	0.049	0.000	0.000	0.047	0.000	0.049	0.024	0.024
53	C2H4 Yield, % of Feed Carbon	0.278	0.544	0.418	0.801	0.278	0.801	0.510	0.192
54	HC Yield, % of Feed Carbon	5.043	3.798	4.384	4.556	3.798	5.043	4.445	0.445
55	Carbon Conv (Based on Solids), %	52.64	40.03	55.29	55.78	40.03	55.78	50.94	6.41
56	Carbon Conv (Based on Gas), %	34.08	37.30	39.75	26.91	26.91	39.75	34.51	4.83
57	Diff in C Conv (Solids-Gas), %	18.56	2.73	15.54	28.87	2.73	28.87	16.43	9.32
58									
59	H2O Content in Freeboard Gas, mol %	28.23	11.44	12.74	15.90	11.44	28.23	17.08	6.64
60	Water-Gas Shift Temperature, F	2026	1994	2070	1921	1921	2070	2003	54
61	WGS Temp - Avg Bed Temp, F	351	319	364	320	319	364	339	20
62	WGS Temp - Freebd Temp(@22.5 ft), F	353	343	367	320	320	367	346	17
63	WGS Temp - Freebd Temp(@27.5 ft), F	374	376	393	350	350	393	373	15
64									
65	Coal Nitrogen Released, %	58.34	40.53	58.25	57.54	40.53	58.34	53.67	7.59
66	Released Nitrogen Going to NH3, %	59.89	67.57	34.65	47.63	34.65	67.57	52.44	12.49
67	Coal Nitrogen Going to NH3, %	34.94	27.39	20.18	27.40	20.18	34.94	27.48	5.22
68	NH3 Conc. in Freeboard, ppm	3280	1760	1620	2560	1620	3280	2305	667

Table 2.13 (cont.). UNRECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED (CIRCULATING FLUIDIZED-BED OPERATING MODE)

	Set Point	TR10-1	TR10-2	TR10-3	TR10-4	Minimum	Maximum	Average	Std Dev
	Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit				
	Sorbent	GS Lime	GS Lime	GS Lime	GS Lime				
69	Actual Partial Press. of CO2, psia	10.96	4.73	5.61	4.23	4.23	10.96	6.38	2.69
70	Equilib. PCO2 (Squires), psia	18.54	18.49	23.60	10.07	10.07	23.60	17.68	4.86
71	Equilib. PCO2 (IGT/B&K), psia	40.41	40.31	51.80	21.58	21.58	51.80	38.53	10.84
72	Feed Ca/Feed S Ratio, mol/mol	1.94	1.13	0.68	0.72	0.68	1.94	1.12	0.51
73	Feed Ca/Released S Ratio, mol/mol	2.58	1.58	0.97	1.07	0.97	2.58	1.55	0.64
74	H2S Conc. in Freeboard, ppm	611	149	189	377	149	611	332	183
75	Equilib. H2S Conc. (CaO Rxn), ppm	564	228	280	249	228	564	330	136
76	Approach to Equilib. Capture, %	99.0	102.5	102.4	96.9	96.9	102.5	100.2	2.4
77	Equilib. H2S Conc. (CaCO3 Rxn), ppm	333	58	67	105	58	333	141	112
78	Approach to Equilib. Capture, %	94.1	97.2	96.9	93.7	93.7	97.2	95.5	1.6
79	Ca Closure (out/in), %	47.6	90.8	114.4	80.1	47.6	114.4	83.2	24.0
80	S Closure (out/in), %	67.5	59.4	65.9	73.4	59.4	73.4	66.6	5.0
81	Sorbent Ca Conversion/Utilization,%	37.29	27.40	42.94	60.72	27.40	60.72	42.09	12.11
82	Coal Sulfur Released, %	74.87	71.72	70.87	66.94	66.94	74.87	71.10	2.83
83	Sulfur in Freeboard Gas,% S in Coal	9.05	3.23	3.29	5.61	8.23	9.05	5.30	2.37
84	S in Disch Solids, % of Tot S Feed	58.60	56.17	62.65	67.86	56.17	67.86	61.32	4.43
85	Sulfur Capture by Sorbent, % Coal S	32.61	27.55	33.34	34.64	27.55	34.64	32.04	2.69
86	S in Product Gas, % of Feed S	9.05	3.23	3.29	5.61	3.23	9.05	5.30	2.37
87	S in Product Gas, % of Released S	21.85	7.38	8.81	17.46	7.38	21.85	13.88	6.01
88									
89	CLOSURES:								
90	---------								
91	Total Energy (out/in), %	85.5	97.0	83.3	75.2	75.2	97.0	85.3	7.8
92	Total Mass (out/in), %	108.1	121.5	117.8	114.0	108.1	121.5	115.4	5.0
93	Carbon (out/in), %	82.3	97.3	84.6	71.5	71.5	97.3	83.9	9.2
94	Hydrogen (out/in), %	140.2	148.7	138.7	138.8	138.7	148.7	141.6	4.1
95	Oxygen (out/in), %	122.6	106.7	114.0	115.7	106.7	122.6	114.8	5.7
96	Nitrogen (out/in), %	112.9	129.9	127.3	125.2	112.9	129.9	123.8	6.5
97	Sulfur (out/in), %	67.4	59.4	65.9	73.4	59.4	73.4	66.5	5.0
98	Argon (out/in), %	82.4	72.8	78.8	71.5	71.5	82.4	76.4	4.4
99	Calcium (out/in), %	47.2	90.4	111.5	79.8	47.2	111.5	82.2	23.2
100	Magnesium (out/in), %	91.7	254.7	290.2	196.5	91.7	290.2	208.3	75.2
101	Ash (out/in), %	91.1	95.4	80.9	84.9	80.9	95.4	88.1	5.6

The carbonizer was operated at approximately 3-ft/s superficial gas velocity (based on product gas, calculated at bed temperature and pressure in the 10-in.-ID section), while operating in the jetting fluidized-bed configuration. The temperatures, pressures, and steam injection rates ranged from 1476° to 1797°F, 8.7 to 14.5 atm, and 0 to 0.46 lb/lb coal, respectively. The carbonizer operated at a nominal 10 ft/s superficial gas velocity when operating in a circulating fluidized-bed configuration. The temperatures, pressures, and steam injection rates ranged from 1601° to 1706°F, 4.8 to 8.7 atm, and 0 to 0.29 lb/lb coal, respectively.

With regard to the overall carbonizer test program, at no point were any tars or oil vapors found/condensed from the fuel gas. This is a very important finding because their presence might jeopardize barrier filter operation by causing filter blinding and blocking. The high carbonizer operating temperature, relatively long in-bed gas residence time (approximately 6 to 10 seconds for the jetting fluidized-bed configuration), high pressure, exposure to lime-based sorbents, and method of coal/air feed (coal and air injected at the same point) destroy all tars and oil vapors in the bed.

Carbonizer fuel gas samples extracted from the top of the carbonizer and from a point downstream of the dry-quench spray tower were analyzed by a gas chromatograph, and these analyses were found to be in excellent agreement. Thus, analyses of the samples taken from the point downstream of the dry-quench spray tower were used for preparing material and energy balances.

Based on the analyses of the gas and solid samples and the flow rate and temperature measurements of all streams entering and leaving the pilot plant, FWDC prepared material and energy balances for each of the steady-state periods. The data gathered and the resulting material balances were reviewed by IGT from the standpoint of completeness, accuracy, and consistency of analytical analysis and assumptions necessary for producing complete elemental and energy balances. Several meetings were held between IGT and FWDC to discuss the data and techniques for improving the balances.

IGT also developed a Lotus spreadsheet program to calculate elemental and energy balance closures for a steady-state period from laboratory and pilot plant measurements, and to determine the carbonizer performance. This program was provided to FWDC for merging with their material-balance program (also a Lotus spreadsheet program) for completeness.

Based on the review of the data and discussions with FWDC, IGT revised the FWDC material and energy balances for all the set points and issued them to FWDC. The revised balance for each of the set points is summarized in Appendix A.

2.4. Total Energy, Total Mass, and Elemental Closures

The balance closures (total out divided by total in) were checked to validate the accuracy of the measurements. The total energy, total mass, carbon, hydrogen, oxygen, nitrogen, sulfur, argon, calcium, magnesium, and ash closures for each of the steady-state periods were presented previously in Tables 2.7, 2.9, 2.11, and 2.13. Figures 2.13 and 2.14 show these closures for Test Run TR1. Similarly, Figures 2.15 through 2.26 show these closures for the remaining Test Runs (TR2 through TR10).

The total energy closure for different set points, while operating the carbonizer in the jetting fluidized-bed mode, is shown in Figure 2.27; it ranges from 72.2% to 110.1% with an average value of 87.7%. The figure shows that the closure is usually less than 100%. The total mass closure for different set points is shown in Figure 2.28; it ranges from 84.7% to 111.3% with an average value of 94.8%. The figure shows that the closure is usually less than 100%.

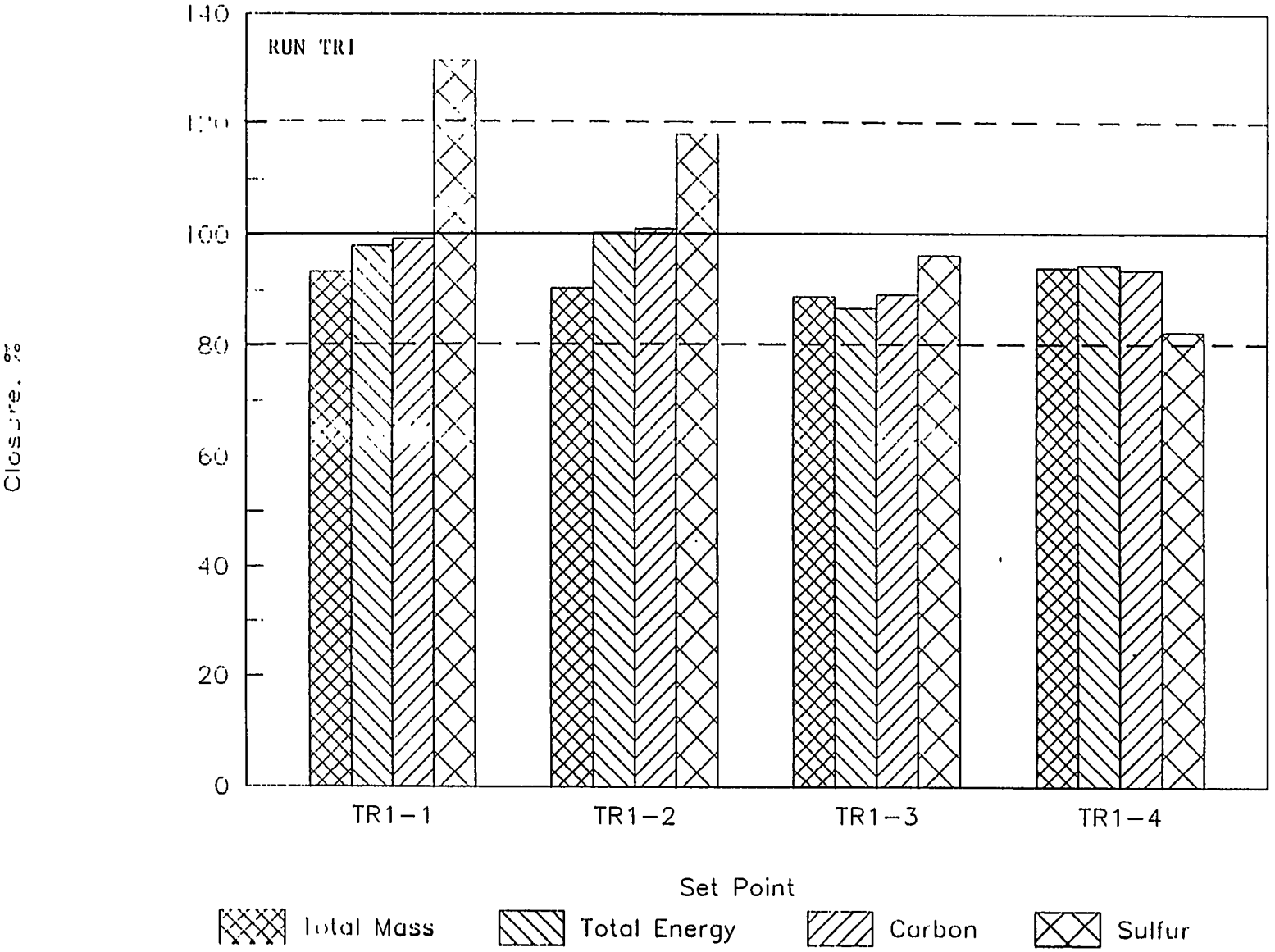

Figure 2.13. TOTAL MASS, TOTAL ENERGY, CARBON, AND SULFUR CLOSURES FOR TEST RUN TR1

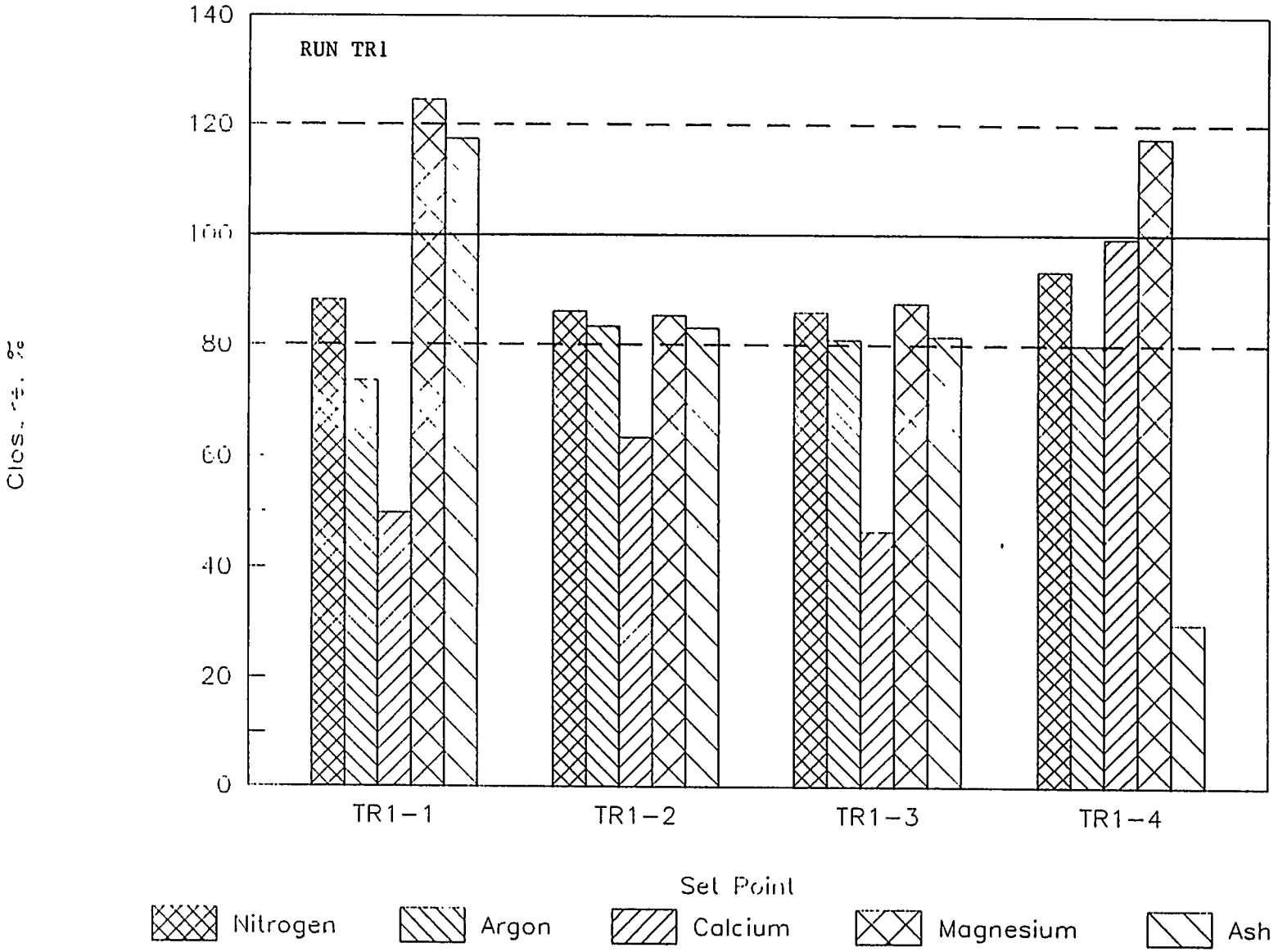

Figure 2.14. NITROGEN, ARGON, CALCIUM, MAGNESIUM, AND ASH CLOSURES FOR TEST RUN TR1

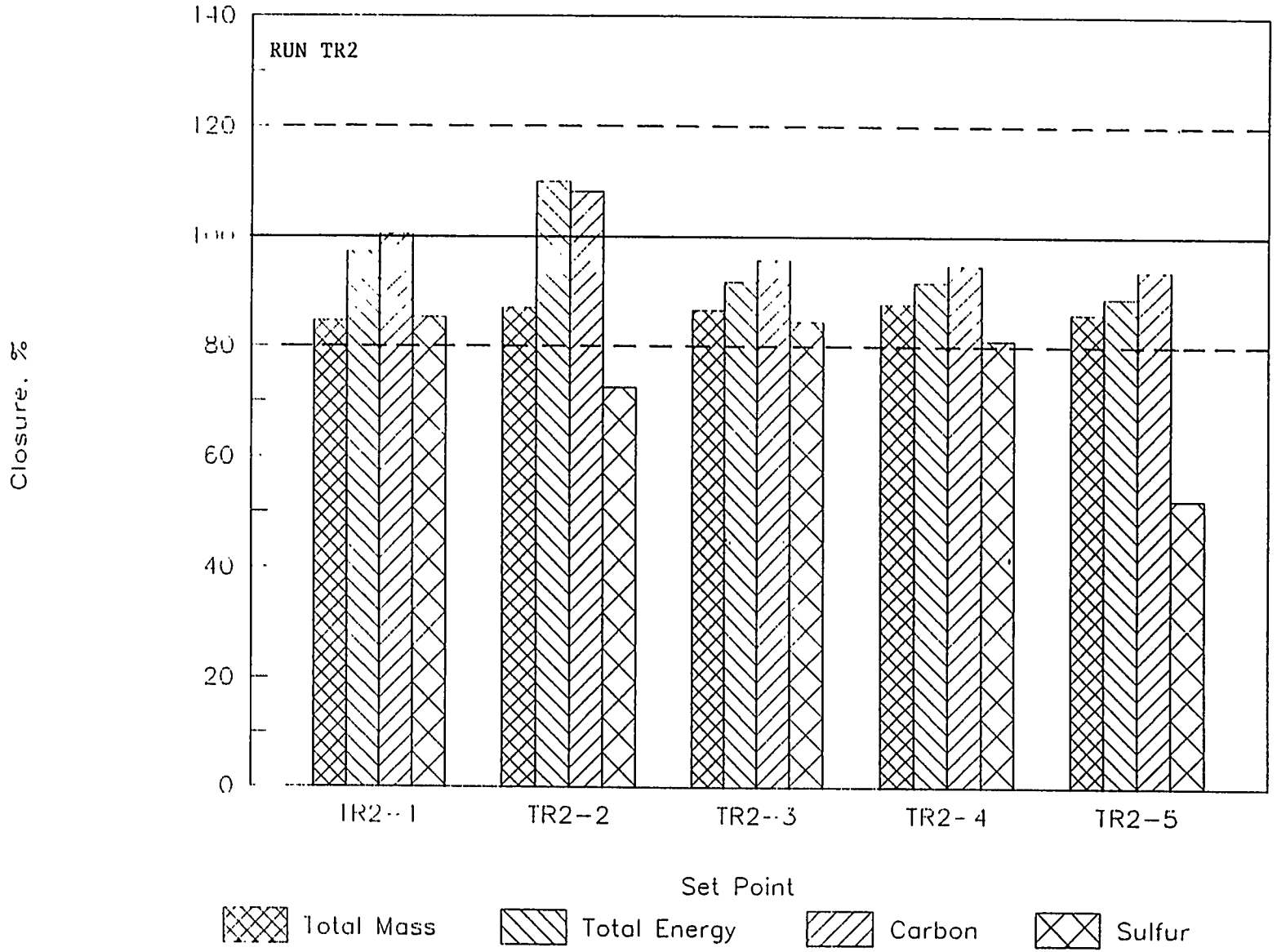

Figure 2.15. TOTAL MASS, TOTAL ENERGY, CARBON, AND SULFUR CLOSURES FOR TEST RUN TR2

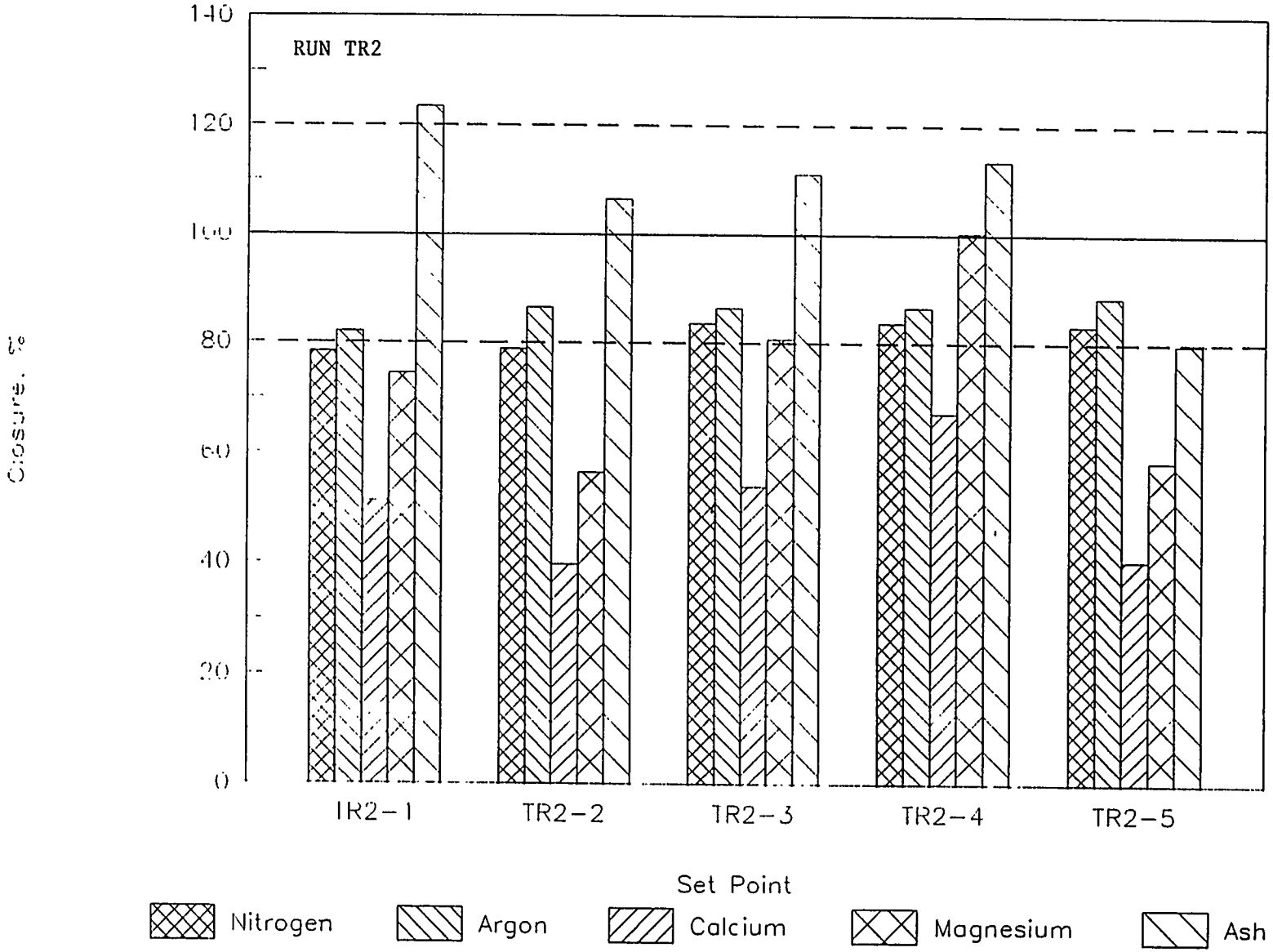

Figure 2.16. NITROGEN, ARGON, CALCIUM, MAGNESIUM, AND ASH CLOSURES FOR TEST RUN TR2

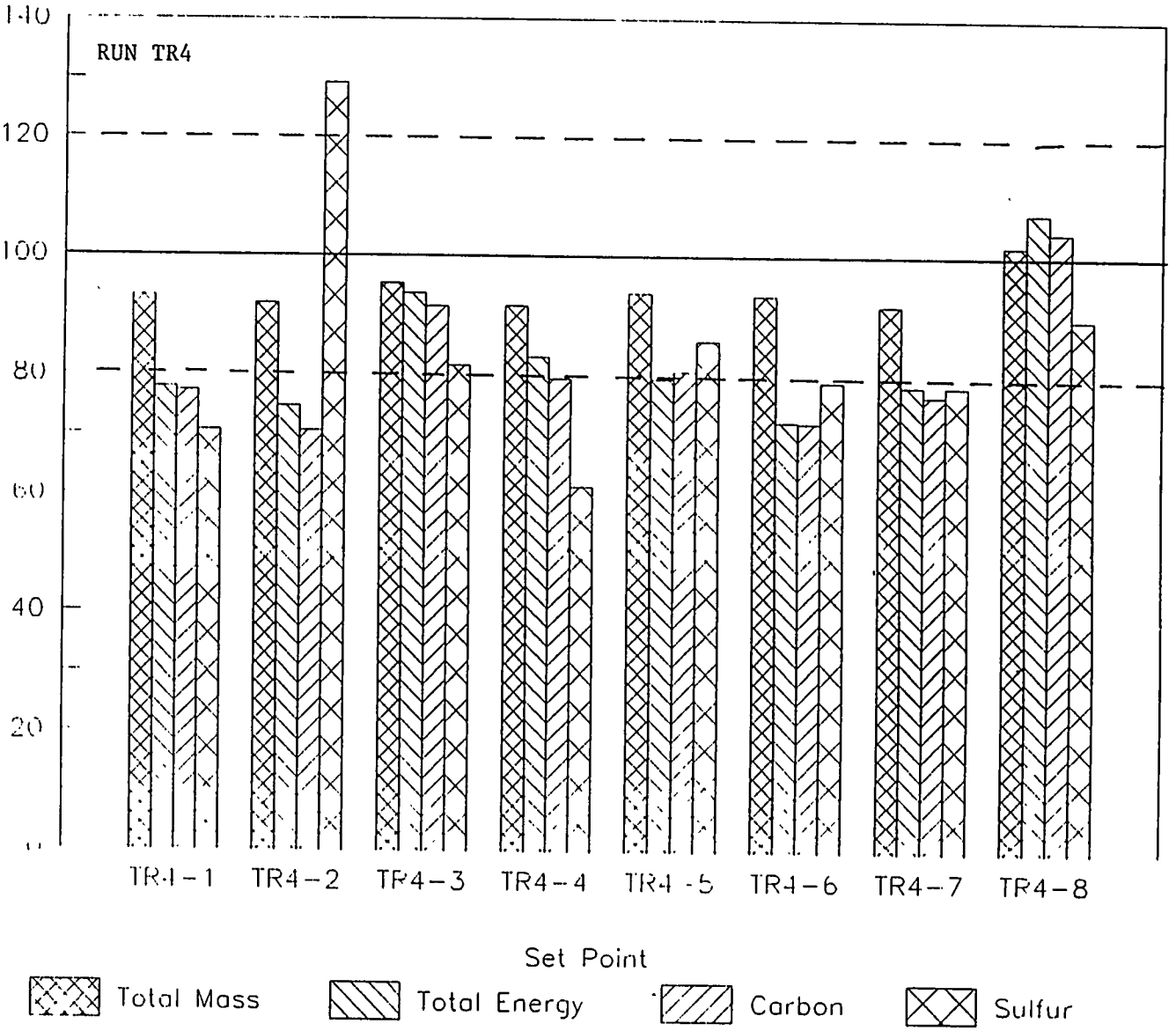

Figure 2.17. TOTAL MASS, TOTAL ENERGY, CARBON, AND SULFUR CLOSURES FOR TEST RUN TR4

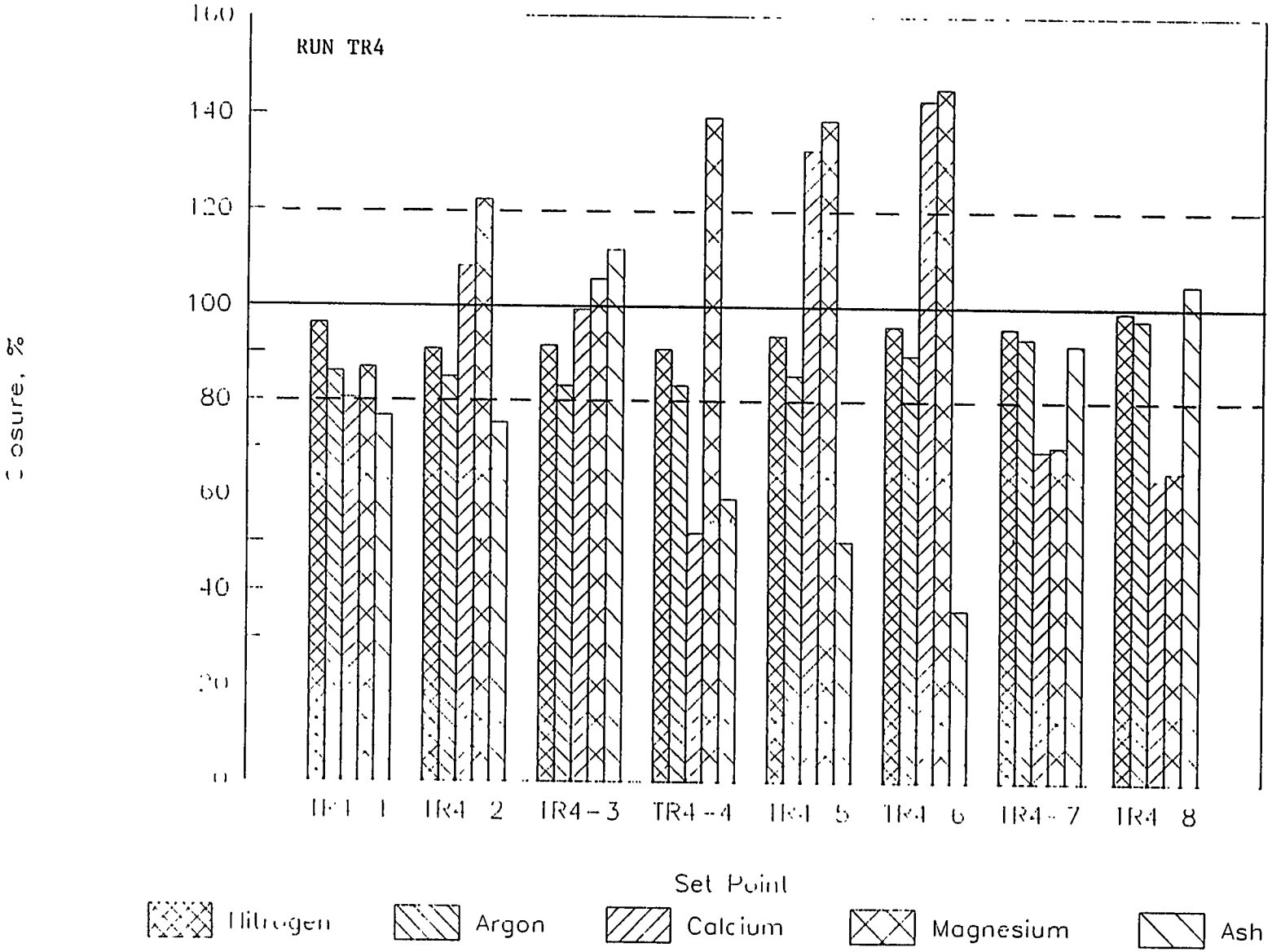

Figure 2.18. NITROGEN, ARGON, CALCIUM, MAGNESIUM, AND ASH CLOSURES FOR TEST RUN TR4

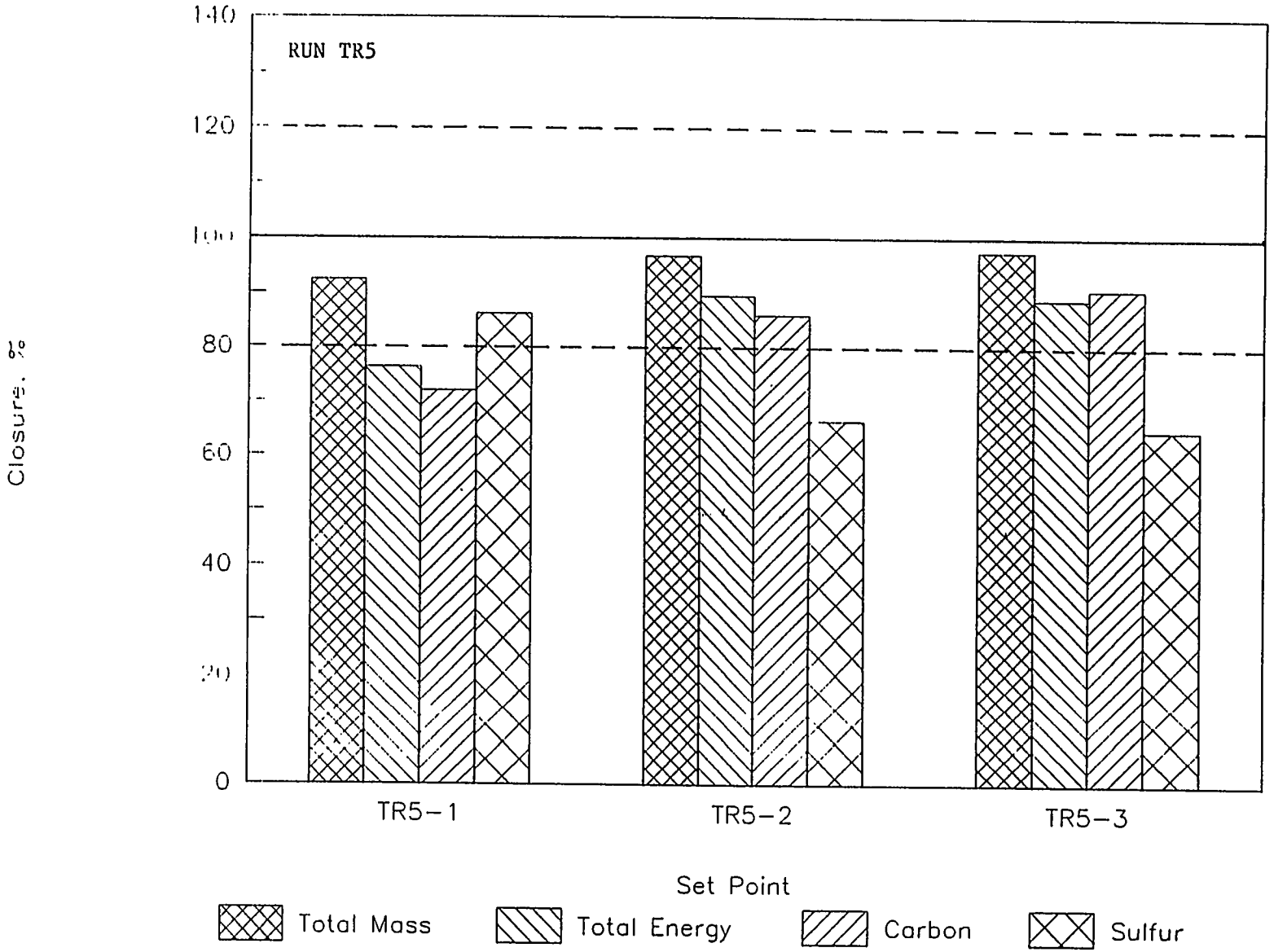

Figure 2.19. TOTAL MASS, TOTAL ENERGY, CARBON, AND SULFUR CLOSURES FOR TEST RUN TR5

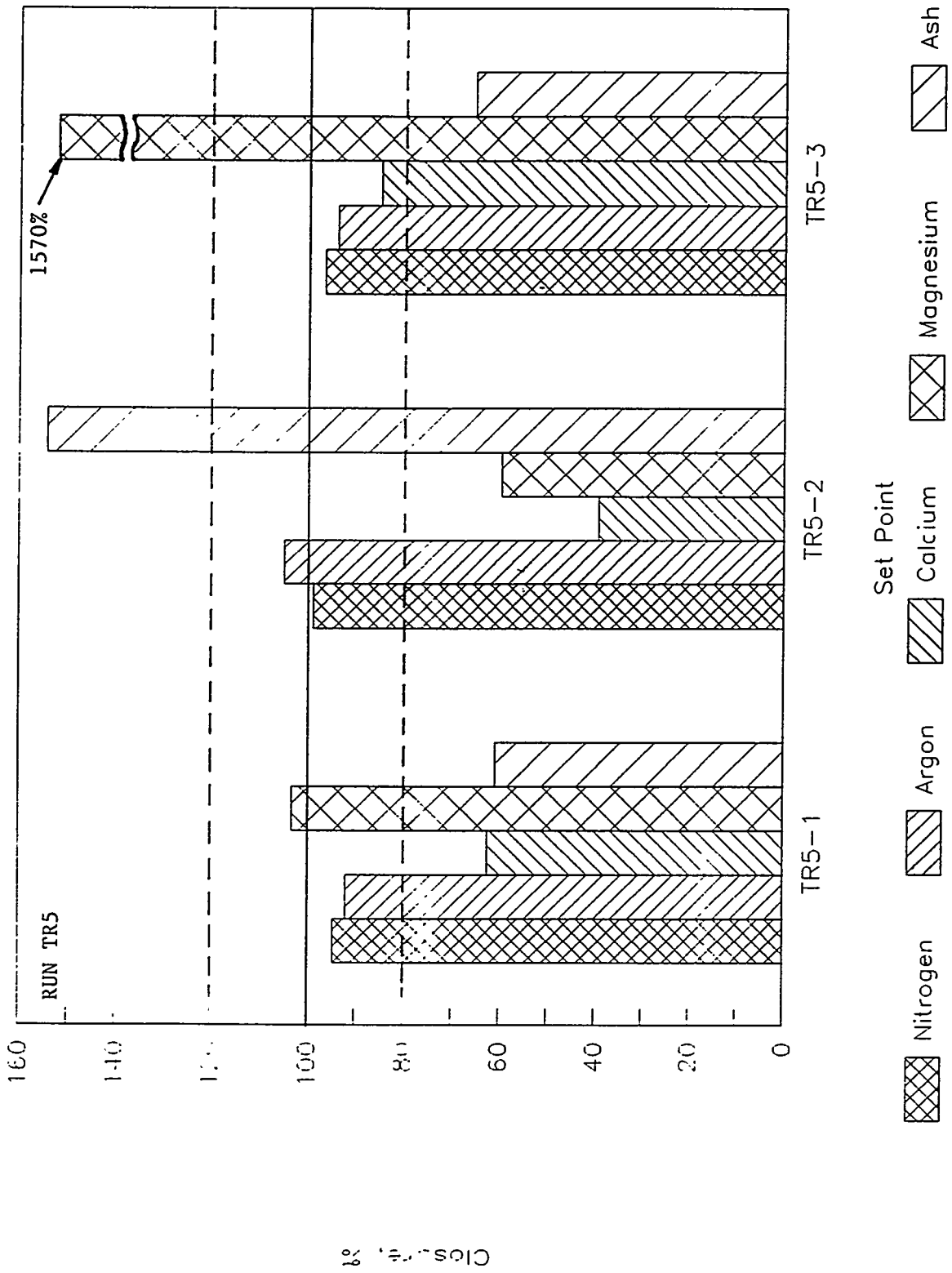

Figure 2.20. NITROGEN, ARGON, CALCIUM, MAGNESIUM, AND ASH CLOSURES FOR TEST RUN TR5

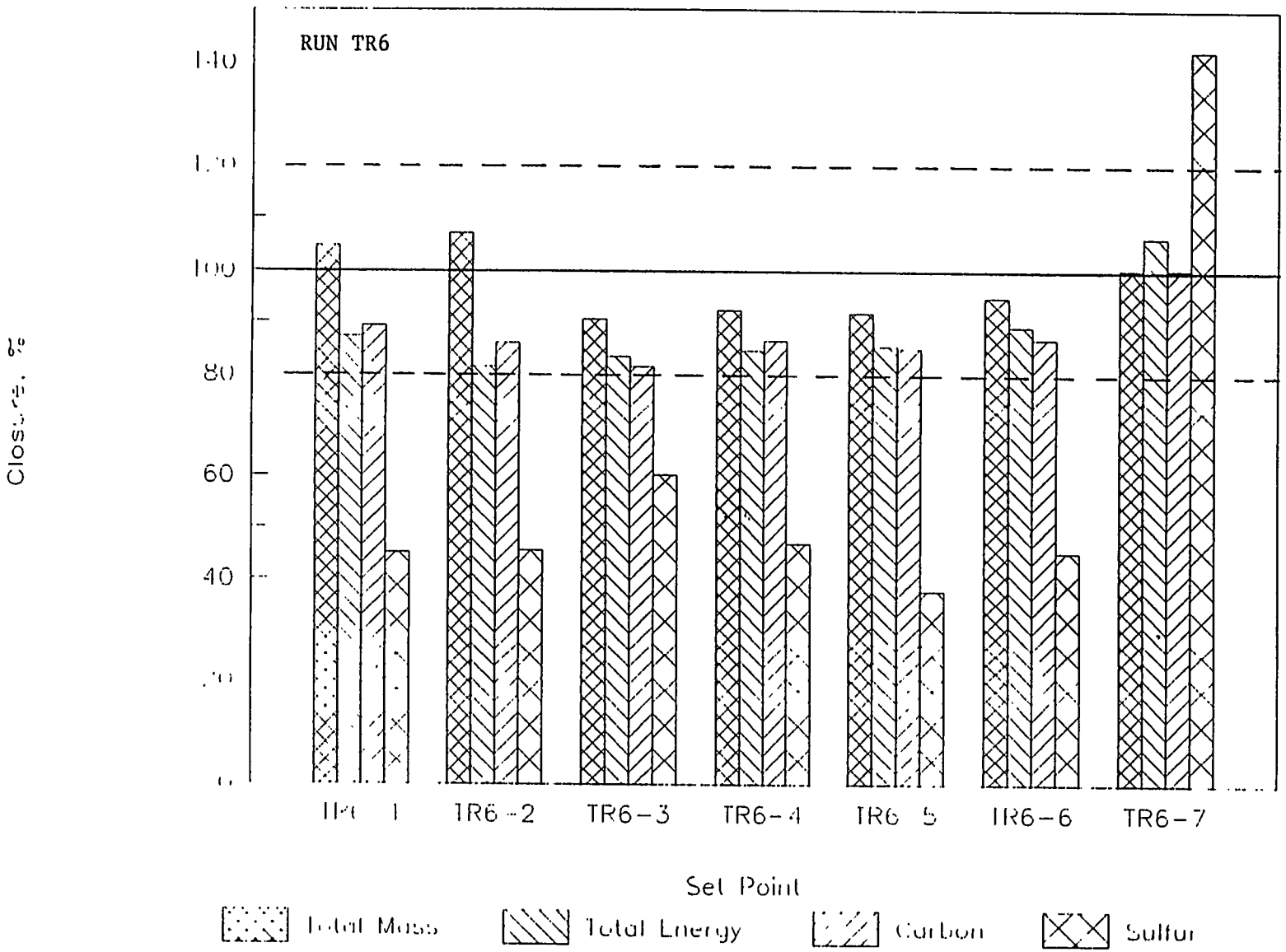

Figure 2.21. TOTAL MASS, TOTAL ENERGY, CARBON, AND SULFUR CLOSURES FOR TEST RUN TR6

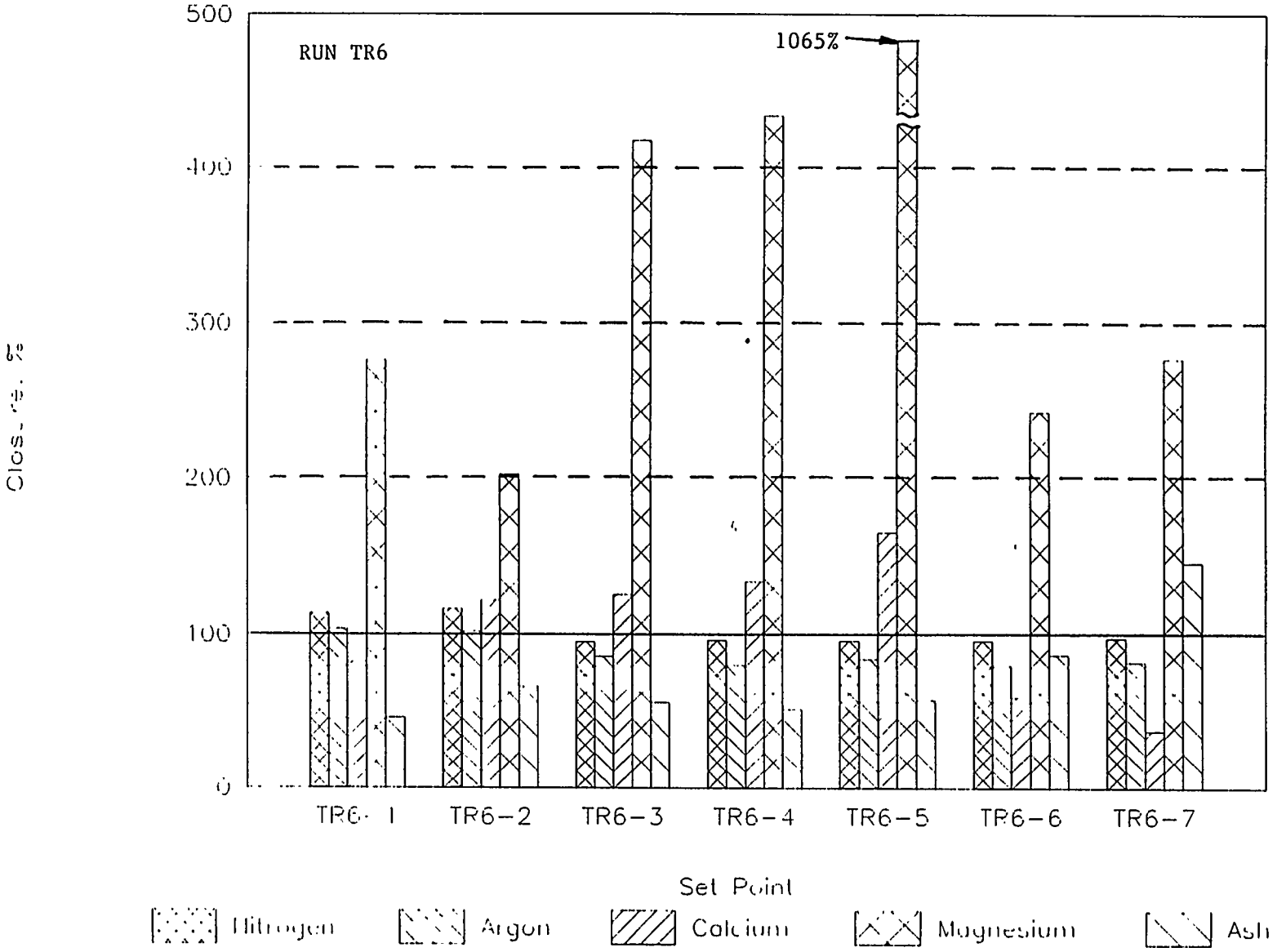

Figure 2.22. NITROGEN, ARGON, CALCIUM, MAGNESIUM, AND ASH CLOSURES FOR TEST RUN TR6

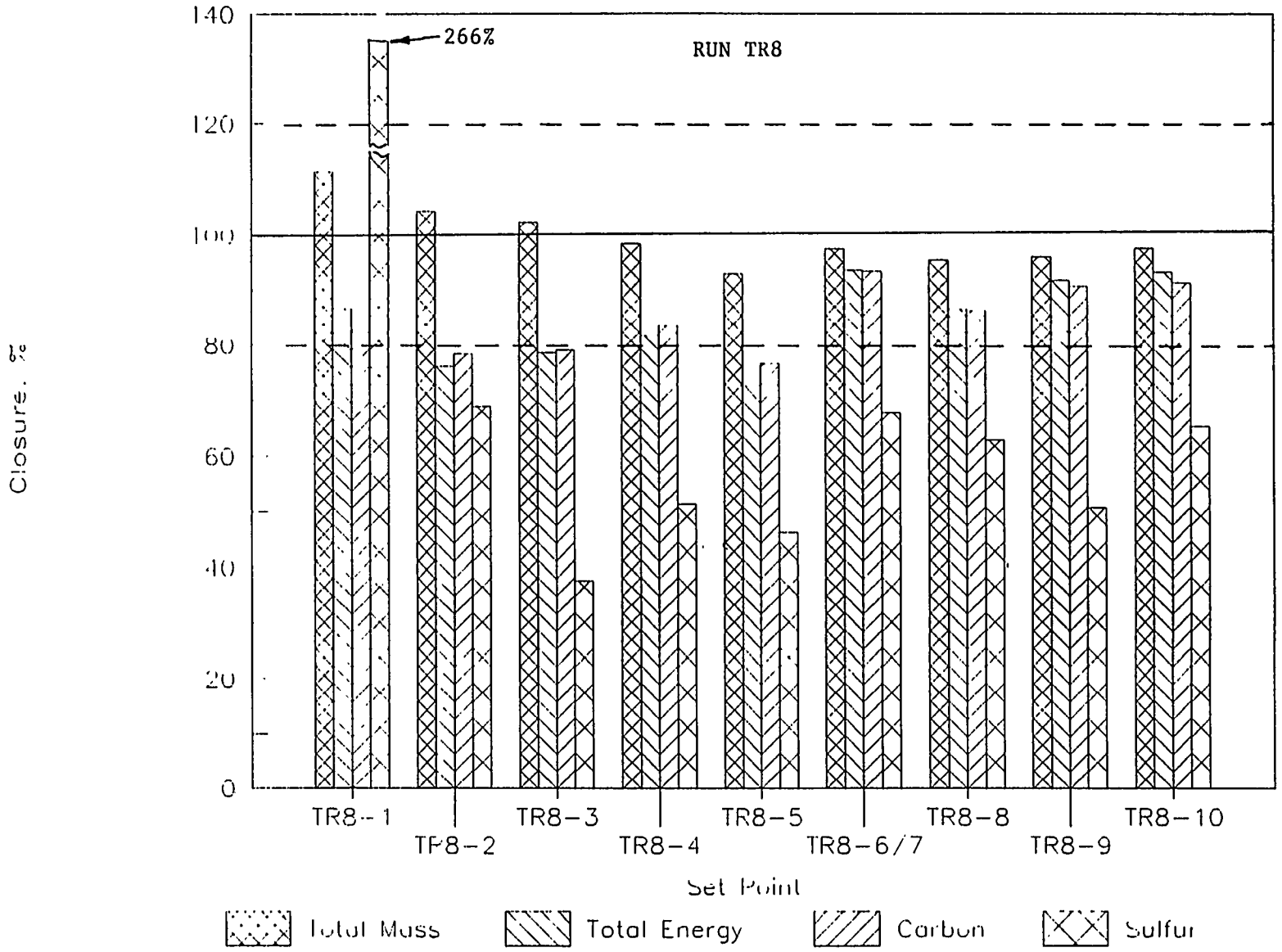

Figure 2.23. TOTAL MASS, TOTAL ENERGY, CARBON, AND SULFUR CLOSURES FOR TEST RUN TR8

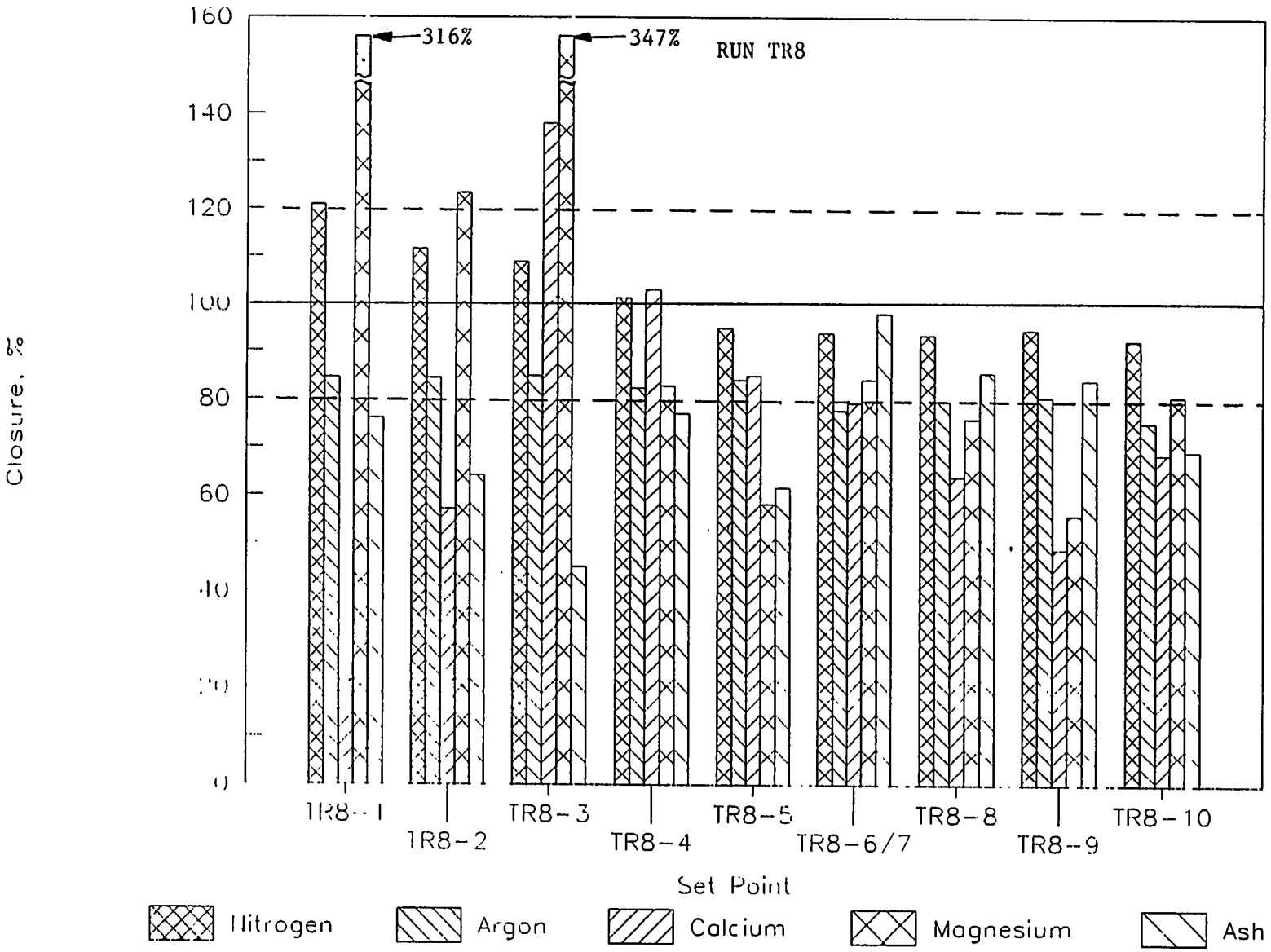

Figure 2.24. NITROGEN, ARGON, CALCIUM, MAGNESIUM, AND ASH CLOSURES FOR TEST RUN TR8

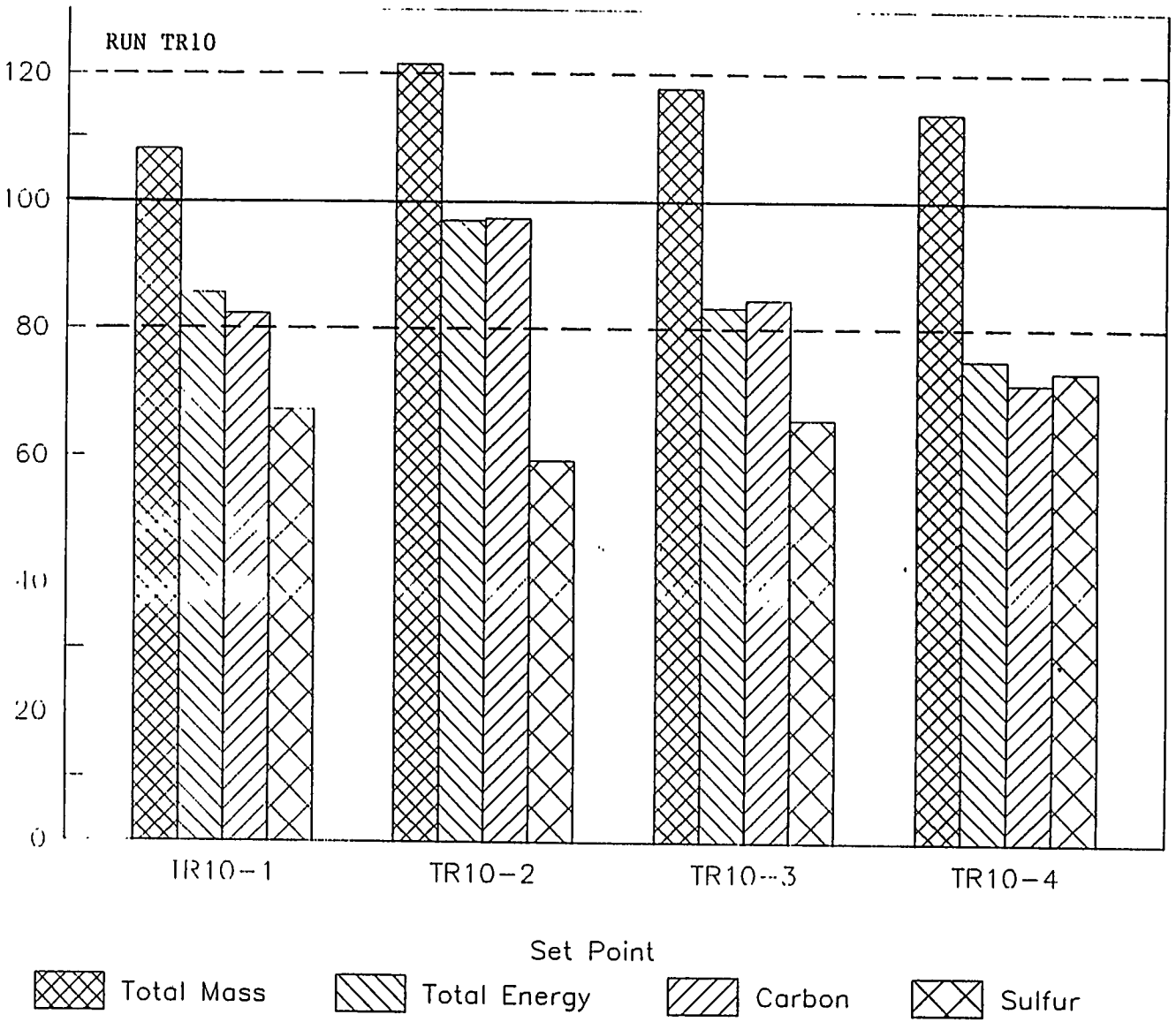

Figure 2.25. TOTAL MASS, TOTAL ENERGY, CARBON, AND SULFUR CLOSURES FOR TEST RUN TR10

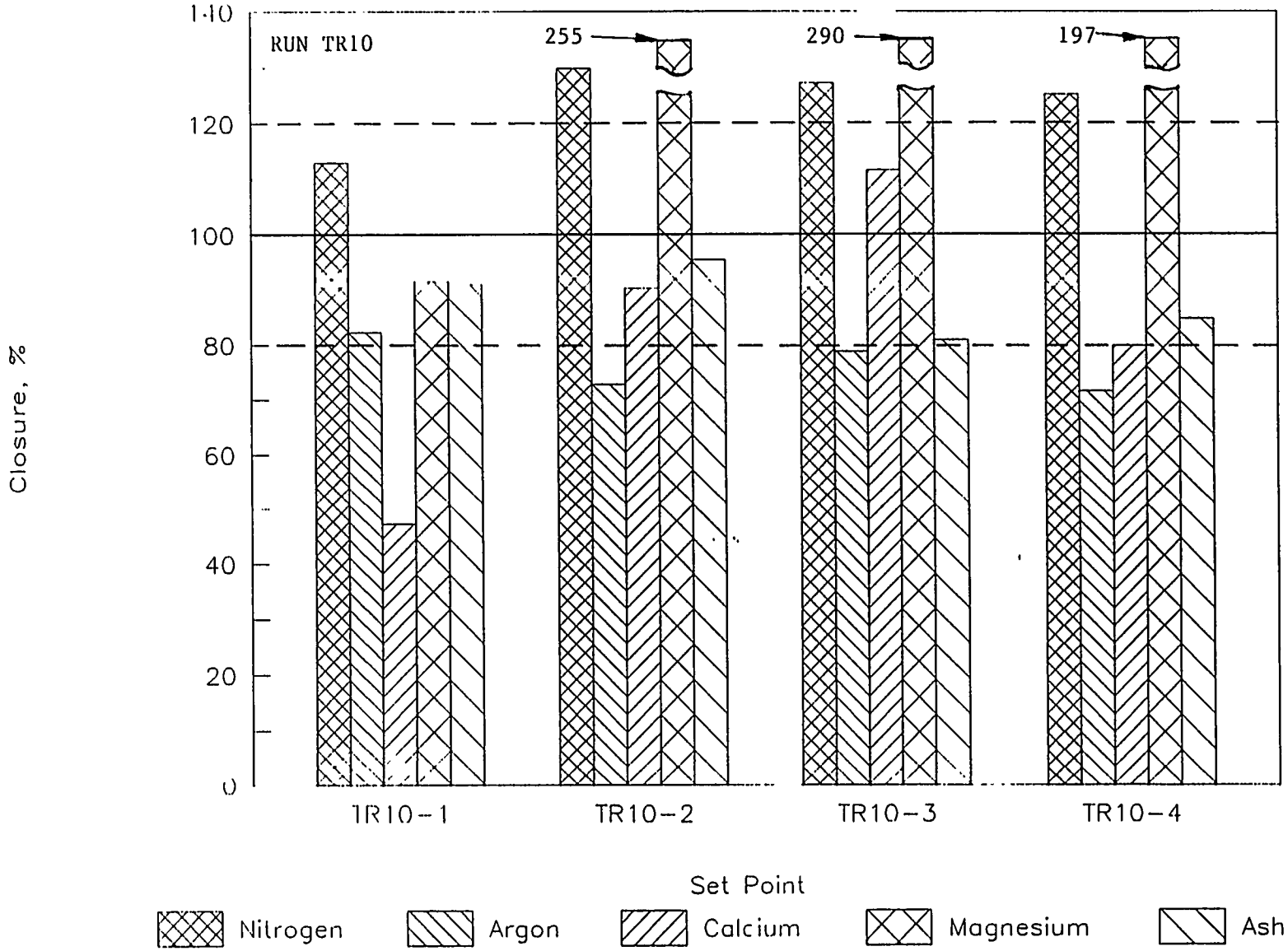

Figure 2.26. NITROGEN, ARGON, CALCIUM, MAGNESIUM, AND ASH CLOSURES FOR TEST RUN TR10

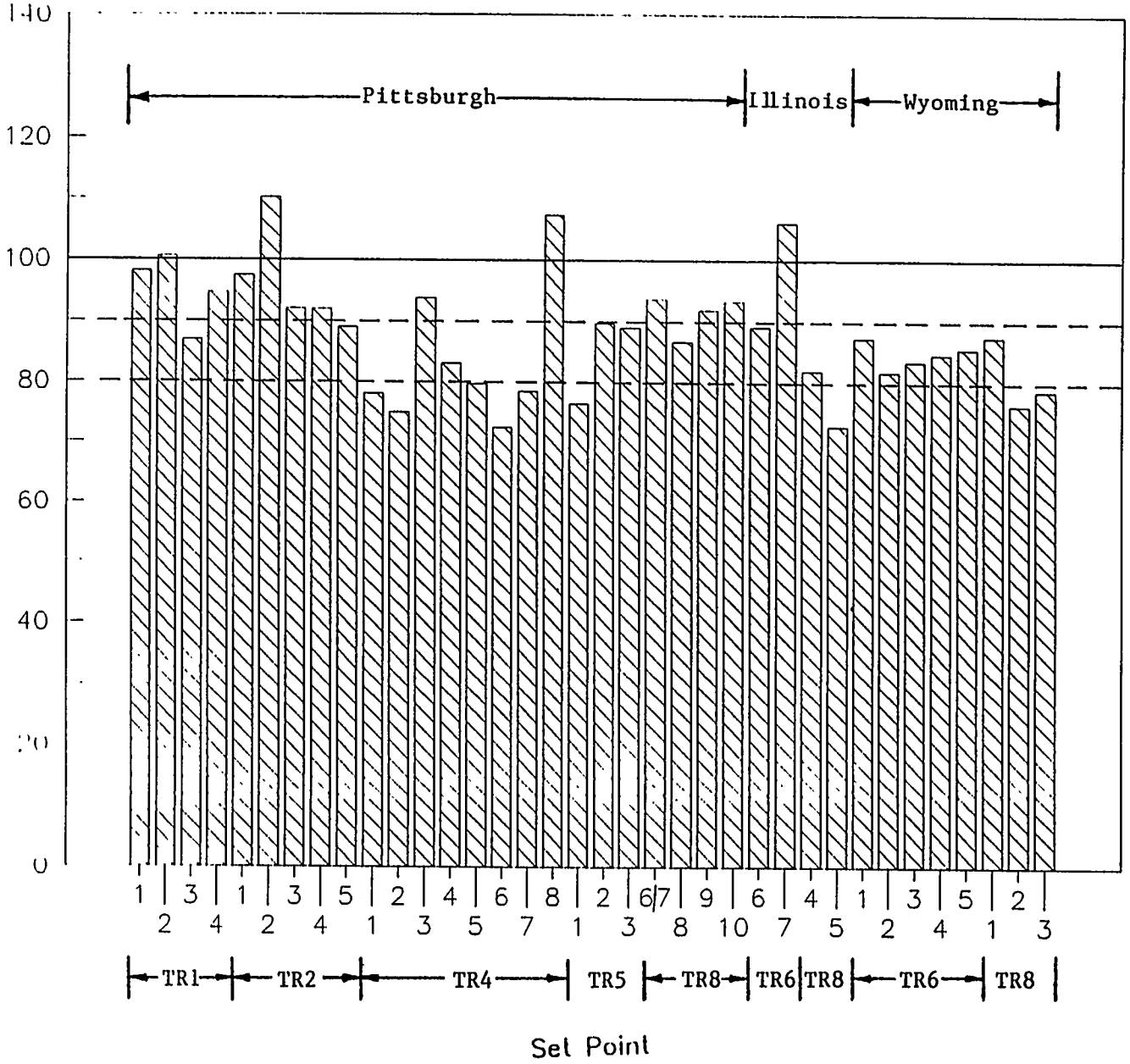

Figure 2.27. TOTAL ENERGY CLOSURE FOR STEADY-STATE PERIODS

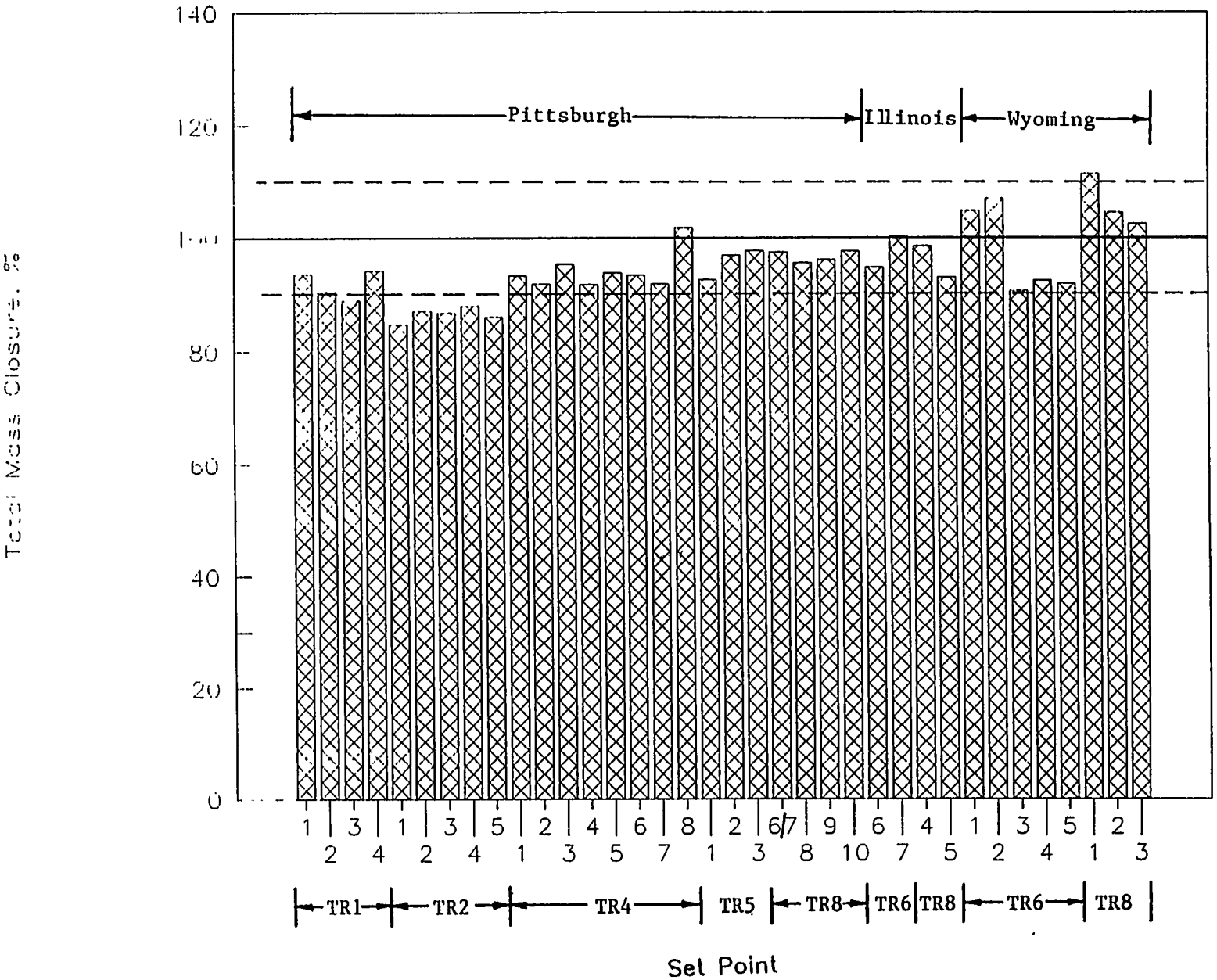

Figure 2.28. TOTAL MASS CLOSURE FOR STEADY-STATE PERIODS

The carbon closure for different set points, while operating the carbonizer in the jetting fluidized-bed mode, is shown in Figure 2.29; it ranges from 70.5% to 108.3% with an average value of 87.6%. The carbon closure parallels the total energy closure; the figure shows that the carbon closure is usually less than 100%. The sulfur closure for different set points is shown in Figure 2.30; it ranges from 37.4% to 265.5% with an average value of 78.7% and a standard deviation of 40.6%. The determination of the fate of sulfur is one of the important objectives of the pilot plant testing, and thus a good closure on sulfur is highly desirable.

The nitrogen closure for different set points is shown in Figure 2.31; it ranges from 78.3% to 120.9% with an average value of 95.1%. The figure shows that the closure is usually less than 100%. The hydrogen closure for different set points is shown in Figure 2.32; it ranges from 81.1% to 151.6% with an average value of 109.5%. The oxygen closure for different set points is shown in Figure 2.33; it ranges from 87.7% to 123.9% with an average value of 102.8%. The argon closure for different set points is shown in Figure 2.34; it ranges from 73.5% to 104.9% with an average value of 86.2%. The figure shows that the argon closure is usually less than 100%.

The calcium closure for different set points is shown in Figure 2.35; it ranges from 21.5% to 164.9% with an average value of 78.5%. The magnesium closure for different set points is shown in Figure 2.36; it ranges from 55.8% to 1570.4% with an average value of 208.7%. The ash (coal ash and sorbent inerts) closure for different set points is shown in Figure 2.37; it ranges from 29.8% to 154.1% with an average value of 80.8%.

Table 2.14 summarizes these closures (along with the minimum, maximum, average, and standard deviation for each of the closures) for all the set points while the carbonizer was operated in the jetting fluidized-bed mode. The table also summarizes the deviation (that is, 100 - closure) for each of the set points, along with its minimum, maximum, average, and standard deviation values. Actually, one should use absolute deviations when looking at the average and standard deviation values for departures from the 100% closures. Thus, the minimum, maximum, average, and standard deviation for absolute deviation of total energy, total mass, and elements are also given in this table. As shown in Table 2.14, the absolute deviation of total energy closure ranged from 0.5% to 27.8% with an average value of 13.6%. The absolute deviation of total mass closure ranged from 0.1% to 15.3% with an average value of 6.9%. The absolute deviation of carbon closure ranged from 0.2% to 29.5% with an average value of 13.2%. The absolute deviation of sulfur closure ranged from 3.7% to 165.5% with an average value of 37.2%. The closures for calcium, magnesium, and ash are also not as self-consistent as desired.

Table 2.15 summarizes these closures for all the set points while the carbonizer was operated in the circulating fluidized-bed mode. The minimum, maximum, average, and standard deviation for absolute deviation of total energy, total mass, and elements are also given in this table. As shown in Table 2.15, the absolute deviation of total energy closure ranged from 3.0% to 24.8% with an average value of 14.8%. The absolute deviation of total mass closure ranged from 8.1% to 21.5% with an average value of 15.3%. The absolute deviation of carbon closure ranged from 2.7% to 28.5% with an average value of 16.1%. The absolute deviation of sulfur closure ranged from 26.6% to 40.6% with an average value of 33.5%. The absolute deviation of hydrogen closure ranged from 38.7% to 48.7% with an average value of 41.6%.

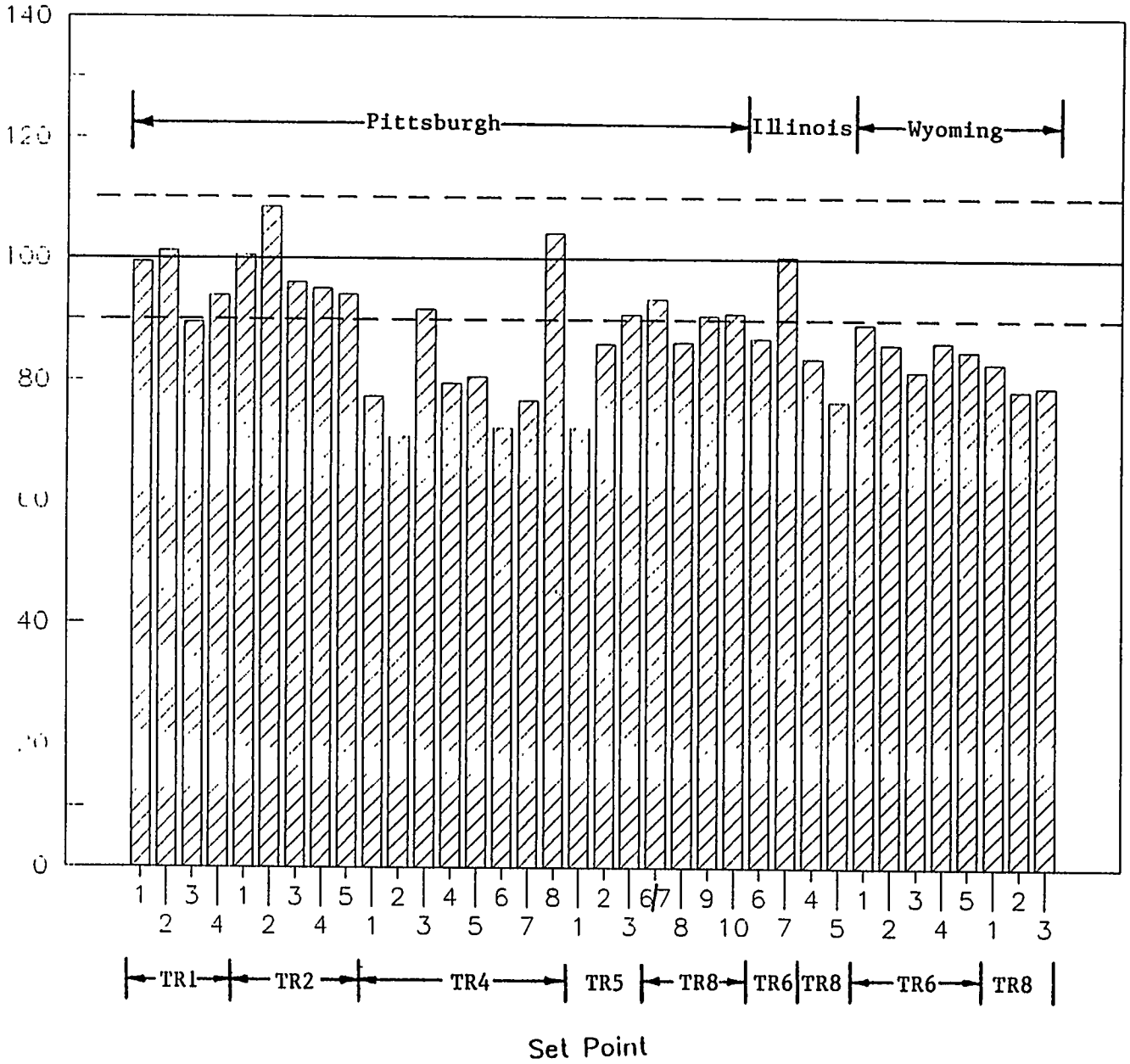

Figure 2.29. CARBON CLOSURE FOR STEADY-STATE PERIODS

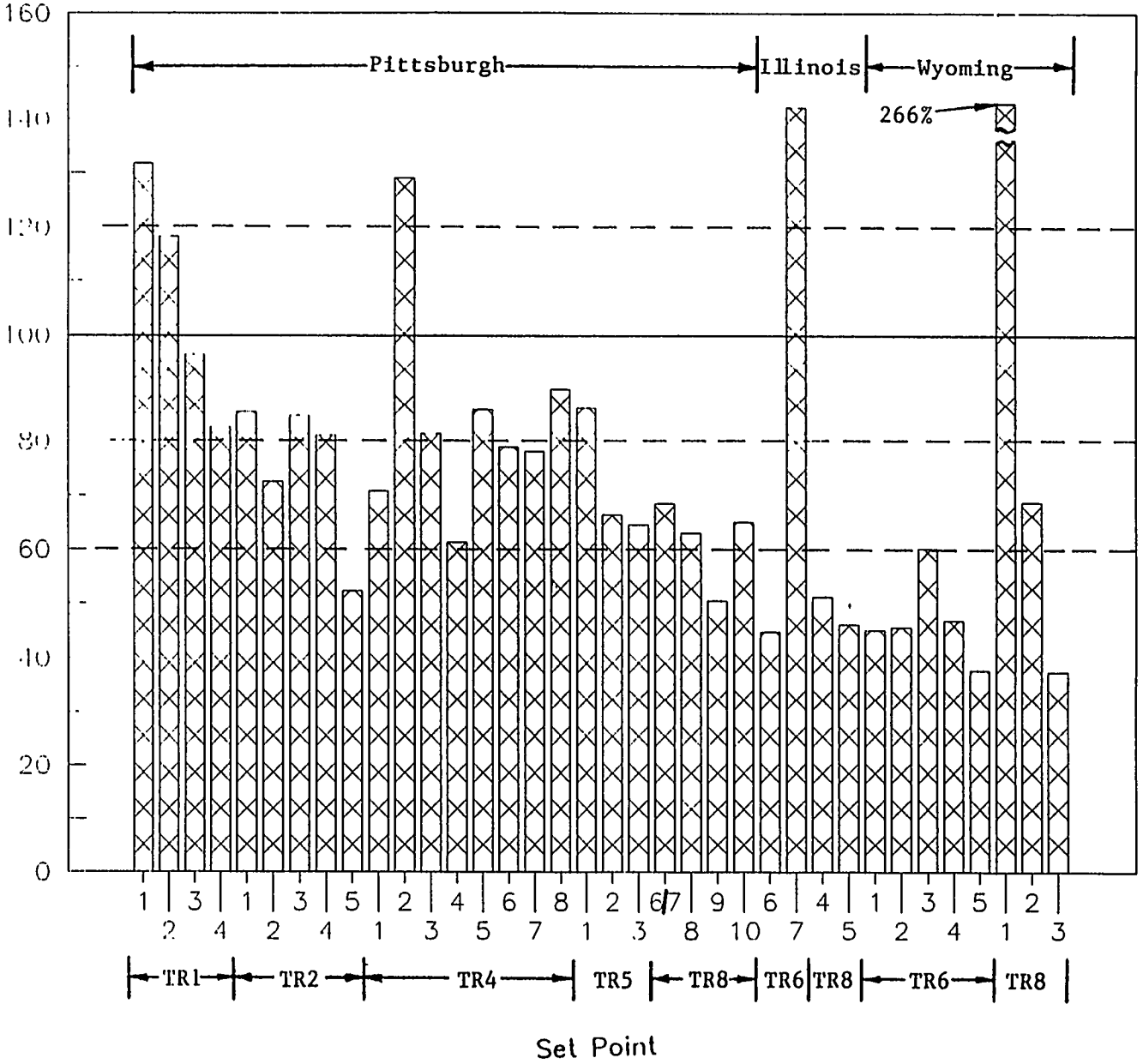

Figure 2.30. SULFUR CLOSURE FOR STEADY-STATE PERIODS

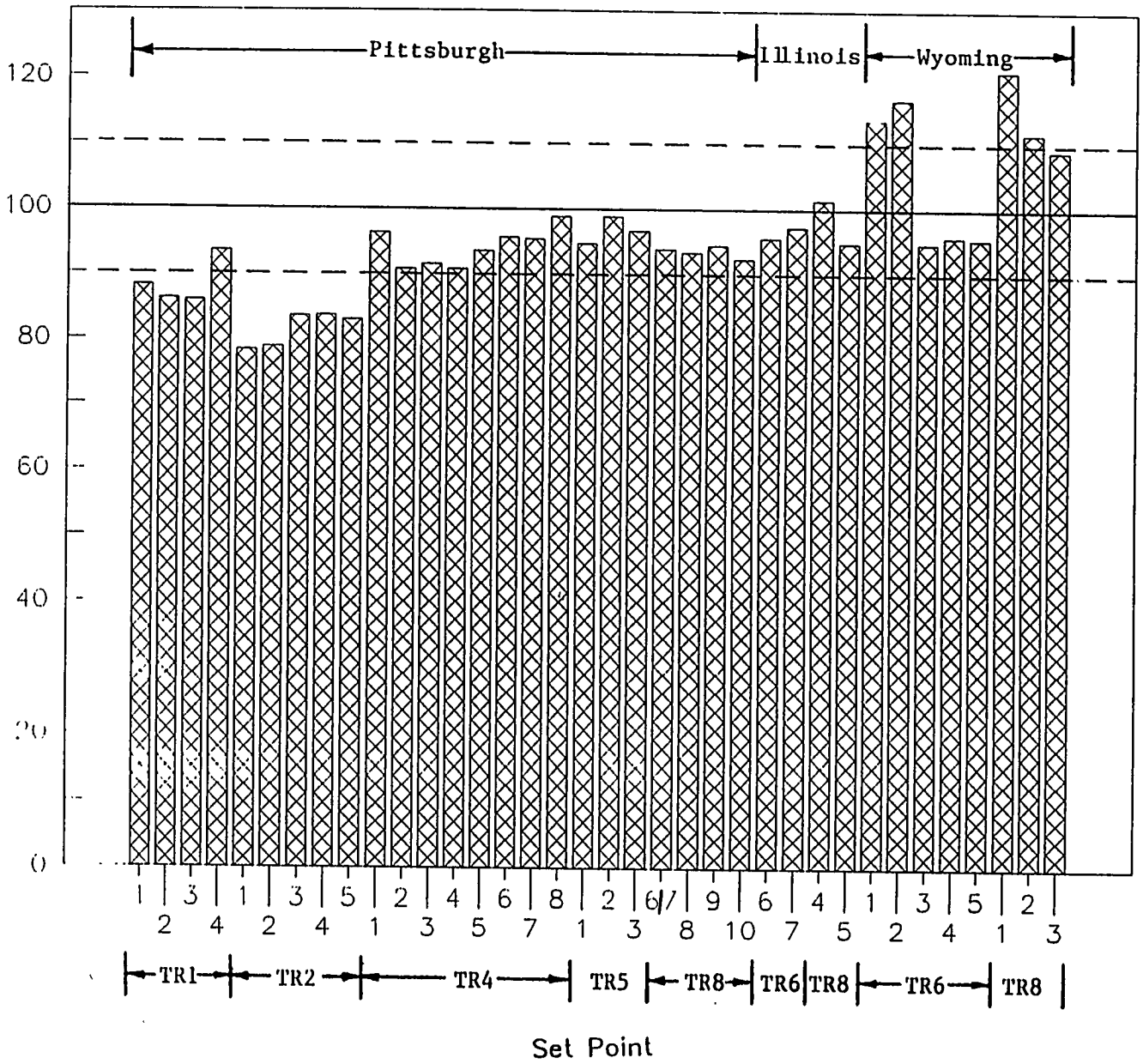

Figure 2.31. NITROGEN CLOSURE FOR STEADY-STATE PERIODS

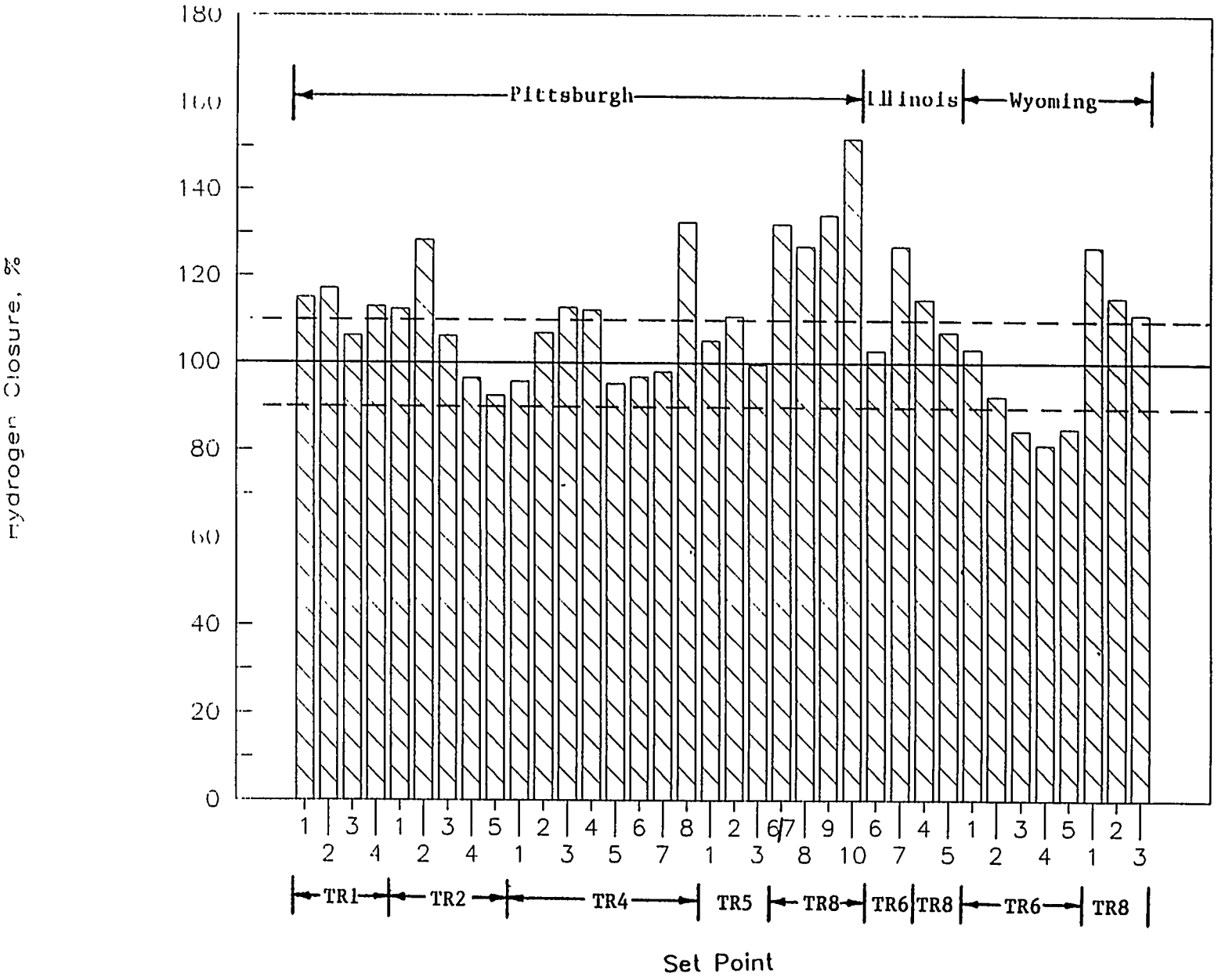

Figure 2.32. HYDROGEN CLOSURE FOR STEADY-STATE PERIODS

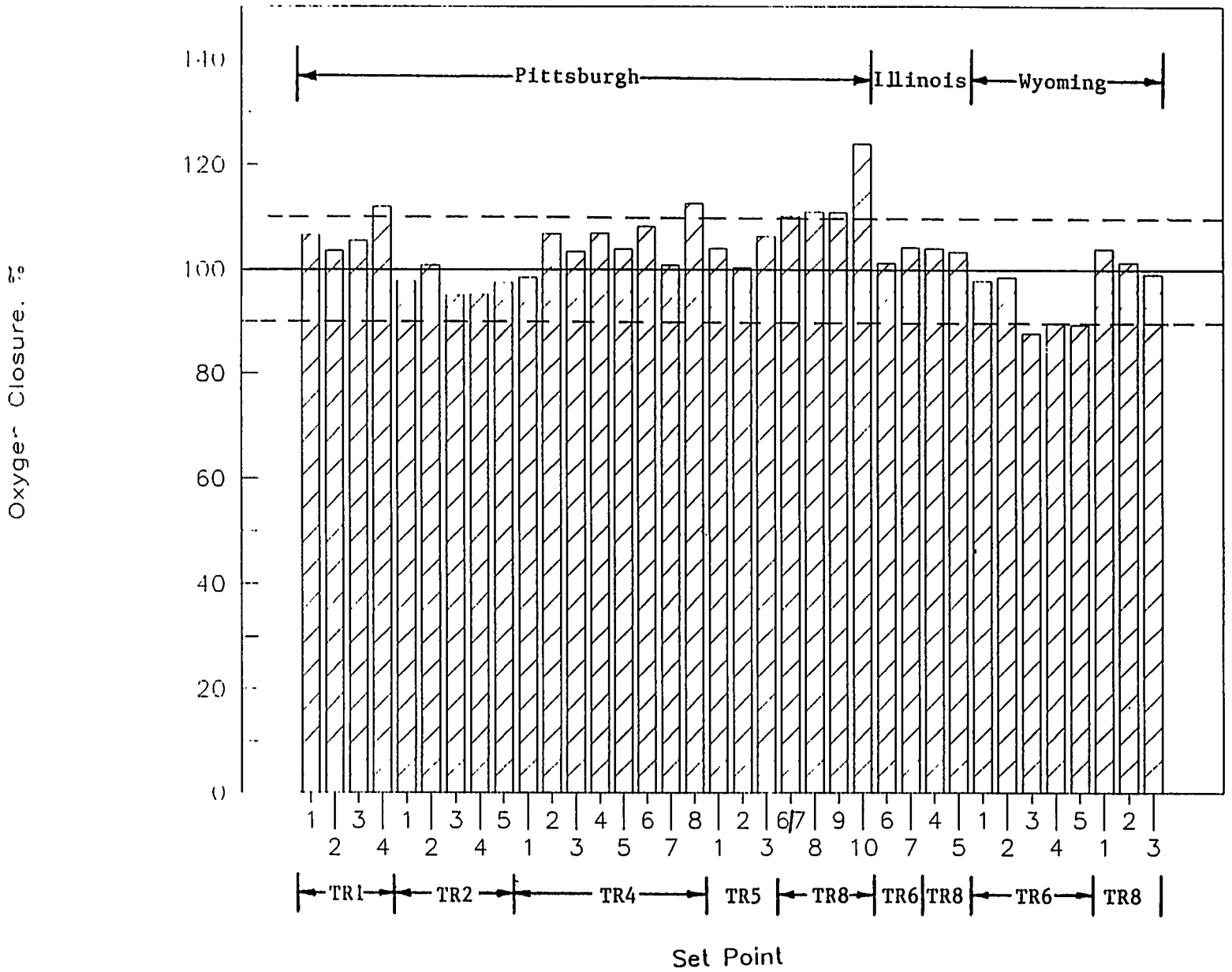

Figure 2.33. OXYGEN CLOSURE FOR STEADY-STATE PERIODS

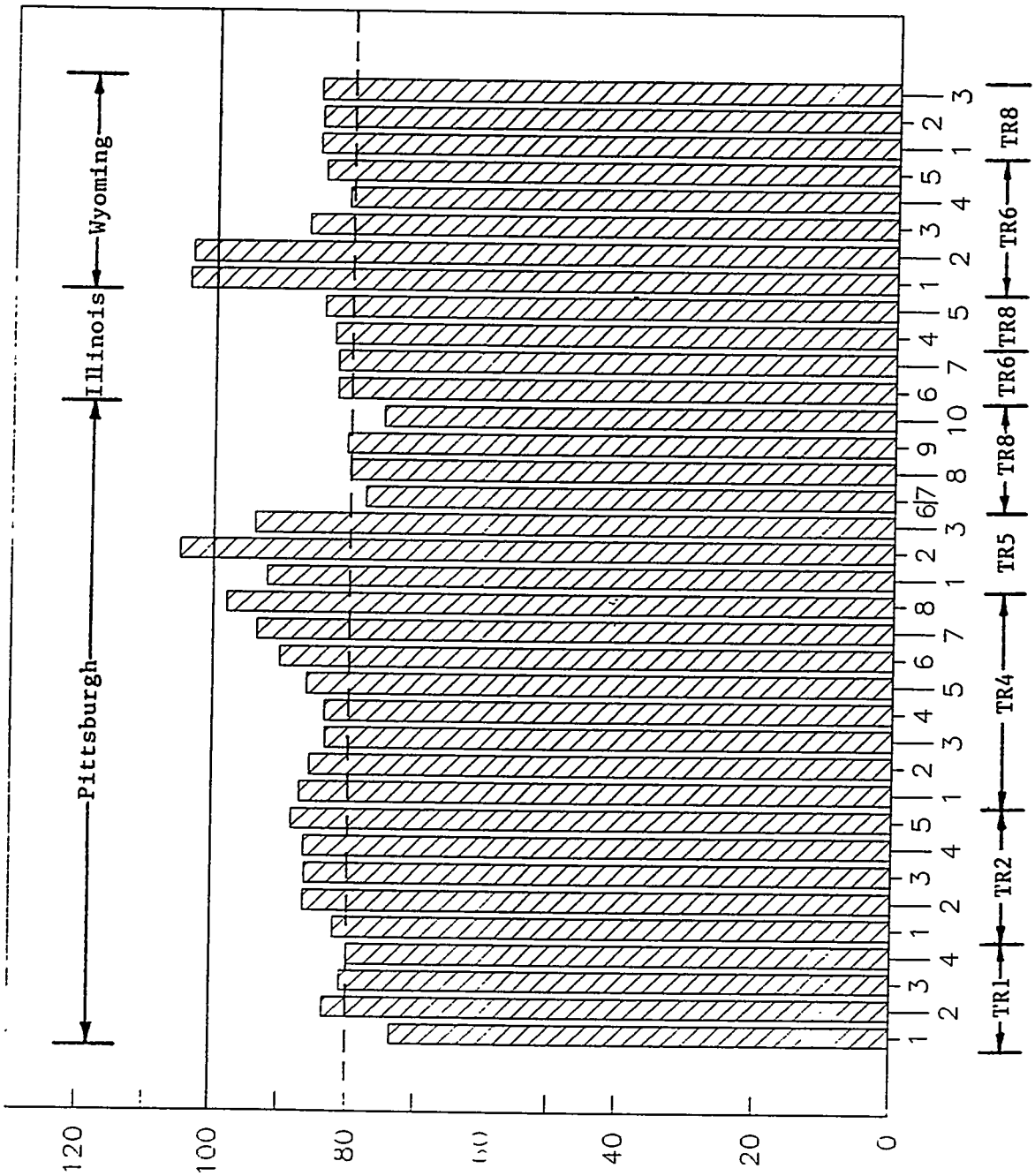

Figure 2.34. ARGON CLOSURE FOR STEADY-STATE PERIODS

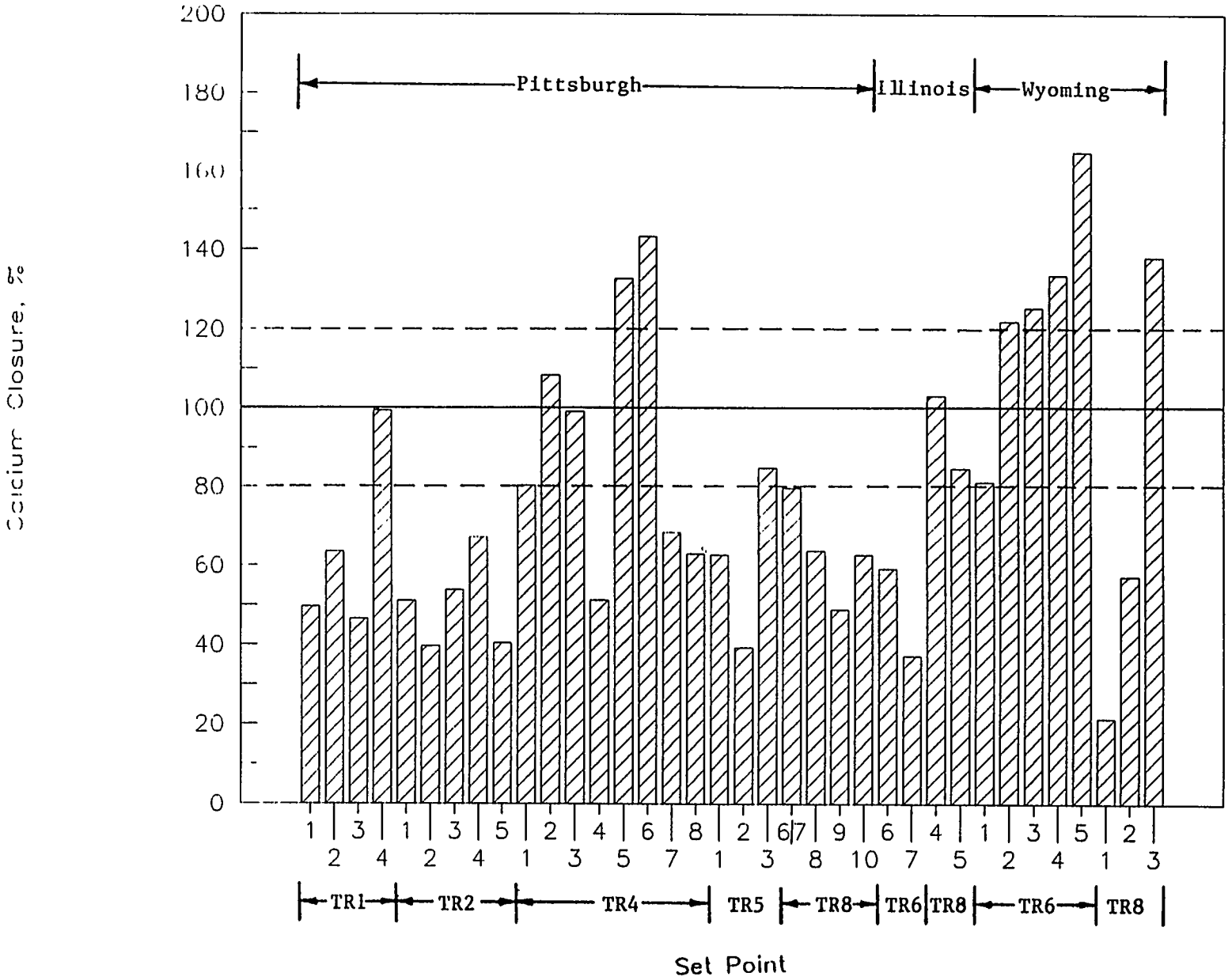

Figure 2.35. CALCIUM CLOSURE FOR STEADY-STATE PERIODS

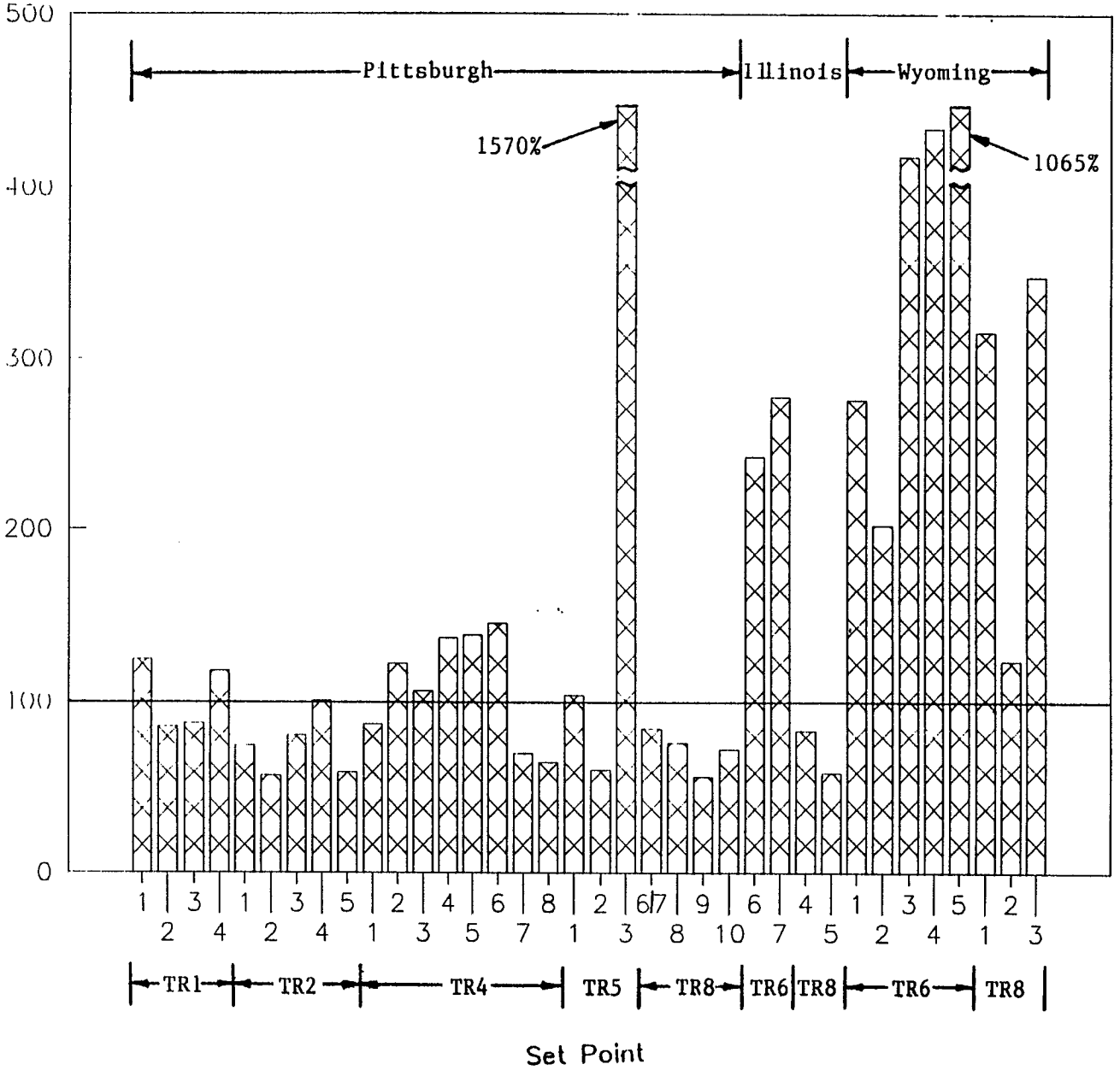

Figure 2.36. MAGNESIUM CLOSURE FOR STEADY-STATE PERIODS

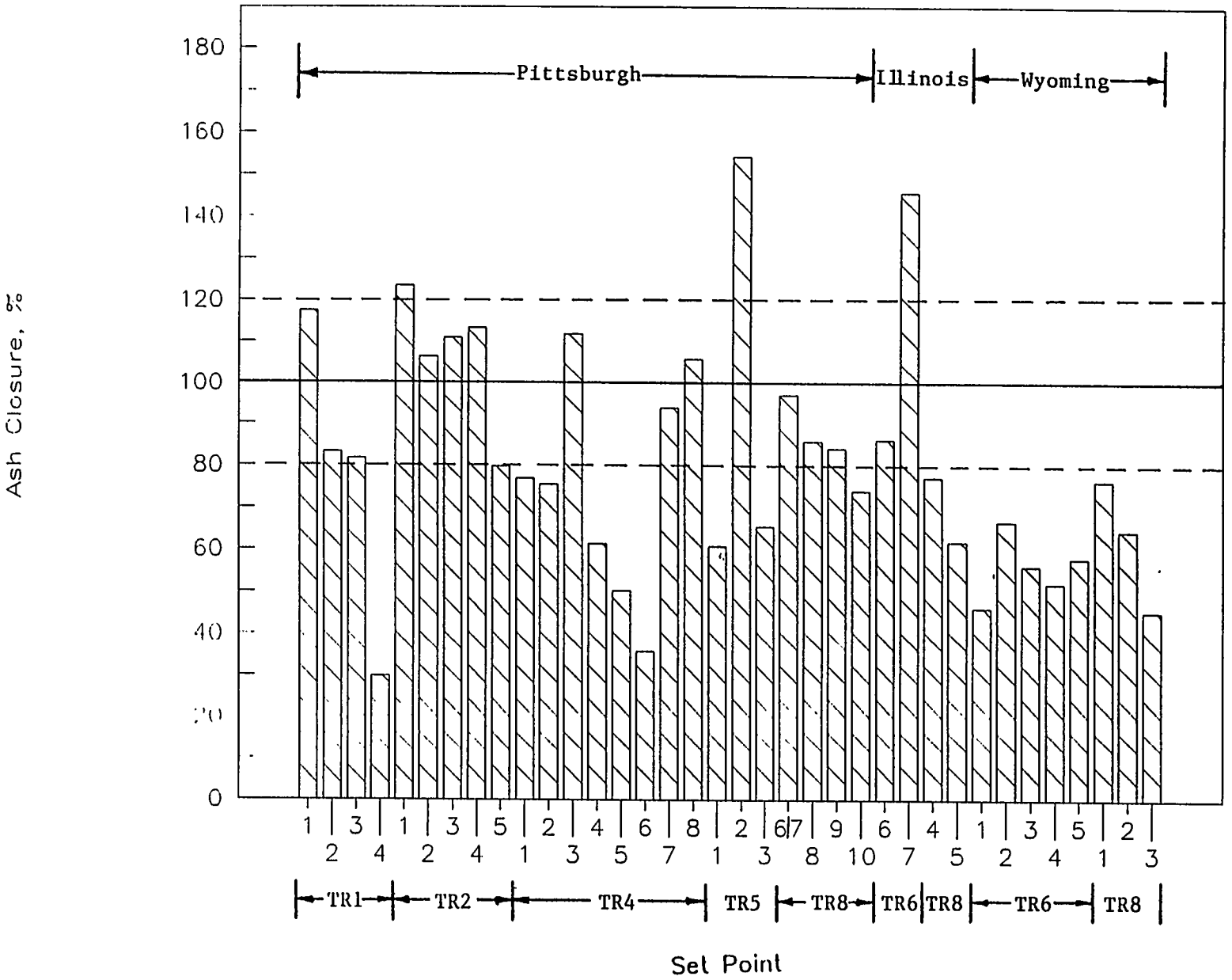

Figure 2.37. ASH CLOSURE FOR STEADY-STATE PERIODS

Table 2.14. ENERGY, MASS, AND ELEMENTAL CLOSURES IN MATERIAL AND ENERGY BALANCES FOR STEADY-STATE PERIODS (JETTING FLUIDIZED-BED OPERATING MODE)

Set Point	TR1-1	TR1-2	TR1-3	TR1-4	TR2-1	TR2-2	TR2-3	TR2-4	TR2-5	TR4-1	TR4-2	TR4-3
Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo
Begin Date	11/20/91	11/21/91	11/21/91	11/21/91	12/19/91	12/19/91	12/20/91	12/20/91	12/20/91	3/10/92	3/11/92	3/12/92
Begin Clock Time, hours	0300	0200	1000	2100	0100	1300	0100	1000	1600	2030	0430	0230
End Clock Time, hours	0700	0600	1400	2330	0500	1700	0500	1400	1800	0030	0830	0630
Steady-State Period Duration, h	4	4	4	2.5	4	4	4	4	2	4	4	4
CLOSURES:												
Total Energy (out/in), %	98.0	100.5	86.9	94.6	97.3	110.1	92.0	91.9	89.0	77.9	74.7	93.7
Total Mass (out/in), %	93.4	90.5	89.0	94.1	84.7	87.1	86.7	87.9	86.0	93.1	91.8	95.3
Carbon (out/in), %	99.3	101.1	89.4	93.8	100.4	108.3	95.9	95.0	94.0	77.3	70.5	91.5
Hydrogen (out/in), %	114.9	117.0	106.2	112.9	112.3	128.4	106.1	96.4	92.4	95.6	106.8	112.6
Oxygen (out/in), %	106.6	103.6	105.5	112.0	97.7	100.8	95.0	95.2	97.3	98.4	106.8	103.4
Nitrogen (out/in), %	88.1	86.1	85.9	93.5	78.3	78.8	83.5	83.6	83.0	96.3	90.7	91.4
Sulfur (out/in), %	131.7	118.2	96.3	82.6	85.3	72.5	84.6	81.1	52.2	70.7	129.0	81.4
Argon (out/in), %	73.5	83.4	81.0	80.0	82.0	86.4	86.3	86.4	88.2	87.1	85.7	83.4
Calcium (out/in), %	49.7	63.5	46.4	99.4	51.0	39.7	53.7	67.1	40.3	80.4	108.3	99.1
Magnesium (out/in), %	124.6	85.4	87.5	117.6	74.4	56.2	80.6	100.2	58.3	86.8	122.1	105.6
Ash (out/in), %	117.4	83.1	81.6	29.8	123.4	106.3	110.9	113.3	79.7	76.8	75.3	111.7
DEVIATIONS:												
Total Energy (out/in), %	2.0	-0.5	13.1	5.4	2.7	-10.1	8.0	8.1	11.0	22.1	25.3	6.3
Total Mass (out/in), %	6.6	9.5	11.0	5.9	15.3	12.9	13.3	12.1	14.0	6.9	8.2	4.7
Carbon (out/in), %	0.7	-1.1	10.6	6.2	-0.4	-8.3	4.1	5.0	6.0	22.7	29.5	8.5
Hydrogen (out/in), %	-14.9	-17.0	-6.2	-12.9	-12.3	-28.4	-6.1	3.6	7.6	4.4	-6.8	-12.6
Oxygen (out/in), %	-6.6	-3.6	-5.5	-12.0	2.3	-0.8	5.0	4.8	2.7	1.6	-6.8	-3.4
Nitrogen (out/in), %	11.9	13.9	14.1	6.5	21.7	21.2	16.5	16.4	17.0	3.7	9.3	8.6
Sulfur (out/in), %	-31.7	-18.2	3.7	17.4	14.7	27.5	15.4	18.9	47.8	29.3	-29.0	18.6
Argon (out/in), %	26.5	16.6	19.0	20.0	18.0	13.6	13.7	13.6	11.8	12.9	14.3	16.6
Calcium (out/in), %	50.3	36.5	53.6	0.6	49.0	60.3	46.3	32.9	59.7	19.6	-8.3	0.9
Magnesium (out/in), %	-24.6	14.6	12.5	-17.6	25.6	43.8	19.4	-0.2	41.7	13.2	-22.1	-5.6
Ash (out/in), %	-17.4	16.9	18.4	70.2	-23.4	-6.3	-10.9	-13.3	20.3	23.2	24.7	-11.7

Table 2.14 (cont.). ENERGY, MASS, AND ELEMENTAL CLOSURES IN MATERIAL AND ENERGY BALANCES FOR STEADY-STATE PERIODS (JETTING FLUIDIZED-BED OPERATING MODE)

Set Point	TR4-4	TR4-5	TR4-6	TR4-7	TR4-8	TR5-1	TR5-2	TR5-3	TR8-67	TR8-8	TR8-9	TR8-10
Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	LV Lime	PR Dolo	PR Dolo	PR Dolo	PR Dolo
Begin Date	3/12/92	3/13/92	3/13/982	3/13/92	3/14/92	3/24/92	3/24/92	3/25/92	6/14/92	6/16/92	6/16/92	6/16/92
Begin Clock Time, hours	1600	0530	1300	2200	0200	1100	1900	0500	2100	0200	0800	1430
End Clock Time, hours	2000	0930	1700	0200	0600	1500	2300	0900	0100	0600	1230	1930
Steady-State Period Duration, h	4	4	4	4	4	4	4	4	4	4	4.5	5
CLOSURES:												
Total Energy (out/in), %	83.0	79.5	72.2	78.2	107.2	76.2	89.5	88.8	93.5	86.5	91.7	93.1
Total Mass (out/in), %	91.6	93.7	93.3	91.7	101.7	92.4	96.8	97.6	97.3	95.4	95.9	97.5
Carbon (out/in), %	79.4	80.6	72.0	76.6	104.0	72.0	85.9	90.7	93.3	86.2	90.6	90.9
Hydrogen (out/in), %	112.1	95.1	96.6	97.7	132.4	104.9	110.5	99.4	132.0	126.8	134.0	151.6
Oxygen (out/in), %	106.9	103.9	108.2	100.8	112.5	104.0	100.3	106.3	110.1	110.9	110.8	123.9
Nitrogen (out/in), %	90.7	93.5	95.6	95.3	98.8	94.6	98.7	96.6	93.8	93.3	94.4	92.3
Sulfur (out/in), %	61.2	85.7	78.9	78.1	89.5	86.1	66.3	64.5	68.4	62.9	50.5	65.0
Argon (out/in), %	83.5	86.1	90.1	93.4	97.9	92.0	104.9	93.9	77.8	80.0	80.6	75.2
Calcium (out/in), %	51.1	132.5	143.2	68.4	62.8	62.5	39.2	84.8	79.6	63.6	48.8	62.5
Magnesium (out/in), %	136.9	138.6	145.2	69.3	64.1	103.2	59.5	1570.4	84.4	75.9	55.8	72.0
Ash (out/in), %	61.2	50.1	35.8	93.7	105.8	60.7	154.1	65.3	97.0	85.7	83.9	73.7
DEVIATIONS:												
Total Energy (out/in), %	17.0	20.5	27.8	21.8	-7.2	23.8	10.5	11.2	6.5	13.5	8.3	6.9
Total Mass (out/in), %	8.4	6.3	6.7	8.3	-1.7	7.6	3.2	2.4	2.7	4.6	4.1	2.5
Carbon (out/in), %	20.6	19.4	28.0	23.4	-4.0	28.0	14.1	9.3	6.7	13.8	9.4	9.1
Hydrogen (out/in), %	-12.1	4.9	3.4	2.3	-32.4	-4.9	-10.5	0.6	-32.0	-26.8	-34.0	-51.6
Oxygen (out/in), %	-6.9	-3.9	-8.2	-0.8	-12.5	-4.0	-0.3	-6.3	-10.1	-10.9	-10.8	-23.9
Nitrogen (out/in), %	9.3	6.5	4.4	4.7	1.2	5.4	1.3	3.4	6.2	6.7	5.6	7.7
Sulfur (out/in), %	38.8	14.3	21.1	21.9	10.5	13.9	33.7	35.5	31.6	37.1	49.5	35.0
Argon (out/in), %	16.5	13.9	9.9	6.6	2.1	8.0	-4.9	6.1	22.2	20.0	19.4	24.8
Calcium (out/in), %	48.9	-32.5	-43.2	31.6	37.2	37.5	60.8	15.2	20.4	36.4	51.2	37.5
Magnesium (out/in), %	-36.9	-38.6	-45.2	30.7	35.9	-3.2	40.5	-1470.4	15.6	24.1	44.2	28.0
Ash (out/in), %	38.8	49.9	64.2	6.3	-5.8	39.3	-54.1	34.7	3.0	14.3	16.1	26.3

Table 2.14 (cont.). ENERGY, MASS, AND ELEMENTAL CLOSURES IN MATERIAL AND ENERGY BALANCES FOR STEADY-STATE PERIODS (JETTING FLUIDIZED-BED OPERATING MODE)

Set Point	TR6-6	TR6-7	TR8-4	TR8-5	TR6-1	TR6-2	TR6-3	TR6-4	TR6-5	TR8-1	TR8-2	TR8-3
Coal	Ill Bit	Ill Bit	Ill Bit	Ill Bit	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub
Sorbent	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime
Begin Date	4/23/92	4/23/92	6/12/92	6/13/92	4/21/92	4/22/92	4/22/92	4/22/92	4/23/92	6/10/92	6/11/92	6/11/92
Begin Clock Time, hours	1800	2300	2100	0700	2100	0430	1400	2100	0400	2000	0300	1330
End Clock Time, hours	2200	0330	0200	1100	0100	0830	1800	0100	0800	0100	0800	1730
Steady-State Period Duration, h	4	4.5	5	4	4	4	4	4	4	5	5	4
CLOSURES:												
Total Energy (out/in), %	88.9	106.0	81.7	72.4	87.1	81.5	83.2	84.4	85.3	87.3	75.9	78.3
Total Mass (out/in), %	94.6	100.1	98.4	92.8	104.6	106.8	90.5	92.2	91.7	111.3	104.2	102.2
Carbon (out/in), %	86.8	100.2	83.6	76.5	89.2	85.9	81.5	86.3	84.9	82.9	78.3	79.0
Hydrogen (out/in), %	102.6	126.8	114.3	106.9	103.0	92.2	84.3	81.1	84.8	126.7	114.8	110.9
Oxygen (out/in), %	101.1	104.1	104.0	103.3	97.7	98.4	87.7	89.7	89.3	103.9	101.3	99.0
Nitrogen (out/in), %	95.5	97.2	101.3	94.7	113.5	116.5	94.6	95.7	95.3	120.9	111.5	108.9
Sulfur (out/in), %	44.8	142.2	51.2	46.1	45.0	45.6	60.1	46.8	37.7	265.5	68.6	37.4
Argon (out/in), %	82.0	82.0	82.5	84.0	103.8	103.4	86.4	80.7	84.1	84.9	84.7	84.9
Calcium (out/in), %	59.1	37.1	103.1	84.7	81.3	121.9	125.3	133.5	164.9	21.5	57.1	138.0
Magnesium (out/in), %	241.4	276.6	82.8	58.0	275.1	202.0	417.3	433.4	1064.7	315.3	123.3	347.4
Ash (out/in), %	86.0	145.5	77.0	61.6	46.0	66.4	55.9	51.6	57.7	76.1	64.2	45.1
DEVIATIONS:												
Total Energy (out/in), %	11.1	-6.0	18.3	27.6	12.9	18.5	16.8	15.6	14.7	12.7	24.1	21.7
Total Mass (out/in), %	5.4	-0.1	1.6	7.2	-4.6	-6.8	9.5	7.8	8.3	-11.3	-4.2	-2.2
Carbon (out/in), %	13.2	-0.2	16.4	23.5	10.8	14.1	18.5	13.7	15.1	17.1	21.7	21.0
Hydrogen (out/in), %	-2.6	-26.8	-14.3	-6.9	-3.0	7.8	15.7	18.9	15.2	-26.7	-14.8	-10.9
Oxygen (out/in), %	-1.1	-4.1	-4.0	-3.3	2.3	1.6	12.3	10.3	10.7	-3.9	-1.3	1.0
Nitrogen (out/in), %	4.5	2.8	-1.3	5.3	-13.5	-16.5	5.4	4.3	4.7	-20.9	-11.5	-8.9
Sulfur (out/in), %	55.2	-42.2	48.8	53.9	55.0	54.4	39.9	53.2	62.3	-165.5	31.4	62.6
Argon (out/in), %	18.0	18.0	17.5	16.0	-3.8	-3.4	13.6	19.3	15.9	15.1	15.3	15.1
Calcium (out/in), %	40.9	62.9	-3.1	15.3	18.7	-21.9	-25.3	-33.5	-64.9	78.5	42.9	-38.0
Magnesium (out/in), %	-141.4	-176.6	17.2	42.0	-175.1	-102.0	-317.3	-333.4	-964.7	-215.3	-23.3	-247.4
Ash (out/in), %	14.0	-45.5	23.0	38.4	54.0	33.6	44.1	48.4	42.3	23.9	35.8	54.9

Table 2.14 (cont.). ENERGY, MASS, AND ELEMENTAL CLOSURES IN MATERIAL AND ENERGY BALANCES FOR STEADY-STATE PERIODS (JETTING FLUIDIZED-BED OPERATING MODE)

Set Point	Minimum	Maximum	Average	Std Dev
Coal	-----Pittsburgh/Illinois/Wyoming----			
Sorbent	Plum Run Dolomite/Longview Limestone			
Begin Date				
Begin Clock Time, hours	(No. of Set Points = 36)			
End Clock Time, hours				
Steady-State Period Duration, h	2.0	5.0	4.0	0.5
CLOSURES:				
Total Energy (out/in), %	72.2	110.1	87.7	9.4
Total Mass (out/in), %	84.7	111.3	94.8	5.9
Carbon (out/in), %	70.5	108.3	87.6	9.3
Hydrogen (out/in), %	81.1	151.6	109.5	15.5
Oxygen (out/in), %	87.7	123.9	102.8	7.0
Nitrogen (out/in), %	78.3	120.9	95.1	9.5
Sulfur (out/in), %	37.4	265.5	78.7	40.6
Argon (out/in), %	73.5	104.9	86.2	7.2
Calcium (out/in), %	21.5	164.9	78.5	35.1
Magnesium (out/in), %	55.8	1570.4	208.7	293.5
Ash (out/in), %	29.8	154.1	80.8	28.6
DEVIATIONS:				
Total Energy (out/in), %	-10.1	27.8	12.3	9.4
Total Mass (out/in), %	-11.3	15.3	5.2	5.9
Carbon (out/in), %	-8.3	29.5	12.4	9.3
Hydrogen (out/in), %	-51.6	18.9	-9.5	15.5
Oxygen (out/in), %	-23.9	12.3	-2.8	7.0
Nitrogen (out/in), %	-20.9	21.7	4.9	9.5
Sulfur (out/in), %	-165.5	62.6	21.3	40.6
Argon (out/in), %	-4.9	26.5	13.8	7.2
Calcium (out/in), %	-64.9	78.5	21.5	35.1
Magnesium (out/in), %	-1470.4	44.2	-108.7	293.5
Ash (out/in), %	-54.1	70.2	19.2	28.6

Table 2.14 (cont.). ENERGY, MASS, AND ELEMENTAL CLOSURES IN MATERIAL AND ENERGY BALANCES FOR STEADY-STATE PERIODS (JETTING FLUIDIZED-BED OPERATING MODE)

Set Point	TR1-1	TR1-2	TR1-3	TR1-4	TR2-1	TR2-2	TR2-3	TR2-4	TR2-5	TR4-1	TR4-2	TR4-3
Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo
ABSOLUTE DEVIATIONS:												
Total Energy (out/in), %	2.0	0.5	13.1	5.4	2.7	10.1	8.0	8.1	11.0	22.1	25.3	6.3
Total Mass (out/in), %	6.6	9.5	11.0	5.9	15.3	12.9	13.3	12.1	14.0	6.9	8.2	4.7
Carbon (out/in), %	0.7	1.1	10.6	6.2	0.4	8.3	4.1	5.0	6.0	22.7	29.5	8.5
Hydrogen (out/in), %	14.9	17.0	6.2	12.9	12.3	28.4	6.1	3.6	7.6	4.4	6.8	12.6
Oxygen (out/in), %	6.6	3.6	5.5	12.0	2.3	0.8	5.0	4.8	2.7	1.6	6.8	3.4
Nitrogen (out/in), %	11.9	13.9	14.1	6.5	21.7	21.2	16.5	16.4	17.0	3.7	9.3	8.6
Sulfur (out/in), %	31.7	18.2	3.7	17.4	14.7	27.5	15.4	18.9	47.8	29.3	29.0	18.6
Argon (out/in), %	26.5	16.6	19.0	20.0	18.0	13.6	13.7	13.6	11.8	12.9	14.3	16.6
Calcium (out/in), %	50.3	36.5	53.6	0.6	49.0	60.3	46.3	32.9	59.7	19.6	8.3	0.9
Magnesium (out/in), %	24.6	14.6	12.5	17.6	25.6	43.8	19.4	0.2	41.7	13.2	22.1	5.6
Ash (out/in), %	17.4	16.9	18.4	70.2	23.4	6.3	10.9	13.3	20.3	23.2	24.7	11.7

Table 2.14 (cont.). ENERGY, MASS, AND ELEMENTAL CLOSURES IN MATERIAL AND ENERGY BALANCES FOR STEADY-STATE PERIODS (JETTING FLUIDIZED-BED OPERATING MODE)

Set Point	TR4-4	TR4-5	TR4-6	TR4-7	TR4-8	TR5-1	TR5-2	TR5-3	TR8-67	TR8-8	TR8-9	TR8-10
Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	LV Lime	PR Dolo	PR Dolo	PR Dolo	PR Dolo
ABSOLUTE DEVIATIONS:												
Total Energy (out/in), %	17.0	20.5	27.8	21.8	7.2	23.8	10.5	11.2	6.5	13.5	8.3	6.9
Total Mass (out/in), %	8.4	6.3	6.7	8.3	1.7	7.6	3.2	2.4	2.7	4.6	4.1	2.5
Carbon (out/in), %	20.6	19.4	28.0	23.4	4.0	28.0	14.1	9.3	6.7	13.8	9.4	9.1
Hydrogen (out/in), %	12.1	4.9	3.4	2.3	32.4	4.9	10.5	0.6	32.0	26.8	34.0	51.6
Oxygen (out/in), %	6.9	3.9	8.2	0.8	12.5	4.0	0.3	6.3	10.1	10.9	10.8	23.9
Nitrogen (out/in), %	9.3	6.5	4.4	4.7	1.2	5.4	1.3	3.4	6.2	6.7	5.6	7.7
Sulfur (out/in), %	38.8	14.3	21.1	21.9	10.5	13.9	33.7	35.5	31.6	37.1	49.5	35.0
Argon (out/in), %	16.5	13.9	9.9	6.6	2.1	8.0	4.9	6.1	22.2	20.0	19.4	24.8
Calcium (out/in), %	48.9	32.5	43.2	31.6	37.2	37.5	60.8	15.2	20.4	36.4	51.2	37.5
Magnesium (out/in), %	36.9	38.6	45.2	30.7	35.9	3.2	40.5	1470.4	15.6	24.1	44.2	28.0
Ash (out/in), %	38.8	49.9	64.2	6.3	5.8	39.3	54.1	34.7	3.0	14.3	16.1	26.3

Table 2.14 (cont.). ENERGY, MASS, AND ELEMENTAL CLOSURES IN MATERIAL AND ENERGY BALANCES FOR STEADY-STATE PERIODS (JETTING FLUIDIZED-BED OPERATING MODE)

Set Point	TR6-6	TR6-7	TR8-4	TR8-5	TR6-1	TR6-2	TR6-3	TR6-4	TR6-5	TR8-1	TR8-2	TR8-3
1 Coal	Ill Bit	Ill Bit	Ill Bit	Ill Bit	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub
2 Sorbent	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime
ABSOLUTE DEVIATIONS:												
Total Energy (out/in), %	11.1	6.0	18.3	27.6	12.9	18.5	16.8	15.6	14.7	12.7	24.1	21.7
Total Mass (out/in), %	5.4	0.1	1.6	7.2	4.6	6.8	9.5	7.8	8.3	11.3	4.2	2.2
Carbon (out/in), %	13.2	0.2	16.4	23.5	10.8	14.1	18.5	13.7	15.1	17.1	21.7	21.0
Hydrogen (out/in), %	2.6	26.8	14.3	6.9	3.0	7.8	15.7	18.9	15.2	26.7	14.8	10.9
Oxygen (out/in), %	1.1	4.1	4.0	3.3	2.3	1.6	12.3	10.3	10.7	3.9	1.3	1.0
Nitrogen (out/in), %	4.5	2.8	1.3	5.3	13.5	16.5	5.4	4.3	4.7	20.9	11.5	8.9
Sulfur (out/in), %	55.2	42.2	48.8	53.9	55.0	54.4	39.9	53.2	62.3	165.5	31.4	62.6
Argon (out/in), %	18.0	18.0	17.5	16.0	3.8	3.4	13.6	19.3	15.9	15.1	15.3	15.1
Calcium (out/in), %	40.9	62.9	3.1	15.3	18.7	21.9	25.3	33.5	64.9	78.5	42.9	38.0
Magnesium (out/in), %	141.4	176.6	17.2	42.0	175.1	102.0	317.3	333.4	964.7	215.3	23.3	247.4
Ash (out/in), %	14.0	45.5	23.0	38.4	54.0	33.6	44.1	48.4	42.3	23.9	35.8	54.9

Table 2.14 (cont.). ENERGY, MASS, AND ELEMENTAL CLOSURES IN MATERIAL AND ENERGY BALANCES FOR STEADY-STATE PERIODS (JETTING FLUIDIZED-BED OPERATING MODE)

Set Point	Minimum	Maximum	Average	Std Dev
Coal	-----Pittsburgh/Illinois/Wyoming----			
Sorbent	Plum Run Dolomite/Longview Limestone			
ABSOLUTE DEVIATIONS:	(No. of Set Points = 36)			
Total Energy (out/in), %	0.5	27.8	13.6	7.4
Total Mass (out/in), %	0.1	15.3	6.9	3.8
Carbon (out/in), %	0.2	29.5	13.2	8.2
Hydrogen (out/in), %	0.6	51.6	14.2	11.3
Oxygen (out/in), %	0.3	23.9	5.8	4.8
Nitrogen (out/in), %	1.2	21.7	9.0	5.8
Sulfur (out/in), %	3.7	165.5	37.2	26.8
Argon (out/in), %	2.1	26.5	14.5	5.8
Calcium (out/in), %	0.6	78.5	36.6	18.9
Magnesium (out/in), %	0.2	1470.4	133.6	283.0
Ash (out/in), %	3.0	70.2	29.7	17.5

Table 2.15. ENERGY, MASS, AND ELEMENTAL CLOSURES IN MATERIAL AND ENERGY BALANCES FOR STEADY-STATE PERIODS (CIRCULATING FLUIDIZED-BED OPERATING MODE)

Set Point	TR10-1	TR10-2	TR10-3	TR10-4	Minimum	Maximum	Average	Std Dev
Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit				
Sorbent	GS Lime	GS Lime	GS Lime	GS Lime				
Begin Date	9/1/92	9/1/92	9/2/92	9/2/92				
Begin Clock Time, hours	0200	1630	0000	0610				
End Clock Time, hours	0600	2100	0400	1240				
Steady-State Period Duration, h	4	4.5	4	6.5	4.0	6.5	4.8	1.0
CLOSURES:								
Total Energy (out/in), %	85.5	97.0	83.3	75.2	75.2	97.0	85.3	7.8
Total Mass (out/in), %	108.1	121.5	117.8	114.0	108.1	121.5	115.4	5.0
Carbon (out/in), %	82.3	97.3	84.6	71.5	71.5	97.3	83.9	9.2
Hydrogen (out/in), %	140.2	148.7	138.7	138.8	138.7	148.7	141.6	4.1
Oxygen (out/in), %	122.6	106.7	114.0	115.7	106.7	122.6	114.8	5.7
Nitrogen (out/in), %	112.9	129.9	127.3	125.2	112.9	129.9	123.8	6.5
Sulfur (out/in), %	67.4	59.4	65.9	73.4	59.4	73.4	66.5	5.0
Argon (out/in), %	82.4	72.8	78.8	71.5	71.5	82.4	76.4	4.4
Calcium (out/in), %	47.2	90.4	111.5	79.8	47.2	111.5	82.2	23.2
Magnesium (out/in), %	91.7	254.7	290.2	196.5	91.7	290.2	208.3	75.2
Ash (out/in), %	91.1	95.4	80.9	84.9	80.9	95.4	88.1	5.6
DEVIATIONS:								
Total Energy (out/in), %	14.5	3.0	16.7	24.8	3.0	24.8	14.8	7.8
Total Mass (out/in), %	-8.1	-21.5	-17.8	-14.0	-21.5	-8.1	-15.3	5.0
Carbon (out/in), %	17.7	2.7	15.4	28.5	2.7	28.5	16.1	9.2
Hydrogen (out/in), %	-40.2	-48.7	-38.7	-38.8	-48.7	-38.7	-41.6	4.1
Oxygen (out/in), %	-22.6	-6.7	-14.0	-15.7	-22.6	-6.7	-14.8	5.7
Nitrogen (out/in), %	-12.9	-29.9	-27.3	-25.2	-29.9	-12.9	-23.8	6.5
Sulfur (out/in), %	32.6	40.6	34.1	26.6	26.6	40.6	33.5	5.0
Argon (out/in), %	17.6	27.2	21.2	28.5	17.6	28.5	23.6	4.4
Calcium (out/in), %	52.8	9.6	-11.5	20.2	-11.5	52.8	17.8	23.2
Magnesium (out/in), %	8.3	-154.7	-190.2	-96.5	-190.2	8.3	-108.3	75.2
Ash (out/in), %	8.9	4.6	19.1	15.1	4.6	19.1	11.9	5.6

Table 2.15 (cont.). ENERGY, MASS, AND ELEMENTAL CLOSURES IN MATERIAL AND ENERGY BALANCES FOR STEADY-STATE PERIODS (CIRCULATING FLUIDIZED-BED OPERATING MODE)

Set Point	TR10-1	TR10-2	TR10-3	TR10-4	Minimum	Maximum	Average	Std Dev
Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit				
Sorbent	GS Lime	GS Lime	GS Lime	GS Lime				
ABSOLUTE DEVIATIONS:								
Total Energy (out/in), %	14.5	3.0	16.7	24.8	3.0	24.8	14.8	7.8
Total Mass (out/in), %	8.1	21.5	17.8	14.0	8.1	21.5	15.3	5.0
Carbon (out/in), %	17.7	2.7	15.4	28.5	2.7	28.5	16.1	9.2
Hydrogen (out/in), %	40.2	48.7	38.7	38.8	38.7	48.7	41.6	4.1
Oxygen (out/in), %	22.6	6.7	14.0	15.7	6.7	22.6	14.8	5.7
Nitrogen (out/in), %	12.9	29.9	27.3	25.2	12.9	29.9	23.8	6.5
Sulfur (out/in), %	32.6	40.6	34.1	26.6	26.6	40.6	33.5	5.0
Argon (out/in), %	17.6	27.2	21.2	28.5	17.6	28.5	23.6	4.4
Calcium (out/in), %	52.8	9.6	11.5	20.2	9.6	52.8	23.5	17.4
Magnesium (out/in), %	8.3	154.7	190.2	96.5	8.3	190.2	112.4	68.8
Ash (out/in), %	8.9	4.6	19.1	15.1	4.6	19.1	11.9	5.6

3. RATIONALE FOR RECONCILIATION AND BALAID PROGRAM

The rationale for the reconciliation of the material and energy balances, and the details of the BALAID program to reconcile the balances, are given in this section.

3.1. Rationale for Reconciliation

A well instrumented pilot plant measures flows and compositions of materials entering and leaving the reactor(s) and other process units. Stream temperatures and heat losses are also measured. This information is ordinarily used to verify that steady-state outflows account for all the mass, energy, and chemical elements in the inflows. A significant imbalance is taken as evidence of measurement error (or nonexistence of a steady-state period), and a clue that instrumentation, analytic methods, equipment or assumptions should be checked.

However, balances never close exactly. In fact, discrepancies can often be substantial. It is not satisfactory to simply ignore discrepancies in the balances, because the laws of conservation are always obeyed. An engineer may choose instead to disregard one of the measurements so as to force closure of a particular balance. But another engineer may decide to treat the same data differently and get a different result. This leads to ambiguity in process performance, economics, and scale-up. It leads to scatter and error in correlations aimed at process optimization.

Data reconciliation resolves ambiguity and inconsistency by making use of all the measurements. Small adjustments are made so that all conservation laws and other equality constraints are obeyed exactly. The size of each adjustment is weighted according to the inverse statistical variance (quality) of the measurement. This is a weighted least squares method. If all the measurement errors are normally distributed and free of covariance, it results in maximum likelihood approximation to true, error-free measurements. In essence, statistical reconciliation is a computational method to resolve process data inconsistency, diagnose errors, and derive maximum benefit from the investment in experimentation.

As discussed in Section 2.4, the deviations in total energy, mass, and elemental closures are often large and cannot be ignored. Furthermore, if the carbon closure is not 100%, then the calculated value of carbon conversion (the most important parameter) depends on whether it is based or solids or gas; the poorer the carbon closure, the larger the difference between the two calculated values. Figure 3.1 shows that the two values are quite different for a lot of set points; the absolute difference between the two values ranges from 0.2% to 31.1% with an average value of 13.8% and a standard deviation of 8.6%. Similar differences exist for other important parameters, such as coal sulfur released, sulfur captured by sorbent, sorbent utilization, ammonia yield, etc. Reconciliation of data eliminates these differences.

Furthermore, the material and energy balances are based on average values of the measurements during a steady-state period; they represent an average value over one or more samples (representing the same quantity) during the period, for a reading which usually undergoes some temporal or random fluctuation. For example, the average values of several key measurements along with their minimum and maximum values (indicating the degree of fluctuation) for two set points are given in Table 3.1. The readings of flow rates, temperature, pressure, etc., are taken every few seconds and then averaged over the period, whereas the gas samples are collected every hour; the gas sample will be affected a lot by the flow rates existing just prior to its collection.

Thus, in consultation with FWDC, it was decided to reconcile all the balances using the BALAID Reconciliation program.

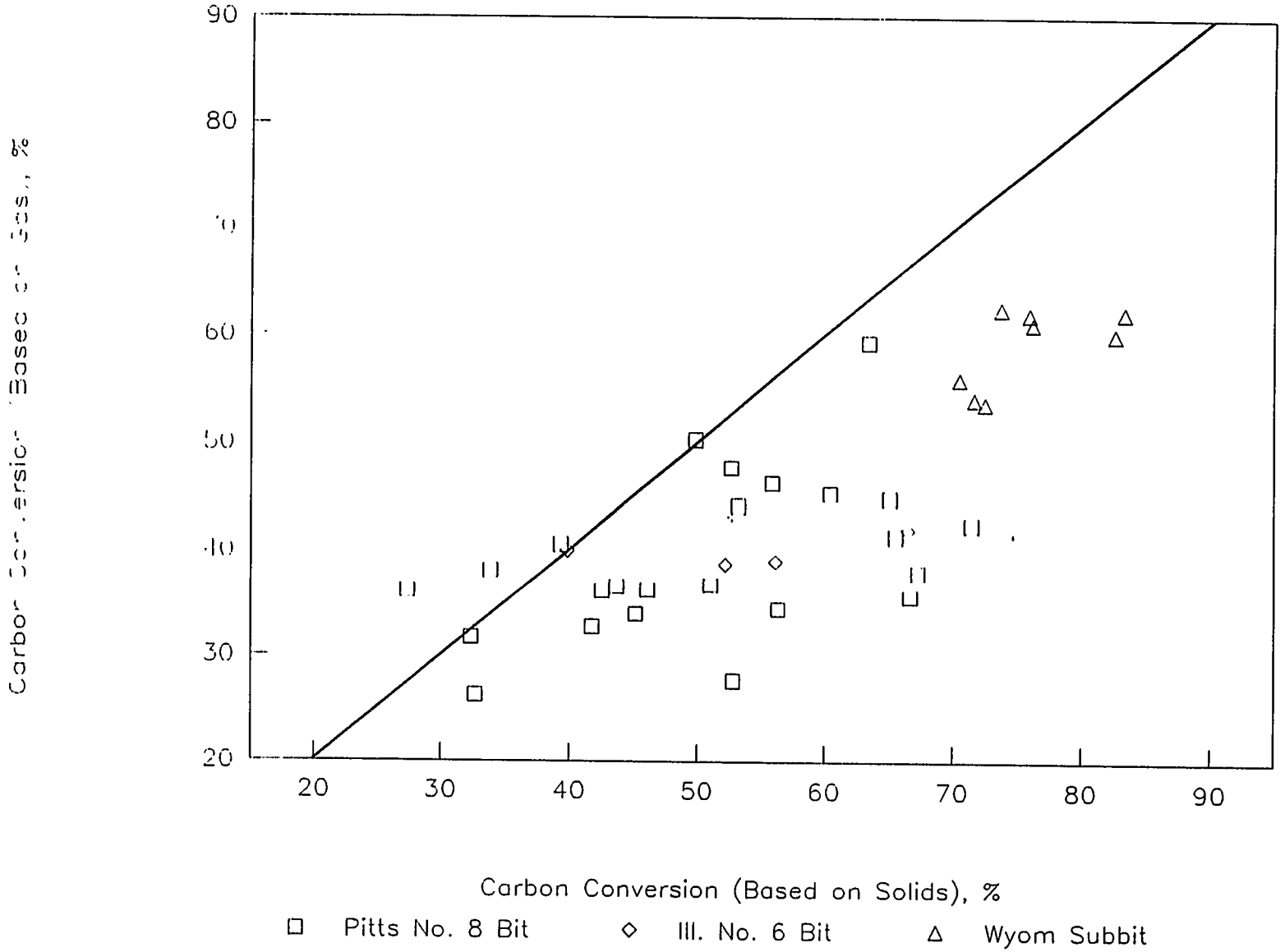

Figure 3.1. COMPARISON OF GAS-BASED CARBON CONVERSION AND SOLIDS-BASED CARBON CONVERSION

Table 3.1. EXAMPLES OF MEASUREMENT FLUCTUATIONS DURING STEADY-STATE PERIODS

Set Point	TR6-1		TR6-3	
	Average	Range	Average	Range
Air Feed, lb/h	754	725-767	808	790-827
Steam Feed, lb/h	------- Not Fed ------		------- Not Fed -------	
Nitrogen Feed, SCFM				
Bed Drain	31.6	10.5-34.6	29.8	29.1-30.5
Feed Lockhoppers	8.8	4.5-14.6	7.7	6.7-9.9
Purges	2.1	2.0-2.2	2.0	1.9-2.1
Cyclones	3.0	2.9-3.1	2.8	2.8-2.9
Cyclone Diplegs	3.0	2.6-3.4	3.0	2.7-3.2
Spray Tower	30.5	29.5-32.3	29.1	27.1-30.1
Carbonizer Pressure, psig	146	135-150	158	153-162
Orifice Pressure, psig	143	133-147	154	150-159
Orifice Temperature, °F	787	779-791	1267	1260-1271
Freeboard Temperature, °F	1517	1505-1524	1462	1450-1470
Bed Drain, °F	356	203-532	135	109-199
Coal Feed (5 Samples)				
Carbon, %	50.8	49.3-51.8	50.8	49.3-51.8
Ash, %	5.58	5.21-6.15	5.58	5.21-6.15
Sulfur, %	0.72	0.58-0.90	0.72	0.58-0.90
Gas Composition (4 Samples)				
CO, mol %	8.79	8.51-9.05	9.80	9.03-10.44
CO_2, mol %	8.43	8.19-8.53	9.26	8.90-9.99
H_2, mol %	7.51	6.96-8.25	8.87	8.42-9.34
CH_4, mol %	1.45	1.03-1.80	1.81	1.73-1.87

3.2. BALAID Reconciliation Program

Science Ventures, Inc., (SVI) of California has developed a proprietary data reconciliation software package for general application to chemical process data, called BALAID (for BALance AID). Like ASPEN and other process design software, BALAID can be applied at any scale from laboratory to commercial, and to virtually any chemistry. It can be applied to a single reactor or to a group of interconnected units. However, unlike ASPEN, BALAID is used to interpret results rather than to predict process performance.

Inputs to the BALAID software are preferably raw measurements such as voltages, weights, and other instrument outputs. These are converted into species flows, stream temperatures, and compositions of variable species (such as coal organic matter) in custom preprocessor subroutines. Variances are computed from variances of the raw measurements. Then a set of reconciled flows, temperatures, and compositions is computed, such that the sum of the squared adjustments divided by the variance of each is minimized. Reconciled data conform to all equality constraints. They also obey inequality constraints as appropriate to the process. For example, negative values are not usually allowed. The program also calculates the adjustments to raw data corresponding to adjustments in the flows, temperatures, and compositions. The statistical z-score is computed for each input as its adjustment divided by its standard deviation. If the data are normally distributed, only one in 20 measurements should have $z > 2$. An absolute value greater than 2 suggests abnormal behavior and is a clue to check the instrument. The program also computes figures of merit appropriate to the process, such as percent carbon utilization or sulfur distribution in products. The standard error of each figure of merit is also computed. This is useful in developing correlations by inter-comparing different experimental periods. Regression samples can be weighted so that runs with good statistical confidence are weighted more than runs with less certain results.

In essence, BALAID is a sophisticated means of data reduction and material-and energy-balance analysis in chemical engineering process development. It utilizes advanced principles in statistics, numerical techniques, and constrained nonlinear optimization theory. While resolving inconsistencies, it provides for more thorough, systematic treatment of test data. It should be recognized that the quality of the reconciled outputs depends on the quality of the measurments, no matter how sophisticated the analysis. Theoretical background on the subject has been given, for example, by Madron et al. (1977), Kemeny et al. (1982), Nogita (1972), Phillips and Harrison (1993), and Albers (1994).

In the past, this BALAID software was successfully applied to the material and energy balances for the steady-state periods derived from the data collected in IGT's U-GAS coal gasification Process Development Unit (Goyal and Rehmat, 1989).

SVI was subcontracted by IGT to custom tailor their BALAID program for statistical reconciliation and analysis of process data from the carbonizer under IGT's supervision. This modified program includes two processing units (Figure 3.2) around which balances are computed. Unit 1 consists of only the carbonizer, whereas Unit 2 consists of the carbonizer and the auxiliary equipment. It should be noted that Unit 1 is a subset of Unit 2 (instead of the usual series connection). This approach eliminates error in char temperature measurement, simplifies estimation of heat loss, and focuses attention on carbonizer performance apart from the downstream separation equipment. (It should be recognized that gas flow rate and its composition are not measured at the freeboard, and several nitrogen purges are added between the freeboard and the gas sample point.) For energy balance calculations for Unit 1, the gas is assumed to leave the control volume boundary at the freeboard temperature (TI3003) measured at the 27.5-ft level.

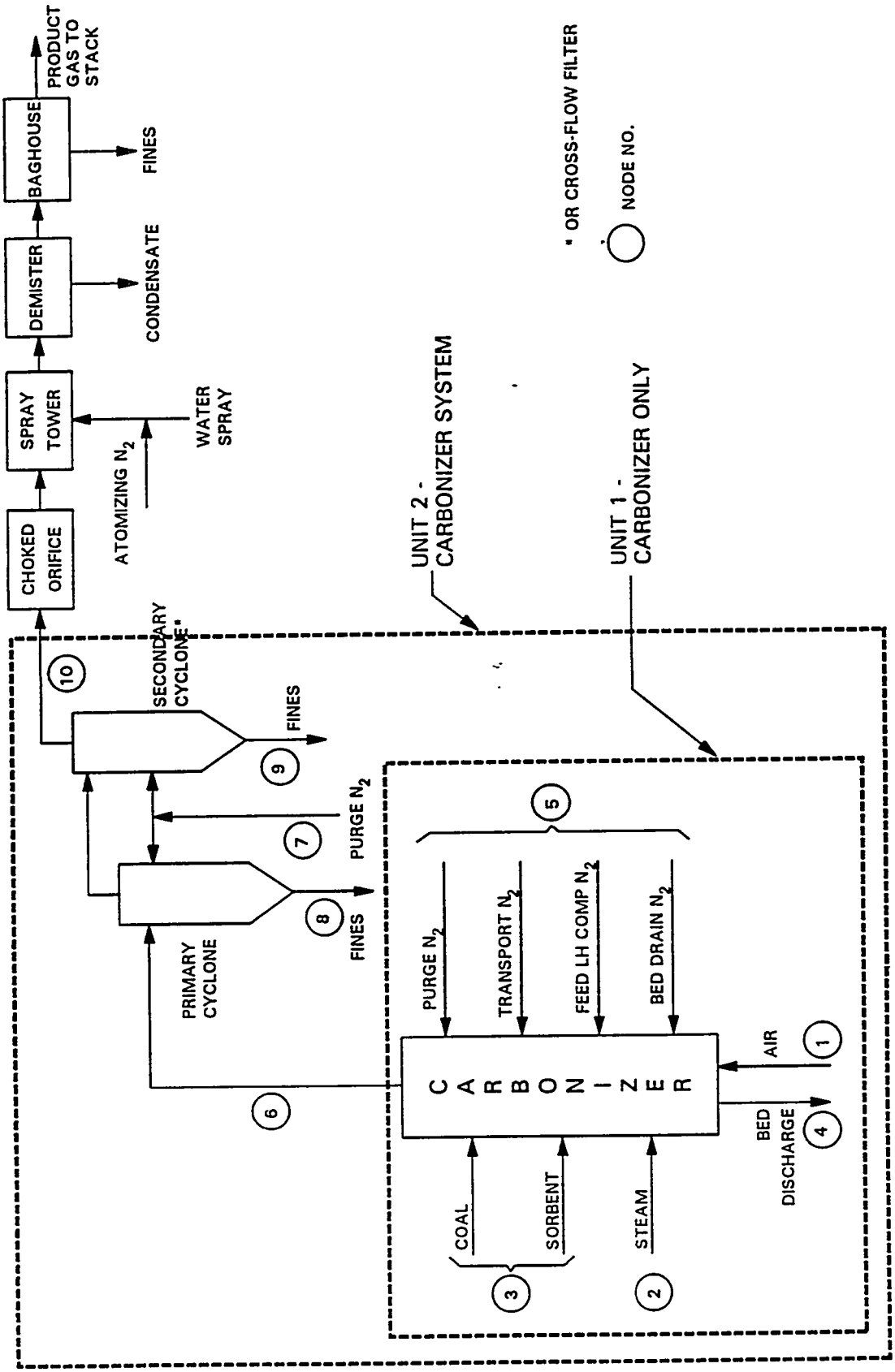

Figure 3.2. IDENTIFICATION OF PROCESSING UNITS FOR BALAID PROGRAM

For purposes of data reconciliation, the plant may be thought of as a "black box." Internal structure, chemical reaction pathways, kinetics, and pressure need not be considered. Analysis focuses on flows across boundaries of plant unit control volumes (shown in Figure 3.2), established at "flow measurement nodes." The species and flows in and out of each chemical reactor or plant unit, or between units, are conceptually divided into flow measurement nodes. These nodes are shown in Figure 3.2. Nodes are assigned so that streams at different temperatures are attributed to different nodes, and so that branching, or flows to different destinations, can be represented. Subject to these considerations, the number of node assignments is minimized in the interest of runtime and memory efficiency. Node numbers are chosen arbitrarily. Each node has a unique temperature, and all species flowing at a node are taken to be at that temperature. Of course, it is desirable to present BALAID with as much information as possible. However, it is not in general required that all species flow (or even any species flow) measurements be available at a given node.

The various elements of this program are summarized in Table 3.2. The BALAID software is logically divided into four programs, namely, BALAID1, BALAID2, BALAID3, and BALAID4. These programs can be run either individually, or sequentially under control of a batch execution file. The four programs are briefly described below.

The first program, BALAID1, prepares data for reconciliation. It reads measurements and their standard errors and computes the species flows, node temperatures, and compositions that enter directly into reconciliation. BALAID1 also computes unreconciled elemental and energy balances.

The program BALAID2 exists solely to diagnose measurement errors. This feature searches for measurements that are highly correlated to discrepancies in the balances. For example, if a single change to coal ash content could explain most of the discrepancies in the ash, carbon, and energy balances, one might be inclined to suspect the coal ash analysis. This module finds all measurements or groups of them that are highly correlated to the set of balance discrepancies. It prints suggested error sources that can be investigated by the user.

The purpose of BALAID3 is to determine the reconciled values of all the measurements. In this program, the flow, temperature, and composition variables are all simultaneously adjusted according to three criteria:

1. All conservation laws and other equality constraints are obeyed exactly.

2. Reconciled values are restricted to a physically realistic range by inequality constraints.

3. The sum of squared adjustments to the variables, weighted by the inverse of their statistical variance, is minimized.

These criteria define a special case of a constrained nonlinear optimization problem with inequality constraints. It is solved for both units in the plant simultaneously. Thus, BALAID3 computes the reconciled general variables. It consists almost entirely of math software designed for general application. However, it also includes custom subroutines that embody the equality constraints and any application-specific inequality constraints. Elemental and energy balances for Carbonizer Units 1 and 2 have been programmed in the form of equality constraints.

Table 3.2. BALAID PROGRAM FOR STATISTICAL RECONCILIATION AND ANALYSIS OF MATERIAL AND ENERGY BALANCES

Element	Description
	Data Conversion / CONVERT: Program was created for translating FWDC spreadsheet data into FORTRAN data file "Balaid.in" - input file for BALAID Program.
CONVERT	Variance Estimation / CONVERT: Temporal Variance --- For each lab measurement, estimates typical random variation among samples within a run. This information is used in runs where only one or a small number of samples are available.
	Thermodynamics Calculation / THERMO — Returns enthalpies and heat capacities as a function of temperature for each species. The standard BALAID subroutine and data have been replaced with counterparts from IGT.
BALAID1	Preprocessing / BALAID1 -- BALAID1 prints unreconciled material and energy balances, compositions, temperatures and thermo properties. It also prepares derivatives for later calculations and stores them in file "LDUMP.BIN".
	Input subroutines / INSEG1 + INSEG2 of each is computed from measurement variances. Defaults are applied in case of missing measurements.--Plant and lab measurement from FW carbonizer are converted into species flows, compositions and node temperatures in standard units.
	System Configurations / BLOCK DATA, COMMON, GLOBAL Carbonizer configuration is used in all four BALAID programs.
BALAID2	Adapt for multiple process units / BALAID2 modules --- Diagnose gross errors in measurements.
	Conservation Laws / ECONS --- Element and energy balances of the reconciled flows, compositions and temperatures, as well as species conservation from freeboard to orifice.
BALAID3	Range Limit / ECONS --- Inequality constraints set limits to the physically realistic range for each variable.
	Other BALAID3 modules --- Balance all elements and energy equations subject to weighted least square minimization of error. Setup a new reconciled flow matrix, and output the information to a new LDUMP.BIN file for BALAID4 output computation.

Table 3.2 (cont.). BALAID PROGRAM FOR STATISTICAL RECONCILIATION AND ANALYSIS OF MATERIAL AND ENERGY BALANCES

	Figures of Merit / FIGSEG --- Prints special FWDC carbonizer performance parameters such as coal conversion, sulfur and ammonia distribution. Includes reconciled gas composition. Raw and reconciled figures of merit are printed with confidence intervals of each.
BALAID4	BALAID4 Standard ouputs / BALAID4 --- Prints reconciled material and energy balances for carbonizer and for the larger system including dust separation. Prints reconciled coal, char, and sorbent compositions, temperatures, etc.

The purpose of BALAID4 is to present the results of reconciliation in a useful form. It prints a table of reconciled values of all the plant and laboratory measurements along with the corresponding unreconciled values and their z-scores for use in detecting abnormal behavior. An individual adjustment larger than two standard deviations may indicate abnormal behavior for the measurement. Such measurements should be checked if possible, by reviewing data entries or rerunning analyses, for example. Reconciliation adjustments may show a trend from test to test, whereby a particular measurement is always adjusted upwards or always adjusted downwards. This is a sign of systematic error, and may indicate a need for more or better instrumentation or procedures. Conversely, there may be an opportunity for cost savings if certain measurements consistently perform much better than is needed. BALAID4 also prints reconciled elemental and energy balances for each process unit, raw and reconciled species flows, temperatures and compositions, and raw and reconciled figures of merit and their standard errors.

There are 168 to 219 measurements to be inputted for each operating period, depending on the number of distinct temporal variances available and on choices in treatment of the data. Thus, for the 40 steady-state periods, there were up to 8760 values to be inputted. For efficiency and to avoid a source of error, a program called CONVERT was written, which automatically transferred all the values from the Lotus spreadsheet file to a standard FORTRAN input file for use by the BALAID program.

For consistency, IGT provided to SVI a diskette containing subroutines related to the calculations of enthalpy for the species present in the system. (These subroutines are identical to those used in the current carbonizer model.) These subroutines were incorporated by SVI into their program.

Significant programming difficulties were encountered due to the presence of a large number of species and from the interdependency of the species. The program had to be considerably expanded over one written by SVI for IGT's U-GAS coal gasifier, which had no sorbent species present.

4. RECONCILIATION OF CARBONIZER DATA

The material and energy balances for the 40 set points (steady-state periods) were reconciled using the BALAID program described in the previous section. The procedure to reconcile the balances and the results of reconciliation are given in this section.

The BALAID program requires each measurement value and its variance. (The variance of a measurement equals the square of its standard deviation.) The measurement values represent mean, or average values, in the sense of an average over one or more samples during a steady-state period, for a reading which might undergo some temporal or random fluctuation. The variances for these mean values should include two types of components, which are simply added:

- "Precision variance" - a predetermined characteristic of each instrument, analytic procedure, or recording method. It is due to intrinsic random instrument error, truncation or round-off, fineness of scale calibration, or range of repeatability or reproducibility of an analysis.

- "Temporal or stochastic variance" - due to random or time-dependent measurement variation, or any other measured variation from sample to sample representing the same quantity. It is sometimes called "residual error."

For example, suppose a thermocouple is read and recorded to the nearest 20 degrees. Then the instrument precision is ±10°. Taking 10° as the 95% (2-sigma) confidence interval, the standard deviation is 10/2 = 5, and the precision variance is its square, or 25. Further, suppose there were three readings of 640°, 600°, and 620° on that thermocouple during a steady-state test. Their mean is 620° and their temporal variance is 400. Thus, the total variance is 25 + 400 = 425.

It is not essential that variances be known exactly. Even a crude estimate is an improvement over earlier treatments of process development data which did not take into account at all the relative quality or confidence in measurements.

For convenience, the standard formulas for mean and temporal variance of n samples on measurement x are given below:

$$\bar{x} = (\Sigma x)/n \qquad \text{Mean}$$

$$S_x^2 = \Sigma(x-\bar{x})^2/(n-1) = (\Sigma x^2-(\Sigma x)^2/n)/(n-1) \qquad \text{Variance}$$

4.1. Accuracies of Various Measurements

The BALAID program requires accuracies of all the measurements. The accuracies of various measurements, developed in consultation with FWDC, are given below. Unless noted otherwise, the accuracies can be taken at the 95% confidence level. (Because usually the temporal variance dominates, these accuracies need not be known precisely.)

1. The accuracies (Repeatability and Reproducibility) of various solids analysis measurements are listed in Table 4.1. The Repeatability values were used because the analyses were done in the same laboratory.

Table 4.1. ACCURACIES OF SOLIDS LABORATORY ANALYSES

	Repeatability**	Reproducibility**
Proximate Analysis, wt %		
Moisture		
Less than 5%	0.2	0.3
Greater than 5%	0.3	0.5
Total (including air dry loss)	0.3	0.5
Ash		
No carbonates present	0.2	0.3
Carbonates present	0.3	0.5
Coals with more than 12% ash containing carbonate and pyrite	0.5	1.0
Ultimate Analysis, wt %		
Carbon	0.3	--
Hydrogen	0.07	--
Nitrogen	0.05	--
Sulfur†	0.02 + 0.06x	0.14 + 0.08x
Heating Value, Btu/lb	50	100
Forms of Sulfur, wt %		
Sulfate	0.02	0.04
Pyritic, less than 2%	0.05	0.30
Pyritic, equal to or greater than 2%	0.10	0.40
Carbon Dioxide, wt %		
Under 1% carbon dioxide	0.05	0.10
Over 1% carbon dioxide	0.10	0.20
Major/Minor Elements by X-ray Fluorescence, wt %		
CaO	0.22	0.53
MgO	0.32	0.55
SO_3	(see sulfur correction above)	

* Prepared from individual ASTM methods, Annual Book of Standards.

** 95% confidence level.

† Sulfur measured by high temperature combustion. Precision covers the concentration range from 0.8 to 12.9% as sulfur trioxide. x is the measured value in %.

2. The dry gas (demister gas) composition is measured using GC. The species include N_2, O_2, CO, CO_2, CH_4, C_2H_4, C_2H_6, H_2, and Ar. The accuracy was taken as ±2% of the measurement.

3. The H_2S and NH_3 were measured using in-house methods. Thus, the accuracy of these methods are not available. However, for this study the accuracies for H_2S and NH_3 measurement were taken as ±2% of the measurement. These high accuracies were intentionally specified to minimize any adjustments in these measurements.

4. The accuracy of coal and sorbent feed rates were specified as 1 lb/h.

5. The accuracy of drains scales was ±0.1% of full scale. The full scale for these was 1000 pounds.

6. The gas flow rates were measured using three types of meters, namely, vortex meters, turbine meters, and orifice plate. The types of meters used for different flows are listed in Table 4.2.

   a. The accuracy of vortex meters is ±1% of the full-scale flow rate. The repeatability of this meter is ±0.2% of the rate. The full-scale readings for these meters are listed in Table 4.2.

   b. The accuracy of turbine meters is ±1% of the full-scale flow rate. The full-scale readings for these meters are listed in Table 4.2.

   c. The accuracy of orifice plate measurement is ±1% of the full-scale flow rate. An orifice plate was used to measure air feed rate (FIC-1055).

7. All temperatures were measured using Type K thermocouples (standard-grade material). For different temperture ranges, the accuracy of this type of thermocouple is -

0° - 530°F	±4°F
530° - 2300°F	±0.75%

8. The accuracy of the carbonizer heat losses and the system heat losses were taken as ±10%.

9. The accuracy of the orifice pressure measurement was ±0.5% of the full scale; the full scale was 300 psi.

4.2. Temporal Variations in Measurements

The material and energy balances are based on average values of the measurements during a steady-state period; they represent an average value over one or more samples (representing the same quantity) during the period, for a reading which might undergo some temporal or random fluctuation. The average values of several key measurements along with their minimum values, maximum values, and standard deviation values (indicating the degree of fluctuation) for each of the set points are given in Appendix B.

In addition, for reconciliation, the temporal standard deviations of several other parameters were specified as follows:

Table 4.2. TYPES OF GAS FLOW METERS AND FULL-SCALE READINGS

Tag	Description	Meter Type	Full Scale Reading
FI-3028	Bed Drain N_2 Feed, SCFM	Vortex	200
FI-4051	N_2 to Spray Tower, SCFM	Vortex	80
FIC-3072	Primary Cyclone Dipleg Steam, lb/h	Vortex	3000
FIC-3090	Secondary Cyclone Dipleg Steam, lb/h	Vortex	2564
FIC-BSTM	Steam Flow to Carbonizer, lb/h	Vortex	300
FIC-1053	Transport N_2 Feed, SCFM	Turbine	17
FI-7008	Feed Lockhopper Comp. N_2, SCFM	Turbine	50
FI-7020	Purge N_2 to Cyclones Diplegs, SCFM	Turbine	35
FI-7021	Purge N_2 to Carbonizer, SCFM	Turbine	7
FI-7022	Purge N_2 to cyclones, SCFM	Turbine	4
FI-7029	N_2 to Opacity Meter, SCFM	Turbine	110
FIC-1055	Total Air Feed, lb/h	Orifice Plate	1809

Coal Feed	2.5% of measured rate
Sorbent Feed	2.5% of measured rate
Drains	5% of measured rate
Sulfur in Coal (Ultimate Analysis)	5% of measured value
Carbonizer Heat Loss	30%
System Heat Loss	30%
Water Content in Freeboard Gas	1.5 mole %
Drains Solids Analyses:	
Total S	50% of measurement
Sulfide S	100% of measurement
Ash	50% of measurement
CaO	100% of measurement
MgO	100% of measurement

The temporal standard deviation for all the drains (that is, bed, primary-cyclone fines, secondary-cyclone fines, baghouse filter fines) was taken as 5% of the measured value. This relatively high value accounts for the fluctuations in the measured rates as well as any accumulation in the bed during the set point. Also, the sulfur content in the coal feed often varied a lot from sample to sample. To limit adjustments in the sulfur in the coal feed, the temporal standard deviation was restricted to 5% of the measured value.

Table 4.3 summarizes accuracies of various measurements that have been used to reconcile all the balances. The accuracies are specified at the 95% confidence level, or plus or minus twice the standard deviation; significance of the standard deviation is shown in Figure 4.1. A 95% confidence interval means that, if the experiment were repeated an infinite number of times and the results averaged, the probability is 95% that the printed value would agree with the population mean within plus or minus 2 times the standard deviation.

The precision standard deviation and temporal standard deviation along with the average value of each of the plant and laboratory measurements are given in Appendix C. Usually, the temporal variance dominates.

4.3. Reconciled Carbonizer Data and Material and Energy Balances

The material and energy balances for each of the 40 set points were reconciled using the BALAID program. During reconciliation, a maximum likelihood set of measurement values is computed in which all elemental and energy balances close exactly; the adjustments are made to all species flows, temperatures, and compositions with adjustments weighted according to the statistical variance of each variable. A sample input to and output from the BALAID program is given in Appendix H.

Table 4.4 summarizes various measured (unreconciled) and reconciled flow rates along with percentage change for each set point for Test Run TR1; the table shows that the changes required in the various flow rates to close the elemental and energy balance are usually small. For reference, the energy, mass, carbon, sulfur, hydrogen, oxygen, and nitrogen closures for each set point are also included in the table. The amount of adjustment made in each flow rate must be judged based on these closures (that is, the poorer closures will require larger adjustments) and the standard deviations of the measured flow rates (temporal variations, reflecting the amount of fluctuation observed in the measurement during the set point). Similarly, Tables 4.5 through 4.10 provide reconciliation results for Test Runs TR2, TR4.

Table 4.3. TEMPORAL AND/OR PRECISION ACCURACIES* OF MEASUREMENTS

Coal Feed[b]:	±5% of measured rate
Sorbent Feed[b]:	±5% of measured rate
Drains[b]:	±10% of measured rate
Gas Flow (Vortex Meter)[a]:	±1% of full scale
Gas Flow (Turbine Meter)[a]:	±1% of full scale
Gas Flow (Orifice Plate)[a]:	±1% of full scale
Dry Gas Composition[a]:	±2% of measurement
Water Content in Freeboard Gas[c]:	±3 mole %
Orifice Pressure[a]:	±0.5% of full scale
Temperature (Thermocouple K)[a]:	
0 - 530°F	±4°F
530 - 2300°F	±0.75%
Carbonizer Heat Losses[b]:	±30%
System Heat Losses[b]:	±30%
Coal Feed Sulfur[c]:	±10% of measurement
Sigma Values for Drains Solids Analysis[c]:	
Total S	50% of measurement
Sulfide S	100% of measurement
Ash S	50% of measurement
CaO	100% of measurement
MgO	100% of measurement

* Accuracies specified at 95% confidence level (=2σ).
a = precision
b = temporal
c = total

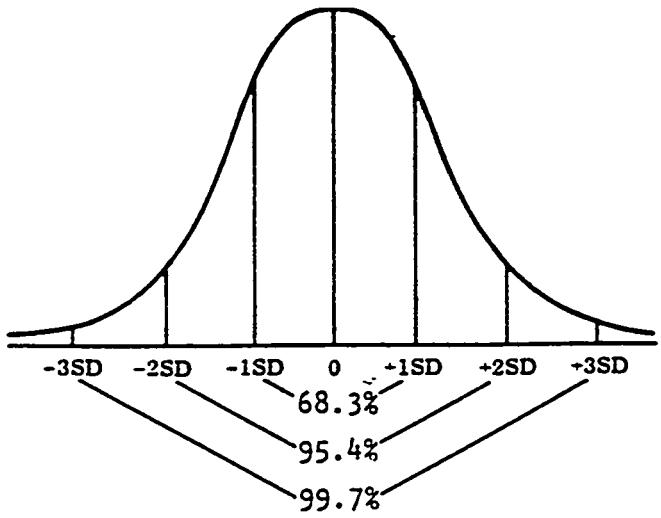

Figure 4.1. STANDARD DEVIATION AND A NORMAL CURVE

Table 4.4. RESULTS OF RECONCILIATION FOR TEST RUN TR1

Set Point Feedstocks	TR1-1 Pittsburgh Coal + Dolomite			TR1-2 Pittsburgh Coal + Dolomite			TR1-3 Pittsburgh Coal + Dolomite			TR1-4 Pittsburgh Coal + Dolomite		
	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %
Coal Feed, lb/h	329.00	337.88	2.7	235.00	238.72	1.6	354.00	341.93	-3.4	395.00	386.68	-2.1
Sorbent Feed, lb/h	89.00	82.26	-7.6	67.00	66.14	-1.3	98.00	96.47	-1.6	97.00	98.66	1.7
Air Feed, lb/h	627.90	622.98	-0.8	586.53	570.82	-2.7	658.52	611.04	-7.2	559.77	537.71	-3.9
Steam Feed, lb/h	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
N2 Purges to Carbonizer, SCFM	93.26	82.25	-11.8	74.02	65.85	-11.0	67.91	63.61	-6.3	44.00	41.72	-5.2
N2 Purge to Cyclones, SCFM	30.60	30.58	-0.1	32.59	32.57	-0.1	31.64	31.60	-0.1	32.71	32.70	0.0
N2 Purge to Opacity Meter, SCFM	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
N2 Purge to Spray Tower, SCFM	43.99	43.91	-0.2	47.70	47.49	-0.4	47.23	47.04	-0.4	47.94	47.86	-0.2
Carbonizer Drain, lb/h	74.40	80.52	8.2	50.67	64.91	28.1	109.40	147.15	34.5	88.00	90.87	3.3
Primary Cyclone Drain, lb/h	78.20	72.48	-7.3	72.30	74.81	3.5	100.90	106.83	5.9	97.60	116.46	19.3
Sec. Cyclone Drain, lb/h	127.80	128.70	0.7	43.10	44.86	4.1	24.00	23.85	-0.6	93.70	116.31	24.1
Baghouse Drain, lb/h	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
Orifice Gas Flow, lb/h	1208.7	1261.2	4.3	1064.9	1127.0	5.8	1146.2	1193.3	4.1	1030.1	1029.1	-0.1

For Reference:												
Energy Closure (out/in), %	98.0	100.0	--	100.5	100.0	--	86.9	100.0	--	94.6	100.0	--
Mass Closure (out/in), %	93.4	100.0	--	90.5	100.0	--	89.0	100.0	--	94.1	100.0	--
Carbon Closure (out/in), %	99.3	100.0	--	101.1	100.0	--	89.4	100.0	--	93.8	100.0	--
Sulfur Closure (out/in), %	131.7	100.0	--	118.2	100.0	--	96.3	100.0	--	82.6	100.0	--
Hydrogen Closure (out/in), %	114.9	100.0	--	117.0	100.0	--	106.2	100.0	--	112.9	100.0	--
Oxygen Closure (out/in), %	106.6	100.0	--	103.6	100.0	--	105.5	100.0	--	112.0	100.0	--
Nitrogen Closure (out/in), %	88.1	100.0	--	86.1	100.0	--	85.9	100.0	--	93.5	100.0	--

Table 4.5. RESULTS OF RECONCILIATION FOR TEST RUN TR2

Set Point Feedstocks	TR2-1 Pittsburgh Coal + Dolomite			TR2-2 Pittsburgh Coal + Dolomite			TR2-3 Pittsburgh Coal + Dolomite			TR2-4 Pittsburgh Coal + Dolomite		
	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %
Coal Feed, lb/h	234.00	235.47	0.6	315.00	327.62	4.0	182.00	181.25	-0.4	376.00	373.85	-0.6
Sorbent Feed, lb/h	118.00	115.08	-2.5	94.00	88.54	-5.8	83.00	79.56	-4.2	99.00	97.18	-1.8
Air Feed, lb/h	716.65	676.99	-5.5	609.52	555.83	-8.8	696.68	664.43	-4.6	984.54	959.48	-2.5
Steam Feed, lb/h	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
N2 Purges to Carbonizer, SCFM	87.77	85.44	-2.7	88.12	85.99	-2.4	86.45	82.82	-4.2	88.00	76.73	-12.8
N2 Purge to Cyclones, SCFM	12.33	12.30	-0.2	12.28	12.26	-0.2	11.82	11.81	-0.1	9.08	9.04	-0.4
N2 Purge to Opacity Meter, SCFM	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
N2 Purge to Spray Tower, SCFM	46.22	45.84	-0.8	46.45	46.14	-0.7	47.53	47.37	-0.3	44.48	44.39	-0.2
Carbonizer Drain, lb/h	65.71	85.12	29.5	151.26	173.70	14.8	29.30	35.16	20.0	136.11	149.11	9.6
Primary Cyclone Drain, lb/h	97.53	104.25	6.9	72.77	72.83	0.1	70.45	83.38	18.4	82.40	82.74	0.4
Sec. Cyclone Drain, lb/h	4.02	4.03	0.2	7.06	7.05	-0.2	3.14	3.16	0.6	2.59	2.56	-1.2
Baghouse Drain, lb/h	5.00	5.04	0.8	11.87	11.84	-0.2	8.21	8.19	-0.3	18.81	18.81	0.0
Orifice Gas Flow, lb/h	1109.1	1262.0	13.8	1031.5	1141.7	10.7	1099.9	1214.5	10.4	1421.3	1557.2	9.6
For Reference:												
Energy Closure (out/in), %	97.3	100.0	--	110.1	100.0	--	92.0	100.0	--	91.9	100.0	--
Mass Closure (out/in), %	84.7	100.0	--	87.1	100.0	--	86.7	100.0	--	87.9	100.0	--
Carbon Closure (out/in), %	100.4	100.0	--	108.3	100.0	--	95.9	100.0	--	95.0	100.0	--
Sulfur Closure (out/in), %	85.3	100.0	--	72.5	100.0	--	84.6	100.0	--	81.1	100.0	--
Hydrogen Closure (out/in), %	112.3	100.0	--	128.4	100.0	--	106.1	100.0	--	96.4	100.0	--
Oxygen Closure (out/in), %	97.7	100.0	--	100.8	100.0	--	95.0	100.0	--	95.2	100.0	--
Nitrogen Closure (out/in), %	78.3	100.0	--	78.8	100.0	--	83.5	100.0	--	83.6	100.0	--

Table 4.5 (cont.). RESULTS OF RECONCILIATION FOR TEST RUN TR2

Set Point Feedstocks	TR2-5 Pittsburgh Coal + Dolomite		
	Measured	Reconciled	Change, %
Coal Feed, lb/h	508.00	489.06	-3.7
Sorbent Feed, lb/h	160.00	151.10	-5.6
Air Feed, lb/h	979.89	955.79	-2.5
Steam Feed, lb/h	0.00	0.00	0.0
N2 Purges to Carbonizer, SCFM	93.03	69.08	-25.7
N2 Purge to Cyclones, SCFM	8.32	8.31	-0.1
N2 Purge to Opacity Meter, SCFM	0.00	0.00	0.0
N2 Purge to Spray Tower, SCFM	43.82	43.74	-0.2
Carbonizer Drain, lb/h	165.18	212.09	28.4
Primary Cyclone Drain, lb/h	134.09	155.79	16.2
Sec. Cyclone Drain, lb/h	5.71	5.75	0.7
Baghouse Drain, lb/h	14.51	14.67	1.1
Orifice Gas Flow, lb/h	1484.4	1550.4	4.4
For Reference:			
Energy Closure (out/in), %	89.0	100.0	--
Mass Closure (out/in), %	86.0	100.0	--
Carbon Closure (out/in), %	94.0	100.0	--
Sulfur Closure (out/in), %	52.2	100.0	--
Hydrogen Closure (out/in), %	92.4	100.0	--
Oxygen Closure (out/in), %	97.3	100.0	--
Nitrogen Closure (out/in), %	83.0	100.0	--

Table 4.6. RESULTS OF RECONCILIATION FOR TEST RUN TR4

Set Point Feedstocks	TR4-1 Pittsburgh Coal + Dolomite			TR4-2 Pittsburgh Coal + Dolomite			TR4-3 Pittsburgh Coal + Dolomite			TR4-4 Pittsburgh Coal + Dolomite		
	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %
Coal Feed, lb/h	259.00	232.76	-10.1	297.00	270.66	-8.9	207.00	202.43	-2.2	253.00	227.83	-10.0
Sorbent Feed, lb/h	97.60	97.18	-0.4	90.00	89.93	-0.1	86.00	85.90	-0.1	95.00	94.64	-0.4
Air Feed, lb/h	683.97	666.39	-2.6	656.03	644.25	-1.8	625.50	600.46	-4.0	564.66	544.25	-3.6
Steam Feed, lb/h	49.79	55.56	11.6[a]	117.96	118.30	0.3	95.98	96.28	0.3	77.41	78.08	0.9
N2 Purges to Carbonizer, SCFM	69.67	69.50	-0.2	66.16	65.44	-1.1	29.32	28.22	-3.8	56.84	55.04	-3.2
N2 Purge to Cyclones, SCFM	7.53	7.53	0.0	7.62	7.61	-0.1	8.36	8.36	0.0	8.42	8.42	0.0
N2 Purge to Opacity Meter, SCFM	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
N2 Purge to Spray Tower, SCFM	39.10	39.22	0.3	39.10	38.97	-0.3	37.07	37.02	-0.2	37.36	37.25	-0.3
Carbonizer Drain, lb/h	59.37	81.20	36.8	82.17	111.65	35.9	65.36	66.48	1.7	85.57	112.94	32.0
Primary Cyclone Drain, lb/h	66.49	73.89	11.1	81.38	88.16	8.3	77.29	78.84	2.0	49.78	56.61	13.7
Sec. Cyclone Drain, lb/h	3.77	3.76	-0.1	4.09	4.14	1.2	6.51	6.56	0.8	5.35	5.48	2.5
Baghouse Drain, lb/h	15.15	15.54	2.6	7.73	7.83	1.3	4.69	4.71	0.5	16.50	17.09	3.6
Orifice Gas Flow, lb/h	1188.8	1218.6	2.5	1190.5	1234.9	3.7	971.6	990.5	1.9	1014.6	1033.7	1.9
For Reference:												
Energy Closure (out/in), %	77.9	100.0	--	74.7	100.0	--	93.7	100.0	--	83.0	100.0	--
Mass Closure (out/in), %	93.1	100.0	--	91.8	100.0	--	95.3	100.0	--	91.6	100.0	--
Carbon Closure (out/in), %	77.3	100.0	--	70.5	100.0	--	91.5	100.0	--	79.4	100.0	--
Sulfur Closure (out/in), %	70.7	100.0	--	129.0	100.0	--	81.4	100.0	--	61.2	100.0	--
Hydrogen Closure (out/in), %	95.6	100.0	--	106.8	100.0	--	112.6	100.0	--	112.1	100.0	--
Oxygen Closure (out/in), %	98.4	100.0	--	106.8	100.0	--	103.4	100.0	--	106.9	100.0	--
Nitrogen Closure (out/in), %	96.3	100.0	--	90.7	100.0	--	91.4	100.0	--	90.7	100.0	--

a. The steam flow was fluctuating during the set point (min. = 14.48 lb/h, max. = 66.97 lb/h, SD = 20.09 lb/h).

Table 4.6 (cont.). RESULTS OF RECONCILIATION FOR TEST RUN TR4

Set Point Feedstocks	TR4-5 Pittsburgh Coal + Dolomite			TR4-6 Pittsburgh Coal + Dolomite			TR4-7 Pittsburgh Coal + Dolomite			TR4-8 Pittsburgh Coal + Dolomite		
	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %
Coal Feed, lb/h	370.00	329.15	-11.0	396.00	333.34	-15.8	450.00	412.24	-8.4	338.00	347.37	2.8
Sorbent Feed, lb/h	106.00	106.13	0.1	106.00	106.09	0.1	182.00	181.55	-0.3	150.00	149.89	-0.1
Air Feed, lb/h	899.87	895.50	-0.5	820.11	819.21	-0.1	772.66	769.56	-0.4	750.88	751.59	0.1
Steam Feed, lb/h	140.81	142.76	1.4	84.83	85.09	0.3	50.79	51.75	1.9	40.00	53.48	33.7[b]
N2 Purges to Carbonizer, SCFM	38.48	37.72	-2.0	37.18	36.56	-1.7	68.20	66.78	-2.1	68.47	68.22	-0.4
N2 Purge to Cyclones, SCFM	6.19	6.17	-0.3	8.76	8.76	0.0	8.46	8.46	0.0	8.10	8.10	0.0
N2 Purge to Opacity Meter, SCFM	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
N2 Purge to Spray Tower, SCFM	33.77	33.71	-0.2	33.52	33.51	0.0	33.45	33.35	-0.3	30.67	30.57	-0.3
Carbonizer Drain, lb/h	97.20	97.16	-0.1	112.36	117.66	4.7	195.86	270.24	38.0	169.25	204.40	20.8
Primary Cyclone Drain, lb/h	84.55	96.97	14.7	71.23	85.28	19.7	64.58	68.54	6.1	90.55	90.35	-0.2
Sec. Cyclone Drain, lb/h	3.22	3.25	1.0	4.25	4.39	3.4	25.57	26.16	2.3	3.30	3.30	0.0
Baghouse Drain, lb/h	23.14	23.70	2.4	18.89	20.05	6.2	16.85	17.04	1.1	18.00	17.95	-0.3
Orifice Gas Flow, lb/h	1398.1	1446.8	3.5	1295.0	1317.0	1.7	1342.8	1366.3	1.8	1363.9	1324.3	-2.9
For Reference:												
Energy Closure (out/in), %	79.5	100.0	--	72.2	100.0	--	78.2	100.0	--	107.2	100.0	--
Mass Closure (out/in), %	93.7	100.0	--	93.3	100.0	--	91.7	100.0	--	101.7	100.0	--
Carbon Closure (out/in), %	80.6	100.0	--	72.0	100.0	--	76.6	100.0	--	104.0	100.0	--
Sulfur Closure (out/in), %	85.7	100.0	--	78.9	100.0	--	78.1	100.0	--	89.5	100.0	--
Hydrogen Closure (out/in), %	95.1	100.0	--	96.6	100.0	--	97.7	100.0	--	132.4	100.0	--
Oxygen Closure (out/in), %	103.9	100.0	--	108.2	100.0	--	100.8	100.0	--	112.5	100.0	--
Nitrogen Closure (out/in), %	93.5	100.0	--	95.6	100.0	--	95.3	100.0	--	98.8	100.0	--

b. The steam flow was fluctuating during the set point (min = lb/h, max = lb/h, SD = 9.07 lb/h).

Table 4.7. RESULTS OF RECONCILIATION FOR TEST RUN TR5

Set Point Feedstocks	TR5-1 Pittsburgh Coal + Dolomite			TR5-2 Pittsburgh Coal + Dolomite			TR5-3 Pittsburgh Coal + Limestone		
	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %
Coal Feed, lb/h	229.00	203.82	-11.0	236.00	224.12	-5.0	237.00	220.30	-7.0
Sorbent Feed, lb/h	60.00	59.40	-1.0	119.00	108.12	-9.1	70.00	70.09	0.1
Air Feed, lb/h	605.52	636.08	5.1	698.40	707.45	1.3	672.14	676.01	0.6
Steam Feed, lb/h	90.09	90.68	0.7	89.83	90.19	0.4	100.02	100.14	0.1
N2 Purges to Carbonizer, SCFM	46.17	45.93	-0.5	45.02	44.78	-0.5	48.15	47.64	-1.1
N2 Purge to Cyclones, SCFM	7.48	7.28	-2.7	6.95	6.89	-0.9	3.15	3.15	0.0
N2 Purge to Opacity Meter, SCFM	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
N2 Purge to Spray Tower, SCFM	42.21	42.32	0.3	39.47	39.56	0.3	40.79	40.73	-0.1
Carbonizer Drain, lb/h	45.33	68.95	52.1	62.89	79.24	26.0	52.40	54.20	3.4
Primary Cyclone Drain, lb/h	40.26	45.05	11.9	62.29	68.15	9.4	48.24	51.27	6.3
Sec Cyclone Drain, lb/h	3.60	3.78	5.0	16.00	16.47	2.9	34.13	35.24	3.3
Baghouse Drain, lb/h	6.64	6.96	4.8	6.44	6.57	2.0	16.58	16.17	-2.5
Orifice Gas Flow, lb/h	1033.9	1100.9	6.5	1181.2	1188.3	0.6	1123.6	1134.5	1.0

For Reference:									
Energy Closure (out/in), %	76.2	100.0	--	89.5	100.0	--	88.8	100.0	--
Mass Closure (out/in), %	92.4	100.0	--	96.8	100.0	--	97.6	100.0	--
Carbon Closure (out/in), %	72.0	100.0	--	85.9	100.0	--	90.7	100.0	--
Sulfur Closure (out/in), %	86.1	100.0	--	66.3	100.0	--	64.5	100.0	--
Hydrogen Closure (out/in), %	104.9	100.0	--	110.5	100.0	--	99.4	100.0	--
Oxygen Closure (out/in), %	104.0	100.0	--	100.3	100.0	--	106.3	100.0	--
Nitrogen Closure (out/in), %	94.6	100.0	--	98.7	100.0	--	96.6	100.0	--

Table 4.8. RESULTS OF RECONCILIATION FOR TEST RUN TR6

Set Point Feedstocks	TR6-1 Wyoming Coal + Limestone			TR6-2 Wyoming Coal + Limestone			TR6-3 Wyoming Coal + Limestone			TR6-4 Wyoming Coal + Limestone		
	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %
Coal Feed, lb/h	344.00	330.38	-4.0	329.00	310.57	-5.6	424.00	397.83	-6.2	475.00	443.36	-6.6
Sorbent Feed, lb/h	68.00	67.82	-0.3	67.00	66.66	-0.5	45.00	44.92	-0.1	55.00	54.98	0.0
Air Feed, lb/h	754.15	755.05	0.1	642.40	656.14	2.1	807.91	799.76	-8.2	1000.12	992.63	-0.7
Steam Feed, lb/h	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
N2 Purges to Carbonizer, SCFM	42.53	47.03	10.6	48.69	52.36	7.5	40.03	39.89	-0.4	34.44	34.32	-0.4
N2 Purge to Cyclones, SCFM	5.98	5.99	0.3	4.97	5.37	8.1	5.79	5.79	0.0	4.07	4.06	0.0
N2 Purge to Opacity Meter, SCFM	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0	00.0	00.0	0.0
N2 Purge to Spray Tower, SCFM	30.53	30.85	1.0	30.94	31.19	0.8	29.05	29.12	0.3	23.84	23.85	0.0
Carbonizer Drain, lb/h	46.32	64.22	38.6	69.44	70.89	2.1	39.90	44.51	11.5	57.11	60.38	5.7
Primary Cyclone Drain, lb/h	44.76	45.58	1.8	46.67	47.34	1.9	67.76	69.88	3.1	49.91	50.58	1.3
Sec. Cyclone Drain, lb/h	3.70	3.69	-0.2	5.87	5.80	-1.2	6.75	6.70	-0.7	1.32	1.31	-1.1
Baghouse Drain, lb/h	8.14	8.11	-0.4	12.38	12.47	0.7	8.25	8.13	-1.5	25.59	25.59	0.0
Orifice Gas Flow, lb/h	1342.0	1266.5	-5.6	1228.6	1152.5	-6.2	1215.9	1315.6	8.2	1434.0	1532.2	6.2
For Reference:												
Energy Closure (out/in), %	87.1	100.0	–	81.5	100.0	–	83.2	100.0	–	84.4	100.0	–
Mass Closure (out/in), %	104.6	100.0	–	106.8	100.0	–	90.5	100.0	–	92.2	100.0	–
Carbon Closure (out/in), %	89.2	100.0	–	85.9	100.0	–	81.5	100.0	–	86.3	100.0	–
Sulfur Closure (out/in), %	45.0	100.0	–	45.6	100.0	–	60.1	100.0	–	46.8	100.0	–
Hydrogen Closure (out/in), %	103.0	100.0	–	92.2	100.0	–	84.3	100.0	–	81.1	100.0	–
Oxygen Closure (out/in), %	97.7	100.0	–	98.4	100.0	–	87.7	100.0	–	89.7	100.0	–
Nitrogen Closure (out/in), %	113.5	100.0	–	116.5	100.0	–	94.6	100.0	–	95.7	100.0	–

Table 4.8 (cont.). RESULTS OF RECONCILIATION FOR TEST RUN TR6

Set Point Feedstocks	TR6-5 Wyoming Coal + Limestone			TR6-6 Illinois Coal + Limestone			TR6-7 Illinois Coal + Limestone		
	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %
Coal Feed, lb/h	462.00	429.56	-7.0	304.00	291.83	-4.0	232.00	236.17	1.8
Sorbent Feed, lb/h	17.00	20.46	20.4	36.00	35.94	-0.2	39.00	38.73	-0.7
Air Feed, lb/h	981.61	970.90	-1.1	641.63	634.07	-1.2	561.44	512.72	-8.7
Steam Feed, lb/h	0.00	0.00	0.0	112.43	112.70	0.2	58.04	58.64	1.0
N2 Purges to Carbonizer, SCFM	36.18	36.02	-0.4	42.37	42.14	-0.5	41.90	42.06	0.4
N2 Purge to Cyclones, SCFM	3.63	3.62	-0.4	4.94	4.93	-0.2	5.29	5.30	0.2
N2 Purge to Opacity Meter, SCFM	00.0	00.0	0.0	0.00	0.00	0.0	0.00	0.00	0.0
N2 Purge to Spray Tower, SCFM	22.05	22.10	0.2	27.14	27.12	-0.1	26.13	26.09	-0.2
Carbonizer Drain, lb/h	15.00	19.43	29.5	50.29	77.66	54.4	70.09	80.33	14.6
Primary Cyclone Drain, lb/h	50.79	53.28	4.9	58.75	61.82	5.2	42.89	42.24	-1.5
Sec. Cyclone Drain, lb/h	4.53	4.51	-0.4	5.33	5.38	0.9	13.07	13.02	-0.4
Baghouse Drain, lb/h	26.22	26.44	0.8	28.22	28.86	2.3	15.47	15.39	-0.5
Orifice Gas Flow, lb/h	1404.4	1492.8	6.3	1091.1	1109.3	1.7	959.2	904.99	-5.7

For Reference:									
Energy Closure (out/in), %	85.3	100.0	--	88.9	100.0	--	106.0	100.0	--
Mass Closure (out/in), %	91.7	100.0	--	94.6	100.0	--	100.1	100.0	--
Carbon Closure (out/in), %	84.9	100.0	--	86.8	100.0	--	100.2	100.0	--
Sulfur Closure (out/in), %	37.7	100.0	--	44.8	100.0	--	142.2	100.0	--
Hydrogen Closure (out/in), %	84.8	100.0	--	102.6	100.0	--	126.8	100.0	--
Oxygen Closure (out/in), %	89.3	100.0	--	101.1	100.0	--	104.1	100.0	--
Nitrogen Closure (out/in), %	95.3	100.0	--	95.5	100.0	--	97.2	100.0	--

Table 4.9. RESULTS OF RECONCILIATION FOR TEST RUN TR8

Set Point Feedstocks	TR8-1 Wyoming Coal + Limestone			TR8-2 Wyoming Coal + Limestone			TR8-3 Wyoming Coal + Limestone			TR8-4 Illinois Coal + Limestone		
	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %
Coal Feed, lb/h	300.00	288.37	-3.9	310.00	283.68	-8.5	393.00	362.84	-7.7	320.00	302.41	-5.5
Sorbent Feed, lb/h	41.00	37.18	-9.3	55.00	54.46	-1.0	27.00	27.02	0.1	76.00	75.62	-0.5
Air Feed, lb/h	613.84	600.15	-2.2	704.14	691.38	-1.8	863.49	823.06	-4.7	688.48	668.53	-2.9
Steam Feed, lb/h	45.50	46.45	2.1	46.01	46.47	1.0	48.74	53.10	8.9	96.28	96.68	0.4
N2 Purges to Carbonizer, SCFM	50.10	50.72	1.2	48.16	48.47	0.6	42.17	43.46	3.1	39.94	40.16	0.6
N2 Purge to Cyclones, SCFM	4.33	4.39	1.3	6.77	6.98	3.0	9.03	9.06	0.3	4.15	4.16	0.2
N2 Purge to Opacity Meter, SCFM	32.66	32.75	0.3	32.36	32.47	0.3	25.37	25.43	0.2	0.00	0.00	0.0
N2 Purge to Spray Tower, SCFM	27.94	29.63	6.0	31.06	31.28	0.7	17.79	19.59	10.1	19.28	20.03	3.9
Carbonizer Drain, lb/h	6.04	29.99	396.5	26.51	46.14	74.0	16.76	21.32	27.2	66.67	84.76	27.1
Primary Cyclone Drain, lb/h	45.72	53.12	16.2	34.25	35.92	4.9	33.94	35.82	5.5	57.18	60.76	6.3
Sec. Cyclone Drain, lb/h	10.87	11.61	6.8	4.47	4.60	3.0	7.56	7.62	0.8	34.22	35.47	3.6
Baghouse Drain, lb/h	2.04	2.14	4.9	1.29	1.43	11.1	7.67	7.82	2.0	24.62	25.44	3.3
Orifice Gas Flow, lb/h	1478.5	1264.5	-14.5	1497.6	1377.3	-8.0	1641.7	1538.6	-6.3	1170.9	1133.1	-3.2
For Reference:												
Energy Closure (out/in), %	87.3	100.0	–	75.9	100.0	–	78.3	100.0	–	81.7	100.0	–
Mass Closure (out/in), %	111.3	100.0	–	104.2	100.0	–	102.2	100.0	–	98.4	100.0	–
Carbon Closure (out/in), %	82.9	100.0	–	78.3	100.0	–	79.0	100.0	–	83.6	100.0	–
Sulfur Closure (out/in), %	265.5	100.0	–	68.6	100.0	–	37.4	100.0	–	51.2	100.0	–
Hydrogen Closure (out/in), %	126.7	100.0	–	114.8	100.0	–	110.9	100.0	–	114.3	100.0	–
Oxygen Closure (out/in), %	103.9	100.0	–	101.3	100.0	–	99.0	100.0	–	104.0	100.0	–
Nitrogen Closure (out/in), %	120.9	100.0	–	111.5	100.0	–	108.9	100.0	–	101.3	100.0	–

Table 4.9 (cont.). RESULTS OF RECONCILIATION FOR TEST RUN TR8

Set Point Feedstocks	TR8-5 Illinois Coal + Limestone			TR8-6/7 Pittsburgh Coal + Dolomite			TR8-8 Pittsburgh Coal + Dolomite			TR8-9 Pittsburgh Coal + Dolomite		
	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %
Coal Feed, lb/h	427.00	388.05	-9.1	380.00	375.66	-1.1	360.00	342.85	-4.8	350.00	337.02	-3.7
Sorbent Feed, lb/h	104.00	101.16	-2.7	124.00	119.98	-3.2	80.00	79.47	-0.7	84.00	79.93	-4.8
Air Feed, lb/h	954.18	935.47	-1.9	916.78	879.66	-4.1	837.73	823.02	-1.8	800.41	782.67	-2.2
Steam Feed, lb/h	139.67	144.66	3.6	99.09	99.78	0.7	90.00	90.48	0.5	54.99	55.54	1.0
N2 Purges to Carbonizer, SCFM	47.66	47.22	-0.9	59.38	59.11	-0.5	62.08	61.82	-0.4	62.62	62.28	-0.5
N2 Purge to Cyclones, SCFM	6.02	6.02	0.0	5.62	5.62	0.0	5.20	5.20	0.0	5.17	5.16	-0.2
N2 Purge to Opacity Meter, SCFM	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
N2 Purge to Spray Tower, SCFM	21.21	21.38	0.8	5.46	5.38	-1.3	12.43	12.30	-1.0	13.34	13.31	-0.2
Carbonizer Drain, lb/h	51.47	94.05	82.7	82.02	98.21	19.7	67.45	103.88	54.0	73.61	102.86	39.7
Primary Cyclone Drain, lb/h	61.44	66.04	7.5	114.54	120.57	5.3	93.87	99.99	6.5	68.19	74.69	9.5
Sec. Cyclone Drain, lb/h	36.67	38.75	5.6	32.25	32.60	1.1	10.93	11.09	1.4	31.55	32.41	2.7
Baghouse Drain, lb/h	34.86	36.56	4.9	41.11	41.15	0.1	35.08	36.04	2.7	32.24	33.13	2.8
Orifice Gas Flow, lb/h	1544.7	1569.7	1.6	1489.2	1469.2	-1.3	1381.1	1381.6	0.04	1319.1	1310.8	-0.6
For Reference:												
Energy Closure (out/in), %	72.4	100.0	--	93.5	100.0	--	86.5	100.0	--	91.7	100.0	--
Mass Closure (out/in), %	92.8	100.0	--	97.3	100.0	--	95.4	100.0	--	95.9	100.0	--
Carbon Closure (out/in), %	76.5	100.0	--	93.3	100.0	--	86.2	100.0	--	90.6	100.0	--
Sulfur Closure (out/in), %	46.1	100.0	--	68.4	100.0	--	62.9	100.0	--	50.5	100.0	--
Hydrogen Closure (out/in), %	106.9	100.0	--	132.0	100.0	--	126.8	100.0	--	134.0	100.0	--
Oxygen Closure (out/in), %	103.3	100.0	--	110.1	100.0	--	110.9	100.0	--	110.8	100.0	--
Nitrogen Closure (out/in), %	94.7	100.0	--	93.8	100.0	--	93.3	100.0	--	94.4	100.0	--

Table 4.9 (cont.). RESULTS OF RECONCILIATION FOR TEST RUN TR8

Set Point Feedstocks	TR8-10 Pittsburgh Coal + Dolomite		
	Measured	Reconciled	Change, %
Coal Feed, lb/h	350.00	337.71	-3.5
Sorbent Feed, lb/h	40.00	39.76	-0.6
Air Feed, lb/h	737.86	661.67	-10.3
Steam Feed, lb/h	55.02	55.72	1.3
N2 Purges to Carbonizer, SCFM	59.60	59.39	-0.4
N2 Purge to Cyclones, SCFM	5.08	5.08	0.0
N2 Purge to Opacity Meter, SCFM	0.00	0.00	0.0
N2 Purge to Spray Tower, SCFM	4.79	4.69	-2.1
Carbonizer Drain, lb/h	93.88	120.75	28.6
Primary Cyclone Drain, lb/h	88.34	94.47	6.9
Sec. Cyclone Drain, lb/h	1.52	1.57	3.2
Baghouse Drain, lb/h	16.81	17.22	2.4
Orifice Gas Flow, lb/h	1232.0	1146.4	-6.9
For Reference:			
Energy Closure (out/in), %	93.1	100.0	--
Mass Closure (out/in), %	97.5	100.0	--
Carbon Closure (out/in), %	90.9	100.0	--
Sulfur Closure (out/in), %	65.0	100.0	--
Hydrogen Closure (out/in), %	151.6	100.0	--
Oxygen Closure (out/in), %	123.9	100.0	--
Nitrogen Closure (out/in), %	92.3	100.0	--

Table 4.10. RESULTS OF RECONCILIATION FOR TEST RUN TR10

Set Point Feedstocks	TR10-1 Pittsburgh Coal + Limestone			TR10-2 Pittsburgh Coal + Limestone			TR10-3 Pittsburgh Coal + Limestone			TR10-4 Pittsburgh Coal + Limestone		
	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %	Measured	Reconciled	Change, %
Coal Feed, lb/h	525.00	507.59	-3.3	232.00	230.20	-0.8	300.00	285.72	-4.8	286.00	259.98	-9.1
Sorbent Feed, lb/h	143.00	137.00	-4.2	32.00	32.33	1.0	25.00	25.30	1.2	25.00	24.71	-1.2
Air Feed, lb/h	1158.45	1126.46	-2.8	736.21	598.99	-18.6[a]	845.20	836.00	-1.1	641.61	615.68	-4.0
Steam Feed, lb/h	150.73	151.10	0.3	0.13	0.13	0.0	0.28	0.30	5.8	0.27	0.29	8.2
N2 Purges to Carbonizer[b], SCFM	11.42	11.55	1.1	41.45	49.50	19.4[c]	19.80	28.74	45.2[c]	25.14	33.01	31.3[c]
N2 Purge to Cyclones, SCFM	2.03	2.03	0.0	2.05	2.05	0.0	2.07	2.07	0.0	2.08	2.08	0.0
N2 Purge to Opacity Meter, SCFM	58.76	58.83	0.1	58.38	58.43	0.1	58.27	58.34	0.1	59.20	59.30	0.2
N2 Purge to Spray Tower, SCFM	23.87	24.06	0.8	19.89	20.34	2.3	25.30	25.62	1.3	25.38	25.79	1.6
Carbonizer Drain, lb/h	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
Primary Cyclone Drain, lb/h	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
Sec. Cyclone Drain, lb/h	219.65	306.95	39.8	47.50	48.54	2.2	107.00	122.27	14.3	105.22	137.66	30.8
Baghouse Drain, lb/h	72.39	77.42	7.0	101.65	103.63	2.0	41.62	42.11	1.2	32.01	33.63	5.1
Orifice Gas Flow, lb/h	2191.4	1858.5	-15.2	1614.8	1196.6	-25.9	1647.8	1377.8	-16.4	1386.2	1147.4	-17.2
For Reference:												
Energy Closure (out/in), %	85.5	100.0	–	97.0	100.0	–	83.3	100.0	–	75.2	100.0	–
Mass Closure (out/in), %	108.1	100.0	–	121.5	100.0	–	117.8	100.0	–	114.0	100.0	–
Carbon Closure (out/in), %	82.3	100.0	–	97.3	100.0	–	84.6	100.0	–	71.5	100.0	–
Sulfur Closure (out/in), %	67.4	100.0	–	59.4	100.0	–	65.9	100.0	–	73.4	100.0	–
Hydrogen Closure (out/in), %	140.2	100.0	–	148.7	100.0	–	138.7	100.0	–	138.8	100.0	–
Oxygen Closure (out/in), %	122.6	100.0	–	106.7	100.0	–	114.0	100.0	–	115.7	100.0	–
Nitrogen Closure (out/in), %	112.9	100.0	–	129.9	100.0	–	127.3	100.0	–	125.2	100.0	–

a. The air feed was fluctuating during the set point (min = 609 lb/h, max = 857 lb/h, SD = 113 lb/h).
b. Includes L-Valve Aeration nitrogen.
c. The L-Valve Aeration nitrogen was fluctuating a lot during set points 2, 3, and 4.

TR5, TR6, TR8, and TR10, respectively. These tables show that the adjustments required in the various flow rates to close the elemental and energy balance are usually small, except for Test Run TR10 (see Table 4.10). It was noted that the difference between the total mass closure and the carbon closure in the unreconciled data for all the set points in Test Run TR10 was usually large (26% to 43%). Furthermore, the air feed was fluctuating significantly during set point TR10-2, while the L-Valve aeration nitrogen also had large fluctuations during set points TR10-2, TR10-3, and TR10-4. These are reflected in the relatively larger adjustments made in some of the parameters in the reconciled data for these set points.

For each set point, the adjustment made by the BALAID program in each of the measurements is given in Appendix D. The reconciled material and energy balances for each of the set points, showing 100% total energy, total mass, and elemental closures, are given in Appendix E. For each of the set points, a comparison of unreconciled and reconciled compositions of all the solid streams is given in Appendix F. For each of the set points, a comparison of unreconciled and reconciled compositions of the freeboard gas, orifice gas, and demister gas is given in Appendix G.

The reconciled data for each of these set points (steady-state periods) are also provided here. These data are arranged by fluidized-bed operating mode (jetting or circulating) and coal feed type. The reconciled compositions of the coal and sorbent feed for each of the 24 set points achieved while feeding Pittsburgh coal and operating in the jetting fluidized-bed mode are given in Table 4.11. The minimum, maximum, average, and standard deviation for each parameter, showing variations among set points, is also given in this table. The reconciled data for each of the 24 steady-state periods obtained with the Pittsburgh coal feed are given in Table 4.12. The table also includes statistical information (minimum, maximum, average, and standard deviation) for each of the parameters. The reconciled compositions of the coal and sorbent feed for each of the 4 set points achieved while feeding Illinois coal are given in Table 4.13; the reconciled data are given in Table 4.14. The reconciled compositions of the coal and sorbent feed for each of the 8 set points achieved while feeding Wyoming coal are given in Table 4.15; the reconciled data are given in Table 4.16. Because the reactor pressure, average bed temperature, bed temperature at the 7.5-ft level, freeboard temperature at the 22.5-ft level, and bed height are not needed for material and energy balance calculations, their reconciled and unreconciled values are identical.

The reconciled compositions of the coal and sorbent feed for each of the 4 set points achieved with the Pittsburgh coal feed while operating the carbonizer in the circulating fluidized-bed mode are given in Table 4.17; the measured and derived data are given in Table 4.18.

Tables 4.12, 4.14, 4.16, and 4.18 contain reconciled data for all set points, whereas Tables 2.7, 2.9, 2.11, and 2.13 (presented earlier) are identical but contain the unreconciled data; thus one can easily make a comparison of the reconciled and unreconciled data.

The results of reconciliation, for the test runs in which the carbonizer was operated in a jetting fluidized-bed mode, are also presented here in graphical form. These adjustments should be evaluated in the light of various closures presented earlier in Section 2.4. Figure 4.2 shows a comparison of reconciled and unreconciled coal feed rate for various set points; in general, the coal feed rate was reduced. As shown earlier in Table 2.14, the average carbon and energy closures (out/in) for all the set points are 87.6% and 87.7%, respectively, indicating a need to reduce the in flow of coal feed; thus the adjustments are consistent with the closures. Figure 4.3 shows a comparison of reconciled and unreconciled sorbent feed rate for various set points; the adjustments are minimal. Figure 4.4 shows a comparison of reconciled and unreconciled values of air feed rate; although the adjustments are minimal, the reconciled values are usually lower than the unreconciled values. This trend is perhaps affected by the fact that the average argon closure for all the set points is only 86.2%. Figures 4.5, 4.6, and 4.7 show

Table 4.11. RECONCILED COMPOSITION OF COAL AND SORBENT FEEDS FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

Set Point	TR1-1	TR1-2	TR1-3	TR1-4	TR2-1	TR2-2	TR2-3	TR2-4	TR2-5	TR4-1	TR4-2	TR4-3
Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo
Moisture in Coal Feed, wt %	2.16	2.18	2.32	2.32	2.29	2.24	2.30	2.29	2.38	2.33	2.37	2.19
Coal (MF) Feed Composition, wt %												
C	68.424	69.142	66.150	67.646	69.668	70.266	69.684	69.567	68.963	69.717	69.927	72.138
H	4.742	4.736	4.627	4.763	4.701	4.762	4.698	4.685	4.628	4.715	4.794	4.847
O	6.764	6.684	9.072	8.171	6.225	5.963	6.091	6.223	6.928	7.771	7.697	5.931
N	1.894	1.905	1.887	1.904	1.965	1.973	1.964	1.964	1.962	1.924	1.928	1.937
S	3.476	3.349	3.313	3.213	4.655	4.688	4.695	4.652	4.628	3.404	3.410	3.413
Ash	14.700	14.185	14.951	14.302	12.787	12.348	12.867	12.909	12.892	12.469	12.245	11.735
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
HHV, Btu/lb (MF)	12322	12452	11943	12530	12729	12969	12608	12774	12555	12709	12832	12926
Sorbent Feed Composition, wt %												
CaCO3	52.992	56.061	56.070	56.600	53.783	53.349	53.403	54.196	53.783	53.342	53.458	53.465
MgCO3	45.263	42.140	42.272	41.396	45.179	45.614	45.537	44.715	45.234	45.636	45.514	45.508
CaS*	0.525	0.493	0.492	0.477	0.359	0.371	0.366	0.357	0.370	0.380	0.379	0.379
Inerts	1.220	1.306	1.166	1.527	0.679	0.666	0.694	0.732	0.633	0.642	0.649	0.648
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

* Sulfur in Sorbent is reported as CaS.

Table 4.11 (cont.). RECONCILED COMPOSITION OF COAL AND SORBENT FEEDS FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

Set Point	TR4-4	TR4-5	TR4-6	TR4-7	TR4-8	TR5-1	TR5-2	TR5-3	TR8-67	TR8-8	TR8-9	TR8-10
Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	LV Lime	PR Dolo	PR Dolo	PR Dolo	PR Dolo
Moisture in Coal Feed, wt %	2.43	2.37	2.56	2.33	2.13	1.63	1.52	1.55	2.88	2.99	2.96	2.96
Coal (MF) Feed Composition, wt %												
C	70.092	72.687	72.321	69.721	72.979	74.014	74.859	74.801	70.072	69.431	69.658	69.722
H	4.840	4.840	4.923	4.724	4.855	4.673	4.718	4.698	4.359	4.321	4.343	4.348
O	7.881	7.524	8.750	7.791	5.640	5.467	5.185	5.164	5.674	5.869	5.849	5.941
N	1.937	1.986	2.010	1.922	1.945	2.052	2.066	2.062	1.802	1.790	1.795	1.798
S	3.409	3.505	3.553	3.382	3.432	1.898	1.895	1.884	4.167	4.140	4.101	4.121
Ash	11.842	9.458	8.443	12.461	11.148	11.895	11.277	11.391	13.926	14.449	14.253	14.070
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
HHV, Btu/lb (MF)	12713	13108	13214	12850	13123	13116	13211	13193	12680	12565	12642	12660
Sorbent Feed Composition, wt %												
CaCO3	53.383	53.450	53.462	53.457	53.370	63.737	62.446	96.595	58.270	57.238	57.112	57.366
MgCO3	45.622	45.523	45.510	45.528	45.618	35.418	36.732	2.786	40.395	41.517	41.674	41.394
CaS*	0.380	0.378	0.378	0.379	0.379	0.466	0.501	0.298	0.182	0.500	0.519	0.500
Inerts	0.615	0.649	0.650	0.636	0.633	0.379	0.321	0.321	1.153	0.745	0.695	0.740
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

* Sulfur in Sorbent is reported as CaS.

Table 4.11 (cont.). RECONCILED COMPOSITION OF COAL AND SORBENT FEEDS FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

Set Point	Minimum	Maximum	Average	Std Dev
Coal	----Pittsburgh No. 8 Bituminous-----			
Sorbent	Plum Run Dolomite/Longview Limestone			
	(No. of Set Points = 24)			
Moisture in Coal Feed, wt %	1.52	2.99	2.32	0.38
Coal (MF) Feed Composition, wt %				
C	66.150	74.859	70.485	2.131
H	4.321	4.923	4.681	0.167
O	5.164	9.072	6.677	1.113
N	1.790	2.066	1.932	0.077
S	1.884	4.695	3.599	0.819
Ash	8.443	14.951	12.625	1.584
Total	100.000	100.000	100.000	
HHV, Btu/lb (MF)	11943	13214	12768	303
Sorbent Feed Composition**, wt %				
CaCO3	52.992	63.737	55.381	2.888
MgCO3	35.418	45.636	43.432	2.897
CaS*	0.182	0.525	0.413	0.078
Inerts	0.321	1.527	0.773	0.288
Total	100.000	100.000	100.000	

* Sulfur in Sorbent is reported as CaS.

** Minimum, Maximum, Average, and Standard Deviation do not include Set Point TR5-3, in which Limestone was fed.

Table 4.12. RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

Set Point	TR1-1	TR1-2	TR1-3	TR1-4	TR2-1	TR2-2	TR2-3	TR2-4	TR2-5	TR4-1	TR4-2	TR4-3
1 Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
2 Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo
3 Begin Date	11/20/91	11/21/91	11/21/91	11/21/91	12/19/91	12/19/91	12/20/91	12/20/91	12/20/91	3/10/92	3/11/92	3/12/92
4 Begin Clock Time, hours	0300	0200	1000	2100	0100	1300	0100	1000	1600	2030	0430	0230
5 End Clock Time, hours	0700	0600	1400	2330	0500	1700	0500	1400	1800	0030	0830	0630
6 Steady-State Period Duration, h	4	4	4	2.5	4	4	4	4	2	4	4	4
7 Reactor Pressure, psig	152.6	132.9	144.7	125.4	139.8	128.3	138.1	191.8	198.6	153.3	155.9	125.2
8 Orifice Pressure, psig	150.0	130.4	142.0	123.1	137.1	125.7	135.3	187.9	194.5	150.1	152.6	122.8
9 Average Bed Temp, F	1584	1681	1608	1482	1698	1598	1797	1784	1679	1663	1608	1708
10 Bed Temp (@7.5 ft), F	1611	1696	1636	1512	1700	1605	1794	1793	1692	1664	1605	1710
11 Freeboard Temp (@22.5 ft), F	1553	1651	1581	1440	1652	1567	1705	1738	1675	1626	1573	1643
12 Freeboard Temp (@27.5 ft), F	1505	1591	1533	1394	1605	1504	1629	1669	1589	1583	1531	1591
13 Orifice Temperature, F	1258	1267	1270	1164	1323	1255	1324	1437	1400	1326	1292	1311
14 Coal Feed Rate, lb/h	337.9	238.7	341.9	386.7	235.5	327.6	181.3	373.8	489.1	232.8	270.7	202.4
15 Sorbent Feed Rate, lb/h	82.3	66.1	96.5	98.7	115.1	88.5	79.6	97.2	151.1	97.2	89.9	85.9
16 Bed Drain Rate, lb/h	80.5	64.9	147.1	90.9	85.1	173.7	35.2	149.1	212.1	81.2	111.6	66.5
17 First Cyclone Rate, lb/h	72.5	74.8	106.8	116.5	104.3	72.8	83.4	82.7	155.8	73.9	88.2	78.8
18 Second Cyclone Rate, lb/h	128.7	44.9	23.8	116.3	4.0	7.0	3.2	2.6	5.7	3.8	4.1	6.6
19 Baghouse Fines Rate, lb/h	0.0	0.0	0.0	0.0	5.0	11.8	8.2	18.8	14.7	15.5	7.8	4.7
20 Total Drains Rate, lb/h	281.7	184.6	277.8	323.6	198.4	265.4	129.9	253.2	388.3	174.4	211.8	156.6
21 Steam Feed Rate, lb/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.6	118.3	96.3
22 Air Feed Rate, lb/h	623.0	570.8	611.0	537.7	677.0	555.8	664.4	959.5	955.8	666.4	644.2	600.5
23 Air Feed Rate (Ar Forced), lb/h	623.0	570.8	611.0	537.7	677.0	555.8	664.4	959.5	955.8	666.4	644.2	600.5
24 N2 Purges to Carbonizer, lb/h	364.4	291.7	281.8	184.8	378.5	380.9	366.9	339.9	306.0	307.9	289.9	125.0
25 N2 Purges to Cyclones + O.M., lb/h	135.5	144.3	140.0	144.9	54.5	54.3	52.3	40.1	36.8	33.3	33.7	37.0
26 N2 Purge to Spray Tower, lb/h	194.5	210.4	208.4	212.0	203.1	204.4	209.9	196.6	193.8	173.7	172.6	164.0
27 Total N2 Purges to system, lb/h	694.3	646.4	630.2	541.7	636.0	639.6	629.1	576.6	536.6	515.0	496.3	326.0
28 Reactor Exit Gas, lb/h	1126.0	982.9	1053.5	884.4	1207.7	1087.6	1162.4	1517.4	1513.8	1185.5	1201.4	953.7
29 Orifice Gas, lb/h	1261.4	1127.2	1193.5	1029.3	1262.2	1141.9	1214.7	1557.5	1550.7	1218.8	1235.1	990.7
30 Demister Gas, lb/h	1455.9	1337.6	1401.9	1241.3	1465.3	1346.3	1424.6	1754.1	1744.4	1392.6	1407.8	1154.7
31 CH4 in Demister Gas, mol %	1.624	0.864	1.888	2.405	1.124	1.974	0.532	1.567	2.392	1.140	1.480	0.747
32 C2H4 in Demister Gas, mol %	0.068	0.018	0.071	0.151	0.008	0.122	0.000	0.002	0.020	0.010	0.028	0.002
33 C2H6 in Demister Gas, mol %	0.025	0.000	0.028	0.227	0.004	0.406	0.009	0.000	0.024	0.005	0.020	0.000
34 Demister Gas HHV, Btu/SCF	46.9	42.5	56.7	65.5	45.2	60.3	38.0	65.4	71.1	49.7	53.6	51.9
35 Bed Density, lb/ft3	14.41	13.70	13.43	15.23	15.45	12.61	14.39	13.53	14.56	17.17	16.17	21.33

Table 4.12 (cont.). RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

Set Point	TR4-4	TR4-5	TR4-6	TR4-7	TR4-8	TR5-1	TR5-2	TR5-3	TR8-67	TR8-8	TR8-9	TR8-10
1 Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
2 Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	LV Lime	PR Dolo	PR Dolo	PR Dolo	PR Dolo
3 Begin Date	3/12/92	3/13/92	3/13/92	3/13/92	3/14/92	3/24/92	3/24/92	3/25/92	6/14/92	6/16/92	6/16/92	6/16/92
4 Begin Clock Time, hours	1600	0530	1300	2200	0200	1100	1900	0500	2100	0200	0800	1430
5 End Clock Time, hours	2000	0930	1700	0200	0600	1500	2300	0900	0100	0600	1230	1930
6 Steady-State Period Duration, h	4	4	4	4	4	4	4	4	4	4	4.5	5
7 Reactor Pressure, psig	129.1	193.2	175.8	177.9	182.2	134.3	154.8	147.4	156.0	143.5	135.0	126.5
8 Orifice Pressure, psig	126.6	189.3	172.2	174.7	178.8	131.8	152.1	144.7	155.2	142.5	134.2	125.8
9 Average Bed Temp, F	1607	1720	1713	1601	1618	1693	1701	1706	1699	1707	1713	1729
10 Bed Temp (@7.5 ft), F	1607	1729	1722	1614	1623	1699	1706	1711	1698	1703	1707	1724
11 Freeboard Temp (@22.5 ft), F	1568	1691	1681	1582	1600	1653	1662	1667	1675	1683	1683	1697
12 Freeboard Temp (@27.5 ft), F	1524	1638	1602	1547	1558	1610	1618	1621	1634	1610	1602	1614
13 Orifice Temperature, F	1269	1429	1409	1347	1367	1324	1353	1364	1232	1226	1206	1199
14 Coal Feed Rate, lb/h	227.8	329.1	333.3	412.2	347.4	203.8	224.1	220.3	375.7	342.8	337.0	337.7
15 Sorbent Feed Rate, lb/h	94.6	106.1	106.1	181.6	149.9	59.4	108.1	70.1	120.0	79.5	79.9	39.8
16 Bed Drain Rate, lb/h	112.9	97.2	117.7	270.2	204.4	68.9	79.2	54.2	98.2	103.9	102.9	120.7
17 First Cyclone Rate, lb/h	56.6	97.0	85.3	68.5	90.4	45.0	68.1	51.3	120.6	100.0	74.7	94.5
18 Second Cyclone Rate, lb/h	5.5	3.3	4.4	26.2	3.3	3.8	16.5	35.2	32.6	11.1	32.4	1.6
19 Baghouse Fines Rate, lb/h	17.1	23.7	20.1	17.0	18.0	7.0	6.6	16.2	41.1	36.0	33.1	17.2
20 Total Drains Rate, lb/h	192.1	221.1	227.4	382.0	316.0	124.7	170.4	156.9	292.5	251.0	243.1	234.0
21 Steam Feed Rate, lb/h	78.1	142.8	85.1	51.7	53.5	90.7	90.2	100.1	99.8	90.5	55.5	55.7
22 Air Feed Rate, lb/h	544.3	895.5	819.2	769.6	751.6	636.1	707.5	676.0	879.7	823.0	782.7	661.7
23 Air Feed Rate (Ar Forced), lb/h	544.3	895.5	819.2	769.6	751.6	636.1	707.5	676.0	879.7	823.0	782.7	661.7
24 N2 Purges to Carbonizer, lb/h	243.8	167.1	161.9	295.8	302.2	203.5	198.4	211.0	261.9	273.9	275.9	263.1
25 N2 Purges to Cyclones + O.M., lb/h	37.3	27.3	38.8	37.5	35.9	32.3	30.5	13.9	24.9	23.0	22.9	22.5
26 N2 Purge to Spray Tower, lb/h	165.0	149.3	148.5	147.7	135.4	187.5	175.3	180.4	23.9	54.5	59.0	20.8
27 Total N2 Purges to system, lb/h	446.1	343.8	349.2	481.0	473.5	423.2	404.2	405.4	310.6	351.4	357.8	306.4
28 Reactor Exit Gas, lb/h	996.6	1419.7	1278.5	1329.1	1288.7	1068.9	1158.0	1120.8	1444.6	1358.8	1288.2	1124.1
29 Orifice Gas, lb/h	1033.9	1447.0	1317.3	1366.6	1324.5	1101.1	1188.5	1134.7	1469.5	1381.9	1311.0	1146.6
30 Demister Gas, lb/h	1198.9	1596.4	1465.7	1514.3	1460.0	1288.6	1363.8	1315.1	1493.3	1436.3	1370.0	1167.4
31 CH4 in Demister Gas, mol %	1.402	1.283	1.797	1.957	2.060	0.977	1.556	0.969	1.347	1.317	1.334	1.880
32 C2H4 in Demister Gas, mol %	0.050	0.000	0.002	0.045	0.028	0.002	0.000	0.000	0.008	0.009	0.007	0.009
33 C2H6 in Demister Gas, mol %	0.020	0.012	0.000	0.030	0.018	0.000	0.000	0.000	0.008	0.011	0.009	0.015
34 Demister Gas HHV, Btu/SCF	52.6	72.9	73.6	63.6	63.2	64.9	58.1	54.0	62.5	60.7	62.1	70.2
35 Bed Density, lb/ft3	17.31	13.58	14.44	14.04	16.49	11.72	11.88	12.71	16.06	16.68	18.81	16.48

Table 4.12 (cont.). RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

Set Point	Minimum	Maximum	Average	Std Dev
1 Coal	----Pittsburgh No. 8 Bituminous-----			
2 Sorbent	Plum Run Dolomite/Longview Limestone			
3 Begin Date				
4 Begin Clock Time, hours	(No. of Set Points = 24)			
5 End Clock Time, hours				
6 Steady-State Period Duration, h	2.0	5.0	3.9	0.6
7 Reactor Pressure, psig	125.2	198.6	151.8	22.6
8 Orifice Pressure, psig	122.8	194.5	149.1	22.0
9 Average Bed Temp, F	1482	1797	1671	69
10 Bed Temp (@7.5 ft), F	1512	1794	1678	63
11 Freeboard Temp (@22.5 ft), F	1440	1738	1635	64
12 Freeboard Temp (@27.5 ft), F	1394	1669	1579	58
13 Orifice Temperature, F	1164	1437	1306	73
14 Coal Feed Rate, lb/h	181.3	489.1	304.6	77.1
15 Sorbent Feed Rate, lb/h	39.8	181.6	97.6	30.1
16 Bed Drain Rate, lb/h	35.2	270.2	113.7	54.1
17 First Cyclone Rate, lb/h	45.0	155.8	85.9	23.6
18 Second Cyclone Rate, lb/h	1.6	128.7	21.9	32.8
19 Baghouse Fines Rate, lb/h	0.0	41.1	14.2	11.0
20 Total Drains Rate, lb/h	124.7	388.3	235.7	70.2
21 Steam Feed Rate, lb/h	0.0	142.8	52.7	45.5
22 Air Feed Rate, lb/h	537.7	959.5	708.9	124.0
23 Air Feed Rate (Ar Forced), lb/h	537.7	959.5	708.9	124.0
24 N2 Purges to Carbonizer, lb/h	125.0	380.9	269.8	69.9
25 N2 Purges to Cyclones + O.M., lb/h	13.9	144.9	52.2	40.9
26 N2 Purge to Spray Tower, lb/h	20.8	212.0	157.9	57.6
27 Total N2 Purges to system, lb/h	306.4	694.3	480.0	121.0
28 Reactor Exit Gas, lb/h	884.4	1517.4	1198.0	169.8
29 Orifice Gas, lb/h	990.7	1557.5	1250.2	153.0
30 Demister Gas, lb/h	1154.7	1754.1	1408.2	148.4
31 CH4 in Demister Gas, mol %	0.532	2.405	1.484	0.485
32 C2H4 in Demister Gas, mol %	0.000	0.151	0.028	0.039
33 C2H6 in Demister Gas, mol %	0.000	0.406	0.036	0.089
34 Demister Gas HHV, Btu/SCF	38.0	73.6	58.6	9.5
35 Bed Density, lb/ft3	11.72	21.33	15.09	2.20

Table 4.12 (cont.). RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

	Set Point	TR1-1	TR1-2	TR1-3	TR1-4	TR2-1	TR2-2	TR2-3	TR2-4	TR2-5	TR4-1	TR4-2	TR4-3
	Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
	Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo
36	Bed Height, ft	25.7	17.7	25.8	26.5	15.6	16.9	16.5	17.0	22.9	15.1	16.0	14.9
37	Bed Weight, lb	305.62	178.99	286.69	336.30	176.50	156.88	174.43	168.89	265.90	188.35	188.94	231.19
38													
39	Avg Bed T - FB T (@22.5 ft), F	31	30	27	42	46	31	92	46	4	37	35	65
40	Avg Bed T - FB T (@27.5 ft), F	79	90	75	88	93	94	168	115	90	80	77	117
41	Coal Feed (MF), lb/h	330.59	233.51	334.01	377.72	230.08	320.26	177.08	365.27	477.44	227.33	264.25	198.00
42	Carbon in Coal Feed, lb/h	226.20	161.45	220.95	255.52	160.29	225.04	123.39	254.11	329.26	158.49	184.78	142.83
43	Air/Coal in Feed, lb/lb	1.844	2.391	1.787	1.391	2.875	1.697	3.666	2.567	1.954	2.863	2.380	2.966
44	Feed Oxygen/Carbon in Feed, mol/mol	0.240	0.308	0.241	0.183	0.368	0.215	0.469	0.329	0.253	0.366	0.303	0.366
45	Feed Steam/Carbon in Feed, mol/mol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.234	0.427	0.449
46	Feed(Steam+Moist)/C in Feed,mol/mol	0.021	0.021	0.024	0.023	0.022	0.022	0.023	0.022	0.024	0.256	0.450	0.470
47	Total Char/MF Coal Feed, lb/lb	0.6448	0.5797	0.5958	0.6736	0.4957	0.6172	0.4136	0.4986	0.5808	0.4813	0.5411	0.5152
48	Orifice Gas/Coal Feed, lb/lb	3.733	4.722	3.491	2.662	5.360	3.486	6.702	4.166	3.171	5.236	4.563	4.894
49	Purge-Free Gas Make/Coal Feed,lb/lb	2.254	2.896	2.257	1.809	3.522	2.157	4.389	3.150	2.470	3.770	3.368	4.094
50	Purge-Free Gas Make/Coal Feed,SCF/lb	32.432	41.309	32.481	26.476	48.601	30.649	60.022	44.624	35.099	53.770	50.106	60.423
51	CH4 Yield, % of Feed Carbon	4.627	3.153	5.312	5.235	4.451	5.192	2.647	4.780	5.617	4.437	5.141	2.755
52	C2H6 Yield, % of Feed Carbon	0.142	0.000	0.158	0.988	0.032	2.136	0.090	0.000	0.113	0.039	0.139	0.000
53	C2H4 Yield, % of Feed Carbon	0.387	0.131	0.399	0.657	0.063	0.642	0.000	0.012	0.094	0.078	0.195	0.015
54	HC Yield, % of Feed Carbon	5.156	3.284	5.869	6.881	4.546	7.970	2.736	4.792	5.824	4.553	5.475	2.770
55	Carbon Conv (Based on Solids), %	30.74	39.77	36.03	27.01	49.85	33.38	60.96	49.27	37.64	51.31	42.68	47.70
56	Carbon Conv (Based on Gas), %	30.74	39.77	36.03	27.01	49.85	33.38	60.96	49.27	37.64	51.31	42.68	47.70
57	Diff in C Conv (Solids-Gas), %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
58													
59	H2O Content in Freeboard Gas, mol %	9.07	7.64	8.60	11.51	6.16	7.35	5.90	6.52	9.11	11.56	18.13	19.23
60	Water-Gas Shift Temperature, F	1777	1867	1795	1635	1935	1725	2193	1951	2129	1909	1771	1998
61	WGS Temp - Avg Bed Temp, F	193	186	187	153	237	127	396	167	450	246	163	290
62	WGS Temp - Freebd Temp(@22.5 ft), F	224	216	214	195	283	158	488	213	454	283	198	355
63	WGS Temp - Freebd Temp(@27.5 ft), F	272	276	262	241	330	221	564	282	540	326	240	407
64													
65	Coal Nitrogen Released, %	29.00	47.56	41.06	26.49	49.86	36.41	63.00	55.80	40.96	52.70	49.21	48.52
66	Released Nitrogen Going to NH3, %	60.45	40.61	42.60	41.89	13.14	41.71	21.24	58.28	66.78	70.24	89.61	30.38
67	Coal Nitrogen Going to NH3, %	17.53	19.32	17.49	11.10	6.55	15.19	13.38	32.52	27.35	37.02	44.10	14.74
68	NH3 Conc. in Freeboard, ppm	1870	1690	2000	1690	480	1710	800	2970	3250	2630	3480	1100

Table 4.12 (cont.). RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

	Set Point	TR4-4	TR4-5	TR4-6	TR4-7	TR4-8	TR5-1	TR5-2	TR5-3	TR8-67	TR8-8	TR8-9	TR8-10
	Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
	Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	LV Lime	PR Dolo	PR Dolo	PR Dolo	PR Dolo
36	Bed Height, ft	15.9	18.8	18.7	23.4	17.2	17.5	18.2	16.8	18.5	16.1	15.5	17.1
37	Bed Weight, lb	201.39	189.09	199.37	263.62	208.81	151.04	159.23	156.99	219.04	197.22	212.55	207.02
38													
39	Avg Bed T - FB T (@22.5 ft), F	39	29	32	19	18	40	39	39	24	24	30	32
40	Avg Bed T - FB T (@27.5 ft), F	83	82	111	54	60	83	83	85	65	97	111	115
41	Coal Feed (MF), lb/h	222.29	321.36	324.82	402.62	339.97	200.49	220.71	216.89	364.84	332.60	327.04	327.71
42	Carbon in Coal Feed, lb/h	155.81	233.59	234.91	280.71	248.11	148.39	165.22	162.23	255.65	230.93	227.81	228.49
43	Air/Coal in Feed, lb/lb	2.389	2.721	2.458	1.867	2.164	3.121	3.157	3.069	2.342	2.401	2.322	1.959
44	Feed Oxygen/Carbon in Feed, mol/mol	0.304	0.334	0.304	0.239	0.264	0.373	0.373	0.363	0.299	0.310	0.299	0.252
45	Feed Steam/Carbon in Feed, mol/mol	0.334	0.407	0.241	0.123	0.144	0.407	0.364	0.411	0.260	0.261	0.162	0.163
46	Feed(Steam+Moist)/C in Feed,mol/mol	0.358	0.430	0.266	0.146	0.164	0.422	0.378	0.425	0.288	0.291	0.192	0.192
47	Total Char/MF Coal Feed, lb/lb	0.5402	0.4663	0.4845	0.6181	0.6019	0.4278	0.4727	0.5069	0.5877	0.5730	0.5831	0.6233
48	Orifice Gas/Coal Feed, lb/lb	4.538	4.396	3.952	3.315	3.813	5.402	5.303	5.151	3.912	4.031	3.890	3.395
49	Purge-Free Gas Make/Coal Feed,lb/lb	3.304	3.806	3.349	2.507	2.840	4.246	4.282	4.130	3.148	3.165	3.003	2.549
50	Purge-Free Gas Make/Coal Feed,SCF/lb	48.697	56.923	49.249	36.592	41.244	63.064	61.372	60.690	45.953	46.398	43.592	37.871
51	CH4 Yield, % of Feed Carbon	4.880	4.066	5.119	4.766	5.450	3.872	5.731	3.565	3.580	3.730	3.621	4.411
52	C2H6 Yield, % of Feed Carbon	0.139	0.076	0.000	0.146	0.095	0.000	0.000	0.000	0.043	0.062	0.049	0.070
53	C2H4 Yield, % of Feed Carbon	0.348	0.000	0.011	0.219	0.148	0.016	0.000	0.000	0.043	0.051	0.038	0.042
54	HC Yield, % of Feed Carbon	5.368	4.142	5.131	5.131	5.693	3.888	5.731	3.565	3.665	3.843	3.707	4.523
55	Carbon Conv (Based on Solids), %	42.86	51.41	47.06	33.14	36.77	59.74	54.01	49.69	39.94	42.08	41.01	35.35
56	Carbon Conv (Based on Gas), %	42.86	51.41	47.06	33.14	36.77	59.74	54.01	49.69	39.94	42.08	41.01	35.35
57	Diff in C Conv (Solids-Gas), %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
58													
59	H2O Content in Freeboard Gas, mol %	15.74	16.97	14.39	13.61	11.33	12.39	14.18	16.39	15.70	14.99	12.17	13.34
60	Water-Gas Shift Temperature, F	1696	1823	1817	1770	1505	1728	1894	2096	1862	1917	1853	1851
61	WGS Temp - Avg Bed Temp, F	89	103	104	169	-113	35	193	390	163	210	140	122
62	WGS Temp - Freebd Temp(@22.5 ft), F	128	132	136	188	-95	75	232	429	187	234	170	154
63	WGS Temp - Freebd Temp(@27.5 ft), F	172	185	215	223	-53	118	276	475	228	307	251	237
64													
65	Coal Nitrogen Released, %	44.27	50.79	52.86	34.46	41.14	68.65	62.96	58.09	58.62	55.61	56.12	53.37
66	Released Nitrogen Going to NH3, %	56.75	38.63	21.71	42.46	36.58	54.64	48.21	53.61	20.57	22.81	26.27	26.05
67	Coal Nitrogen Going to NH3, %	25.12	19.62	11.48	14.63	15.05	37.51	30.35	31.14	12.06	12.68	14.74	13.90
68	NH3 Conc. in Freeboard, ppm	2040	1620	1090	1610	1470	2250	2280	2330	1030	1040	1280	1360

Table 4.12 (cont.). RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

	Set Point	Minimum	Maximum	Average	Std Dev
	Coal	----Pittsburgh No. 8 Bituminous-----			
	Sorbent	Plum Run Dolomite/Longview Limestone			
36	Bed Height, ft	14.9	26.5	18.5	3.5
37	Bed Weight, lb	151.04	336.30	209.34	48.28
38					
39	Avg Bed T - FB T (@22.5 ft), F	4.0	92.0	35.5	16.4
40	Avg Bed T - FB T (@27.5 ft), F	54.0	168.0	91.5	23.0
41	Coal Feed (MF), lb/h	177.08	477.44	297.37	74.89
42	Carbon in Coal Feed, lb/h	123.39	329.26	208.92	50.32
43	Air/Coal in Feed, lb/lb	1.391	3.666	2.431	0.538
44	Feed Oxygen/Carbon in Feed, mol/mol	0.183	0.469	0.306	0.063
45	Feed Steam/Carbon in Feed, mol/mol	0.000	0.449	0.183	0.166
46	Feed(Steam+Moist)/C in Feed,mol/mol	0.021	0.470	0.205	0.165
47	Total Char/MF Coal Feed, lb/lb	0.4136	0.6736	0.5468	0.0685
48	Orifice Gas/Coal Feed, lb/lb	2.662	6.702	4.304	0.902
49	Purge-Free Gas Make/Coal Feed,lb/lb	1.809	4.389	3.186	0.728
50	Purge-Free Gas Make/Coal Feed,SCF/lb	26.476	63.064	46.152	10.563
51	CH4 Yield, % of Feed Carbon	2.647	5.731	4.422	0.873
52	C2H6 Yield, % of Feed Carbon	0.000	2.136	0.188	0.449
53	C2H4 Yield, % of Feed Carbon	0.000	0.657	0.150	0.193
54	HC Yield, % of Feed Carbon	2.736	7.970	4.760	1.231
55	Carbon Conv (Based on Solids), %	27.01	60.96	43.31	8.72
56	Carbon Conv (Based on Gas), %	27.01	60.96	43.31	8.72
57	Diff in C Conv (Solids-Gas), %	0.00	0.00	0.00	0.00
58					
59	H2O Content in Freeboard Gas, mol %	5.90	19.23	12.17	3.85
60	Water-Gas Shift Temperature, F	1505	2193	1854	151
61	WGS Temp - Avg Bed Temp, F	-113	450	183	116
62	WGS Temp - Freebd Temp(@22.5 ft), F	-95	488	219	121
63	WGS Temp - Freebd Temp(@27.5 ft), F	-53	564	275	127
64					
65	Coal Nitrogen Released, %	26.49	68.65	49.06	10.48
66	Released Nitrogen Going to NH3, %	13.14	89.61	42.72	18.26
67	Coal Nitrogen Going to NH3, %	6.55	44.10	20.61	9.81
68	NH3 Conc. in Freeboard, ppm	480	3480	1795	747

Table 4.12 (cont.). RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

	Set Point	TR1-1	TR1-2	TR1-3	TR1-4	TR2-1	TR2-2	TR2-3	TR2-4	TR2-5	TR4-1	TR4-2	TR4-3
	Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
	Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo
69	Actual Partial Press. of CO2, psia	11.63	9.98	12.15	12.29	11.55	10.39	10.66	14.55	16.77	14.87	15.56	13.56
70	Equilib. PCO2 (Squires), psia	8.67	19.45	10.66	3.39	22.25	9.78	46.70	42.53	19.15	16.84	10.66	24.05
71	Equilib. PCO2 (IGT/B&K), psia	18.49	42.47	22.88	7.05	48.75	20.95	104.49	94.90	41.78	36.60	22.88	52.82
72	Feed Ca/Feed S Ratio, mol/mol	1.22	1.52	1.57	1.47	1.85	1.01	1.64	0.99	1.18	2.15	1.71	2.18
73	Feed Ca/Released S Ratio, mol/mol	1.52	2.06	2.14	3.58	2.14	1.25	1.78	1.14	1.40	2.60	1.99	2.78
74	H2S Conc. in Freeboard, ppm	218	323	171	248	1622	591	477	104	195	140	928	167
75	Equilib. H2S Conc. (CaO Rxn), ppm	134	156	138	117	132	114	171	182	184	222	290	426
76	Approach to Equilib. Capture, %	98.7	96.5	99.5	97.1	77.0	94.9	94.5	101.0	99.9	101.9	87.1	106.4
77	Equilib. H2S Conc. (CaCO3 Rxn), ppm	179	80	157	422	69	121	39	62	162	196	424	240
78	Approach to Equilib. Capture, %	99.4	95.0	99.8	104.1	76.2	94.9	92.3	99.5	99.7	101.3	89.5	101.7
79	Ca Closure (out/in), %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
80	S Closure (out/in), %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
81	Sorbent Ca Conversion/Utilization,%	65.23	46.60	46.65	27.61	36.11	75.87	52.51	87.24	70.91	38.23	42.25	35.67
82	Coal Sulfur Released, %	80.07	73.65	73.16	41.21	86.37	80.49	92.07	86.75	83.99	82.50	85.74	78.38
83	Sulfur in Freeboard Gas,% S in Coal	2.54	4.83	1.95	2.20	21.20	5.05	7.69	1.10	1.59	2.55	15.21	2.91
84	S in Disch Solids, % of Tot S Feed	97.56	95.35	98.01	97.78	79.13	95.04	92.44	98.98	98.41	97.46	85.04	97.18
85	Sulfur Capture by Sorbent, % Coal S	77.59	68.92	71.14	38.96	65.14	75.48	84.40	85.71	82.38	79.90	70.52	75.50
86	S in Product Gas, % of Feed S	2.54	4.83	1.95	2.20	21.20	5.05	7.69	1.10	1.59	2.55	15.21	2.91
87	S in Product Gas, % of Released S	3.18	6.55	2.66	5.34	24.55	6.28	8.35	1.26	1.89	3.09	17.74	3.72

Table 4.12 (cont.). RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

Set Point	TR4-4	TR4-5	TR4-6	TR4-7	TR4-8	TR5-1	TR5-2	TR5-3	TR8-67	TR8-8	TR8-9	TR8-10
Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit
Sorbent	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	PR Dolo	LV Lime	PR Dolo	PR Dolo	PR Dolo	PR Dolo
69 Actual Partial Press. of CO2, psia	13.40	20.47	18.75	17.58	18.86	13.29	17.43	13.88	16.15	13.59	12.71	10.75
70 Equilib. PCO2 (Squires), psia	10.57	26.39	24.43	10.04	11.60	21.39	22.78	23.68	22.42	23.87	25.00	28.27
71 Equilib. PCO2 (IGT/B&K), psia	22.68	58.10	53.67	21.51	24.97	46.82	49.94	51.98	49.14	52.40	54.96	62.35
72 Feed Ca/Feed S Ratio, mol/mol	2.14	1.61	1.57	2.28	2.20	3.19	5.17	5.31	1.47	1.06	1.09	0.54
73 Feed Ca/Released S Ratio, mol/mol	2.73	1.94	1.84	3.45	3.78	3.56	7.38	7.27	2.47	1.70	2.03	1.10
74 H2S Conc. in Freeboard, ppm	381	67	91	294	991	1238	70	0	83	21	0	1243
75 Equilib. H2S Conc. (CaO Rxn), ppm	251	391	321	213	188	262	308	361	338	331	274	315
76 Approach to Equilib. Capture, %	97.2	106.6	103.9	98.5	80.7	58.0	113.2	119.9	105.3	106.4	106.3	79.3
77 Equilib. H2S Conc. (CaCO3 Rxn), ppm	319	303	246	373	305	163	235	212	244	189	139	120
78 Approach to Equilib. Capture, %	98.6	104.8	102.6	101.5	83.1	55.6	108.8	110.8	103.3	103.4	103.1	76.0
79 Ca Closure (out/in), %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
80 S Closure (out/in), %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
81 Sorbent Ca Conversion/Utilization,%	34.82	51.84	54.64	28.49	21.40	15.69	14.19	14.15	40.31	59.97	50.52	68.52
82 Coal Sulfur Released, %	78.31	83.02	85.64	66.24	58.10	89.63	70.10	73.00	59.67	62.41	53.74	49.15
83 Sulfur in Freeboard Gas,% S in Coal	6.11	1.05	1.24	3.48	13.21	42.91	2.33	0.00	0.95	0.25	0.00	12.72
84 S in Disch Solids, % of Tot S Feed	94.06	99.05	98.85	96.64	87.03	58.49	97.68	99.83	99.08	99.77	99.96	87.35
85 Sulfur Capture by Sorbent, % Coal S	72.25	82.05	84.47	62.80	44.84	46.78	67.65	72.82	58.74	62.18	53.70	36.41
86 S in Product Gas, % of Feed S	6.11	1.05	1.24	3.48	13.21	42.91	2.33	0.00	0.95	0.25	0.00	12.72
87 S in Product Gas, % of Released S	7.81	1.27	1.45	5.26	22.75	47.87	3.32	0.00	1.60	0.41	0.00	25.87

Table 4.12 (cont.). RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED

	Set Point	Minimum	Maximum	Average	Std Dev
	Coal	----Pittsburgh No. 8 Bituminous-----			
	Sorbent	Plum Run Dolomite/Longview Limestone			
69	Actual Partial Press. of CO2, psia	9.98	20.47	14.20	2.88
70	Equilib. PCO2 (Squires), psia	3.39	46.70	20.19	9.98
71	Equilib. PCO2 (IGT/B&K), psia	7.05	104.49	44.27	22.48
72	Feed Ca/Feed S Ratio, mol/mol	0.54	5.31	1.92	1.14
73	Feed Ca/Released S Ratio, mol/mol	1.10	7.38	2.65	1.60
74	H2S Conc. in Freeboard, ppm	0	1622	403	449
75	Equilib. H2S Conc. (CaO Rxn), ppm	114	426	242	91
76	Approach to Equilib. Capture, %	58.0	119.9	97.1	12.8
77	Equilib. H2S Conc. (CaCO3 Rxn), ppm	39	424	208	106
78	Approach to Equilib. Capture, %	55.6	110.8	96.0	12.1
79	Ca Closure (out/in), %	100.0	100.0	100.0	0.0
80	S Closure (out/in), %	100.0	100.0	100.0	0.0
81	Sorbent Ca Conversion/Utilization,%	14.15	87.24	44.98	19.43
82	Coal Sulfur Released, %	41.21	92.07	73.89	13.39
83	Sulfur in Freeboard Gas,% S in Coal	0.00	42.91	6.38	9.31
84	S in Disch Solids, % of Tot S Feed	58.49	99.96	93.76	9.05
85	Sulfur Capture by Sorbent, % Coal S	36.41	85.71	67.51	14.21
86	S in Product Gas, % of Feed S	0.00	42.91	6.38	9.31
87	S in Product Gas, % of Released S	0.00	47.87	8.43	11.23

Table 4.13. RECONCILED COMPOSITION OF COAL AND SORBENT FEEDS FOR STEADY-STATE PERIODS WITH ILLINOIS NO. 6 BITUMINOUS COAL FEED

Set Point	TR6-6	TR6-7	TR8-4	TR8-5	Minimum	Maximum	Average	Std Dev
Coal	Ill Bit	Ill Bit	Ill Bit	Ill Bit				
Sorbent	LV Lime	LV Lime	LV Lime	LV Lime				
Moisture in Coal Feed, wt %	11.34	10.73	9.88	10.25	9.88	11.34	10.55	0.55
Coal (MF) Feed Composition, wt %								
C	69.760	70.656	69.262	68.420	68.420	70.656	69.524	0.810
H	4.898	4.970	4.183	4.135	4.135	4.970	4.547	0.389
O	7.841	7.452	8.778	9.134	7.452	9.134	8.301	0.681
N	1.752	1.765	1.585	1.574	1.574	1.765	1.669	0.090
S	3.318	3.464	3.294	3.283	3.283	3.464	3.340	0.073
Ash	12.431	11.693	12.897	13.454	11.693	13.454	12.619	0.646
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	
HHV, Btu/lb (MF)	12457	12536	12514	12459	12457	12536	12492	34
Sorbent Feed Composition, wt %								
CaCO3	97.090	97.116	97.456	97.951	97.090	97.951	97.403	0.348
MgCO3	1.749	1.791	1.984	1.490	1.490	1.984	1.753	0.176
CaS*	0.333	0.336	0.389	0.397	0.333	0.397	0.364	0.029
Inerts	0.828	0.757	0.171	0.162	0.162	0.828	0.479	0.314
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	

* Sulfur in Sorbent is reported as CaS.

Table 4.14. RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH ILLINOIS NO. 6 BITUMINOUS COAL FEED

Set Point	TR6-6	TR6-7	TR8-4	TR8-5	Minimum	Maximum	Average	Std Dev
1 Coal	Ill Bit	Ill Bit	Ill Bit	Ill Bit				
2 Sorbent	LV Lime	LV Lime	LV Lime	LV Lime				
3 Begin Date	4/23/92	4/23/92	6/12/92	6/13/92				
4 Begin Clock Time, hours	1800	2300	2100	0700				
5 End Clock Time, hours	2200	0330	0200	1100				
6 Steady-State Period Duration, h	4	4.5	5	4	4.0	5.0	4.4	0.4
7 Reactor Pressure, psig	143.5	122.4	113.2	160.6	113.2	160.6	134.9	18.4
8 Orifice Pressure, psig	140.7	120.2	112.7	159.9	112.7	159.9	133.4	18.4
9 Average Bed Temp, F	1600	1599	1652	1715	1599	1715	1642	48
10 Bed Temp (@7.5 ft), F	1605	1603	1645	1706	1603	1706	1640	42
11 Freeboard Temp (@22.5 ft), F	1573	1573	1623	1680	1573	1680	1612	44
12 Freeboard Temp (@27.5 ft), F	1536	1532	1588	1645	1532	1645	1575	46
13 Orifice Temperature, F	1297	1267	1071	1214	1071	1297	1212	87
14 Coal Feed Rate, lb/h	291.8	236.2	302.4	388.1	236.2	388.1	304.6	54.3
15 Sorbent Feed Rate, lb/h	35.9	38.7	75.6	101.2	35.9	101.2	62.9	27.1
16 Bed Drain Rate, lb/h	77.7	80.3	84.8	94.1	77.7	94.1	84.2	6.2
17 First Cyclone Rate, lb/h	61.8	42.2	60.8	66.0	42.2	66.0	57.7	9.2
18 Second Cyclone Rate, lb/h	5.4	13.0	35.5	38.8	5.4	38.8	23.2	14.3
19 Baghouse Fines Rate, lb/h	28.9	15.4	25.4	36.6	15.4	36.6	26.6	7.6
20 Total Drains Rate, lb/h	173.7	151.0	206.4	235.4	151.0	235.4	191.6	32.0
21 Steam Feed Rate, lb/h	112.7	58.6	96.7	144.7	58.6	144.7	103.2	31.0
22 Air Feed Rate, lb/h	634.1	512.7	668.5	935.5	512.7	935.5	687.7	154.3
23 Air Feed Rate (Ar Forced), lb/h	634.1	512.7	668.5	935.5	512.7	935.5	687.7	154.3
24 N2 Purges to Carbonizer, lb/h	186.7	186.3	177.9	209.2	177.9	209.2	190.0	11.6
25 N2 Purges to Cyclones + O.M., lb/h	21.9	23.5	18.4	26.7	18.4	26.7	22.6	3.0
26 N2 Purge to Spray Tower, lb/h	120.2	115.6	88.7	94.7	88.7	120.2	104.8	13.3
27 Total N2 Purges to system, lb/h	328.7	325.3	285.1	330.6	285.1	330.6	317.4	18.8
28 Reactor Exit Gas, lb/h	1087.6	881.7	1114.9	1543.3	881.7	1543.3	1156.9	240.6
29 Orifice Gas, lb/h	1109.5	905.2	1133.3	1570.0	905.2	1570.0	1179.5	242.3
30 Demister Gas, lb/h	1229.7	1020.7	1222.1	1664.7	1020.7	1664.7	1284.3	235.1
31 CH4 in Demister Gas, mol %	1.332	1.392	1.352	1.437	1.332	1.437	1.378	0.040
32 C2H4 in Demister Gas, mol %	0.044	0.039	0.034	0.000	0.000	0.044	0.029	0.017
33 C2H6 in Demister Gas, mol %	0.014	0.016	0.026	0.018	0.014	0.026	0.019	0.005
34 Demister Gas HHV, Btu/SCF	62.8	61.3	63.8	65.4	61.3	65.4	63.3	1.5
35 Bed Density, lb/ft3	12.58	11.81	14.63	30.02	11.81	30.02	17.26	7.44

Table 4.14 (cont.). RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH ILLINOIS NO. 6 BITUMINOUS COAL FEED

	Set Point	TR6-6	TR6-7	TR8-4	TR8-5	Minimum	Maximum	Average	Std Dev
	Coal	Ill Bit	Ill Bit	Ill Bit	Ill Bit				
	Sorbent	LV Lime	LV Lime	LV Lime	LV Lime				
36	Bed Height, ft	16.6	18.3	17.8	15.4	15.4	18.3	17.0	1.1
37	Bed Weight, lb	153.39	159.20	192.47	337.90	153.39	337.90	210.74	74.92
38									
39	Avg Bed T - FB T (@22.5 ft), F	27	26	29	35	26.0	35.0	29.3	3.5
40	Avg Bed T - FB T (@27.5 ft), F	64	67	64	70	64.0	70.0	66.3	2.5
41	Coal Feed (MF), lb/h	258.73	210.82	272.53	348.29	210.82	348.29	272.59	49.34
42	Carbon in Coal Feed, lb/h	180.49	148.95	188.76	238.30	148.95	238.30	189.12	32.04
43	Air/Coal in Feed, lb/lb	2.173	2.171	2.211	2.411	2.171	2.411	2.241	0.099
44	Feed Oxygen/Carbon in Feed, mol/mol	0.306	0.300	0.308	0.342	0.300	0.342	0.314	0.016
45	Feed Steam/Carbon in Feed, mol/mol	0.416	0.262	0.341	0.405	0.262	0.416	0.356	0.061
46	Feed(Steam+Moist)/C in Feed,mol/mol	0.538	0.376	0.447	0.516	0.376	0.538	0.469	0.064
47	Total Char/MF Coal Feed, lb/lb	0.5529	0.5481	0.5192	0.4692	0.4692	0.5529	0.5223	0.0333
48	Orifice Gas/Coal Feed, lb/lb	3.802	3.833	3.748	4.046	3.748	4.046	3.857	0.113
49	Purge-Free Gas Make/Coal Feed,lb/lb	3.087	2.944	3.098	3.438	2.944	3.438	3.142	0.181
50	Purge-Free Gas Make/Coal Feed,SCF/lb	47.350	44.266	46.016	50.557	44.266	50.557	47.047	2.303
51	CH4 Yield, % of Feed Carbon	4.267	4.395	4.030	4.599	4.030	4.599	4.323	0.208
52	C2H6 Yield, % of Feed Carbon	0.090	0.101	0.155	0.115	0.090	0.155	0.115	0.025
53	C2H4 Yield, % of Feed Carbon	0.282	0.246	0.203	0.000	0.000	0.282	0.183	0.109
54	HC Yield, % of Feed Carbon	4.639	4.742	4.387	4.714	4.387	4.742	4.621	0.140
55	Carbon Conv (Based on Solids), %	42.71	41.61	46.18	52.62	41.61	52.62	45.78	4.29
56	Carbon Conv (Based on Gas), %	42.71	41.61	46.18	52.62	41.61	52.62	45.78	4.29
57	Diff in C Conv (Solids-Gas), %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
58									
59	H2O Content in Freeboard Gas, mol %	21.75	17.05	17.86	17.76	17.05	21.75	18.60	1.84
60	Water Gas Shift Temperature, F	1821	1792	1646	1585	1585	1821	1711	98
61	WGS Temp - Avg Bed Temp, F	221	193	-6	-130	-130	221	70	145
62	WGS Temp - Freebd Temp(@22.5 ft), F	248	219	23	-95	-95	248	99	141
63	WGS Temp - Freebd Temp(@27.5 ft), F	285	260	58	-60	-60	285	136	143
64									
65	Coal Nitrogen Released, %	52.33	51.00	61.35	72.40	51.00	72.40	59.27	8.56
66	Released Nitrogen Going to NH3, %	72.53	86.42	55.24	28.91	28.91	86.42	60.77	21.46
67	Coal Nitrogen Going to NH3, %	37.95	44.07	33.89	20.93	20.93	44.07	34.21	8.48
68	NH3 Conc. in Freeboard, ppm	2850	3420	2430	1390	1390	3420	2523	742

Table 4.14 (cont.). RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH ILLINOIS NO. 6 BITUMINOUS COAL FEED

	Set Point	TR6-6	TR6-7	TR8-4	TR8-5	Minimum	Maximum	Average	Std Dev
	Coal	Ill Bit	Ill Bit	Ill Bit	Ill Bit				
	Sorbent	LV Lime	LV Lime	LV Lime	LV Lime				
69	Actual Partial Press. of CO2, psia	13.72	11.31	13.34	20.40	11.31	20.40	14.69	3.42
70	Equilib. PCO2 (Squires), psia	9.95	9.87	15.40	25.39	9.87	25.39	15.15	6.32
71	Equilib. PCO2 (IGT/B&K), psia	21.32	21.14	33.39	55.84	21.14	55.84	32.92	14.13
72	Feed Ca/Feed S Ratio, mol/mol	1.30	1.65	2.63	2.78	1.30	2.78	2.09	0.63
73	Feed Ca/Released S Ratio, mol/mol	2.70	2.04	3.47	3.01	2.04	3.47	2.81	0.52
74	H2S Conc. in Freeboard, ppm	369	3802	142	21	21	3802	1083	1574
75	Equilib. H2S Conc. (CaO Rxn), ppm	339	265	331	402	265	402	334	49
76	Approach to Equilib. Capture, %	98.9	30.9	104.1	107.4	30.9	107.4	85.3	31.6
77	Equilib. H2S Conc. (CaCO3 Rxn), ppm	467	303	287	323	287	467	345	72
78	Approach to Equilib. Capture, %	103.9	31.1	103.1	105.8	31.1	105.8	86.0	31.7
79	Ca Closure (out/in), %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0
80	S Closure (out/in), %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0
81	Sorbent Ca Conversion/Utilization,%	32.94	14.85	28.48	33.62	14.85	33.62	27.47	7.55
82	Coal Sulfur Released, %	48.25	80.82	75.68	92.06	48.25	92.06	74.20	16.11
83	Sulfur in Freeboard Gas,% S in Coal	5.93	57.08	2.17	0.36	0.36	57.08	16.39	23.58
84	S in Disch Solids, % of Tot S Feed	94.06	43.34	97.79	99.69	43.34	99.69	83.72	23.40
85	Sulfur Capture by Sorbent, % Coal S	42.27	23.71	73.44	91.74	23.71	91.74	57.79	26.46
86	S in Product Gas, % of Feed S	5.93	57.08	2.17	0.36	0.36	57.08	16.39	23.58
87	S in Product Gas, % of Released S	12.30	70.63	2.87	0.39	0.39	70.63	21.55	28.68

Table 4.15. RECONCILED COMPOSITION OF COAL AND SORBENT FEEDS FOR STEADY-STATE PERIODS WITH WYOMING EAGLE BUTTE SUBBITUMINOUS COAL FEED

Set Point	TR6-1	TR6-2	TR6-3	TR6-4	TR6-5	TR8-1	TR8-2	TR8-3	Minimum	Maximum	Average	Std Dev
Coal	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub				
Sorbent	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime				
Moisture in Coal Feed, wt %	28.17	28.33	27.75	27.60	27.93	29.24	30.67	30.24	27.60	30.67	28.74	1.10
Coal (MF) Feed Composition, wt %												
C	68.362	67.471	67.406	67.922	67.856	67.691	66.888	66.852	66.852	68.362	67.556	0.483
H	4.971	4.868	4.838	4.825	4.888	4.610	4.565	4.569	4.565	4.971	4.767	0.150
O	16.356	17.125	17.251	16.726	16.809	18.198	18.566	18.752	16.356	18.752	17.473	0.850
N	1.334	1.331	1.331	1.330	1.332	1.188	1.181	1.182	1.181	1.334	1.276	0.071
S	0.908	0.964	0.969	0.961	0.937	0.941	0.904	0.873	0.873	0.969	0.932	0.032
Ash	8.070	8.241	8.205	8.236	8.179	7.372	7.896	7.771	7.372	8.241	7.996	0.285
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	
HHV, Btu/lb (MF)	11831	11730	11750	11646	11744	11541	11403	11418	11403	11831	11633	151
Sorbent Feed Composition, wt %												
CaCO3	97.073	97.480	97.167	97.054	97.477	97.181	97.708	97.159	97.054	97.708	97.287	0.222
MgCO3	1.753	1.331	1.644	1.759	1.499	2.348	1.760	2.277	1.331	2.348	1.796	0.329
CaS*	0.324	0.333	0.333	0.332	0.274	0.428	0.390	0.386	0.274	0.428	0.350	0.045
Inerts	0.850	0.856	0.856	0.855	0.750	0.043	0.142	0.178	0.043	0.856	0.566	0.348
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	

* Sulfur in Sorbent is reported as CaS.

Table 4.16. RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH WYOMING EAGLE BUTTE SUBBITUMINOUS COAL FEED

Set Point	TR6-1	TR6-2	TR6-3	TR6-4	TR6-5	TR8-1	TR8-2	TR8-3	Minimum	Maximum	Average	Std Dev
1 Coal	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub				
2 Sorbent	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime				
3 Begin Date	4/21/92	4/22/92	4/22/92	4/22/92	4/23/92	6/10/92	6/11/92	6/11/92				
4 Begin Clock Time, hours	2100	0430	1400	2100	0400	2000	0300	1330				
5 End Clock Time, hours	0100	0830	1800	0100	0800	0100	0800	1730				
6 Steady-State Period Duration, h	4	4	4	4	4	5	5	4	4.0	5.0	4.3	0.4
7 Reactor Pressure, psig	145.9	129.8	157.5	191.9	189.6	128.6	132.7	156.5	128.6	191.9	154.1	23.6
8 Orifice Pressure, psig	143.1	127.3	154.3	188.2	186.0	128.2	132.2	156.1	127.3	188.2	151.9	22.7
9 Average Bed Temp, F	1580	1509	1511	1609	1632	1476	1593	1613	1476	1632	1565	54
10 Bed Temp (@7.5 ft), F	1578	1507	1509	1607	1632	1478	1587	1602	1478	1632	1563	53
11 Freeboard Temp (@22.5 ft), F	1567	1500	1515	1579	1593	1432	1541	1575	1432	1593	1538	50
12 Freeboard Temp (@27.5 ft), F	1515	1453	1462	1549	1563	1396	1492	1533	1396	1563	1495	52
13 Orifice Temperature, F	788	763	1267	1354	1367	770	822	963	763	1367	1012	254
14 Coal Feed Rate, lb/h	330.4	310.6	397.8	443.5	429.6	288.4	283.7	362.8	283.7	443.5	355.8	58.5
15 Sorbent Feed Rate, lb/h	67.8	66.7	44.9	55.0	20.5	37.2	54.5	27.0	20.5	67.8	46.7	16.4
16 Bed Drain Rate, lb/h	64.2	70.9	44.5	60.4	19.4	30.0	46.1	21.3	19.4	70.9	44.6	18.4
17 First Cyclone Rate, lb/h	45.6	47.4	69.9	50.6	53.3	53.1	35.9	35.8	35.8	69.9	48.9	10.2
18 Second Cyclone Rate, lb/h	3.7	5.8	6.7	1.3	4.5	11.6	4.6	7.6	1.3	11.6	5.7	2.9
19 Baghouse Fines Rate, lb/h	8.1	12.5	8.1	25.6	26.4	2.1	1.4	7.8	1.4	26.4	11.5	9.0
20 Total Drains Rate, lb/h	121.6	136.6	129.2	137.8	103.7	96.9	88.1	72.6	72.6	137.8	110.8	22.6
21 Steam Feed Rate, lb/h	0.0	0.0	0.0	0.0	0.0	46.5	46.5	53.1	0.0	53.1	18.3	23.6
22 Air Feed Rate, lb/h	755.1	656.2	799.8	992.6	970.9	600.1	691.4	823.1	600.1	992.6	786.1	132.2
23 Air Feed Rate (Ar Forced), lb/h	755.1	656.2	799.8	992.6	970.9	600.1	691.4	823.1	600.1	992.6	786.1	132.2
24 N2 Purges to Carbonizer, lb/h	208.3	231.9	176.7	152.0	159.6	224.7	214.7	192.5	152.0	231.9	195.1	28.0
25 N2 Purges to Cyclones + O.M., lb/h	26.6	23.8	25.7	18.0	16.0	164.6	174.7	152.8	16.0	174.7	75.3	69.1
26 N2 Purge to Spray Tower, lb/h	136.7	138.2	129.0	105.7	97.9	131.3	138.6	86.8	86.8	138.6	120.5	19.2
27 Total N2 Purges to system, lb/h	371.6	393.9	331.4	275.7	273.5	520.5	528.1	432.1	273.5	528.1	390.8	92.4
28 Reactor Exit Gas, lb/h	1240.2	1128.9	1290.2	1505.4	1477.0	1100.2	1202.8	1386.1	1100.2	1505.4	1291.4	142.6
29 Orifice Gas, lb/h	1266.7	1152.7	1315.8	1523.4	1493.1	1264.7	1377.6	1538.9	1152.7	1538.9	1366.6	131.8
30 Demister Gas, lb/h	1403.4	1290.9	1444.8	1629.1	1591.0	1396.0	1516.2	1625.7	1290.9	1629.1	1487.1	115.4
31 CH4 in Demister Gas, mol %	1.365	1.306	1.608	1.749	1.515	1.204	1.043	1.531	1.043	1.749	1.415	0.215
32 C2H4 in Demister Gas, mol %	0.028	0.038	0.023	0.010	0.009	0.033	0.017	0.009	0.009	0.038	0.021	0.011
33 C2H6 in Demister Gas, mol %	0.020	0.038	0.032	0.015	0.011	0.076	0.030	0.045	0.011	0.076	0.033	0.019
34 Demister Gas HHV, Btu/SCF	73.6	66.7	85.5	88.8	87.2	56.7	55.2	73.5	55.2	88.8	73.4	12.4
35 Bed Density, lb/ft3	55.45	48.06	38.38	43.43	45.80	26.86	55.00	59.69	26.86	59.69	46.58	9.94

Table 4.16 (cont.). RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH WYOMING EAGLE BUTTE SUBBITUMINOUS COAL FEED

	Set Point	TR6-1	TR6-2	TR6-3	TR6-4	TR6-5	TR8-1	TR8-2	TR8-3	Minimum	Maximum	Average	Std Dev
	Coal	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub				
	Sorbent	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime				
36	Bed Height, ft	20.2	20.7	23.7	15.6	14.5	19.7	17.1	18.1	14.5	23.7	18.7	2.8
37	Bed Weight, lb	849.44	762.44	731.84	496.41	480.58	398.16	693.17	798.14	398.16	849.44	651.27	157.57
38													
39	Avg Bed T - FB T (@22.5 ft), F	13	9	-4	30	39	44	52	38	-4.0	52.0	27.6	18.3
40	Avg Bed T - FB T (@27.5 ft), F	65	56	49	60	69	80	101	80	49.0	101.0	70.0	15.5
41	Coal Feed (MF), lb/h	237.31	222.58	287.44	321.08	309.58	204 05	196.68	253.13	196.68	321.08	253.98	44.38
42	Carbon in Coal Feed, lb/h	162.23	150.18	193.75	218.08	210.07	138.12	131.56	169.22	131.56	218.08	171.65	30.43
43	Air/Coal in Feed, lb/lb	2.285	2.113	2.010	2.238	2.260	2.081	2.437	2.268	2.010	2.437	2.212	0.127
44	Feed Oxygen/Carbon in Feed, mol/mol	0.405	0.380	0.359	0.396	0.402	0.378	0.457	0.423	0.359	0.457	0.400	0.028
45	Feed Steam/Carbon in Feed, mol/mol	0.000	0.000	0.000	0.000	0.000	0.224	0.235	0.209	0.000	0.235	0.084	0.108
46	Feed(Steam+Moist)/C in Feed,mol/mol	0.382	0.390	0.380	0.374	0.381	0.631	0.676	0.641	0.374	0.676	0.482	0.130
47	Total Char/MF Coal Feed, lb/lb	0.2894	0.3285	0.3070	0.2746	0.2752	0.3080	0.2309	0.2157	0.2157	0.3285	0.2786	0.0363
48	Orifice Gas/Coal Feed, lb/lb	3.834	3.712	3.308	3.435	3.476	4.386	4.856	4.241	3.308	4.856	3.906	0.507
49	Purge-Free Gas Make/Coal Feed,lb/lb	3.123	2.888	2.799	3.052	3.067	3.036	3.483	3.290	2.799	3.483	3.092	0.202
50	Purge-Free Gas Make/Coal Feed,SCF/lb	45.768	42.351	41.686	44.848	45.382	45.049	50.936	48.609	41.686	50.936	45.579	2.836
51	CH4 Yield, % of Feed Carbon	5.366	5.088	5.535	5.995	5.295	5.529	5.420	6.725	5.088	6.725	5.619	0.484
52	C2H6 Yield, % of Feed Carbon	0.157	0.296	0.220	0.103	0.077	0.698	0.312	0.395	0.077	0.698	0.282	0.187
53	C2H4 Yield, % of Feed Carbon	0.220	0.296	0.158	0.069	0.063	0.303	0.177	0.079	0.063	0.303	0.171	0.091
54	HC Yield, % of Feed Carbon	5.744	5.680	5.913	6.167	5.434	6.530	5.908	7.200	5.434	7.200	6.072	0.526
55	Carbon Conv (Based on Solids), %	71.09	65.33	68.15	72.87	72.89	66.23	77.96	80.12	65.33	80.12	71.83	4.95
56	Carbon Conv (Based on Gas), %	71.09	65.33	68.15	72.87	72.89	66.23	77.96	80.12	65.33	80.12	71.83	4.95
57	Diff in C Conv (Solids-Gas), %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
58													
59	H2O Content in Freeboard Gas, mol %	11.73	12.69	12.53	12.57	12.45	16.17	14.83	14.24	11.73	16.17	13.40	1.42
60	Water-Gas Shift Temperature, F	1734	1775	1786	1938	1867	1502	1506	1510	1502	1938	1702	163
61	WGS Temp - Avg Bed Temp, F	154	266	275	329	235	26	-87	-103	-103	329	137	159
62	WGS Temp - Freebd Temp(@22.5 ft), F	167	275	271	359	274	70	-35	-65	-65	359	165	148
63	WGS Temp - Freebd Temp(@27.5 ft), F	219	322	324	389	304	106	14	-23	-23	389	207	146
64													
65	Coal Nitrogen Released, %	65.34	59.38	68.13	75.75	72.28	74.04	86.27	87.56	59.38	87.56	73.59	9.10
66	Released Nitrogen Going to NH3, %	60.08		88.32	77.10	46.26	86.13	93.11	84.70	46.26	93.11	76.53	15.86
67	Coal Nitrogen Going to NH3, %	39.26		60.17	58.41	33.44	63.76	80.33	74.17	33.44	80.33	58.50	15.81
68	NH3 Conc. in Freeboard, ppm	1880	4450	3290	3080	1730	2620	2910	2970	1730	4450	2866	796

Table 4.16 (cont.). RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH WYOMING EAGLE BUTTE SUBBITUMINOUS COAL FEED

	Set Point	TR6-1	TR6-2	TR6-3	TR6-4	TR6-5	TR8-1	TR8-2	TR8-3	Minimum	Maximum	Average	Std Dev
	Coal	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub	Wy Sub				
	Sorbent	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime	LV Lime				
69	Actual Partial Press. of CO2, psia	15.39	13.42	16.07	19.14	18.59	15.80	17.13	20.25	13.42	20.25	16.97	2.10
70	Equilib. PCO2 (Squires), psia	8.37	4.39	4.47	10.75	13.05	3.20	9.37	11.12	3.20	13.05	8.09	3.41
71	Equilib. PCO2 (IGT/B&K), psia	17.84	9.19	9.37	23.08	28.17	6.64	20.04	23.90	6.64	28.17	17.28	7.46
72	Feed Ca/Feed S Ratio, mol/mol	9.79	9.70	5.02	5.54	2.20	6.03	9.58	3.81	2.20	9.79	6.46	2.73
73	Feed Ca/Released S Ratio, mol/mol	21.76	18.97	8.64	8.35	4.18	6.28	11.77	5.14	4.18	21.76	10.64	6.07
74	H2S Conc. in Freeboard, ppm	213	34	100	97	54	1312	772	383	34	1312	371	423
75	Equilib. H2S Conc. (CaO Rxn), ppm	170	143	142	202	216	160	226	232	142	232	186	35
76	Approach to Equilib. Capture, %	90.8	116.6	104.8	111.6	126.3	4.0	28.4	79.1	4.0	126.3	82.7	41.2
77	Equilib. H2S Conc. (CaCO3 Rxn), ppm	313	436	509	359	308	789	412	422	308	789	444	145
78	Approach to Equilib. Capture, %	130.7	211.1	181.8	135.2	148.3	8.3	37.6	107.4	8.3	211.1	120.1	63.9
79	Ca Closure (out/in), %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0
80	S Closure (out/in), %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0
81	Sorbent Ca Conversion/Utilization,%	3.50	5.51	10.88	11.35	22.84	1.16	2.38	12.22	1.16	22.84	8.73	6.69
82	Coal Sulfur Released, %	44.99	51.13	58.10	66.36	52.66	95.92	81.46	73.99	44.99	95.92	65.58	16.20
83	Sulfur in Freeboard Gas,% S in Coal	15.02	2.18	5.75	5.82	3.38	92.57	63.62	29.64	2.18	92.57	27.25	31.35
84	S in Disch Solids, % of Tot S Feed	85.37	97.82	94.29	94.03	96.84	10.71	39.23	71.04	10.71	97.82	73.67	30.11
85	Sulfur Capture by Sorbent, % Coal S	29.71	48.84	52.25	60.24	49.48	3.34	17.47	44.42	3.34	60.24	38.22	18.30
86	S in Product Gas, % of Feed S	15.02	2.18	5.75	5.82	3.38	92.57	63.62	29.64	2.18	92.57	27.25	31.35
87	S in Product Gas, % of Released S	33.38	4.27	9.90	8.77	6.42	96.51	78.09	40.06	4.27	96.51	34.68	33.07

Table 4.17. RECONCILED COMPOSITIONS OF COAL AND SORBENT FEEDS FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED (CIRCULATING FLUIDIZED-BED OPERATING MODE)

Set Point	TR10-1	TR10-2	TR10-3	TR10-4	Minimum	Maximum	Average	Std Dev
Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit				
Sorbent	GS Lime	GS Lime	GS Lime	GS Lime				
Moisture in Coal Feed, wt %	3.36	3.25	3.41	3.58	3.25	3.58	3.40	0.12
Coal (MF) Feed Composition, wt %								
C	71.539	72.408	71.837	70.906	70.906	72.408	71.673	0.542
H	5.097	5.103	5.110	5.128	5.097	5.128	5.110	0.012
O	6.962	6.374	6.543	6.914	6.374	6.962	6.698	0.248
N	2.014	2.019	2.009	1.999	1.999	2.019	2.010	0.007
S	3.307	3.258	3.270	3.262	3.258	3.307	3.274	0.019
Ash	11.081	10.838	11.231	11.791	10.838	11.791	11.235	0.350
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	
HHV, Btu/lb (MF)	13118	13087	13000	12946	12946	13118	13038	68
Sorbent Feed Composition, wt %								
CaCO3	70.605	81.583	81.956	82.467	70.605	82.467	79.153	4.945
MgCO3	27.609	16.445	15.952	15.568	15.568	27.609	18.894	5.041
CaS*	0.578	0.402	0.405	0.415	0.402	0.578	0.450	0.074
Inerts	1.208	1.570	1.687	1.550	1.208	1.687	1.504	0.179
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	

* Sulfur in Sorbent is reported as CaS.

Table 4.18. RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED (CIRCULATING FLUIDIZED-BED OPERATING MODE)

Set Point	TR10-1	TR10-2	TR10-3	TR10-4	Minimum	Maximum	Average	Std Dev
1 Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit				
2 Sorbent	GS Lime	GS Lime	GS Lime	GS Lime				
3 Begin Date	9/1/92	9/1/92	9/2/92	9/2/92				
4 Begin Clock Time, hours	0200	1630	0000	0610				
5 End Clock Time, hours	0600	2100	0400	1240				
6 Steady-State Period Duration, h	4	4.5	4	6.5	4.0	6.5	4.8	1.0
7 Reactor Pressure, psig	113.7	68.7	72.7	55.9	55.9	113.7	77.8	21.7
8 Orifice Pressure, psig	91.3	46.2	56.6	42.4	42.4	91.3	59.1	19.3
9 Average Bed Temp, F	1675	1675	1706	1601	1601	1706	1664	39
10 Bed Temp (@7.5 ft), F	1682	1688	1714	1601	1601	1714	1671	42
11 Freeboard Temp (@22.5 ft), F	1673	1651	1703	1601	1601	1703	1657	37
12 Freeboard Temp (@27.5 ft), F	1648	1615	1671	1570	1570	1671	1626	38
13 Orifice Temperature, F	1133	883	924	818	818	1133	940	118
14 Coal Feed Rate, lb/h	507.6	230.2	285.7	260.0	230.2	507.6	320.9	109.6
15 Sorbent Feed Rate, lb/h	137.0	32.3	25.3	24.7	24.7	137.0	54.8	47.5
16 Bed Drain Rate, lb/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17 First Cyclone Rate, lb/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18 Second Cyclone Rate, lb/h	307.0	48.5	122.3	137.7	48.5	307.0	153.9	94.6
19 Baghouse Fines Rate, lb/h	77.4	103.6	42.1	33.6	33.6	103.6	64.2	28.1
20 Total Drains Rate, lb/h	384.4	152.1	164.4	171.3	152.1	384.4	218.1	96.3
21 Steam Feed Rate, lb/h	151.1	0.1	0.3	0.3	0.1	151.1	37.9	65.3
22 Air Feed Rate, lb/h	1126.5	599.0	836.0	615.7	599.0	1126.5	794.3	213.4
23 Air Feed Rate (Ar Forced), lb/h	1126.5	599.0	836.0	615.7	599.0	1126.5	794.3	213.4
24 N2 Purges to Carbonizer, lb/h	51.2	219.3	127.3	146.2	51.2	219.3	136.0	59.8
25 N2 Purges to Cyclones + O.M., lb/h	269.6	267.9	267.7	271.9	267.7	271.9	269.3	1.7
26 N2 Purge to Spray Tower, lb/h	106.6	90.1	113.5	114.2	90.1	114.2	106.1	9.7
27 Total N2 Purges to system, lb/h	427.4	577.3	508.5	532.3	427.4	577.3	511.4	54.4
28 Reactor Exit Gas, lb/h	1589.3	928.9	1110.4	875.7	875.7	1589.3	1126.1	281.2
29 Orifice Gas, lb/h	1858.9	1196.8	1378.0	1147.7	1147.7	1858.9	1395.4	281.0
30 Demister Gas, lb/h	1965.5	1287.0	1491.5	1261.9	1261.9	1965.5	1501.5	282.3
31 CH4 in Demister Gas, mol %	1.882	0.922	1.234	1.303	0.922	1.882	1.335	0.347
32 C2H4 in Demister Gas, mol %	0.056	0.078	0.067	0.145	0.056	0.145	0.087	0.035
33 C2H6 in Demister Gas, mol %	0.010	0.000	0.000	0.008	0.000	0.010	0.005	0.005
34 Demister Gas HHV, Btu/SCF	69.2	39.6	50.2	42.1	39.6	69.2	50.3	11.6
35 Bed Density, lb/ft3								

Table 4.18 (cont.). RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED (CIRCULATING FLUIDIZED-BED OPERATING MODE)

	Set Point	TR10-1	TR10-2	TR10-3	TR10-4	Minimum	Maximum	Average	Std Dev
	Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit				
	Sorbent	GS Lime	GS Lime	GS Lime	GS Lime				
36	Bed Height, ft								
37	Bed Weight, lb								
38									
39	Avg Bed T FB T (@22.5 ft), F	2	24	3	0	0.0	24.0	7.3	9.7
40	Avg Bed T - FB T (@27.5 ft), F	27	60	35	31	27.0	60.0	38.3	12.9
41	Coal Feed (MF), lb/h	490.55	222.70	275.98	250.67	222.70	490.55	309.98	105.94
42	Carbon in Coal Feed, lb/h	350.94	161.26	198.26	177.74	161.26	350.94	222.05	75.56
43	Air/Coal in Feed, lb/lb	2.219	2.602	2.926	2.368	2.219	2.926	2.529	0.267
44	Feed Oxygen/Carbon in Feed, mol/mol	0.279	0.323	0.367	0.301	0.279	0.367	0.318	0.033
45	Feed Steam/Carbon in Feed, mol/mol	0.287	0.001	0.001	0.001	0.001	0.287	0.073	0.124
46	Feed(Steam+Moist)/C in Feed,mol/mol	0.319	0.032	0.034	0.036	0.032	0.319	0.105	0.123
47	Total Char/MF Coal Feed, lb/lb	0.5773	0.5870	0.5297	0.6088	0.5297	0.6088	0.5757	0.0289
48	Orifice Gas/Coal Feed, lb/lb	3.662	5.199	4.823	4.414	3.662	5.199	4.525	0.570
49	Purge-Free Gas Make/Coal Feed,lb/lb	3.030	3.083	3.441	2.806	2.806	3.441	3.090	0.228
50	Purge-Free Gas Make/Coal Feed,SCF/lb	45.277	43.522	48.431	39.750	39.750	48.431	44.245	3.135
51	CH4 Yield, % of Feed Carbon	4.883	3.228	4.082	4.070	3.228	4.883	4.066	0.585
52	C2H6 Yield, % of Feed Carbon	0.052	0.000	0.000	0.050	0.000	0.052	0.026	0.026
53	C2H4 Yield, % of Feed Carbon	0.291	0.546	0.443	0.906	0.291	0.906	0.547	0.227
54	HC Yield, % of Feed Carbon	5.225	3.774	4.525	5.026	3.774	5.225	4.638	0.560
55	Carbon Conv (Based on Solids), %	37.48	38.44	46.12	34.82	34.82	46.12	39.21	4.20
56	Carbon Conv (Based on Gas), %	37.48	38.44	46.12	34.82	34.82	46.12	39.21	4.20
57	Diff in C Conv (Solids-Gas), %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
58									
59	H2O Content in Freeboard Gas, mol %	20.68	8.28	8.35	10.40	8.28	20.68	11.93	5.12
60	Water-Gas Shift Temperature, F	1684	1570	1601	1499	1499	1684	1589	66
61	WGS Temp - Avg Bed Temp, F	9	-105	-105	-102	-105	9	-76	49
62	WGS Temp - Freebd Temp(@22.5 ft), F	11	-81	-102	-102	-102	11	-69	47
63	WGS Temp - Freebd Temp(@27.5 ft), F	36	-45	-70	-71	-71	36	-38	44
64									
65	Coal Nitrogen Released, %	47.14	38.10	49.06	38.72	38.10	49.06	43.26	4.90
66	Released Nitrogen Going to NH3, %	75.27	71.90	42.74	75.80	42.74	75.80	66.43	13.76
67	Coal Nitrogen Going to NH3, %	35.48	27.39	20.97	29.35	20.97	35.48	28.30	5.18
68	NH3 Conc. in Freeboard, ppm	4010	2560	2030	3240	2030	4010	2960	743

Table 4.18 (cont.). RECONCILED CARBONIZER PILOT PLANT DATA FOR STEADY-STATE PERIODS WITH PITTSBURGH NO. 8 BITUMINOUS COAL FEED (CIRCULATING FLUIDIZED-BED OPERATING MODE)

Set Point	TR10-1	TR10-2	TR10-3	TR10-4	Minimum	Maximum	Average	Std Dev
Coal	Pitt Bit	Pitt Bit	Pitt Bit	Pitt Bit				
Sorbent	GS Lime	GS Lime	GS Lime	GS Lime				
69 Actual Partial Press. of CO2, psia	13.98	7.05	8.18	6.66	6.66	13.98	8.97	2.95
70 Equilib. PCO2 (Squires), psia	18.54	18.54	23.68	10.04	10.04	23.68	17.70	4.90
71 Equilib. PCO2 (IGT/B&K), psia	40.43	40.43	51.98	21.51	21.51	51.98	38.59	10.93
72 Feed Ca/Feed S Ratio, mol/mol	1.91	1.16	0.74	0.80	0.74	1.91	1.15	0.47
73 Feed Ca/Released S Ratio, mol/mol	2.31	2.34	1.65	1.37	1.37	2.34	1.92	0.42
74 H2S Conc. in Freeboard, ppm	766	220	240	499	220	766	431	222
75 Equilib. H2S Conc. (CaO Rxn), ppm	413	166	184	163	163	413	232	105
76 Approach to Equilib. Capture, %	94.3	98.3	98.1	92.4	92.4	98.3	95.8	2.5
77 Equilib. H2S Conc. (CaCO3 Rxn), ppm	311	63	63	108	63	311	136	103
78 Approach to Equilib. Capture, %	92.8	95.1	94.1	91.3	91.3	95.1	93.3	1.4
79 Ca Closure (out/in), %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0
80 S Closure (out/in), %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0
81 Sorbent Ca Conversion/Utilization,%	39.1	40.3	56.1	65.3	39.08	65.31	50.20	11.02
82 Coal Sulfur Released, %	82.73	49.81	44.59	58.26	44.59	82.73	58.85	14.63
83 Sulfur in Freeboard Gas,% S in Coal	9.44	3.22	3.49	6.34	3.22	9.44	5.62	2.52
84 S in Disch Solids, % of Tot S Feed	90.79	96.62	96.52	93.71	90.79	96.62	94.41	2.39
85 Sulfur Capture by Sorbent, % Coal S	73.31	46.41	41.09	51.94	41.09	73.31	53.19	12.23
86 S in Product Gas, % of Feed S	9.44	3.22	3.49	6.34	3.22	9.44	5.62	2.52
87 S in Product Gas, % of Released S	11.41	6.67	7.83	10.89	6.67	11.41	9.20	2.00

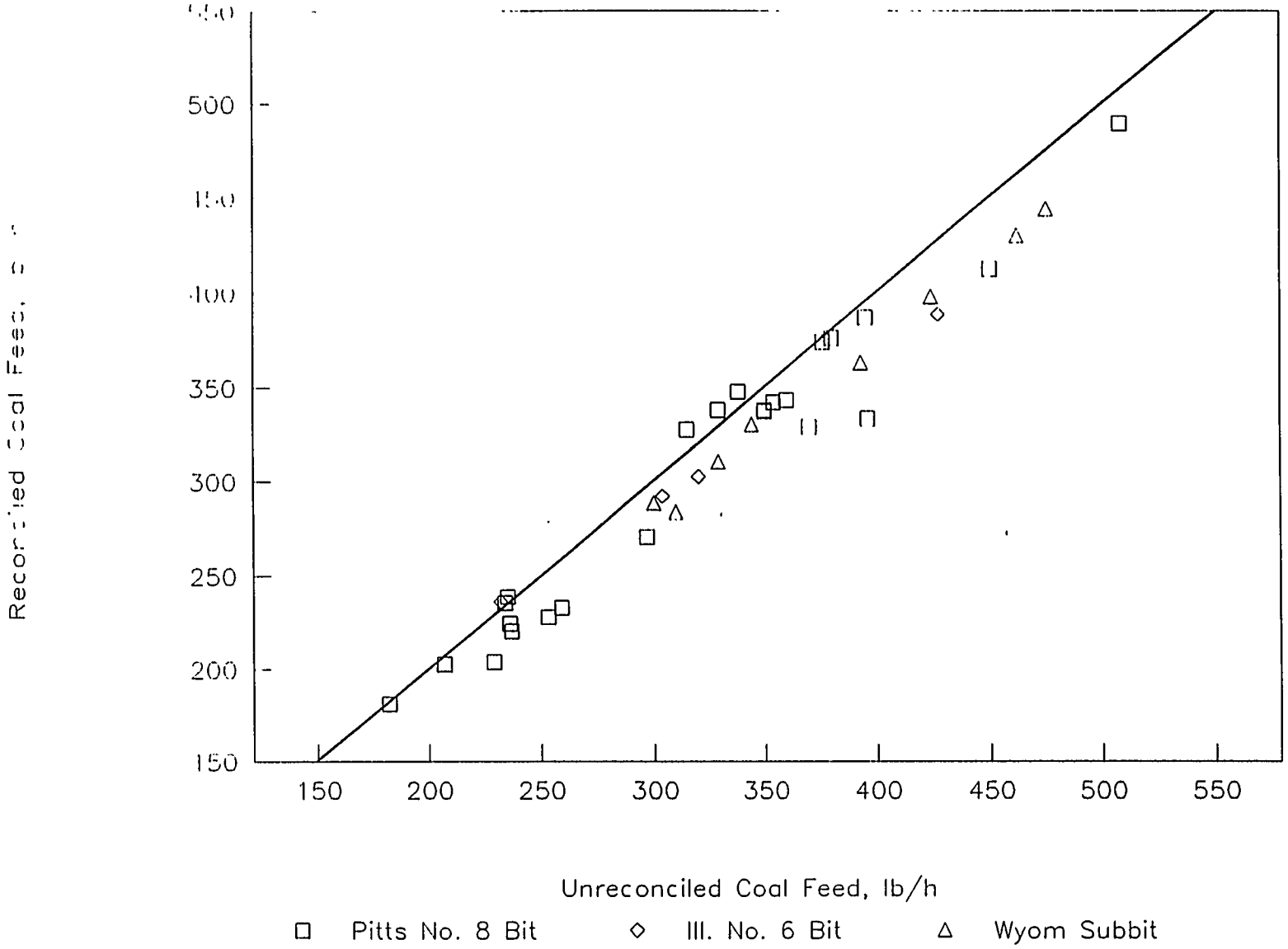

Figure 4.2. COMPARISON OF RECONCILED AND UNRECONCILED COAL FEED RATE

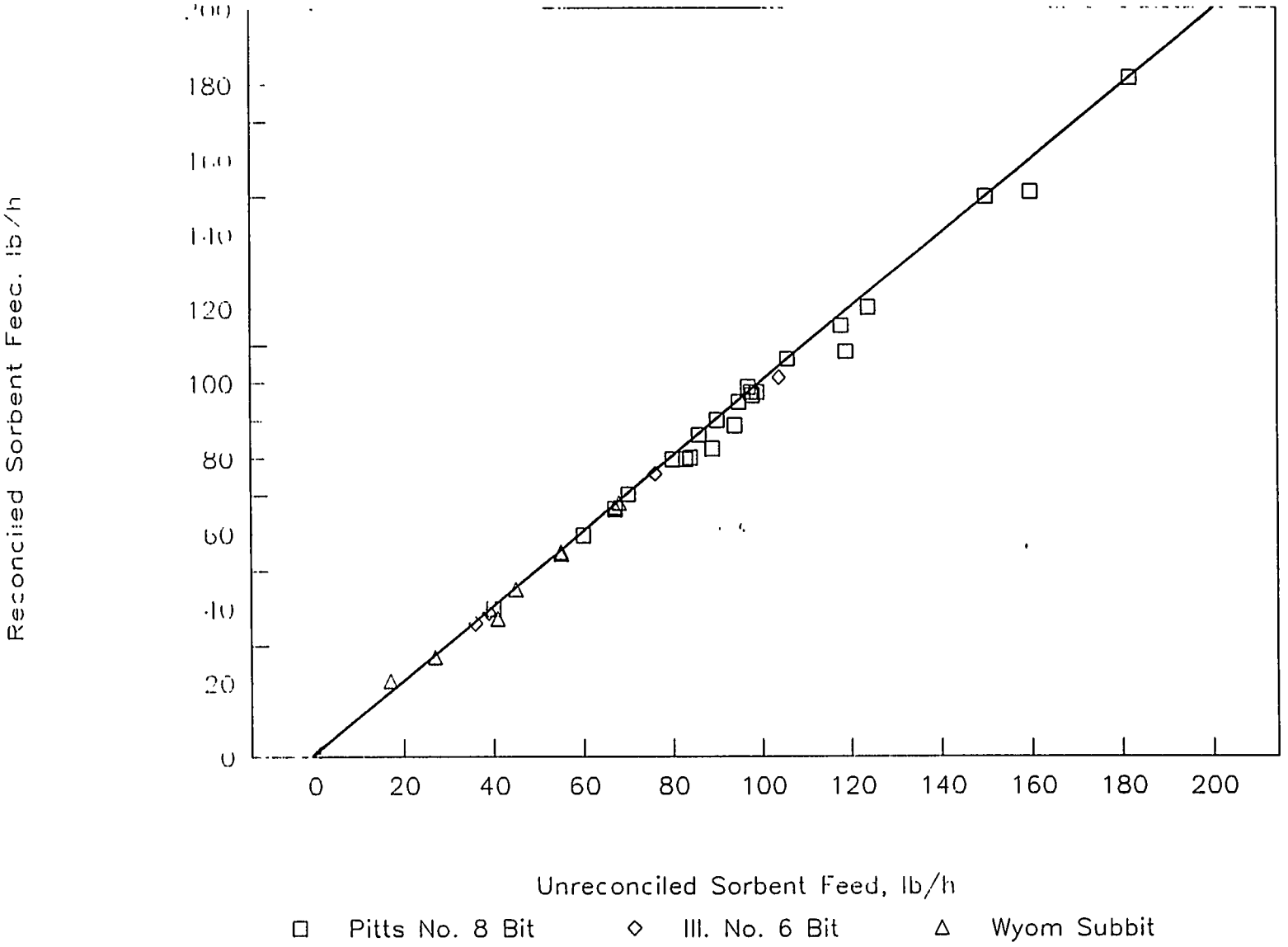

Figure 4.3. COMPARISON OF RECONCILED AND UNRECONCILED SORBENT FEED RATE

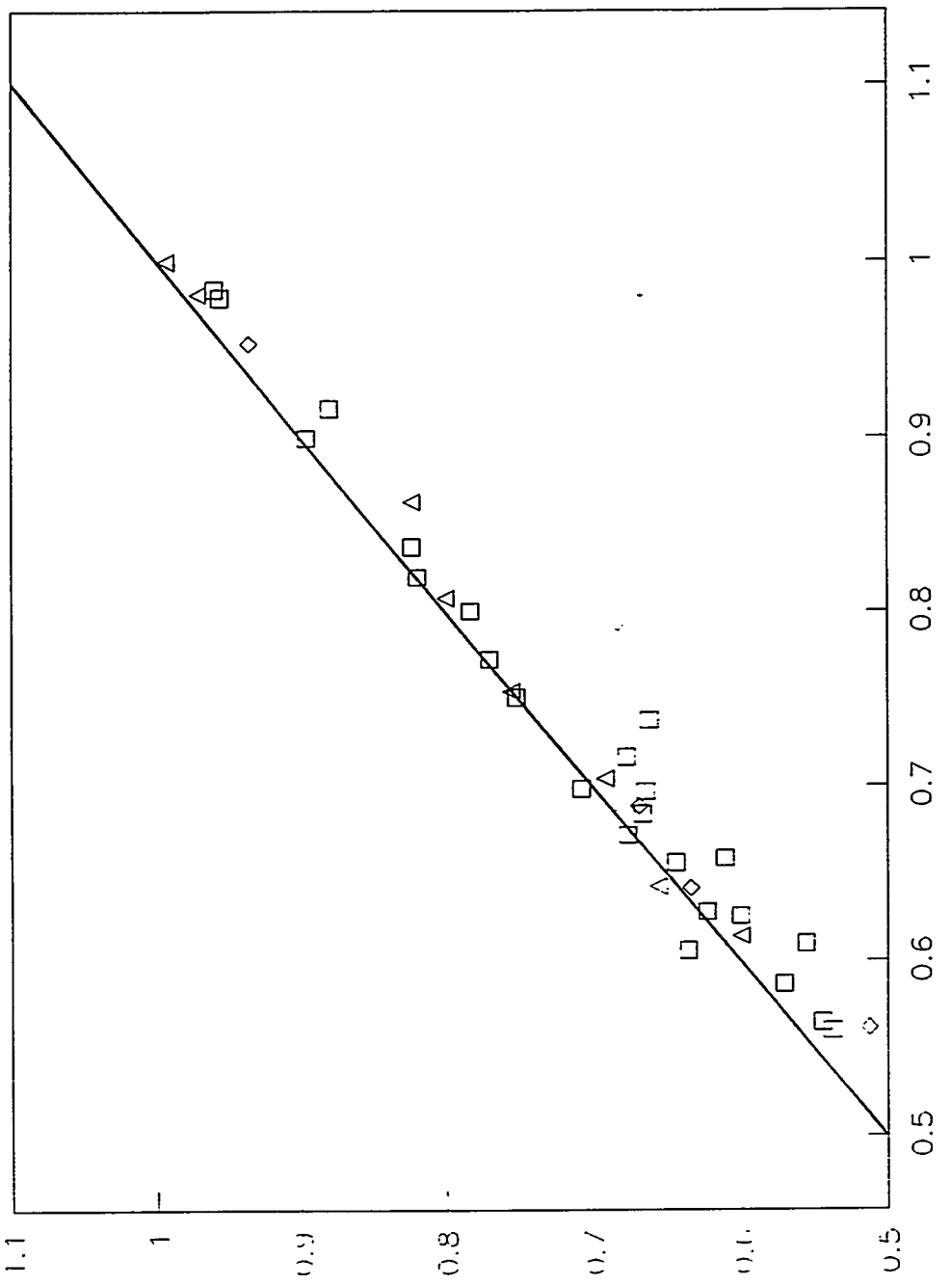

Figure 4.4. COMPARISON OF RECONCILED AND UNRECONCILED AIR FEED RATE

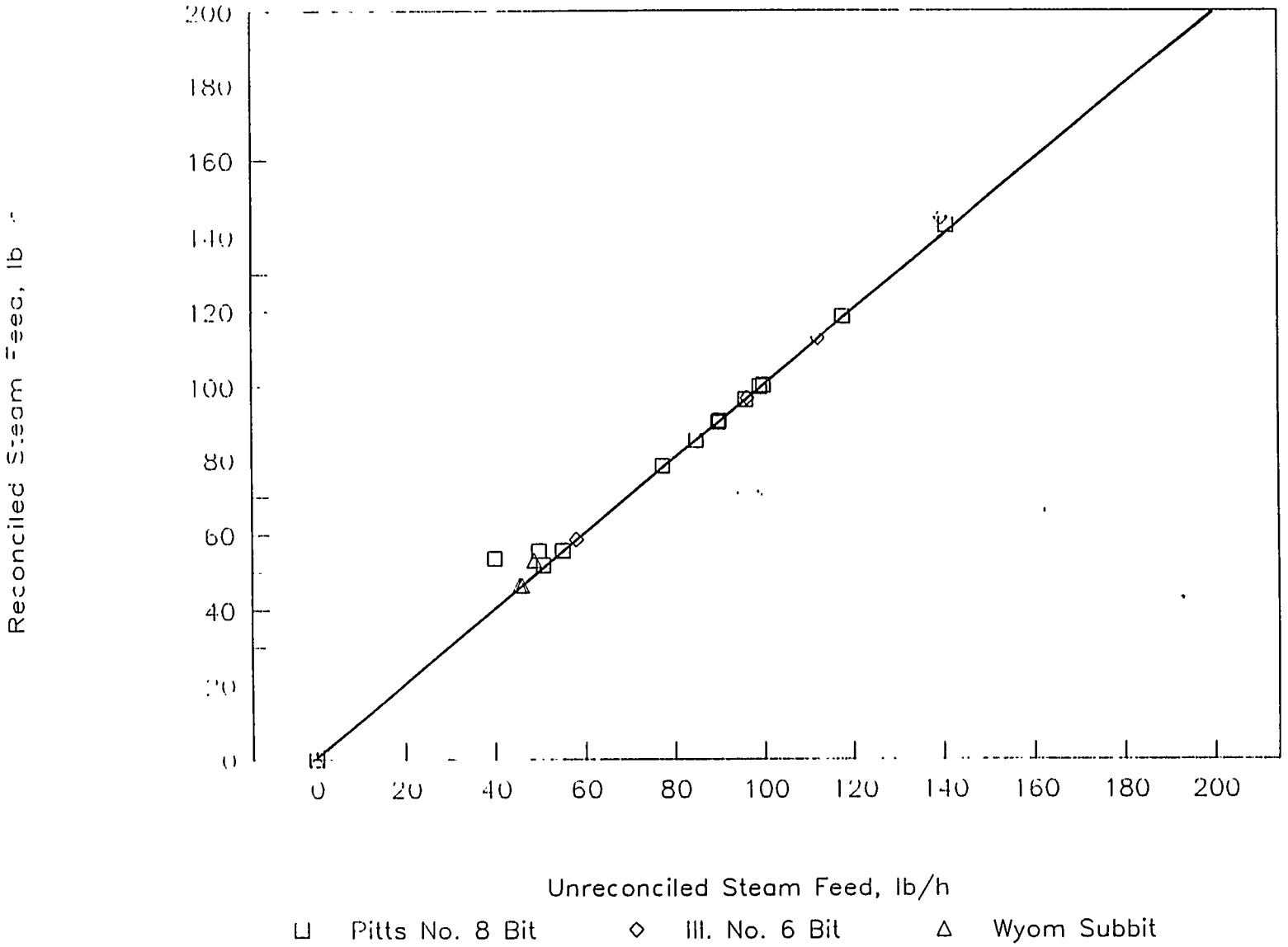

Figure 4.5. COMPARISON OF RECONCILED AND UNRECONCILED STEAM FEED RATE

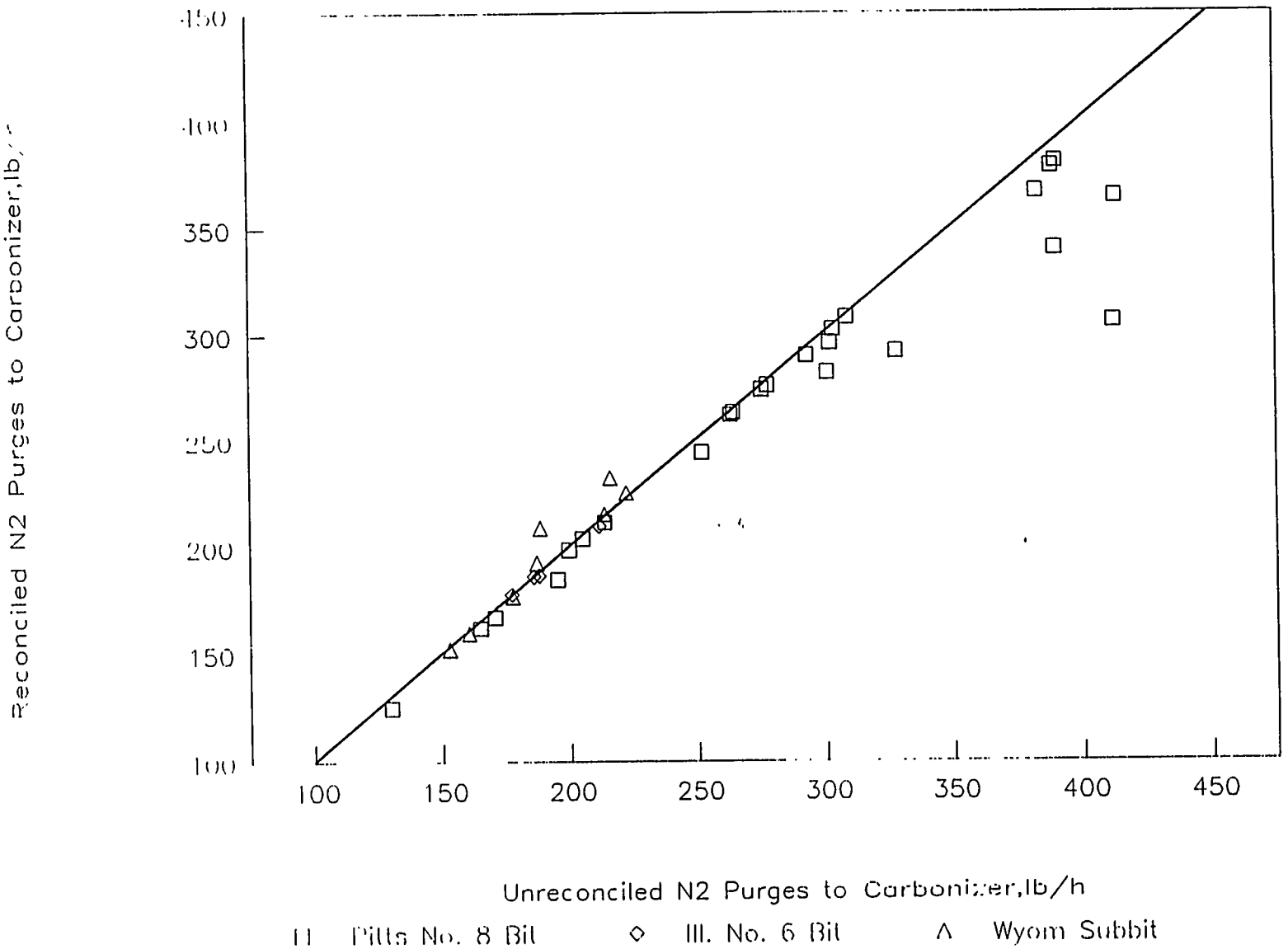

Figure 4.6. COMPARISON OF RECONCILED AND UNRECONCILED NITROGEN PURGE FLOW RATE TO CARBONIZER

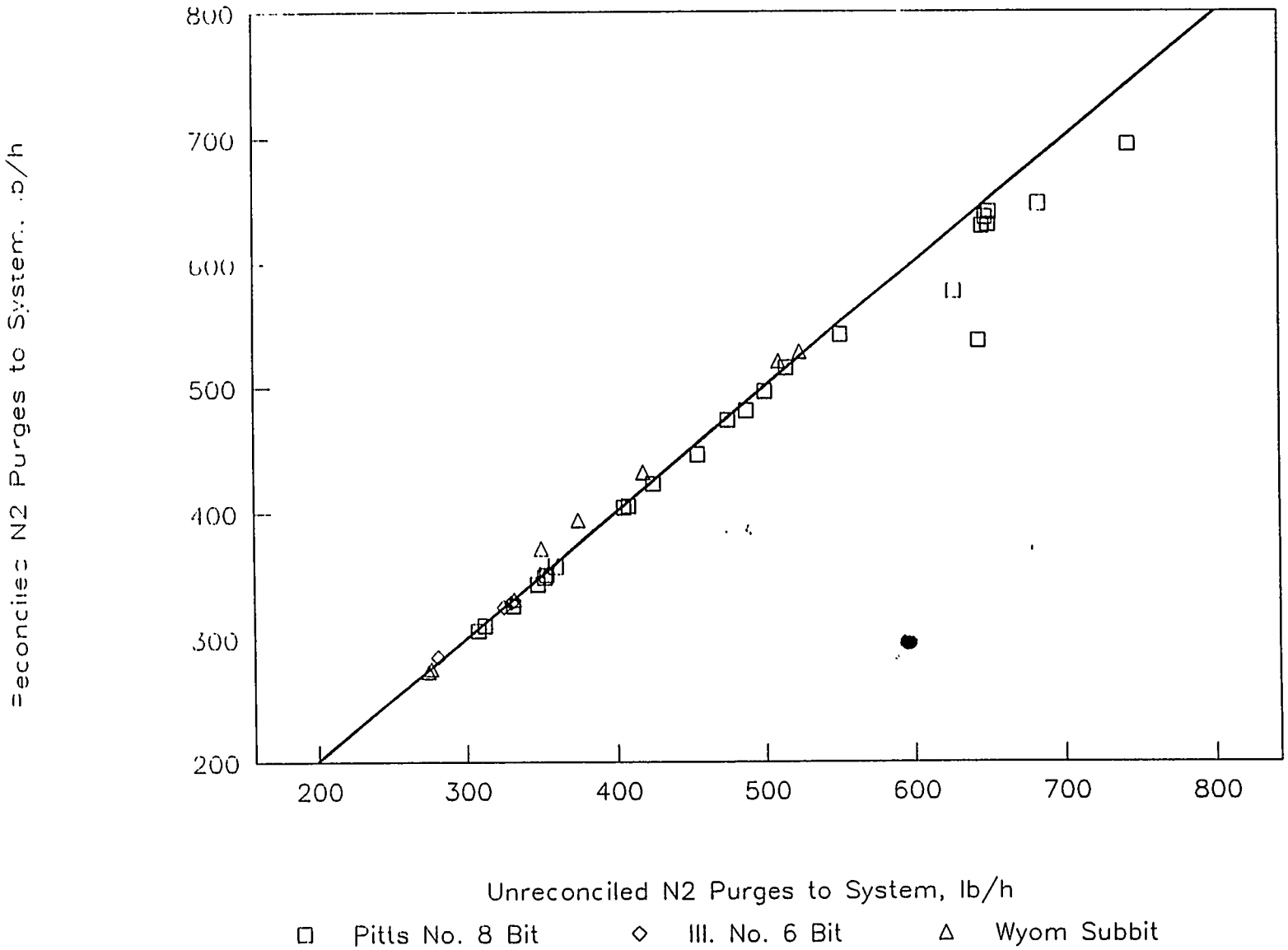

Figure 4.7. COMPARISON OF RECONCILED AND UNRECONCILED NITROGEN PURGE FLOW RATE TO SYSTEM

a comparison of reconciled and unreconciled values of the steam feed rate, total nitrogen purges to carbonizer alone, and total nitrogen purges to the system; the adjustments made are minimal.

Figures 4.8 and 4.9 show a comparison of reconciled and unreconciled values of total drains rate (that is, all solids drain rates combined) and orifice gas flow rate, respectively. These figures show that the reconciled values are usually higher than the unreconciled values. This trend is consistent with the total mass closure (out/in), which ranged from 84.7% to 111.3% with an average value of 94.8% (see Table 2.14).

Figures 4.10 and 4.11 show a comparison of reconciled and unreconciled values of H_2S and NH_3 concentration in the carbonizer freeboard gas; the adjustments made are minimal, indicating that the measured values of these species were not adjusted appreciably. This was intentionally done by specifying high accuracies of H_2S and NH_3 measurements. In Figure 4.10, the Wyoming coal data point standing all by itself and showing a large adjustment made in its reconciled value corresponds to the set point TR8-1 in which the sulfur closure was 266%. During this set point, the measured value (3174 ppm) was excessively high, and it had to be reduced significantly to close the sulfur balance.

In Section 3.1, it was mentioned that the carbon conversion calculated from unreconciled data could differ significantly depending on whether it is based on solids or gas; the larger the deviation in carbon closure, the larger would be the difference in the two values. The reconciliation process eliminates this difference. Because all the closures are 100%, there is a unique value of carbon conversion, independent of the basis (solids or gas). Figures 4.12 through 4.18 show a comparison of these unreconciled values of the carbon conversion to the reconciled value of the carbon conversion for Test Runs TR1, TR2, TR4, TR5, TR6, TR8, and TR10, respectively; the reconciled value is usually between two unreconciled values for each of the set points.

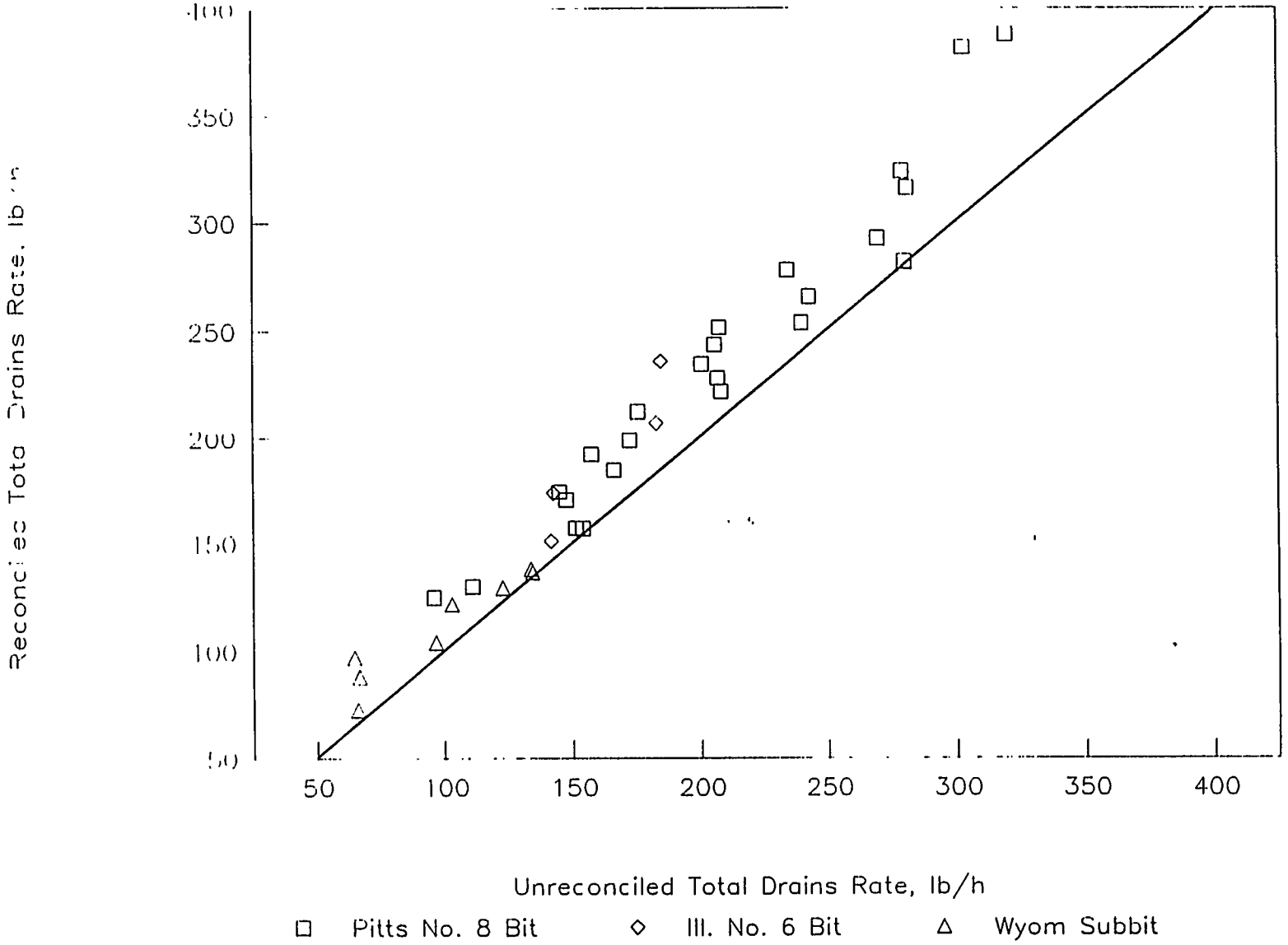

Figure 4.8. COMPARISON OF RECONCILED AND UNRECONCILED TOTAL DRAINS RATE

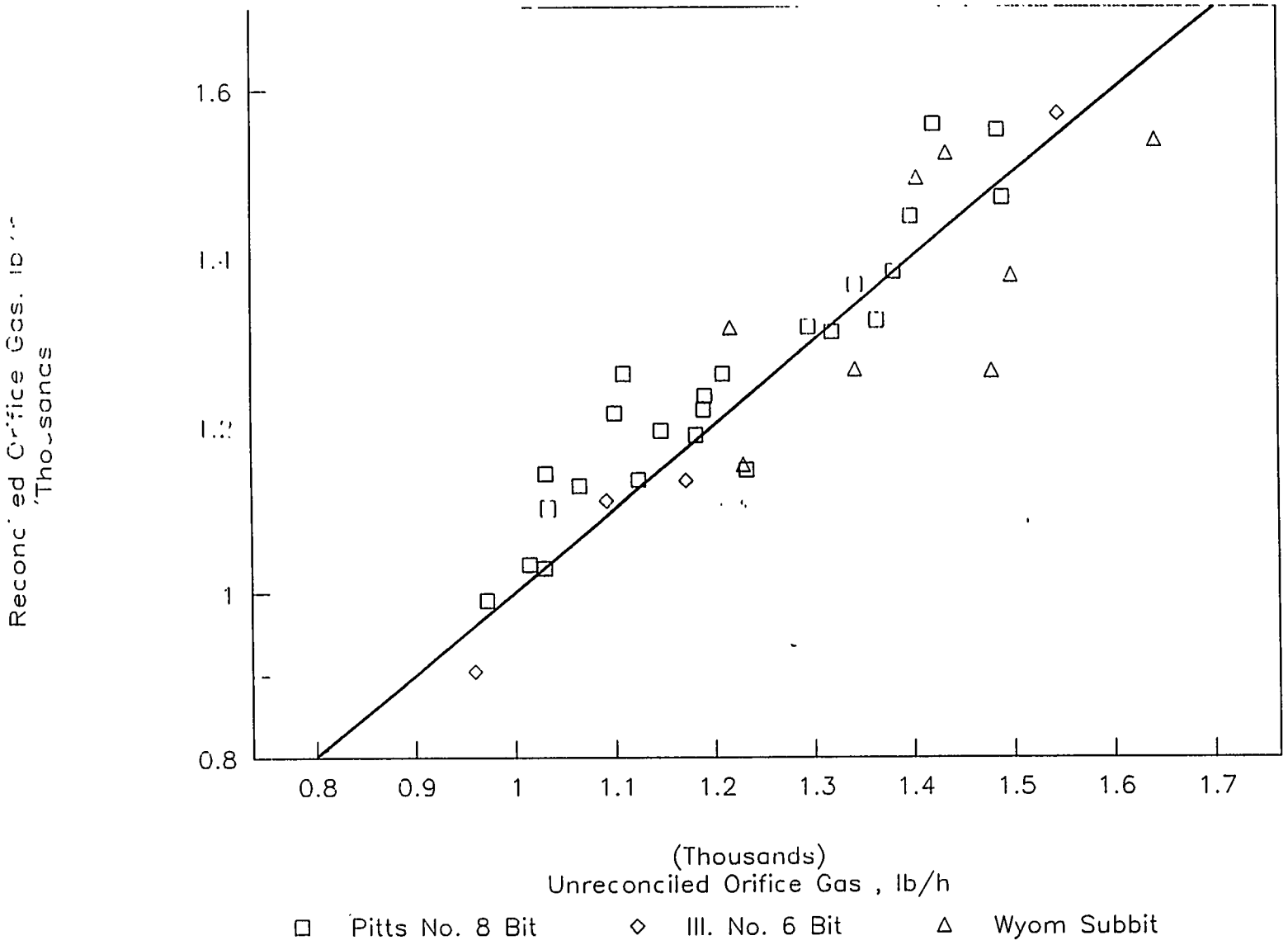

Figure 4.9. COMPARISON OF RECONCILED AND UNRECONCILED ORIFICE GAS FLOW RATE

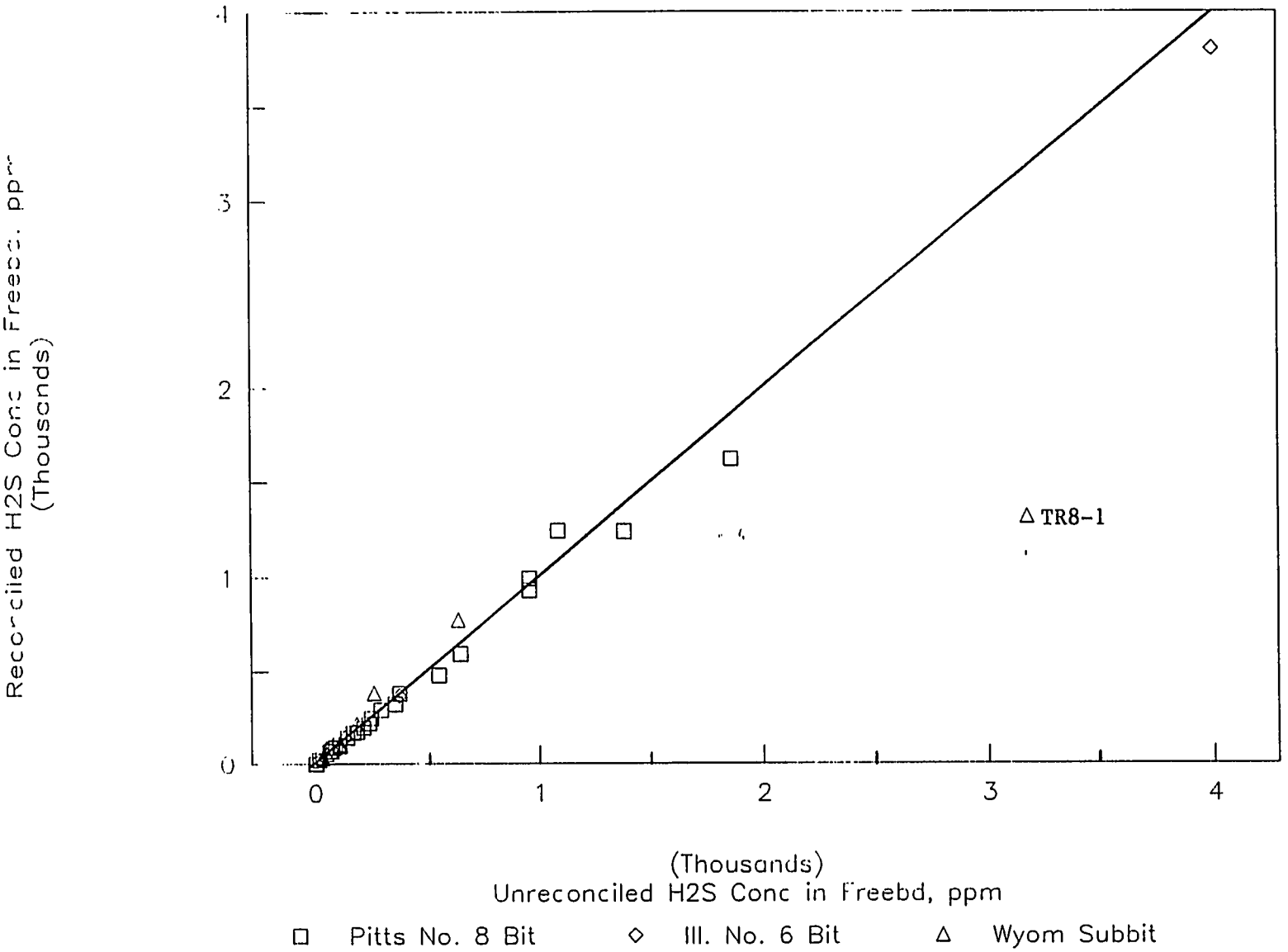

Figure 4.10. COMPARISON OF RECONCILED AND UNRECONCILED VALUES OF H_2S CONCENTRATION IN FREEBOARD

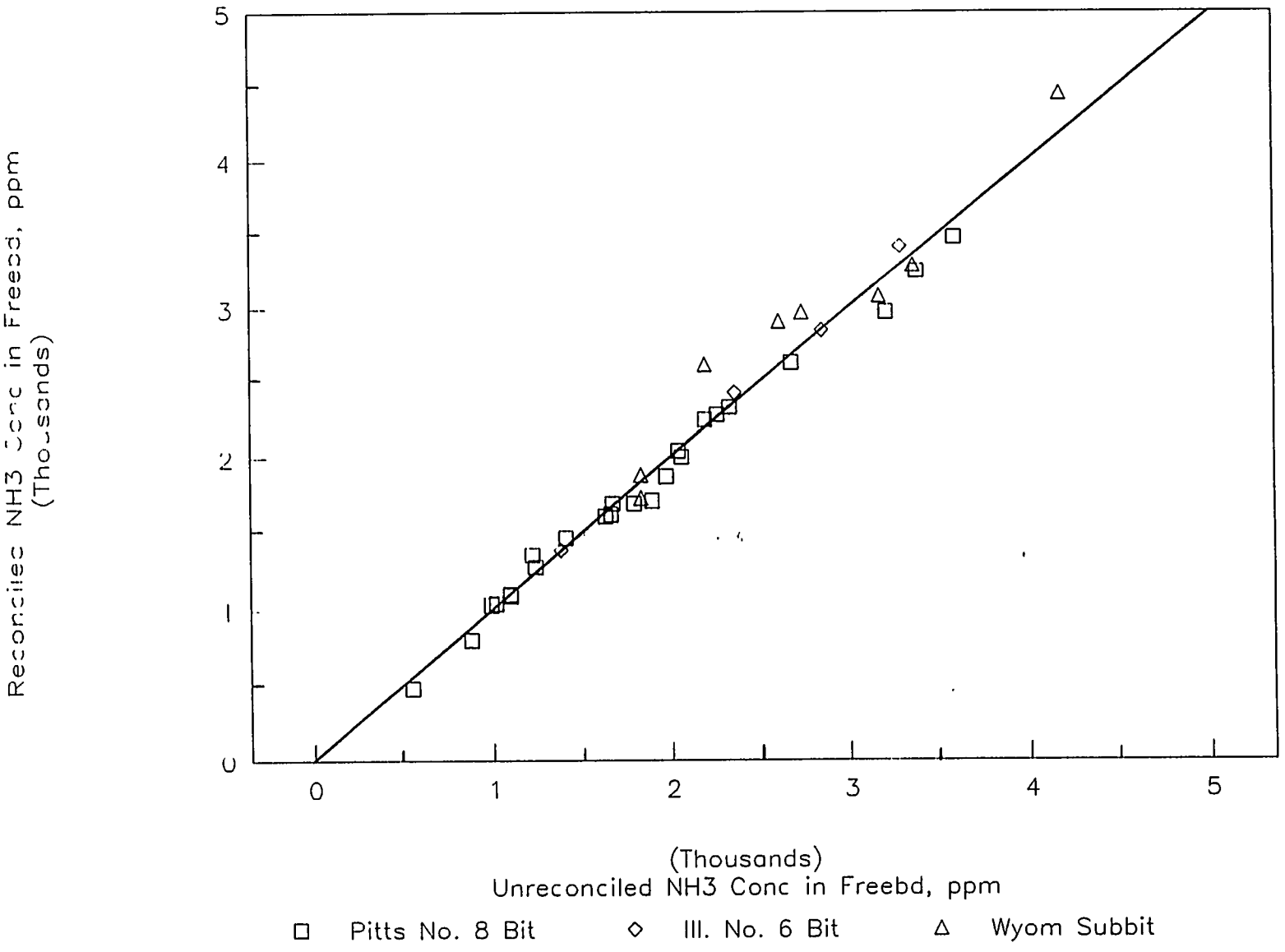

Figure 4.11. COMPARISON OF RECONCILED AND UNRECONCILED VALUES OF AMMONIA CONCENTRATION IN FREEBOARD

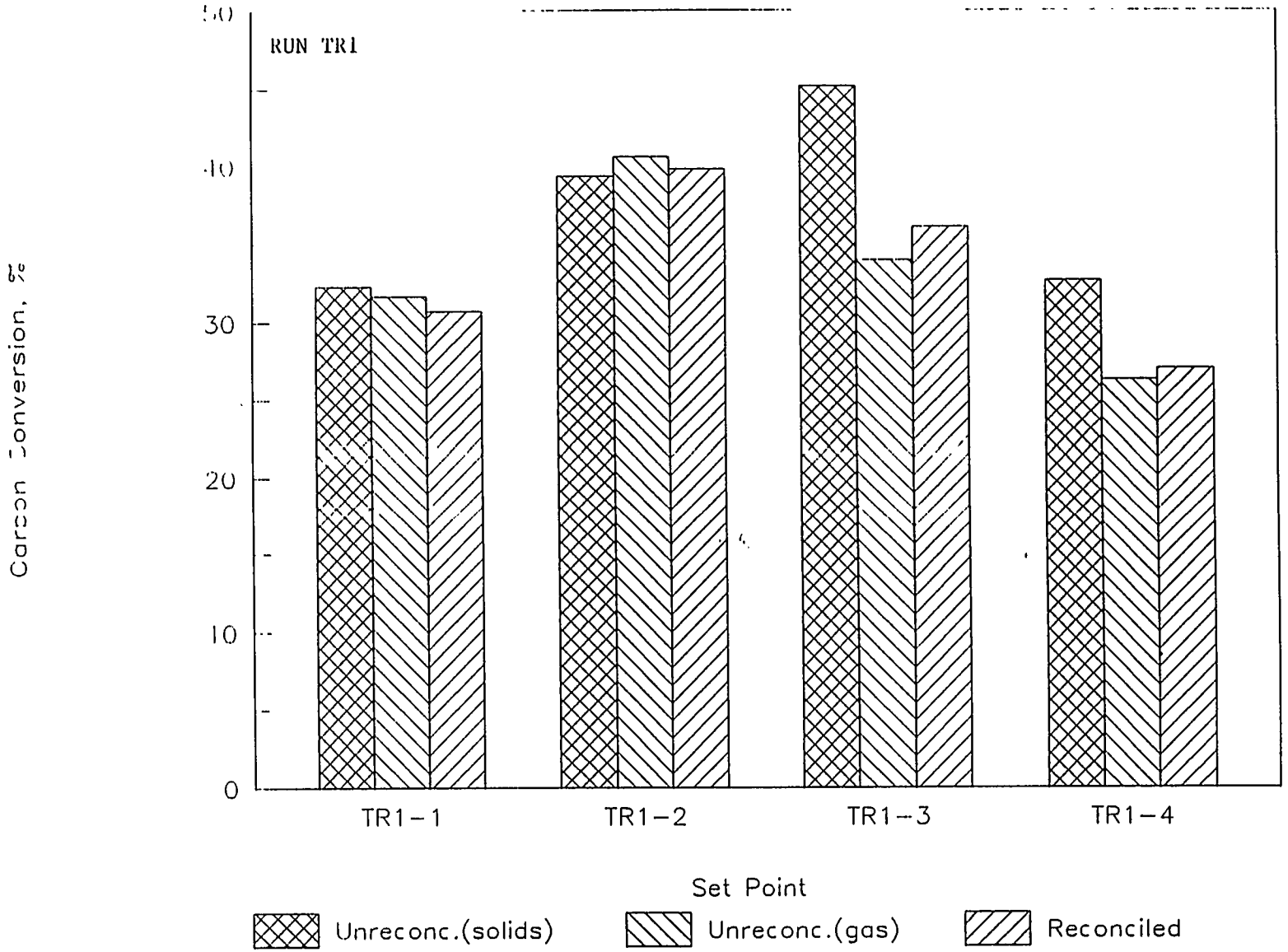

Figure 4.12. COMPARISON OF RECONCILED AND UNRECONCILED VALUES OF CARBON CONVERSION FOR TEST RUN TR1

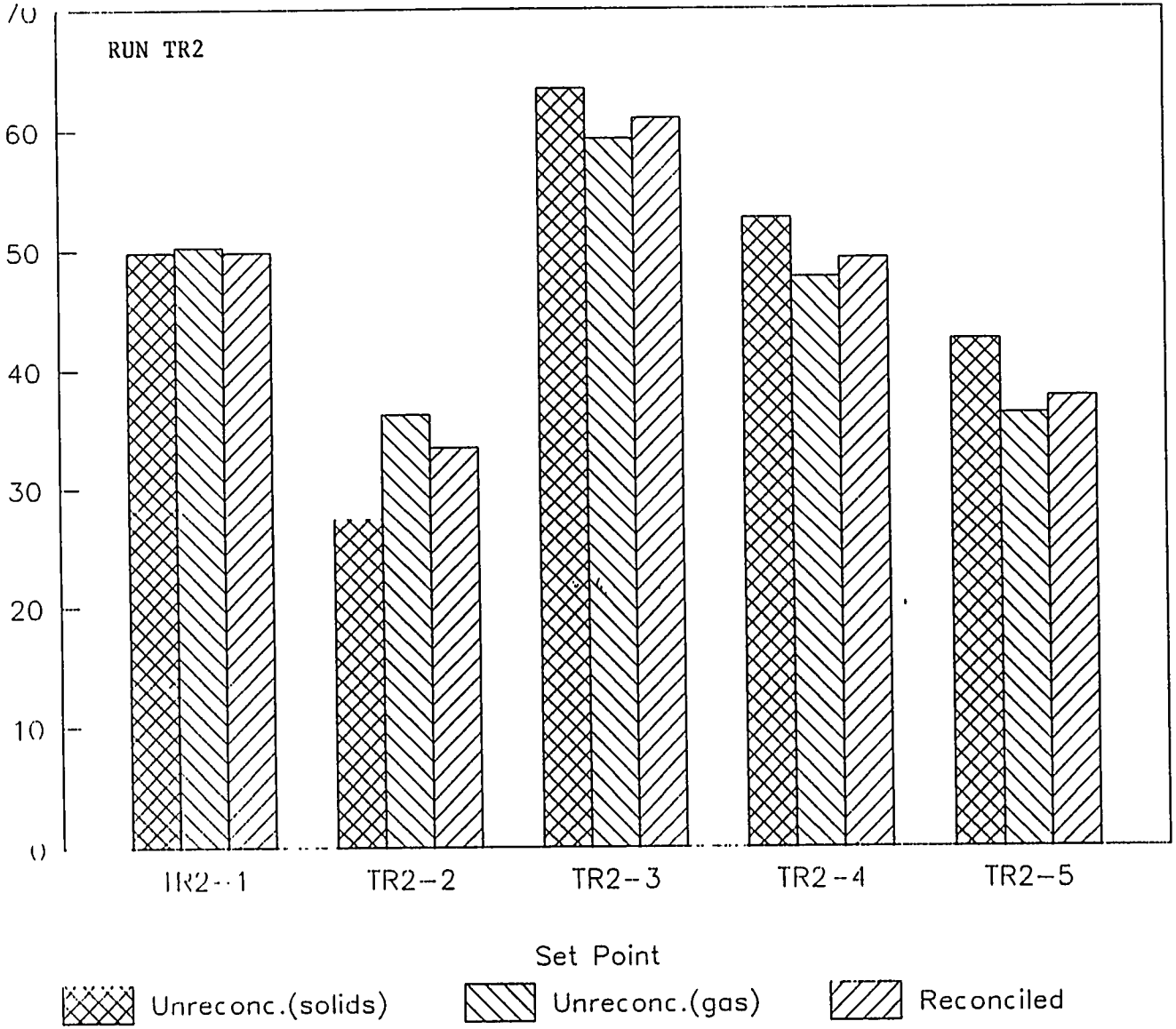

Figure 4.13. COMPARISON OF RECONCILED AND UNRECONCILED VALUES OF CARBON CONVERSION FOR TEST RUN TR2

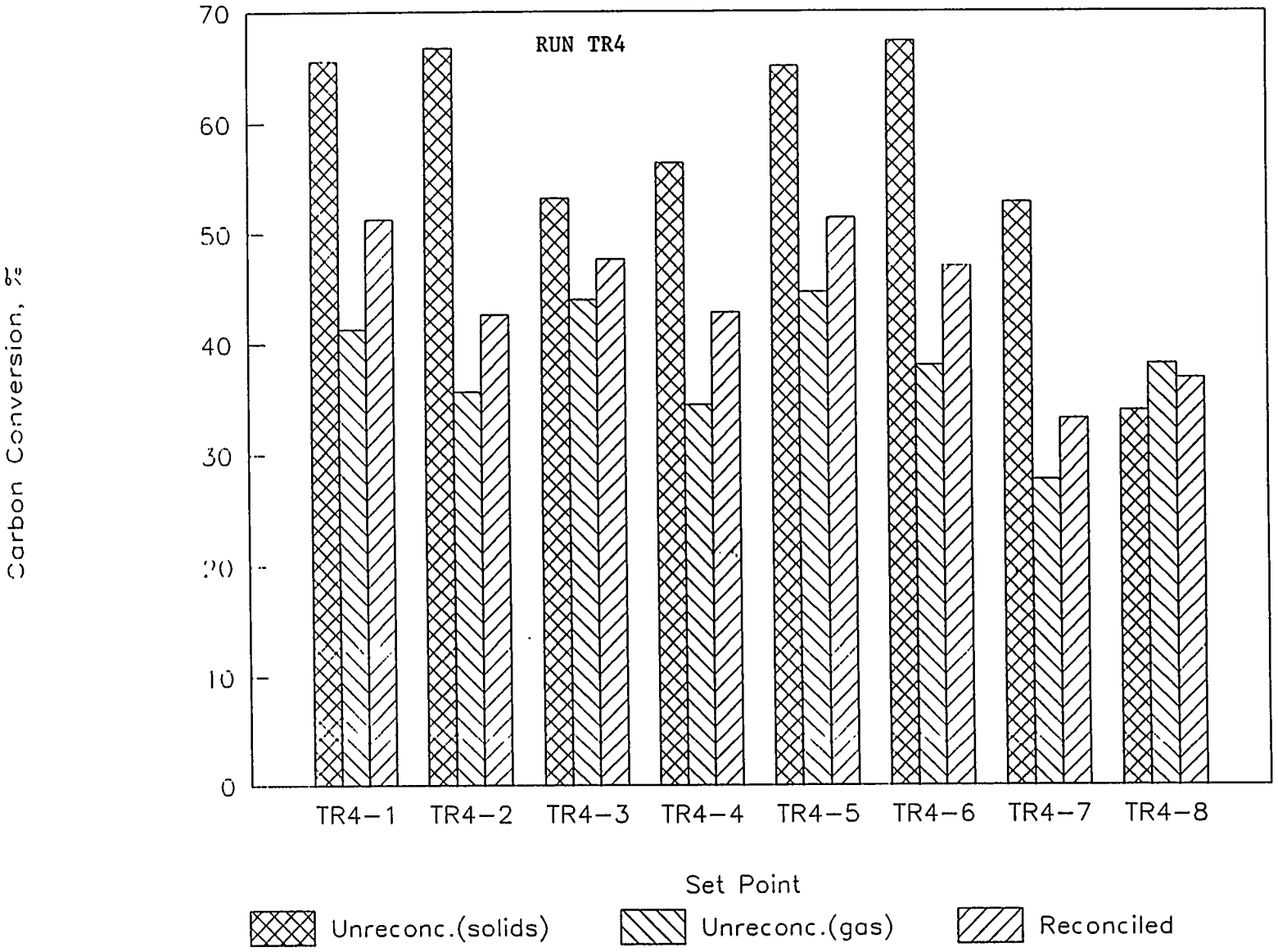

Figure 4.14. COMPARISON OF RECONCILED AND UNRECONCILED VALUES OF CARBON CONVERSION FOR TEST RUN TR4

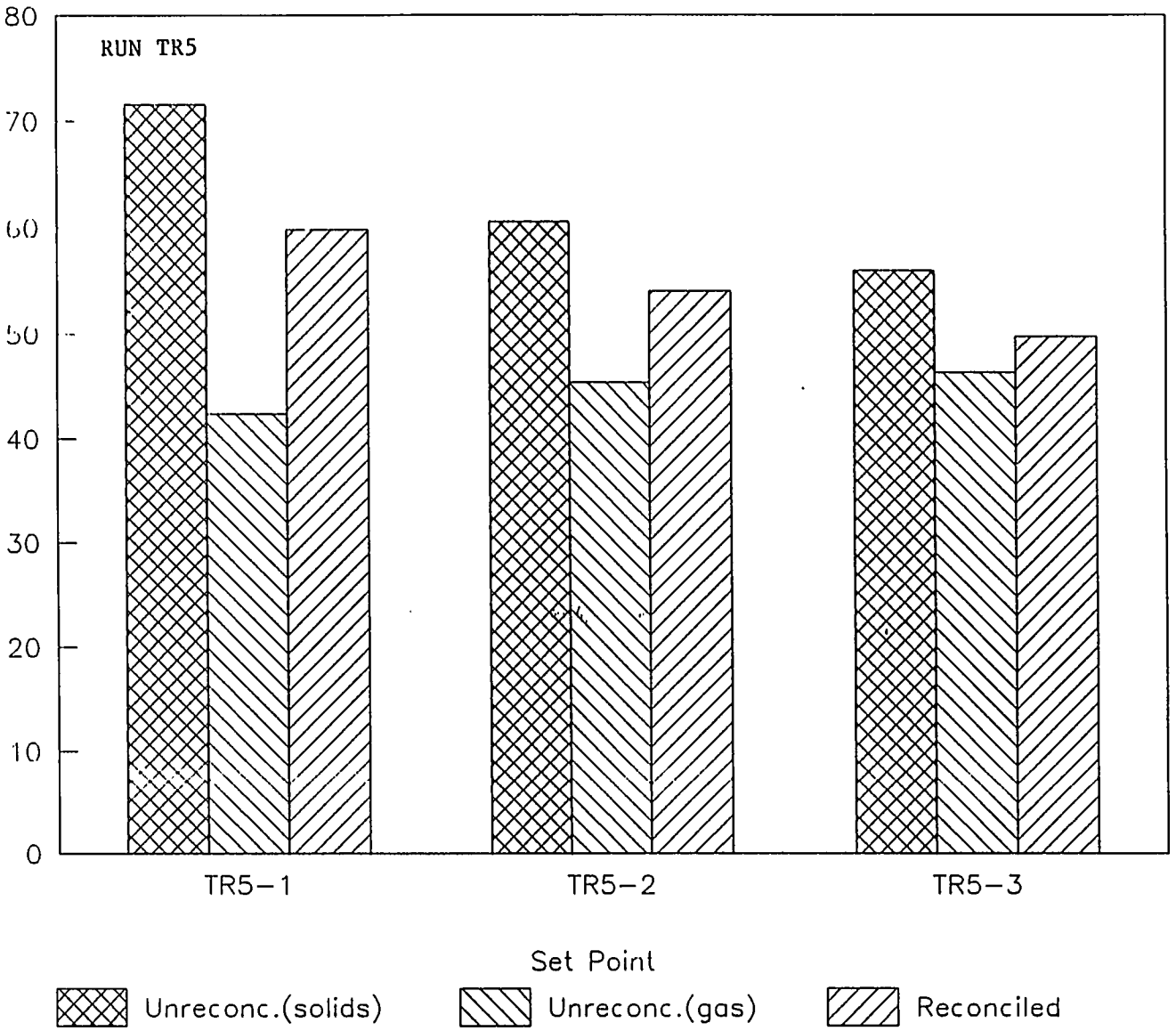

Figure 4.15. COMPARISON OF RECONCILED AND UNRECONCILED VALUES OF CARBON CONVERSION FOR TEST RUN TR5

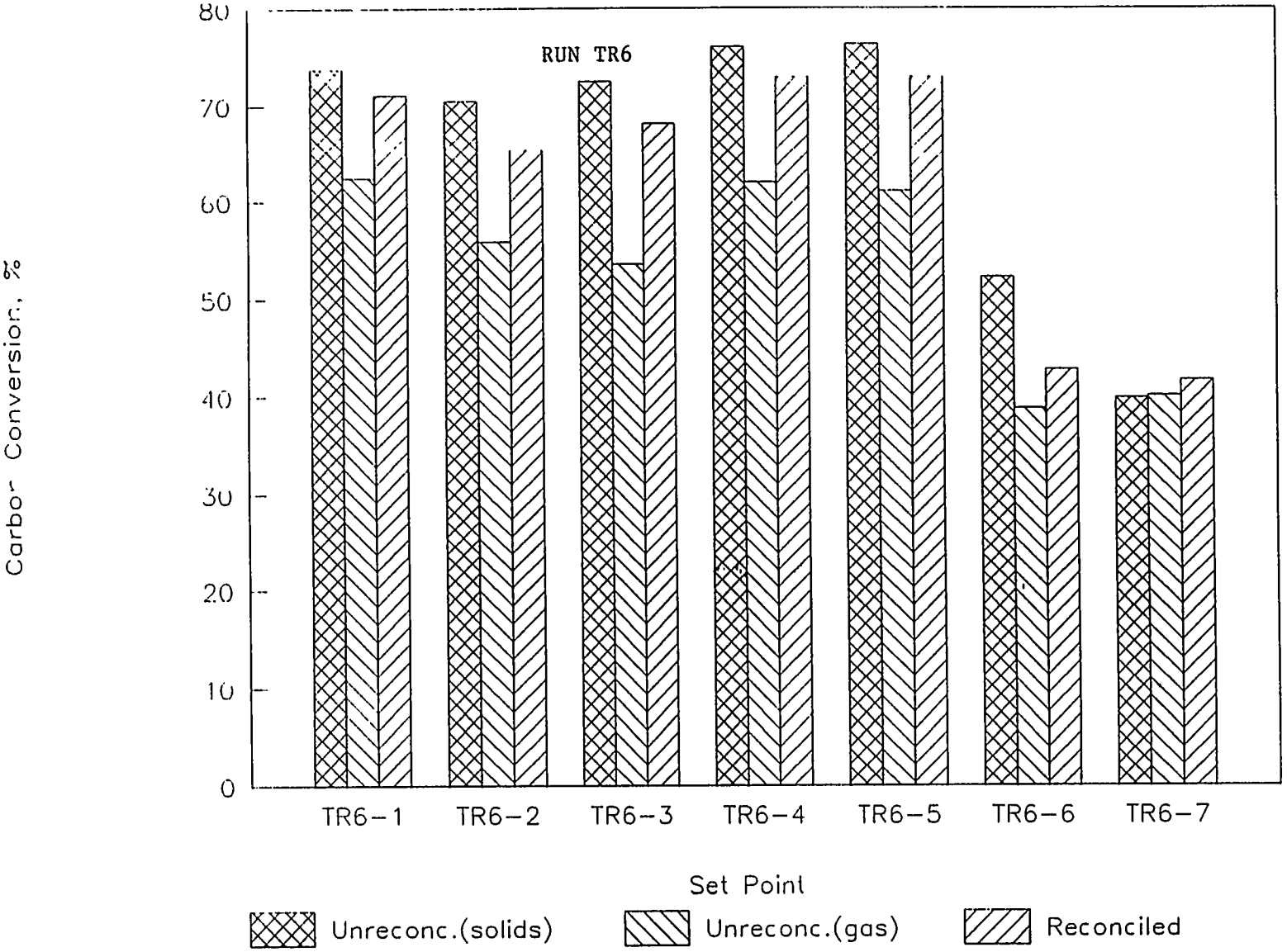

Figure 4.16. COMPARISON OF RECONCILED AND UNRECONCILED VALUES OF CARBON CONVERSION FOR TEST RUN TR6

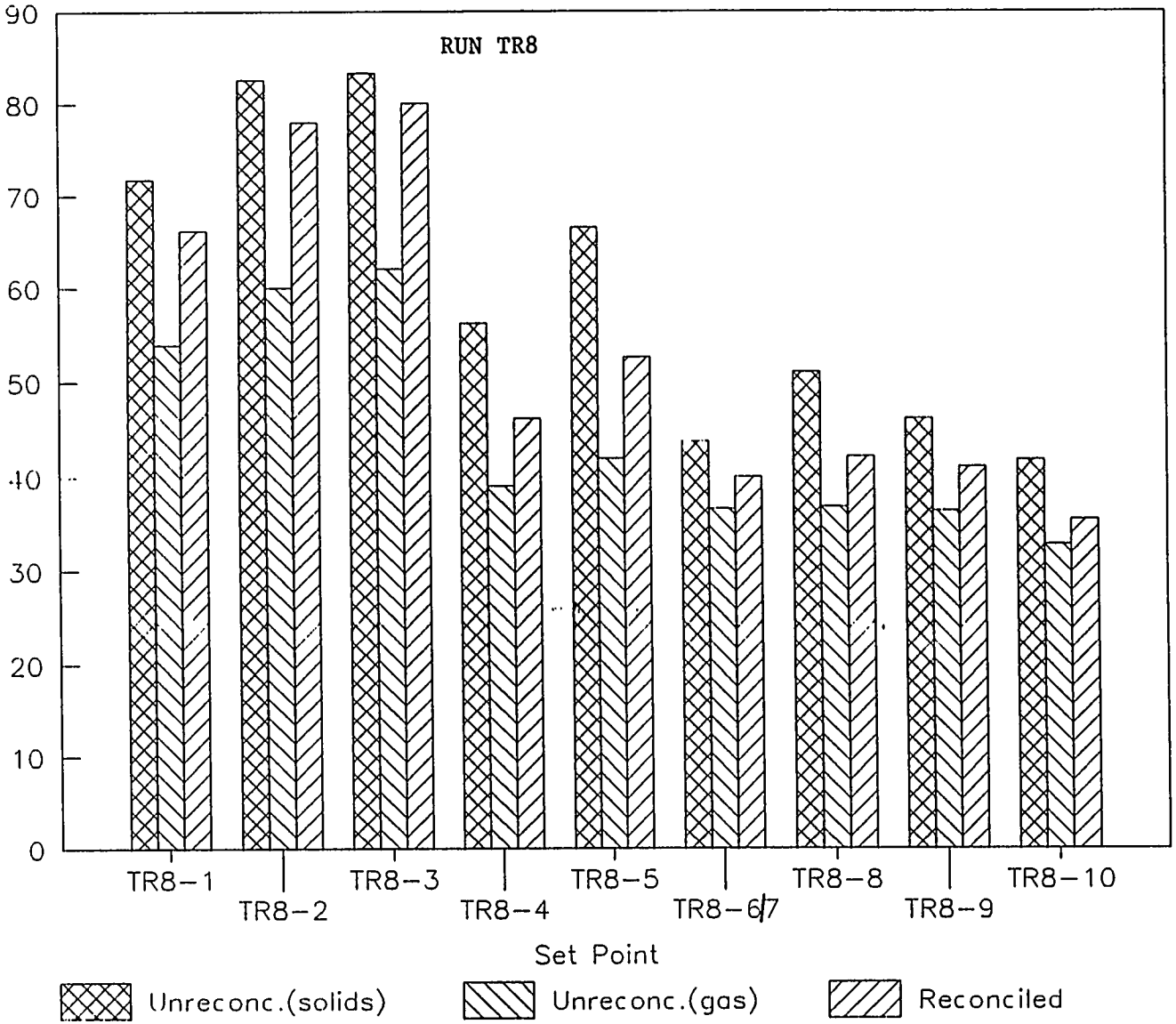

Figure 4.17. COMPARISON OF RECONCILED AND UNRECONCILED VALUES OF CARBON CONVERSION FOR TEST RUN TR8

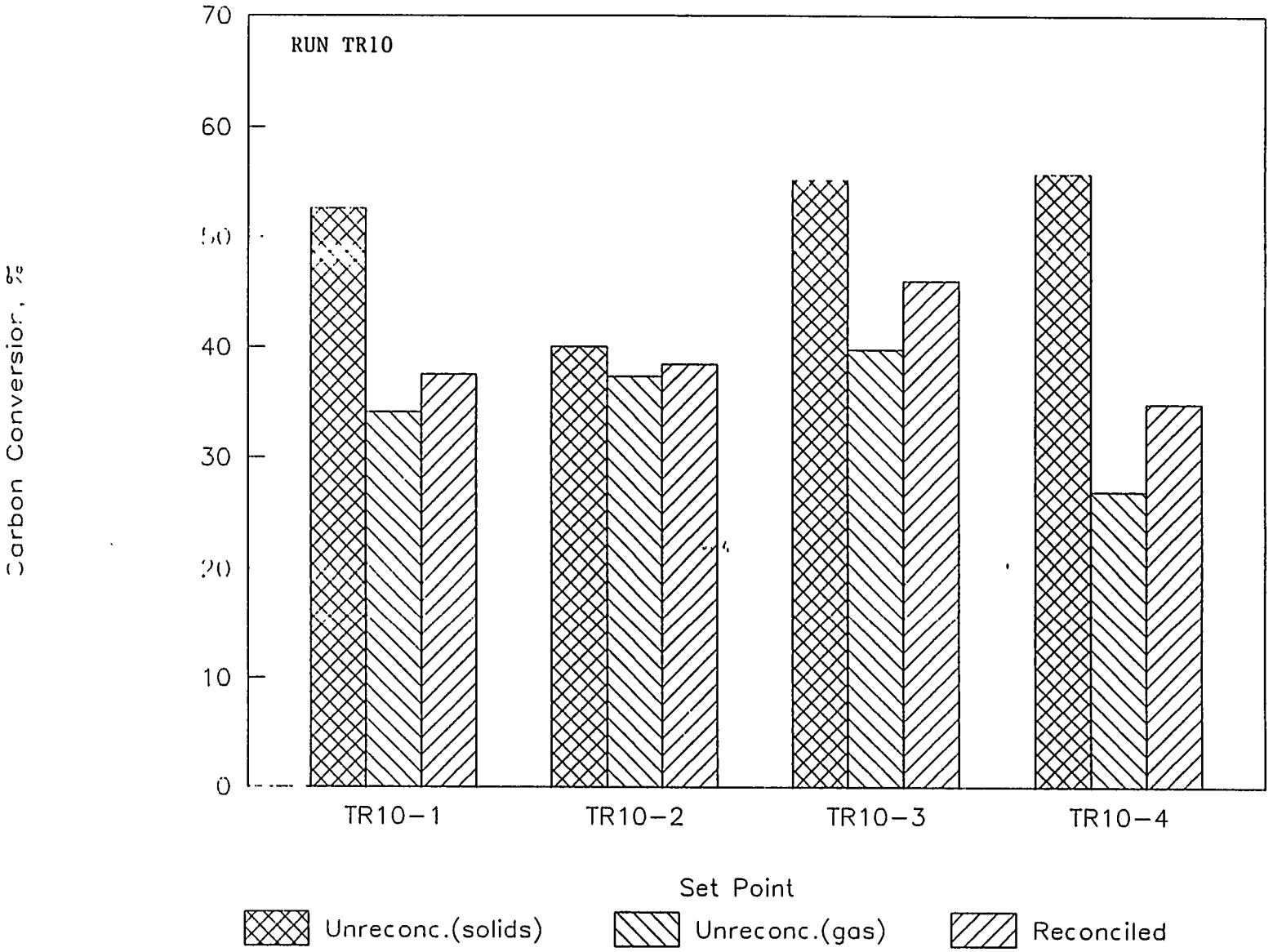

Figure 4.18. COMPARISON OF RECONCILED AND UNRECONCILED VALUES OF CARBON CONVERSION FOR TEST RUN TR10

5. CONCLUSIONS

During the period beginning November 1991 and ending September 1992, a series of tests were conducted in a fluidized-bed coal carbonizer to determine its performance characteristics. The carbonizer was operated for 533 hours in a jetting fluidized-bed configuration during which 36 set points (steady-state periods) were achieved. Testing was completed with four different fuels, namely, Pittsburgh No. 8 bituminous coal, Illinois No. 6 bituminous coal, Wyoming Eagle Butte subbituminous coal, and petroleum coke; a total of 83 tons of feedstock was consumed. In addition, an exploratory carbonizer test in a circulating fluidized-bed configuration entailing four set points and 9.9 tons of two different fuels (Pittsburgh No. 8 bituminous coal and petroleum coke) was completed. Sorbent (dolomite or limestone) was also fed to the carbonizer during each of the set points to capture sulfur. Throughout the program, the carbonizer operation was smooth and controlled. Feedstocks were switched "on the fly" from petroleum coke to subbituminous coal to bituminous coal, and from limestone to dolomite without causing any process upsets or problems.

At no point in the carbonizer test program were any tars or oil vapors found/condensed from the fuel gas. This is a very important finding, because their presence might jeopardize barrier filter operation by causing filter blinding and blocking. The high carbonizer operating temperature, relatively long in-bed gas residence time (approximately 6 to 10 seconds for the jetting fluidized-bed configuration), high pressure, exposure to lime-based sorbents, and method of coal/air feed (coal and air injected at the same point) destroy all tars and oil vapors in the bed. Furthermore, freeboard and demister gas sample analyses were in close agreement, indicating that no shifting in the gas composition was occurring in the downstream piping.

The carbonizer test program has been very successful. It has demonstrated that the carbonizer operation is smooth and controlled, emissions are lower than were previously estimated for a commercial plant, and the char/sorbent residue and fuel gas from the process appear compatible with particle-capturing ceramic barrier filters.

Extensive data were collected on the feed and product stream compositions, heating values, temperatures, and flow rates. With these data, elemental and energy balances were computed to evaluate and confirm accuracy of the data. The carbonizer data were not as self-consistent as could be desired (balance closure imperfection). A software package, called BALAID, has been developed by Science Ventures, Inc., of California which reconciles the data by applying conservation laws and other equality and inequality constraints. Adjustments are made to all the species flows, temperatures, and variable-species compositions, with the adjustments weighted according to the statistical variance of each variable. A maximum-likelihood set of reconciled values is computed in which all the elemental and energy balances close exactly. This approach takes advantage of all the available measurement information as well as information embodied in the conservation laws and in the estimated quality of the measurements. The program utilizes advanced principles in statistics, numerical techniques, and constrained nonlinear optimization theory. This program has been successfully applied to reconcile the carbonizer data.

6. REFERENCES

Albers, J. E., "Data Reconciliation with Unmeasured Variables," Hydrocarbon Processing, 73, No. 3, 65-66 (1994).

Goyal, A., and A. Rehmat, "Coal Test Program in a Pressurized, Fluidized-Bed Ash-Agglomeration Process Development Unit: Volume II - Data Analysis," Final Report to the Gas Research Institute, Contract No. 5084-221-1040, GRI-88/0197, Institute of Gas Technology, March 1989.

Kemeny, S., J. Manczinger, S. Skjold-Jorgensen, and K. Toth, "Reduction of Thermodynamic Data by Means of the Multiresponse Maximum Likelihood Principle, AIChE Journal, 28, No.1, 20-30 (1982).

Madron, F., V. Veverka, and V. Vanecek, "Statistical Analysis of Material Balance of a Chemical Reactor," AIChE Journal, 23, No. 4, 482-486 (1977).

Nogita, S., "Statistical Test and Adjustment of Process Data," Ind. Eng. Chem. Proc. Des. Develop., 11, No. 2, 197-200 (1972).

Phillips, A. G., and D. P. Harrison, "Gross Error Detection and Data Reconciliation in Experimental Kinetics," Ind. Eng. Chem. Res., 32, 2530-2536 (1993).

Rehmat, A., and A. Goyal, "Pressurized Fluidized-Bed Combustion (PFBC): Second Generation Systems Research and Development, Subtask: Carbonizer Model," Final Report to Foster Wheeler Development Corp., DOE Contract No. DE-AC21-86MC21023, Institute of Gas Technology, November 1987.

Robertson, A., W. Domeracki, R. Newby, A. Rehmat, and D. Horazak, "Second-Generation Pressurized Fluidized Bed Combustion Plant -Conceptual Design and Optimization of a Second-Generation PFB Combustion Plant," Foster Wheeler Development Corporation Phase 2 Annual Report (October 1, 1991-September 30, 1992), FWC/FWDC-TR-92/11 to the U.S. DOE under Contract DE-AC21-86MC21023, October (1992).

Robertson, A., R. Garland, R. Newby, J. Patel, and L. Rubow, "Second-Generation PFB Combustion Plant Performance and Economics," Paper presented at the 1988 Seminar on Fluidized-Bed Combustion Technology for Utility Applications, Palo Alto, CA, May 3-5, 1988.

APPENDIX A

UNRECONCILED MATERIAL AND ENERGY BALANCES

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A total of 36 set points (steady-state periods) were achieved while operating the carbonizer in a jetting fluidized-bed mode, and 4 set points were achieved while operating the carbonizer in a circulating fluidized-bed mode. Table A.1 summarizes the coal and sorbent types used, date, duration, pressure, and bed and freeboard temperatures for each of these steady-state periods. Table A.2 summarizes the minimum and maximum values of the bed temperature, pressure, coal feed rate, and sorbent feed rate by coal and sorbent type.

The unreconciled material and energy balances, along with various closures, for each of the steady-state periods are given in this appendix. The location of various nodes (referred in these Tables) is shown in Figure A.1.

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Table A.1. SUMMARY OF STEADY-STATE PERIODS FROM CARBONIZER PILOT PLANT OPERATION

Set Point	Coal Feed	Sorbent Feed	Date	Duration, hours	Pressure, psig	Bed Temp., °F	Freeboard Temp., °F
TR1-1	Pittsburgh No 8	Dolomite	11/20/91	0300-0700	152.6	1584	1553
TR1-2	Pittsburgh No 8	Dolomite	11/21/91	0200-0600	132.9	1681	1651
TR1-3	Pittsburgh No 8	Dolomite	11/21/91	1000-1400	144.7	1608	1581
TR1-4	Pittsburgh No 8	Dolomite	11/21/91	2100-2330	125.4	1482	1440
TR2-1	Pittsburgh No 8	Dolomite	12/19/91	0100-0500	139.8	1698	1652
TR2-2	Pittsburgh No 8	Dolomite	12/19/91	1300-1700	128.3	1598	1567
TR2-3	Pittsburgh No 8	Dolomite	12/20/91	0100-0500	138.1	1797	1705
TR2-4	Pittsburgh No 8	Dolomite	12/20/91	1000-1400	191.8	1784	1738
TR2-5	Pittsburgh No 8	Dolomite	12/20/91	1600-1800	198.6	1679	1675
TR4-1	Pittsburgh No 8	Dolomite	3/10/92	2030-0030	153.3	1663	1626
TR4-2	Pittsburgh No 8	Dolomite	3/11/92	0430-0830	155.9	1608	1573
TR4-3	Pittsburgh No 8	Dolomite	3/12/92	0230-0630	125.2	1708	1643
TR4-4	Pittsburgh No 8	Dolomite	3/12/92	1600-2000	129.1	1607	1568
TR4-5	Pittsburgh No 8	Dolomite	3/13/92	0530-0930	193.2	1720	1691
TR4-6	Pittsburgh No 8	Dolomite	3/13/92	1300-1700	175.8	1713	1681
TR4-7	Pittsburgh No 8	Dolomite	3/13/92	2200-0200	177.9	1601	1582
TR4-8	Pittsburgh No 8	Dolomite	3/14/92	0200-0600	182.2	1618	1600
TR5-1	Pittsburgh No 8	Dolomite	3/24/92	1100-1500	134.3	1693	1653
TR5-2	Pittsburgh No 8	Dolomite	3/24/92	1900-2300	154.8	1701	1662
TR5-3	Pittsburgh No 8	Limestone	3/25/92	0500-0900	147.4	1706	1667
TR6-1	Wyoming	Limestone	4/21/92	2100-0100	145.9	1580	1567
TR6-2	Wyoming	Limestone	4/22/92	0430-0830	129.8	1509	1500
TR6-3	Wyoming	Limestone	4/22/92	1400-1800	157.5	1511	1515
TR6-4	Wyoming	Limestone	4/22/92	2100-0100	191.9	1609	1579
TR6-5	Wyoming	Limestone	4/23/92	0400-0800	189.6	1632	1593
TR6-6	Illinois No 6	Limestone	4/23/92	1800-2200	143.5	1600	1573
TR6-7	Illinois No 6	Limestone	4/23/92	2300-0330	122.4	1599	1573
TR8-1	Wyoming	Limestone	6/10/92	2000-0100	128.6	1476	1432
TR8-2	Wyoming	Limestone	6/11/92	0300-0800	132.7	1593	1541
TR8-3	Wyoming	Limestone	6/11/92	1330-1730	156.5	1613	1575
TR8-4	Illinois No 6	Limestone	6/12/92	2100-0200	113.2	1652	1623
TR8-5	Illinois No 6	Limestone	6/13/92	0700-1100	160.6	1715	1680
TR8-6/7	Pittsburgh No 8	Dolomite	6/14/92	2100-0100	156.0	1699	1675
TR8-8	Pittsburgh No 8	Dolomite	6/16/92	0200-0600	143.5	1707	1683
TR8-9	Pittsburgh No 8	Dolomite	6/16/92	0800-1230	135.0	1713	1683
TR8-10	Pittsburgh No 8	Dolomite	6/16/92	1430-1930	126.5	1729	1697
TR10-1*	Pittsburgh No 8	Limestone	9/1/92	0200-0600	113.7	1675	1652
TR10-2*	Pittsburgh No 8	Limestone	9/1/92	1630-2100	68.7	1675	1618
TR10-3*	Pittsburgh No 8	Limestone	9/2/92	0000-0400	72.7	1706	1677
TR10-4*	Pittsburgh No 8	Limestone	9/2/92	0610-1240	55.9	1601	1571

*The carbonizer was operated in a circulating fluidized-bed mode during Test TR10.

Table A.2. SUMMARY OF STEADY-STATE PERIODS BY COAL AND SORBENT TYPE

	Coal	Sorbent	Total Set Points	Bed Temperature, °F		Pressure, psig		Coal Feed, lb/h		Sorbent Feed, lb/h	
				Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
A.	Jetting Fluidized-Bed Mode										
	Pittsburgh	Dolomite	23	1482	1797	125	199	182	508	40	182
	Illinois	Limestone	4	1599	1715	113	161	232	427	36	104
	Wyoming	Limestone	8	1476	1632	129	192	300	475	17	68
B.	Circulating Fluidized-Bed Mode										
	Pittsburgh	Limestone	4	1601	1706	56	114	232	525	25	143

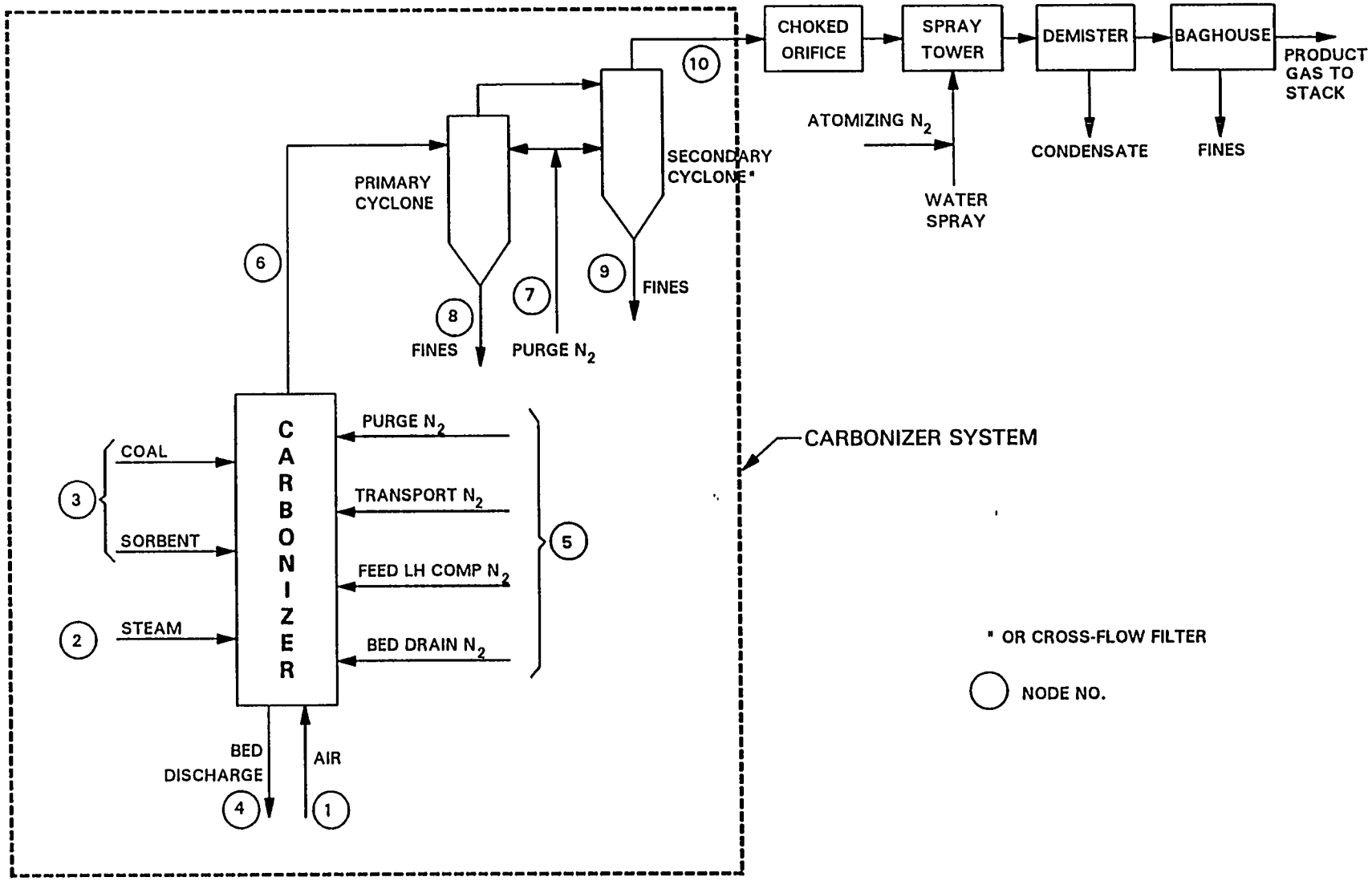

Figure A.1. NODE IDENTIFICATION FOR BALAID PROGRAM

Unreconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	3.69	.00	.00	.00	3.69
2	Methane	.00	.00	.00	.00	.00	14.05	.00	.00	.00	14.05
3	Ammonia	.00	.00	.00	.00	.00	1.35	.00	.00	.00	1.35
4	Water Vapor	.00	.00	.00	.00	.00	83.60	.00	.00	.00	83.60
5	Carbon Monoxide	.00	.00	.00	.00	.00	66.08	.00	.00	.00	66.08
6	Nitrogen	.00	.00	.00	.00	413.06	765.35	135.54	.00	.00	900.89
7	Air, dry	627.91	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	1.03	.00	.00	.00	1.03
9	Ethane	.00	.00	.00	.00	.00	.41	.00	.00	.00	.41
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.33	.00	.00	.00	.33
11	Argon	.00	.00	.00	.00	.00	5.96	.00	.00	.00	5.96
12	Carbon Dioxide	.00	.00	.00	.00	.00	131.34	.00	.00	.00	131.34
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	7.15	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	3.30	.00	2.01	.00	.34	1.68	.00
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	36.98	15.32	.00	19.65	.00	12.50	7.15	.00
18	Calcium Oxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	Calcium Sulfide	.00	.00	.43	7.75	.00	6.36	.00	4.11	2.24	.00
20	Calcium Carbonate	.00	.00	50.20	2.77	.00	2.92	.00	.01	2.92	.00
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	1.38	.37	.00	.32	.00	.16	.16	.00
23	Coal Ash	.00	.00	47.46	23.37	.00	33.27	.00	15.69	17.58	.00
24	Coal organic matter	.00	.00	274.40	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	21.53	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	45.40	.00	45.40	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	96.07	.00	.00	96.07	.00
28	BD char organic	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	TOTAL GAS FLOW	627.9	.0	.0	.0	413.1	1073.2	135.5	.0	.0	1208.7
	TOTAL MASS FLOW	627.9	.0	418.0	74.4	413.1	1279.2	135.5	78.2	127.8	1208.7

Node assignments

Index	Node Name	Temperature (Degrees F)
1	Feed Air	89.3
2	Steam to Carbonizer	100.0
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	96.3
5	N2 Purges to carbonizer	86.4
6	Freeboard gas	1505.3
7	N2 Purges to cyclones	86.4
8	Primary cyclone Drain	144.3
9	Secondary cyclone Drain	179.0
10	Dusty gas to orifice	1257.9

TR1 - TEST POINT 1 11/20/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.9	627.9	.00	.0	474.	145.6	.00	.00	8.098	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	0.	.0	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	3983.9	418.0	15.86	233.4	6.	72.2	10.66	10.63	.000	20.35	48.84
N2 Purges to carbonizer	1.0	413.1	.00	.0	413.	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.3	135.5	.00	.0	136.	.0	.00	.00	.000	.00	.00
Total Inflow	3987.1	1594.5	15.86	233.4	1029.	217.8	10.66	10.63	8.098	20.35	48.84

OUTFLOWS

Carbonizer Drain	301.4	74.4	.10	21.6	1.	11.4	6.41	5.24	.000	5.41	23.73
Primary cyclone Drain	637.8	78.2	.30	42.9	1.	7.3	3.81	4.71	.000	2.29	15.84
Secondary cyclone Drain	1369.6	127.8	.77	91.2	3.	6.1	3.07	3.75	.000	2.41	17.74
Dusty gas to orifice	1399.5	1208.7	17.06	75.9	902.	207.5	.00	.31	5.955	.00	.00
Heat Loss	200.0										
Total Outflow	3908.3	1489.1	18.23	231.7	906.	232.2	13.29	14.01	5.955	10.12	57.32
Loss	78.8	105.4	-2.37	1.7	123.	-14.4	-2.63	-3.37	2.143	10.23	-8.48
Percent Loss	2.0	6.6	-14.9	.7	11.9	-6.6	-24.6	-31.7	26.5	50.3	-17.4
Closure (out/in) %	98.0	93.4	114.9	99.3	88.1	106.6	124.6	131.7	73.5	49.7	117.4

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	3.49	.00	.00	.00	3.49
2	Methane		.00	.00	.00	.00	.00	6.82	.00	.00	.00	6.82
3	Ammonia		.00	.00	.00	.00	.00	1.05	.00	.00	.00	1.05
4	Water Vapor		.00	.00	.00	.00	.00	64.39	.00	.00	.00	64.39
5	Carbon Monoxide		.00	.00	.00	.00	.00	82.27	.00	.00	.00	82.27
6	Nitrogen		.00	.00	.00	.00	327.82	644.03	144.35	.00	.00	788.38
7	Air, dry		586.54	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.25	.00	.00	.00	.25
9	Ethane		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.42	.00	.00	.00	.42
11	Argon		.00	.00	.00	.00	.00	6.31	.00	.00	.00	6.31
12	Carbon Dioxide		.00	.00	.00	.00	.00	111.54	.00	.00	.00	111.54
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	5.10	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	5.55	.00	3.76	.00	2.10	1.66	.00
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	27.84	2.63	.00	1.67	.00	1.49	.18	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	Calcium Sulfide		.00	.00	.33	7.22	.00	3.12	.00	2.21	.91	.00
20	Calcium Carbonate		.00	.00	37.79	4.26	.00	5.37	.00	2.82	2.54	.00
21	Calcium Sulfate		.00	.00	.00	.45	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	1.04	.40	.00	.26	.00	.16	.10	.00
23	Coal Ash		.00	.00	33.90	10.79	.00	17.57	.00	10.81	6.76	.00
24	Coal organic matter		.00	.00	196.00	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	19.36	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	52.70	.00	52.70	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	30.95	.00	.00	30.95	.00
28	BD char organic		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	TOTAL GAS FLOW		586.5	.0	.0	.0	327.8	920.6	144.4	.0	.0	1064.9
	TOTAL MASS FLOW		586.5	.0	302.0	50.7	327.8	1036.0	144.4	72.3	43.1	1064.9

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	84.9
2	Steam to Carbonizer	300.0
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	112.2
5	N2 Purges to carbonizer	79.2
6	Freeboard gas	1590.8
7	N2 Purges to cyclones	79.2
8	Primary cyclone Drain	156.3
9	Secondary cyclone Drain	178.3
10	Dusty gas to orifice	1266.7

TR1 - TEST POINT 2 11/21/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.1	586.5	.00	.0	442.9	136.0	.000	.000	7.564	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.000	.000	.000	.00	.00
Coal & Sorbent Feeds	2843.4	302.0	11.33	167.1	4.4	53.3	8.026	7.603	.000	15.32	34.94
N2 Purges to carbonizer	.2	327.8	.00	.0	327.8	.0	.000	.000	.000	.00	.00
N2 Purges to cyclones	.1	144.4	.00	.0	144.4	.0	.000	.000	.000	.00	.00
Total Inflow	2844.7	1360.7	11.33	167.1	919.5	189.3	8.026	7.603	7.564	15.32	34.94

OUTFLOWS

Carbonizer Drain	279.7	50.7	.08	18.3	.4	6.0	4.105	4.787	.000	5.85	11.19
Primary cyclone Drain	752.4	72.3	.34	50.1	1.2	3.0	1.698	2.528	.000	2.36	10.97
Secondary cyclone Drain	441.3	43.1	.19	29.5	.7	2.0	1.052	1.281	.000	1.52	6.86
Dusty gas to orifice	1184.4	1064.9	12.66	71.0	789.2	185.3	.000	.394	6.307	.00	.00
Heat Loss	200.0										
Total Outflow	2857.8	1231.0	13.26	169.0	791.6	196.2	6.856	8.990	6.307	9.73	29.03
Loss	-13.1	129.7	-1.93	-1.9	127.9	-6.9	1.170	-1.387	1.258	5.58	5.91
Percent Loss	-.5	9.5	-17.0	-1.1	13.9	-3.6	14.6	-18.2	16.6	36.5	16.9
Closure (out/in) %	100.5	90.5	117.0	101.1	86.1	103.6	85.4	118.2	83.4	63.5	83.1

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Mass Flows, Pounds per hour

Index I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	4.00	.00	.00	.00	4.00
2	Methane	.00	.00	.00	.00	.00	15.25	.00	.00	.00	15.25
3	Ammonia	.00	.00	.00	.00	.00	1.32	.00	.00	.00	1.32
4	Water Vapor	.00	.00	.00	.00	.00	78.74	.00	.00	.00	78.74
5	Carbon Monoxide	.00	.00	.00	.00	.00	86.66	.00	.00	.00	86.66
6	Nitrogen	.00	.00	.00	.00	300.77	667.19	140.11	.00	.00	807.31
7	Air, dry	658.53	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	1.03	.00	.00	.00	1.03
9	Ethane	.00	.00	.00	.00	.00	.43	.00	.00	.00	.43
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.24	.00	.00	.00	.24
11	Argon	.00	.00	.00	.00	.00	6.88	.00	.00	.00	6.88
12	Carbon Dioxide	.00	.00	.00	.00	.00	144.37	.00	.00	.00	144.37
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	7.69	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	4.48	.00	2.10	.00	1.89	.21	.00
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	40.72	17.35	.00	4.52	.00	3.46	1.06	.00
18	Calcium Oxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	Calcium Sulfide	.00	.00	.48	8.37	.00	2.92	.00	2.50	.43	.00
20	Calcium Carbonate	.00	.00	55.28	6.66	.00	3.65	.00	3.20	.45	.00
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	1.52	.50	.00	.21	.00	.18	.03	.00
23	Coal Ash	.00	.00	51.07	23.93	.00	18.29	.00	15.15	3.13	.00
24	Coal organic matter	.00	.00	295.25	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	48.12	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	74.52	.00	74.52	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	18.69	.00	.00	18.69	.00
28	BD char organic	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	TOTAL GAS FLOW	658.5	.0	.0	.0	300.8	1006.1	140.1	.0	.0	1146.2
	TOTAL MASS FLOW	658.5	.0	452.0	109.4	300.8	1131.0	140.1	100.9	24.0	1146.2

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	81.6
2	Steam to Carbonizer	500.0
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	248.3
5	N2 Purges to carbonizer	82.3
6	Freeboard gas	1532.0
7	N2 Purges to cyclones	82.3
8	Primary cyclone Drain	151.0
9	Secondary cyclone Drain	173.9
10	Dusty gas to orifice	1269.2

TR1 - TEST POINT 3 11/21/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.7	658.5	.00	.0	497.3	152.7	.00	.00	8.493	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	4285.2	452.0	17.07	251.4	6.6	78.8	11.74	11.45	.000	22.40	52.59
N2 Purges to carbonizer	.4	300.8	.00	.0	300.8	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.2	140.1	.00	.0	140.1	.0	.00	.00	.000	.00	.00
Total Inflow	4286.5	1551.4	17.07	251.4	944.8	231.6	11.74	11.45	8.493	22.40	52.59

OUTFLOWS

Carbonizer Drain	679.7	109.4	.27	47.4	1.2	14.8	7.70	6.29	.000	7.32	24.43
Primary cyclone Drain	1058.2	100.9	.56	70.2	1.8	4.3	2.14	3.91	.000	2.67	15.34
Secondary cyclone Drain	269.3	24.0	.17	17.8	.5	.9	.43	.60	.000	.42	3.16
Dusty gas to orifice	1516.7	1146.2	17.13	89.2	808.4	224.4	.00	.22	6.878	.00	.00
Heat Loss	200.0										
Total Outflow	3723.9	1380.5	18.12	224.6	811.9	244.4	10.27	11.02	6.878	10.40	42.92
Loss	562.5	170.9	-1.06	26.8	132.9	-12.8	1.47	.43	1.615	12.00	9.66
Percent Loss	13.1	11.0	-6.2	10.6	14.1	-5.5	12.5	3.7	19.0	53.6	18.4
Closure (out/in) %	86.9	89.0	106.2	89.4	85.9	105.5	87.5	96.3	81.0	46.4	81.6

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	4.16	.00	.00	.00	4.16
2	Methane	.00	.00	.00	.00	.00	17.94	.00	.00	.00	17.94
3	Ammonia	.00	.00	.00	.00	.00	.97	.00	.00	.00	.97
4	Water Vapor	.00	.00	.00	.00	.00	91.95	.00	.00	.00	91.95
5	Carbon Monoxide	.00	.00	.00	.00	.00	57.82	.00	.00	.00	57.82
6	Nitrogen	.00	.00	.00	.00	194.87	569.05	144.87	.00	.00	713.92
7	Air, dry	559.78	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	1.96	.00	.00	.00	1.96
9	Ethane	.00	.00	.00	.00	.00	3.17	.00	.00	.00	3.17
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.29	.00	.00	.00	.29
11	Argon	.00	.00	.00	.00	.00	5.78	.00	.00	.00	5.78
12	Carbon Dioxide	.00	.00	.00	.00	.00	132.11	.00	.00	.00	132.11
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	8.58	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	11.33	.00	11.33	.00	7.10	4.23	.00
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	40.31	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	2.22	.00	3.25	.00	1.61	1.64	.00
19	Calcium Sulfide	.00	.00	.47	5.38	.00	3.83	.00	2.59	1.24	.00
20	Calcium Carbonate	.00	.00	54.72	16.00	.00	16.48	.00	10.77	5.71	.00
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	1.51	.75	.00	.75	.00	.47	.28	.00
23	Coal Ash	.00	.00	56.98	1.02	.00	14.92	.00	6.82	8.10	.00
24	Coal organic matter	.00	.00	329.44	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	51.29	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	68.25	.00	68.25	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	72.49	.00	.00	72.49	.00
28	BD char organic	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	TOTAL GAS FLOW	559.8	.0	.0	.0	194.9	885.2	144.9	.0	.0	1030.1
	TOTAL MASS FLOW	559.8	.0	492.0	88.0	194.9	1076.5	144.9	97.6	93.7	1030.1

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	79.2
2	Steam to Carbonizer	300.0
3	Coal & Sorbent Feeds	80.0
4	Carbonizer Drain	1800.7
5	N2 Purges to carbonizer	82.7
6	Freeboard gas	1393.7
7	N2 Purges to cyclones	82.7
8	Primary cyclone Drain	1857.0
9	Secondary cyclone Drain	1850.6
10	Dusty gas to orifice	1183.4

TR1 - TEST POINT 4 11/21/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.3	559.8	.00	.0	422.7	129.8	.00	.00	7.219	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	4789.8	492.0	19.04	278.9	7.3	81.7	11.62	12.75	.000	22.17	58.49
N2 Purges to carbonizer	.3	194.9	.00	.0	194.9	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.2	144.9	.00	.0	144.9	.0	.00	.00	.000	.00	.00
Total Inflow	4790.6	1391.5	19.04	278.9	769.8	211.5	11.62	12.75	7.219	22.17	58.49

OUTFLOWS

Carbonizer Drain	745.8	88.0	.28	49.8	1.4	12.8	6.83	4.16	.000	10.99	1.77
Primary cyclone Drain	1009.7	97.6	.53	64.9	1.8	8.4	4.28	3.44	.000	6.90	7.29
Secondary cyclone Drain	1082.5	93.7	.63	68.6	1.9	4.9	2.55	2.64	.000	4.15	8.38
Dusty gas to orifice	1493.1	1030.1	20.07	78.5	714.7	210.7	.00	.27	5.778	.00	.00
Heat Loss	200.0										
Total Outflow	4531.1	1309.4	21.50	261.8	719.8	236.9	13.67	10.52	5.778	22.04	17.44
Loss	259.5	82.1	-2.46	17.2	50.0	-25.4	-2.05	2.22	1.441	.13	41.05
Percent Loss	5.4	5.9	-12.9	6.2	6.5	-12.0	-17.6	17.4	20.0	.6	70.2
Closure (out/in) %	94.6	94.1	112.9	93.8	93.5	112.0	117.6	82.6	80.0	99.4	29.8

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	2.85	.00	.00	.00	2.85
2	Methane		.00	.00	.00	.00	.00	9.55	.00	.00	.00	9.55
3	Ammonia		.00	.00	.00	.00	.00	.36	.00	.00	.00	.36
4	Water Vapor		.00	.00	.00	.00	.00	60.08	.00	.00	.00	60.08
5	Carbon Monoxide		.00	.00	.00	.00	.00	101.56	.00	.00	.00	101.56
6	Nitrogen		.00	.00	.00	.00	388.72	717.68	54.59	.00	.00	772.27
7	Air, dry		716.66	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.13	.00	.00	.00	.13
9	Ethane		.00	.00	.00	.00	.00	.07	.00	.00	.00	.07
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	2.43	.00	.00	.00	2.43
11	Argon		.00	.00	.00	.00	.00	7.58	.00	.00	.00	7.58
12	Carbon Dioxide		.00	.00	.00	.00	.00	152.21	.00	.00	.00	152.21
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	5.35	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	8.95	.00	7.03	.00	6.44	.35	.24
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	51.66	.49	.00	4.49	.00	4.24	.10	.14
18	Calcium Oxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	Calcium Sulfide		.00	.00	.41	5.05	.00	5.71	.00	5.45	.20	.06
20	Calcium Carbonate		.00	.00	65.04	9.49	.00	9.06	.00	8.06	.47	.53
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.89	.22	.00	.23	.00	.21	.01	.01
23	Coal Ash		.00	.00	29.14	18.81	.00	17.79	.00	16.42	.33	.44
24	Coal organic matter		.00	.00	199.52	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	22.69	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	56.71	.00	56.71	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	1.95	.00	.00	1.95	.00
28	BD char organic		.00	.00	.00	.00	.00	3.58	.00	.00	.00	3.58
	TOTAL GAS FLOW		716.7	.0	.0	.0	388.7	1054.5	54.6	.0	.0	1109.1
	TOTAL MASS FLOW		716.7	.0	352.0	65.7	388.7	1161.0	54.6	97.5	4.0	1114.1

Node assignments

Index I	Node Name	Temperature (Degrees F)
1	Feed Air	75.1
2	Steam to Carbonizer	.0
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	157.1
5	N2 Purges to carbonizer	91.9
6	Freeboard gas	1605.5
7	N2 Purges to cyclones	91.9
8	Primary cyclone Drain	161.5
9	Secondary cyclone Drain	171.3
10	Dusty gas to orifice	1322.7

TR2 - TEST POINT 1 12/19/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	-.3	716.7	.00	.0	541.2	166.2	.00	.00	9.243	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	2856.2	352.0	11.33	174.7	4.5	79.5	14.89	10.73	.000	26.28	30.03
N2 Purges to carbonizer	1.4	388.7	.00	.0	388.7	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.2	54.6	.00	.0	54.6	.0	.00	.00	.000	.00	.00
Total Inflow	2857.5	1512.0	11.33	174.7	989.0	245.7	14.89	10.73	9.243	26.28	30.03

OUTFLOWS

Carbonizer Drain	333.5	65.7	.19	22.5	.6	8.4	5.54	3.01	.000	6.61	19.03
Primary cyclone Drain	837.4	97.5	.37	55.2	1.6	8.8	5.10	3.62	.000	6.25	16.63
Secondary cyclone Drain	29.4	4.0	.01	1.9	.1	.4	.24	.14	.000	.30	.94
Dusty gas to orifice	1380.4	1114.1	12.25	95.9	772.7	222.5	.19	2.37	7.578	.25	.44
Heat Loss	200.0										
Total Outflow	2780.7	1281.3	12.73	175.4	774.8	240.1	11.07	9.15	7.578	13.41	37.05
Loss	76.8	230.6	-1.39	-.7	214.2	5.6	3.82	1.58	1.664	12.87	-7.03
Percent Loss	2.7	15.3	-12.3	-.4	21.7	2.3	25.6	14.7	18.0	49.0	-23.4
Closure (out/in) %	97.3	84.7	112.3	100.4	78.3	97.7	74.4	85.3	82.0	51.0	123.4

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Mass Flows, Pounds per hour

Index I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	3.33	.00	.00	.00	3.33
2	Methane	.00	.00	.00	.00	.00	16.33	.00	.00	.00	16.33
3	Ammonia	.00	.00	.00	.00	.00	1.17	.00	.00	.00	1.17
4	Water Vapor	.00	.00	.00	.00	.00	76.40	.00	.00	.00	76.40
5	Carbon Monoxide	.00	.00	.00	.00	.00	70.22	.00	.00	.00	70.22
6	Nitrogen	.00	.00	.00	.00	390.28	658.28	54.40	.00	.00	712.68
7	Air, dry	609.53	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	1.91	.00	.00	.00	1.91
9	Ethane	.00	.00	.00	.00	.00	8.78	.00	.00	.00	8.78
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.81	.00	.00	.00	.81
11	Argon	.00	.00	.00	.00	.00	6.79	.00	.00	.00	6.79
12	Carbon Dioxide	.00	.00	.00	.00	.00	133.12	.00	.00	.00	133.12
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	7.20	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	3.78	.00	1.76	.00	1.26	.23	.27
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	41.15	8.78	.00	2.75	.00	2.49	.12	.15
18	Calcium Oxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	Calcium Sulfide	.00	.00	.33	7.75	.00	2.33	.00	1.97	.18	.18
20	Calcium Carbonate	.00	.00	51.81	4.01	.00	2.73	.00	2.05	.29	.39
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.71	.20	.00	.08	.00	.06	.01	.01
23	Coal Ash	.00	.00	39.22	28.50	.00	13.68	.00	11.13	1.12	1.42
24	Coal organic matter	.00	.00	268.58	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	98.23	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	53.81	.00	53.81	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	5.10	.00	.00	5.10	.00
28	BD char organic	.00	.00	.00	.00	.00	9.47	.00	.00	.00	9.47
	TOTAL GAS FLOW	609.5	.0	.0	.0	390.3	977.1	54.4	.0	.0	1031.5
	TOTAL MASS FLOW	609.5	.0	409.0	151.3	390.3	1068.8	54.4	72.8	7.1	1043.4

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	81.8
2	Steam to Carbonizer	.0
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	300.1
5	N2 Purges to carbonizer	98.4
6	Freeboard gas	1504.1
7	N2 Purges to cyclones	98.4
8	Primary cyclone Drain	155.5
9	Secondary cyclone Drain	170.3
10	Dusty gas to orifice	1255.0

TR2 - TEST POINT 2 12/19/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.7	609.5	.00	.0	460.3	141.4	.00	.00	7.861	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	3889.1	409.0	15.26	226.9	6.1	73.7	11.86	14.34	.000	20.93	39.93
N2 Purges to carbonizer	2.1	390.3	.00	.0	390.3	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.3	54.4	.00	.0	54.4	.0	.00	.00	.000	.00	.00
Total Inflow	3892.2	1463.2	15.26	226.9	911.0	215.1	11.86	14.34	7.861	20.93	39.93

OUTFLOWS

Carbonizer Drain	1450.7	151.3	.62	93.7	2.4	8.4	4.81	6.70	.000	5.92	28.70
Primary cyclone Drain	814.7	72.8	.49	50.8	1.5	2.9	1.48	2.48	.000	1.92	11.20
Secondary cyclone Drain	75.6	7.1	.05	4.9	.1	.3	.18	.19	.000	.22	1.13
Dusty gas to orifice	1743.3	1043.4	18.43	96.3	713.9	205.1	.20	1.02	6.792	.25	1.43
Heat Loss	200.0										
Total Outflow	4284.3	1274.5	19.59	245.7	717.9	216.8	6.67	10.39	6.792	8.30	42.46
Loss	-392.1	188.7	-4.33	-18.8	193.2	-1.6	5.19	3.95	1.069	12.63	-2.53
Percent Loss	-10.1	12.9	-28.4	-8.3	21.2	-.8	43.8	27.5	13.6	60.3	-6.3
Closure (out/in) %	110.1	87.1	128.4	108.3	78.8	100.8	56.2	72.5	86.4	39.7	106.3

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	2.21	.00	.00	.00	2.21
2	Methane		.00	.00	.00	.00	.00	4.34	.00	.00	.00	4.34
3	Ammonia		.00	.00	.00	.00	.00	.57	.00	.00	.00	.57
4	Water Vapor		.00	.00	.00	.00	.00	49.67	.00	.00	.00	49.67
5	Carbon Monoxide		.00	.00	.00	.00	.00	101.69	.00	.00	.00	101.69
6	Nitrogen		.00	.00	.00	.00	382.89	751.39	52.34	.00	.00	803.73
7	Air, dry		696.69	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	Ethane		.00	.00	.00	.00	.00	.14	.00	.00	.00	.14
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.69	.00	.00	.00	.69
11	Argon		.00	.00	.00	.00	.00	7.75	.00	.00	.00	7.75
12	Carbon Dioxide		.00	.00	.00	.00	.00	129.14	.00	.00	.00	129.14
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	4.16	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	4.12	.00	7.94	.00	7.35	.20	.39
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	36.34	2.97	.00	1.09	.00	1.08	.01	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	.08	.00	.00	.00	.08
19	Calcium Sulfide		.00	.00	.29	5.71	.00	4.94	.00	4.75	.08	.11
20	Calcium Carbonate		.00	.00	45.75	1.61	.00	8.26	.00	7.46	.29	.50
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.62	.13	.00	.21	.00	.19	.01	.01
23	Coal Ash		.00	.00	22.66	9.05	.00	16.45	.00	14.51	.68	1.26
24	Coal organic matter		.00	.00	155.18	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	5.71	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	35.11	.00	35.11	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	1.87	.00	.00	1.87	.00
28	BD char organic		.00	.00	.00	.00	.00	5.86	.00	.00	.00	5.86
	TOTAL GAS FLOW		696.7	.0	.0	.0	382.9	1047.6	52.3	.0	.0	1099.9
	TOTAL MASS FLOW		696.7	.0	265.0	29.3	382.9	1129.4	52.3	70.5	3.1	1108.2

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	80.2
2	Steam to Carbonizer	.0
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	98.6
5	N2 Purges to carbonizer	102.1
6	Freeboard gas	1629.4
7	N2 Purges to cyclones	102.1
8	Primary cyclone Drain	154.6
9	Secondary cyclone Drain	170.1
10	Dusty gas to orifice	1323.7

TR2 - TEST POINT 3 12/20/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.5	696.7	.000	.0	526.1	161.6	.00	.000	8.985	.00	.00
Steam to Carbonizer	.0	.0	.000	.0	.0	.0	.00	.000	.000	.00	.00
Coal & Sorbent Feeds	2227.5	265.0	8.814	134.8	3.5	57.3	10.47	8.330	.000	18.48	23.29
N2 Purges to carbonizer	2.4	382.9	.000	.0	382.9	.0	.00	.000	.000	.00	.00
N2 Purges to cyclones	.3	52.3	.000	.0	52.3	.0	.00	.000	.000	.00	.00
Total Inflow	2230.7	1396.9	8.814	134.8	964.9	218.9	10.47	8.330	8.985	18.48	23.29

OUTFLOWS

Carbonizer Drain	88.3	29.3	.053	5.6	.2	4.1	3.34	3.042	.000	3.82	9.18
Primary cyclone Drain	518.2	70.5	.162	34.1	.9	7.1	4.75	3.141	.000	5.63	14.70
Secondary cyclone Drain	28.0	3.1	.014	1.8	.0	.2	.12	.078	.000	.16	.69
Dusty gas to orifice	1218.5	1108.2	9.127	87.8	804.3	196.5	.23	.790	7.752	.32	1.27
Heat Loss	200.0										
Total Outflow	2053.0	1211.0	9.355	129.3	805.4	207.9	8.45	7.051	7.752	9.93	25.83
Loss	177.7	185.9	-.541	5.5	159.4	11.0	2.03	1.279	1.233	8.56	-2.54
Percent Loss	8.0	13.3	-6.1	4.1	16.5	5.0	19.4	15.4	13.7	46.3	-10.9
Closure (out/in) %	92.0	86.7	106.1	95.9	83.5	95.0	80.6	84.6	86.3	53.7	110.9

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	5.43	.00	.00	.00	5.43
2	Methane	.00	.00	.00	.00	.00	16.10	.00	.00	.00	16.10
3	Ammonia	.00	.00	.00	.00	.00	2.80	.00	.00	.00	2.80
4	Water Vapor	.00	.00	.00	.00	.00	62.24	.00	.00	.00	62.24
5	Carbon Monoxide	.00	.00	.00	.00	.00	169.66	.00	.00	.00	169.66
6	Nitrogen	.00	.00	.00	.00	389.73	941.83	40.23	.00	.00	982.06
7	Air, dry	984.55	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.04	.00	.00	.00	.04
9	Ethane	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.19	.00	.00	.00	.19
11	Argon	.00	.00	.00	.00	.00	10.97	.00	.00	.00	10.97
12	Carbon Dioxide	.00	.00	.00	.00	.00	171.77	.00	.00	.00	171.77
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	8.59	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	9.02	.00	3.62	.00	2.68	.14	.80
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	43.34	11.55	.00	5.42	.00	4.86	.00	.55
18	Calcium Oxide	.00	.00	.00	.00	.00	.01	.00	.00	.01	.00
19	Calcium Sulfide	.00	.00	.35	16.58	.00	5.69	.00	4.76	.05	.88
20	Calcium Carbonate	.00	.00	54.57	2.28	.00	3.72	.00	2.70	.17	.85
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.75	.34	.00	.16	.00	.13	.00	.03
23	Coal Ash	.00	.00	46.82	35.55	.00	17.85	.00	14.35	.50	3.00
24	Coal organic matter	.00	.00	320.59	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	60.79	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	52.92	.00	52.92	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	1.71	.00	.00	1.71	.00
28	BD char organic	.00	.00	.00	.00	.00	12.71	.00	.00	.00	12.71
	TOTAL GAS FLOW	984.6	.0	.0	.0	389.7	1381.0	40.2	.0	.0	1421.3
	TOTAL MASS FLOW	984.6	.0	475.0	136.1	389.7	1484.8	40.2	82.4	2.6	1440.1

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	82.4
2	Steam to Carbonizer	.0
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	294.9
5	N2 Purges to carbonizer	106.7
6	Freeboard gas	1669.1
7	N2 Purges to cyclones	106.7
8	Primary cyclone Drain	154.7
9	Secondary cyclone Drain	170.8
10	Dusty gas to orifice	1436.8

TR2 - TEST POINT 4 12/20/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.3	984.6	.00	.0	744.	228.3	.00	.00	12.70	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	0.	.0	.00	.00	.00	.00	.00
Coal & Sorbent Feeds	4651.2	475.0	18.21	269.1	7.	81.2	12.49	17.10	.00	22.05	47.56
N2 Purges to carbonizer	2.9	389.7	.00	.0	390.	.0	.00	.00	.00	.00	.00
N2 Purges to cyclones	.3	40.2	.00	.0	40.	.0	.00	.00	.00	.00	.00
Total Inflow	4655.7	1889.5	18.21	269.1	1181.	309.6	12.49	17.10	12.70	22.05	47.56

OUTFLOWS

Carbonizer Drain	940.8	136.1	.19	58.7	1.	11.2	8.77	9.76	.00	10.13	35.89
Primary cyclone Drain	803.5	82.4	.32	51.2	1.	5.1	3.02	3.26	.00	3.73	14.48
Secondary cyclone Drain	25.2	2.6	.01	1.7	0.	.1	.09	.05	.00	.10	.50
Dusty gas to orifice	2309.6	1440.1	17.04	144.0	985.	278.1	.64	.80	10.97	.83	3.02
Heat Loss	200.0										
Total Outflow	4279.1	1661.2	17.56	255.6	987.	294.6	12.51	13.87	10.97	14.79	53.90
Loss	376.6	228.3	.65	13.5	193.	15.0	-.02	3.22	1.72	7.26	-6.33
Percent Loss	8.1	12.1	3.6	5.0	16.4	4.8	-.2	18.9	13.6	32.9	-13.3
Closure (out/in) %	91.9	87.9	96.4	95.0	83.6	95.2	100.2	81.1	86.4	67.1	113.3

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	4.49	.00	.00	.00	4.49
2	Methane		.00	.00	.00	.00	.00	23.94	.00	.00	.00	23.94
3	Ammonia		.00	.00	.00	.00	.00	3.08	.00	.00	.00	3.08
4	Water Vapor		.00	.00	.00	.00	.00	91.50	.00	.00	.00	91.50
5	Carbon Monoxide		.00	.00	.00	.00	.00	156.10	.00	.00	.00	156.10
6	Nitrogen		.00	.00	.00	.00	412.00	949.84	36.85	.00	.00	986.69
7	Air, dry		979.90	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.36	.00	.00	.00	.36
9	Ethane		.00	.00	.00	.00	.00	.45	.00	.00	.00	.45
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.38	.00	.00	.00	.38
11	Argon		.00	.00	.00	.00	.00	11.14	.00	.00	.00	11.14
12	Carbon Dioxide		.00	.00	.00	.00	.00	206.29	.00	.00	.00	206.29
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	11.61	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	5.99	.00	5.62	.00	4.83	.29	.51
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	70.04	8.02	.00	8.51	.00	7.96	.12	.42
18	Calcium Oxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	Calcium Sulfide		.00	.00	.56	8.37	.00	7.73	.00	6.88	.21	.63
20	Calcium Carbonate		.00	.00	88.19	6.20	.00	7.34	.00	6.57	.34	.43
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	1.20	.24	.00	.24	.00	.22	.01	.02
23	Coal Ash		.00	.00	63.26	27.80	.00	23.12	.00	19.98	.96	2.17
24	Coal organic matter		.00	.00	433.14	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	108.56	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	87.64	.00	87.64	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	3.77	.00	.00	3.77	.00
28	BD char organic		.00	.00	.00	.00	.00	10.33	.00	.00	.00	10.33
	TOTAL GAS FLOW		979.9	.0	.0	.0	412.0	1447.6	36.9	.0	.0	1484.4
	TOTAL MASS FLOW		979.9	.0	668.0	165.2	412.0	1601.9	36.9	134.1	5.7	1498.9

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	83.8
2	Steam to Carbonizer	.0
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	366.7
5	N2 Purges to carbonizer	113.9
6	Freeboard gas	1589.8
7	N2 Purges to cyclones	113.9
8	Primary cyclone Drain	165.7
9	Secondary cyclone Drain	172.1
10	Dusty gas to orifice	1400.0

TR2 - TEST POINT 5 12/20/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.6	979.9	.00	.0	740.	227.3	.00	.00	12.64	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	0.	.0	.00	.00	.00	.00	.00
Coal & Sorbent Feeds	6266.2	668.0	24.60	367.0	10.	123.2	20.19	23.14	.00	35.63	64.46
N2 Purges to carbonizer	3.8	412.0	.00	.0	412.	.0	.00	.00	.00	.00	.00
N2 Purges to cyclones	.3	36.9	.00	.0	37.	.0	.00	.00	.00	.00	.00
Total Inflow	6271.9	2096.8	24.60	367.0	1199.	350.5	20.19	23.14	12.64	35.63	64.46

OUTFLOWS

Carbonizer Drain	1607.9	165.2	.56	104.3	3.	9.9	5.93	6.57	.00	7.13	28.04
Primary cyclone Drain	1306.4	134.1	.62	85.1	2.	9.6	5.21	4.58	.00	6.46	20.20
Secondary cyclone Drain	56.2	5.7	.03	3.6	0.	.3	.21	.17	.00	.26	.97
Dusty gas to orifice	2409.8	1498.9	21.54	151.8	989.	321.1	.43	.76	11.14	.52	2.19
Heat Loss	200.0										
Total Outflow	5580.3	1803.9	22.74	344.9	995.	340.9	11.77	12.08	11.14	14.37	51.40
Loss	691.6	292.8	1.86	22.1	204.	9.6	8.42	11.05	1.50	21.26	13.06
Percent Loss	11.0	14.0	7.6	6.0	17.0	2.7	41.7	47.8	11.8	59.7	20.3
Closure (out/in) %	89.0	86.0	92.4	94.0	83.0	97.3	58.3	52.2	88.2	40.3	79.7

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	3.95	.00	.00	.00	3.95
2	Methane		.00	.00	.00	.00	.00	9.03	.00	.00	.00	9.03
3	Ammonia		.00	.00	.00	.00	.00	1.96	.00	.00	.00	1.96
4	Water Vapor		.00	49.77	.00	.00	.00	93.35	.00	.00	.00	93.35
5	Carbon Monoxide		.00	.00	.00	.00	.00	81.69	.00	.00	.00	81.69
6	Nitrogen		.00	.00	.00	.00	308.55	794.44	33.34	.00	.00	827.78
7	Air, dry		683.99	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.14	.00	.00	.00	.14
9	Ethane		.00	.00	.00	.00	.00	.07	.00	.00	.00	.07
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.21	.00	.00	.00	.21
11	Argon		.00	.00	.00	.00	.00	7.68	.00	.00	.00	7.68
12	Carbon Dioxide		.00	.00	.00	.00	.00	162.94	.00	.00	.00	162.94
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	5.39	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	10.35	.00	8.09	.00	6.68	.43	.97
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	44.44	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	1.88	.00	2.06	.00	1.28	.13	.65
19	Calcium Sulfide		.00	.00	.37	5.75	.00	3.51	.00	3.03	.15	.33
20	Calcium Carbonate		.00	.00	52.16	13.29	.00	9.20	.00	8.23	.36	.61
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.63	.30	.00	.21	.00	.18	.01	.03
23	Coal Ash		.00	.00	28.95	12.02	.00	10.20	.00	8.30	.52	1.38
24	Coal organic matter		.00	.00	224.66	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	15.79	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	38.79	.00	38.79	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	2.18	.00	.00	2.18	.00
28	BD char organic		.00	.00	.00	.00	.00	11.18	.00	.00	.00	11.18
	TOTAL GAS FLOW		684.0	49.8	.0	.0	308.5	1155.5	33.3	.0	.0	1188.8
	TOTAL MASS FLOW		684.0	49.8	356.6	59.4	308.5	1240.9	33.3	66.5	3.8	1204.0

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	78.4
2	Steam to Carbonizer	387.8
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	98.5
5	N2 Purges to carbonizer	146.8
6	Freeboard gas	1582.9
7	N2 Purges to cyclones	146.8
8	Primary cyclone Drain	168.4
9	Secondary cyclone Drain	181.6
10	Dusty gas to orifice	1325.7

TR4 - TEST POINT 1 03/10/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.2	684.0	.00	.0	516.5	158.6	.00	.000	8.821	.00	.00
Steam to Carbonizer	59.3	49.8	5.57	.0	.0	44.2	.00	.000	.000	.00	.00
Coal & Sorbent Feeds	3241.5	356.6	12.71	197.9	4.9	68.7	12.81	8.856	.000	21.09	29.58
N2 Purges to carbonizer	5.3	308.5	.00	.0	308.5	.0	.00	.000	.000	.00	.00
N2 Purges to cyclones	.6	33.3	.00	.0	33.3	.0	.00	.000	.000	.00	.00
Total Inflow	3307.0	1432.3	18.28	197.9	863.3	271.6	12.81	8.856	8.821	21.09	29.58

OUTFLOWS

Carbonizer Drain	225.9	59.4	.07	16.2	.4	11.0	6.24	3.294	.000	9.86	12.31
Primary cyclone Drain	577.1	66.5	.25	37.7	.9	7.0	4.03	2.252	.000	5.89	8.48
Secondary cyclone Drain	32.5	3.8	.01	2.1	.1	.4	.26	.110	.000	.32	.52
Dusty gas to orifice	1541.7	1204.0	17.16	97.0	829.7	248.9	.59	.602	7.680	.89	1.41
Heat Loss	200.0										
Total Outflow	2577.1	1333.6	17.49	153.0	831.1	267.3	11.12	6.257	7.680	16.97	22.72
Loss	729.9	98.7	.80	44.9	32.2	4.3	1.70	2.598	1.141	4.12	6.86
Percent Loss	22.1	6.9	4.4	22.7	3.7	1.6	13.2	29.3	12.9	19.6	23.2
Closure (out/in) %	77.9	93.1	95.6	77.3	96.3	98.4	86.8	70.7	87.1	80.4	76.8

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	5.08	.00	.00	.00	5.08
2	Methane		.00	.00	.00	.00	.00	12.51	.00	.00	.00	12.51
3	Ammonia		.00	.00	.00	.00	.00	2.76	.00	.00	.00	2.76
4	Water Vapor		.00	117.93	.00	.00	.00	179.48	.00	.00	.00	179.48
5	Carbon Monoxide		.00	.00	.00	.00	.00	56.63	.00	.00	.00	56.63
6	Nitrogen		.00	.00	.00	.00	293.00	712.52	33.74	.00	.00	746.27
7	Air, dry		656.04	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.42	.00	.00	.00	.42
9	Ethane		.00	.00	.00	.00	.00	.31	.00	.00	.00	.31
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	1.46	.00	.00	.00	1.46
11	Argon		.00	.00	.00	.00	.00	7.25	.00	.00	.00	7.25
12	Carbon Dioxide		.00	.00	.00	.00	.00	178.31	.00	.00	.00	178.31
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	6.18	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	13.26	.00	6.06	.00	5.28	.29	.49
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	40.98	9.61	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	.74	.00	.26	.11	.37
19	Calcium Sulfide		.00	.00	.34	15.62	.00	3.51	.00	3.20	.15	.17
20	Calcium Carbonate		.00	.00	48.10	16.88	.00	7.86	.00	7.31	.29	.26
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.58	.46	.00	.17	.00	.15	.01	.01
23	Coal Ash		.00	.00	33.20	12.99	.00	11.82	.00	11.48	.63	.71
24	Coal organic matter		.00	.00	257.62	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	13.35	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	54.71	.00	54.71	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	2.62	.00	.00	2.62	.00
28	BD char organic		.00	.00	.00	.00	.00	5.71	.00	.00	.00	5.71
	TOTAL GAS FLOW		656.0	117.9	.0	.0	293.0	1156.7	33.7	.0	.0	1190.5
	TOTAL MASS FLOW		656.0	117.9	387.0	82.2	293.0	1249.9	33.7	81.4	4.1	1198.2

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	78.9
2	Steam to Carbonizer	394.4
3	Coal & Scrbent Feeds	60.0
4	Carbonizer Drain	214.4
5	N2 Purges to carbonizer	115.6
6	Freeboard gas	1530.6
7	N2 Purges to cyclones	115.6
8	Primary cyclone Drain	163.1
9	Secondary cyclone Drain	185.5
10	Dusty gas to orifice	1292.2

TR4 - TEST POINT 2 03/11/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.3	656.0	.00	.0	495.4	152.2	.00	.00	8.461	.00	.00
Steam to Carbonizer	141.0	117.9	13.20	.0	.0	104.7	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	3732.0	387.0	14.58	224.1	5.6	67.5	11.81	10.12	.000	13.45	33.78
N2 Purges to carbonizer	2.8	293.0	.00	.0	293.0	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.3	33.7	.00	.0	33.7	.0	.00	.00	.000	.00	.00
Total Inflow	3876.4	1487.7	27.78	224.1	827.8	324.4	11.81	10.12	8.461	13.45	33.78

OUTFLOWS

Carbonizer Drain	186.0	82.2	.10	15.3	.3	18.8	10.76	7.96	.000	15.44	13.45
Primary cyclone Drain	833.4	81.4	.46	51.8	1.3	5.7	3.18	3.40	.000	4.89	10.62
Secondary cyclone Drain	40.4	4.1	.02	2.5	.1	.3	.18	.13	.000	.27	.64
Dusty gas to orifice	1634.5	1198.2	29.07	88.3	748.7	321.8	.30	1.57	7.250	.47	.72
Heat Loss	200.0										
Total Outflow	2894.2	1365.9	29.66	157.9	750.4	346.6	14.42	13.06	7.250	21.07	25.44
Loss	982.1	121.9	-1.88	66.2	77.4	-22.2	-2.61	-2.94	1.210	-1.62	8.35
Percent Loss	25.3	8.2	-6.8	29.5	9.3	-6.8	-22.1	-29.0	14.3	-8.3	24.7
Closure (out/in) %	74.7	91.8	106.8	70.5	90.7	106.8	122.1	129.0	85.7	108.3	75.3

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	4.71	.00	.00	.00	4.71
2	Methane	.00	.00	.00	.00	.00	5.30	.00	.00	.00	5.30
3	Ammonia	.00	.00	.00	.00	.00	.69	.00	.00	.00	.69
4	Water Vapor	.00	95.95	.00	.00	.00	149.86	.00	.00	.00	149.86
5	Carbon Monoxide	.00	.00	.00	.00	.00	69.48	.00	.00	.00	69.48
6	Nitrogen	.00	.00	.00	.00	129.84	548.47	37.03	.00	.00	585.50
7	Air, dry	625.51	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.03	.00	.00	.00	.03
9	Ethane	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.21	.00	.00	00	.21
11	Argon	.00	.00	.00	.00	.00	6.73	.00	.00	.00	6.73
12	Carbon Dioxide	.00	.00	.00	.00	.00	149.13	.00	.00	.00	149.13
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	4.31	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	12.98	.00	6.79	.00	5.92	.55	.32
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	39.16	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	5.81	.00	3.96	.00	3.34	.40	.21
19	Calcium Sulfide	.00	.00	.33	7.99	.00	1.60	.00	1.39	.17	.04
20	Calcium Carbonate	.00	.00	45.96	8.57	.00	6.68	.00	5.82	.55	.31
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.56	.36	.00	.19	.00	.16	.02	.01
23	Coal Ash	.00	.00	23.14	17.67	.00	8.25	.00	6.62	1.08	.56
24	Coal organic matter	.00	.00	179.55	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	11.98	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	54.04	.00	54.04	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	3.75	.00	.00	3.75	.00
28	BD char organic	.00	.00	.00	.00	.00	3.23	.00	.00	.00	3.23
	TOTAL GAS FLOW	625.5	96.0	.0	.0	129.8	934.6	37.0	.0	.0	971.6
	TOTAL MASS FLOW	625.5	96.0	293.0	65.4	129.8	1023.1	37.0	77.3	6.5	976.3

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	81.2
2	Steam to Carbonizer	393.9
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	279.8
5	N2 Purges to carbonizer	93.1
6	Freeboard gas	1590.8
7	N2 Purges to cyclones	93.1
8	Primary cyclone Drain	163.0
9	Secondary cyclone Drain	188.1
10	Dusty gas to orifice	1310.6

TR4 - TEST POINT 3 03/12/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.6	625.5	.00	.0	472.4	145.1	.00	.000	8.067	.00	.00
Steam to Carbonizer	114.7	96.0	10.74	.0	.0	85.2	.00	.000	.000	.00	.00
Coal & Sorbent Feeds	2585.3	293.0	10.16	159.2	3.9	59.1	11.29	7.091	.000	18.58	23.70
N2 Purges to carbonizer	.5	129.8	.00	.0	129.8	.0	.00	.000	.000	.00	.00
N2 Purges to cyclones	.1	37.0	.00	.0	37.0	.0	.00	.000	.000	.00	.00
Total Inflow	2701.2	1181.3	20.90	159.2	643.2	289.3	11.29	7.091	8.067	18.58	23.70

OUTFLOWS

Carbonizer Drain	174.8	65.4	.18	12.0	.3	10.9	7.83	4.133	.000	12.02	18.03
Primary cyclone Drain	794.1	77.3	.34	52.4	1.4	6.1	3.57	1.255	.000	5.49	6.78
Secondary cyclone Drain	55.3	6.5	.02	3.7	.1	.6	.33	.118	.000	.60	1.09
Dusty gas to orifice	1306.5	976.3	22.98	77.6	586.2	281.5	.19	.265	6.726	.30	.57
Heat Loss	200.0										
Total Outflow	2530.6	1125.5	23.52	145.6	587.9	299.1	11.92	5.771	6.726	18.42	26.48
Loss	170.6	55.9	-2.62	13.6	55.3	-9.8	-.63	1.320	1.341	.17	-2.78
Percent Loss	6.3	4.7	-12.6	8.5	8.6	-3.4	-5.6	18.6	16.6	.9	-11.7
Closure (out/in) %	93.7	95.3	112.6	91.5	91.4	103.4	105.6	81.4	83.4	99.1	111.7

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	4.46	.00	.00	.00	4.46
2	Methane	.00	.00	.00	.00	.00	10.01	.00	.00	.00	10.01
3	Ammonia	.00	.00	.00	.00	.00	1.32	.00	.00	.00	1.32
4	Water Vapor	.00	77.39	.00	.00	.00	139.59	.00	.00	.00	139.59
5	Carbon Monoxide	.00	.00	.00	.00	.00	51.63	.00	.00	.00	51.63
6	Nitrogen	.00	.00	.00	.00	251.75	612.47	37.30	.00	.00	649.77
7	Air, dry	564.67	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.63	.00	.00	.00	.63
9	Ethane	.00	.00	.00	.00	.00	.28	.00	.00	.00	.28
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.49	.00	.00	.00	.49
11	Argon	.00	.00	.00	.00	.00	6.08	.00	.00	.00	6.08
12	Carbon Dioxide	.00	.00	.00	.00	.00	150.36	.00	.00	.00	150.36
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	5.27	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	21.44	.00	2.99	.00	2.09	.42	.48
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	43.26	6.47	.00	1.52	.00	1.39	.00	.13
18	Calcium Oxide	.00	.00	.00	.00	.00	.20	.00	.00	.20	.00
19	Calcium Sulfide	.00	.00	.36	4.65	.00	1.96	.00	1.52	.18	.26
20	Calcium Carbonate	.00	.00	50.77	11.39	.00	5.27	.00	3.92	.35	.99
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.62	.21	.00	.10	.00	.07	.01	.02
23	Coal Ash	.00	.00	28.28	7.85	.00	9.51	.00	6.50	.78	2.23
24	Coal organic matter	.00	.00	219.45	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	33.55	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	34.29	.00	34.29	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	3.41	.00	.00	3.41	.00
28	BD char organic	.00	.00	.00	.00	.00	12.39	.00	.00	.00	12.39
	TOTAL GAS FLOW	564.7	77.4	.0	.0	251.8	977.3	37.3	.0	.0	1014.6
	TOTAL MASS FLOW	564.7	77.4	348.0	85.6	251.8	1048.9	37.3	49.8	5.4	1031.1

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	77.4
2	Steam to Carbonizer	394.6
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	136.8
5	N2 Purges to carbonizer	101.8
6	Freeboard gas	1523.8
7	N2 Purges to cyclones	101.8
8	Primary cyclone Drain	154.6
9	Secondary cyclone Drain	182.5
10	Dusty gas to orifice	1268.5

TR4 - TEST POINT 4 03/12/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.1	564.7	.00	.0	426.4	131.0	.00	.000	7.282	.00	.00
Steam to Carbonizer	92.5	77.4	8.66	.0	.0	68.7	.00	.000	.000	.00	.00
Coal & Sorbent Feeds	3166.7	348.0	12.42	193.3	4.8	67.0	12.47	8.650	.000	20.53	28.90
N2 Purges to carbonizer	1.5	251.8	.00	.0	251.8	.0	.00	.000	.000	.00	.00
N2 Purges to cyclones	.2	37.3	.00	.0	37.3	.0	.00	.000	.000	.00	.00
Total Inflow	3261.0	1279.1	21.08	193.3	720.3	266.7	12.47	8.650	7.282	20.53	28.90

OUTFLOWS

Carbonizer Drain	458.6	85.6	.20	33.7	.9	17.7	14.79	3.131	.000	7.15	8.06
Primary cyclone Drain	513.6	49.8	.29	33.2	.9	3.5	1.66	1.263	.000	2.41	6.57
Secondary cyclone Drain	51.5	5.4	.02	3.3	.1	.4	.25	.125	.000	.38	.79
Dusty gas to orifice	1483.4	1031.1	23.12	83.3	651.2	263.5	.33	.777	6.084	.54	2.25
Heat Loss	200.0										
Total Outflow	2707.1	1171.8	23.63	153.5	653.0	285.1	17.04	5.296	6.084	10.49	17.68
Loss	553.9	107.3	-2.55	39.7	67.3	-18.4	-4.57	3.353	1.199	10.04	11.22
Percent Loss	17.0	8.4	-12.1	20.6	9.3	-6.9	-36.6	38.8	16.5	48.9	38.8
Closure (out/in) %	83.0	91.6	112.1	79.4	90.7	106.9	136.6	61.2	83.5	51.1	61.2

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	8.60	.00	.00	.00	8.60
2	Methane	.00	.00	.00	.00	.00	12.34	.00	.00	.00	12.34
3	Ammonia	.00	.00	.00	.00	.00	1.51	.00	.00	.00	1.51
4	Water Vapor	.00	140.77	.00	.00	.00	174.83	.00	.00	.00	174.83
5	Carbon Monoxide	.00	.00	.00	.00	.00	125.60	.00	.00	.00	125.60
6	Nitrogen	.00	.00	.00	.00	170.41	795.82	27.43	.00	.00	823.26
7	Air, dry	899.89	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	Ethane	.00	.00	.00	.00	.00	.21	.00	.00	.00	.21
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.12	.00	.00	.00	.12
11	Argon	.00	.00	.00	.00	.00	9.99	.00	.00	.00	9.99
12	Carbon Dioxide	.00	.00	.00	.00	.00	241.67	.00	.00	.00	241.67
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	7.70	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	27.59	.00	3.93	.00	3.56	.11	.26
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	48.27	.00	.00	.95	.00	.36	.00	.59
18	Calcium Oxide	.00	.00	.00	13.51	.00	.03	.00	.00	.03	.00
19	Calcium Sulfide	.00	.00	.40	17.39	.00	2.86	.00	2.37	.04	.45
20	Calcium Carbonate	.00	.00	56.65	18.04	.00	5.49	.00	4.61	.13	.74
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.69	.80	.00	.11	.00	.09	.00	.02
23	Coal Ash	.00	.00	41.36	.76	.00	19.40	.00	14.85	.81	3.74
24	Coal organic matter	.00	.00	320.94	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	19.13	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	58.71	.00	58.71	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	2.09	.00	.00	2.09	.00
28	BD char organic	.00	.00	.00	.00	.00	17.34	.00	.00	.00	17.34
	TOTAL GAS FLOW	899.9	140.8	.0	.0	170.4	1370.7	27.4	.0	.0	1398.1
	TOTAL MAS:								84.6	3.2	1421.2

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	78.1
2	Steam to Carbonizer	394.1
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	140.5
5	N2 Purges to carbonizer	99.4
6	Freeboard gas	1637.7
7	N2 Purges to cyclones	99.4
8	Primary cyclone Drain	161.0
9	Secondary cyclone Drain	190.4
10	Dusty gas to orifice	1428.9

TR4 - TEST POINT 5 03/13/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.2	899.9	.00	.0	679.6	208.7	.00	.00	11.61	.00	.00
Steam to Carbonizer	168.2	140.8	15.75	.0	.0	125.0	.00	.00	.00	.00	.00
Coal & Sorbent Feeds	4653.4	476.0	18.16	278.4	7.0	81.0	13.91	12.59	.00	22.91	42.05
N2 Purges to carbonizer	.9	170.4	.00	.0	170.4	.0	.00	.00	.00	.00	.00
N2 Purges to cyclones	.2	27.4	.00	.0	27.4	.0	.00	.00	.00	.00	.00
Total Inflow	4823.0	1714.5	33.92	278.4	884.5	414.7	13.91	12.59	11.61	22.91	42.05

OUTFLOWS

Carbonizer Drain	293.5	97.2	.18	20.1	.5	23.5	16.64	8.21	.00	26.54	1.55
Primary cyclone Drain	874.5	84.6	.37	56.5	1.5	3.8	2.25	1.95	.00	3.16	14.94
Secondary cyclone Drain	30.2	3.2	.01	2.0	.0	.1	.07	.04	.00	.09	.82
Dusty gas to orifice	2434.7	1421.2	31.70	145.9	825.0	403.5	.33	.59	9.99	.55	3.75
Heat Loss	200.0										
Total Outflow	3832.9	1606.2	32.26	224.5	827.1	430.9	19.28	10.79	9.99	30.35	21.06
Loss	990.1	108.3	1.65	53.9	57.4	-16.2	-5.37	1.80	1.62	-7.44	20.99
Percent Loss	20.5	6.3	4.9	19.4	6.5	-3.9	-38.6	14.3	13.9	-32.5	49.9
Closure (out/in) %	79.5	93.7	95.1	80.6	93.5	103.9	138.6	85.7	86.1	132.5	50.1

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	6.97	.00	.00	.00	6.97
2	Methane		.00	.00	.00	.00	.00	15.64	.00	.00	.00	15.64
3	Ammonia		.00	.00	.00	.00	.00	.91	.00	.00	.00	.91
4	Water Vapor		.00	84.80	.00	.00	.00	145.09	.00	.00	.00	145.09
5	Carbon Monoxide		.00	.00	.00	.00	.00	114.33	.00	.00	.00	114.33
6	Nitrogen		.00	.00	.00	.00	164.67	751.92	38.79	.00	.00	790.71
7	Air, dry		820.12	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.03	.00	.00	.00	.03
9	Ethane		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.14	.00	.00	.00	.14
11	Argon		.00	.00	.00	.00	.00	9.52	.00	.00	.00	9.52
12	Carbon Dioxide		.00	.00	.00	.00	.00	211.63	.00	.00	.00	211.63
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	8.25	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	29.53	.00	3.57	.00	2.51	.27	.79
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	48.27	.00	.00	.86	.00	.86	.00	.00
18	Calcium Oxide		.00	.00	.00	18.49	.00	.76	.00	.00	.27	.49
19	Calcium Sulfide		.00	.00	.40	16.43	.00	3.17	.00	2.64	.07	.46
20	Calcium Carbonate		.00	.00	56.65	15.83	.00	4.54	.00	3.72	.13	.69
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.69	.86	.00	.12	.00	.09	.01	.03
23	Coal Ash		.00	.00	44.27	-.88	.00	15.98	.00	12.74	.73	2.52
24	Coal organic matter		.00	.00	343.49	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	32.11	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	48.67	.00	48.67	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	2.77	.00	.00	2.77	.00
28	BD char organic		.00	.00	.00	.00	.00	13.92	.00	.00	.00	13.92
	TOTAL GAS FLOW		820.1	84.8	.0	.0	164.7	1256.2	38.8	[illegible]	.0	1295.0
	TOTAL MASS FLOW		820.1	84.8	502.0	112.4	164.7	1350.6	38.8	71.2	4.3	1313.9

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	81.6
2	Steam to Carbonizer	394.7
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	291.0
5	N2 Purges to carbonizer	102.5
6	Freeboard gas	1601.7
7	N2 Purges to cyclones	102.5
8	Primary cyclone Drain	155.6
9	Secondary cyclone Drain	182.3
10	Dusty gas to orifice	1408.5

TR4 - TEST POINT 6 03/13/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.9	820.1	.00	.0	619.3	190.2	.00	.00	10.58	.00	.00
Steam to Carbonizer	101.4	84.8	9.49	.0	.0	75.3	.00	.00	.00	.00	.00
Coal & Sorbent Feeds	4985.5	502.0	19.44	297.0	7.5	82.8	13.91	13.47	.00	22.91	44.95
N2 Purges to carbonizer	1.0	164.7	.00	.0	164.7	.0	.00	.00	.00	.00	.00
N2 Purges to cyclones	.2	38.8	.00	.0	38.8	.0	.00	.00	.00	.00	.00
Total Inflow	5089.0	1610.4	28.93	297.0	830.3	348.3	13.91	13.47	10.58	22.91	44.95

OUTFLOWS

Carbonizer Drain	485.7	112.4	.20	32.5	.7	24.6	17.81	7.94	.00	28.68	-.02
Primary cyclone Drain	738.0	71.2	.30	46.7	1.3	3.3	1.76	2.10	.00	2.96	12.83
Secondary cyclone Drain	39.9	4.3	.02	2.7	.1	.2	.17	.06	.00	.28	.73
Dusty gas to orifice	2209.0	1313.9	27.42	131.9	791.8	348.8	.47	.52	9.52	.88	2.54
Heat Loss	200.0										
Total Outflow	3672.6	1501.7	27.95	213.7	793.9	376.9	20.21	10.62	9.52	32.80	16.09
Loss	1416.5	108.7	.98	83.3	36.5	-28.6	-6.30	2.85	1.05	-9.90	28.87
Percent Loss	27.8	6.7	3.4	28.0	4.4	-8.2	-45.2	21.1	9.9	-43.2	64.2
Closure (out/in) %	72.2	93.3	96.6	72.0	95.6	108.2	145.2	78.9	90.1	143.2	35.8

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	5.75	.00	.00	.00	5.75
2	Methane		.00	.00	.00	.00	.00	17.61	.00	.00	.00	17.61
3	Ammonia		.00	.00	.00	.00	.00	1.38	.00	.00	.00	1.38
4	Water Vapor		.00	50.77	.00	.00	.00	137.15	.00	.00	.00	137.15
5	Carbon Monoxide		.00	.00	.00	.00	.00	86.94	.00	.00	.00	86.94
6	Nitrogen		.00	.00	.00	.00	302.06	845.32	37.47	.00	.00	882.79
7	Air, dry		772.67	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.71	.00	.00	.00	.71
9	Ethane		.00	.00	.00	.00	.00	.51	.00	.00	.00	.51
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.50	.00	.00	.00	.50
11	Argon		.00	.00	.00	.00	.00	9.31	.00	.00	.00	9.31
12	Carbon Dioxide		.00	.00	.00	.00	.00	200.16	.00	.00	.00	200.16
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	9.37	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	16.48	.00	8.37	.00	6.78	1.17	.43
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	82.88	4.60	.00	.82	.00	.00	.66	.16
18	Calcium Oxide		.00	.00	.00	.00	.00	1.20	.00	1.20	.00	.00
19	Calcium Sulfide		.00	.00	.69	8.47	.00	4.58	.00	3.34	.85	.40
20	Calcium Carbonate		.00	.00	97.26	33.21	.00	13.74	.00	10.35	2.70	.69
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	1.18	.54	.00	.27	.00	.21	.05	.01
23	Coal Ash		.00	.00	50.30	38.12	.00	9.33	.00	4.68	2.18	2.47
24	Coal organic matter		.00	.00	390.33	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	94.44	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	38.03	.00	38.03	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	17.97	.00	.00	17.97	.00
28	BD char organic		.00	.00	.00	.00	.00	12.68	.00	.00	.00	12.68
	TOTAL GAS FLOW		772.7	50.8	.0	.0	302.1	1305.3	37.5	.0	.0	1342.8
	TOTAL MASS FLOW		772.7	50.8	632.0	195.9	302.1	1412.3	37.5	64.6	25.6	1359.7

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	82.3
2	Steam to Carbonizer	394.6
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	386.8
5	N2 Purges to carbonizer	115.5
6	Freeboard gas	1547.1
7	N2 Purges to cyclones	115.5
8	Primary cyclone Drain	151.7
9	Secondary cyclone Drain	176.1
10	Dusty gas to crifice	1347.0

TR4 - TEST POINT 7 03/13/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.0	772.7	.00	.0	583.5	179.2	.00	.00	9.965	.00	.00
Steam to Carbonizer	60.7	50.8	5.68	.0	.0	45.1	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	5623.5	632.0	22.09	345.4	8.6	125.8	23.89	15.41	.000	39.33	51.48
N2 Purges to carbonizer	2.9	302.1	.00	.0	302.1	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.4	37.5	.00	.0	37.5	.0	.00	.00	.000	.00	.00
Total Inflow	5688.4	1795.0	27.77	345.4	931.6	350.1	23.89	15.41	9.965	39.33	51.48

OUTFLOWS

Carbonizer Drain	1363.0	195.9	.59	92.4	2.3	25.1	11.27	7.52	.000	18.01	38.66
Primary cyclone Drain	565.3	64.6	.29	36.5	1.0	8.0	4.09	2.92	.000	6.86	4.89
Secondary cyclone Drain	268.6	25.6	.15	17.3	.6	2.1	.89	.74	.000	1.55	2.23
Dusty gas to orifice	2052.0	1359.7	26.11	118.3	884.2	317.6	.31	.85	9.309	.50	2.48
Heat Loss	200.0										
Total Outflow	4448.8	1645.7	27.13	264.5	888.2	352.8	16.55	12.04	9.309	26.91	48.26
Loss	1239.6	149.3	.64	81.0	43.4	-2.7	7.34	3.37	.656	12.42	3.23
Percent Loss	21.8	8.3	2.3	23.4	4.7	-.8	30.7	21.9	6.6	31.6	6.3
Closure (out/in) %	78.2	91.7	97.7	76.6	95.3	100.8	69.3	78.1	93.4	68.4	93.7

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	6.33	.00	.00	.00	6.33
2	Methane		.00	.00	.00	.00	.00	18.67	.00	.00	.00	18.67
3	Ammonia		.00	.00	.00	.00	.00	1.22	.00	.00	.00	1.22
4	Water Vapor		.00	39.99	.00	.00	.00	136.90	.00	.00	.00	136.90
5	Carbon Monoxide		.00	.00	.00	.00	.00	77.53	.00	.00	.00	77.53
6	Nitrogen		.00	.00	.00	.00	303.25	861.09	35.88	.00	.00	896.97
7	Air, dry		750.89	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.43	.00	.00	.00	.43
9	Ethane		.00	.00	.00	.00	.00	.31	.00	.00	.00	.31
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	1.65	.00	.00	.00	1.65
11	Argon		.00	.00	.00	.00	.00	9.48	.00	.00	.00	9.48
12	Carbon Dioxide		.00	.00	.00	.00	.00	214.45	.00	.00	.00	214.45
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	7.04	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	15.45	.00	3.61	.00	2.46	.18	.98
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	68.30	1.52	.00	2.40	.00	2.35	.05	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	.33	.00	.00	.00	.33
19	Calcium Sulfide		.00	.00	.57	5.97	.00	3.01	.00	2.44	.09	.47
20	Calcium Carbonate		.00	.00	80.16	31.90	.00	5.89	.00	4.51	.36	1.03
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.97	.48	.00	.13	.00	.09	.01	.03
23	Coal Ash		.00	.00	37.78	24.90	.00	15.50	.00	13.52	.29	1.70
24	Coal organic matter		.00	.00	293.18	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	89.02	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	65.18	.00	65.18	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	2.33	.00	.00	2.33	.00
28	BD char organic		.00	.00	.00	.00	.00	13.47	.00	.00	.00	13.47
	TOTAL GAS FLOW		750.9	40.0	.0	.0	303.3	1328.1	35.9	.0	.0	1363.9
	TOTAL MASS FLOW		750.9	40.0	488.0	169.3	303.3	1439.9	35.9	90.6	3.3	1381.9

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	82.2
2	Steam to Carbonizer	395.0
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	339.4
5	N2 Purges to carbonizer	125.0
6	Freeboard gas	1559.2
7	N2 Purges to cyclones	125.0
8	Primary cyclone Drain	162.4
9	Secondary cyclone Drain	187.9
10	Dusty gas to orifice	1366.9

TR4 - TEST POINT 8 03/14/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.9	750.9	.00	.0	567.1	174.2	.00	.00	9.684	.00	.00
Steam to Carbonizer	47.8	40.0	4.48	.0	.0	35.5	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	4214.9	488.0	16.59	261.2	6.4	101.4	19.69	11.59	.000	32.42	38.76
N2 Purges to carbonizer	3.6	303.3	.00	.0	303.3	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.4	35.9	.00	.0	35.9	.0	.00	.00	.000	.00	.00
Total Inflow	4267.7	1618.0	21.07	261.2	912.6	311.0	19.69	11.59	9.684	32.42	38.76

OUTFLOWS

Carbonizer Drain	1284.3	169.3	.46	87.4	2.1	22.3	9.76	5.75	.000	16.09	25.38
Primary cyclone Drain	958.3	90.6	.50	62.6	1.5	4.5	2.16	2.54	.000	3.16	13.61
Secondary cyclone Drain	35.0	3.3	.02	2.3	.1	.3	.12	.08	.000	.20	.29
Dusty gas to orifice	2097.6	1381.9	26.90	119.3	898.3	322.8	.59	2.00	9.478	.91	1.72
Heat Loss	200.0										
Total Outflow	4575.2	1645.0	27.88	271.6	901.9	349.8	12.63	10.38	9.478	20.36	41.01
Loss	-307.5	-27.0	-6.82	-10.4	10.7	-38.8	7.06	1.22	.206	12.06	-2.26
Percent Loss	-7.2	-1.7	-32.4	-4.0	1.2	-12.5	35.9	10.5	2.1	37.2	-5.8
Closure (out/in) %	107.2	101.7	132.4	104.0	98.8	112.5	64.1	89.5	97.9	62.8	105.8

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	5.72	.00	.00	.00	5.72
2	Methane	.00	.00	.00	.00	.00	6.24	.00	.00	.00	6.24
3	Ammonia	.00	.00	.00	.00	.00	1.75	.00	.00	.00	1.75
4	Water Vapor	.00	90.07	.00	.00	.00	125.90	.00	.00	.00	125.90
5	Carbon Monoxide	.00	.00	.00	.00	.00	77.01	.00	.00	.00	77.01
6	Nitrogen	.00	.00	.00	.00	204.50	626.38	33.13	.00	.00	659.51
7	Air, dry	605.53	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.03	.00	.00	.00	.03
9	Ethane	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	1.84	.00	.00	.00	1.84
11	Argon	.00	.00	.00	.00	.00	7.19	.00	.00	.00	7.19
12	Carbon Dioxide	.00	.00	.00	.00	.00	148.72	.00	.00	.00	148.72
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	3.29	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	8.82	.00	1.51	.00	1.13	.17	.21
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	20.94	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	3.88	.00	.32	.00	.18	.04	.10
19	Calcium Sulfide	.00	.00	.28	2.20	.00	.87	.00	.76	.04	.06
20	Calcium Carbonate	.00	.00	38.54	10.27	.00	2.29	.00	1.62	.36	.31
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.24	.13	.00	.03	.00	.02	.00	.00
23	Coal Ash	.00	.00	24.09	6.03	.00	8.59	.00	7.55	.49	.55
24	Coal organic matter	.00	.00	201.63	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	14.00	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	29.00	.00	29.00	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	2.49	.00	.00	2.49	.00
28	BD char organic	.00	.00	.00	.00	.00	5.40	.00	.00	.00	5.40
	TOTAL GAS FLOW	605.5	90.1	.0	.0	204.5	1000.8	33.1	.0	.0	1933.9
	TOTAL MASS FLOW	605.5	90.1	289.0	45.3	204.5	1051.3	33.1	40.3	3.8	1040.5

Node assignments

Index J	Node Name	Temperature Degrees F)
1	Feed Air	82.8
2	Steam to Carbonizer	387.6
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	103.4
5	N2 Purges to carbonizer	107.4
6	Freeboard gas	1610.2
7	N2 Purges to cyclones	107.4
8	Primary cyclone Drain	143.0
9	Secondary cyclone Drain	190.1
10	Dusty gas to orifice	1323.6

TR5 - TEST POINT 1 3/24/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.8	605.5	.00	.0	457.3	140.4	.000	.000	7.809	.00	.00
Steam to Carbonizer	107.4	90.1	10.08	.0	.0	80.0	.000	.000	.000	.00	.00
Coal & Sorbent Feeds	2956.8	289.0	11.09	178.5	4.7	44.4	6.037	4.434	.000	15.59	24.33
N2 Purges to carbonizer	1.5	204.5	.00	.0	204.5	.0	.000	.000	.000	.00	.00
N2 Purges to cyclones	.2	33.1	.00	.0	33.1	.0	.000	.000	.000	.00	.00
Total Inflow	3066.8	1222.2	21.16	178.5	699.6	264.8	6.037	4.434	7.809	15.59	24.33

OUTFLOWS

Carbonizer Drain	204.0	45.3	.13	14.5	.3	9.5	5.318	1.299	.000	8.11	6.15
Primary cyclone Drain	419.5	40.3	.21	28.0	.6	1.3	.684	.671	.000	1.20	7.57
Secondary cyclone Drain	36.1	3.6	.01	2.4	.1	.3	.100	.046	.000	.20	.50
Dusty gas to orifice	1477.9	1040.5	21.84	83.6	661.1	264.2	.128	1.803	7.186	.23	.55
Heat Loss	200.0										
Total Outflow	2337.5	1129.7	22.20	128.5	662.0	275.3	6.230	3.819	7.186	9.74	14.77
Loss	729.3	92.5	-1.03	50.0	37.6	-10.5	-.193	.616	.624	5.85	9.56
Percent Loss	23.8	7.6	-4.9	28.0	5.4	-4.0	-3.2	13.9	8.0	37.5	39.3
Closure (out/in) %	76.2	92.4	104.9	72.0	94.6	104.0	103.2	86.1	92.0	62.5	60.7

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	4.52	.00	.00	.00	4.52
2	Methane	.00	.00	.00	.00	.00	10.77	.00	.00	.00	10.77
3	Ammonia	.00	.00	.00	.00	.00	1.69	.00	.00	.00	1.69
4	Water Vapor	.00	89.81	.00	.00	.00	140.39	.00	.00	.00	140.39
5	Carbon Monoxide	.00	.00	.00	.00	.00	81.57	.00	.00	.00	81.57
6	Nitrogen	.00	.00	.00	.00	199.40	719.05	30.77	.00	.00	749.82
7	Air, dry	698.41	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	Ethane	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.11	.00	.00	.00	.11
11	Argon	.00	.00	.00	.00	.00	9.45	.00	.00	.00	9.45
12	Carbon Dioxide	.00	.00	.00	.00	.00	182.88	.00	.00	.00	182.88
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	3.39	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	9.05	.00	2.54	.00	1.67	.69	.18
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	41.54	.00	.00	.49	.00	.49	.00	.00
18	Calcium Oxide	.00	.00	.00	5.84	.00	.77	.00	.00	.67	.10
19	Calcium Sulfide	.00	.00	.55	2.02	.00	1.80	.00	1.41	.30	.08
20	Calcium Carbonate	.00	.00	76.43	9.12	.00	4.04	.00	3.01	.80	.23
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.48	.14	.00	.05	.00	.03	.02	.00
23	Coal Ash	.00	.00	24.83	23.69	.00	15.13	.00	12.11	2.20	.83
24	Coal organic matter	.00	.00	207.79	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	13.03	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	43.56	.00	43.56	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	11.32	.00	.00	11.32	.00
28	BD char organic	.00	.00	.00	.00	.00	5.03	.00	.00	.00	5.03
	TOTAL GAS FLOW	698.4	89.8	.0	.0	199.4	1150.4	30.8	.0	.0	1181.2
	TOTAL MASS FLOW	698.4	89.8	355.0	52.9	199.4	1235.2	30.8	62.8	16.0	1187.6

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	84.4
2	Steam to Carbonizer	386.9
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	97.4
5	N2 Purges to carbonizer	126.2
6	Freeboard gas	1618.6
7	N2 Purges to cyclones	126.2
8	Primary cyclone Drain	148.8
9	Secondary cyclone Drain	180.5
10	Dusty gas to orifice	1352.8

TR5 - TEST POINT 2 3/24/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.2	698.4	.00	.0	527.4	162.0	.00	.000	9.007	.00	.00
Steam to Carbonizer	107.0	89.8	10.05	.0	.0	79.8	.00	.000	.000	.00	.00
Coal & Sorbent Feeds	3007.5	355.0	11.42	191.2	4.8	74.7	11.97	4.688	.000	30.91	25.31
N2 Purges to carbonizer	2.4	199.4	.00	.0	199.4	.0	.00	.000	.000	.00	.00
N2 Purges to cyclones	.4	30.8	.00	.0	30.8	.0	.00	.000	.000	.00	.00
Total Inflow	3118.6	1373.4	21.47	191.2	762.4	316.4	11.97	4.688	9.007	30.91	25.31

OUTFLOWS

Carbonizer Drain	191.3	62.9	.08	13.2	.3	9.6	5.46	1.450	.000	8.95	23.83
Primary cyclone Drain	640.8	62.3	.29	42.2	.9	2.4	1.15	1.226	.000	1.99	12.14
Secondary cyclone Drain	165.8	16.0	.08	11.0	.2	.8	.41	.242	.000	.97	2.21
Dusty gas to orifice	1592.5	1187.6	23.28	97.8	751.3	304.5	.11	.190	9.446	.21	.83
Heat Loss	200.0										
Total Outflow	2790.4	1328.8	23.73	164.2	752.8	317.3	7.13	3.109	9.446	12.11	39.01
Loss	328.2	44.6	-2.25	27.0	9.7	-.9	4.84	1.579	-.438	18.80	-13.70
Percent Loss	10.5	3.2	-10.5	14.1	1.3	-.3	40.5	33.7	-4.9	60.8	-54.1
Closure (out/in) %	89.5	96.8	110.5	85.9	98.7	100.3	59.5	66.3	104.9	39.2	154.1

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	4.56	.00	.00	.00	4.56
2	Methane		.00	.00	.00	.00	.00	7.43	.00	.00	.00	7.43
3	Ammonia		.00	.00	.00	.00	.00	1.68	.00	.00	.00	1.68
4	Water Vapor		.00	99.99	.00	.00	.00	135.78	.00	.00	.00	135.78
5	Carbon Monoxide		.00	.00	.00	.00	.00	85.01	.00	.00	.00	85.01
6	Nitrogen		.00	.00	.00	.00	213.27	697.17	13.94	.00	.00	711.11
7	Air, dry		672.15	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	Ethane		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.01	.00	.00	.00	.01
11	Argon		.00	.00	.00	.00	.00	8.14	.00	.00	.00	8.14
12	Carbon Dioxide		.00	.00	.00	.00	.00	169.84	.00	.00	.00	169.84
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	3.40	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	9.31	.00	4.87	.00	2.31	1.54	1.01
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	1.89	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	17.05	.00	4.02	.00	1.70	1.67	.64
19	Calcium Sulfide		.00	.00	.21	2.60	.00	1.69	.00	1.00	.52	.16
20	Calcium Carbonate		.00	.00	67.66	7.67	.00	6.38	.00	3.21	1.74	1.43
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.24	.14	.00	.06	.00	.03	.02	.01
23	Coal Ash		.00	.00	24.93	4.47	.00	11.76	.00	5.95	4.37	1.44
24	Coal organic matter		.00	.00	208.67	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	11.15	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	34.04	.00	34.04	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	24.26	.00	.00	24.26	.00
28	BD char organic		.00	.00	.00	.00	.00	11.88	.00	.00	.00	11.88
	TOTAL GAS FLOW		672.2	100.0	.0	.0	213.3	1109.6	13.9	.0	.0	1123.6
	TOTAL MASS FLOW		672.2	100.0	307.0	52.4	213.3	1208.6	13.9	48.2	34.1	1140.1

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	79.3
2	Steam to Carbonizer	387.0
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	85.1
5	N2 Purges to carbonizer	119.7
6	Freeboard gas	1621.2
7	N2 Purges to cyclones	119.7
8	Primary cyclone Drain	138.8
9	Secondary cyclone Drain	178.9
10	Dusty gas to orifice	1363.8

TR5 - TEST POINT 3 3/25/92 Pittsburgh Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.4	672.2	.00	.0	507.6	155.9	.0000	.000	8.669	.00	.00
Steam to Carbonizer	119.2	100.0	11.19	.0	.0	88.8	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	3050.5	307.0	11.47	185.2	4.9	48.0	.5445	4.556	.000	27.21	25.17
N2 Purges to carbonizer	2.3	213.3	.00	.0	213.3	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	.1	13.9	.00	.0	13.9	.0	.0000	.000	.000	.00	.00
Total Inflow	3172.4	1306.4	22.66	185.2	739.7	292.7	.5445	4.556	8.669	27.21	25.17

OUTFLOWS

Carbonizer Drain	157.8	52.4	.08	11.5	.3	12.2	5.6146	1.381	.000	16.70	4.62
Primary cyclone Drain	499.9	48.2	.25	33.1	.7	2.9	1.3956	.821	.000	3.06	5.97
Secondary cyclone Drain	354.4	34.1	.16	23.5	.5	1.9	.9296	.482	.000	2.19	4.39
Dusty gas to orifice	1605.5	1140.1	22.03	99.9	712.8	293.9	.6103	.256	8.143	1.12	1.45
Heat Loss	200.0										
Total Outflow	2817.5	1274.9	22.52	168.0	714.3	311.0	8.550	2.940	8.143	23.07	16.44
Loss	355.0	31.4	.14	17.2	25.4	-18.3	-8.006	1.616	.525	4.15	8.73
Percent Loss	11.2	2.4	.6	9.3	3.4	-6.3	-1470.4	35.5	6.1	15.2	34.7
Closure (out/in) %	88.8	97.6	99.4	90.7	96.6	106.3	1570.4	64.5	93.9	84.8	65.3

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	7.60	.00	.00	.00	7.60
2	Methane		.00	.00	.00	.00	.00	11.72	.00	.00	.00	11.72
3	Ammonia		.00	.00	.00	.00	.00	1.57	.00	.00	.00	1.57
4	Water Vapor		.00	.00	.00	.00	.00	108.10	.00	.00	.00	108.10
5	Carbon Monoxide		.00	.00	.00	.00	.00	123.62	.00	.00	.00	123.62
6	Nitrogen		.00	.00	.00	.00	188.35	865.53	26.47	.00	.00	892.00
7	Air, dry		754.16	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.41	.00	.00	.00	.41
9	Ethane		.00	.00	.00	.00	.00	.32	.00	.00	.00	.32
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.32	.00	.00	.00	.32
11	Argon		.00	.00	.00	.00	.00	10.09	.00	.00	.00	10.09
12	Carbon Dioxide		.00	.00	.00	.00	.00	186.23	.00	.00	.00	186.23
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	92.42	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	.58	.00	.96	.00	.71	.07	.18
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	1.17	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	9.50	.00	2.15	.00	1.77	.12	.25
19	Calcium Sulfide		.00	.00	.23	.37	.00	.37	.00	.31	.02	.04
20	Calcium Carbonate		.00	.00	66.02	28.38	.00	3.75	.00	2.48	.32	.95
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.58	.40	.00	.07	.00	.05	.00	.01
23	Coal Ash		.00	.00	19.19	.83	.00	7.79	.00	6.49	.58	.72
24	Coal organic matter		.00	.00	232.37	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	6.25	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	32.95	.00	32.95	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	2.58	.00	.00	2.58	.00
28	BD char organic		.00	.00	.00	.00	.00	5.99	.00	.00	.00	5.99
	TOTAL GAS FLOW		754.2	.0	.0	.0	188.4	1315.5	26.5	.0	.0	1342.0
	TOTAL MASS FLOW		754.2	.0	412.0	46.3	188.4	1372.1	26.5	44.8	3.7	1350.1

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	85.7
2	Steam to Carbonizer	387.4
3	Coal & Sorbent Feeds	75.0
4	Carbonizer Drain	355.8
5	N2 Purges to carbonizer	147.6
6	Freeboard gas	1516.7
7	N2 Purges to cyclones	147.6
8	Primary cyclone Drain	171.2
9	Secondary cyclone Drain	195.5
10	Dusty gas to orifice	787.4

TEST POINT 6-1 05/14/93 ISSUE 0

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.6	754.2	.00	.0	569.5	174.9	.0000	.000	9.726	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	2951.9	412.0	22.73	182.7	3.4	153.9	.3384	2.571	.000	26.56	19.77
N2 Purges to carbonizer	3.3	188.4	.00	.0	188.4	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	.5	26.5	.00	.0	26.5	.0	.0000	.000	.000	.00	.00
Total Inflow	2957.2	1381.0	22.73	182.7	787.7	328.8	.3384	2.571	9.726	26.56	19.77
OUTFLOWS											
Carbonizer Drain	69.2	46.3	.01	9.3	.2	16.6	.3527	.348	.000	18.36	1.23
Primary cyclone Drain	474.6	44.8	.24	32.0	.7	2.0	.4289	.389	.000	2.43	6.54
Secondary cyclone Drain	38.1	3.7	.02	2.5	.0	.2	.0434	.037	.000	.23	.59
Dusty gas to orifice	1794.4	1350.1	23.12	119.1	893.4	302.6	.1061	.384	10.094	.58	.74
Heat Loss	200.0										
Total Outflow	2576.3	1444.9	23.40	162.9	894.4	321.4	.9311	1.157	10.09	21.60	9.09
Loss	381.0	-63.9	-.67	19.8	-106.6	7.5	-.5926	1.413	-.37	4.96	10.68
Percent Loss	12.9	-4.6	-3.0	10.8	-13.5	2.3	-175.1	55.0	-3.8	18.7	54.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Mass FlowsPounds per hour

Index I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	5.60	.00	.00	.00	5.60
2	Methane	.00	.00	.00	.00	.00	9.87	.00	.00	.00	9.87
3	Ammonia	.00	.00	.00	.00	.00	3.25	.00	.00	.00	3.25
4	Water Vapor	.00	.00	.00	.00	.00	96.11	.00	.00	.00	96.11
5	Carbon Monoxide	.00	.00	.00	.00	.00	93.06	.00	.00	.00	93.06
6	Nitrogen	.00	.00	.00	.00	215.65	819.74	22.01	.00	.00	841.75
7	Air, dry	642.41	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.52	.00	.00	.00	.52
9	Ethane	.00	.00	.00	.00	.00	.55	.00	.00	.00	.55
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.05	.00	.00	.00	.05
11	Argon	.00	.00	.00	.00	.00	8.57	.00	.00	.00	8.57
12	Carbon Dioxide	.00	.00	.00	.00	.00	169.29	.00	.00	.00	169.29
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	88.39	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	.13	.00	.97	.00	.64	.15	.18
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.02	.00	.00	.00	.02
17	Magnesium Carbonate	.00	.00	1.16	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	11.11	.00	1.14	.00	.87	.27	.00
19	Calcium Sulfide	.00	.00	.22	1.10	.00	.39	.00	.29	.03	.06
20	Calcium Carbonate	.00	.00	65.05	50.81	.00	4.93	.00	3.12	.51	1.31
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.57	.63	.00	.07	.00	.04	.01	.01
23	Coal Ash	.00	.00	18.35	2.01	.00	9.85	.00	7.19	.91	1.75
24	Coal organic matter	.00	.00	222.24	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	3.65	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	34.52	.00	34.52	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	3.99	.00	.00	3.99	.00
28	BD char organic	.00	.00	.00	.00	.00	9.05	.00	.00	.00	9.05
	TOTAL GAS FLOW	642.4	.0	.0	.0	215.6	1206.6	22.0	.0	.0	1228.6
	TOTAL MASS FLOW	642.4	.0	396.0	69.4	215.6	1271.5	22.0	46.7	5.9	1241.0

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	85.4
2	Steam to Carbonizer	387.6
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	462.2
5	N2 Purges to carbonizer	153.3
6	Freeboard gas	1455.1
7	N2 Purges to cyclones	153.3
8	Primary cyclone Drain	171.1
9	Secondary cyclone Drain	200.8
10	Dusty gas to orifice	762.4

TR6 - TEST POINT 2 05/14/93 ISSUE 0 REVISION 6

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.3	642.4	.00	.0	485.1	149.0	.0000	.000	8.285	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	2821.7	396.0	21.74	175.0	3.2	148.1	.3335	2.462	.000	26.17	18.92
N2 Purges to carbonizer	4.1	215.6	.00	.0	215.6	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	.4	22.0	.00	.0	22.0	.0	.0000	.000	.000	.00	.00
Total Inflow	2827.5	1276.0	21.74	175.0	726.0	297.1	.3335	2.462	8.285	26.17	18.92

OUTFLOWS

Carbonizer Drain	21.1	69.4	.01	9.6	.2	27.6	.0806	.496	.000	28.90	2.64
Primary cyclone Drain	506.3	46.7	.32	33.6	.7	2.0	.3867	.408	.000	2.03	7.23
Secondary cyclone Drain	59.3	5.9	.03	3.9	.1	.4	.0908	.065	.000	.41	.92
Dusty gas to orifice	1517.6	1241.0	19.67	103.3	844.6	262.3	.1155	.154	8.568	.56	1.76
Heat Loss	200.0										
Total Outflow	2304.3	1363.0	20.03	150.3	845.5	292.3	.6737	1.121	8.568	31.90	12.56
Loss	523.2	-86.9	1.71	24.7	-119.5	4.9	-.3403	1.340	-.283	-5.73	6.36
Percent Loss	18.5	-6.8	7.8	14.1	-16.5	1.6	-102.0	54.4	-3.4	-21.9	33.6

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Mass FlowsPounds per hour

Index I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	8.28	.00	.00	.00	8.28
2	Methane	.00	.00	.00	.00	.00	13.44	.00	.00	.00	13.44
3	Ammonia	.00	.00	.00	.00	.00	2.64	.00	.00	.00	2.64
4	Water Vapor	.00	.00	.00	.00	.00	96.33	.00	.00	.00	96.33
5	Carbon Monoxide	.00	.00	.00	.00	.00	127.38	.00	.00	.00	127.38
6	Nitrogen	.00	.00	.00	.00	177.28	744.40	25.66	.00	.00	770.06
7	Air, dry	807.92	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.36	.00	.00	.00	.36
9	Ethane	.00	.00	.00	.00	.00	.54	.00	.00	.00	.54
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.17	.00	.00	.00	.17
11	Argon	.00	.00	.00	.00	.00	9.01	.00	.00	.00	9.01
12	Carbon Dioxide	.00	.00	.00	.00	.00	187.71	.00	.00	.00	187.71
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	113.92	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	.13	.00	1.42	.00	1.03	.14	.25
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	.78	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	7.52	.00	2.69	.00	2.01	.17	.52
19	Calcium Sulfide	.00	.00	.15	1.57	.00	.69	.00	.54	.09	.07
20	Calcium Carbonate	.00	.00	43.69	26.24	.00	7.38	.00	6.03	.59	.76
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.38	.37	.00	.12	.00	.09	.01	.02
23	Coal Ash	.00	.00	23.65	.94	.00	12.03	.00	9.64	1.25	1.14
24	Coal organic matter	.00	.00	286.41	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	3.14	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	48.43	.00	48.43	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	4.51	.00	.00	4.51	.00
28	BD char organic	.00	.00	.00	.00	.00	5.50	.00	.00	.00	5.50
	TOTAL GAS FLOW	807.9	.0	.0	.0	177.3	1190.3	25.7	.0	.0	1215.9
	TOTAL MASS FLOW	807.9	.0	469.0	39.9	177.3	1273.0	25.7	67.8	6.8	1224.2

Node assignments

Index J	Node Name	Temperature Degrees F)
1	Feed Air	84.0
2	Steam to Carbonizer	387.4
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	134.8
5	N2 Purges to carbonizer	150.2
6	Freeboard gas	1462.3
7	N2 Purges to cyclones	150.2
8	Primary cyclone Drain	169.4
9	Secondary cyclone Drain	192.9
10	Dusty gas to orifice	1267.2

TR6 - TEST POINT 3 05/14/93 ISSUE 0 REVISION 6

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.4	807.9	.00	.0	610.1	187.4	.0000	.000	10.42	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.0000	.000	.00	.00	.00
Coal & Sorbent Feeds	3667.4	469.0	28.01	220.6	4.1	171.3	.2240	3.111	.00	17.58	24.04
N2 Purges to carbonizer	3.2	177.3	.00	.0	177.3	.0	.0000	.000	.00	.00	.00
N2 Purges to cyclones	.5	25.7	.00	.0	25.7	.0	.0000	.000	.00	.00	.00
Total Inflow	3672.4	1479.8	28.01	220.6	817.2	358.6	.2240	3.111	10.42	17.58	24.04

OUTFLOWS

Carbonizer Drain	28.1	39.9	.01	6.1	.1	14.8	.0809	.773	.00	16.75	1.30
Primary cyclone Drain	707.0	67.8	.43	47.4	.9	3.9	.6186	.717	.00	4.15	9.73
Secondary cyclone Drain	66.9	6.8	.04	4.4	.1	.4	.0829	.081	.00	.40	1.26
Dusty gas to orifice	2054.9	1224.2	23.13	122.0	772.3	295.4	.1524	.300	9.01	.71	1.16
Heat Loss	200.0										
Total Outflow	3057.0	1338.6	23.61	179.9	773.4	314.4	.9347	1.871	9.01	22.02	13.45
Loss	615.5	141.3	4.40	40.7	43.8	44.2	-.7108	1.240	1.41	-4.44	10.59
Percent Loss	16.8	9.5	15.7	18.5	5.4	12.3	-317.3	39.9	13.6	-25.3	44.1

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Mass FlowsPounds per hour

Index I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.0	.0	.0	.0	.0	8.5	.0	.0	.0	8.5
2	Methane	.0	.0	.0	.0	.0	16.8	.0	.0	.0	16.8
3	Ammonia	.0	.0	.0	.0	.0	2.9	.0	.0	.0	2.9
4	Water Vapor	.0	.0	.0	.0	.0	104.2	.0	.0	.0	104.2
5	Carbon Monoxide	.0	.0	.0	.0	.0	179.5	.0	.0	.0	179.5
6	Nitrogen	.0	.0	.0	.0	152.5	869.3	18.0	.0	.0	887.3
7	Air, dry	1000.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	Ethlyene	.0	.0	.0	.0	.0	.2	.0	.0	.0	.2
9	Ethane	.0	.0	.0	.0	.0	.3	.0	.0	.0	.3
10	Hydrogen Sulfide	.0	.0	.0	.0	.0	.2	.0	.0	.0	.2
11	Argon	.0	.0	.0	.0	.0	10.4	.0	.0	.0	10.4
12	Carbon Dioxide	.0	.0	.0	.0	.0	223.7	.0	.0	.0	223.7
13	Sulfur Dioxide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	Water Moisture	.0	.0	127.6	.0	.0	.0	.0	.0	.0	.0
15	Magnesium Oxide	.0	.0	.0	.7	.0	1.2	.0	.7	.0	.5
16	Magnesium Sulfide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	Magnesium Carbonate	.0	.0	.9	.0	.0	.0	.0	.0	.0	.0
18	Calcium Oxide	.0	.0	.0	13.5	.0	2.4	.0	1.5	.1	.8
19	Calcium Sulfide	.0	.0	.2	1.5	.0	.9	.0	.6	.0	.2
20	Calcium Carbonate	.0	.0	53.4	34.7	.0	5.3	.0	3.4	.1	1.7
21	Calcium Sulfate	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	Sorbent Inerts	.0	.0	.5	.5	.0	.1	.0	.1	.0	.0
23	Coal Ash	.0	.0	26.5	1.3	.0	12.0	.0	8.0	.2	3.8
24	Coal organic matter	.0	.0	320.9	.0	.0	.0	.0	.0	.0	.0
25	CD char organic	.0	.0	.0	4.8	.0	.0	.0	.0	.0	.0
26	PD char organic	.0	.0	.0	.0	.0	35.6	.0	35.6	.0	.0
27	SD char organic	.0	.0	.0	.0	.0	.8	.0	.0	.8	.0
28	BD char organic	.0	.0	.0	.0	.0	18.5	.0	.0	.0	18.5
	TOTAL GAS FLOW	1000.1	.0	.0	.0	152.5	1415.9	18.0	.0	.0	1433.9
	TOTAL MASS FLOW	1000.1	.0	530.0	57.1	152.5	1492.8	18.0	49.9	1.3	1459.5

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	90.1
2	Steam to Carbonizer	387.6
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	150.7
5	N2 Purges to carbonizer	152.3
6	Freeboard gas	1548.7
7	N2 Purges to cyclones	152.3
8	Primary cyclone Drain	159.8
9	Secondary cyclone Drain	197.5
10	Dusty gas to orifice	1353.8

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	3.1	1000.1	.00	.0	755.3	232.0	.0000	.000	12.90	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.0000	.000	.00	.00	.00
Coal & Sorbent Feeds	4105.1	530.0	31.38	247.7	4.6	194.0	.2737	3.492	.00	21.49	26.97
N2 Purges to carbonizer	2.8	152.5	.00	.0	152.5	.0	.0000	.000	.00	.00	.00
N2 Purges to cyclones	.3	18.0	.00	.0	18.0	.0	.0000	.000	.00	.00	.00
Total Inflow	4111.4	1700.7	31.38	247.7	930.5	426.0	.2737	3.492	12.90	21.49	26.97
OUTFLOWS											
Carbonizer Drain	46.0	57.1	.01	8.8	.1	20.8	.4461	.772	.00	24.36	1.85
Primary cyclone Drain	520.8	49.9	.27	35.1	.5	2.4	.4387	.438	.00	2.78	8.03
Secondary cyclone Drain	12.2	1.3	.01	.8	.0	.1	.0273	.016	.00	.12	.22
Dusty gas to orifice	2691.2	1459.5	25.16	169.1	890.0	358.9	.2744	.409	10.41	1.41	3.82
Heat Loss	200.0										
Total Outflow	3470.2	1567.9	25.45	213.7	890.7	382.2	1.187	1.636	10.41	28.67	13.92
Loss	641.2	132.8	5.93	34.0	39.8	43.8	-.913	1.856	2.49	-7.19	13.05
Percent Loss	15.6	7.8	18.9	13.7	4.3	10.3	-333.4	53.2	19.3	-33.5	48.4

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Index		Mass FlowsPounds per hour									
I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	9.57	.00	.00	.00	9.57
2	Methane	.00	.00	.00	.00	.00	14.55	.00	.00	.00	14.55
3	Ammonia	.00	.00	.00	.00	.00	1.68	.00	.00	.00	1.68
4	Water Vapor	.00	.00	.00	.00	.00	106.30	.00	.00	.00	106.30
5	Carbon Monoxide	.00	.00	.00	.00	.00	173.51	.00	.00	.00	173.51
6	Nitrogen	.00	.00	.00	.00	160.22	860.61	16.09	.00	.00	876.69
7	Air, dry	981.63	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.15	.00	.00	.00	.15
9	Ethane	.00	.00	.00	.00	.00	.20	.00	.00	.00	.20
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.09	.00	.00	.00	.09
11	Argon	.00	.00	.00	.00	.00	10.64	.00	.00	.00	10.64
12	Carbon Dioxide	.00	.00	.00	.00	.00	211.03	.00	.00	.00	211.03
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	124.13	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	.14	.00	1.35	.00	.83	.12	.40
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	.29	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	3.48	.00	1.97	.00	.96	.25	.76
19	Calcium Sulfide	.00	.00	.06	.31	.00	1.43	.00	1.07	.08	.29
20	Calcium Carbonate	.00	.00	16.50	9.36	.00	5.84	.00	3.59	.40	1.85
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.15	.14	.00	.10	.00	.06	.01	.03
23	Coal Ash	.00	.00	25.77	.41	.00	14.29	.00	9.18	.79	4.33
24	Coal organic matter	.00	.00	312.08	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	1.16	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	35.10	.00	35.10	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	2.89	.00	.00	2.89	.00
28	BD char organic	.00	.00	.00	.00	.00	18.55	.00	.00	.00	18.55
	TOTAL GAS FLOW	981.6	.0	.0	.0	160.2	1388.3	16.1	.0	.0	1404.4
	TOTAL MASS FLOW	981.6	.0	479.0	15.0	160.2	1469.9	16.1	50.8	4.5	1430.6

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	88.5
2	Steam to Carbonizer	387.7
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	76.1
5	N2 Purges to carbonizer	154.5
6	Freeboard gas	1562.6
7	N2 Purges to cyclones	154.5
8	Primary cyclone Drain	158.1
9	Secondary cyclone Drain	193.7
10	Dusty gas to orifice	1367.2

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	2.7	981.6	.00	.0	741.3	227.7	.0000	.000	12.66	.000	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.0000	.000	.00	.000	.00
Coal & Sorbent Feeds	4020.0	479.0	30.52	236.6	4.5	171.4	.0846	3.342	.00	6.641	25.92
N2 Purges to carbonizer	3.1	160.2	.00	.0	160.2	.0	.0000	.000	.00	.000	.00
N2 Purges to cyclones	.3	16.1	.00	.0	16.1	.0	.0000	.000	.00	.000	.00
Total Inflow	4026.1	1636.9	30.52	236.6	922.1	399.0	.0846	3.342	12.66	6.641	25.92

OUTFLOWS

Carbonizer Drain	9.7	15.0	.00	2.2	.0	5.5	.0848	.180	.00	6.408	.55
Primary cyclone Drain	518.7	50.8	.24	34.4	.6	2.3	.5023	.680	.00	2.718	9.23
Secondary cyclone Drain	42.5	4.5	.02	2.8	.0	.3	.0721	.056	.00	.380	.80
Dusty gas to orifice	2662.4	1430.6	25.63	161.3	878.5	348.2	.2417	.343	10.64	1.448	4.36
Heat Loss	200.0										
Total Outflow	3433.3	1501.0	25.89	200.8	879.2	356.4	.9008	1.259	10.64	10.95	14.94
Loss	592.9	135.9	4.64	35.8	43.0	42.7	-.8162	2.084	2.02	-4.31	10.97
Percent Loss	14.7	8.3	15.2	15.1	4.7	10.7	-964.7	62.3	15.9	-64.9	42.3

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Mass Flows Pounds per hour

Index I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	6.06	.00	.00	.00	6.06
2	Methane	.00	.00	.00	.00	.00	10.05	.00	.00	.00	10.05
3	Ammonia	.00	.00	.00	.00	.00	2.08	.00	.00	.00	2.08
4	Water Vapor	.00	112.40	.00	.00	.00	183.30	.00	.00	.00	183.30
5	Carbon Monoxide	.00	.00	.00	.00	.00	57.77	.00	.00	.00	57.77
6	Nitrogen	.00	.00	.00	.00	187.65	641.74	21.90	.00	.00	663.64
7	Air, dry	641.65	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.58	.00	.00	.00	.58
9	Ethane	.00	.00	.00	.00	.00	.20	.00	.00	.00	.20
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.54	.00	.00	.00	.54
11	Argon	.00	.00	.00	.00	.00	6.78	.00	.00	.00	6.78
12	Carbon Dioxide	.00	.00	.00	.00	.00	160.14	.00	.00	.00	160.14
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	33.04	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	.00	.00	.51	.00	.33	.05	.13
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	.62	.43	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	.00	.00	2.15	.00	1.65	.26	.24
19	Calcium Sulfide	.00	.00	.12	2.65	.00	.91	.00	.63	.05	.23
20	Calcium Carbonate	.00	.00	34.95	10.17	.00	1.81	.00	1.17	.07	.57
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.31	.12	.00	.06	.00	.04	.01	.01
23	Coal Ash	.00	.00	32.19	12.83	.00	14.93	.00	9.29	1.33	4.31
24	Coal organic matter	.00	.00	238.77	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	24.08	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	45.64	.00	45.64	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	3.56	.00	.00	3.56	.00
28	BD char organic	.00	.00	.00	.00	.00	22.73	.00	.00	.00	22.73
	TOTAL GAS FLOW	641.6	112.4	.0	.0	187.6	1069.2	21.9	.0	.0	1091.1
	TOTAL MASS FLOW	641.6	112.4	340.0	50.3	187.6	1161.5	21.9	58.8	5.3	1119.4

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	87.5
2	Steam to Carbonizer	387.3
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	133.4
5	N2 Purges to carbonizer	164.6
6	Freeboard gas	1535.7
7	N2 Purges to cyclones	164.6
8	Primary cyclone Drain	159.9
9	Secondary cyclone Drain	192.3
10	Dusty gas to orifice	1296.7

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.6	641.6	.00	.0	484.6	148.8	.0000	.000	8.275	.00	.00
Steam to Carbonizer	134.0	112.4	12.58	.0	.0	99.8	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	3368.7	340.0	17.06	195.1	4.8	67.1	.1792	9.310	.000	14.06	32.50
N2 Purges to carbonizer	4.1	187.6	.00	.0	187.6	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	.5	21.9	.00	.0	21.9	.0	.0000	.000	.000	.00	.00
Total Inflow	3508.9	1303.6	29.64	195.1	698.9	315.7	.1792	9.310	8.275	14.06	32.50
OUTFLOWS											
Carbonizer Drain	326.0	50.3	.13	24.3	.4	5.1	.1248	1.753	.000	5.55	12.95
Primary cyclone Drain	670.3	58.8	.42	43.4	.9	1.2	.1965	1.362	.000	2.00	9.34
Secondary cyclone Drain	52.4	5.3	.03	3.4	.1	.1	.0319	.100	.000	.24	1.34
Dusty gas to orifice	1871.8	1119.4	29.82	98.4	665.9	312.6	.0794	.960	6.784	.53	4.32
Heat Loss	200.0										
Total Outflow	3120.4	1233.7	30.40	169.4	667.3	319.0	.4326	4.174	6.784	8.31	27.95
Loss	388.5	69.9	-.76	25.7	31.6	-3.3	-.2534	5.136	1.491	5.75	4.55
Percent Loss	11.1	5.4	-2.6	13.2	4.5	-1.1	-141.4	55.2	18.0	40.9	14.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass FlowsPounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	4.82	.00	.00	.00	4.82
2	Methane		.00	.00	.00	.00	.00	9.11	.00	.00	.00	9.11
3	Ammonia		.00	.00	.00	.00	.00	2.08	.00	.00	.00	2.08
4	Water Vapor		.00	58.03	.00	.00	.00	144.40	.00	.00	.00	144.40
5	Carbon Monoxide		.00	.00	.00	.00	.00	51.16	.00	.00	.00	51.16
6	Nitrogen		.00	.00	.00	.00	185.57	591.71	23.44	.00	.00	615.15
7	Air, dry		561.45	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.43	.00	.00	.00	.43
9	Ethane		.00	.00	.00	.00	.00	.19	.00	.00	.00	.19
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	5.07	.00	.00	.00	5.07
11	Argon		.00	.00	.00	.00	.00	5.93	.00	.00	.00	5.93
12	Carbon Dioxide		.00	.00	.00	.00	.00	120.90	.00	.00	.00	120.90
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	25.21	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	.00	.00	.34	.00	.21	.07	.07
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	.67	1.14	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	1.29	.00	.85	.22	.22
19	Calcium Sulfide		.00	.00	.13	5.05	.00	.82	.00	.64	.18	.00
20	Calcium Carbonate		.00	.00	37.86	1.48	.00	2.20	.00	1.48	.35	.37
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.33	.07	.00	.05	.00	.03	.01	.01
23	Coal Ash		.00	.00	24.57	24.65	.00	11.45	.00	6.68	2.28	2.50
24	Coal organic matter		.00	.00	182.22	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	37.70	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	33.00	.00	33.00	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	9.97	.00	.00	9.97	.00
28	BD char organic		.00	.00	.00	.00	.00	12.31	.00	.00	.00	12.31
	TOTAL GAS FLOW		561.5	58.0	.0	.0	185.6	935.8	23.4	.0	.0	959.2
	TOTAL MASS FLOW		561.5	58.0	271.0	70.1	185.6	1007.2	23.4	42.9	13.1	974.7

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	89.1
2	Steam to Carbonizer	387.7
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	149.8
5	N2 Purges to carbonizer	160.7
6	Freeboard gas	1531.9
7	N2 Purges to cyclones	160.7
8	Primary cyclone Drain	147.1
9	Secondary cyclone Drain	190.5
10	Dusty gas to orifice	1266.6

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.6	561.5	.00	.0	424.0	130.2	.0000	.000	7.241	.00	.00
Steam to Carbonizer	69.2	58.0	6.49	.0	.0	51.5	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	2562.2	271.0	13.02	150.2	3.6	56.6	.1941	7.122	.000	15.23	24.90
N2 Purges to carbonizer	3.9	185.6	.00	.0	185.6	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	.5	23.4	.00	.0	23.4	.0	.0000	.000	.000	.00	.00
Total Inflow	2637.4	1099.5	19.51	150.2	636.7	238.4	.1941	7.122	7.241	15.23	24.90

OUTFLOWS

Carbonizer Drain	460.8	70.1	.23	35.9	.6	1.4	.3291	3.468	.000	3.40	24.72
Primary cyclone Drain	483.2	42.9	.28	31.3	.7	1.0	.1259	1.224	.000	1.56	6.71
Secondary cyclone Drain	147.7	13.1	.09	9.4	.2	.3	.0401	.330	.000	.40	2.29
Dusty gas to orifice	1504.9	974.7	24.15	73.9	617.1	245.6	.0418	5.108	5.935	.31	2.50
Heat Loss	200.0										
Total Outflow	2796.7	1100.8	24.74	150.5	618.7	248.3	.5369	10.13	5.935	5.66	36.23
Loss	-159.3	-1.3	-5.23	-.3	17.9	-9.9	-.3428	-3.01	1.306	9.58	-11.33
Percent Loss	-6.0	-.1	-26.8	-.2	2.8	-4.1	-176.6	-42.2	18.0	62.9	-45.5

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Index		Mass Flows, Pounds per hour									
I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.0	.0	.0	.0	.0	6.8	.0	.0	.0	6.8
2	Methane	.0	.0	.0	.0	.0	10.2	.0	.0	.0	10.2
3	Ammonia	.0	.0	.0	.0	.0	1.9	.0	.0	.0	1.9
4	Water Vapor	.0	45.5	.0	.0	.0	177.2	.0	.0	.0	177.2
5	Carbon Monoxide	.0	.0	.0	.0	.0	60.0	.0	.0	.0	60.0
6	Nitrogen	.0	.0	.0	.0	221.9	864.0	163.8	.0	.0	1027.8
7	Air, dry	513.9	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	Ethlyene	.0	.0	.0	.0	.0	.5	.0	.0	.0	.5
9	Ethane	.0	.0	.0	.0	.0	1.2	.0	.0	.0	1.2
10	Hydrogen Sulfide	.0	.0	.0	.0	.0	5.6	.0	.0	.0	5.6
11	Argon	.0	.0	.0	.0	.0	6.7	.0	.0	.0	6.7
12	Carbon Dioxide	.0	.0	.0	.0	.0	180.4	.0	.0	.0	180.4
13	Sulfur Dioxide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	Water Moisture	.0	.0	81.2	.0	.0	.0	.0	.0	.0	.0
15	Magnesium Oxide	.0	.0	.0	.0	.0	.7	.0	.5	.2	.0
16	Magnesium Sulfide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	Magnesium Carbonate	.0	.0	.9	1.4	.0	.0	.0	.0	.0	.0
18	Calcium Oxide	.0	.0	.0	.0	.0	.6	.0	.4	.2	.0
19	Calcium Sulfide	.0	.0	.2	.1	.0	.3	.0	.2	.0	.0
20	Calcium Carbonate	.0	.0	39.9	1.3	.0	5.7	.0	4.3	1.2	.1
21	Calcium Sulfate	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	Sorbent Inerts	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
23	Coal Ash	.0	.0	15.1	2.3	.0	9.2	.0	6.8	2.2	.2
24	Coal organic matter	.0	.0	203.7	.0	.0	.0	.0	.0	.0	.0
25	CD char organic	.0	.0	.0	1.0	.0	.0	.0	.0	.0	.0
26	PD char organic	.0	.0	.0	.0	.0	33.5	.0	33.5	.0	.0
27	SD char organic	.0	.0	.0	.0	.0	7.0	.0	.0	7.0	.0
28	BD char organic	.0	.0	.0	.0	.0	1.7	.0	.0	.0	1.7
	TOTAL GAS FLOW	513.9	45.5	.0	.0	221.9	1314.6	163.8	.0	.0	1478.5
	TOTAL MASS FLOW	513.9	45.5	341.0	6.0	221.9	1373.3	163.8	45.7	10.9	1480.5

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	83.3
2	Steam to Carbonizer	386.9
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	84.2
5	N2 Purges to carbonizer	151.1
6	Freeboard gas	1396.0
7	N2 Purges to cyclones	151.1
8	Primary cyclone Drain	183.6
9	Secondary cyclone Drain	169.0
10	Dusty gas to orifice	769.4

08:12:43] TR8 - TEST POINT 1 05/13/93 Wyoming Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.9	613.9	.00	.0	463.6	142.4	.0000	.000	7.917	.00	.00
Steam to Carbonizer	54.2	45.5	5.09	.0	.0	40.4	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	2615.4	341.0	19.07	153.4	2.6	132.4	.2515	2.090	.000	16.06	15.12
N2 Purges to carbonizer	4.1	221.9	.00	.0	221.9	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	3.0	163.8	.00	.0	163.8	.0	.0000	.000	.000	.00	.00
Total Inflow	2677.7	1386.1	24.16	153.4	851.9	315.2	.2515	2.090	7.917	16.06	15.12

OUTFLOWS

Carbonizer Drain	12.3	6.0	.00	1.3	.0	1.4	.3915	.061	.000	.58	2.32
Primary cyclone Drain	493.8	45.7	.33	33.1	.5	2.4	.2721	.185	.000	2.16	6.82
Secondary cyclone Drain	101.8	10.9	.07	7.0	.1	.7	.1219	.053	.000	.66	2.16
Dusty gas to orifice	1528.9	1480.5	30.20	85.6	1029.4	323.0	.0074	5.252	6.720	.06	.22
Heat Loss	200.0										
Total Outflow	2336.9	1543.2	30.60	127.1	1030.	327.4	.7929	5.550	6.720	3.46	11.52
Loss	340.8	-157.1	-6.45	26.3	-178.	-12.3	-.5415	-3.460	1.197	12.61	3.61
Percent Loss	12.7	-11.3	-26.7	17.1	-20.9	-3.9	-215.3	-165.5	15.1	78.5	23.9
Closure (out/in) %	87.3	111.3	126.7	82.9	120.9	103.9	315.3	265.5	84.9	21.5	76.1

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.0	.0	.0	.0	.0	7.0	.0	.0	.0	7.0
2	Methane		.0	.0	.0	.0	.0	9.2	.0	.0	.0	9.2
3	Ammonia		.0	.0	.0	.0	.0	2.3	.0	.0	.0	2.3
4	Water Vapor		.0	46.0	.0	.0	.0	164.0	.0	.0	.0	164.0
5	Carbon Monoxide		.0	.0	.0	.0	.0	73.6	.0	.0	.0	73.6
6	Nitrogen		.0	.0	.0	.0	213.3	851.5	173.3	.0	.0	1024.8
7	Air, dry		704.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	Ethlyene		.0	.0	.0	.0	.0	.3	.0	.0	.0	.3
9	Ethane		.0	.0	.0	.0	.0	.5	.0	.0	.0	.5
10	Hydrogen Sulfide		.0	.0	.0	.0	.0	1.1	.0	.0	.0	1.1
11	Argon		.0	.0	.0	.0	.0	7.7	.0	.0	.0	7.7
12	Carbon Dioxide		.0	.0	.0	.0	.0	207.1	.0	.0	.0	207.1
13	Sulfur Dioxide		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	Water Moisture		.0	.0	83.9	.0	.0	.0	.0	.0	.0	.0
15	Magnesium Oxide		.0	.0	.0	.1	.0	.6	.0	.5	.1	.0
16	Magnesium Sulfide		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	Magnesium Carbonate		.0	.0	1.2	.0	.0	.0	.0	.0	.0	.0
18	Calcium Oxide		.0	.0	.0	2.1	.0	.4	.0	.3	.2	.0
19	Calcium Sulfide		.0	.0	.2	.4	.0	.2	.0	.2	.0	.0
20	Calcium Carbonate		.0	.0	53.5	19.8	.0	5.5	.0	4.9	.5	.1
21	Calcium Sulfate		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	Sorbent Inerts		.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
23	Coal Ash		.0	.0	15.6	1.5	.0	8.5	.0	7.5	.8	.2
24	Coal organic matter		.0	.0	210.5	.0	.0	.0	.0	.0	.0	.0
25	CD char organic		.0	.0	.0	2.5	.0	.0	.0	.0	.0	.0
26	PD char organic		.0	.0	.0	.0	.0	20.9	.0	20.9	.0	.0
27	SD char organic		.0	.0	.0	.0	.0	2.9	.0	.0	2.9	.0
28	BD char organic		.0	.0	.0	.0	.0	1.0	.0	.0	.0	1.0
	TOTAL GAS FLOW		704.1	46.0	.0	.0	213.3	1324.3	173.3	.0	.0	1497.6
	TOTAL MASS FLOW		704.1	46.0	365.0	26.5	213.3	1364.3	173.3	34.3	4.5	1498.9

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	76.9
2	Steam to Carbonizer	387.2
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	72.0
5	N2 Purges to carbonizer	143.5
6	Freeboard gas	1491.9
7	N2 Purges to cyclones	143.5
8	Primary cyclone Drain	174.7
9	Secondary cyclone Drain	167.0
10	Dusty gas to orifice	818.0

TR8 - TEST POINT 2 05/13/93 Wyoming Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.0	704.1	.00	.0	531.8	163.3	.0000	.000	9.081	.00	.00
Steam to Carbonizer	54.8	46.0	5.15	.0	.0	40.9	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	2693.1	365.0	19.70	160.0	2.7	142.9	.3373	2.182	.000	21.55	15.65
N2 Purges to carbonizer	3.5	213.3	.00	.0	213.3	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	2.9	173.3	.00	.0	173.3	.0	.0000	.000	.000	.00	.00
Total Inflow	2754.3	1501.8	24.85	160.0	921.1	347.0	.3373	2.182	9.081	21.55	15.65

OUTFLOWS

Carbonizer Drain	15.5	26.5	.01	4.8	.0	10.1	.0481	.283	.000	9.67	1.58
Primary cyclone Drain	305.1	34.3	.17	21.0	.2	2.6	.3090	.136	.000	2.25	7.50
Secondary cyclone Drain	41.6	4.5	.02	2.9	.0	.3	.0526	.020	.000	.34	.79
Dusty gas to orifice	1529.2	1498.9	28.32	96.6	1026.7	338.3	.0064	1.059	7.694	.05	.17
Heat Loss	200.0										
Total Outflow	2091.3	1564.1	28.52	125.3	1027.	351.4	.4161	1.498	7.694	12.31	10.05
Loss	663.0	-62.4	-3.67	34.7	-106.	-4.4	-.0787	.684	1.387	9.24	5.60
Percent Loss	24.1	-4.2	-14.8	21.7	-11.5	-1.3	-23.3	31.4	15.3	42.9	35.8

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Index		Mass FlowsPounds per hour									
I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.0	.0	.0	.0	.0	9.6	.0	.0	.0	9.6
2	Methane	.0	.0	.0	.0	.0	14.2	.0	.0	.0	14.2
3	Ammonia	.0	.0	.0	.0	.0	2.7	.0	.0	.0	2.7
4	Water Vapor	.0	48.7	.0	.0	.0	174.8	.0	.0	.0	174.8
5	Carbon Monoxide	.0	.0	.0	.0	.0	105.9	.0	.0	.0	105.9
6	Nitrogen	.0	.0	.0	.0	186.8	927.8	152.3	.0	.0	1080.2
7	Air, dry	863.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	Ethlyene	.0	.0	.0	.0	.0	.2	.0	.0	.0	.2
9	Ethane	.0	.0	.0	.0	.0	.8	.0	.0	.0	.8
10	Hydrogen Sulfide	.0	.0	.0	.0	.0	.5	.0	.0	.0	.5
11	Argon	.0	.0	.0	.0	.0	9.5	.0	.0	.0	9.5
12	Carbon Dioxide	.0	.0	.0	.0	.0	243.4	.0	.0	.0	243.4
13	Sulfur Dioxide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	Water Moisture	.0	.0	106.4	.0	.0	.0	.0	.0	.0	.0
15	Magnesium Oxide	.0	.0	.0	.2	.0	.8	.0	.5	.2	.1
16	Magnesium Sulfide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	Magnesium Carbonate	.0	.0	.6	.0	.0	.0	.0	.0	.0	.0
18	Calcium Oxide	.0	.0	.0	15.0	.0	1.6	.0	1.1	.3	.2
19	Calcium Sulfide	.0	.0	.1	.4	.0	.7	.0	.6	.0	.1
20	Calcium Carbonate	.0	.0	26.3	.1	.0	5.2	.0	3.5	.8	.8
21	Calcium Sulfate	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	Sorbent Inerts	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
23	Coal Ash	.0	.0	19.7	.3	.0	8.5	.0	5.9	1.3	1.3
24	Coal organic matter	.0	.0	266.9	.0	.0	.0	.0	.0	.0	.0
25	CD char organic	.0	.0	.0	.6	.0	.0	.0	.0	.0	.0
26	PD char organic	.0	.0	.0	.0	.0	22.3	.0	22.3	.0	.0
27	SD char organic	.0	.0	.0	.0	.0	5.0	.0	.0	5.0	.0
28	BD char organic	.0	.0	.0	.0	.0	5.1	.0	.0	.0	5.1
	TOTAL GAS FLOW	863.5	48.7	.0	.0	186.8	1489.3	152.3	.0	.0	1641.7
	TOTAL MASS FLOW	863.5	48.7	420.0	16.8	186.8	1538.5	152.3	33.9	7.6	1649.4

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	86.3
2	Steam to Carbonizer	386.9
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	237.9
5	N2 Purges to carbonizer	138.2
6	Freeboard gas	1533.2
7	N2 Purges to cyclones	138.2
8	Primary cyclone Drain	172.2
9	Secondary cyclone Drain	159.1
10	Dusty gas to orifice	962.3

TR8 - TEST POINT 3 05/13/93 Wyoming Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.9	863.5	.00	.0	652.1	200.3	.0000	.000	11.14	.00	.00
Steam to Carbonizer	58.1	48.7	5.45	.0	.0	43.3	.0000	.000	.00	.00	.00
Coal & Sorbent Feeds	3446.3	420.0	24.98	197.7	3.4	160.7	.1656	2.693	.00	10.58	19.76
N2 Purges to carbonizer	2.8	186.8	.00	.0	186.8	.0	.0000	.000	.00	.00	.00
N2 Purges to cyclones	2.3	152.3	.00	.0	152.3	.0	.0000	.000	.00	.00	.00
Total Inflow	3511.4	1671.4	30.43	197.7	994.7	404.2	.1656	2.693	11.14	10.58	19.76

OUTFLOWS

Carbonizer Drain	11.0	16.8	.01	.6	.0	4.4	.1089	.183	.00	11.02	.36
Primary cyclone Drain	330.1	33.9	.21	22.3	.3	2.2	.2962	.246	.00	2.50	5.96
Secondary cyclone Drain	73.1	7.6	.04	5.0	.0	.5	.1021	.034	.00	.54	1.31
Dusty gas to orifice	2136.9	1649.4	33.49	128.4	1082.4	393.2	.0680	.544	9.46	.54	1.27
Heat Loss	200.0										
Total Outflow	2751.2	1707.6	33.75	156.3	1083.	400.3	.5753	1.007	9.46	14.60	8.90
Loss	760.3	-36.3	-3.32	41.4	-88.	3.9	-.4097	1.685	1.68	-4.02	10.86
Percent Loss	21.7	-2.2	-10.9	21.0	-8.9	1.0	-247.4	62.6	15.1	-38.0	54.9

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Index		Mass FlowsPounds per hour									
I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	6.34	.00	.00	.00	6.34
2	Methane	.00	.00	.00	.00	.00	9.99	.00	.00	.00	9.99
3	Ammonia	.00	.00	.00	.00	.00	1.83	.00	.00	.00	1.83
4	Water Vapor	.00	96.26	.00	.00	.00	177.74	.00	.00	.00	177.74
5	Carbon Monoxide	.00	.00	.00	.00	.00	63.46	.00	.00	.00	63.46
6	Nitrogen	.00	.00	.00	.00	176.89	707.59	18.40	.00	.00	725.99
7	Air, dry	688.49	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.43	.00	.00	.00	.43
9	Ethane	.00	.00	.00	.00	.00	.36	.00	.00	.00	.36
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.21	.00	.00	.00	.21
11	Argon	.00	.00	.00	.00	.00	7.33	.00	.00	.00	7.33
12	Carbon Dioxide	.00	.00	.00	.00	.00	177.23	.00	.00	.00	177.23
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	29.58	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	.34	.00	.30	.00	.15	.08	.08
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	1.62	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	12.14	.00	2.64	.00	1.35	.72	.57
19	Calcium Sulfide	.00	.00	.29	5.79	.00	1.96	.00	1.31	.31	.34
20	Calcium Carbonate	.00	.00	73.95	33.77	.00	5.80	.00	3.54	1.38	.88
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.14	.12	.00	.02	.00	.01	.01	.00
23	Coal Ash	.00	.00	35.17	4.43	.00	22.63	.00	11.08	7.06	4.49
24	Coal organic matter	.00	.00	255.25	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	10.09	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	39.74	.00	39.74	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	24.67	.00	.00	24.67	.00
28	BD char organic	.00	.00	.00	.00	.00	18.26	.00	.00	.00	18.26
	TOTAL GAS FLOW	688.5	96.3	.0	.0	176.9	1152.5	18.4	.0	.0	1170.9
	TOTAL MASS FLOW	688.5	96.3	396.0	66.7	176.9	1268.5	18.4	57.2	34.2	1195.5

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	83.7
2	Steam to Carbonizer	386.8
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	106.4
5	N2 Purges to carbonizer	117.3
6	Freeboard gas	1588.4
7	N2 Purges to cyclones	117.3
8	Primary cyclone Drain	171.6
9	Secondary cyclone Drain	177.8
10	Dusty gas to orifice	1070.2

TR8 - TEST POINT 4 05/13/93 Ill No.6 + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.1	688.5	.00	.0	519.9	159.7	.0000	.000	8.879	.00	.00
Steam to Carbonizer	114.7	96.3	10.77	.0	.0	85.5	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	3624.5	396.0	15.52	212.5	4.6	88.0	.4661	9.827	.000	29.78	35.31
N2 Purges to carbonizer	1.8	176.9	.00	.0	176.9	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	.2	18.4	.00	.0	18.4	.0	.0000	.000	.000	.00	.00
Total Inflow	3742.3	1376.0	26.29	212.5	719.9	333.1	.4661	9.827	8.879	29.78	35.31

OUTFLOWS

Carbonizer Drain	133.9	66.7	.07	13.6	.2	19.8	.2037	2.890	.000	25.41	4.54
Primary cyclone Drain	590.3	57.2	.33	38.6	.6	2.1	.0882	1.181	.000	3.11	11.09
Secondary cyclone Drain	366.8	34.2	.23	24.0	.4	.9	.0469	.427	.000	1.24	7.06
Dusty gas to orifice	1765.3	1195.5	29.40	101.4	727.8	323.6	.0470	.532	7.325	.95	4.50
Heat Loss	200.0										
Total Outflow	3056.2	1353.6	30.04	177.6	728.9	346.4	.3858	5.030	7.325	30.71	27.20
Loss	686.1	22.4	-3.75	34.9	-9.1	-13.3	.0803	4.797	1.554	-.94	8.11
Percent Loss	18.3	1.6	-14.3	16.4	-1.3	-4.0	17.2	48.8	17.5	-3.1	23.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass FlowsPounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	8.28	.00	.00	.00	8.28
2	Methane		.00	.00	.00	.00	.00	12.80	.00	.00	.00	12.80
3	Ammonia		.00	.00	.00	.00	.00	1.40	.00	.00	.00	1.40
4	Water Vapor		.00	139.64	.00	.00	.00	234.03	.00	.00	.00	234.03
5	Carbon Monoxide		.00	.00	.00	.00	.00	88.53	.00	.00	.00	88.53
6	Nitrogen		.00	.00	.00	.00	211.08	884.50	26.64	.00	.00	911.14
7	Air, dry		954.20	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	Ethane		.00	.00	.00	.00	.00	.31	.00	.00	.00	.31
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.04	.00	.00	.00	.04
11	Argon		.00	.00	.00	.00	.00	10.34	.00	.00	.00	10.34
12	Carbon Dioxide		.00	.00	.00	.00	.00	277.84	.00	.00	.00	277.84
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	39.47	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	.25	.00	.36	.00	.15	.10	.11
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	2.21	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	22.41	.00	5.01	.00	2.28	1.64	1.09
19	Calcium Sulfide		.00	.00	.40	8.83	.00	1.94	.00	.93	.64	.37
20	Calcium Carbonate		.00	.00	101.20	16.14	.00	6.22	.00	3.07	2.41	.74
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.19	.13	.00	.03	.00	.02	.01	.01
23	Coal Ash		.00	.00	46.93	1.13	.00	27.74	.00	13.11	7.67	6.96
24	Coal organic matter		.00	.00	340.60	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	2.59	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	41.88	.00	41.88	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	24.19	.00	.00	24.19	.00
28	BD char organic		.00	.00	.00	.00	.00	25.60	.00	.00	.00	25.60
	TOTAL GAS FLOW		954.2	139.6	.0	.0	211.1	1518.1	26.6	.0	.0	1544.7
	TOTAL MASS FLOW		954.2	139.6	531.0	51.5	211.1	1651.0	26.6	61.4	36.7	1579.6

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	80.7
2	Steam to Carbonizer	387.0
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	79.8
5	N2 Purges to carbonizer	116.6
6	Freeboard gas	1646.8
7	N2 Purges to cyclones	116.6
8	Primary cyclone Drain	158.1
9	Secondary cyclone Drain	184.6
10	Dusty gas to orifice	1209.7

TR8 - TEST POINT 5 05/13/93 Ill No. 6 + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.8	954.2	.00	.0	720.6	221.3	.0000	.00	12.31	.00	.00
Steam to Carbonizer	166.4	139.6	15.63	.0	.0	124.0	.0000	.00	.00	.00	.00
Coal & Sorbent Feeds	4834.6	531.0	20.71	283.9	6.2	118.6	.6379	13.12	.00	40.75	47.12
N2 Purges to carbonizer	2.1	211.1	.00	.0	211.1	.0	.0000	.00	.00	.00	.00
N2 Purges to cyclones	.3	26.6	.00	.0	26.6	.0	.0000	.00	.00	.00	.00
Total Inflow	5004.2	1862.6	36.33	283.9	964.5	463.9	.6379	13.12	12.31	40.75	47.12

OUTFLOWS

Carbonizer Drain	43.3	51.5	.05	4.2	.0	14.2	.1532	4.17	.00	27.38	1.26
Primary cyclone Drain	620.0	61.4	.37	40.8	.6	2.2	.0921	.94	.00	3.38	13.13
Secondary cyclone Drain	361.6	36.7	.20	23.7	.4	1.7	.0613	.53	.00	2.50	7.68
Dusty gas to orifice	2400.5	1579.6	38.20	148.5	912.7	461.1	.0634	.41	10.34	1.28	6.97
Heat Loss	200.0										
Total Outflow	3625.4	1729.1	38.82	217.1	913.7	479.2	.3699	6.04	10.34	34.53	29.03
Loss	1378.8	133.4	-2.49	66.7	50.8	-15.3	.2680	7.07	1.97	6.22	18.08
Percent Loss	27.6	7.2	-6.9	23.5	5.3	-3.3	42.0	53.9	16.0	15.3	38.4

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Mass FlowsPounds per hour

Index I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	6.75	.00	.00	.00	6.75
2	Methane	.00	.00	.00	.00	.00	12.55	.00	.00	.00	12.55
3	Ammonia	.00	.00	.00	.00	.00	.97	.00	.00	.00	.97
4	Water Vapor	.00	99.06	.00	.00	.00	232.35	.00	.00	.00	232.35
5	Carbon Monoxide	.00	.00	.00	.00	.00	96.55	.00	.00	.00	96.55
6	Nitrogen	.00	.00	.00	.00	262.98	896.95	24.87	.00	.00	921.83
7	Air, dry	916.80	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.13	.00	.00	.00	.13
9	Ethane	.00	.00	.00	.00	.00	.14	.00	.00	.00	.14
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.15	.00	.00	.00	.15
11	Argon	.00	.00	.00	.00	.00	9.19	.00	.00	.00	9.19
12	Carbon Dioxide	.00	.00	.00	.00	.00	208.60	.00	.00	.00	208.60
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	10.70	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	10.28	.00	10.42	.00	8.21	1.33	.89
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	51.31	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	2.86	.00	6.17	.00	3.91	.76	1.50
19	Calcium Sulfide	.00	.00	.22	8.04	.00	5.67	.00	4.66	.58	.44
20	Calcium Carbonate	.00	.00	71.07	9.50	.00	12.17	.00	8.22	2.19	1.76
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	1.41	.51	.00	.61	.00	.43	.09	.10
23	Coal Ash	.00	.00	50.83	21.58	.00	27.95	.00	16.30	5.00	6.65
24	Coal organic matter	.00	.00	318.47	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	29.26	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	72.83	.00	72.83	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	22.31	.00	.00	22.31	.00
28	BD char organic	.00	.00	.00	.00	.00	29.77	.00	.00	.00	29.77
	TOTAL GAS FLOW	916.8	99.1	.0	.0	263.0	1464.4	24.9	.0	.0	1489.2
	TOTAL MASS FLOW	916.8	99.1	504.0	82.0	263.0	1652.3	24.9	114.5	32.3	1530.3

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	85.2
2	Steam to Carbonizer	386.8
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	109.4
5	N2 Purges to carbonizer	126.3
6	Freeboard gas	1635.1
7	N2 Purges to cyclones	126.3
8	Primary cyclone Drain	186.0
9	Secondary cyclone Drain	145.3
10	Dusty gas to orifice	1231.6

TR8 - TEST POINT 6/7 05/13/93 Pitts No 8 + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.8	916.8	.00	.0	692.3	212.6	.00	.00	11.82	.00	.00
Steam to Carbonizer	118.0	99.1	11.09	.0	.0	88.0	.00	.00	.00	.00	.00
Coal & Sorbent Feeds	4629.5	504.0	17.18	275.0	6.7	93.9	14.79	15.56	.00	28.58	52.24
N2 Purges to carbonizer	3.2	263.0	.00	.0	263.0	.0	.00	.00	.00	.00	.00
N2 Purges to cyclones	.3	24.9	.00	.0	24.9	.0	.00	.00	.00	.00	.00
Total Inflow	4752.9	1807.7	28.27	275.0	986.9	394.6	14.79	15.56	11.82	28.58	52.24

OUTFLOWS

Carbonizer Drain	451.1	82.0	.18	28.2	.5	9.5	6.20	5.12	.00	10.31	22.09
Primary cyclone Drain	1077.9	114.5	.54	70.0	1.3	8.3	4.95	4.04	.00	8.67	16.72
Secondary cyclone Drain	329.7	32.3	.18	21.6	.4	1.8	.80	.69	.00	1.74	5.09
Dusty gas to orifice	2382.9	1530.3	36.42	136.8	923.0	414.8	.54	.80	9.19	2.02	6.75
Heat Loss	200.0										
Total Outflow	4441.6	1759.1	37.33	256.6	925.2	434.3	12.48	10.65	9.19	22.75	50.65
Loss	311.2	48.6	-9.06	18.5	61.7	-39.8	2.31	4.91	2.63	5.83	1.59
Percent Loss	6.5	2.7	-32.0	6.7	6.2	-10.1	15.6	31.6	22.2	20.4	3.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Mass FlowsPounds per hour

Index I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	6.39	.00	.00	.00	6.39
2	Methane	.00	.00	.00	.00	.00	11.55	.00	.00	.00	11.55
3	Ammonia	.00	.00	.00	.00	.00	.92	.00	.00	.00	.92
4	Water Vapor	.00	89.98	.00	.00	.00	205.72	.00	.00	.00	205.72
5	Carbon Monoxide	.00	.00	.00	.00	.00	90.77	.00	.00	.00	90.77
6	Nitrogen	.00	.00	.00	.00	274.93	847.89	23.05	.00	.00	870.94
7	Air, dry	837.74	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.13	.00	.00	.00	.13
9	Ethane	.00	.00	.00	.00	.00	.18	.00	.00	.00	.18
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.03	.00	.00	.00	.03
11	Argon	.00	.00	.00	.00	.00	8.65	.00	.00	.00	8.65
12	Carbon Dioxide	.00	.00	.00	.00	.00	185.83	.00	.00	.00	185.83
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	10.14	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	7.05	.00	3.73	.00	2.57	.19	.97
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	33.26	2.59	.00	.10	.00	.00	.10	.00
18	Calcium Oxide	.00	.00	.00	.00	.00	1.23	.00	.47	.00	.76
19	Calcium Sulfide	.00	.00	.40	8.43	.00	2.56	.00	2.03	.18	.35
20	Calcium Carbonate	.00	.00	45.72	8.41	.00	3.58	.00	2.58	.37	.63
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.63	.27	.00	.13	.00	.08	.01	.03
23	Coal Ash	.00	.00	48.16	18.03	.00	23.36	.00	15.97	1.65	5.74
24	Coal organic matter	.00	.00	301.71	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	22.68	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	70.17	.00	70.17	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	8.43	.00	.00	8.43	.00
28	BD char organic	.00	.00	.00	.00	.00	26.60	.00	.00	.00	26.60
	TOTAL GAS FLOW	837.7	90.0	.0	.0	274.9	1358.1	23.0	.0	.0	1381.1
	TOTAL MASS FLOW	837.7	90.0	440.0	67.5	274.9	1497.9	23.0	93.9	10.9	1416.2

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	78.1
2	Steam to Carbonizer	387.2
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	81.8
5	N2 Purges to carbonizer	115.9
6	Freeboard gas	1610.9
7	N2 Purges to cyclones	115.9
8	Primary cyclone Drain	175.8
9	Secondary cyclone Drain	130.1
10	Dusty gas to orifice	1225.1

TR8 - TEST POINT 8 05/13/93 Pitts No 8 + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.2	837.7	.00	.0	632.6	194.3	.000	.00	10.80	.00	.00
Steam to Carbonizer	107.2	90.0	10.07	.0	.0	79.9	.000	.00	.00	.00	.00
Coal & Sorbent Feeds	4412.2	440.0	16.28	255.8	6.3	69.9	9.588	14.83	.00	18.53	48.78
N2 Purges to carbonizer	2.7	274.9	.00	.0	274.9	.0	.000	.00	.00	.00	.00
N2 Purges to cyclones	.2	23.0	.00	.0	23.0	.0	.000	.00	.00	.00	.00
Total Inflow	4522.6	1665.7	26.35	255.8	936.9	344.1	9.588	14.83	10.80	18.53	48.78

OUTFLOWS

Carbonizer Drain	364.5	67.5	.09	21.8	.4	8.3	4.996	5.44	.00	8.05	18.30
Primary cyclone Drain	1039.2	93.9	.45	66.7	1.4	2.4	1.552	2.90	.00	2.49	16.06
Secondary cyclone Drain	125.2	10.9	.08	8.1	.1	.3	.144	.27	.00	.25	1.65
Dusty gas to orifice	2185.0	1416.2	32.79	124.0	872.1	370.6	.583	.72	8.65	.99	5.77
Heat Loss	200.0										
Total Outflow	3913.9	1588.4	33.41	220.6	874.1	381.6	7.275	9.32	8.65	11.78	41.78
Loss	608.7	77.3	-7.06	35.2	62.9	-37.5	2.313	5.51	2.16	6.74	7.00
Percent Loss	13.5	4.6	-26.8	13.8	6.7	-10.9	24.1	37.1	20.0	36.4	14.3

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	6.12	.00	.00	.00	6.12
2	Methane		.00	.00	.00	.00	.00	11.75	.00	.00	.00	11.75
3	Ammonia		.00	.00	.00	.00	.00	1.07	.00	.00	.00	1.07
4	Water Vapor		.00	54.97	.00	.00	.00	172.03	.00	.00	.00	172.03
5	Carbon Monoxide		.00	.00	.00	.00	.00	96.53	.00	.00	.00	96.53
6	Nitrogen		.00	.00	.00	.00	277.35	833.91	22.88	.00	.00	856.79
7	Air, dry		800.42	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.10	.00	.00	.00	.10
9	Ethane		.00	.00	.00	.00	.00	.14	.00	.00	.00	.14
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.01	.00	.00	.00	.01
11	Argon		.00	.00	.00	.00	.00	8.32	.00	.00	.00	8.32
12	Carbon Dioxide		.00	.00	.00	.00	.00	166.26	.00	.00	.00	166.26
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	9.86	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	5.55	.00	3.07	.00	1.60	.68	.79
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	34.92	.00	.00	1.47	.00	1.47	.00	.00
18	Calcium Oxide		.00	.00	.00	.85	.00	.40	.00	.00	.18	.22
19	Calcium Sulfide		.00	.00	.42	4.83	.00	2.94	.00	2.15	.48	.31
20	Calcium Carbonate		.00	.00	48.00	6.06	.00	4.63	.00	2.25	1.05	1.33
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.66	.19	.00	.13	.00	.07	.03	.03
23	Coal-Ash		.00	.00	46.82	18.15	.00	21.37	.00	11.90	4.52	4.94
24	Coal organic matter		.00	.00	293.33	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	37.98	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	48.75	.00	48.75	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	24.61	.00	.00	24.61	.00
28	BD char organic		.00	.00	.00	.00	.00	24.61	.00	.00	.00	24.61
	TOTAL GAS FLOW		800.4	55.0	.0	.0	277.4	1296.2	22.9	.0	.0	1319.1
	TOTAL MASS FLOW		800.4	55.0	434.0	73.6	277.4	1428.2	22.9	68.2	31.6	1351.3

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	80.0
2	Steam to Carbonizer	387.1
3	Coal & Sorbent Feeds	70.0
4	Carbonizer Drain	81.5
5	N2 Purges to carbonizer	122.6
6	Freeboard gas	1603.0
7	N2 Purges to cyclones	122.6
8	Primary cyclone Drain	154.7
9	Secondary cyclone Drain	136.3
10	Dusty gas to orifice	1206.0

TR8 - TEST POINT 9 05/13/93 Pitts No 8 + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.6	800.4	.00	.0	604.5	185.6	.00	.00	10.32	.00	.00
Steam to Carbonizer	65.5	55.0	6.15	.0	.0	48.8	.00	.00	.00	.00	.00
Coal & Sorbent Feeds	4284.8	434.0	15.83	249.5	6.1	71.1	10.07	14.43	.00	19.45	47.48
N2 Purges to carbonizer	3.1	277.4	.00	.0	277.4	.0	.00	.00	.00	.00	.00
N2 Purges to cyclones	.3	22.9	.00	.0	22.9	.0	.00	.00	.00	.00	.00
Total Inflow	4354.3	1589.6	21.98	249.5	910.8	305.6	10.07	14.43	10.32	19.45	47.48

OUTFLOWS

Carbonizer Drain	597.5	73.6	.19	36.4	.6	5.4	3.35	3.64	.00	5.72	18.35
Primary cyclone Drain	731.2	68.2	.33	46.7	.9	2.6	1.39	2.27	.00	2.09	11.97
Secondary cyclone Drain	361.5	31.6	.17	23.6	.4	.8	.41	.77	.00	.81	4.55
Dusty gas to orifice	2103.6	1351.3	28.75	119.4	858.2	329.8	.48	.60	8.32	.86	4.97
Heat Loss	200.0										
Total Outflow	3993.8	1524.7	29.44	226.0	860.1	338.5	5.62	7.29	8.32	9.49	39.84
Loss	360.5	64.9	-7.46	23.4	50.7	-32.9	4.45	7.14	2.00	9.97	7.64
Percent Loss	8.3	4.1	-34.0	9.4	5.6	-10.8	44.2	49.5	19.4	51.2	16.1

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass FlowsPounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	5.89	.00	.00	.00	5.89
2	Methane		.00	.00	.00	.00	.00	13.99	.00	.00	.00	13.99
3	Ammonia		.00	.00	.00	.00	.00	1.01	.00	.00	.00	1.01
4	Water Vapor		.00	55.01	.00	.00	.00	203.75	.00	.00	.00	203.75
5	Carbon Monoxide		.00	.00	.00	.00	.00	77.34	.00	.00	.00	77.34
6	Nitrogen		.00	.00	.00	.00	263.97	758.40	22.51	.00	.00	780.91
7	Air, dry		737.87	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.11	.00	.00	.00	.11
9	Ethane		.00	.00	.00	.00	.00	.20	.00	.00	.00	.20
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	1.79	.00	.00	.00	1.79
11	Argon		.00	.00	.00	.00	.00	7.16	.00	.00	.00	7.16
12	Carbon Dioxide		.00	.00	.00	.00	.00	139.89	.00	.00	.00	139.89
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	9.86	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	2.29	.00	1.77	.00	1.38	.01	.38
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	16.63	3.41	.00	.06	.00	.05	.01	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	.50	.00	.00	.00	.50
19	Calcium Sulfide		.00	.00	.20	4.45	.00	1.83	.00	1.59	.02	.22
20	Calcium Carbonate		.00	.00	22.86	3.10	.00	1.76	.00	1.53	.02	.21
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.31	.13	.00	.07	.00	.05	.00	.02
23	Coal Ash		.00	.00	46.82	18.61	.00	15.92	.00	13.14	.22	2.55
24	Coal organic matter		.00	.00	293.33	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	61.89	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	70.60	.00	70.60	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	1.23	.00	.00	1.23	.00
28	BD char organic		.00	.00	.00	.00	.00	12.93	.00	.00	.00	12.93
	TOTAL GAS FLOW		737.9	55.0	.0	.0	264.0	1209.5	22.5	.0	.0	1232.0
	TOTAL MASS FLOW		737.9	55.0	390.0	93.9	264.0	1316.2	22.5	88.3	1.5	1248.9

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	88.6
2	Steam to Carbonizer	386.9
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	158.0
5	N2 Purges to carbonizer	128.4
6	Freeboard gas	1614.3
7	N2 Purges to cyclones	128.4
8	Primary cyclone Drain	175.8
9	Secondary cyclone Drain	134.0
10	Dusty gas to orifice	1198.6

TR8 - TEST POINT 10 05/13/93 Pitts No 8 + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	2.1	737.9	.00	.0	557.2	171.1	.000	.00	9.516	.000	.00
Steam to Carbonizer	65.6	55.0	6.16	.0	.0	48.8	.000	.00	.000	.000	.00
Coal & Sorbent Feeds	4315.2	390.0	15.83	243.9	6.1	48.7	4.794	14.33	.000	9.264	47.13
N2 Purges to carbonizer	3.4	264.0	.00	.0	264.0	.0	.000	.00	.000	.000	.00
N2 Purges to cyclones	.3	22.5	.00	.0	22.5	.0	.000	.00	.000	.000	.00
Total Inflow	4386.5	1469.4	21.98	243.9	849.8	268.6	4.794	14.33	9.516	9.264	47.13

OUTFLOWS

Carbonizer Drain	920.3	93.9	.20	58.6	1.1	4.3	2.365	4.85	.000	3.714	18.74
Primary cyclone Drain	1040.1	88.3	.46	67.4	1.2	1.3	.848	2.46	.000	1.497	13.19
Secondary cyclone Drain	18.2	1.5	.01	1.2	.0	.0	.011	.03	.000	.019	.22
Dusty gas to orifice	1905.6	1248.9	32.66	94.5	782.0	327.2	.229	1.97	7.156	.562	2.57
Heat Loss	200.0										
Total Outflow	4084.2	1432.6	33.33	221.6	784.3	332.9	3.452	9.31	7.156	5.793	34.72
Loss	302.3	36.8	-11.35	22.2	65.5	-64.3	1.342	5.02	2.360	3.471	12.41
Percent Loss	6.9	2.5	-51.6	9.1	7.7	-23.9	28.0	35.0	24.8	37.5	26.3

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Unreconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.0	.0	.0	.0	.0	10.0	.0	.0	.0	10.0
2	Methane	.0	.0	.0	.0	.0	23.2	.0	.0	.0	23.2
3	Ammonia	.0	.0	.0	.0	.0	4.4	.0	.0	.0	4.4
4	Water Vapor	.0	150.7	.0	.0	.0	395.9	.0	.0	.0	395.9
5	Carbon Monoxide	.0	.0	.0	.0	.0	98.0	.0	.0	.0	98.0
6	Nitrogen	.0	.0	.0	.0	50.6	1082.7	269.2	.0	.0	1351.9
7	Air, dry	1158.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	Ethlyene	.0	.0	.0	.0	.0	1.2	.0	.0	.0	1.2
9	Ethane	.0	.0	.0	.0	.0	.2	.0	.0	.0	.2
10	Hydrogen Sulfide	.0	.0	.0	.0	.0	1.6	.0	.0	.0	1.6
11	Argon	.0	.0	.0	.0	.0	12.3	.0	.0	.0	12.3
12	Carbon Dioxide	.0	.0	.0	.0	.0	292.6	.0	.0	.0	292.6
13	Sulfur Dioxide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	Water Moisture	.0	.0	16.9	.0	.0	.0	.0	.0	.0	.0
15	Magnesium Oxide	.0	.0	.0	.0	.0	16.9	.0	.0	13.2	3.7
16	Magnesium Sulfide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	Magnesium Carbonate	.0	.0	38.5	.0	.0	.0	.0	.0	.0	.0
18	Calcium Oxide	.0	.0	.0	.0	.0	4.9	.0	.0	.7	4.2
19	Calcium Sulfide	.0	.0	.8	.0	.0	13.1	.0	.0	11.2	1.9
20	Calcium Carbonate	.0	.0	101.8	.0	.0	21.6	.0	.0	20.6	1.1
21	Calcium Sulfate	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	Sorbent Inerts	.0	.0	1.9	.0	.0	.9	.0	.0	.7	.2
23	Coal Ash	.0	.0	54.7	.0	.0	50.7	.0	.0	40.7	9.9
24	Coal organic matter	.0	.0	453.5	.0	.0	.0	.0	.0	.0	.0
25	CD char organic	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
26	PD char organic	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
27	SD char organic	.0	.0	.0	.0	.0	132.5	.0	.0	132.5	.0
28	BD char organic	.0	.0	.0	.0	.0	51.5	.0	.0	.0	51.5
	TOTAL GAS FLOW	1158.5	150.7	.0	.0	50.6	1922.1	269.2	.0	.0	2191.4
	TOTAL MASS FLOW	1158.5	150.7	668.0	.0	50.6	2214.2	269.2	.0	219.7	2263.8

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	79.7
2	Steam to Carbonizer	387.9
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	176.3
5	N2 Purges to carbonizer	156.1
6	Freeboard gas	1652.3
7	N2 Purges to cyclones	156.1
8	Primary cyclone Drain	514.8
9	Secondary cyclone Drain	288.4
10	Dusty gas to orifice	1115.9

TR10 - TEST POINT 1 9/1/92 Pittsburgh Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.8	1158.5	.00	.0	875.	268.7	.00	.00	14.94	.00	.00
Steam to Carbonizer	179.6	150.7	16.86	.0	0.	133.8	.00	.00	.00	.00	.00
Coal & Sorbent Feeds	6593.2	668.0	27.72	385.4	10.	118.5	11.10	17.21	.00	41.20	56.60
N2 Purges to carbonizer	1.0	50.6	.00	.0	51.	.0	.00	.00	.00	.00	.00
N2 Purges to cyclones	5.3	269.2	.00	.0	269.	.0	.00	.00	.00	.00	.00
Total Inflow	6779.9	2297.0	44.58	385.4	1205.	521.0	11.10	17.21	14.94	41.20	56.60

OUTFLOWS

Carbonizer Drain	.0	.0	.00	.0	0.	.0	.00	.00	.00	.00	.00
Primary cyclone Drain	.0	.0	.00	.0	0.	.0	.00	.00	.00	.00	.00
Secondary cyclone Drain	2014.6	219.7	.73	127.8	3.	15.3	7.97	8.40	.00	15.00	41.42
Dusty gas to orifice	3580.1	2263.8	61.78	189.5	1357.	623.5	2.20	3.19	12.30	4.44	10.15
Heat Loss	200.0										
Total Outflow	5794.6	2483.4	62.51	317.2	1360.	638.8	10.17	11.59	12.30	19.44	51.57
Loss	985.2	-186.4	-17.93	68.2	-155.	-117.8	.92	5.62	2.64	21.76	5.03
Percent Loss	14.5	-8.1	-40.2	17.7	-12.9	-22.6	8.3	32.6	17.6	52.8	8.9
Closure (out/in) %	85.5	108.1	140.2	82.3	112.9	122.6	91.7	67.4	82.4	47.2	91.1

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.0	.0	.0	.0	.0	3.6	.0	.0	.0	3.6
2	Methane	.0	.0	.0	.0	.0	7.1	.0	.0	.0	7.1
3	Ammonia	.0	.0	.0	.0	.0	1.5	.0	.0	.0	1.5
4	Water Vapor	.0	.1	.0	.0	.0	103.7	.0	.0	.0	103.7
5	Carbon Monoxide	.0	.0	.0	.0	.0	54.9	.0	.0	.0	54.9
6	Nitrogen	.0	.0	.0	.0	183.6	1042.6	267.7	.0	.0	1310.3
7	Air, dry	736.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	Ethlyene	.0	.0	.0	.0	.0	1.0	.0	.0	.0	1.0
9	Ethane	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10	Hydrogen Sulfide	.0	.0	.0	.0	.0	.3	.0	.0	.0	.3
11	Argon	.0	.0	.0	.0	.0	6.9	.0	.0	.0	6.9
12	Carbon Dioxide	.0	.0	.0	.0	.0	125.6	.0	.0	.0	125.6
13	Sulfur Dioxide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	Water Moisture	.0	.0	7.5	.0	.0	.0	.0	.0	.0	.0
15	Magnesium Oxide	.0	.0	.0	.0	.0	6.1	.0	.0	1.9	4.3
16	Magnesium Sulfide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	Magnesium Carbonate	.0	.0	5.0	.0	.0	.0	.0	.0	.0	.0
18	Calcium Oxide	.0	.0	.0	.0	.0	7.3	.0	.0	2.2	5.1
19	Calcium Sulfide	.0	.0	.1	.0	.0	4.7	.0	.0	2.1	2.6
20	Calcium Carbonate	.0	.0	26.3	.0	.0	4.3	.0	.0	1.7	2.6
21	Calcium Sulfate	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	Sorbent Inerts	.0	.0	.5	.0	.0	.5	.0	.0	.2	.3
23	Coal Ash	.0	.0	24.2	.0	.0	23.1	.0	.0	8.3	14.8
24	Coal organic matter	.0	.0	200.4	.0	.0	.0	.0	.0	.0	.0
25	CD char organic	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
26	PD char organic	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
27	SD char organic	.0	.0	.0	.0	.0	31.1	.0	.0	31.1	.0
28	BD char organic	.0	.0	.0	.0	.0	72.0	.0	.0	.0	72.0
	TOTAL GAS FLOW	736.2	.1	.0	.0	183.6	1347.1	267.7	.0	.0	1614.8
	TOTAL MASS FLOW	736.2	.1	264.0	.0	183.6	1496.2	267.7	.0	47.5	1716.4

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	84.3
2	Steam to Carbonizer	387.4
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	85.1
5	N2 Purges to carbonizer	160.8
6	Freeboard gas	1617.6
7	N2 Purges to cyclones	160.8
8	Primary cyclone Drain	514.8
9	Secondary cyclone Drain	193.7
10	Dusty gas to orifice	868.3

TR10 - TEST POINT 2 9/1/92 Pittsburgh Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.3	736.2	.00	.0	556.	170.7	.000	.000	9.495	.00	.00
Steam to Carbonizer	.2	.1	.01	.0	0.	.1	.000	.000	.000	.00	.00
Coal & Sorbent Feeds	2934.6	264.0	12.25	166.4	5.	36.6	1.451	7.506	.000	10.61	24.69
N2 Purges to carbonizer	3.8	183.6	.00	.0	184.	.0	.000	.000	.000	.00	.00
N2 Purges to cyclones	5.6	267.7	.00	.0	268.	.0	.000	.000	.000	.00	.00
Total Inflow	2945.5	1451.6	12.26	166.4	1012.	207.4	1.451	7.506	9.495	10.61	24.69
OUTFLOWS											
Carbonizer Drain	.0	.0	.00	.0	0.	.0	.000	.000	.000	.00	.00
Primary cyclone Drain	.0	.0	.00	.0	0.	.0	.000	.000	.000	.00	.00
Secondary cyclone Drain	459.7	47.5	.17	29.5	1.	2.2	1.122	1.817	.000	3.46	8.49
Dusty gas to orifice	2197.2	1716.4	18.07	132.5	1313.	219.1	2.574	2.640	6.912	6.13	15.06
Heat Loss	200.0										
Total Outflow	2857.0	1763.9	18.24	162.0	1314.	221.3	3.696	4.457	6.912	9.58	23.55
Loss	88.5	-312.3	-5.98	4.4	-302.	-13.9	-2.245	3.049	2.583	1.02	1.14
Percent Loss	3.0	-21.5	-48.7	2.7	-29.9	-6.7	-154.7	40.6	27.2	9.6	4.6
Closure (out/in) %	97.0	121.5	148.7	97.3	129.9	106.7	254.7	59.4	72.8	90.4	95.4

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index		Mass Flows, Pounds per hour									
I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.0	.0	.0	.0	.0	4.9	.0	.0	.0	4.9
2	Methane	.0	.0	.0	.0	.0	11.1	.0	.0	.0	11.1
3	Ammonia	.0	.0	.0	.0	.0	1.4	.0	.0	.0	1.4
4	Water Vapor	.0	.3	.0	.0	.0	119.9	.0	.0	.0	119.9
5	Carbon Monoxide	.0	.0	.0	.0	.0	84.1	.0	.0	.0	84.1
6	Nitrogen	.0	.0	.0	.0	87.7	1001.5	267.2	.0	.0	1268.7
7	Air, dry	845.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	Ethlyene	.0	.0	.0	.0	.0	1.0	.0	.0	.0	1.0
9	Ethane	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10	Hydrogen Sulfide	.0	.0	.0	.0	.0	.3	.0	.0	.0	.3
11	Argon	.0	.0	.0	.0	.0	8.6	.0	.0	.0	8.6
12	Carbon Dioxide	.0	.0	.0	.0	.0	147.7	.0	.0	.0	147.7
13	Sulfur Dioxide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	Water Moisture	.0	.0	9.6	.0	.0	.0	.0	.0	.0	.0
15	Magnesium Oxide	.0	.0	.0	.0	.0	5.5	.0	.0	4.1	1.4
16	Magnesium Sulfide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	Magnesium Carbonate	.0	.0	3.9	.0	.0	.0	.0	.0	.0	.0
18	Calcium Oxide	.0	.0	.0	.0	.0	2.8	.0	.0	1.1	1.7
19	Calcium Sulfide	.0	.0	.1	.0	.0	7.3	.0	.0	6.4	1.0
20	Calcium Carbonate	.0	.0	20.6	.0	.0	7.9	.0	.0	7.2	.7
21	Calcium Sulfate	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	Sorbent Inerts	.0	.0	.4	.0	.0	.5	.0	.0	.4	.1
23	Coal Ash	.0	.0	31.2	.0	.0	25.2	.0	.0	18.7	6.4
24	Coal organic matter	.0	.0	259.1	.0	.0	.0	.0	.0	.0	.0
25	CD char organic	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
26	PD char organic	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
27	SD char organic	.0	.0	.0	.0	.0	69.2	.0	.0	69.2	.0
28	BD char organic	.0	.0	.0	.0	.0	30.3	.0	.0	.0	30.3
	TOTAL GAS FLOW	845.2	.3	.0	.0	87.7	1380.6	267.2	.0	.0	1647.8
	TOTAL MASS FLOW	845.2	.3	325.0	.0	87.7	1529.2	267.2	.0	107.0	1689.4

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	76.3
2	Steam to Carbonizer	387.8
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	75.7
5	N2 Purges to carbonizer	157.2
6	Freeboard gas	1677.5
7	N2 Purges to cyclones	157.2
8	Primary cyclone Drain	514.8
9	Secondary cyclone Drain	188.3
10	Dusty gas to orifice	917.2

TR10 - TEST POINT 3 9/2/92 Pittsburgh Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	-.1	845.2	.00	.0	638.3	196.0	.000	.000	10.90	.000	.00
Steam to Carbonizer	.3	.3	.03	.0	.0	.3	.000	.000	.00	.000	.00
Coal & Sorbent Feeds	3806.6	325.0	15.84	213.2	5.9	39.4	1.134	9.676	.00	8.287	31.66
N2 Purges to carbonizer	1.7	87.7	.00	.0	87.7	.0	.000	.000	.00	.000	.00
N2 Purges to cyclones	5.3	267.2	.00	.0	267.2	.0	.000	.000	.00	.000	.00
Total Inflow	3813.8	1525.4	15.87	213.2	999.1	235.7	1.134	9.676	10.90	8.287	31.66
OUTFLOWS											
Carbonizer Drain	.0	.0	.00	.0	.0	.0	.000	.000	.00	.000	.00
Primary cyclone Drain	.0	.0	.00	.0	.0	.0	.000	.000	.00	.000	.00
Secondary cyclone Drain	1040.4	107.0	.25	65.8	1.7	5.4	2.462	5.116	.00	7.181	19.10
Dusty gas to orifice	1937.0	1689.4	21.77	114.5	1270.6	263.3	.828	1.257	8.59	2.058	6.53
Heat Loss	200.0										
Total Outflow	3177.4	1796.5	22.02	180.3	1272.	268.7	3.290	6.373	8.59	9.239	25.63
Loss	636.5	-271.0	-6.15	32.8	-273.	-33.0	-2.157	3.302	2.31	-.953	6.03
Percent Loss	16.7	-17.8	-38.7	15.4	-27.3	-14.0	-190.2	34.1	21.2	-11.5	19.1
Closure (out/in) %	83.3	117.8	138.7	84.6	127.3	114.0	290.2	65.9	78.8	111.5	80.9

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Unreconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.0	.0	.0	.0	.0	3.6	.0	.0	.0	3.6
2	Methane	.0	.0	.0	.0	.0	9.9	.0	.0	.0	9.9
3	Ammonia	.0	.0	.0	.0	.0	1.9	.0	.0	.0	1.9
4	Water Vapor	.0	.3	.0	.0	.0	122.1	.0	.0	.0	122.1
5	Carbon Monoxide	.0	.0	.0	.0	.0	38.3	.0	.0	.0	38.3
6	Nitrogen	.0	.0	.0	.0	111.4	817.9	271.4	.0	.0	1089.3
7	Air, dry	641.6	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	Ethlyene	.0	.0	.0	.0	.0	1.9	.0	.0	.0	1.9
9	Ethane	.0	.0	.0	.0	.0	.1	.0	.0	.0	.1
10	Hydrogen Sulfide	.0	.0	.0	.0	.0	.5	.0	.0	.0	.5
11	Argon	.0	.0	.0	.0	.0	5.9	.0	.0	.0	5.9
12	Carbon Dioxide	.0	.0	.0	.0	.0	112.6	.0	.0	.0	112.6
13	Sulfur Dioxide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	Water Moisture	.0	.0	9.2	.0	.0	.0	.0	.0	.0	.0
15	Magnesium Oxide	.0	.0	.0	.0	.0	3.5	.0	.0	2.7	.7
16	Magnesium Sulfide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	Magnesium Carbonate	.0	.0	3.9	.0	.0	.4	.0	.0	.4	.0
18	Calcium Oxide	.0	.0	.0	.0	.0	.7	.0	.0	.0	.7
19	Calcium Sulfide	.0	.0	.1	.0	.0	7.3	.0	.0	6.6	.7
20	Calcium Carbonate	.0	.0	20.6	.0	.0	5.2	.0	.0	5.1	.1
21	Calcium Sulfate	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	Sorbent Inerts	.0	.0	.4	.0	.0	.3	.0	.0	.3	.0
23	Coal Ash	.0	.0	29.8	.0	.0	25.3	.0	.0	20.6	4.7
24	Coal organic matter	.0	.0	247.0	.0	.0	.0	.0	.0	.0	.0
25	CD char organic	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
26	PD char organic	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
27	SD char organic	.0	.0	.0	.0	.0	69.5	.0	.0	69.5	.0
28	BD char organic	.0	.0	.0	.0	.0	25.1	.0	.0	.0	25.1
	TOTAL GAS FLOW	641.6	.3	.0	.0	111.4	1114.8	271.4	.0	.0	1386.2
	TOTAL MASS FLOW	641.6	.3	311.0	.0	111.4	1252.0	271.4	.0	105.2	1418.2

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	77.3
2	Steam to Carbonizer	387.8
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	72.0
5	N2 Purges to carbonizer	153.3
6	Freeboard gas	1570.7
7	N2 Purges to cyclones	153.3
8	Primary cyclone Drain	514.8
9	Secondary cyclone Drain	201.7
10	Dusty gas to orifice	813.4

TR10 - TEST POINT 4 9/2/92 Pittsburgh Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.0	641.6	.00	.0	484.5	148.8	.000	.000	8.275	.000	.00
Steam to Carbonizer	.3	.3	.03	.0	.0	.2	.000	.000	.000	.000	.00
Coal & Sorbent Feeds	3627.2	311.0	15.10	203.4	5.6	38.1	1.134	9.226	.000	8.287	30.20
N2 Purges to carbonizer	2.1	111.4	.00	.0	111.4	.0	.000	.000	.000	.000	.00
N2 Purges to cyclones	5.1	271.4	.00	.0	271.4	.0	.000	.000	.000	.000	.00
Total Inflow	3634.8	1335.6	15.13	203.4	872.9	187.1	1.134	9.226	8.275	8.287	30.20

OUTFLOWS

Carbonizer Drain	.0	.0	.00	.0	.0	.0	.000	.000	.000	.000	.00
Primary cyclone Drain	.0	.0	.00	.0	.0	.0	.000	.000	.000	.000	.00
Secondary cyclone Drain	1049.7	105.2	.35	65.4	1.8	3.8	1.776	5.557	.000	5.696	20.92
Dusty gas to orifice	1482.6	1418.2	20.65	80.1	1091.4	212.7	.452	1.217	5.918	.914	4.73
Heat Loss	200.0										
Total Outflow	2732.2	1523.4	20.99	145.5	1093.	216.5	2.229	6.774	5.918	6.611	25.65
Loss	902.6	-187.7	-5.87	57.9	-220.	-29.4	-1.095	2.452	2.357	1.676	4.55
Percent Loss	24.8	-14.1	-38.8	28.5	-25.2	-15.7	-96.5	26.6	28.5	20.2	15.1
Closure (out/in) %	75.2	114.1	138.8	71.5	125.2	115.7	196.5	73.4	71.5	79.8	84.9

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

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APPENDIX B

TEMPORAL VARIATIONS IN MEASUREMENTS

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A total of 36 set points (steady-state periods) were achieved while operating the carbonizer in a jetting fluidized-bed mode, and 4 set points were achieved while operating the carbonizer in a circulating fluidized-bed mode. Table B.1 summarizes the coal and sorbent types used, date, duration, pressure, and bed and freeboard temperatures for each of these steady-state periods.

The material and energy balances are based an average values of measurements taken during the steady-state period: they represent an average value over one or more samples (representing the same quantity) during the period, for a reading which might undergo some temporal or random fluctuation. Tables summarizing the average values of several key measurements along with their minimum values, maximum values, and standard deviation values (indicating the degree of fluctuations) for each of the set points are given in this appendix.

The temperature distribution in the carbonizer bed is also included in these tables.

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Table B.1. SUMMARY OF STEADY-STATE PERIODS FROM CARBONIZER PILOT PLANT OPERATION

Set Point	Coal Feed	Sorbent Feed	Date	Duration, hours	Pressure, psig	Bed Temp., °F	Freeboard Temp., °F
TR1-1	Pittsburgh No 8	Dolomite	11/20/91	0300-0700	152.6	1584	1553
TR1-2	Pittsburgh No 8	Dolomite	11/21/91	0200-0600	132.9	1681	1651
TR1-3	Pittsburgh No 8	Dolomite	11/21/91	1000-1400	144.7	1608	1581
TR1-4	Pittsburgh No 8	Dolomite	11/21/91	2100-2330	125.4	1482	1440
TR2-1	Pittsburgh No 8	Dolomite	12/19/91	0100-0500	139.8	1698	1652
TR2-2	Pittsburgh No 8	Dolomite	12/19/91	1300-1700	128.3	1598	1567
TR2-3	Pittsburgh No 8	Dolomite	12/20/91	0100-0500	138.1	1797	1705
TR2-4	Pittsburgh No 8	Dolomite	12/20/91	1000-1400	191.8	1784	1738
TR2-5	Pittsburgh No 8	Dolomite	12/20/91	1600-1800	198.6	1679	1675
TR4-1	Pittsburgh No 8	Dolomite	3/10/92	2030-0030	153.3	1663	1626
TR4-2	Pittsburgh No 8	Dolomite	3/11/92	0430-0830	155.9	1608	1573
TR4-3	Pittsburgh No 8	Dolomite	3/12/92	0230-0630	125.2	1708	1643
TR4-4	Pittsburgh No 8	Dolomite	3/12/92	1600-2000	129.1	1607	1568
TR4-5	Pittsburgh No 8	Dolomite	3/13/92	0530-0930	193.2	1720	1691
TR4-6	Pittsburgh No 8	Dolomite	3/13/92	1300-1700	175.8	1713	1681
TR4-7	Pittsburgh No 8	Dolomite	3/13/92	2200-0200	177.9	1601	1582
TR4-8	Pittsburgh No 8	Dolomite	3/14/92	0200-0600	182.2	1618	1600
TR5-1	Pittsburgh No 8	Dolomite	3/24/92	1100-1500	134.3	1693	1653
TR5-2	Pittsburgh No 8	Dolomite	3/24/92	1900-2300	154.8	1701	1662
TR5-3	Pittsburgh No 8	Limestone	3/25/92	0500-0900	147.4	1706	1667
TR6-1	Wyoming	Limestone	4/21/92	2100-0100	145.9	1580	1567
TR6-2	Wyoming	Limestone	4/22/92	0430-0830	129.8	1509	1500
TR6-3	Wyoming	Limestone	4/22/92	1400-1800	157.5	1511	1515
TR6-4	Wyoming	Limestone	4/22/92	2100-0100	191.9	1609	1579
TR6-5	Wyoming	Limestone	4/23/92	0400-0800	189.6	1632	1593
TR6-6	Illinois No 6	Limestone	4/23/92	1800-2200	143.5	1600	1573
TR6-7	Illinois No 6	Limestone	4/23/92	2300-0330	122.4	1599	1573
TR8-1	Wyoming	Limestone	6/10/92	2000-0100	128.6	1476	1432
TR8-2	Wyoming	Limestone	6/11/92	0300-0800	132.7	1593	1541
TR8-3	Wyoming	Limestone	6/11/92	1330-1730	156.5	1613	1575
TR8-4	Illinois No 6	Limestone	6/12/92	2100-0200	113.2	1652	1623
TR8-5	Illinois No 6	Limestone	6/13/92	0700-1100	160.6	1715	1680
TR8-6/7	Pittsburgh No 8	Dolomite	6/14/92	2100-0100	156.0	1699	1675
TR8-8	Pittsburgh No 8	Dolomite	6/16/92	0200-0600	143.5	1707	1683
TR8-9	Pittsburgh No 8	Dolomite	6/16/92	0800-1230	135.0	1713	1683
TR8-10	Pittsburgh No 8	Dolomite	6/16/92	1430-1930	126.5	1729	1697
TR10-1*	Pittsburgh No 8	Limestone	9/1/92	0200-0600	113.7	1675	1652
TR10-2*	Pittsburgh No 8	Limestone	9/1/92	1630-2100	68.7	1675	1618
TR10-3*	Pittsburgh No 8	Limestone	9/2/92	0000-0400	72.7	1706	1677
TR10-4*	Pittsburgh No 8	Limestone	9/2/92	0610-1240	55.9	1601	1571

*The carbonizer was operated in a circulating fluidized-bed mode during Test TR10.

TR1 - TEST POINT 1

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	152.621	3.519	158.250	144.609
PI-3106	ORIFICE PRESSURE, PSIG	149.991	3.448	155.648	142.102
PI-7040	BOILER STEAM PRESSURE, PSIG				
FIC-1055	TOTAL AIR FEED, LB/HR	627.897	6.145	644.951	615.484
FIC-1053	TRANSPORT N2 FEED, SCFM	0.000	0.000	0.000	0.000
FI-3028	BED DRAIN N2 FEED, SCFM	74.153	10.743	45.654	49.400
FI-4051	N2 TO SPRAY TOWER, SCFM	43.985	0.882	46.317	40.824
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	12.120	1.520	15.000	8.900
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	26.646	0.530	27.679	24.780
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.991	0.063	7.148	6.638
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.957	0.068	4.040	3.641
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	1121.573	67.850	1379.177	883.654
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	1005.501	53.723	1118.971	734.070
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR		9.068	625.073	578.710
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	10.698	0.492	11.516	9.990
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	2.728	0.261	3.027	2.391
SI-3033B	BED DRAIN SCREW RATE, RPM	32.995	0.038	33.093	32.861
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	6.165	0.379	7.145	5.372
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	8.307	0.656	10.743	7.033
PDI-3057	BED LEVEL DP, IN H2O	65.646	2.808	71.927	60.334
PDI-3009	BED LEVEL DP, IN H2O	51.993	2.326	56.960	47.139
TI-1059	AIR FEED TEMP, F	89.345	2.597	92.148	83.711
TIC-3027	BED DRAIN TEMP, F	96.345	30.356	252.344	78.438
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	144.277	7.201	162.500	132.266
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	178.968	15.150	214.258	153.359
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1505.330	13.964	1530.915	1473.909
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1552.637	13.481	1579.375	1521.406
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1542.179	14.023	1570.379	1507.398
TI-3015	CARB BED TEMP (AT 12 FT), F	1572.412	14.494	1603.711	1532.195
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1610.896	15.226	1642.434	1563.191
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1640.721	16.407	1677.203	1597.691
TI-3021	CARB BED TEMP (AT 1.3 FT), F	1619.400	12.600	1641.700	1588.900
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	231.001	3.722	235.570	224.250
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	207.007	1.675	210.324	203.766
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	197.288	1.317	199.363	194.961
TI-3108	ORIFICE TEMP, F	1257.901	7.044	1272.637	1244.336
TI-7012	PURGE N2 TEMP, F	86.356	1.994	90.742	83.164
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	208.663	24.753	314.363	194.422
TI-3089	15# STEAM TEMP, F	264.276	0.240	264.961	263.672
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	212.366	1.270	228.293	211.852
TI-7041	BOILER STEAM TEMPERATURE, F				
LCP-34	REPORTED BED LEVEL, FT	26.028	0.919	29.161	24.061

TR1 - TEST POINT 2

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	132.900	1.363	135.633	129.563
PI-3106	ORIFICE PRESSURE, PSIG	130.436	1.320	133.125	127.195
PI-7040	BOILER STEAM PRESSURE, PSIG				
FIC-1055	TOTAL AIR FEED, LB/HR	586.528	5.842	599.691	574.799
FIC-1053	TRANSPORT N2 FEED, SCFM	14.442	6.153	27.333	7.459
FI-3028	BED DRAIN N2 FEED, SCFM	40.718	0.463	42.425	38.880
FI-4051	N2 TO SPRAY TOWER, SCFM	47.703	0.789	49.394	45.252
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	11.773	2.907	17.759	6.523
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	28.567	0.283	29.403	27.353
FI-7021	PURGE N2 TO CARBONIZER, SCFM	7.084	0.053	7.297	6.830
FI-7022	PURGE N2 TO CYCLONES, SCFM	4.026	0.077	4.185	3.747
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	1119.123	40.799	1272.786	1048.260
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	1017.417	27.588	1113.713	934.833
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR				
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	7.716	0.350	8.273	6.938
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	2.053	0.037	2.112	1.923
SI-3033B	BED DRAIN SCREW RATE, RPM	13.717	8.360	30.161	1.586
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	6.163	0.192	6.713	5.691
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	7.901	0.387	9.108	6.943
PDI-3057	BED LEVEL DP, IN H2O	41.470	2.254	46.629	37.436
PDI-3009	BED LEVEL DP, IN H2O	24.022	2.246	29.159	19.493
TI-1059	AIR FEED TEMP, F	84.919	1.195	87.852	83.086
TIC-3027	BED DRAIN TEMP, F	112.222	34.755	248.984	84.375
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	156.335	10.269	188.008	137.813
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	178.294	7.529	201.406	163.438
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1590.771	3.044	1595.715	1580.891
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1650.672	4.606	1658.281	1638.281
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1657.794	7.576	1671.363	1636.953
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1672.964	8.833	1689.063	1649.891
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1695.620	8.603	1710.670	1674.485
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1728.360	8.561	1748.337	1708.087
TI-3021	CARB BED TEMP (AT 1.3 FT), F	1706.600	6.600	1718.400	1692.400
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	228.952	0.966	231.438	227.215
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	210.771	0.675	212.031	209.066
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	201.943	0.414	202.508	201.160
TI-3108	ORIFICE TEMP, F	1266.688	1.816	1270.211	1258.127
TI-7012	PURGE N2 TEMP, F	79.197	2.520	82.695	71.016
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	166.558	0.990	168.727	164.504
TI-3089	15# STEAM TEMP, F	263.911	0.257	264.404	263.203
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	211.966	0.180	212.391	211.672
TI-7041	BOILER STEAM TEMPERATURE, F				
LCP-34	REPORTED BED LEVEL, FT	17.780	0.599	19.092	16.377

TR1 - TEST POINT 3

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	144.747	4.967	149.930	133.969
PI-3106	ORIFICE PRESSURE, PSIG	141.993	4.856	147.094	131.461
PI-7040	BOILER STEAM PRESSURE, PSIG				
FIC-1055	TOTAL AIR FEED, LB/HR	658.519	28.080	703.266	605.202
FIC-1053	TRANSPORT N2 FEED, SCFM	16.944	2.787	25.364	10.730
FI-3028	BED DRAIN N2 FEED, SCFM	29.800	4.723	32.395	3.193
FI-4051	N2 TO SPRAY TOWER, SCFM	47.232	0.670	49.419	45.323
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	14.120	2.770	20.300	9.100
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	27.632	0.479	28.976	26.215
FI-7021	PURGE N2 TO CARBONIZER, SCFM	7.047	0.046	7.194	6.915
FI-7022	PURGE N2 TO CYCLONES, SCFM	4.004	0.050	4.179	3.792
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	1108.723	45.862	1318.232	1028.254
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	1027.565	29.465	1115.490	949.882
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR				
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	11.542	0.366	12.112	10.609
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	3.362	0.031	3.441	3.295
SI-3033B	BED DRAIN SCREW RATE, RPM	33.006	0.070	33.121	32.276
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	6.275	0.262	7.018	5.530
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	7.742	0.452	9.193	6.775
PDI-3057	BED LEVEL DP, IN H2O	61.514	2.368	68.153	55.541
PDI-3009	BED LEVEL DP, IN H2O	46.922	2.088	53.466	42.067
TI-1059	AIR FEED TEMP, F	81.581	0.779	83.887	80.547
TIC-3027	BED DRAIN TEMP, F	248.305	81.638	411.953	115.938
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	150.985	8.014	180.313	141.328
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	173.938	6.453	188.086	161.914
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1531.955	17.426	1559.867	1496.662
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1580.794	18.141	1610.000	1549.375
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1570.819	19.483	1601.016	1534.172
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1599.708	21.075	1630.844	1553.668
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1635.681	19.185	1662.469	1592.301
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1650.304	15.337	1671.004	1609.281
TI-3021	CARB BED TEMP (AT 1.3 FT), F	1610.000	11.800	1629.500	1586.100
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1710.848	15.903	1732.172	1682.506
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	218.793	2.432	224.070	215.984
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	208.226	1.488	211.043	206.102
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	196.687	1.867	200.262	194.063
TI-3108	ORIFICE TEMP, F	1269.177	16.248	1288.270	1235.666
TI-7012	PURGE N2 TEMP, F	82.254	1.750	86.602	78.633
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	160.972	0.672	162.348	159.563
TI-3089	15# STEAM TEMP, F	263.771	0.238	264.248	263.125
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	211.954	0.185	212.391	211.672
TI-7041	BOILER STEAM TEMPERATURE, F				
LCP-34	REPORTED BED LEVEL, FT	25.826	1.027	28.476	23.546

TR1 - TEST POINT 4

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	125.417	2.238	129.961	120.914
PI-3106	ORIFICE PRESSURE, PSIG	123.073	2.194	127.477	118.664
PI-7040	BOILER STEAM PRESSURE, PSIG				
FIC-1055	TOTAL AIR FEED, LB/HR	559.767	6.950	573.421	540.633
FIC-1053	TRANSPORT N2 FEED, SCFM	12.736	5.827	25.047	1.236
FI-3028	BED DRAIN N2 FEED, SCFM	13.744	0.627	20.412	12.917
FI-4051	N2 TO SPRAY TOWER, SCFM	47.936	0.802	50.459	45.831
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	10.484	2.434	19.375	5.542
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	28.717	0.301	29.613	27.529
FI-7021	PURGE N2 TO CARBONIZER, SCFM	7.034	0.064	7.222	6.826
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.993	0.080	4.128	3.730
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	1104.455	53.943	1333.505	967.409
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	979.034	48.785	1118.645	748.292
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR				
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	13.831	1.003	15.708	12.829
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	3.158	0.023	3.223	3.095
SI-3033B	BED DRAIN SCREW RATE, RPM	30.039	0.051	30.177	29.904
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	7.413	0.903	8.806	3.708
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	8.780	0.348	9.603	7.896
PDI-3057	BED LEVEL DP, IN H2O	71.769	2.278	76.699	65.880
PDI-3009	BED LEVEL DP, IN H2O	56.986	1.985	61.183	52.943
TI-1059	AIR FEED TEMP, F	79.161	0.196	79.570	78.633
TIC-3027	BED DRAIN TEMP, F	190.732	56.288	310.078	108.125
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	156.997	9.525	175.859	127.930
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	160.634	7.333	182.813	148.008
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1393.725	7.384	1409.109	1378.585
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1440.038	8.744	1457.500	1423.594
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1430.863	10.597	1448.102	1410.906
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1465.769	14.227	1490.822	1433.816
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1512.117	21.331	1559.418	1447.383
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1562.098	41.583	1737.196	1483.702
TI-3021	CARB BED TEMP (AT 1.3 FT), F				
TI_3021B	CARB BED TEMP (AT 1.3 FT), F				
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	170.466	0.508	171.512	169.805
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	194.265	1.113	195.859	191.816
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	185.758	0.579	187.055	184.898
TI-3108	ORIFICE TEMP, F	1163.437	7.596	1184.096	1150.539
TI-7012	PURGE N2 TEMP, F	82.664	3.159	88.203	74.854
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	162.765	11.556	202.867	156.418
TI-3089	15# STEAM TEMP, F	264.010	0.278	264.648	263.359
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	212.445	1.972	228.495	211.672
TI-7041	BOILER STEAM TEMPERATURE, F				
LCP-34	REPORTED BED LEVEL, FT	26.608	0.986	28.223	23.631

TR2 - TEST POINT 1

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	139.831	4.529	148.570	134.039
PI-3106	ORIFICE PRESSURE, PSIG	137.119	4.443	145.662	131.468
PI-7040	BOILER STEAM PRESSURE, PSIG				
FIC-1055	TOTAL AIR FEED, LB/HR	716.651	15.626	746.182	693.301
FIC-1053	TRANSPORT N2 FEED, SCFM	1.983	0.830	3.595	0.529
FI-3028	BED DRAIN N2 FEED, SCFM	67.510	1.222	69.149	64.137
FI-4051	N2 TO SPRAY TOWER, SCFM	46.219	0.778	47.855	44.870
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	11.356	2.113	16.569	7.542
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	8.370	0.212	8.874	7.935
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.918	0.092	7.057	6.724
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.956	0.051	4.030	3.857
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	294.315	12.805	330.461	277.894
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	310.220	12.157	333.277	289.890
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR				
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	9.076	0.023	9.112	9.020
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	3.547	0.005	3.557	3.537
SI-3033B	BED DRAIN SCREW RATE, RPM	4.133	2.492	9.989	1.042
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	6.767	0.326	7.281	6.070
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	8.908	0.578	9.816	7.826
PDI-3057	BED LEVEL DP, IN H2O	40.565	2.626	45.777	36.880
PDI-3009	BED LEVEL DP, IN H2O	20.555	2.814	25.320	16.363
TI-1059	AIR FEED TEMP, F	75.082	0.952	76.211	73.048
TIC-3027	BED DRAIN TEMP, F	157.078	71.319	337.773	87.547
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	161.535	8.809	182.035	145.402
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	171.324	14.722	191.164	153.273
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1605.536	2.897	1612.138	1599.003
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1651.661	4.581	1658.422	1640.594
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1663.849	8.581	1675.442	1645.702
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1683.505	12.784	1703.047	1660.724
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1700.155	11.800	1718.304	1673.740
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1732.039	14.171	1752.079	1703.318
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1711.611	15.918	1732.985	1683.270
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1710.848	15.903	1732.172	1682.506
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	205.463	1.030	206.569	202.670
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	203.116	0.788	203.891	201.070
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	194.237	0.678	194.817	192.535
TI-3108	ORIFICE TEMP, F	1322.650	6.263	1336.105	1314.369
TI-7012	PURGE N2 TEMP, F	91.854	7.537	109.103	80.331
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	181.456	3.575	188.400	176.597
TI-3089	15# STEAM TEMP, F	264.397	0.067	264.576	264.271
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	211.347	0.091	211.546	211.169
TI-7041	BOILER STEAM TEMPERATURE, F				
LCP-34	REPORTED BED LEVEL, FT	15.520	0.754	17.146	14.196

TR2 - TEST POINT 2

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	128.304	5.188	142.577	123.188
PI-3106	ORIFICE PRESSURE, PSIG	125.701	5.064	139.634	120.708
PI-7040	BOILER STEAM PRESSURE, PSIG				
FIC-1055	TOTAL AIR FEED, LB/HR	609.520	28.490	685.480	575.352
FIC-1053	TRANSPORT N2 FEED, SCFM	0.568	0.151	0.897	0.322
FI-3028	BED DRAIN N2 FEED, SCFM	68.753	1.128	70.156	65.715
FI-4051	N2 TO SPRAY TOWER, SCFM	46.452	0.506	47.335	45.240
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	11.956	2.424	16.608	8.592
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	8.372	0.264	8.745	7.889
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.844	0.066	6.969	6.702
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.910	0.038	3.983	3.824
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	281.242	13.593	306.866	258.423
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	257.749	6.694	271.461	243.077
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR				
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	12.405	0.012	12.429	12.376
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	2.546	0.004	2.552	2.539
SI-3033B	BED DRAIN SCREW RATE, RPM	20.439	7.910	30.008	5.899
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	5.445	0.357	5.999	4.783
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	7.272	0.583	8.094	6.480
PDI-3057	BED LEVEL DP, IN H2O	36.245	3.796	45.599	27.051
PDI-3009	BED LEVEL DP, IN H2O	19.705	4.288	28.784	8.721
TI-1059	AIR FEED TEMP, F	81.837	0.956	83.305	80.672
TIC-3027	BED DRAIN TEMP, F	300.125	105.983	466.961	153.180
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	155.508	11.571	185.133	138.754
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	170.292	4.443	175.977	160.461
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1504.113	8.649	1525.893	1487.920
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1566.891	12.482	1589.234	1541.031
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1572.186	14.628	1600.342	1531.924
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1587.966	16.615	1618.286	1541.761
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1604.540	16.347	1637.894	1559.346
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1625.582	16.994	1656.447	1583.231
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1600.319	18.389	1636.059	1553.147
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1599.514	18.373	1635.185	1552.410
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	196.436	1.777	199.507	193.038
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	198.989	0.646	200.423	198.278
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	188.798	0.268	189.283	188.436
TI-3108	ORIFICE TEMP, F	1255.037	6.619	1272.749	1247.840
TI-7012	PURGE N2 TEMP, F	98.411	5.043	108.307	88.906
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	173.350	0.653	174.351	172.105
TI-3089	15# STEAM TEMP, F	264.741	0.083	264.852	264.568
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	211.597	0.057	211.672	211.483
TI-7041	BOILER STEAM TEMPERATURE, F				
LCP-34	REPORTED BED LEVEL, FT	16.747	1.466	18.928	13.941

TR2 - TEST POINT 3

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	138.081	6.870	150.670	127.934
PI-3106	ORIFICE PRESSURE, PSIG	135.312	6.726	147.642	125.297
PI-7040	BOILER STEAM PRESSURE, PSIG				
FIC-1055	TOTAL AIR FEED, LB/HR	696.683	21.627	749.405	672.722
FIC-1053	TRANSPORT N2 FEED, SCFM	0.542	0.145	0.885	0.242
FI-3028	BED DRAIN N2 FEED, SCFM	66.929	1.329	68.983	64.190
FI-4051	N2 TO SPRAY TOWER, SCFM	47.527	0.495	48.345	46.814
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	12.188	4.855	17.413	4.054
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	7.936	0.167	8.201	7.622
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.792	0.071	6.902	6.588
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.882	0.037	3.946	3.786
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	301.748	6.863	317.893	290.343
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	250.472	4.666	259.375	242.608
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR				
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	5.686	0.284	6.070	5.430
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	2.216	0.003	2.223	2.210
SI-3033B	BED DRAIN SCREW RATE, RPM	0.589	0.474	1.951	0.040
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	10.850	1.100	12.752	9.633
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	8.301	1.321	11.063	5.709
PDI-3057	BED LEVEL DP, IN H2O	40.238	2.355	44.789	34.332
PDI-3009	BED LEVEL DP, IN H2O	8.990	3.052	16.408	3.995
TI-1059	AIR FEED TEMP, F	80.158	0.116	80.430	79.979
TIC-3027	BED DRAIN TEMP, F	98.645	49.005	309.656	75.539
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	154.594	8.129	169.012	140.961
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	170.111	4.408	176.117	159.488
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1629.395	2.566	1634.471	1624.748
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1705.002	5.055	1713.906	1694.188
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1733.095	9.067	1749.368	1711.602
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1783.192	17.208	1809.619	1741.992
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1793.555	18.904	1825.567	1749.332
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1834.142	19.235	1865.302	1792.275
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1843.125	24.148	1891.002	1792.971
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1842.161	24.140	1889.937	1791.967
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	202.502	0.736	203.496	200.603
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	205.480	1.556	207.359	202.530
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	195.384	1.886	197.971	192.086
TI-3108	ORIFICE TEMP, F	1323.715	6.599	1333.998	1312.096
TI-7012	PURGE N2 TEMP, F	102.119	5.450	113.756	92.732
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	167.169	0.372	168.026	166.723
TI-3089	15# STEAM TEMP, F	264.663	0.051	264.766	264.570
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	211.598	0.066	211.672	211.467
TI-7041	BOILER STEAM TEMPERATURE, F				
LCP-34	REPORTED BED LEVEL, FT	16.899	2.055	21.618	14.053

TR2 - TEST POINT 4

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	191.768	7.347	199.758	175.509
PI-3106	ORIFICE PRESSURE, PSIG	187.909	7.174	195.682	172.036
PI-7040	BOILER STEAM PRESSURE, PSIG				
FIC-1055	TOTAL AIR FEED, LB/HR	984.537	17.085	1017.034	960.505
FIC-1053	TRANSPORT N2 FEED, SCFM	0.510	0.156	0.705	0.028
FI-3028	BED DRAIN N2 FEED, SCFM	67.047	9.569	87.980	51.828
FI-4051	N2 TO SPRAY TOWER, SCFM	44.480	0.537	45.284	43.143
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	13.748	1.343	17.409	10.504
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	5.920	0.521	7.042	5.331
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.691	0.111	6.841	6.349
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.163	0.278	3.657	2.796
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	227.196	11.477	252.489	205.205
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	247.622	5.498	263.606	240.375
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR				
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	14.448	0.099	14.764	14.340
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	3.950	0.014	3.973	3.918
SI-3033B	BED DRAIN SCREW RATE, RPM	15.074	6.125	24.227	5.075
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	6.588	0.291	7.133	6.053
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	7.803	0.525	8.701	6.349
PDI-3057	BED LEVEL DP, IN H2O	39.027	5.240	49.296	28.117
PDI-3009	BED LEVEL DP, IN H2O	19.185	5.565	29.975	7.994
TI-1059	AIR FEED TEMP, F	82.448	0.472	83.172	81.453
TIC-3027	BED DRAIN TEMP, F	294.921	96.081	455.141	144.523
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	154.658	9.163	175.496	139.648
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	170.830	7.030	182.500	156.527
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1669.075	8.203	1679.249	1649.639
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1738.252	12.777	1757.453	1715.219
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1755.767	14.650	1780.160	1717.911
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1773.627	18.913	1808.447	1731.970
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1793.283	16.600	1821.980	1757.523
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1810.057	20.773	1852.738	1769.417
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1789.710	19.280	1821.398	1745.395
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1788.753	19.252	1820.230	1744.400
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	211.406	0.691	212.858	210.127
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	212.799	0.849	214.008	211.247
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	201.619	0.181	201.834	201.268
TI-3108	ORIFICE TEMP, F	1436.847	5.748	1446.568	1424.868
TI-7012	PURGE N2 TEMP, F	106.746	5.387	119.229	98.117
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	248.337	24.086	289.225	208.653
TI-3089	15# STEAM TEMP, F	264.724	0.104	264.977	264.507
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	211.503	0.091	211.656	211.342
TI-7041	BOILER STEAM TEMPERATURE, F				
LCP-34	REPORTED BED LEVEL, FT	15.400	1.503	18.169	12.433

TR2 - TEST POINT 5

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	198.589	2.017	202.521	194.916
PI-3106	ORIFICE PRESSURE, PSIG	194.518	1.974	198.398	190.927
PI-7040	BOILER STEAM PRESSURE, PSIG				
FIC-1055	TOTAL AIR FEED, LB/HR	979.887	26.351	1010.807	933.009
FIC-1053	TRANSPORT N2 FEED, SCFM	0.514	0.109	0.749	0.370
FI-3028	BED DRAIN N2 FEED, SCFM	71.325	15.364	89.687	33.463
FI-4051	N2 TO SPRAY TOWER, SCFM	43.815	0.317	44.502	43.427
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	14.562	1.215	16.313	12.797
FI-7020	PURGE N2 TO C. _ONES DIPLEGS, SCFM	5.440	0.286	6.050	4.915
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.624	0.072	6.729	6.489
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.881	0.108	3.088	2.661
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	207.556	14.336	229.303	187.300
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	253.340	5.925	262.389	246.800
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR				
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	18.189	0.026	18.243	18.149
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	5.970	0.008	5.986	5.961
SI-3033B	BED DRAIN SCREW RATE, RPM	26.516	3.984	33.007	18.402
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	6.513	0.224	6.874	6.060
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	8.395	0.317	9.011	7.918
PDI-3057	BED LEVEL DP, IN H2O	58.619	3.158	63.484	50.905
PDI-3009	BED LEVEL DP, IN H2O	41.754	3.599	47.877	33.300
TI-1059	AIR FEED TEMP, F	83.834	0.727	84.711	82.867
TIC-3027	BED DRAIN TEMP, F	366.670	73.260	445.195	245.156
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	165.698	7.445	174.234	147.574
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	172.125	5.293	181.094	161.949
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1589.802	5.623	1596.739	1577.146
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1675.201	8.986	1689.375	1661.594
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1661.634	7.538	1675.152	1650.025
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1675.918	8.967	1688.856	1660.456
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1691.570	10.306	1706.268	1672.239
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1727.558	18.006	1768.300	1708.999
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1640.220	58.720	1751.335	1555.566
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1639.354	58.726	1750.549	1554.551
TI- .05	CARB SHELL TEMP (AT 23.8 FT), F	209.000	0.952	210.270	207.593
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	213.665	0.178	213.936	213.325
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	200.027	0.351	200.639	199.399
TI-3108	ORIFICE TEMP, F	1400.012	2.956	1402.688	1393.544
TI-7012	PURGE N2 TEMP, F	113.872	4 .3	120.232	107.714
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	302.300	13.680	316.681	273.121
TI-3089	15# STEAM TEMP, F	264.744	0.083	264.945	264.633
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	211.443	0.091	211.609	211.295
TI-7041	BOILER STEAM TEMPERATURE, F				
LCP-34	REPORTED BED LEVEL, FT	22.284	1.507	24.847	19.702

TR4 - TEST POINT 1

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	153.309	5.836	163.020	146.121
PI-3106	ORIFICE PRESSURE, PSIG	150.072	5.708	159.570	143.051
PI-7040	BOILER STEAM PRESSURE, PSIG	201.034	19.505	222.035	170.133
FIC-1055	TOTAL AIR FEED, LB/HR	683.974	17.111	713.359	663.424
FIC-1053	TRANSPORT N2 FEED, SCFM	0.734	0.307	1.262	0.231
FI-3028	BED DRAIN N2 FEED, SCFM	47.019	0.871	48.576	45.511
FI-4051	N2 TO SPRAY TOWER, SCFM	39.102	0.752	40.362	37.734
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	15.833	2.992	20.623	9.901
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	4.777	0.150	4.985	4.508
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.080	0.179	6.476	5.716
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.751	0.053	2.850	2.663
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	599.718	9.068	625.073	578.710
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	600.078	3.151	607.688	592.983
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	49.785	20.087	66.970	14.480
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	9.070	0.020	9.115	9.026
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	2.920	0.003	2.927	2.912
SI-3033B	BED DRAIN SCREW RATE, RPM	10.620	3.680	20.014	7.952
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	8.505	0.598	9.331	7.551
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	9.900	0.920	11.033	8.333
PDI-3057	BED LEVEL DP, IN H2O	43.173	5.096	51.635	35.509
PDI-3009	BED LEVEL DP, IN H2O	19.413	4.306	27.434	13.323
TI-1059	AIR FEED TEMP, F	78.399	0.903	80.045	76.854
TIC-3027	BED DRAIN TEMP, F	98.493	25.142	182.156	80.922
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	168.420	8.872	180.020	151.543
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	181.637	6.996	191.031	170.211
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1582.865	4.655	1593.055	1574.152
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1625.877	4.922	1636.047	1615.969
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1631.741	4.978	1641.225	1622.219
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1652.634	6.911	1668.324	1641.661
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1663.842	6.446	1678.695	1653.132
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1705.215	12.020	1721.256	1675.793
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1704.692	9.392	1724.142	1683.465
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1703.285	9.310	1722.821	1682.129
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	178.346	3.005	181.574	172.410
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	200.319	0.328	201.052	199.795
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	191.119	0.222	191.601	190.720
TI-3108	ORIFICE TEMP, F	1325.714	4.912	1332.059	1315.604
TI-7012	PURGE N2 TEMP, F	146.844	17.702	180.438	116.047
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	310.756	10.429	332.116	286.842
TI-3089	15# STEAM TEMP, F	271.558	4.520	277.773	262.906
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	209.859	0.395	210.001	209.695
TI-7041	BOILER STEAM TEMPERATURE, F	387.840	7.777	396.257	375.040
LCP-34	REPORTED BED LEVEL, FT	15.074	0.487	16.059	14.160

TR4 - TEST POINT 2

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	155.903	1.008	157.432	153.886
PI-3106	ORIFICE PRESSURE, PSIG	152.640	0.993	154.174	150.668
PI-7040	BOILER STEAM PRESSURE, PSIG	217.481	2.464	222.605	213.438
FIC-1055	TOTAL AIR FEED, LB/HR	656.029	4.404	663.742	645.000
FIC-1053	TRANSPORT N2 FEED, SCFM	0.533	0.162	0.768	0.184
FI-3028	BED DRAIN N2 FEED, SCFM	48.563	0.716	49.643	46.384
FI-4051	N2 TO SPRAY TOWER, SCFM	39.098	0.829	40.714	37.470
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	10.708	1.787	15.863	8.358
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	4.770	0.129	5.006	4.462
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.352	0.145	6.574	6.111
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.849	0.044	2.902	2.713
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	600.840	8.066	623.565	589.510
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	600.626	2.609	605.825	594.941
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	117.962	0.659	118.952	116.843
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	9.055	0.049	9.116	8.963
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	2.915	0.015	2.936	2.885
SI-3033B	BED DRAIN SCREW RATE, RPM	12.650	1.076	15.013	11.968
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	8.421	0.178	8.752	8.102
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	9.325	0.181	9.760	9.054
PDI-3057	BED LEVEL DP, IN H2O	43.487	1.518	45.752	40.359
PDI-3009	BED LEVEL DP, IN H2O	20.245	1.580	22.110	17.245
TI-1059	AIR FEED TEMP, F	78.932	1.113	80.914	77.125
TIC-3027	BED DRAIN TEMP, F	214.361	39.991	286.313	148.500
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	163.116	10.840	182.438	146.641
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	185.459	7.352	195.082	171.855
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1530.577	2.458	1533.148	1525.745
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1572.615	3.120	1575.844	1565.938
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1575.908	3.800	1580.963	1566.264
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1594.018	5.269	1602.109	1582.023
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1605.240	5.166	1612.680	1591.789
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1657.090	13.331	1701.122	1635.356
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1622.900	9.486	1640.940	1602.395
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1621.748	9.482	1639.833	1601.148
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	182.347	0.639	183.407	180.945
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	198.351	0.920	199.687	196.902
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	185.841	1.352	187.881	183.982
TI-3108	ORIFICE TEMP, F	1292.177	3.392	1298.426	1285.576
TI-7012	PURGE N2 TEMP, F	115.626	4.731	125.837	106.974
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	342.025	9.833	352.349	319.287
TI-3089	15# STEAM TEMP, F	272.719	4.849	280.867	262.617
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	209.349	0.079	209.480	209.192
TI-7041	BOILER STEAM TEMPERATURE, F	394.353	0.905	396.198	392.779
LCP-34	REPORTED BED LEVEL, FT	16.079	0.411	16.720	15.279

TR4 - TEST POINT 3

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	125.155	3.332	130.083	117.396
PI-3106	ORIFICE PRESSURE, PSIG	122.788	3.259	127.594	115.202
PI-7040	BOILER STEAM PRESSURE, PSIG	216.120	3.084	224.009	211.680
FIC-1055	TOTAL AIR FEED, LB/HR	625.504	12.864	644.732	596.343
FIC-1053	TRANSPORT N2 FEED, SCFM	0.938	1.186	5.432	0.234
FI-3028	BED DRAIN N2 FEED, SCFM	11.458	1.478	12.197	4.598
FI-4051	N2 TO SPRAY TOWER, SCFM	37.070	1.273	38.838	34.182
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	10.240	2.631	15.832	6.873
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	5.108	0.119	5.383	4.899
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.680	0.132	6.871	6.340
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.252	0.048	3.334	3.136
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	600.681	5.880	615.287	592.765
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	599.508	2.076	604.350	595.524
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	95.978	0.149	96.309	95.695
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	7.595	0.217	8.018	7.149
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	2.414	0.008	2.432	2.399
SI-3033B	BED DRAIN SCREW RATE, RPM	31.705	2.932	33.051	20.890
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	13.180	0.416	13.861	12.564
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	12.301	1.931	14.375	7.829
PDI-3057	BED LEVEL DP, IN H2O	52.950	4.946	58.852	43.497
PDI-3009	BED LEVEL DP, IN H2O	16.674	4.743	23.232	7.555
TI-1059	AIR FEED TEMP, F	81.186	0.501	81.555	79.531
TIC-3027	BED DRAIN TEMP, F	279.788	39.454	350.023	186.602
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	162.995	10.656	184.352	145.570
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	188.090	6.257	199.871	177.082
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1590.900	4.321	1600.189	1585.075
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1643.236	5.678	1653.578	1636.250
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1659.576	8.864	1675.568	1646.560
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1701.563	8.123	1713.565	1684.370
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1710.335	8.800	1723.545	1692.131
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1759.572	15.037	1798.425	1732.648
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1700.554	81.870	1777.536	1487.599
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1699.922	81.294	1775.852	1488.044
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	194.435	0.608	195.195	193.056
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	201.027	0.767	202.272	199.795
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	184.887	0.827	186.030	183.551
TI-3108	ORIFICE TEMP, F	1310.594	2.950	1315.339	1302.018
TI-7012	PURGE N2 TEMP, F	93.086	5.767	109.488	83.878
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	332.079	85.409	581.956	283.727
TI-3089	15# STEAM TEMP, F	276.661	1.762	279.391	273.926
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	209.974	0.071	210.091	209.821
TI-7041	BOILER STEAM TEMPERATURE, F	393.893	1.180	396.798	392.205
LCP-34	REPORTED BED LEVEL, FT	14.291	1.969	18.543	11.453

TR4 - TEST POINT 4

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	129.095	2.076	132.169	125.009
PI-3106	ORIFICE PRESSURE, PSIG	126.554	2.049	129.532	122.468
PI-7040	BOILER STEAM PRESSURE, PSIG	217.765	3.969	222.902	212.487
FIC-1055	TOTAL AIR FEED, LB/HR	564.664	9.486	582.056	542.935
FIC-1053	TRANSPORT N2 FEED, SCFM	0.666	0.209	1.164	0.384
FI-3028	BED DRAIN N2 FEED, SCFM	36.118	3.175	38.032	28.626
FI-4051	N2 TO SPRAY TOWER, SCFM	37.356	1.088	40.399	35.218
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	13.496	2.276	18.988	10.347
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	5.250	0.077	5.394	5.130
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.562	0.101	6.690	6.378
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.171	0.035	3.230	3.117
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	601.398	6.813	620.761	585.531
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	600.286	2.548	605.520	593.418
FIC-8STM	STEAM FLOW TO CARBONIZER, LB/HR	77.409	1.021	78.724	75.103
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	9.086	0.034	9.149	9.019
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	2.926	0.005	2.938	2.919
SI-3033B	BED DRAIN SCREW RATE, RPM	7.821	2.676	15.990	5.031
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	8.514	0.369	9.460	8.090
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	9.980	0.384	10.875	9.107
PDI-3057	BED LEVEL DP, IN H2O	46.341	4.297	52.305	39.417
PDI-3009	BED LEVEL DP, IN H2O	23.299	5.119	29.834	14.615
TI-1059	AIR FEED TEMP, F	77.446	2.399	80.594	74.148
TIC-3027	BED DRAIN TEMP, F	136.821	37.183	243.625	94.508
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	154.565	14.393	178.496	134.707
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	182.451	10.672	197.895	164.645
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1523.833	7.735	1537.388	1510.471
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1568.179	8.204	1580.109	1554.531
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1576.406	12.037	1591.708	1556.202
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1595.644	18.098	1623.135	1567.019
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1607.327	16.142	1631.091	1579.777
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1646.899	9.746	1661.020	1621.327
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1561.334	41.376	1639.736	1492.208
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1558.380	42.036	1637.634	1488.026
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	177.413	1.748	180.137	174.405
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	194.043	0.354	194.655	193.496
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	176.905	0.608	177.639	175.856
TI-3108	ORIFICE TEMP, F	1268.480	5.269	1276.711	1259.621
TI-7012	PURGE N2 TEMP, F	101.759	4.110	112.042	94.979
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	287.213	13.973	321.856	271.346
TI-3089	15# STEAM TEMP, F	275.486	1.983	278.655	272.609
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	210.098	0.080	210.234	209.965
TI-7041	BOILER STEAM TEMPERATURE, F	394.589	1.529	396.505	392.524
LCP-34	REPORTED BED LEVEL, FT	15.103	2.134	17.696	11.891

TR4 - TEST POINT 5

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	193.188	2.128	196.479	189.033
PI-3106	ORIFICE PRESSURE, PSIG	189.292	2.066	192.480	185.252
PI-7040	BOILER STEAM PRESSURE, PSIG	216.389	3.478	222.429	210.349
FIC-1055	TOTAL AIR FEED, LB/HR	899.874	2.090	902.610	894.925
FIC-1053	TRANSPORT N2 FEED, SCFM	0.467	0.167	0.817	0.059
FI-3028	BED DRAIN N2 FEED, SCFM	21.083	2.065	24.047	15.769
FI-4051	N2 TO SPRAY TOWER, SCFM	33.768	1.037	35.932	32.052
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	11.473	1.837	14.033	8.208
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	3.970	0.404	4.473	3.052
FI-7021	PURGE N2 TO CARBONIZER, SCFM	5.453	0.608	6.749	4.464
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.224	0.353	2.963	1.844
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	601.968	8.051	621.384	589.587
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	599.915	1.668	603.046	596.981
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	140.810	9.325	155.365	119.126
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	13.566	0.054	13.694	13.469
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	4.433	0.007	4.451	4.419
SI-3033B	BED DRAIN SCREW RATE, RPM	8.864	1.097	11.984	7.943
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	6.237	0.260	6.583	5.727
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	7.829	0.354	8.381	7.092
PDI-3057	BED LEVEL DP, IN H2O	43.963	1.714	47.083	41.221
PDI-3009	BED LEVEL DP, IN H2O	23.030	1.436	26.074	21.357
TI-1059	AIR FEED TEMP, F	78.100	0.259	78.621	77.625
TIC-3027	BED DRAIN TEMP, F	140.520	15.618	173.398	119.594
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	161.043	13.859	191.195	143.039
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	190.427	8.064	198.520	173.293
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1637.730	2.754	1642.683	1632.991
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1691.102	2.856	1697.719	1686.953
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1690.463	4.365	1702.184	1684.548
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1704.003	5.108	1717.511	1697.863
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1728.754	6.578	1746.691	1719.713
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1755.684	13.624	1776.716	1732.365
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1652.967	18.990	1688.258	1614.879
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1650.123	19.266	1685.886	1611.601
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	187.390	1.258	190.253	185.204
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	196.963	0.548	197.811	196.039
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	182.959	0.572	183.856	181.970
TI-3108	ORIFICE TEMP, F	1428.882	1.816	1432.264	1425.569
TI-7012	PURGE N2 TEMP, F	99.421	6.337	111.197	88.586
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	468.560	138.313	866.806	366.077
TI-3089	15# STEAM TEMP, F	275.598	1.827	278.989	273.414
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	210.370	0.041	210.468	210.324
TI-7041	BOILER STEAM TEMPERATURE, F	394.138	1.329	396.315	391.772
LCP-34	REPORTED BED LEVEL, FT	18.994	0.752	20.178	17.625

TR4 - TEST POINT 6

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	175.779	2.890	181.495	171.127
PI-3106	ORIFICE PRESSURE, PSIG	172.231	2.856	177.919	167.639
PI-7040	BOILER STEAM PRESSURE, PSIG	218.022	3.934	223.659	211.397
FIC-1055	TOTAL AIR FEED, LB/HR	820.107	1.658	823.360	816.272
FIC-1053	TRANSPORT N2 FEED, SCFM	0.703	0.244	1.473	0.348
FI-3028	BED DRAIN N2 FEED, SCFM	21.337	3.256	25.494	16.389
FI-4051	N2 TO SPRAY TOWER, SCFM	33.518	0.970	36.151	31.941
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	8.542	1.128	12.021	6.818
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	5.337	0.155	5.630	5.021
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.599	0.131	6.739	6.136
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.422	0.100	3.610	3.194
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	599.199	11.621	625.621	579.947
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	599.906	2.137	606.023	594.540
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	84.825	1.012	86.166	82.688
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	14.151	0.172	14.342	13.370
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	4.430	0.005	4.444	4.421
SI-3033B	BED DRAIN SCREW RATE, RPM	12.606	2.664	17.635	9.057
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	6.364	0.557	7.480	5.321
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	8.330	0.777	9.698	6.997
PDI-3057	BED LEVEL DP, IN H2O	46.330	1.799	50.339	43.053
PDI-3009	BED LEVEL DP, IN H2O	25.401	2.516	31.621	21.314
TI-1059	AIR FEED TEMP, F	81.591	1.422	83.918	79.806
TIC-3027	BED DRAIN TEMP, F	290.964	81.134	465.492	177.289
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	155.579	9.491	173.832	141.516
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	182.338	9.292	197.281	167.672
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1601.711	6.676	1612.552	1586.928
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1680.990	8.183	1692.141	1666.984
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1683.409	6.925	1692.135	1665.975
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1698.036	6.856	1705.836	1680.561
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1721.896	8.204	1732.491	1702.022
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1736.617	10.349	1756.032	1703.341
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1665.519	16.553	1703.435	1629.541
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1663.045	16.851	1701.497	1626.264
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	188.196	1.940	191.188	185.348
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	202.835	0.945	204.448	201.430
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	188.436	1.991	191.475	185.797
TI-3108	ORIFICE TEMP, F	1408.506	7.428	1419.212	1392.547
TI-7012	PURGE N2 TEMP, F	102.538	4.899	111.851	93.574
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	540.192	159.786	775.837	349.977
TI-3089	15# STEAM TEMP, F	275.843	2.075	279.414	272.852
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	210.260	0.032	210.306	210.198
TI-7041	BOILER STEAM TEMPERATURE, F	394.714	1.483	396.769	392.138
LCP-34	REPORTED BED LEVEL, FT	17.190	1.632	21.220	15.114

TR4 - TEST POINT 7

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	177.937	1.095	179.801	176.325
PI-3106	ORIFICE PRESSURE, PSIG	174.723	1.102	176.534	173.041
PI-7040	BOILER STEAM PRESSURE, PSIG	217.689	2.367	222.288	213.834
FIC-1055	TOTAL AIR FEED, LB/HR	772.662	6.047	784.191	757.271
FIC-1053	TRANSPORT N2 FEED, SCFM	0.636	0.210	1.282	0.385
FI-3028	BED DRAIN N2 FEED, SCFM	45.917	4.541	54.981	35.825
FI-4051	N2 TO SPRAY TOWER, SCFM	33.453	1.506	35.340	31.156
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	15.182	1.691	17.697	11.968
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	5.135	0.076	5.373	5.031
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.466	0.122	6.617	6.246
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.326	0.069	3.425	3.198
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	600.968	19.644	618.595	546.375
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	599.988	7.880	613.940	573.730
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	50.785	3.704	56.801	42.764
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	14.161	0.039	14.241	14.085
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	6.024	0.010	6.040	6.005
SI-3033B	BED DRAIN SCREW RATE, RPM	26.438	2.511	30.003	20.028
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	6.004	0.299	6.538	5.547
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	8.095	0.435	8.912	7.492
PDI-3057	BED LEVEL DP, IN H2O	57.822	3.411	61.325	49.612
PDI-3009	BED LEVEL DP, IN H2O	39.256	3.604	43.441	29.637
TI-1059	AIR FEED TEMP, F	82.256	0.821	83.477	80.179
TIC-3027	BED DRAIN TEMP, F	386.797	69.836	473.258	248.664
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	151.662	13.195	187.738	136.578
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	176.131	7.226	192.016	166.926
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1547.072	18.608	1582.941	1521.540
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1582.478	20.929	1626.516	1554.922
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1569.756	22.571	1620.871	1540.802
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1588.037	22.297	1634.653	1559.741
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1614.035	22.827	1656.422	1584.215
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1633.552	28.009	1689.438	1598.653
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1635.780	26.713	1678.030	1585.637
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1633.574	26.521	1676.626	1587.703
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	181.697	2.266	184.036	176.264
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	200.816	0.903	202.193	199.489
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	188.515	0.283	189.121	188.151
TI-3108	ORIFICE TEMP, F	1347.020	7.237	1362.624	1335.808
TI-7012	PURGE N2 TEMP, F	115.502	7.863	131.344	105.477
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	353.319	76.212	458.994	211.905
TI-3089	15# STEAM TEMP, F	274.843	4.149	279.500	265.280
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	215.378	10.550	245.487	210.396
TI-7041	BOILER STEAM TEMPERATURE, F	394.560	0.902	396.311	392.987
LCP-34	REPORTED BED LEVEL, FT	22.629	1.318	24.444	19.351

TR4 - TEST POINT 8

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	182.194	1.738	184.964	178.144
PI-3106	ORIFICE PRESSURE, PSIG	178.838	1.653	181.474	174.938
PI-7040	BOILER STEAM PRESSURE, PSIG				
FIC-1055	TOTAL AIR FEED, LB/HR	750.876	8.978	768.627	737.111
FIC-1053	TRANSPORT N2 FEED, SCFM	0.609	0.188	1.093	0.234
FI-3028	BED DRAIN N2 FEED, SCFM	47.085	1.879	49.421	40.732
FI-4051	N2 TO SPRAY TOWER, SCFM	30.670	0.779	32.308	29.335
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	14.496	2.863	16.816	6.531
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	4.965	0.142	5.135	4.466
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.280	0.195	6.490	5.754
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.136	0.084	3.261	2.875
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	600.919	17.785	624.572	561.443
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	600.416	2.896	609.699	596.213
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	40.000	9.068	625.073	578.710
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	14.152	0.037	14.221	14.086
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	6.027	0.011	6.054	6.006
SI-3033B	BED DRAIN SCREW RATE, RPM	22.118	7.189	30.020	6.013
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	6.810	0.476	8.459	5.964
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	9.511	0.573	10.291	8.149
PDI-3057	BED LEVEL DP, IN H2O	48.292	3.276	56.310	42.673
PDI-3009	BED LEVEL DP, IN H2O	25.803	4.001	35.084	19.683
TI-1059	AIR FEED TEMP, F	82.226	0.309	82.539	81.618
TIC-3027	BED DRAIN TEMP, F	339.431	87.093	471.828	183.484
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	162.430	12.972	191.813	140.395
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	187.921	7.272	197.227	171.520
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1559.193	19.248	1583.487	1527.901
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1599.736	20.396	1626.516	1569.016
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1594.960	21.812	1628.472	1563.389
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1607.961	23.331	1647.526	1574.440
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1623.044	24.912	1661.186	1588.707
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1645.159	24.349	1679.615	1606.173
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1652.012	21.900	1702.571	1618.412
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1649.320	22.169	1700.625	1615.665
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	176.460	0.675	177.441	175.501
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	198.763	0.356	199.597	198.339
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	188.221	0.254	188.537	187.702
TI-3108	ORIFICE TEMP, F	1366.898	5.289	1375.400	1357.827
TI-7012	PURGE N2 TEMP, F	125.025	4.721	133.348	116.391
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	378.617	36.591	435.634	307.897
TI-3089	15# STEAM TEMP, F	264.545	0.722	266.070	263.328
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	210.505	0.059	210.630	210.396
TI-7041	BOILER STEAM TEMPERATURE, F	395.036	0.546	396.081	394.309
LCP-34	REPORTED BED LEVEL, FT	16.304	1.682	19.462	14.380

TR5 - TEST POINT 1

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	134.281	3.197	141.572	129.232
PI-3106	ORIFICE PRESSURE, PSIG	131.814	3.134	138.954	126.860
PI-7040	BOILER STEAM PRESSURE, PSIG	199.353	2.143	203.147	196.462
FIC-1055	TOTAL AIR FEED, LB/HR	605.516	18.410	646.313	574.308
FIC-1053	TRANSPORT N2 FEED, SCFM	0.138	0.353	1.695	-0.039
FI-3028	BED DRAIN N2 FEED, SCFM	30.447	0.166	30.824	30.125
FI-4051	N2 TO SPRAY TOWER, SCFM	42.205	0.559	43.645	41.447
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	9.046	0.640	10.892	7.907
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	4.151	1.199	5.605	2.890
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.543	0.208	6.730	6.113
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.329	0.028	3.366	3.250
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	1399.689	3.491	1404.273	1387.409
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	1289.964	1.652	1293.390	1287.173
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	90.090	0.748	91.427	87.940
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	7.546	0.257	8.001	7.125
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	2.141	0.009	2.155	2.122
SI-3033B	BED DRAIN SCREW RATE, RPM	4.772	1.642	7.956	3.007
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	5.806	0.137	6.048	5.606
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	6.761	0.244	7.240	6.314
PDI-3057	BED LEVEL DP, IN H2O	34.967	1.665	38.883	32.484
PDI-3009	BED LEVEL DP, IN H2O	14.514	1.677	18.872	12.254
TI-1059	AIR FEED TEMP, F	82.771	1.744	85.141	80.523
TIC-3027	BED DRAIN TEMP, F	103.417	16.815	144.516	86.586
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	142.977	10.172	168.855	132.609
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	190.143	6.694	199.891	176.348
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1610.241	6.559	1621.725	1600.045
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1653.354	7.531	1666.781	1637.719
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1666.474	9.193	1681.051	1645.340
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1688.025	10.614	1707.132	1663.165
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1699.180	11.205	1715.782	1672.286
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1719.834	12.720	1737.174	1688.101
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1717.945	11.698	1731.639	1684.395
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1716.590	11.709	1730.276	1683.009
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	187.251	1.008	188.932	185.473
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	192.354	3.368	197.081	186.174
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	186.740	3.035	191.008	181.413
TI-3108	ORIFICE TEMP, F	1323.646	6.088	1332.834	1309.884
TI-7012	PURGE N2 TEMP, F	107.435	3.182	116.906	102.906
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	257.658	26.584	342.359	226.188
TI-3089	15# STEAM TEMP, F	285.456	2.182	289.506	279.430
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	213.511	0.238	213.828	212.948
TI-7041	BOILER STEAM TEMPERATURE, F	387.601	0.863	389.090	386.470
LCP-34	REPORTED BED LEVEL, FT	17.609	0.539	18.752	16.879

TR5 - TEST POINT 2

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	154.812	5.734	162.757	146.660
PI-3106	ORIFICE PRESSURE, PSIG	152.067	5.617	159.837	144.173
PI-7040	BOILER STEAM PRESSURE, PSIG	197.608	0.844	198.898	195.898
FIC-1055	TOTAL AIR FEED, LB/HR	698.397	15.032	717.147	673.672
FIC-1053	TRANSPORT N2 FEED, SCFM	0.248	0.262	1.201	-0.039
FI-3028	BED DRAIN N2 FEED, SCFM	29.243	2.267	33.850	24.008
FI-4051	N2 TO SPRAY TOWER, SCFM	39.466	0.959	41.309	38.107
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	9.245	0.853	10.783	7.934
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	3.928	1.945	5.128	0.019
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.286	0.271	6.581	5.715
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.019	0.082	3.145	2.871
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	1399.151	7.720	1414.299	1382.171
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	1287.006	3.407	1295.486	1281.609
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	89.833	0.619	90.647	87.947
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	7.071	0.018	7.106	7.041
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	4.954	0.006	4.969	4.945
SI-3033B	BED DRAIN SCREW RATE, RPM	7.556	3.466	12.536	3.033
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	7.189	0.777	8.061	5.768
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	6.851	0.799	8.309	5.218
PDI-3057	BED LEVEL DP, IN H2O	36.943	2.892	41.163	31.928
PDI-3009	BED LEVEL DP, IN H2O	12.550	5.372	21.844	5.512
TI-1059	AIR FEED TEMP, F	84.390	1.405	86.328	82.375
TIC-3027	BED DRAIN TEMP, F	97.390	12.913	147.180	85.398
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	148.775	15.011	184.000	128.594
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	180.458	9.323	205.094	170.457
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1618.604	2.998	1626.657	1614.348
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1662.199	3.857	1672.344	1655.328
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1667.782	6.111	1683.420	1659.583
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1697.590	17.795	1734.615	1672.749
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1706.480	14.317	1740.213	1687.591
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1730.993	14.963	1761.964	1707.159
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1721.526	21.056	1755.756	1689.588
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1720.199	21.039	1754.424	1688.227
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	189.574	1.358	191.259	187.288
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	200.747	0.877	201.906	199.435
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	191.596	0.968	192.751	189.840
TI-3108	ORIFICE TEMP, F	1352.826	4.240	1359.255	1343.196
TI-7012	PURGE N2 TEMP, F	126.222	5.739	137.375	117.492
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	285.526	36.842	359.483	222.613
TI-3089	15# STEAM TEMP, F	289.483	3.194	292.242	276.515
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	216.292	2.475	221.483	213.415
TI-7041	BOILER STEAM TEMPERATURE, F	386.865	0.342	387.435	386.164
LCP-34	REPORTED BED LEVEL, FT	18.354	1.617	21.390	16.008

TR5 - TEST POINT 3

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	147.404	1.835	149.463	143.297
PI-3106	ORIFICE PRESSURE, PSIG	144.693	1.824	146.763	140.632
PI-7040	BOILER STEAM PRESSURE, PSIG	197.799	0.795	199.404	195.795
FIC-1055	TOTAL AIR FEED, LB/HR	672.141	6.815	682.382	661.318
FIC-1053	TRANSPORT N2 FEED, SCFM	1.691	2.271	9.834	-0.036
FI-3028	BED DRAIN N2 FEED, SCFM	31.121	0.384	31.609	30.248
FI-4051	N2 TO SPRAY TOWER, SCFM	40.788	1.157	41.964	38.897
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	8.903	0.999	10.003	6.860
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	0.012	0.021	0.106	0.001
FI-7021	PURGE N2 TO CARBONIZER, SCFM	6.438	0.272	6.647	5.725
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.135	0.040	3.205	3.053
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	1399.902	16.163	1439.866	1364.792
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	1286.443	3.747	1295.837	1277.152
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	100.020	0.288	100.549	99.328
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	7.074	0.013	7.117	7.059
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	2.861	0.123	2.969	2.667
SI-3033B	BED DRAIN SCREW RATE, RPM	4.308	0.870	6.936	3.936
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	7.583	1.091	8.912	6.120
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	7.332	0.462	8.307	6.770
PDI-3057	BED LEVEL DP, IN H2O	36.255	1.403	39.193	34.458
PDI-3009	BED LEVEL DP, IN H2O	13.321	1.367	16.065	10.893
TI-1059	AIR FEED TEMP, F	79.252	2.665	84.086	76.508
TIC-3027	BED DRAIN TEMP, F	85.109	14.908	146.219	77.008
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	138.840	13.949	173.746	124.234
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	178.895	4.974	190.910	172.727
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1621.165	5.224	1629.873	1614.762
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1667.061	6.287	1677.281	1659.141
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1677.905	6.300	1689.006	1669.245
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1703.008	5.062	1712.577	1694.365
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1711.292	5.885	1722.334	1702.159
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1732.177	5.298	1743.306	1723.792
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1733.065	8.497	1749.136	1717.235
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1731.919	8.495	1748.083	1716.058
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	181.740	2.625	186.264	178.609
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	194.459	2.926	199.255	190.055
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	185.112	2.752	189.552	181.161
TI-3108	ORIFICE TEMP, F	1363.830	9.739	1380.126	1352.705
TI-7012	PURGE N2 TEMP, F	119.737	5.267	132.791	112.961
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	257.813	63.795	417.315	212.822
TI-3089	15# STEAM TEMP, F	287.424	3.169	292.829	281.070
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	216.610	4.993	232.897	213.199
TI-7041	BOILER STEAM TEMPERATURE, F	387.009	0.324	387.608	386.225
LCP-34	REPORTED BED LEVEL, FT	16.934	0.645	18.513	16.160

TR6 - TEST POINT 1

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	145.856	3.752	150.314	135.171
PI-3106	ORIFICE PRESSURE, PSIG	143.050	3.678	147.466	132.637
PI-7040	BOILER STEAM PRESSURE, PSIG	198.753	0.678	199.748	197.452
FIC-1055	TOTAL AIR FEED, LB/HR	754.148	10.877	766.954	724.762
FIC-1053	TRANSPORT N2 FEED, SCFM	0.000	0.008	0.000	-0.044
FI-3028	BED DRAIN N2 FEED, SCFM	31.613	6.540	34.558	10.533
FI-4051	N2 TO SPRAY TOWER, SCFM	30.533	0.796	32.314	29.482
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	8.830	2.649	14.576	4.496
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	2.990	0.286	3.410	2.609
FI-7021	PURGE N2 TO CARBONIZER, SCFM	2.085	0.037	2.172	2.028
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.985	0.055	3.132	2.886
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	834.930	4.865	850.830	828.926
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	812.335	7.249	824.847	802.975
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	0.000	0.009	0.012	-0.015
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	9.233	0.033	9.278	9.158
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	1.909	0.010	1.925	1.892
SI-3033B	BED DRAIN SCREW RATE, RPM	1.824	1.006	4.135	0.519
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	25.812	0.549	26.798	24.646
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	31.974	0.851	34.350	30.502
PDI-3057	BED LEVEL DP, IN H2O	193.913	5.954	206.427	183.998
PDI-3009	BED LEVEL DP, IN H2O	134.028	5.309	142.241	123.913
TI-1059	AIR FEED TEMP, F	85.678	1.720	87.508	82.703
TIC-3027	BED DRAIN TEMP, F	355.833	103.215	532.063	203.102
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	171.193	12.163	196.031	152.988
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	195.544	8.389	210.465	185.539
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1516.674	6.063	1524.073	1504.892
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1566.604	5.075	1571.891	1555.047
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1567.587	7.969	1577.908	1551.637
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1572.964	7.811	1583.011	1556.866
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1578.182	7.747	1587.737	1561.754
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1600.525	7.344	1609.701	1584.988
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1624.987	9.647	1644.284	1606.150
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1623.281	9.605	1642.472	1604.506
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	194.169	4.093	199.130	186.354
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	187.316	2.654	191.223	182.958
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	185.710	2.702	188.995	180.218
TI-3108	ORIFICE TEMP, F	787.433	3.544	791.240	779.448
TI-7012	PURGE N2 TEMP, F	147.612	6.887	160.015	128.446
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	217.364	3.707	225.166	211.609
TI-3089	15# STEAM TEMP, F	281.348	2.331	284.094	275.805
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	211.161	0.086	211.295	211.043
TI-7041	BOILER STEAM TEMPERATURE, F	387.438	0.302	387.866	386.770
LCP-34	REPORTED BED LEVEL, FT	18.905	0.927	20.967	17.219

TR6 - TEST POINT 2

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	129.774	5.005	139.575	121.350
PI-3106	ORIFICE PRESSURE, PSIG	127.290	4.877	136.814	119.044
PI-7040	BOILER STEAM PRESSURE, PSIG	198.997	0.673	200.116	197.693
FIC-1055	TOTAL AIR FEED, LB/HR	642.404	19.565	680.211	606.185
FIC-1053	TRANSPORT N2 FEED, SCFM	2.112	2.237	6.888	-0.044
FI-3028	BED DRAIN N2 FEED, SCFM	38.237	5.365	45.261	16.693
FI-4051	N2 TO SPRAY TOWER, SCFM	30.945	1.150	32.876	29.334
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	6.283	0.730	7.597	4.213
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	1.883	1.607	3.535	0.005
FI-7021	PURGE N2 TO CARBONIZER, SCFM	2.057	0.043	2.113	1.964
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.086	0.046	3.182	3.010
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	838.343	7.174	858.712	830.285
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	809.417	5.820	819.882	801.518
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	0.000	0.014	0.018	-0.042
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	9.264	0.035	9.326	9.190
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	1.924	0.008	1.943	1.905
SI-3033B	BED DRAIN SCREW RATE, RPM	2.764	1.093	5.059	1.042
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	24.469	0.489	25.853	23.579
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	27.716	0.667	28.939	26.298
PDI-3057	BED LEVEL DP, IN H2O	172.784	2.608	180.048	166.548
PDI-3009	BED LEVEL DP, IN H2O	122.594	3.018	129.601	115.593
TI-1059	AIR FEED TEMP, F	85.424	2.296	88.719	82.129
TIC-3027	BED DRAIN TEMP, F	462.225	43.529	526.836	335.625
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	171.119	12.316	192.742	157.125
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	200.836	5.970	208.402	188.898
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1455.115	9.877	1470.580	1439.104
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1500.070	13.113	1523.938	1480.219
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1498.271	12.200	1516.149	1478.325
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1503.928	12.532	1523.283	1483.291
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1507.162	12.751	1527.272	1486.339
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1527.865	12.664	1549.122	1506.812
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1539.717	13.900	1561.754	1515.907
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1538.162	13.894	1560.281	1514.361
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	185.076	2.307	188.867	180.837
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	194.004	0.542	194.907	193.092
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	192.074	0.724	193.074	190.559
TI-3108	ORIFICE TEMP, F	762.414	5.345	770.482	755.465
TI-7012	PURGE N2 TEMP, F	153.277	7.033	166.625	144.164
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	213.307	2.399	221.454	211.277
TI-3089	15# STEAM TEMP, F	279.940	5.170	284.398	268.867
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	211.116	0.087	211.295	211.025
TI-7041	BOILER STEAM TEMPERATURE, F	387.580	0.286	388.062	387.126
LCP-34	REPORTED BED LEVEL, FT	17.826	0.547	18.860	16.419

TR6 - TEST POINT 3

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	157.500	2.161	162.316	153.340
PI-3106	ORIFICE PRESSURE, PSIG	154.330	2.165	159.164	150.209
PI-7040	BOILER STEAM PRESSURE, PSIG	198.450	0.885	199.601	196.059
FIC-1055	TOTAL AIR FEED, LB/HR	807.910	11.905	827.245	789.614
FIC-1053	TRANSPORT N2 FEED, SCFM	0.414	0.526	1.917	-0.027
FI-3028	BED DRAIN N2 FEED, SCFM	29.831	0.385	30.465	29.084
FI-4051	N2 TO SPRAY TOWER, SCFM	29.048	0.935	30.153	27.138
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	7.740	0.784	9.946	6.676
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	2.953	0.124	3.161	2.673
FI-7021	PURGE N2 TO CARBONIZER, SCFM	2.043	0.040	2.091	1.940
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.841	0.030	2.885	2.779
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	819.296	5.440	835.288	810.497
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	803.784	2.221	809.395	800.854
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	0.000	0.010	0.018	-0.019
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	13.436	0.414	13.969	12.999
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	1.605	0.009	1.622	1.589
SI-3033B	BED DRAIN SCREW RATE, RPM	1.041	0.483	2.027	0.311
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	20.433	0.640	21.555	19.196
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	22.133	0.374	23.010	21.096
PDI-3057	BED LEVEL DP, IN H2O	160.084	1.280	163.042	157.250
PDI-3009	BED LEVEL DP, IN H2O	120.755	1.426	124.412	118.696
TI-1059	AIR FEED TEMP, F	83.954	0.834	86.078	82.930
TIC-3027	BED DRAIN TEMP, F	134.784	24.209	198.930	109.063
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	169.438	9.767	192.777	156.586
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	192.906	12.097	213.676	177.941
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1462.336	5.656	1469.718	1450.455
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1514.582	6.854	1522.922	1501.328
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1496.422	6.853	1504.362	1482.698
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1505.528	7.344	1514.442	1490.023
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1509.387	7.516	1518.557	1493.131
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1532.088	8.815	1544.401	1512.003
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1556.312	6.506	1563.641	1540.337
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1554.769	6.518	1562.113	1538.765
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	173.699	0.453	174.710	173.057
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	193.104	0.393	193.842	192.391
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	191.108	0.453	191.978	190.577
TI-3108	ORIFICE TEMP, F	1267.196	3.341	1271.406	1260.391
TI-7012	PURGE N2 TEMP, F	150.188	5.362	163.203	141.650
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	259.051	5.095	268.956	246.749
TI-3089	15# STEAM TEMP, F	280.952	2.273	283.242	273.294
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	211.041	0.038	211.169	210.989
TI-7041	BOILER STEAM TEMPERATURE, F	387.364	0.378	387.875	386.363
LCP-34	REPORTED BED LEVEL, FT	19.793	0.693	21.706	18.785

TR6 - TEST POINT 4

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	191.890	0.916	193.205	189.703
PI-3106	ORIFICE PRESSURE, PSIG	188.158	0.902	189.415	186.038
PI-7040	BOILER STEAM PRESSURE, PSIG	198.960	0.547	199.770	197.834
FIC-1055	TOTAL AIR FEED, LB/HR	1000.122	3.263	1005.011	991.754
FIC-1053	TRANSPORT N2 FEED, SCFM	0.075	0.392	1.858	-0.050
FI-3028	BED DRAIN N2 FEED, SCFM	19.357	0.976	20.702	17.439
FI-4051	N2 TO SPRAY TOWER, SCFM	23.841	1.373	26.621	21.435
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	12.943	0.644	14.137	12.009
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	1.872	0.154	2.200	1.524
FI-7021	PURGE N2 TO CARBONIZER, SCFM	2.065	0.086	2.253	1.969
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.194	0.040	2.258	2.104
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	802.876	6.140	824.979	796.873
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	818.628	2.912	827.977	815.347
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	0.000	0.011	0.010	-0.026
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	14.007	0.073	14.144	13.909
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	1.627	0.020	1.670	1.604
SI-3033B	BED DRAIN SCREW RATE, RPM	1.071	0.794	2.895	0.339
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	22.187	0.883	23.583	20.587
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	25.046	1.358	26.799	22.817
PDI-3057	BED LEVEL DP, IN H2O	114.094	3.930	122.402	108.852
PDI-3009	BED LEVEL DP, IN H2O	61.693	3.587	69.098	55.332
TI-1059	AIR FEED TEMP, F	90.118	0.897	91.117	88.228
TIC-3027	BED DRAIN TEMP, F	150.656	59.974	362.594	101.117
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	159.778	9.379	182.094	148.898
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	197.491	7.897	207.742	182.465
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1548.660	5.506	1557.156	1535.771
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1578.699	5.361	1588.391	1566.172
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1594.047	5.100	1605.182	1579.435
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1605.229	7.734	1620.471	1586.587
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1607.211	7.284	1621.100	1590.234
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1628.618	8.713	1644.161	1612.289
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1658.414	5.865	1673.052	1648.015
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1656.688	5.867	1671.334	1646.328
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	183.013	2.778	186.947	178.304
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	194.479	1.150	195.931	192.104
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	192.147	0.634	193.056	191.170
TI-3108	ORIFICE TEMP, F	1353.751	7.441	1363.087	1338.721
TI-7012	PURGE N2 TEMP, F	152.306	6.767	162.070	135.087
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	285.779	3.552	291.902	278.242
TI-3089	15# STEAM TEMP, F	282.426	1.956	284.523	281.266
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	211.091	1.058	211.232	211.043
TI-7041	BOILER STEAM TEMPERATURE, F	387.583	1.225	387.922	387.040
LCP-34	REPORTED BED LEVEL, FT	13.610	1.482	14.518	12.552

TR6 - TEST POINT 5

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	189.639	0.771	191.095	188.180
PI-3106	ORIFICE PRESSURE, PSIG	185.960	0.761	187.376	184.538
PI-7040	BOILER STEAM PRESSURE, PSIG	199.286	0.509	200.327	198.253
FIC-1055	TOTAL AIR FEED, LB/HR	981.615	4.444	989.148	975.830
FIC-1053	TRANSPORT N2 FEED, SCFM	0.146	0.338	1.136	-0.043
FI-3028	BED DRAIN N2 FEED, SCFM	21.277	1.127	22.744	17.411
FI-4051	N2 TO SPRAY TOWER, SCFM	22.052	1.071	24.136	20.629
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	12.700	0.569	14.061	11.195
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	1.391	0.500	2.154	0.738
FI-7021	PURGE N2 TO CARBONIZER, SCFM	2.054	0.108	2.269	1.955
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.241	0.050	2.302	2.091
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	813.040	5.296	826.705	803.676
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	811.735	8.556	825.913	797.840
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	0.000	0.009	0.006	-0.027
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	14.287	0.576	15.791	13.947
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	0.516	0.006	0.524	0.502
SI-3033B	BED DRAIN SCREW RATE, RPM	0.494	1.122	5.660	0.127
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	23.682	0.503	24.905	22.851
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	26.411	0.877	27.366	23.937
PDI-3057	BED LEVEL DP, IN H2O	109.820	3.504	113.104	99.738
PDI-3009	BED LEVEL DP, IN H2O	50.896	5.011	54.949	36.690
TI-1059	AIR FEED TEMP, F	88.462	1.743	89.891	85.094
TIC-3027	BED DRAIN TEMP, F	76.105	1.994	80.078	73.211
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	158.127	10.089	181.020	146.121
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	193.697	10.659	207.570	178.508
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1562.563	5.288	1571.996	1556.056
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1592.959	6.071	1603.656	1585.547
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1611.264	8.019	1626.731	1601.501
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1631.384	10.759	1652.478	1618.679
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1632.406	10.634	1652.573	1619.757
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1654.756	12.795	1679.438	1637.625
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1680.117	15.177	1711.737	1662.199
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1678.317	15.134	1709.776	1660.488
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	187.660	1.487	189.822	184.314
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	198.858	0.904	200.423	197.719
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	193.353	0.511	194.000	192.499
TI-3108	ORIFICE TEMP, F	1367.212	2.933	1373.109	1364.089
TI-7012	PURGE N2 TEMP, F	154.493	8.760	177.289	142.208
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	260.698	5.541	268.291	250.484
TI-3089	15# STEAM TEMP, F	279.944	4.699	283.711	267.250
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	211.108	0.076	211.295	211.043
TI-7041	BOILER STEAM TEMPERATURE, F	387.725	0.214	388.174	387.277
LCP-34	REPORTED BED LEVEL, FT	12.457	0.596	13.201	11.008

TR6 - TEST POINT 6

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	143.504	2.638	148.943	138.598
PI-3106	ORIFICE PRESSURE, PSIG	140.694	2.573	146.016	135.881
PI-7040	BOILER STEAM PRESSURE, PSIG	198.351	0.875	199.744	195.570
FIC-1055	TOTAL AIR FEED, LB/HR	641.634	11.836	666.797	621.266
FIC-1053	TRANSPORT N2 FEED, SCFM	0.792	0.207	1.420	0.329
FI-3028	BED DRAIN N2 FEED, SCFM	28.267	1.178	31.690	27.070
FI-4051	N2 TO SPRAY TOWER, SCFM	27.141	1.098	28.296	24.239
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	11.383	0.920	13.512	9.840
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	1.960	0.205	2.586	1.682
FI-7021	PURGE N2 TO CARBONIZER, SCFM	1.927	0.075	2.175	1.803
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.985	0.114	3.389	2.857
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	795.193	31.396	849.100	745.323
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	814.588	2.691	823.385	810.054
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	112.434	1.420	114.998	109.151
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	9.201	0.202	10.132	9.082
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	1.293	0.027	1.345	1.261
SI-3033B	BED DRAIN SCREW RATE, RPM	4.327	2.306	9.987	1.240
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	6.335	0.188	6.669	6.032
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	7.257	0.194	7.615	6.869
PDI-3057	BED LEVEL DP, IN H2O	35.395	1.104	38.830	33.675
PDI-3009	BED LEVEL DP, IN H2O	16.738	1.319	20.730	14.555
TI-1059	AIR FEED TEMP, F	87.550	1.181	90.117	85.664
TIC-3027	BED DRAIN TEMP, F	133.380	23.293	181.586	99.898
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	159.933	11.771	184.473	141.961
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	192.265	10.495	207.168	175.453
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1535.665	5.048	1547.433	1528.871
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1573.181	5.734	1586.297	1564.984
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1578.280	5.649	1590.899	1568.277
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1594.078	5.343	1604.050	1584.682
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1604.761	6.276	1619.146	1594.239
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1622.412	6.429	1632.567	1611.920
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1620.942	5.736	1631.834	1609.771
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1619.277	5.719	1630.224	1608.185
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	181.507	1.103	183.443	180.110
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	200.944	0.675	202.032	199.723
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	193.117	0.782	194.000	191.529
TI-3108	ORIFICE TEMP, F	1296.678	5.099	1310.814	1288.710
TI-7012	PURGE N2 TEMP, F	164.643	5.934	174.953	161.852
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	299.139	54.931	379.320	211.016
TI-3089	15# STEAM TEMP, F	283.633	1.384	286.335	282.008
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	211.119	0.078	211.357	211.025
TI-7041	BOILER STEAM TEMPERATURE, F	387.262	0.362	387.839	386.136
LCP-34	REPORTED BED LEVEL, FT	14.612	0.633	16.543	13.793

TR6 - TEST POINT 7

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	122.429	3.808	127.305	112.146
PI-3106	ORIFICE PRESSURE, PSIG	120.163	3.720	124.873	110.060
PI-7040	BOILER STEAM PRESSURE, PSIG	199.503	0.575	200.480	197.880
FIC-1055	TOTAL AIR FEED, LB/HR	561.442	19.872	593.545	501.840
FIC-1053	TRANSPORT N2 FEED, SCFM	0.093	0.223	0.591	-0.044
FI-3028	BED DRAIN N2 FEED, SCFM	32.178	0.622	32.477	29.424
FI-4051	N2 TO SPRAY TOWER, SCFM	26.132	0.652	27.324	24.503
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	7.717	0.958	9.187	4.752
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	2.194	0.064	2.359	2.104
FI-7021	PURGE N2 TO CARBONIZER, SCFM	1.912	0.066	1.993	1.741
FI-7022	PURGE N2 TO CYCLONES, SCFM	3.099	0.038	3.147	3.003
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	800.894	30.368	846.335	746.257
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	812.876	2.401	818.817	808.659
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	58.041	0.538	59.187	57.252
FI-7029	N2 TO OPACITY METER, SCFM				
SI-2052B	COAL SCREW FEEDER RATE, RPM	8.634	0.250	9.157	8.365
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	1.294	0.008	1.313	1.278
SI-3033B	BED DRAIN SCREW RATE, RPM	7.753	2.341	12.014	5.040
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	5.595	0.093	5.748	5.359
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	6.811	0.197	7.126	6.386
PDI-3057	BED LEVEL DP, IN H2O	36.949	2.381	42.207	33.666
PDI-3009	BED LEVEL DP, IN H2O	20.953	2.497	26.324	17.787
TI-1059	AIR FEED TEMP, F	89.117	1.280	91.164	87.164
TIC-3027	BED DRAIN TEMP, F	149.811	31.897	207.469	105.000
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	147.137	12.426	177.363	131.773
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	190.547	7.546	200.680	178.000
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1531.899	5.519	1542.923	1523.804
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1573.466	7.958	1588.172	1560.297
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1576.451	11.466	1596.380	1558.520
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1588.953	12.086	1609.928	1570.325
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1602.944	12.456	1624.573	1581.430
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1626.841	12.980	1648.646	1601.952
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1619.787	12.382	1643.802	1601.411
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1618.138	12.355	1642.187	1599.679
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	182.815	0.857	184.018	181.125
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	199.514	1.162	201.322	197.679
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	187.574	1.284	189.876	185.797
TI-3108	ORIFICE TEMP, F	1266.636	4.443	1272.032	1255.899
TI-7012	PURGE N2 TEMP, F	160.665	6.134	178.141	152.438
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	276.928	52.161	363.616	210.576
TI-3089	15# STEAM TEMP, F	282.494	1.106	284.703	280.797
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	211.029	0.050	211.106	210.827
TI-7041	BOILER STEAM TEMPERATURE, F	387.712	0.242	388.065	387.145
LCP-34	REPORTED BED LEVEL, FT	16.862	0.932	19.400	15.743

TR8 - TEST POINT 1

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	128.578	2.639	133.284	124.127
PI-3106	ORIFICE PRESSURE, PSIG	128.221	2.663	133.097	123.647
PI-7040	BOILER STEAM PRESSURE, PSIG	197.445	0.689	199.132	196.425
FIC-1055	TOTAL AIR FEED, LB/HR	613.841	6.731	628.096	602.872
FIC-1053	TRANSPORT N2 FEED, SCFM	1.256	0.157	1.494	0.935
FI-3028	BED DRAIN N2 FEED, SCFM	40.005	0.077	40.209	39.857
FI-4051	N2 TO SPRAY TOWER, SCFM	27.944	2.339	30.750	23.786
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	7.004	1.115	10.804	5.649
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	1.836	0.356	2.460	1.346
FI-7021	PURGE N2 TO CARBONIZER, SCFM	1.839	0.099	1.956	1.533
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.496	0.024	2.546	2.454
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	700.230	1.671	703.598	694.371
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	699.947	1.055	702.438	697.558
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	45.499	1.696	47.973	41.655
FI-7029	N2 TO OPACITY METER, SCFM	32.662	0.363	33.339	32.008
SI-2052B	COAL SCREW FEEDER RATE, RPM	10.216	0.092	10.365	9.953
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	1.302	0.028	1.351	1.259
SI-3033B	BED DRAIN SCREW RATE, RPM	0.343	0.125	0.794	0.092
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	24.956	1.419	27.243	21.204
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	15.488	4.963	23.391	8.022
PDI-3057	BED LEVEL DP, IN H2O	91.539	12.457	113.646	75.453
PDI-3009	BED LEVEL DP, IN H2O	20.215	8.932	36.120	7.590
TI-1059	AIR FEED TEMP, F	83.341	2.842	87.847	79.320
TIC-3027	BED DRAIN TEMP, F	84.157	4.302	89.961	77.945
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	183.629	11.674	209.234	165.922
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	168.995	3.742	175.625	161.313
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1395.994	7.992	1421.151	1387.635
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1432.247	10.414	1463.688	1421.984
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1440.757	13.331	1487.489	1429.162
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1476.620	21.597	1566.938	1457.948
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1478.403	23.581	1577.461	1457.697
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1497.486	24.608	1604.627	1477.685
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1508.506	24.286	1616.071	1488.439
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1505.415	24.170	1612.565	1485.544
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	203.245	3.396	207.135	197.602
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	187.687	1.447	189.462	184.773
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	182.798	1.744	185.006	180.110
TI-3108	ORIFICE TEMP, F	769.405	6.237	781.405	758.470
TI-7012	PURGE N2 TEMP, F	151.136	4.407	158.754	142.490
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	237.021	2.917	242.075	231.411
TI-3089	15# STEAM TEMP, F	279.661	2.337	282.247	275.624
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	210.488	0.092	210.684	210.324
TI-7041	BOILER STEAM TEMPERATURE, F	386.872	0.289	387.520	386.384
LCP-34	REPORTED BED LEVEL, FT	21.066	4.438	33.192	16.555

TR8 - TEST POINT 2

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	132.710	1.907	137.370	129.537
PI-3106	ORIFICE PRESSURE, PSIG	132.189	1.887	136.868	129.082
PI-7040	BOILER STEAM PRESSURE, PSIG	197.908	0.528	198.795	196.767
FIC-1055	TOTAL AIR FEED, LB/HR	704.138	7.616	720.653	693.001
FIC-1053	TRANSPORT N2 FEED, SCFM	1.141	0.113	1.339	0.801
FI-3028	BED DRAIN N2 FEED, SCFM	39.996	0.102	40.403	39.778
FI-4051	N2 TO SPRAY TOWER, SCFM	31.062	0.197	31.436	30.535
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	5.331	0.719	6.232	3.354
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	4.285	1.147	6.325	2.550
FI-7021	PURGE N2 TO CARBONIZER, SCFM	1.695	0.144	1.962	1.453
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.489	0.018	2.523	2.452
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	700.318	1.769	705.708	697.528
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	699.888	1.210	701.662	696.617
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	46.014	0.784	47.346	44.199
FI-7029	N2 TO OPACITY METER, SCFM	32.359	0.267	32.821	31.751
SI-2052B	COAL SCREW FEEDER RATE, RPM	8.180	0.031	8.243	8.104
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	1.934	0.006	1.941	1.921
SI-3033B	BED DRAIN SCREW RATE, RPM	0.358	0.003	0.364	0.349
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	29.315	0.879	30.813	27.101
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	31.719	3.743	36.361	24.648
PDI-3057	BED LEVEL DP, IN H2O	160.272	23.712	199.982	121.608
PDI-3009	BED LEVEL DP, IN H2O	73.036	25.075	116.696	34.643
TI-1059	AIR FEED TEMP, F	76.858	0.556	78.125	75.891
TIC-3027	BED DRAIN TEMP, F	71.999	1.059	74.070	70.555
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	174.662	12.514	197.621	158.324
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	166.975	5.085	176.801	160.625
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1491.913	8.947	1511.459	1469.574
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1540.955	10.507	1570.328	1521.281
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1561.071	12.726	1600.243	1538.154
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1586.580	12.239	1609.173	1559.490
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1587.435	12.645	1612.639	1559.634
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1611.883	12.885	1639.927	1582.831
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1620.484	12.594	1647.512	1591.971
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1617.431	12.564	1644.379	1588.891
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	199.164	1.399	201.016	196.884
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	181.899	0.915	183.856	180.860
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	179.120	0.995	181.556	178.160
TI-3108	ORIFICE TEMP, F	817.960	14.235	836.513	790.227
TI-7012	PURGE N2 TEMP, F	143.491	3.917	155.242	140.012
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	221.994	2.629	227.287	215.351
TI-3089	15# STEAM TEMP, F	276.907	1.545	280.141	275.469
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	210.651	0.087	210.863	210.504
TI-7041	BOILER STEAM TEMPERATURE, F	387.165	0.194	387.479	386.717
LCP-34	REPORTED BED LEVEL, FT	17.200	0.900	18.661	15.728

TR8 - TEST POINT 3

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	156.488	2.336	159.567	151.078
PI-3106	ORIFICE PRESSURE, PSIG	156.071	2.325	159.145	150.712
PI-7040	BOILER STEAM PRESSURE, PSIG	197.245	0.654	198.450	195.848
FIC-1055	TOTAL AIR FEED, LB/HR	863.494	26.909	910.423	796.932
FIC-1053	TRANSPORT N2 FEED, SCFM	0.886	0.079	1.046	0.686
FI-3028	BED DRAIN N2 FEED, SCFM	34.073	2.466	40.315	32.816
FI-4051	N2 TO SPRAY TOWER, SCFM	17.796	2.519	22.632	14.741
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	5.371	0.681	6.575	4.228
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	6.704	0.275	7.007	6.182
FI-7021	PURGE N2 TO CARBONIZER, SCFM	1.844	0.097	2.029	1.681
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.324	0.032	2.395	2.285
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	799.805	2.241	804.550	795.075
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	800.286	1.080	802.695	797.817
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	48.744	5.843	56.414	27.186
FI-7029	N2 TO OPACITY METER, SCFM	25.370	0.329	26.173	24.944
SI-2052B	COAL SCREW FEEDER RATE, RPM	9.408	0.484	10.127	8.990
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	0.910	0.006	0.920	0.896
SI-3033B	BED DRAIN SCREW RATE, RPM	0.525	0.008	0.547	0.515
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	26.686	0.761	28.836	25.493
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	34.423	0.440	35.273	33.549
PDI-3057	BED LEVEL DP, IN H2O	185.159	3.856	190.281	175.283
PDI-3009	BED LEVEL DP, IN H2O	104.653	4.105	109.435	97.276
TI-1059	AIR FEED TEMP, F	86.341	1.125	87.539	84.156
TIC-3027	BED DRAIN TEMP, F	237.928	111.341	367.430	93.703
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	172.211	15.837	204.191	153.160
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	159.070	5.975	170.785	147.457
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1533.211	14.354	1552.929	1508.962
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1575.158	17.924	1599.844	1544.547
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1590.628	22.388	1620.779	1548.691
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1599.701	23.085	1630.311	1555.842
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1601.821	23.884	1634.345	1555.752
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1634.239	26.102	1671.714	1584.792
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1640.407	25.159	1675.361	1591.254
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1636.741	25.070	1671.563	1587.766
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	215.848	0.872	216.829	213.630
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	198.037	1.588	199.902	195.159
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	197.487	1.931	200.154	194.188
TI-3108	ORIFICE TEMP, F	962.259	6.285	971.907	947.571
TI-7012	PURGE N2 TEMP, F	138.223	2.830	145.703	133.662
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	243.003	10.585	259.882	222.779
TI-3089	15# STEAM TEMP, F	284.197	1.658	285.648	281.102
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	210.847	0.092	211.077	210.702
TI-7041	BOILER STEAM TEMPERATURE, F	386.899	0.247	387.360	386.294
LCP-34	REPORTED BED LEVEL, FT	18.217	0.509	19.063	17.355

TR8 - TEST POINT 4

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	113.229	2.627	120.764	107.934
PI-3106	ORIFICE PRESSURE, PSIG	112.687	2.631	120.326	107.379
PI-7040	BOILER STEAM PRESSURE, PSIG	197.516	0.617	198.652	196.045
FIC-1055	TOTAL AIR FEED, LB/HR	688.479	10.093	711.739	669.326
FIC-1053	TRANSPORT N2 FEED, SCFM	0.515	0.116	0.772	0.295
FI-3028	BED DRAIN N2 FEED, SCFM	35.514	1.433	36.834	32.689
FI-4051	N2 TO SPRAY TOWER, SCFM	19.275	2.134	21.909	14.448
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	2.271	0.637	3.992	1.182
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	1.506	0.097	1.665	1.313
FI-7021	PURGE N2 TO CARBONIZER, SCFM	1.639	0.178	1.921	1.395
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.648	0.027	2.689	2.576
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	800.094	4.035	805.274	788.327
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	800.354	2.737	805.236	790.919
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	96.284	0.553	97.146	95.000
FI-7029	N2 TO OPACITY METER, SCFM	0.000	0.004	0.000	-0.058
SI-2052B	COAL SCREW FEEDER RATE, RPM	10.250	0.027	10.304	10.202
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	2.972	0.008	2.990	2.957
SI-3033B	BED DRAIN SCREW RATE, RPM	3.157	1.248	5.089	1.078
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	6.947	0.665	8.106	6.008
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	8.439	0.511	9.304	7.369
PDI-3057	BED LEVEL DP, IN H2O	44.609	1.888	46.783	40.606
PDI-3009	BED LEVEL DP, IN H2O	19.305	1.712	23.269	16.590
TI-1059	AIR FEED TEMP, F	83.706	2.075	88.106	81.172
TIC-3027	BED DRAIN TEMP, F	106.350	18.093	151.539	89.516
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	171.612	13.075	199.039	151.645
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	177.775	8.843	203.500	166.477
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1588.437	2.873	1594.313	1584.356
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1623.121	3.291	1629.781	1618.031
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1628.459	3.316	1637.097	1623.656
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1639.409	3.158	1649.316	1635.251
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1645.250	3.501	1655.194	1640.091
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1683.328	5.124	1693.591	1669.362
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1661.888	3.717	1670.887	1655.567
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1658.243	3.663	1667.316	1651.867
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	190.742	2.958	196.650	185.923
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	199.864	2.065	203.604	197.405
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	193.832	1.820	197.530	191.421
TI-3108	ORIFICE TEMP, F	1070.161	6.308	1077.963	1056.468
TI-7012	PURGE N2 TEMP, F	117.276	5.946	132.068	107.861
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	320.442	80.577	459.358	210.378
TI-3089	15# STEAM TEMP, F	282.529	1.869	285.352	280.453
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	250.362	39.420	374.750	211.214
TI-7041	BOILER STEAM TEMPERATURE, F	386.844	0.265	387.354	386.262
LCP-34	REPORTED BED LEVEL, FT	17.911	0.625	18.852	16.624

TR8 - TEST POINT 5

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	160.571	6.183	172.688	155.348
PI-3106	ORIFICE PRESSURE, PSIG	159.892	6.135	171.933	154.657
PI-7040	BOILER STEAM PRESSURE, PSIG	197.752	0.419	198.616	197.046
FIC-1055	TOTAL AIR FEED, LB/HR	954.179	37.491	1021.423	906.565
FIC-1053	TRANSPORT N2 FEED, SCFM	0.555	0.116	0.835	0.335
FI-3028	BED DRAIN N2 FEED, SCFM	40.101	1.536	41.659	37.241
FI-4051	N2 TO SPRAY TOWER, SCFM	21.205	3.323	25.903	15.322
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	5.399	2.280	10.054	2.229
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	3.689	0.642	5.045	3.215
FI-7021	PURGE N2 TO CARBONIZER, SCFM	1.605	0.083	1.730	1.460
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.326	0.078	2.403	2.174
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	800.527	3.373	804.392	791.340
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	799.875	4.832	807.545	787.551
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	139.674	7.264	155.348	126.104
FI-7029	N2 TO OPACITY METER, SCFM	0.000	0.004	0.000	-0.043
SI-2052B	COAL SCREW FEEDER RATE, RPM	17.777	1.072	19.471	15.673
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	4.390	0.373	4.985	3.976
SI-3033B	BED DRAIN SCREW RATE, RPM	1.539	1.063	5.085	1.064
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	13.316	0.950	14.838	11.571
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	17.312	2.134	21.056	13.873
PDI-3057	BED LEVEL DP, IN H2O	77.584	10.465	98.400	66.352
PDI-3009	BED LEVEL DP, IN H2O	40.430	11.586	65.425	31.131
TI-1059	AIR FEED TEMP, F	80.682	2.025	84.359	78.039
TIC-3027	BED DRAIN TEMP, F	79.819	4.545	99.859	76.625
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	158.099	14.925	195.547	138.422
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	184.645	19.263	235.434	168.617
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1646.800	5.540	1655.982	1637.079
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1679.563	6.422	1689.813	1665.938
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1687.205	9.970	1705.241	1664.409
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1698.570	13.249	1721.566	1668.684
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1706.123	13.446	1728.228	1673.391
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1745.962	14.612	1771.090	1710.236
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1737.577	17.277	1766.845	1700.082
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1734.144	17.271	1763.525	1696.679
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	182.675	2.711	188.393	179.041
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	197.590	1.823	201.142	195.482
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	191.281	1.551	194.231	189.058
TI-3108	ORIFICE TEMP, F	1209.664	13.509	1233.766	1190.821
TI-7012	PURGE N2 TEMP, F	116.639	3.416	124.537	110.925
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	302.084	35.511	480.370	210.666
TI-3089	15# STEAM TEMP, F	282.405	1.397	285.547	281.016
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	286.653	108.967	565.602	210.863
TI-7041	BOILER STEAM TEMPERATURE, F	387.023	0.169	387.358	386.698
LCP-34	REPORTED BED LEVEL, FT	15.390	0.841	17.407	14.049

TR8 - TEST POINT 6/7

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	155.995	1.036	157.962	154.280
PI-3106	ORIFICE PRESSURE, PSIG	155.224	1.077	157.179	153.427
PI-7040	BOILER STEAM PRESSURE, PSIG	197.197	0.590	198.183	195.375
FIC-1055	TOTAL AIR FEED, LB/HR	916.781	13.514	937.576	887.839
FIC-1053	TRANSPORT N2 FEED, SCFM	0.704	0.127	0.971	0.548
FI-3028	BED DRAIN N2 FEED, SCFM	41.751	0.992	42.788	39.184
FI-4051	N2 TO SPRAY TOWER, SCFM	5.456	1.403	7.574	2.919
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	15.291	1.516	18.092	12.863
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	3.261	0.157	3.601	3.051
FI-7021	PURGE N2 TO CARBONIZER, SCFM	1.632	0.044	1.730	1.557
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.355	0.016	2.383	2.323
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	899.188	5.181	905.568	886.581
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	899.746	3.901	904.932	887.327
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	99.087	1.107	100.407	96.834
FI-7029	N2 TO OPACITY METER, SCFM	0.000	0.004	0.000	-0.045
SI-2052B	COAL SCREW FEEDER RATE, RPM	12.131	0.034	12.213	12.067
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	4.245	0.014	4.272	4.220
SI-3033B	BED DRAIN SCREW RATE, RPM	7.864	1.488	11.207	5.122
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	7.201	0.219	7.742	6.865
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	9.260	0.308	9.839	8.516
PDI-3057	BED LEVEL DP, IN H2O	50.870	3.198	57.653	46.162
PDI-3009	BED LEVEL DP, IN H2O	30.456	3.154	37.187	25.876
TI-1059	AIR FEED TEMP, F	85.180	1.334	87.992	83.852
TIC-3027	BED DRAIN TEMP, F	109.435	19.550	183.102	93.617
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	186.029	12.982	213.230	168.910
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	145.313	6.440	163.387	136.285
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1635.137	3.456	1639.990	1628.148
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1675.016	3.855	1681.156	1667.547
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1671.560	5.357	1680.597	1661.669
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1681.598	6.171	1692.405	1669.748
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1698.011	8.070	1711.656	1683.189
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1742.014	37.385	1821.587	1704.001
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1701.997	10.663	1721.433	1678.533
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1698.409	10.609	1717.714	1674.957
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	191.196	1.799	193.874	188.456
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	202.619	1.303	205.311	201.070
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	195.883	1.453	198.788	194.170
TI-3108	ORIFICE TEMP, F	1231.648	2.329	1234.280	1224.274
TI-7012	PURGE N2 TEMP, F	126.307	5.176	133.314	116.414
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	402.735	85.547	540.868	275.730
TI-3089	15# STEAM TEMP, F	285.461	1.628	287.875	283.531
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	233.830	35.338	346.882	210.648
TI-7041	BOILER STEAM TEMPERATURE, F	386.772	1.315	387.248	386.048
LCP-34	REPORTED BED LEVEL, FT	18.526	1.061	20.374	16.774

TR8 - TEST POINT 8

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	143.480	1.094	145.462	141.316
PI-3106	ORIFICE PRESSURE, PSIG	142.529	1.090	144.563	140.318
PI-7040	BOILER STEAM PRESSURE, PSIG	197.813	0.479	198.802	196.784
FIC-1055	TOTAL AIR FEED, LB/HR	837.725	7.505	850.408	823.915
FIC-1053	TRANSPORT N2 FEED, SCFM	0.615	0.129	1.012	0.435
FI-3028	BED DRAIN N2 FEED, SCFM	43.614	0.364	44.126	42.542
FI-4051	N2 TO SPRAY TOWER, SCFM	12.429	1.417	15.309	9.679
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	16.163	1.376	18.443	13.111
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	2.721	0.089	2.867	2.568
FI-7021	PURGE N2 TO CARBONIZER, SCFM	1.683	0.062	1.866	1.590
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.483	0.019	2.512	2.443
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	900.309	5.195	905.863	884.595
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	899.931	1.721	904.083	896.411
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	90.004	0.105	90.191	89.809
FI-7029	N2 TO OPACITY METER, SCFM	0.000	0.007	0.000	-0.031
SI-2052B	COAL SCREW FEEDER RATE, RPM	9.776	0.121	10.039	9.685
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	2.383	0.006	2.395	2.373
SI-3033B	BED DRAIN SCREW RATE, RPM	5.181	1.027	6.033	3.400
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	6.897	0.258	7.667	6.542
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	9.621	0.439	10.264	8.712
PDI-3057	BED LEVEL DP, IN H2O	45.425	1.866	47.868	41.805
PDI-3009	BED LEVEL DP, IN H2O	25.785	1.955	28.613	22.165
TI-1059	AIR FEED TEMP, F	78.066	1.060	79.927	76.499
TIC-3027	BED DRAIN TEMP, F	81.777	4.380	92.625	76.766
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	175.786	12.894	203.426	158.539
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	130.141	2.989	139.301	126.582
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1610.888	2.830	1617.511	1605.939
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1682.893	3.096	1689.922	1677.016
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1681.557	4.204	1691.419	1673.445
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1692.625	4.844	1704.105	1683.813
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1702.772	5.903	1718.963	1693.458
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1757.057	16.758	1787.529	1726.316
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1701.751	7.444	1721.069	1690.444
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1699.521	7.421	1718.736	1688.306
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	184.386	1.243	186.785	182.616
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	196.091	1.307	198.519	194.134
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	187.730	0.887	189.570	186.354
TI-3108	ORIFICE TEMP, F	1225.141	3.470	1230.716	1218.971
TI-7012	PURGE N2 TEMP, F	115.924	4.552	128.453	110.117
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	352.415	94.211	493.350	213.927
TI-3089	15# STEAM TEMP, F	284.692	1.341	287.109	282.850
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	215.897	9.285	250.559	211.483
TI-7041	BOILER STEAM TEMPERATURE, F	387.179	0.189	387.539	386.804
LCP-34	REPORTED BED LEVEL, FT	16.184	0.423	17.069	15.426

TR8 - TEST POINT 9

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	134.998	2.762	140.072	130.148
PI-3106	ORIFICE PRESSURE, PSIG	134.170	2.806	139.458	129.298
PI-7040	BOILER STEAM PRESSURE, PSIG	197.667	0.559	198.614	196.641
FIC-1055	TOTAL AIR FEED, LB/HR	800.406	7.001	814.412	784.412
FIC-1053	TRANSPORT N2 FEED, SCFM	0.604	0.138	0.956	0.384
FI-3028	BED DRAIN N2 FEED, SCFM	44.476	0.400	45.312	43.792
FI-4051	N2 TO SPRAY TOWER, SCFM	13.342	1.459	15.686	10.151
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	15.864	2.011	18.769	11.875
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	2.635	0.229	3.174	2.372
FI-7021	PURGE N2 TO CARBONIZER, SCFM	1.680	0.078	2.022	1.616
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.532	0.027	2.580	2.470
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	899.855	4.566	905.505	887.600
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	899.892	1.871	903.792	896.644
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	54.988	0.195	55.283	54.635
FI-7029	N2 TO OPACITY METER, SCFM	0.000	0.007	0.003	-0.028
SI-2052B	COAL SCREW FEEDER RATE, RPM	10.896	0.719	11.639	9.698
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	2.386	0.006	2.397	2.377
SI-3033B	BED DRAIN SCREW RATE, RPM	6.315	0.978	6.935	3.889
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	6.235	0.232	6.656	5.745
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	10.849	0.268	11.290	10.304
PDI-3057	BED LEVEL DP, IN H2O	48.816	3.465	57.238	44.478
PDI-3009	BED LEVEL DP, IN H2O	29.582	4.536	40.657	24.781
TI-1059	AIR FEED TEMP, F	79.985	2.130	83.305	76.574
TIC-3027	BED DRAIN TEMP, F	81.545	4.613	95.898	76.805
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	164.679	12.026	186.668	149.695
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	136.314	3.526	145.215	132.117
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1602.951	9.563	1615.013	1586.479
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1682.684	11.488	1700.797	1664.391
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1682.190	15.564	1705.852	1655.876
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1693.826	16.853	1719.178	1666.058
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1706.695	16.804	1733.461	1680.911
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1767.161	21.270	1803.144	1714.392
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1713.293	19.741	1745.127	1679.429
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1710.998	19.740	1742.829	1677.073
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	185.058	1.367	187.899	183.605
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	197.830	2.344	201.836	194.314
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	187.310	1.711	189.822	184.395
TI-3108	ORIFICE TEMP, F	1206.042	3.802	1212.298	1199.419
TI-7012	PURGE N2 TEMP, F	122.577	4.741	137.805	114.766
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	298.598	89.400	463.773	211.887
TI-3089	15# STEAM TEMP, F	284.579	1.127	287.266	283.289
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	245.127	37.878	345.836	211.672
TI-7041	BOILER STEAM TEMPERATURE, F	387.087	0.194	387.407	386.741
LCP-34	REPORTED BED LEVEL, FT	15.746	1.119	18.914	14.415

TR8 - TEST POINT 10

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	126.535	4.710	136.195	118.927
PI-3106	ORIFICE PRESSURE, PSIG	125.774	4.697	135.417	118.151
PI-7040	BOILER STEAM PRESSURE, PSIG	197.381	0.500	198.434	196.116
FIC-1055	TOTAL AIR FEED, LB/HR	737.856	30.152	785.350	684.715
FIC-1053	TRANSPORT N2 FEED, SCFM	0.679	0.092	0.897	0.550
FI-3028	BED DRAIN N2 FEED, SCFM	45.752	0.443	46.521	44.821
FI-4051	N2 TO SPRAY TOWER, SCFM	4.789	1.040	6.865	3.605
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	11.266	4.643	17.715	3.286
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	2.490	0.226	2.815	2.107
FI-7021	PURGE N2 TO CARBONIZER, SCFM	1.904	0.166	2.262	1.694
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.594	0.030	2.660	2.521
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	900.381	4.553	906.384	887.702
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	900.118	0.886	901.481	898.534
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	55.020	0.108	55.262	54.816
FI-7029	N2 TO OPACITY METER, SCFM	0.000	0.005	0.000	-0.035
SI-2052B	COAL SCREW FEEDER RATE, RPM	12.538	0.153	12.649	11.996
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	1.597	0.146	1.882	1.489
SI-3033B	BED DRAIN SCREW RATE, RPM	9.803	2.719	13.856	0.030
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	5.488	0.142	5.714	5.182
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	9.503	0.629	10.647	8.438
PDI-3057	BED LEVEL DP, IN H2O	47.857	2.678	52.072	42.625
PDI-3009	BED LEVEL DP, IN H2O	30.954	3.198	36.118	24.827
TI-1059	AIR FEED TEMP, F	88.616	0.970	89.586	86.555
TIC-3027	BED DRAIN TEMP, F	158.038	61.387	322.375	100.039
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	175.830	12.912	203.043	158.055
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	134.046	3.767	143.398	129.281
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1614.313	7.719	1634.747	1598.392
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1697.408	10.421	1725.047	1676.453
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1699.358	14.495	1737.985	1673.627
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1710.079	15.636	1751.967	1681.990
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1724.278	16.220	1767.038	1693.957
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1783.760	24.377	1836.155	1736.192
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1725.476	16.191	1766.986	1695.430
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1722.863	16.178	1764.302	1692.751
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	193.127	2.242	195.356	188.822
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	204.210	0.524	205.077	203.227
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	196.601	1.532	198.824	193.496
TI-3108	ORIFICE TEMP, F	1198.588	3.345	1205.440	1193.435
TI-7012	PURGE N2 TEMP, F	128.395	2.269	132.564	124.271
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	368.147	79.951	487.742	215.216
TI-3089	15# STEAM TEMP, F	286.291	1.212	288.742	284.336
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	212.118	2.588	225.856	211.357
TI-7041	BOILER STEAM TEMPERATURE, F	386.888	0.197	387.268	386.389
LCP-34	REPORTED BED LEVEL, FT	17.298	1.244	20.674	14.576

TR10 - TEST POINT 1

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	113.651	2.524	116.020	107.285
PI-3106	ORIFICE PRESSURE, PSIG	111.493	2.594	114.089	104.967
PI-7040	BOILER STEAM PRESSURE, PSIG	199.254	0.680	200.302	198.134
FIC-1055	TOTAL AIR FEED, LB/HR	1158.448	31.214	1192.327	1073.267
FIC-1053	TRANSPORT N2 FEED, SCFM	0.996	0.108	1.169	0.695
FI-3028	BED DRAIN N2 FEED, SCFM	0.000	0.013	0.008	-0.029
FI-4051	N2 TO SPRAY TOWER, SCFM	23.865	0.548	24.625	22.869
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	2.885	0.997	4.910	0.917
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	0.000	7.677	0.000	-7.560
FI-7021	PURGE N2 TO CARBONIZER, SCFM	2.223	0.162	2.515	1.718
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.030	0.008	2.046	2.018
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	1456.734	63.402	1513.798	1199.284
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	1073.943	46.044	1157.386	940.209
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	150.725	0.605	152.191	149.780
FI-7029	N2 TO OPACITY METER, SCFM	58.760	0.274	59.380	58.261
SI-2052B	COAL SCREW FEEDER RATE, RPM	10.086	0.017	10.118	10.052
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	4.972	0.007	4.984	4.962
SI-3033B	BED DRAIN SCREW RATE, RPM	0.124	0.350	1.805	0.048
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	10.563	3.691	15.440	0.584
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	9.554	3.234	13.523	0.996
PDI-3057	BED LEVEL DP, IN H2O	37.096	6.054	45.193	16.344
PDI-3009	BED LEVEL DP, IN H2O	7.073	1.576	9.087	1.963
TI-1059	AIR FEED TEMP, F	79.706	0.690	80.891	78.623
TIC-3027	BED DRAIN TEMP, F	176.330	12.073	200.891	156.547
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	514.844	0.000	514.844	514.844
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	288.416	48.861	397.539	213.863
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1652.279	8.307	1668.434	1632.924
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1672.908	9.909	1693.328	1654.984
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1665.162	14.381	1701.587	1644.983
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1675.100	15.922	1722.952	1654.708
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1681.521	18.458	1742.109	1660.355
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1677.992	15.742	1723.275	1655.227
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1649.330	12.196	1684.775	1633.359
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1646.351	12.203	1681.906	1630.606
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	150.396	3.808	155.591	142.777
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	162.982	5.020	170.577	154.747
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	178.347	3.814	183.712	171.211
TI-3108	ORIFICE TEMP, F	1115.854	20.754	1138.057	1071.528
TI-7012	PURGE N2 TEMP, F	156.138	1.683	159.641	153.258
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	2943.910	0.000	2943.910	2943.910
TI-3089	15# STEAM TEMP, F	256.661	0.125	256.859	256.422
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	352.973	68.801	506.404	233.176
TI-7041	BOILER STEAM TEMPERATURE, F	387.911	0.273	388.365	387.484
LCP-34	REPORTED BED LEVEL, FT	22.982	23.034	128.965	14.014
FIC-3187	L-VALVE AERATION N2	1.719	0.055	1.848	1.613
FIC-7026	L-VALVE AERATION N2	1.451	0.447	2.216	0.536
FIC-3191	L-VALVE AERATION N2	2.147			

TR10 - TEST POINT 2

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	68.671	7.889	80.060	56.576
PI-3106	ORIFICE PRESSURE, PSIG	67.572	7.640	78.574	55.852
PI-7040	BOILER STEAM PRESSURE, PSIG	198.432	0.760	199.378	196.352
FIC-1055	TOTAL AIR FEED, LB/HR	736.211	112.871	856.733	609.047
FIC-1053	TRANSPORT N2 FEED, SCFM	0.279	0.386	1.124	0.000
FI-3028	BED DRAIN N2 FEED, SCFM	0.000	0.020	0.016	-0.041
FI-4051	N2 TO SPRAY TOWER, SCFM	19.887	1.129	22.303	17.882
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	1.657	1.597	4.924	0.018
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	0.000	7.610	0.000	-7.593
FI-7021	PURGE N2 TO CARBONIZER, SCFM	1.940	0.047	2.017	1.836
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.053	0.020	2.097	2.017
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	1166.224	296.936	1493.158	674.787
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	1150.334	24.765	1174.342	1044.660
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	0.130	0.059	0.236	0.012
FI-7029	N2 TO OPACITY METER, SCFM	58.383	0.371	58.931	57.480
SI-2052B	COAL SCREW FEEDER RATE, RPM	3.482	0.016	3.518	3.451
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	0.936	0.002	0.939	0.931
SI-3033B	BED DRAIN SCREW RATE, RPM	0.109	0.188	1.060	0.065
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	14.394	5.740	32.948	5.146
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	10.195	6.698	19.382	2.112
PDI-3057	BED LEVEL DP, IN H2O	35.448	10.096	50.069	23.367
PDI-3009	BED LEVEL DP, IN H2O	3.211	3.832	11.033	-2.752
TI-1059	AIR FEED TEMP, F	84.310	1.345	85.500	81.250
TIC-3027	BED DRAIN TEMP, F	85.081	2.465	89.648	81.609
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	514.844	0.000	514.844	514.844
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	193.715	34.205	272.008	159.711
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1617.592	22.939	1674.991	1589.981
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1651.137	22.575	1712.766	1614.672
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1656.391	26.596	1722.837	1604.194
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1680.287	32.568	1745.776	1615.833
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1688.230	34.564	1756.564	1620.907
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1673.708	34.545	1737.318	1611.507
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1648.479	34.601	1696.859	1577.441
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1645.455	34.636	1693.269	1574.260
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	165.723	1.099	166.990	164.109
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	181.010	0.452	181.916	180.361
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	181.726	0.243	182.239	181.341
TI-3108	ORIFICE TEMP, F	868.288	37.463	931.305	805.180
TI-7012	PURGE N2 TEMP, F	160.753	4.766	168.070	150.906
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	2943.909	0.000	2943.910	2943.910
TI-3089	15# STEAM TEMP, F	256.638	0.152	256.852	256.320
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	221.715	28.065	342.660	211.043
TI-7041	BOILER STEAM TEMPERATURE, F	387.370	0.337	387.826	386.468
LCP-34	REPORTED BED LEVEL, FT	20.739	9.389	43.242	10.854
FIC-3187	L-VALVE AERATION N2	19.208	7.424	34.023	0.076
FIC-7026	L-VALVE AERATION N2	14.610	6.270	20.950	-0.017
FIC-3191	L-VALVE AERATION N2	3.757			

TR10 - TEST POINT 3

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	72.695	3.245	78.042	67.821
PI-3106	ORIFICE PRESSURE, PSIG	71.272	3.195	76.589	66.448
PI-7040	BOILER STEAM PRESSURE, PSIG	199.052	0.721	200.684	198.049
FIC-1055	TOTAL AIR FEED, LB/HR	845.203	3.992	850.628	838.037
FIC-1053	TRANSPORT N2 FEED, SCFM	0.908	0.276	1.276	0.322
FI-3028	BED DRAIN N2 FEED, SCFM	0.004	0.012	0.030	-0.014
FI-4051	N2 TO SPRAY TOWER, SCFM	25.298	0.528	26.068	24.127
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	1.761	1.469	6.142	0.233
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	0.000	7.665	0.000	-7.604
FI-7021	PURGE N2 TO CARBONIZER, SCFM	2.132	0.425	3.049	1.667
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.071	0.015	2.093	2.043
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	1480.533	58.884	1549.789	1385.083
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	1140.629	14.903	1160.188	1103.592
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	0.284	0.088	0.445	0.131
FI-7029	N2 TO OPACITY METER, SCFM	58.268	0.331	58.868	57.641
SI-2052B	COAL SCREW FEEDER RATE, RPM	4.438	0.015	4.472	4.402
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	0.832	0.002	0.834	0.829
SI-3033B	BED DRAIN SCREW RATE, RPM	6.428	4.455	25.033	5.059
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	7.871	4.827	19.045	2.258
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	15.006	1.693	17.020	10.957
PDI-3057	BED LEVEL DP, IN H2O	40.435	4.527	46.756	31.813
PDI-3009	BED LEVEL DP, IN H2O	5.521	2.178	9.847	2.236
TI-1059	AIR FEED TEMP, F	76.312	0.624	77.727	75.680
TIC-3027	BED DRAIN TEMP, F	75.714	1.109	78.695	74.281
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	514.844	0.000	514.844	514.844
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	188.286	17.178	226.930	168.539
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1677.482	22.068	1707.058	1642.431
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1703.442	23.290	1739.641	1661.172
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1695.736	26.147	1738.991	1644.576
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1709.491	27.640	1757.943	1655.690
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1714.256	28.507	1761.845	1655.690
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1702.733	28.137	1752.712	1645.145
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1674.887	23.953	1712.107	1624.240
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1671.958	23.890	1709.026	1621.547
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	161.916	0.677	162.887	160.659
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	176.835	0.658	178.232	175.871
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	182.804	0.310	183.605	182.419
TI-3108	ORIFICE TEMP, F	917.152	19.798	961.685	873.090
TI-7C..	PURGE N2 TEMP, F	157.186	4.020	162.688	150.008
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	2943.910	0.000	2943.910	2943.910
TI-3089	15# STEAM TEMP, F	256.746	0.164	256.992	256.406
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	227.006	17.483	272.939	211.295
TI-7041	BOILER STEAM TEMPERATURE, F	387.809	0.282	388.390	387.474
LCP-34	REPORTED BED LEVEL, FT	11.973	0.950	15.955	11.208
FIC-3187	L-VALVE AERATION N2	4.744	6.875	28.535	2.431
FIC-7026	L-VALVE AERATION N2	9.230	3.648	22.122	5.751
FIC-3191	L-VALVE AERATION N2	1.027			

TR10 - TEST POINT 4

DATA ENTRY
HISTORIAN INFORMATION (TO BE IMPORTED FROM VAX)

TAG	DECRIPTION	AVG	STD	MAX	MIN
PI-3007	CARBONIZER PRESSURE, PSIG	55.891	1.586	58.566	48.532
PI-3106	ORIFICE PRESSURE, PSIG	55.089	1.023	57.565	52.838
PI-7040	BOILER STEAM PRESSURE, PSIG	198.889	0.561	199.915	197.787
FIC-1055	TOTAL AIR FEED, LB/HR	641.606	4.870	647.629	632.677
FIC-1053	TRANSPORT N2 FEED, SCFM	1.036	0.125	1.182	0.644
FI-3028	BED DRAIN N2 FEED, SCFM	0.018	0.007	0.037	0.003
FI-4051	N2 TO SPRAY TOWER, SCFM	25.376	0.737	26.627	23.506
FI-7008	FEED LOCKHOPPER COMP N2, SCFM	1.071	0.586	3.113	0.276
FI-7020	PURGE N2 TO CYCLONES DIPLEGS, SCFM	0.000	7.657	0.000	-7.602
FI-7021	PURGE N2 TO CARBONIZER, SCFM	1.790	0.050	1.881	1.691
FI-7022	PURGE N2 TO CYCLONES, SCFM	2.080	0.012	2.103	2.056
FIC-3072	PRIMARY CYCLONE DIP-LEG STM, LB/HR	1284.759	28.865	1334.849	1208.365
FIC-3090	SECONDARY CYCLONE DIP-LEG STM, LB/HR	1142.036	13.540	1169.352	1104.133
FIC-BSTM	STEAM FLOW TO CARBONIZER, LB/HR	0.265	0.099	0.446	0.086
FI-7029	N2 TO OPACITY METER, SCFM	59.200	0.311	60.227	58.584
SI-2052B	COAL SCREW FEEDER RATE, RPM	4.424	0.019	4.476	4.397
SI-1047B	SORBENT SCREW FEEDER RATE, RPM	0.828	0.003	0.833	0.821
SI-3033B	BED DRAIN SCREW RATE, RPM	5.063	0.004	5.072	5.055
PDI-3018	BED DENSITY DP (DH=2.25 FT), IN H2O	2.778	0.801	5.110	1.560
PDI-3059	BED DENSITY DP (DH=3.0 FT), IN H2O	16.917	1.779	25.650	14.249
PDI-3057	BED LEVEL DP, IN H2O	45.616	7.749	83.503	21.812
PDI-3009	BED LEVEL DP, IN H2O	3.291	1.027	5.632	1.447
TI-1059	AIR FEED TEMP, F	77.263	2.499	81.797	74.578
TIC-3027	BED DRAIN TEMP, F	72.005	2.338	77.742	69.938
TI-3070	PRIMARY CYCLONE LOCKHOPPER TEMP, F	514.844	0.000	514.844	514.844
TI-3082	SECONDARY CYCLONE LOCKHOPPER TEMP, F	201.653	22.482	272.063	178.508
TI-3003	FREEBOARD TEMP (AT 27.5 FT), F	1570.702	10.097	1596.074	1550.928
TIC-3002	CARB BED TEMP (AT 22.5 FT), F	1600.908	11.264	1623.281	1577.922
TI-3006	CARB BED TEMP (AT 17.5 FT), F	1588.558	13.045	1615.013	1561.934
TI-3015	CARB BED TEMP (AT 12.5 FT), F	1601.078	13.757	1629.977	1572.859
TI-3016	CARB BED TEMP (AT 7.5 FT), F	1601.410	14.365	1631.807	1572.034
TI-3020	CARB BED TEMP (AT 2.5 FT), F	1614.403	13.284	1650.719	1587.779
TI-3021A	CARB BED TEMP (AT 1.3 FT), F	1567.334	11.803	1591.396	1544.232
TI_3021B	CARB BED TEMP (AT 1.3 FT), F	1565.181	11.745	1588.983	1542.204
TI-3005	CARB SHELL TEMP (AT 23.8 FT), F	161.470	1.784	165.043	159.563
TI-3012	CARB SHELL TEMP (AT 11.0 FT), F	178.750	1.731	181.107	175.663
TI-3019	CARB SHELL TEMP (AT 2.3 FT), F	183.369	0.272	184.252	183.030
TI-3108	ORIFICE TEMP, F	813.399	20.432	859.156	786.108
TI-7012	PURGE N2 TEMP, F	153.345	2.144	157.607	149.070
TI-3060	PRIMARY CYCLONE DIP-LEG STM TEMP, F	2943.908	0.001	2943.910	2943.910
TI-3089	15# STEAM TEMP, F	257.203	0.186	257.539	256.820
TI-3096	SECONDARY CYCLONE DIP-LEG STM TEMP, F	220.844	12.989	267.016	211.517
TI-7041	BOILER STEAM TEMPERATURE, F	387.770	0.241	388.208	387.243
LCP-34	REPORTED BED LEVEL, FT	11.732	1.894	17.015	2.205
FIC-3187	L-VALVE AERATION N2	6.938	5.208	34.578	5.093
FIC-7026	L-VALVE AERATION N2	9.662	2.332	23.920	8.632
FIC-3191	L-VALVE AERATION N2	4.645			

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APPENDIX C

INPUT DATA FILES FOR BALAID PROGRAM

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A total of 36 set points (steady-state periods) were achieved while operating the carbonizer in a jetting fluidized-bed mode, and 4 set points were achieved while operating the carbonizer in a circulating fluidized-bed mode. Table C.1 summarizes the coal and sorbent types used, date, duration, pressure, and bed and freeboard temperatures for each of these steady-state periods.

The input data files processed by the BALAID program (for each of the set points) are given in this appendix. Each file consists of labels and default values of the run control parameters, run title, and plant and laboratory measurements. The plant measurements constitute a mean value, overall standard deviation (Sigma), temporal standard deviation (T Sigma), precision standard deviation (P Sigma), and measurement label. The square of the overall standard deviation equals the sum of the squares of "T Sigma" and "P Sigma." Laboratory measurements follow the same format as plant measurements.

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Table C.1. SUMMARY OF STEADY-STATE PERIODS FROM CARBONIZER PILOT PLANT OPERATION

Set Point	Coal Feed	Sorbent Feed	Date	Duration, hours	Pressure, psig	Bed Temp., °F	Freeboard Temp., °F
TR1-1	Pittsburgh No 8	Dolomite	11/20/91	0300-0700	152.6	1584	1553
TR1-2	Pittsburgh No 8	Dolomite	11/21/91	0200-0600	132.9	1681	1651
TR1-3	Pittsburgh No 8	Dolomite	11/21/91	1000-1400	144.7	1608	1581
TR1-4	Pittsburgh No 8	Dolomite	11/21/91	2100-2330	125.4	1482	1440
TR2-1	Pittsburgh No 8	Dolomite	12/19/91	0100-0500	139.8	1698	1652
TR2-2	Pittsburgh No 8	Dolomite	12/19/91	1300-1700	128.3	1598	1567
TR2-3	Pittsburgh No 8	Dolomite	12/20/91	0100-0500	138.1	1797	1705
TR2-4	Pittsburgh No 8	Dolomite	12/20/91	1000-1400	191.8	1784	1738
TR2-5	Pittsburgh No 8	Dolomite	12/20/91	1600-1800	198.6	1679	1675
TR4-1	Pittsburgh No 8	Dolomite	3/10/92	2030-0030	153.3	1663	1626
TR4-2	Pittsburgh No 8	Dolomite	3/11/92	0430-0830	155.9	1608	1573
TR4-3	Pittsburgh No 8	Dolomite	3/12/92	0230-0630	125.2	1708	1643
TR4-4	Pittsburgh No 8	Dolomite	3/12/92	1600-2000	129.1	1607	1568
TR4-5	Pittsburgh No 8	Dolomite	3/13/92	0530-0930	193.2	1720	1691
TR4-6	Pittsburgh No 8	Dolomite	3/13/92	1300-1700	175.8	1713	1681
TR4-7	Pittsburgh No 8	Dolomite	3/13/92	2200-0200	177.9	1601	1582
TR4-8	Pittsburgh No 8	Dolomite	3/14/92	0200-0600	182.2	1618	1600
TR5-1	Pittsburgh No 8	Dolomite	3/24/92	1100-1500	134.3	1693	1653
TR5-2	Pittsburgh No 8	Dolomite	3/24/92	1900-2300	154.8	1701	1662
TR5-3	Pittsburgh No 8	Limestone	3/25/92	0500-0900	147.4	1706	1667
TR6-1	Wyoming	Limestone	4/21/92	2100-0100	145.9	1580	1567
TR6-2	Wyoming	Limestone	4/22/92	0430-0830	129.8	1509	1500
TR6-3	Wyoming	Limestone	4/22/92	1400-1800	157.5	1511	1515
TR6-4	Wyoming	Limestone	4/22/92	2100-0100	191.9	1609	1579
TR6-5	Wyoming	Limestone	4/23/92	0400-0800	189.6	1632	1593
TR6-6	Illinois No 6	Limestone	4/23/92	1800-2200	143.5	1600	1573
TR6-7	Illinois No 6	Limestone	4/23/92	2300-0330	122.4	1599	1573
TR8-1	Wyoming	Limestone	6/10/92	2000-0100	128.6	1476	1432
TR8-2	Wyoming	Limestone	6/11/92	0300-0800	132.7	1593	1541
TR8-3	Wyoming	Limestone	6/11/92	1330-1730	156.5	1613	1575
TR8-4	Illinois No 6	Limestone	6/12/92	2100-0200	113.2	1652	1623
TR8-5	Illinois No 6	Limestone	6/13/92	0700-1100	160.6	1715	1680
TR8-6/7	Pittsburgh No 8	Dolomite	6/14/92	2100-0100	156.0	1699	1675
TR8-8	Pittsburgh No 8	Dolomite	6/16/92	0200-0600	143.5	1707	1683
TR8-9	Pittsburgh No 8	Dolomite	6/16/92	0800-1230	135.0	1713	1683
TR8-10	Pittsburgh No 8	Dolomite	6/16/92	1430-1930	126.5	1729	1697
TR10-1*	Pittsburgh No 8	Limestone	9/1/92	0200-0600	113.7	1675	1652
TR10-2*	Pittsburgh No 8	Limestone	9/1/92	1630-2100	68.7	1675	1618
TR10-3*	Pittsburgh No 8	Limestone	9/2/92	0000-0400	72.7	1706	1677
TR10-4*	Pittsburgh No 8	Limestone	9/2/92	0610-1240	55.9	1601	1571

*The carbonizer was operated in a circulating fluidized-bed mode during Test TR10.

INPUT DATA FILE FOR TR1-1

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,      'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     4.5,    1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR1 - TEST POINT 1  <<CASE D>>  11/20/91  Pittsburgh Coal + Dolomite
SET POINT DATE:     11/20/91
SET POINT TIME:     03:00:00 - 07:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	152.6210	3.598E+00	3.519000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	149.9910	3.463E+00	3.448000E+00	3.250000E-01	Orifice Pressure	PSIG	PI-3106
3	100.0000	1.000E+01	.000000E+00	1.000000E+01	Boiler Steam Pressure	PSIG	PI-7040
4	627.8970	1.093E+01	6.145000E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.0000	.000E+00	.000000E+00	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	74.1530	1.079E+01	1.074300E+01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	43.9850	9.685E-01	8.820000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	12.1200	1.540E+00	1.520000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	26.6460	5.581E-01	5.300000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.9910	7.207E-02	6.300000E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.9570	7.088E-02	6.800000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	1121.5730	6.949E+01	6.785000E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	1005.5010	5.523E+01	5.372300E+01	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.0000	.000E+00	.000000E+00	.000000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	329.0000	8.2402	8.225	.5	Coal Feed rate	lb/hr	
16	89.0000	2.2805	2.225	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	89.3450	3.278E+00	2.597000E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	96.3450	3.042E+01	3.035600E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	144.2770	7.474E+00	7.201000E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	178.9680	1.528E+01	1.515000E+01	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1505.3300	1.506E+01	1.396400E+01	5.644987E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1257.9010	8.478E+00	7.044000E+00	4.717129E+00	Orifice Temp (Upstream)	F	TI-3108
38	86.3560	2.824E+00	1.994000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	208.6630	2.483E+01	2.475300E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	264.2760	2.014E+00	2.400000E-01	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	212.3660	2.369E+00	1.270000E+00	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	100.0000	1.000E+01	.000000E+00	1.000000E+01	Boiler Steam Temperature	F	TI-7041
43	.0000	2.000E+01	.000000E+00	.000000E+00	unused		
44	74.4000	5.000E-01	.000000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	78.2000	3.942E+00	3.910000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	127.8000	6.410E+00	6.390000E+00	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	.0000	.000E+00	.000000E+00	.000000E+00	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR1-1

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	67.4946	1.794E+00	1.788010E+00	1.500000E-01	Coal - C	Mass %
2	4.5782	1.303E-01	1.255282E-01	3.500000E-02	Coal - H	Mass %
3	1.8536	7.893E-02	7.487097E-02	2.500000E-02	Coal - N	Mass %
4	3.1736	.15868	.15868		Coal - S	Mass %
5	14.4255	2.034E+00	2.031932E+00	1.000000E-01	Coal - Ash	Mass %
6	2.1727	3.419E-01	3.072165E-01	1.500000E-01	Coal - H2O	Mass %
7	12296.0000	307.4		307.4	Coal - HHV *	BTU/lb
8	29.1880	6.451E+00	6.448761E+00	1.500000E-01	CD Drain - C	Mass %
9	.1360	5.201E-02	3.847075E-02	3.500000E-02	CD Drain - H	Mass %
10	.7420	1.814E-01	1.796387E-01	2.500000E-02	CD Drain - N	Mass %
11	7.0840	1.771	1.771		CD Drain - S	Mass %
12	75.4940	8.538E+00	8.534191E+00	2.500000E-01	CD Drain - Ash	Mass %
13	4359.1	108.98		108.98	CD Drain - HHV (dry) *	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	4.6540	2.327	2.327		CD Drain - sfide S	Mass %
16	3.3980	5.532E-01	5.324662E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	9.9880	4.994	4.994		CD Drain - Ash S	Mass %
18	13.5600				CD Drain - Ash CaO	Mass %
19	19.0160				CD Drain - Ash MgO	Mass %
20	56.0780	4.839E+00	4.836774E+00	1.500000E-01	PD Drain - C	Mass %
21	.3880	4.467E-02	2.774881E-02	3.500000E-02	PD Drain - H	Mass %
22	1.3860	1.522E-01	1.501001E-01	2.500000E-02	PD Drain - N	Mass %
23	6.1440	1.536	1.536		PD Drain - S	Mass %
24	45.8400	4.555E+00	4.548029E+00	2.500000E-01	PD Drain - Ash	Mass %
25	8299.4	207.49		207.49	PD Drain - HHV (dry) *	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	2.3876	1.1938	1.1938		PD Drain - sfide S *	Mass %
28	2.3260	1.749E-01	8.989415E-02	1.500000E-01	PD Drain - crbate C	Mass %
29	11.1200	5.56	5.56		PD Drain - Ash S	Mass %
30	9.1200				PD Drain - Ash CaO	Mass %
31	17.9800				PD Drain - Ash MgO	Mass %
32	71.1680	2.449E+00	2.444122E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.5980	5.996E-02	4.868154E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	2.0980	1.776E-01	1.758436E-01	2.500000E-02	CF/SD Drain - N	Mass %
35	2.9260	.7315	.7315		CF/SD Drain - S	Mass %
36	28.4000	4.532E+00	4.524963E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	10748.3	268.71		268.71	CF/SD Drain - HHV (dry) *	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	.7780	.389	.389		CF/SD Drain - sfide S	Mass %
40	1.0680	3.215E-01	2.843765E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	11.2040	5.602	5.602		CF/SD Drain - Ash S	Mass %
42	9.2800				CF/SD Drain - Ash CaO	Mass %
43	14.0000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	69.9800	1.338E+00	1.329620E+00	1.500000E-01	BD Drain - C	Mass %
46	.6300	5.292E-02	3.969000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.9800	1.137E-01	1.108800E-01	2.500000E-02	BD Drain - N	Mass %
48	2.5400	.635	.635		BD Drain - S	Mass %
49	24.7400	1.311E+00	1.286480E+00	2.500000E-01	BD Drain - Ash	Mass %
50	10685.4	267.14		267.14	BD Drain - HHV (dry) *	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.5000	.25	.25		BD Drain - sfide S *	Mass %
53	.6980	.698E+00	6.816920E-01	1.500000E-01	BD Drain - crbate C *	Mass %
54	3.4360	1.718	1.718		BD Drain - Ash S *	Mass %
55	23.8200				BD Drain - Ash CaO *	Mass %
56	5.8690				BD Drain - Ash MgO *	Mass %
57	81.9000	1.702E+00	1.491905E+00	8.200000E-01	Demister Gas - N2	mol,vol %
58	.2580	1.126E-01	1.125611E-01	3.580000E-03	Demister Gas - O2	mol,vol %
59	4.8820	6.428E-01	6.409122E-01	4.982000E-02	Demister Gas - CO	mol,vol %
60	1.8120	9.917E-02	9.731288E-02	1.912000E-02	Demister Gas - CH4	mol,vol %
61	6.1760	3.228E-01	3.165919E-01	6.276000E-02	Demister Gas - CO2	mol,vol %
62	.0760	1.154E-02	1.140178E-02	1.760000E-03	Demister Gas - C2H4	mol,vol %
63	.0280	8.464E-03	8.366597E-03	1.280000E-03	Demister Gas - C2H6	mol,vol %
64	.0200	7.074E-03	7.071072E-03	2.000000E-04	Demister Gas - H2S	mol,vol %
65	3.7860	1.811E-01	1.768587E-01	3.886000E-02	Demister Gas - H2	mol,vol %
66	.1644	7.816E-02	7.772573E-02	8.218001E-03	Demister Gas - NH3	mol,vol %
67	.3200	4.204E-02	4.183288E-02	4.200000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR1-1

69					Freeboard Gas - O2	mol,vol %
70					Freeboard Gas - CO	mol,vol %
71					Freeboard Gas - CH4	mol,vol %
72					Freeboard Gas - CO2	mol,vol %
73					Freeboard Gas - C2H4	mol,vol %
74					Freeboard Gas - C2H6	mol,vol %
75	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - H2S	mol,vol %
76					Freeboard Gas - H2	mol,vol %
77	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - NH3	mol,vol %
78					Freeboard Gas - Ar	mol,vol %
79	11.5160	1.500E+00	.000000E+00	1.500000E+00	Water Content in Freeboard Gas	mol,vol %
80	.0000	.000E+00	.000000E+00	.000000E+00	Demister Gas - SO2	mol,vol %
81	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - SO2	mol,vol %
82	60.1167	1.167E+00	1.161615E+00	1.100000E-01	Sorbent - CaO	Mass %
83	37.3333	1.507E+00	1.498849E+00	1.600000E-01	Sorbent - MgO	Mass %
84	1.0167	1.983E-01	1.940797E-01	4.050000E-02	Sorbent - SO3	Mass %
85	2.9167	1.008E+00	9.968270E-01	1.500000E-01	Sorbent - Ash	Mass %
86	.0000	.000E+00	.000000E+00	.000000E+00	Unused	
87	5.000	.000E+00	.000000E+00	.000000E+00	Demister gas # of Analyses,	dimensionless
88	4.0	.000E+00	.000000E+00	.000000E+00	Freeboard gas # of Analyses,	dimensionless
89	.0000	.000E+00	.000000E+00	.000000E+00	Unused	

INPUT DATA FILE FOR TR1-2

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,     'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     4.5,    1.8,     1.,    .25,     1.,    .5,   .04,    .99,  20/

TR1 - TEST POINT 2  <<CASE D>>  11/21/91  Pittsburgh Coal + Dolomite  .
SET POINT DATE:      11/21/91
SET POINT TIME:      02:00:00 - 06:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	132.9000	1.556E+00	1.363000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	130.4360	1.359E+00	1.320000E+00	3.250000E-01	Orifice Pressure	PSIG	PI-3106
3	100.	10.		10.	Boiler Steam Pressure	PSIG	PI-7040
4	586.5280	1.077E+01	5.842000E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	14.4420	6.154E+00	6.153000E+00	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	40.7180	1.102E+00	4.630000E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	47.7030	8.846E-01	7.890000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	11.7730	2.918E+00	2.907000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	28.5670	3.327E-01	2.830000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	7.0840	6.351E-02	5.300000E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	4.0260	7.956E-02	7.700000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	1119.1230	4.347E+01	4.079900E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	1017.4170	3.042E+01	2.758800E+01	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.0000	.000E+00	.000000E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	235.0000	5.8962	5.875	.5	Coal Feed rate	lb/hr	
16	67.0000	1.7480	1.675	.5	Sorbent Feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	84.9190	2.330E+00	1.195000E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	112.2220	3.481E+01	3.475500E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	156.3350	1.046E+01	1.026900E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	178.2940	7.790E+00	7.529000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1590.7710	6.697E+00	3.044000E+00	5.965391E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1266.6880	5.085E+00	1.816000E+00	4.750080E+00	Orifice Temp (Upstream)	F	TI-3108
38	79.1970	3.217E+00	2.520000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	166.5580	2.232E+00	9.900000E-01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	263.9110	2.016E+00	2.570000E-01	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	211.9660	2.008E+00	1.800000E-01	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	300.	30.		30.	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	50.6700	2.582E+00	2.533500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	72.3000	3.649E+00	3.615000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	43.1000	2.212E+00	2.155000E+00	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47					BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR1-2

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	67.4946	1.794E+00	1.788010E+00	1.500000E-01	Coal - C	Mass %
2	4.5782	1.303E-01	1.255282E-01	3.500000E-02	Coal - H	Mass %
3	1.8536	7.893E-02	7.487097E-02	2.500000E-02	Coal - N	Mass %
4	3.1736	.15868	.15868		Coal - S	Mass %
5	14.4255	2.034E+00	2.031932E+00	1.000000E-01	Coal - Ash	Mass %
6	2.1727	3.419E-01	3.072165E-01	1.500000E-01	Coal - H2O	Mass %
7	12296.0000	307.4		307.4	Coal - HHV *	BTU/lb
8	37.4250	1.923E+00	1.917402E+00	1.500000E-01	CD Drain - C	Mass %
9	.1550	3.686E-02	1.156563E-02	3.500000E-02	CD Drain - H	Mass %
10	.7900	5.132E-02	4.481803E-02	2.500000E-02	CD Drain - N	Mass %
11	9.7825	2.44563	2.44563		CD Drain - S	Mass %
12	76.7475	4.839E+00	4.832509E+00	2.500000E-01	CD Drain - Ash	Mass %
13	5954.7	148.87		148.87	CD Drain - HHV (dry) *	BTU/lb
14	.2175	1.478E-01	3.546124E-02	1.435000E-01	CD Drain - sfate S	Mass %
15	6.5575	3.27875	3.27875		CD Drain - sfide S	Mass %
16	1.8100	2.195E-01	1.602170E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	12.1250	6.0625	6.0625		CD Drain - Ash S	Mass %
18	21.8000				CD Drain - Ash CaO	Mass %
19	18.1250				CD Drain - Ash MgO	Mass %
20	70.9450	8.890E-01	8.762500E-01	1.500000E-01	PD Drain - C	Mass %
21	.4775	4.424E-02	2.705991E-02	3.500000E-02	PD Drain - H	Mass %
22	1.7575	4.662E-02	3.935220E-02	2.500000E-02	PD Drain - N	Mass %
23	3.5775	.89438	.89438		PD Drain - S	Mass %
24	28.5725	1.221E+00	1.194880E+00	2.500000E-01	PD Drain - Ash	Mass %
25	10482.1	262.05		262.05	PD Drain - HHV (dry) *	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	1.3900	.695	.695		PD Drain - sfide S	Mass %
28	.7800	1.669E-01	7.312659E-02	1.500000E-01	PD Drain - crbate C	Mass %
29	6.1425	3.07125	3.07125		PD Drain - Ash S	Mass %
30	16.3500				PD Drain - Ash CaO	Mass %
31	13.9500				PD Drain - Ash MgO	Mass %
32	68.4725	1.420E+00	1.412212E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.4400	4.268E-02	2.442622E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.6650	7.412E-02	6.978068E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	2.9725	0.74313	0.74313		CF/SD Drain - S	Mass %
36	29.7300	2.693E+00	2.681676E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	10280.3	257.01		257.01	CF/SD Drain - HHV (dry) *	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	.9350	.4675	.4675		CF/SD Drain - sfide S	Mass %
40	.7675	1.952E-01	1.248794E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	6.4850	3.2425	3.2425		CF/SD Drain - Ash S	Mass %
42	16.6250				CF/SD Drain - Ash CaO	Mass %
43	13.6250				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	69.9980	1.338E+00	1.329962E+00	1.500000E-01	BD Drain - C	Mass %
46	.6300	5.292E-02	3.969000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.9800	1.137E-01	1.108800E-01	2.500000E-02	BD Drain - N	Mass %
48	2.5400	0.635	0.635		BD Drain - S	Mass %
49	24.7400	1.311E+00	1.286480E+00	2.500000E-01	BD Drain - Ash	Mass %
50	10686.1	267.15		267.15	BD Drain - HHV (dry) *	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.5000	.25	.25		BD Drain - sfide S *	Mass %
53	.6980	6.980E-01	6.816920E-01	1.500000E-01	BD Drain - crbate C *	Mass %
54	3.4360	1.718	1.718		BD Drain - Ash S *	Mass %
55	23.8200				BD Drain - Ash CaO *	Mass %
56	5.8690				BD Drain - Ash MgO *	Mass %
57	81.4000	9.465E-01	4.812133E-01	8.150000E-01	Demister Gas - N2	mol,vol %
58	.4400	1.706E-01	1.704993E-01	5.400000E-03	Demister Gas - O2	mol,vol %
59	6.5650	1.152E-01	9.397835E-02	6.665000E-02	Demister Gas - CO	mol,vol %
60	.9500	5.506E-02	5.405004E-02	1.050000E-02	Demister Gas - CH4	mol,vol %
61	5.6650	1.370E-01	1.243244E-01	5.765000E-02	Demister Gas - CO2	mol,vol %
62	.0200	3.101E-03	2.859484E-03	1.200000E-03	Demister Gas - C2H4	mol,vol %
63	.0000	.000E+00	.000000E+00	1.000000E-03	Demister Gas - C2H6	mol,vol %
64	.0275	1.037E-02	1.036822E-02	2.750000E-04	Demister Gas - H2S	mol,vol %
65	3.8700	1.463E-01	1.408326E-01	3.970000E-02	Demister Gas - H2	mol,vol %
66	.1375	2.035E-02	1.914890E-02	6.875000E-03	Demister Gas - NH3	mol,vol %
67	.3725	8.208E-03	6.711265E-03	4.725000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR1-2

69					Freeboard Gas - O2	mol,vol %
70					Freeboard Gas - CO	mol,vol %
71					Freeboard Gas - CH4	mol,vol %
72					Freeboard Gas - CO2	mol,vol %
73					Freeboard Gas - C2H4	mol,vol %
74					Freeboard Gas - C2H6	mol,vol %
75					Freeboard Gas - H2S	mol,vol %
76					Freeboard Gas - H2	mol,vol %
77					Freeboard Gas - NH3	mol,vol %
78					Freeboard Gas - Ar	mol,vol %
79	10.3810	1.500E+00	.000000E+00	1.500000E+00	Water Content in Freeboard Gas	mol,vol %
80	.0000	.000E+00	.000000E+00	.000000E+00	Demister Gas - SO2	mol,vol %
81	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - SO2	mol,vol %
82	60.1167	1.167E+00	1.161615E+00	1.100000E-01	Sorbent - CaO	Mass %
83	37.3333	1.507E+00	1.498849E+00	1.600000E-01	Sorbent - MgO	Mass %
84	1.0167	1.983E-01	1.940797E-01	4.050000E-02	Sorbent - SO3	Mass %
85	2.9167	1.008E+00	9.968270E-01	1.500000E-01	Sorbent - Ash	Mass %
86	.0000	.000E+00	.000000E+00	.000000E+00	Unused	
87	4.0000	.000E+00	.000000E+00	.000000E+00	Demister gas # of Analyses,	dimensionless
88	3.0000	.000E+00	.000000E+00	.000000E+00	Freeboard gas # of Analyses,	dimensionless
89	.0000	.000E+00	.000000E+00	.000000E+00	Unused	

INPUT DATA FILE FOR TR1-3

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,      'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     4.5,   1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR1 - TEST POINT 3  <<CASE D>>  11/21/91  Pittsburgh Coal + Dolomite
SET POINT DATE:     11/21/91
SET POINT TIME:     10:00:00 - 14:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	144.7470	5.023E+00	4.967000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	141.9930	4.870E+00	4.856000E+00	3.750000E-01	Orifice Pressure	PSIG	PI-3106
3	100.	10.		10.	Boiler Steam Pressure	PSIG	PI-7040
4	658.5190	2.950E+01	2.808000E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	16.9440	2.788E+00	2.787000E+00	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	29.8000	4.828E+00	4.723000E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	47.2320	7.803E-01	6.700000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	14.1200	2.781E+00	2.770000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	27.6320	5.100E-01	4.790000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	7.0470	5.780E-02	4.600000E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	4.0040	5.385E-02	5.000000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	1108.7230	4.825E+01	4.586200E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	1027.5650	3.213E+01	2.946500E+01	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.0000	.000E+00	.000000E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	354.0000	8.8641	8.85	.5	Coal Feed rate	lb/hr	
16	98.0000	2.5005	2.45	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	81.5810	2.146E+00	7.790000E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	248.3050	8.166E+01	8.163800E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	150.9850	8.260E+00	8.014000E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	173.9380	6.756E+00	6.453000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1531.9550	1.835E+01	1.742600E+01	5.744831E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1269.1770	1.693E+01	1.624800E+01	4.759414E+00	Orifice Temp (Upstream)	F	TI-3108
38	82.2540	2.658E+00	1.750000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	160.9720	2.110E+00	6.720000E-01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	263.7710	2.014E+00	2.380000E-01	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	211.9540	2.009E+00	1.850000E-01	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	500.	5.000E+02		5.000000E+02	Boiler Steam Temperature *	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	109.4000	5.493E+00	5.470000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	100.9000	5.070E+00	5.045000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	24.0000	1.300E+00	1.200000E+00	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	.0000	.000E+00	.000000E+00	.000000E+01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR1-3

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	67.4946	1.794E+00	1.788010E+00	1.500000E-01	Coal - C	Mass %
2	4.5782	1.303E-01	1.255282E-01	3.500000E-02	Coal - H	Mass %
3	1.8536	7.893E-02	7.487097E-02	2.500000E-02	Coal - N	Mass %
4	3.1736	.15868	.15868		Coal - S	Mass %
5	14.4255	2.034E+00	2.031932E+00	1.000000E-01	Coal - Ash	Mass %
6	2.1727	3.419E-01	3.072165E-01	1.500000E-01	Coal - H2O	Mass %
7	12296.0000	307.4		307.4	Coal - HHV *	BTU/lb
8	43.5825	3.666E+00	3.662763E+00	1.500000E-01	CD Drain - C	Mass %
9	.2475	3.959E-02	1.850555E-02	3.500000E-02	CD Drain - H	Mass %
10	1.0975	1.129E-01	1.100540E-01	2.500000E-02	CD Drain - N	Mass %
11	5.7900	1.4475	1.4475		CD Drain - S	Mass %
12	59.2650	3.738E+00	3.729238E+00	2.500000E-01	CD Drain - Ash	Mass %
13	6405.5	160.14		160.14	CD Drain - HHV (dry) *	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	3.4225	1.71125	1.71125		CD Drain - sfide S	Mass %
16	3.0100	5.785E-01	5.587049E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	10.5500	5.275	5.275		CD Drain - Ash S	Mass %
18	15.9000				CD Drain - Ash CaO	Mass %
19	19.8250				CD Drain - Ash MgO	Mass %
20	71.0550	9.068E-01	8.942820E-01	1.500000E-01	PD Drain - C	Mass %
21	.5650	3.741E-02	1.320411E-02	3.500000E-02	PD Drain - H	Mass %
22	1.8525	5.002E-02	4.331897E-02	2.500000E-02	PD Drain - N	Mass %
23	3.9525	.98813	.98813		PD Drain - S	Mass %
24	27.3575	8.825E-01	8.463880E-01	2.500000E-01	PD Drain - Ash	Mass %
25	10546.2	263.66		263.66	PD Drain - HHV (dry) *	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	1.1225	.56125	.56125		PD Drain - sfide S	Mass %
28	.8875	1.803E-01	1.000839E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	6.5575	3.27875	3.27875		PD Drain - Ash S	Mass %
30	13.8000				PD Drain - Ash CaO	Mass %
31	13.1000				PD Drain - Ash MgO	Mass %
32	75.5650	9.357E-01	9.235842E-01	1.500000E-01	CF/SD Drain - C	Mass %
33	.7125	4.241E-02	2.394607E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	2.0475	5.173E-02	4.528259E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	2.5300	0.6325	0.6325		CF/SD Drain - S	Mass %
36	21.6425	9.607E-01	9.275999E-01	2.500000E-01	CF/SD Drain - Ash	Mass %
37	11255.1	281.38		281.38	CF/SD Drain - HHV (dry) *	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	.8050	.4025	.4025		CF/SD Drain - sfide S	Mass %
40	.8675	1.684E-01	7.648222E-02	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	5.0225	2.51125	2.51125		CF/SD Drain - Ash S	Mass %
42	11.4500				CF/SD Drain - Ash CaO	Mass %
43	14.1000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	69.9800	1.338E+00	1.329620E+00	1.500000E-01	BD Drain - C	Mass %
46	.6300	5.292E-02	3.969000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.9800	1.137E-01	1.108800E-01	2.500000E-02	BD Drain - N	Mass %
48	2.5400	0.635	0.635		BD Drain - S	Mass %
49	24.7400	1.311E+00	1.286480E+00	2.500000E-01	BD Drain - Ash	Mass %
50	10685.4	267.14		267.14	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.5000	.25	.25		BD Drain - sfide S *	Mass %
53	.6980	6.980E-01	6.816920E-01	1.500000E-01	BD Drain - crbate C *	Mass %
54	3.4360	1.718	1.718		BD Drain - Ash S *	Mass %
55	23.8200				BD Drain - Ash CaO *	Mass %
56	5.8690				BD Drain - Ash MgO *	Mass %
57	78.6333	8.946E-01	4.248190E-01	7.873333E-01	Demister Gas - N2	mol,vol %
58	.7500	2.298E-01	2.296029E-01	8.500000E-03	Demister Gas - O2	mol,vol %
59	6.4667	1.200E-01	1.003978E-01	6.566667E-02	Demister Gas - CO	mol,vol %
60	1.9867	1.083E-01	1.062740E-01	2.086667E-02	Demister Gas - CH4	mol,vol %
61	6.8567	2.711E-01	2.620102E-01	6.956667E-02	Demister Gas - CO2	mol,vol %
62	.0767	9.981E-03	9.823042E-03	1.766667E-03	Demister Gas - C2H4	mol,vol %
63	.0300	4.383E-03	4.185905E-03	1.300000E-03	Demister Gas - C2H6	mol,vol %
64	.0146	2.397E-03	2.392157E-03	1.456667E-04	Demister Gas - H2S	mol,vol %
65	4.1467	1.197E-01	1.119594E-01	4.246667E-02	Demister Gas - H2	mol,vol %
66	.1625	3.532E-02	3.437773E-02	8.123334E-03	Demister Gas - NH3	mol,vol %
67	.3933	7.375E-03	5.481607E-03	4.933333E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR1-3

69					Freeboard Gas - O2	mol,vol %
70					Freeboard Gas - CO	mol,vol %
71					Freeboard Gas - CH4	mol,vol %
72					Freeboard Gas - CO2	mol,vol %
73					Freeboard Gas - C2H4	mol,vol %
74					Freeboard Gas - C2H6	mol,vol %
75	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - H2S	mol,vol %
76					Freeboard Gas - H2	mol,vol %
77	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - NH3	mol,vol %
78					Freeboard Gas - Ar	mol,vol %
79	11.5620	1.500E+00	.000000E+00	1.500000E+00	Water Content in Freeboard Gas	mol,vol %
80	.0000	.000E+00	.000000E+00	.000000E+00	Demister Gas - SO2	mol,vol %
81	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - SO2	mol,vol %
82	60.1167	1.167E+00	1.161615E+00	1.100000E-01	Sorbent - CaO	Mass %
83	37.3333	1.507E+00	1.498849E+00	1.600000E-01	Sorbent - MgO	Mass %
84	1.0167	1.983E-01	1.940797E-01	4.050000E-02	Sorbent - SO3	Mass %
85	2.9167	1.008E+00	9.968270E-01	1.500000E-01	Sorbent - Ash	Mass %
86	.0000	.000E+00	.000000E+00	.000000E+00	Unused	
87	3.0000	.000E+00	.000000E+00	.000000E+00	Demister gas # of Analyses,	dimensionless
88	2.0000	.000E+00	.000000E+00	.000000E+00	Freeboard gas # of Analyses,	dimensionless
89	.0000	.000E+00	.000000E+00	.000000E+00	Unused	

INPUT DATA FILE FOR TR1-4

DEFAULT CONTROL PARAMETERS,

IPRINT	LEVEL	MAXCYC	ITIME	DEVICE
1,	3,	40,	0,	'A'

EPSMAX	CUTOF1	CUTOF2	ERRMIN	TOLERN	QALITY	EXPT	SENSTV	CORRCO	MAXPNT
.2,	4.5,	1.8,	1.,	.25,	1.,	.5,	.04,	.99,	20/

TR1 - TEST POINT 4 <<CASE D>> 11/21/91 Pittsburgh Coal + Dolomite
SET POINT DATE: 11/21/91
SET POINT TIME: 21:00:00 - 23:30:00

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	125.4170	2.360E+00	2.238000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	123.0730	2.226E+00	2.194000E+00	3.750000E-01	Orifice Pressure	PSIG	PI-3106
3	100.	10.		10.	Boiler Steam Pressure	PSIG	PI-7040
4	559.7670	1.141E+01	6.950000E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	12.7360	5.828E+00	5.827000E+00	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	13.7440	1.180E+00	6.270000E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	47.9360	8.962E-01	8.020000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	10.4840	2.447E+00	2.434000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	28.7170	3.482E-01	3.010000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	7.0340	7.295E-02	6.400000E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.9930	8.246E-02	8.000000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	1104.4550	5.599E+01	5.394300E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	979.0340	5.044E+01	4.878500E+01	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.0000	.000E+00	.000000E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	395.0000	9.8877	9.875	.5	Coal Feed rate	lb/hr	
16	97.0000	2.4760	2.425	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	79.1610	2.010E+00	1.960000E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	190.7320	5.632E+01	5.628800E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	156.9970	9.733E+00	9.525000E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	160.6340	7.601E+00	7.333000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1393.7250	9.047E+00	7.384000E+00	5.226469E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1163.4370	8.760E+00	7.596000E+00	4.362889E+00	Orifice Temp (Upstream)	F	TI-3108
38	82.6640	3.739E+00	3.159000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	162.7650	1.173E+01	1.155600E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	264.0100	2.019E+00	2.780000E-01	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	212.4450	2.809E+00	1.972000E+00	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	300.	100.		100.	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	88.0000	4.428E+00	4.400000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	97.6000	4.906E+00	4.880000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	93.7000	4.712E+00	4.685000E+00	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47		2.000E+01	1.999375E+01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR1-4

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	67.4946	1.794E+00	1.788010E+00	1.500000E-01	Coal - C	Mass %
2	4.5782	1.303E-01	1.255282E-01	3.500000E-02	Coal - H	Mass %
3	1.8536	7.893E-02	7.487097E-02	2.500000E-02	Coal - N	Mass %
4	3.1736	.15868	.15868		Coal - S	Mass %
5	14.4255	.5	.5		Coal - Ash *	Mass %
6	2.1727	3.419E-01	3.072165E-01	1.500000E-01	Coal - H2O	Mass %
712296	.0000	307.4		307.4	Coal - HHV *	BTU/lb
8	56.6225	2.749E+00	2.745352E+00	1.500000E-01	CD Drain - C	Mass %
9	.3175	4.206E-02	2.331629E-02	3.500000E-02	CD Drain - H	Mass %
10	1.5875	1.084E-01	1.055068E-01	2.500000E-02	CD Drain - N	Mass %
11	4.7350	1.18375	1.18375		CD Drain - S	Mass %
12	42.2800	2.805E+00	2.793974E+00	2.500000E-01	CD Drain - Ash	Mass %
13	8634.0000	4.526E+02	4.519333E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	2.7225	1.36125	1.36125		CD Drain - sfide S	Mass %
16	2.1850	2.733E-01	2.284954E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	9.3550	4.6775	4.6775		CD Drain - Ash S	Mass %
18	41.3750				CD Drain - Ash CaO	Mass %
19	30.5000				CD Drain - Ash MgO	Mass %
20	66.9633	2.631E+00	2.626256E+00	1.500000E-01	PD Drain - C	Mass %
21	.5433	4.627E-02	3.025763E-02	3.500000E-02	PD Drain - H	Mass %
22	1.8633	6.139E-02	5.606936E-02	2.500000E-02	PD Drain - N	Mass %
23	3.5533	0.88833	0.88833		PD Drain - S	Mass %
24	30.5833	2.502E+00	2.489526E+00	2.500000E-01	PD Drain - Ash	Mass %
2510408	.0000	3.354E+02	3.344723E+02	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	1.1867	.59335	.59335		PD Drain - sfide S	Mass %
28	1.3333	2.028E-01	1.364102E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	7.5767	3.78835	3.78835		PD Drain - Ash S	Mass %
30	32.5667				PD Drain - Ash CaO	Mass %
31	23.9333				PD Drain - Ash MgO	Mass %
32	73.0233	1.318E+00	1.309593E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.6700	4.508E-02	2.841239E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.9933	5.763E-02	5.192149E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	2.8133	.70333	.70333		CF/SD Drain - S	Mass %
36	22.2767	2.367E+00	2.353341E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
3711575	.3300	2.639E+02	2.627408E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	.5867	.29335	.29335		CF/SD Drain - sfide S	Mass %
40	.7300	1.872E-01	1.120134E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	4.7867	2.39335	2.39335		CF/SD Drain - Ash S	Mass %
42	27.7667				CF/SD Drain - Ash CaO	Mass %
43	20.2333				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	69.9800	1.338E+00	1.329620E+00	1.500000E-01	BD Drain - C	Mass %
46	.6300	5.292E-02	3.969000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.9800	1.137E-01	1.108800E-01	2.500000E-02	BD Drain - N	Mass %
48	2.54[illegible]	0.635	0.635		BD Drain - S	Mass %
49	24.7400	1.311E+00	1.286480E+00	2.500000E-01	BD Drain - Ash	Mass %
5010685	.4	267.14		267.14	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.5000	.25	.25		BD Drain - sfide S *	Mass %
53	.6980	6.980E-01	6.816920E-01	1.500000E-01	BD Drain - crbate C *	Mass %
54	3.4360	1.718	1.718		BD Drain - Ash S *	Mass %
55	23.8200				BD Drain - Ash CaO *	Mass %
56	5.8690				BD Drain - Ash MgO *	Mass %
57	78.6667	9.294E-01	4.933842E-01	7.876666E-01	Demister Gas - N2	mol,vol %
58	.3233	6.766E-02	6.752573E-02	4.233333E-03	Demister Gas - O2	mol,vol %
59	4.8367	2.519E-01	2.469762E-01	4.936666E-02	Demister Gas - CO	mol,vol %
60	2.6200	1.257E-01	1.226786E-01	2.720000E-02	Demister Gas - CH4	mol,vol %
61	7.0333	1.891E-01	1.751176E-01	7.133333E-02	Demister Gas - CO2	mol,vol %
62	.1633	3.388E-02	3.377553E-02	2.633333E-03	Demister Gas - C2H4	mol,vol %
63	.2467	4.026E-02	4.010858E-02	3.466667E-03	Demister Gas - C2H6	mol,vol %
64	.0200	2.177E-03	2.167951E-03	2.000000E-04	Demister Gas - H2S	mol,vol %
65	4.8367	2.250E-01	2.195360E-01	4.936666E-02	Demister Gas - H2	mol,vol %
66	.1333	1.612E-02	1.468097E-02	6.666667E-03	Demister Gas - NH3	mol,vol %
67	.3533	6.917E-03	5.224369E-03	4.533334E-03	Demister Gas - Ar	mol,vol %
68	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR1-4

69	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - O2	mol,vol %
70	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - CO	mol,vol %
71	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - CH4	mol,vol %
72	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - CO2	mol,vol %
73	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - C2H4	mol,vol %
74	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - C2H6	mol,vol %
75	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - H2S	mol,vol %
76	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - H2	mol,vol %
77	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - NH3	mol,vol %
78	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - Ar	mol,vol %
79	14.9900	1.500E+00	.000000E+00	1.500000E+00	Water Content in Freeboard Gas	mol,vol %
80	.0000	.000E+00	.000000E+00	.000000E+00	Demister Gas - SO2	mol,vol %
81	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - SO2	mol,vol %
82	60.1167	1.167E+00	1.161615E+00	1.100000E-01	Sorbent - CaO	Mass %
83	37.3333	1.507E+00	1.498849E+00	1.600000E-01	Sorbent - MgO	Mass %
84	1.0167	1.983E-01	1.940797E-01	4.050000E-02	Sorbent - SO3	Mass %
85	2.9167	1.008E+00	9.968270E-01	1.500000E-01	Sorbent - Ash	Mass %
86	.0000	.000E+00	.000000E+00	.000000E+00	Unused	
87	3.0000	.000E+00	.000000E+00	.000000E+00	Demister gas # of Analyses,	dimensionless
88	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard gas # of Analyses,	dimensionless
89	.0000	.000E+00	.000000E+00	.000000E+00	Unused	

INPUT DATA FILE FOR TR2-1

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,     0,      'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     4.5,   1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR2 - TEST POINT 1  <<CASE C>>  12/19/91  Pittsburgh Coal + Dolomite '
SET POINT DATE:     12/19/91
SET POINT TIME:     01:00:00 - 05:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	139.8310	4.591E+00	4.528000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	137.1190	4.455E+00	4.443000E+00	3.250000E-01	Orifice Pressure	PSIG	PI-3106
3	.0000	.000E+00	.000000E+00	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	716.6510	1.806E+01	1.562600E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	1.9830	8.343E-01	8.300000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	67.5100	1.579E+00	1.222000E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	46.2190	8.748E-01	7.780000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	11.3560	2.128E+00	2.113000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	8.3700	2.749E-01	2.120000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.9180	9.843E-02	9.200000E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.9560	5.478E-02	5.100000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	294.3150	1.972E+01	1.280500E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	310.2200	1.767E+01	1.215700E+01	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.0000	.000E+00	.000000E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	234.0000	5.8713	5.85	.5	Coal Feed rate	lb/hr	
16	118.0000	2.9921	2.95	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	75.0820	2.215E+00	9.520000E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	157.0780	7.135E+01	7.131900E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	161.5350	9.033E+00	8.809000E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	171.3240	1.486E+01	1.472200E+01	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1605.5360	6.681E+00	2.897000E+00	6.020760E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1322.6500	7.989E+00	6.263000E+00	4.959938E+00	Orifice Temp (Upstream)	F	TI-3108
38	91.8540	7.798E+00	7.537000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	181.4560	4.096E+00	3.575000E+00	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	264.3970	2.001E+00	6.700000E-02	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	211.3470	2.002E+00	9.100000E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	.0000	.000E+00	.000000E+00	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	65.7100	3.323E+00	3.285500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	97.5300	4.902E+00	4.876500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	4.0200	5.389E-01	2.010000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	5.0000	5.590E-01	2.500000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR2-1

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	68.1918	1.200E+00	1.190770E+00	1.500000E-01	Coal - C	Mass %
2	4.5873	8.360E-02	7.591878E-02	3.500000E-02	Coal - H	Mass %
3	1.9227	6.962E-02	6.497134E-02	2.500000E-02	Coal - N	Mass %
4	4.5055	.22528	.22528		Coal - S	Mass %
5	12.4518	1.450E+00	1.446806E+00	1.000000E-01	Coal - Ash	Mass %
6	2.2855	2.782E-01	2.342812E-01	1.500000E-01	Coal - H2O	Mass %
7	12554.0900	2.744E+02	2.732357E+02	2.500000E+01	Coal - HHV	BTU/lb
8	34.7367	2.106E+00	2.100735E+00	1.500000E-01	CD Drain - C	Mass %
9	.1567	3.603E-02	8.541919E-03	3.500000E-02	CD Drain - H	Mass %
10	.8700	5.979E-02	5.430770E-02	2.500000E-02	CD Drain - N	Mass %
11	4.6533	2.32665	2.32665		CD Drain - S	Mass %
12	71.2267	4.316E+00	4.308600E+00	2.500000E-01	CD Drain - Ash	Mass %
13	5288.6670	2.477E+02	2.464253E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	3.4700	3.4700	3.4700		CD Drain - sfide S	Mass %
16	1.8700	3.770E-01	3.458717E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	7.4867	3.74335	3.74335		CD Drain - Ash S	Mass %
18	20.0667				CD Drain - Ash CaO	Mass %
19	19.9333				CD Drain - Ash MgO	Mass %
20	57.3275	1.016E+00	1.004775E+00	1.500000E-01	PD Drain - C	Mass %
21	.3800	3.628E-02	9.552893E-03	3.500000E-02	PD Drain - H	Mass %
22	1.6150	6.161E-02	5.630463E-02	2.500000E-02	PD Drain - N	Mass %
23	3.7650	1.8825	1.8825		PD Drain - S	Mass %
24	45.6975	6.442E-01	5.937191E-01	2.500000E-01	PD Drain - Ash	Mass %
25	8735.7500	2.839E+02	2.827528E+02	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	2.5175	2.5175	2.5175		PD Drain - sfide S	Mass %
28	1.6325	2.032E-01	1.370383E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	9.2200	4.61	4.61		PD Drain - Ash S	Mass %
30	19.9000				PD Drain - Ash CaO	Mass %
31	19.2500				PD Drain - Ash MgO	Mass %
32	47.9700	9.237E-01	9.114300E-01	1.500000E-01	CF/SD Drain - C	Mass %
33	.3600	4.171E-02	2.268000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.6300	9.464E-02	9.128000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	3.5700	1.785	1.785		CF/SD Drain - S	Mass %
36	53.7600	2.807E+00	2.795520E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	7451.0000	1.511E+02	1.490200E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	2.2600	2.2600	2.2600		CF/SD Drain - sfide S	Mass %
40	1.8200	5.312E-01	5.096000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	6.6700	3.335	3.335		CF/SD Drain - Ash S	Mass %
42	19.9000				CF/SD Drain - Ash CaO	Mass %
43	18.9000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	68.9150	2.817E+00	2.812892E+00	1.500000E-01	BD Drain - C	Mass %
46	.6600	3.530E-02	4.611824E-03	3.500000E-02	BD Drain - H	Mass %
47	1.8200	3.394E-02	2.296050E-02	2.500000E-02	BD Drain - N	Mass %
48	1.7950	0.8975	0.8975		BD Drain - S	Mass %
49	26.5000	1.469E+00	1.447083E+00	2.500000E-01	BD Drain - Ash	Mass %
50	10360.0000	3.595E+02	3.586488E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.5400	.5400	.5400		BD Drain - sfide S	Mass %
53	1.6650	2.752E-01	2.307007E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	7.0100	3.505	3.505		BD Drain - Ash S	Mass %
55	25.7500				BD Drain - Ash CaO	Mass %
56	23.4500				BD Drain - Ash MgO	Mass %
57	79.0275	1.002E+00	6.141731E-01	7.912750E-01	Demister Gas - N2	mol,vol %
58	.2100	6.045E-02	6.037386E-02	3.100000E-03	Demister Gas - O2	mol,vol %
59	8.1350	2.714E-01	2.586150E-01	8.235000E-02	Demister Gas - CO	mol,vol %
60	1.3350	6.912E-02	6.760926E-02	1.435000E-02	Demister Gas - CH4	mol,vol %
61	7.7600	4.017E-01	3.939250E-01	7.860000E-02	Demister Gas - CO2	mol,vol %
62	.0100	5.183E-03	5.064599E-03	1.100000E-03	Demister Gas - C2H4	mol,vol %
63	.0050	5.226E-03	5.119601E-03	1.050000E-03	Demister Gas - C2H6	mol,vol %
64	.1597	6.066E-03	5.852371E-03	1.597500E-03	Demister Gas - H2S	mol,vol %
65	3.1725	1.214E-01	1.168758E-01	3.272500E-02	Demister Gas - H2	mol,vol %
66	.0474	5.721E-03	5.207904E-03	2.368750E-03	Demister Gas - NH3	mol,vol %
67	.4350	8.923E-03	7.140663E-03	5.350000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR2-1

69					Freeboard Gas - O2	mol,vol %
70					Freeboard Gas - CO	mol,vol %
71					Freeboard Gas - CH4	mol,vol %
72					Freeboard Gas - CO2	mol,vol %
73					Freeboard Gas - C2H4	mol,vol %
74					Freeboard Gas - C2H6	mol,vol %
75	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - H2S	mol,vol %
76					Freeboard Gas - H2	mol,vol %
77	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - NH3	mol,vol %
78					Freeboard Gas - Ar	mol,vol %
79	8.7000	1.500E+00	.000000E+00	1.500000E+00	Water Content in Freeboard Gas	mol,vol %
80	.0000	.000E+00	.000000E+00	.000000E+00	Demister Gas - SO2	mol,vol %
81	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - SO2	mol,vol %
82	60.0000	4.411E-01	4.271619E-01	1.100000E-01	Sorbent - CaO	Mass %
83	40.3000	5.822E+00	5.819613E+00	1.500000E-01	Sorbent - MgO	Mass %
84	.7500	1.312E-01	1.270646E-01	3.250000E-02	Sorbent - SO3	Mass %
85	1.4500	2.355E-01	1.815038E-01	1.500000E-01	Sorbent - Ash	Mass %
86	.0000	.000E+00	.000000E+00	.000000E+00	Unused	
87	4.0000	.000E+00	.000000E+00	.000000E+00	Demister gas # of Analyses,	dimensionless
88	2.0000	.000E+00	.000000E+00	.000000E+00	Freeboard gas # of Analyses,	dimensionless
89	.0000	.000E+00	.000000E+00	.000000E+00	Unused	

INPUT DATA FILE FOR TR2-2

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,     'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     4.5,   1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR2 - TEST POINT 2  <<CASE C>>  12/19/91  Pittsburgh Coal + Dolomite
SET POINT DATE:     12/19/91
SET POINT TIME:     13:00:00 - 17:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	128.3040	5.242E+00	5.188000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	125.7010	5.074E+00	5.064000E+00	3.250000E-01	Orifice Pressure	PSIG	PI-3106
3	.0000	.000E+00	.000000E+00	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	609.5200	2.989E+01	2.849000E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.5680	1.733E-01	1.510000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	68.7530	1.507E+00	1.128000E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	46.4520	6.450E-01	5.060000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	11.9560	2.437E+00	2.424000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	8.3720	3.167E-01	2.640000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.8440	7.471E-02	6.600000E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.9100	4.294E-02	3.800000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	281.2420	2.024E+01	1.359300E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	257.7490	1.446E+01	6.694000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.0000	.000E+00	.000000E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	315.0000	7.8909	7.875	.5	Coal Feed rate	lb/hr	
16	94.0000	2.4026	2.35	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	81.8370	2.217E+00	9.560000E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	300.1250	1.060E+02	1.059830E+02	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	155.5080	1.174E+01	1.157100E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	170.2920	4.872E+00	4.443000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1504.1130	1.033E+01	8.649000E+00	5.640424E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1255.0370	8.122E+00	6.619000E+00	4.706388E+00	Orifice Temp (Upstream)	F	TI-3108
38	98.4110	5.425E+00	5.043000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	173.3500	2.104E+00	6.530000E-01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	264.7410	2.002E+00	8.300000E-02	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	211.5970	2.001E+00	5.700000E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	.0000	.000E+00	.000000E+00	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	151.2600	7.580E+00	7.563000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	72.7700	3.673E+00	3.638500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	7.0600	6.121E-01	3.530000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	11.8700	7.760E-01	5.935000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR2-2

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	68.1918	1.200E+00	1.190770E+00	1.500000E-01	Coal - C	Mass %
2	4.5873	8.360E-02	7.591878E-02	3.500000E-02	Coal - H	Mass %
3	1.9227	6.962E-02	6.497134E-02	2.500000E-02	Coal - N	Mass %
4	4.5055	.22528	.22528		Coal - S	Mass %
5	12.4518	1.450E+00	1.446906E+00	1.000000E-01	Coal - Ash	Mass %
6	2.2855	2.782E-01	2.342812E-01	1.500000E-01	Coal - H2O	Mass %
712554	.0900	2.744E+02	2.732357E+02	2.500000E+01	Coal - HHV	BTU/lb
8	63.6400	2.624E+00	2.619523E+00	1.500000E-01	CD Drain - C	Mass %
9	.4200	4.341E-02	2.567134E-02	3.500000E-02	CD Drain - H	Mass %
10	1.6067	1.206E-01	1.180048E-01	2.500000E-02	CD Drain - N	Mass %
11	4.5500	2.275	2.275		CD Drain - S	Mass %
12	37.7167	2.036E+00	2.020925E+00	2.500000E-01	CD Drain - Ash	Mass %
13	9694.6670	4.137E+02	4.128941E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	2.3400	2.3400	2.3400		CD Drain - sfide S	Mass %
16	1.1767	1.885E-01	1.141176E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	7.6333	3.81665	3.81665		CD Drain - Ash S	Mass %
18	14.9000				CD Drain - Ash CaO	Mass %
19	14.3667				CD Drain - Ash MgO	Mass %
20	71.9550	1.573E+00	1.566042E+00	1.500000E-01	PD Drain - C	Mass %
21	.6975	4.459E-02	2.762246E-02	3.500000E-02	PD Drain - H	Mass %
22	2.0875	4.993E-02	4.322170E-02	2.500000E-02	PD Drain - N	Mass %
23	3.5150	1.7575	1.7575		PD Drain - S	Mass %
24	28.3625	1.965E+00	1.949082E+00	2.500000E-01	PD Drain - Ash	Mass %
2511259	.7500	1.435E+02	1.413510E+02	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	1.2375	1.2375	1.2375		PD Drain - sfide S	Mass %
28	.8500	2.011E-01	1.339301E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	7.4125	3.70625	3.70625		PD Drain - Ash S	Mass %
30	13.3750				PD Drain - Ash CaO	Mass %
31	12.2250				PD Drain - Ash MgO	Mass %
32	70.0250	4.556E-01	4.302238E-01	1.500000E-01	CF/SD Drain - C	Mass %
33	.7100	5.003E-02	3.574985E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.7650	5.229E-02	4.592106E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	2.6700	1.335	1.335		CF/SD Drain - S	Mass %
36	28.4300	4.616E-01	3.879846E-01	2.500000E-01	CF/SD Drain - Ash	Mass %
3710767	.5000	7.850E+01	7.440810E+01	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	1.1750	1.1750	1.1750		CF/SD Drain - sfide S	Mass %
40	.7350	1.549E-01	3.877865E-02	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	5.1200	2.56	2.56		CF/SD Drain - Ash S	Mass %
42	15.3500				CF/SD Drain - Ash CaO	Mass %
43	14.7000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	75.9000	1.450E+00	1.442100E+00	1.500000E-01	BD Drain - C	Mass %
46	1.2800	8.791E-02	8.064000E-02	3.500000E-02	BD Drain - H	Mass %
47	2.1300	1.219E-01	1.192800E-01	2.500000E-02	BD Drain - N	Mass %
48	2.2400	1.12	1.12		BD Drain - S	Mass %
49	19.8300	1.061E+00	1.031160E+00	2.500000E-01	BD Drain - Ash	Mass %
5011970	.0000	2.407E+02	2.394000E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.6700	.6700	.6700		BD Drain - sfide S	Mass %
53	.5700	2.190E-01	1.596000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	3.7400	1.87	1.87		BD Drain - Ash S	Mass %
55	15.2000				BD Drain - Ash CaO	Mass %
56	14.4000				BD Drain - Ash MgO	Mass %
57	78.2250	1.185E+00	8.888143E-01	7.832500E-01	Demister Gas - N2	mol,vol %
58	.2700	7.375E-02	7.365459E-02	3.700000E-03	Demister Gas - O2	mol,vol %
59	5.9050	1.285E-01	1.135672E-01	6.005000E-02	Demister Gas - CO	mol,vol %
60	2.3975	1.502E-01	1.480834E-01	2.497500E-02	Demister Gas - CH4	mol,vol %
61	7.1250	1.742E-01	1.585554E-01	7.225000E-02	Demister Gas - CO2	mol,vol %
62	.1600	8.131E-02	8.127067E-02	2.600000E-03	Demister Gas - C2H4	mol,vol %
63	.6875	2.279E-01	2.277600E-01	7.875000E-03	Demister Gas - C2H6	mol,vol %
64	.0558	8.698E-03	8.680443E-03	5.577499E-04	Demister Gas - H2S	mol,vol %
65	3.8850	1.842E-01	1.798351E-01	3.985000E-02	Demister Gas - H2	mol,vol %
66	.1624	2.226E-02	2.072325E-02	8.118751E-03	Demister Gas - NH3	mol,vol %
67	.4125	8.333E-03	6.570029E-03	5.125000E-03	Demister Gas - Ar	mol,vol %
68	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR2-2

```
69     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - O2              mol,vol %
70     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO              mol,vol %
71     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CH4             mol,vol %
72     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H4            mol,vol %
74     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S             mol,vol %
76     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3             mol,vol %
78     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - Ar              mol,vol %
79   11.6000 1.500E+00  .000000E+00 1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2             mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2            mol,vol %
82   60.0000 4.411E-01 4.271619E-01 1.100000E-01 Sorbent - CaO                  Mass %
83   40.3000 5.822E+00 5.819613E+00 1.600000E-01 Sorbent - MgO                  Mass %
84     .7500 1.312E-01 1.270646E-01 3.250000E-02 Sorbent - SO3                  Mass %
85    1.4500 2.355E-01 1.815038E-01 1.500000E-01 Sorbent - Ash                  Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR2-3

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,     'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERM  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     4.5,   1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR2 - TEST POINT 3  <<CASE C>>  12/20/91  Pittsburgh Coal + Dolomite
SET POINT DATE:      12/20/91
SET POINT TIME:      01:00:00 - 05:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	138.0810	6.911E+00	6.870000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	135.3120	6.734E+00	6.726000E+00	3.250000E-01	Orifice Pressure	PSIG	PI-3106
3	.0000	.000E+00	.000000E+00	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	696.6830	2.344E+01	2.162700E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.5420	1.681E-01	1.450000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	66.9290	1.663E+00	1.329000E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	47.5270	6.364E-01	4.950000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	12.1880	4.861E+00	4.855000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	7.9360	2.419E-01	1.670000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.7920	7.916E-02	7.100000E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.8820	4.206E-02	3.700000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	301.7480	1.650E+01	6.863000E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	250.4720	1.364E+01	4.666000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.0000	.000E+00	.000000E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	182.0000	4.5774	4.55	.5	Coal Feed rate	lb/hr	
16	83.0000	2.1344	2.075	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	80.1580	2.003E+00	1.160000E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	98.6450	4.905E+01	4.900500E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	154.5940	8.371E+00	8.129000E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	170.1110	4.841E+00	4.408000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1629.3950	6.627E+00	2.566000E+00	6.110231E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1323.7150	8.258E+00	6.599000E+00	4.963931E+00	Orifice Temp (Upstream)	F	TI-3108
38	102.1190	5.805E+00	5.450000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	167.1690	2.034E+00	3.720000E-01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	264.6630	2.001E+00	5.100000E-02	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	211.5980	2.001E+00	6.600000E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	.0000	.000E+00	.000000E+00	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	29.3000	1.548E+00	1.465000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	70.4500	3.558E+00	3.522500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	3.1400	5.241E-01	1.570000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	8.2100	6.469E-01	4.105000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR2-3

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	68.1918	1.200E+00	1.190770E+00	1.500000E-01	Coal - C	Mass %
2	4.5873	8.360E-02	7.591878E-02	3.500000E-02	Coal - H	Mass %
3	1.9227	6.962E-02	6.497134E-02	2.500000E-02	Coal - N	Mass %
4	4.5055	.22528	.22528		Coal - S	Mass %
5	12.4518	1.450E+00	1.446906E+00	1.000000E-01	Coal - Ash	Mass %
6	2.2855	2.782E-01	2.342812E-01	1.500000E-01	Coal - H2O	Mass %
712554	.0900	2.744E+02	2.732357E+02	2.500000E+01	Coal - HHV	BTU/lb
8	19.3933	2.889E+00	2.885164E+00	1.500000E-01	CD Drain - C	Mass %
9	.1833	8.374E-02	7.607315E-02	3.500000E-02	CD Drain - H	Mass %
10	.6067	8.258E-02	7.870509E-02	2.500000E-02	CD Drain - N	Mass %
11	10.5533	5.27665	5.27665		CD Drain - S	Mass %
12	98.3400	4.576E+00	4.569180E+00	2.500000E-01	CD Drain - Ash	Mass %
13	3592.6670	3.386E+02	3.376403E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	8.8033	8.8033	8.8033		CD Drain - sfide S	Mass %
16	2.1400	2.653E-01	2.188504E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	11.7000	5.85	5.85		CD Drain - Ash S	Mass %
18	18.8433				CD Drain - Ash CaO	Mass %
19	19.5633				CD Drain - Ash MgO	Mass %
20	48.4050	1.535E+00	1.528003E+00	1.500000E-01	FD Drain - C	Mass %
21	.2300	3.783E-02	1.435169E-02	3.500000E-02	FD Drain - H	Mass %
22	1.2625	1.136E-01	1.108032E-01	2.500000E-02	FD Drain - N	Mass %
23	4.4625	2.23125	2.23125		FD Drain - S	Mass %
24	55.7150	2.154E+00	2.139444E+00	2.500000E-01	FD Drain - Ash	Mass %
25	7541.7500	2.147E+02	2.132576E+02	2.500000E+01	FD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	FD Drain - sfate S	Mass %
27	3.0000	3.0000	3.0000		FD Drain - sfide S	Mass %
28	1.4900	2.164E-01	1.559411E-01	1.500000E-01	FD Drain - crbate C	Mass %
29	8.9625	4.48125	4.48125		FD Drain - Ash S	Mass %
30	20.0800				FD Drain - Ash CaO	Mass %
31	20.0625				FD Drain - Ash MgO	Mass %
32	58.1667	6.424E-01	6.245960E-01	1.500000E-01	CF/SD Drain - C	Mass %
33	.4500	3.863E-02	1.635593E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.5000	1.011E-01	9.791218E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	2.4967	1.24835	1.24835		CF/SD Drain - S	Mass %
36	40.8033	7.998E-01	7.597238E-01	2.500000E-01	CF/SD Drain - Ash	Mass %
37	8964.0000	1.062E+02	1.032272E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	1.1200	1.1200	1.1200		CF/SD Drain - sfide S	Mass %
40	1.1767	2.145E-01	1.533035E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	4.8333	2.41665	2.41665		CF/SD Drain - Ash S	Mass %
42	17.6300				CF/SD Drain - Ash CaO	Mass %
43	16.2500				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	66.3300	3.266E-01	2.901462E-01	1.500000E-01	BD Drain - C	Mass %
46	1.0900	3.555E-02	6.205759E-03	3.500000E-02	BD Drain - H	Mass %
47	1.4400	1.174E-01	1.146712E-01	2.500000E-02	BD Drain - N	Mass %
48	1.6400	.82	.82		BD Drain - S	Mass %
49	27.4900	2.876E-01	1.421234E-01	2.500000E-01	BD Drain - Ash	Mass %
5010367	.5000	2.726E+01	1.087239E+01	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.5750	.5750	.5750		BD Drain - sfide S	Mass %
53	.7150	1.811E-01	1.014382E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	3.8600	1.93	1.93		BD Drain - Ash S	Mass %
55	19.2500				BD Drain - Ash CaO	Mass %
56	16.6000				BD Drain - Ash MgO	Mass %
57	79.3333	8.793E-01	3.770235E-01	7.943333E-01	Demister Gas - N2	mol,vol %
58	1.0067	3.260E-01	3.258120E-01	1.106666E-02	Demister Gas - O2	mol,vol %
59	7.5800	1.868E-01	1.702465E-01	7.680000E-02	Demister Gas - CO	mol,vol %
60	.5650	4.048E-02	3.992922E-02	6.650000E-03	Demister Gas - CH4	mol,vol %
61	5.1267	1.244E-01	1.076403E-01	6.226667E-02	Demister Gas - CO2	mol,vol %
62	.0000	.000E+00	.000000E+00	1.000000E-03	Demister Gas - C2H4	mol,vol %
63	.0100	4.733E-03	4.602919E-03	1.100000E-03	Demister Gas - C2H6	mol,vol %
64	.0424	8.337E-03	8.326557E-03	4.236666E-04	Demister Gas - H2S	mol,vol %
65	2.2933	2.019E-01	2.004789E-01	2.393333E-02	Demister Gas - H2	mol,vol %
66	.0697	1.382E-02	1.337187E-02	3.485000E-03	Demister Gas - NH3	mol,vol %
67	.4500	1.242E-02	1.113988E-02	5.500000E-03	Demister Gas - Ar	mol,vol %
68	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR2-3

```
69     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - O2                mol,vol %
70     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO                mol,vol %
71     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CH4               mol,vol %
72     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO2               mol,vol %
73     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H4              mol,vol %
74     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H6              mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S               mol,vol %
76     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - H2                mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3               mol,vol %
78     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - Ar                mol,vol %
79    7.3000 1.500E+00  .000000E+00 1.500000E+00 Water Content in Freeboard Gas    mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2                mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2               mol,vol %
82   60.0000 4.411E-01 4.271619E-01 1.100000E-01 Sorbent - CaO                     Mass %
83   40.3000 5.822E+00 5.819613E+00 1.600000E-01 Sorbent - MgO                     Mass %
84     .7500 1.312E-01 1.270646E-01 3.250000E-02 Sorbent - SO3                     Mass %
85    1.4500 2.355E-01 1.815038E-01 1.500000E-01 Sorbent - Ash                     Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    3.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR2-4

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,      'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     4.5,   1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR2 - TEST POINT 4  <<CASE C>>  12/20/91  Pittsburgh Coal + Dolomite
SET POINT DATE:     12/20/91
SET POINT TIME:     10:00:00 - 14:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	191.7680	7.385E+00	7.347000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	187.9090	7.181E+00	7.174000E+00	3.250000E-01	Orifice Pressure	PSIG	PI-3106
3	.0000	.000E+00	.000000E+00	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	984.5370	1.933E+01	1.708500E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.5100	1.777E-01	1.560000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	67.0470	9.621E+00	9.569000E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	44.4800	6.696E-01	5.370000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	13.7480	1.366E+00	1.343000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	5.9200	5.496E-01	5.210000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.6910	1.164E-01	1.110000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.1630	2.787E-01	2.780000E-01	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	227.1960	1.889E+01	1.147700E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	247.6220	1.395E+01	5.498000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.0000	.000E+00	.000000E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	376.0000	9.4133	9.4	.5	Coal Feed rate	lb/hr	
16	99.0000	2.525	2.475	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	82.4480	2.055E+00	4.720000E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	294.9210	9.610E+01	9.608100E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	154.6580	9.379E+00	9.163000E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	170.8300	7.309E+00	7.030000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1669.0750	1.032E+01	8.203000E+00	6.259031E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1436.8470	7.879E+00	5.748000E+00	5.388176E+00	Orifice Temp (Upstream)	F	TI-3108
38	106.7460	5.746E+00	5.387000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	248.3370	2.417E+01	2.408600E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	264.7240	2.003E+00	1.040000E-01	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	211.5030	2.002E+00	9.100000E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	.0000	.000E+00	.000000E+00	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	136.1100	6.824E+00	6.805500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	82.4000	4.150E+00	4.120000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	2.5900	5.165E-01	1.295000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	18.8100	1.065E+00	9.405000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR2-4

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	68.1918	1.200E+00	1.190770E+00	1.500000E-01	Coal - C	Mass %
2	4.5873	8.360E-02	7.581878E-02	3.500000E-02	Coal - H	Mass %
3	1.9227	6.962E-02	6.497134E-02	2.500000E-02	Coal - N	Mass %
4	4.5055	.22528	.22528		Coal - S	Mass %
5	12.4518	1.450E+00	1.446906E+00	1.000000E-01	Coal - Ash	Mass %
6	2.2855	2.782E-01	2.342812E-01	1.500000E-01	Coal - H2O	Mass %
712554	.0900	2.744E+02	2.732357E+02	2.500000E+01	Coal - HHV	BTU/lb
8	45.2700	9.888E+00	9.887019E+00	1.500000E-01	CD Drain - C	Mass %
9	.1475	4.731E-02	3.183157E-02	3.500000E-02	CD Drain - H	Mass %
10	1.0950	2.068E-01	2.052869E-01	2.500000E-02	CD Drain - N	Mass %
11	7.5250	3.7625	3.7625		CD Drain - S	Mass %
12	65.3350	1.356E+01	1.355683E+01	2.500000E-01	CD Drain - Ash	Mass %
13	7229.5000	1.339E+03	1.338373E+03	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	5.6825	5.6825	5.6825		CD Drain - sfide S	Mass %
16	1.4800	2.940E-01	2.528687E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	9.5150	4.7575	4.7575		CD Drain - Ash S	Mass %
18	16.7200				CD Drain - Ash CaO	Mass %
19	17.1625				CD Drain - Ash MgO	Mass %
20	63.6533	5.427E-01	5.215861E-01	1.500000E-01	PD Drain - C	Mass %
21	.3967	3.634E-02	9.776494E-03	3.500000E-02	PD Drain - H	Mass %
22	1.5500	4.681E-02	3.957489E-02	2.500000E-02	PD Drain - N	Mass %
23	4.0533	2.02665	2.02665		PD Drain - S	Mass %
24	38.5767	1.863E+00	1.846455E+00	2.500000E-01	PD Drain - Ash	Mass %
25	9908.6670	1.011E+02	9.790939E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	2.6300	2.6300	2.6300		PD Drain - sfide S	Mass %
28	1.2633	2.072E-01	1.429292E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	8.1800	4.09	4.09		PD Drain - Ash S	Mass %
30	16.8000				PD Drain - Ash CaO	Mass %
31	16.1333				PD Drain - Ash MgO	Mass %
32	63.5050	1.964E-01	1.268489E-01	1.500000E-01	CF/SD Drain - C	Mass %
33	.4850	3.588E-02	7.911828E-03	3.500000E-02	CF/SD Drain - H	Mass %
34	1.3400	4.811E-02	4.110110E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	2.0800	1.04	1.04		CF/SD Drain - S	Mass %
36	34.1250	4.621E-01	3.886098E-01	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9781.5000	3.258E+01	2.088461E+01	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	.8700	.8700	.8700		CF/SD Drain - sfide S	Mass %
40	.7900	1.861E-01	1.102018E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	4.4250	2.2125	2.2125		CF/SD Drain - Ash S	Mass %
42	16.3000				CF/SD Drain - Ash CaO	Mass %
43	16.1000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	66.4700	1.272E+00	1.262930E+00	1.500000E-01	BD Drain - C	Mass %
46	.4300	4.426E-02	2.709000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.6500	9.572E-02	9.240000E-02	2.500000E-02	BD Drain - N	Mass %
48	3.3600	1.68	1.68		BD Drain - S	Mass %
49	34.1700	1.794E+00	1.776840E+00	2.500000E-01	BD Drain - Ash	Mass %
5010145	.0000	2.044E+02	2.029000E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	2.1200	2.1200	2.1200		BD Drain - sfide S	Mass %
53	.9800	3.127E-01	2.744000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	6.7500	3.375	3.375		BD Drain - Ash S	Mass %
55	18.4000				BD Drain - Ash CaO	Mass %
56	16.8000				BD Drain - Ash MgO	Mass %
57	73.0250	1.232E+00	9.916213E-01	7.312500E-01	Demister Gas - N2	mol,vol %
58	.6575	2.237E-01	2.236201E-01	7.575000E-03	Demister Gas - O2	mol,vol %
59	10.1575	5.478E-01	5.380735E-01	1.025750E-01	Demister Gas - CO	mol,vol %
60	1.6875	1.274E-01	1.261055E-01	1.783250E-02	Demister Gas - CH4	mol,vol %
61	6.5450	1.631E-01	1.489803E-01	6.645000E-02	Demister Gas - CO2	mol,vol %
62	.0025	2.735E-03	2.535525E-03	1.025000E-03	Demister Gas - C2H4	mol,vol %
63	.0000	.000E+00	.000000E+00	1.000000E-03	Demister Gas - C2H6	mol,vol %
64	.0093	2.440E-03	2.438426E-03	9.275000E-05	Demister Gas - H2S	mol,vol %
65	4.5200	4.934E-01	4.912466E-01	4.620000E-02	Demister Gas - H2	mol,vol %
66	.2759	1.046E-01	1.037061E-01	1.379375E-02	Demister Gas - NH3	mol,vol %
67	.4900	8.479E-03	6.090150E-03	5.900000E-03	Demister Gas - Ar	mol,vol %
68	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR2-4

```
69     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - O2              mol,vol %
70     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO              mol,vol %
71     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CH4             mol,vol %
72     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H4            mol,vol %
74     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S             mol,vol %
76     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3             mol,vol %
78     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - Ar              mol,vol %
79    6.7500 1.500E+00  .000000E+00 1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2             mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2            mol,vol %
82   60.0000 4.411E-01 4.271619E-01 1.100000E-01 Sorbent - CaO                  Mass %
83   40.3000 5.822E+00 5.819613E+00 1.600000E-01 Sorbent - MgO                  Mass %
84     .7500 1.312E-01 1.270646E-01 3.250000E-02 Sorbent - SO3                  Mass %
85    1.4500 2.355E-01 1.815038E-01 1.500000E-01 Sorbent - Ash                  Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR2-5

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,      'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     4.5,    1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR2 - TEST POINT 5  <<CASE C>>  12/20/91  Pittsburgh Coal + Dolomite '
SET POINT DATE:     12/20/91
SET POINT TIME:     16:00:00 - 18:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	198.5890	2.152E+00	2.017000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	194.5180	2.001E+00	1.974000E+00	3.250000E-01	Orifice Pressure	PSIG	PI-3106
3	.0000	.000E+00	.000000E+00	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	979.8870	2.786E+01	2.635100E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.5140	1.382E-01	1.090000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	71.3250	1.540E+01	1.536400E+01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	43.8150	5.104E-01	3.170000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	14.5620	1.240E+00	1.215000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	5.4400	3.353E-01	2.860000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.6240	8.006E-02	7.200000E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.8810	1.098E-01	1.080000E-01	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	207.5560	2.075E+01	1.433600E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	253.3400	1.412E+01	5.925000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.0000	.000E+00	.000000E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	508.0000	12.7098	12.7	.5	Coal Feed rate	lb/hr	
16	160.0000	4.0311	4.0000	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	83.8340	2.128E+00	7.270000E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	366.6700	7.329E+01	7.326000E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	165.6980	7.709E+00	7.445000E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	172.1250	5.658E+00	5.293000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1589.8020	8.195E+00	5.623000E+00	5.961757E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1400.0120	5.977E+00	2.856000E+00	5.250045E+00	Orifice Temp (Upstream)	F	TI-3108
38	113.8720	4.722E+00	4.278000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	302.3000	1.383E+01	1.368000E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	264.7440	2.002E+00	8.300000E-02	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	211.4430	2.002E+00	9.100000E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	.0000	.000E+00	.000000E+00	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	165.1800	8.274E+00	8.259000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	134.0900	6.723E+00	6.704500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	5.7100	5.758E-01	2.855000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	14.5100	8.811E-01	7.255000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR2-5

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	68.1918	1.200E+00	1.190770E+00	1.500000E-01	Coal - C	Mass %
2	4.5873	8.360E-02	7.591878E-02	3.500000E-02	Coal - H	Mass %
3	1.9227	6.962E-02	6.497134E-02	2.500000E-02	Coal - N	Mass %
4	4.5055	.22528	.22528		Coal - S	Mass %
5	12.4518	1.450E+00	1.446906E+00	1.000000E-01	Coal - Ash	Mass %
6	2.2855	2.782E-01	2.342812E-01	1.500000E-01	Coal - H2O	Mass %
7	12554.0900	2.744E+02	2.732357E+02	2.500000E+01	Coal - HHV	BTU/lb
8	64.6400	3.034E+00	3.030087E+00	1.500000E-01	CD Drain - C	Mass %
9	.3450	4.053E-02	2.043386E-02	3.500000E-02	CD Drain - H	Mass %
10	1.7100	1.115E-01	1.086616E-01	2.500000E-02	CD Drain - N	Mass %
11	4.0750	2.0375	2.0375		CD Drain - S	Mass %
12	37.6100	9.196E-01	8.849317E-01	2.500000E-01	CD Drain - Ash	Mass %
13	9819.0000	5.019E+02	5.012426E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	2.3050	2.3050	2.3050		CD Drain - sfide S	Mass %
16	1.1700	1.752E-01	9.053910E-02	1.500000E-01	CD Drain - crbate C	Mass %
17	8.4650	4.2325	4.2325		CD Drain - Ash S	Mass %
18	16.4500				CD Drain - Ash CaO	Mass %
19	16.2000				CD Drain - Ash MgO	Mass %
20	64.8450	3.273E-01	2.909053E-01	1.500000E-01	PD Drain - C	Mass %
21	.4700	3.540E-02	5.315084E-03	3.500000E-02	PD Drain - H	Mass %
22	1.7450	5.141E-02	4.492532E-02	2.500000E-02	PD Drain - N	Mass %
23	3.4900	1.745	1.745		PD Drain - S	Mass %
24	38.0150	7.029E-01	6.569286E-01	2.500000E-01	PD Drain - Ash	Mass %
25	9878.0000	1.041E+02	1.010609E+02	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	2.3300	2.3300	2.3300		PD Drain - sfide S	Mass %
28	1.4650	2.555E-01	2.067893E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	9.6600	4.83	4.83		PD Drain - Ash S	Mass %
30	18.1000				PD Drain - Ash CaO	Mass %
31	17.3000				PD Drain - Ash MgO	Mass %
32	63.3000	1.212E+00	1.202700E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.5400	4.881E-02	3.402000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.4400	8.443E-02	8.064000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	2.9600	1.48	1.48		CF/SD Drain - S	Mass %
36	35.0400	1.839E+00	1.822080E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9940.0000	2.004E+02	1.988000E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	1.6400	1.6400	1.6400		CF/SD Drain - sfide S	Mass %
40	1.0200	3.226E-01	2.856000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	6.8000	3.4	3.4		CF/SD Drain - Ash S	Mass %
42	17.7000				CF/SD Drain - Ash CaO	Mass %
43	17.1000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	69.1100	1.322E+00	1.313090E+00	1.500000E-01	BD Drain - C	Mass %
46	.5300	4.837E-02	3.339000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.7400	1.006E-01	9.744000E-02	2.500000E-02	BD Drain - N	Mass %
48	2.7800	1.39	1.39		BD Drain - S	Mass %
49	29.7600	1.568E+00	1.547520E+00	2.500000E-01	BD Drain - Ash	Mass %
50	10546.0000	2.124E+02	2.109200E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	1.9500	1.9500	1.9500		BD Drain - sfide S	Mass %
53	.7700	2.626E-01	2.156000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	6.2300	3.115	3.115		BD Drain - Ash S	Mass %
55	17.0000				BD Drain - Ash CaO	Mass %
56	16.5000				BD Drain - Ash MgO	Mass %
57	72.7667	9.564E-01	6.194442E-01	7.286667E-01	Demister Gas - N2	mol,vol %
58	2.0967	3.550E-01	3.542923E-01	2.196667E-02	Demister Gas - O2	mol,vol %
59	8.5900	2.805E-01	2.667114E-01	8.690000E-02	Demister Gas - CO	mol,vol %
60	2.3000	9.774E-02	9.475105E-02	2.400000E-02	Demister Gas - CH4	mol,vol %
61	7.2250	2.138E-01	2.008661E-01	7.325000E-02	Demister Gas - CO2	mol,vol %
62	.0200	4.258E-03	4.085212E-03	1.200000E-03	Demister Gas - C2H4	mol,vol %
63	.0233	5.655E-03	5.518822E-03	1.233333E-03	Demister Gas - C2H6	mol,vol %
64	.0171	4.844E-03	4.841023E-03	1.710000E-04	Demister Gas - H2S	mol,vol %
65	3.4367	3.844E-01	3.828007E-01	3.536667E-02	Demister Gas - H2	mol,vol %
66	.2783	3.443E-02	3.148863E-02	1.391667E-02	Demister Gas - NH3	mol,vol %
67	.5233	1.108E-02	9.155970E-03	6.233333E-03	Demister Gas - Ar	mol,vol %
68	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR2-5

```
69     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - O2              mol,vol %
70     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO              mol,vol %
71     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CH4             mol,vol %
72     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H4            mol,vol %
74     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S             mol,vol %
76     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3             mol,vol %
78     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - Ar              mol,vol %
79    9.5000 1.500E+00   000000E+00 1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2              mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2             mol,vol %
82   60.0000 4.411E-01 4.271619E-01 1.100000E-01 Sorbent - CaO                   Mass %
83   40.3000 5.822E+00 5.819613E+00 1.600000E-01 Sorbent - MgO                   Mass %
84     .7500 1.312E-01 1.270646E-01 3.250000E-02 Sorbent - SO3                   Mass %
85    1.4500 2.355E-01 1.815038E-01 1.500000E-01 Sorbent - Ash                   Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    3.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR4-1

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,      'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     3.5,   1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR4 - TEST POINT 1  <<CASE C>>  03/10/92  Pittsburgh Coal + Dolomite
SET POINT DATE:     3/10/92
SET POINT TIME:     20:30:00 - 00:30:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	153.3090	5.884E+00	5.836000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	150.0720	5.757E+00	5.708000E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	201.0340	1.952E+01	1.950500E+01	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	683.9740	1.935E+01	1.711100E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.7340	3.185E-01	3.070000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	47.0190	1.326E+00	8.710000E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	39.1020	8.518E-01	7.520000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	15.8330	3.002E+00	2.992000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	4.7770	2.305E-01	1.500000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.0800	1.824E-01	1.790000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.7510	5.665E-02	5.300000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	599.7180	1.753E+01	9.068000E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	600.0780	1.320E+01	3.151000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	49.7850	2.014E+01	2.008700E+01	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	259.0000	6.4943	6.475	.5	Coal Feed rate	lb/hr	
16	97.6000	2.4907	2.44	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	78.3990	2.194E+00	9.030000E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	98.4930	2.522E+01	2.514200E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	168.4200	9.095E+00	8.872000E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	181.6370	7.276E+00	6.996000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1582.8650	7.543E+00	4.655000E+00	5.935744E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1325.7140	6.989E+00	4.912000E+00	4.971427E+00	Orifice Temp (Upstream)	F	TI-3108
38	146.8440	1.781E+01	1.770200E+01	2.000000E+00	Purge N2 Temp	F	TI-7012
39	310.7560	1.062E+01	1.042900E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	271.5580	4.943E+00	4.520000E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	209.8590	2.002E+00	9.500000E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.8400	8.030E+00	7.777000E+00	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	59.3700	3.010E+00	2.968500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	66.4900	3.362E+00	3.324500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	3.7700	5.344E-01	1.885000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	15.1500	9.076E-01	7.575000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless. G SI	

INPUT DATA FILE FOR TR4-1

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	71.5414	1.204E+00	1.194450E+00	1.500000E-01	Coal - C	Mass %
2	4.6757	1.306E-01	1.258112E-01	3.500000E-02	Coal - H	Mass %
3	1.9014	9.733E-02	9.406120E-02	2.500000E-02	Coal - N	Mass %
4	3.3557	.16779	.16779		Coal - S	Mass %
5	11.1786	1.638E+00	1.635290E+00	1.000000E-01	Coal - Ash	Mass %
6	2.0829	4.408E-01	4.144761E-01	1.500000E-01	Coal - H2O	Mass %
712775.5700		2.231E+02	2.217231E+02	2.500000E+01	Coal - HHV	BTU/lb
8	27.9600	3.331E+00	3.327240E+00	1.500000E-01	CD Drain - C	Mass %
9	.1200	4.117E-02	2.167200E-02	3.500000E-02	CD Drain - H	Mass %
10	.7300	1.214E-01	1.188440E-01	2.500000E-02	CD Drain - N	Mass %
11	5.7000	2.85	2.85		CD Drain - S	Mass %
12	76.5200	1.263E+01	1.262580E+01	2.500000E-01	CD Drain - Ash	Mass %
13	4090.0000	5.172E+02	5.165670E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	4.4200	4.42	4.42		CD Drain - sfide S	Mass %
16	2.7600	6.665E-01	6.494280E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	7.0300	3.515	3.515		CD Drain - Ash S	Mass %
18	31.2000				CD Drain - Ash CaO	Mass %
19	23.4000				CD Drain - Ash MgO	Mass %
20	56.9867	6.556E-01	6.381896E-01	1.500000E-01	PD Drain - C	Mass %
21	.3733	3.636E-02	9.841818E-03	3.500000E-02	PD Drain - H	Mass %
22	1.3833	4.414E-02	3.637381E-02	2.500000E-02	PD Drain - N	Mass %
23	3.4033	1.70165	1.70165		PD Drain - S	Mass %
24	44.2433	6.816E-01	6.340445E-01	2.500000E-01	PD Drain - Ash	Mass %
25	8796.6670	6.328E+01	5.813431E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	2.0367	2.0367	2.0367		PD Drain - sfide S	Mass %
28	1.4933	2.467E-01	1.958331E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	8.0300	4.015	4.015		PD Drain - Ash S	Mass %
30	28.1667				PD Drain - Ash CaO	Mass %
31	22.8333				PD Drain - Ash MgO	Mass %
32	57.0700	1.095E+00	1.084330E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.3800	4.240E-02	2.394000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.7700	1.022E-01	9.912000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	2.9800	1.49	1.49		CF/SD Drain - S	Mass %
36	43.9400	2.299E+00	2.284880E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	8704.0000	1.759E+02	1.740800E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	1.7800	1.78	1.78		CF/SD Drain - sfide S	Mass %
40	1.1700	3.603E-01	3.276000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	5.3400	2.67	2.67		CF/SD Drain - Ash S	Mass %
42	27.8000				CF/SD Drain - Ash CaO	Mass %
43	26.4000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	69.6400	1.332E+00	1.323160E+00	1.500000E-01	BD Drain - C	Mass %
46	.6200	5.245E-02	3.906000E-02	3.500000E-02	BD Drain - H	Mass %
47	2.2800	1.301E-01	1.276800E-01	2.500000E-02	BD Drain - N	Mass %
48	2.6500	1.325	1.325		BD Drain - S	Mass %
49	27.3500	1.444E+00	1.422200E+00	2.500000E-01	BD Drain - Ash	Mass %
5010886.0000		2.192E+02	2.177200E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.9600	.96	.96		BD Drain - sfide S	Mass %
53	.4800	2.014E-01	1.344000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	4.9600	2.48	2.48		BD Drain - Ash S	Mass %
55	30.1000				BD Drain - Ash CaO	Mass %
56	23.5000				BD Drain - Ash MgO	Mass %
57	77.2500	8.374E-01	3.207307E-01	7.735000E-01	Demister Gas - N2	mol,vol %
58	1.4000	3.123E-02	2.738687E-02	1.500000E-02	Demister Gas - O2	mol,vol %
59	5.8800	7.706E-02	4.860720E-02	5.980000E-02	Demister Gas - CO	mol,vol %
60	1.1350	7.216E-02	7.109550E-02	1.235000E-02	Demister Gas - CH4	mol,vol %
61	7.4650	9.424E-02	5.619874E-02	7.565000E-02	Demister Gas - CO2	mol,vol %
62	.0100	3.885E-03	3.726157E-03	1.100000E-03	Demister Gas - C2H4	mol,vol %
63	.0050	2.238E-03	1.975909E-03	1.050000E-03	Demister Gas - C2H6	mol,vol %
64	.0126	9.016E-04	8.927864E-04	1.255000E-04	Demister Gas - H2S	mol,vol %
65	3.9500	2.969E-01	2.941243E-01	4.050000E-02	Demister Gas - H2	mol,vol %
66	.2325	1.163E-02	2.381841E-04	1.162750E-02	Demister Gas - NH3	mol,vol %
67	.4500	8.441E-03	6.402873E-03	5.500000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR4-1

```
69                                                  Freeboard Gas - O2              mol,vol %
70                                                  Freeboard Gas - CO              mol,vol %
71                                                  Freeboard Gas - CH4             mol,vol %
72                                                  Freeboard Gas - CO2             mol,vol %
73                                                  Freeboard Gas - C2H4            mol,vol %
74                                                  Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S                mol,vol %
76                                                  Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3                mol,vol %
78                                                  Freeboard Gas - Ar              mol,vol %
79   12.0500 1.5                    1.500000E+00 Water Content in Freeboard Gas    mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2                 mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2                mol,vol %
82   57.6000 1.345E+00 1.340281E+00 1.100000E-01 Sorbent - CaO                      Mass %
83   41.4667 1.068E+00 1.055831E+00 1.600000E-01 Sorbent - MgO                      Mass %
84     .8000 7.181E-02 6.324653E-02 3.400000E-02 Sorbent - SO3                      Mass %
85    1.2333 1.586E-01 5.164160E-02 1.500000E-01 Sorbent - Ash                      Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    3.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88    2.0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR4-2

DEFAULT CONTROL PARAMETERS,

```
  IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
    1,      3,     40,     0,      'A'

  EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
   .2,     3.0,   1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR4 - TEST POINT 2  <<CASE C>>  03/11/92  Pittsburgh Coal + Dolomite
SET POINT DATE:     3/11/92
SET POINT TIME:     04:30:00 - 08:30:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	155.9030	1.256E+00	1.008000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	152.6400	1.244E+00	9.930000E-01	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	217.4810	2.576E+00	2.464000E+00	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	656.0290	1.006E+01	4.404000E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.5330	1.829E-01	1.620000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	48.5630	1.230E+00	7.160000E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	39.0980	9.205E-01	8.290000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	10.7080	1.804E+00	1.787000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	4.7700	2.174E-01	1.290000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.3520	1.492E-01	1.450000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.8490	4.833E-02	4.400000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	600.8400	1.703E+01	8.066000E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	600.6260	1.308E+01	2.609000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	117.9620	1.638E+00	6.590000E-01	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	297.0000	7.4418	7.425	.5	Coal Feed rate	lb/hr	
16	90.0000	2.3049	2.25	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	78.9320	2.289E+00	1.113000E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	214.3610	4.004E+01	3.999100E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	163.1160	1.102E+01	1.084000E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	185.4590	7.619E+00	7.352000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1530.5770	6.244E+00	2.458000E+00	5.739664E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1292.1770	5.915E+00	3.392000E+00	4.845664E+00	Orifice Temp (Upstream)	F	TI-3108
38	115.6260	5.136E+00	4.731000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	342.0250	1.003E+01	9.833000E+00	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	272.7190	5.245E+00	4.849000E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	209.3490	2.002E+00	7.900000E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	394.3530	2.195E+00	9.050000E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	82.1700	4.139E+00	4.108500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	81.3800	4.100E+00	4.069000E+00	5.000000E-01	FD Flow; primary cyclone	lb/hr	
46	4.0900	5.402E-01	2.045000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	7.7300	6.320E-01	3.865000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless. G SI	

INPUT DATA FILE FOR TR4-2

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	71.5414	1.204E+00	1.194450E+00	1.500000E-01	Coal - C	Mass %
2	4.6757	1.306E-01	1.258112E-01	3.500000E-02	Coal - H	Mass %
3	1.9014	9.733E-02	9.406120E-02	2.500000E-02	Coal - N	Mass %
4	3.3557	.16779	.16779		Coal - S	Mass %
5	11.1786	1.638E+00	1.635290E+00	1.000000E-01	Coal - Ash	Mass %
6	2.0829	4.408E-01	4.144761E-01	1.500000E-01	Coal - H2O	Mass %
712775.5700		2.231E+02	2.217231E+02	2.500000E+01	Coal - HHV	BTU/lb
8	19.0400	2.271E+00	2.265760E+00	1.500000E-01	CD Drain - C	Mass %
9	.1300	4.215E-02	2.347800E-02	3.500000E-02	CD Drain - H	Mass %
10	.4300	7.433E-02	7.000400E-02	2.500000E-02	CD Drain - N	Mass %
11	9.9200	4.96	4.96		CD Drain - S	Mass %
12	93.4600	1.542E+01	1.542090E+01	2.500000E-01	CD Drain - Ash	Mass %
13	2804.0000	3.550E+02	3.541452E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	8.6500	8.65	8.65		CD Drain - sfide S	Mass %
16	4.2300	1.007E+00	9.953190E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	11.8000	5.9	5.9		CD Drain - Ash S	Mass %
18	28.8000				CD Drain - Ash CaO	Mass %
19	23.8000				CD Drain - Ash MgO	Mass %
20	63.4633	5.847E-01	5.651574E-01	1.500000E-01	PD Drain - C	Mass %
21	.5633	3.646E-02	1.021091E-02	3.500000E-02	PD Drain - H	Mass %
22	1.6033	4.976E-02	4.302181E-02	2.500000E-02	PD Drain - N	Mass %
23	4.1600	2.08	2.08		PD Drain - S	Mass %
24	34.5567	7.482E-01	7.051708E-01	2.500000E-01	PD Drain - Ash	Mass %
2510340.6700		9.411E+01	9.072800E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	1.7400	1.74	1.74		PD Drain - sfide S	Mass %
28	1.0733	1.752E-01	9.060723E-02	1.500000E-01	PD Drain - crbate C	Mass %
29	7.7833	3.89165	3.89165		PD Drain - Ash S	Mass %
30	24.2333				PD Drain - Ash CaO	Mass %
31	18.7000				PD Drain - Ash MgO	Mass %
32	58.5500	1.123E+00	1.112450E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.4900	4.667E-02	3.087000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.6900	9.789E-02	9.464000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	3.0400	1.52	1.52		CF/SD Drain - S	Mass %
36	35.3700	1.856E+00	1.839240E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9954.0000	2.006E+02	1.990800E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	1.5400	1.54	1.54		CF/SD Drain - sfide S	Mass %
40	.8100	2.719E-01	2.268000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	5.1700	2.585	2.585		CF/SD Drain - Ash S	Mass %
42	25.4000				CF/SD Drain - Ash CaO	Mass %
43	19.4000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	68.1600	1.304E+00	1.295040E+00	1.500000E-01	BD Drain - C	Mass %
46	.7700	5.982E-02	4.851000E-02	3.500000E-02	BD Drain - H	Mass %
47	2.2000	1.257E-01	1.232000E-01	2.500000E-02	BD Drain - N	Mass %
48	2.4700	1.235	1.235		BD Drain - S	Mass %
49	27.1100	1.432E+00	1.409720E+00	2.500000E-01	BD Drain - Ash	Mass %
5010261.0000		2.067E+02	2.052200E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.9400	.94	.94		BD Drain - sfide S	Mass %
53	.4000	1.872E-01	1.120000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	5.1500	2.575	2.575		BD Drain - Ash S	Mass %
55	30.4000				BD Drain - Ash CaO	Mass %
56	22.9000				BD Drain - Ash MgO	Mass %
57	75.9750	8.116E-01	2.827832E-01	7.607500E-01	Demister Gas - N2	mol,vol %
58	1.2450	1.246E-01	1.239004E-01	1.345000E-02	Demister Gas - O2	mol,vol %
59	4.3950	9.716E-02	8.613295E-02	4.494999E-02	Demister Gas - CO	mol,vol %
60	1.6950	9.626E-02	9.457140E-02	1.795000E-02	Demister Gas - CH4	mol,vol %
61	8.8075	1.756E-01	1.513704E-01	8.907500E-02	Demister Gas - CO2	mol,vol %
62	.0325	1.115E-02	1.107293E-02	1.325000E-03	Demister Gas - C2H4	mol,vol %
63	.0225	8.472E-03	8.382834E-03	1.225000E-03	Demister Gas - C2H6	mol,vol %
64	.0931	2.089E-02	2.086699E-02	9.307500E-04	Demister Gas - H2S	mol,vol %
65	5.4800	1.591E-01	1.490145E-01	5.579999E-02	Demister Gas - H2	mol,vol %
66	.3525	8.755E-02	8.575546E-02	1.762250E-02	Demister Gas - NH3	mol,vol %
67	.4500	7.588E-03	5.227928E-03	5.500000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR4-2

```
69                                                Freeboard Gas - O2              mol,vol %
70                                                Freeboard Gas - CO              mol,vol %
71                                                Freeboard Gas - CH4             mol,vol %
72                                                Freeboard Gas - CO2             mol,vol %
73                                                Freeboard Gas - C2H4            mol,vol %
74                                                Freeboard Gas - C2H6            mol,vol %
75    .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S              mol,vol %
76                                                Freeboard Gas - H2              mol,vol %
77    .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3              mol,vol %
78                                                Freeboard Gas - Ar              mol,vol %
79  22.0500 1.5                    1.500000E+00 Water Content in Freeboard Gas mol,vol %
80    .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2              mol,vol %
81    .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2             mol,vol %
82  57.6000 1.345E+00 1.340281E+00 1.100000E-01 Sorbent - CaO                   Mass %
83  41.4667 1.068E+00 1.055831E+00 1.600000E-01 Sorbent - MgO                   Mass %
84    .8000 7.181E-02 6.324653E-02 3.400000E-02 Sorbent - SO3                   Mass %
85   1.2333 1.586E-01 5.164160E-02 1.500000E-01 Sorbent - Ash                   Mass %
86    .0000  .000E+00  .000000E+00  .000000E+00 Unused
87   4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88   2.0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89    .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR4-3

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,      'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     5.5,   2.0,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR4 - TEST POINT 3  <<CASE C>>  03/12/92  Pittsburgh Coal + Dolomite
SET POINT DATE:     3/12/92
SET POINT TIME:     02:30:00 - 06:30:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	125.1550	3.415E+00	3.332000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	122.7880	3.344E+00	3.259000E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	216.1200	3.174E+00	3.084000E+00	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	625.5040	1.573E+01	1.286400E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.9380	1.189E+00	1.186000E+00	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	11.4580	1.785E+00	1.478000E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	37.0700	1.334E+00	1.273000E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	10.2400	2.643E+00	2.631000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	5.1080	2.116E-01	1.190000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.6800	1.366E-01	1.320000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.2520	5.200E-02	4.800000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	600.6810	1.611E+01	5.880000E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	599.5080	1.299E+01	2.076000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	95.9780	1.507E+00	1.490000E-01	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	207.0000	5.1991	5.175	.5	Coal Feed rate	lb/hr	
16	86.0000	2.2074	2.15	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	81.1860	2.062E+00	5.010000E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	279.7880	3.950E+01	3.945400E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	162.9950	1.084E+01	1.065600E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	188.0900	6.569E+00	6.257000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1590.9000	7.366E+00	4.321000E+00	5.965875E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1310.5940	5.732E+00	2.950000E+00	4.914727E+00	Orifice Temp (Upstream)	F	TI-3108
38	93.0860	6.104E+00	5.767000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	332.0790	8.543E+01	8.540900E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	276.6610	2.665E+00	1.762000E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	209.9740	2.001E+00	7.100000E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	393.8930	2.322E+00	1.180000E+00	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	65.3600	3.306E+00	3.268000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	77.2900	3.897E+00	3.864500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	6.5100	5.966E-01	3.255000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	4.6900	5.523E-01	2.345000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless. G SI	

INPUT DATA FILE FOR TR4-3

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	71.5414	1.204E+00	1.194450E+00	1.500000E-01	Coal - C	Mass %
2	4.6757	1.306E-01	1.258112E-01	3.500000E-02	Coal - H	Mass %
3	1.9014	9.733E-02	9.406120E-02	2.500000E-02	Coal - N	Mass %
4	3.3557	.16779	.16779		Coal - S	Mass %
5	11.1786	1.638E+00	1.635290E+00	1.000000E-01	Coal - Ash	Mass %
6	2.0829	4.408E-01	4.144761E-01	1.500000E-01	Coal - H2O	Mass %
7	12775.5700	2.231E+02	2.217231E+02	2.500000E+01	Coal - HHV	BTU/lb
8	18.5967	7.944E-01	7.800955E-01	1.500000E-01	CD Drain - C	Mass %
9	.2867	4.067E-02	2.070445E-02	3.500000E-02	CD Drain - H	Mass %
10	.4567	4.080E-02	3.224277E-02	2.500000E-02	CD Drain - N	Mass %
11	6.4300	3.215	3.215		CD Drain - S	Mass %
12	91.0967	7.739E+00	7.735348E+00	2.500000E-01	CD Drain - Ash	Mass %
13	2997.0000	1.425E+02	1.402491E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	5.5233	5.5233	5.5233		CD Drain - sfide S	Mass %
16	1.6000	2.492E-01	1.989455E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	7.3300	3.665	3.665		CD Drain - Ash S	Mass %
18	28.7333				CD Drain - Ash CaO	Mass %
19	22.1667				CD Drain - Ash MgO	Mass %
20	68.7467	1.303E+00	1.293868E+00	1.500000E-01	PD Drain - C	Mass %
21	.4467	3.603E-02	8.533252E-03	3.500000E-02	PD Drain - H	Mass %
22	1.8067	1.104E-01	1.075666E-01	2.500000E-02	PD Drain - N	Mass %
23	1.6467	.82335	.82335		PD Drain - S	Mass %
24	31.6433	8.127E-01	7.732946E-01	2.500000E-01	PD Drain - Ash	Mass %
25	10310.0000	1.648E+02	1.629152E+02	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	.8100	.81	.81		PD Drain - sfide S	Mass %
28	.9167	1.802E-01	9.988443E-02	1.500000E-01	PD Drain - crbate C	Mass %
29	6.2000	3.1	3.1		PD Drain - Ash S	Mass %
30	31.8667				PD Drain - Ash CaO	Mass %
31	24.5333				PD Drain - Ash MgO	Mass %
32	56.5100	1.084E+00	1.073690E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.3600	4.171E-02	2.268000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.2300	7.328E-02	6.888000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	1.8200	.91	.91		CF/SD Drain - S	Mass %
36	43.3100	2.266E+00	2.252120E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	8542.0000	1.727E+02	1.708400E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	1.1500	1.15	1.15		CF/SD Drain - sfide S	Mass %
40	1.0200	3.226E-01	2.856000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	4.6400	2.32	2.32		CF/SD Drain - Ash S	Mass %
42	29.9000				CF/SD Drain - Ash CaO	Mass %
43	19.6000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	64.4100	1.233E+00	1.223790E+00	1.500000E-01	BD Drain - C	Mass %
46	.5900	5.105E-02	3.717000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.7900	1.033E-01	1.002400E-01	2.500000E-02	BD Drain - N	Mass %
48	1.4800	.74	.74		BD Drain - S	Mass %
49	30.5700	1.609E+00	1.589640E+00	2.500000E-01	BD Drain - Ash	Mass %
50	9763.0000	1.969E+02	1.952600E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.4100	.41	.41		BD Drain - sfide S	Mass %
53	.7600	2.604E-01	2.128000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	4.3400	2.17	2.17		BD Drain - Ash S	Mass %
55	28.5000				BD Drain - Ash CaO	Mass %
56	21.8000				BD Drain - Ash MgO	Mass %
57	74.2750	8.931E-01	4.943970E-01	7.437500E-01	Demister Gas - N2	mol,vol %
58	.9550	4.518E-01	4.516567E-01	1.055000E-02	Demister Gas - O2	mol,vol %
59	6.5550	1.383E-01	1.212001E-01	6.654999E-02	Demister Gas - CO	mol,vol %
60	.8725	6.510E-02	6.436883E-02	9.725000E-03	Demister Gas - CH4	mol,vol %
61	5.9550	2.425E-01	2.249382E-01	9.055000E-02	Demister Gas - CO2	mol,vol %
62	.0025	2.735E-03	2.535525E-03	1.025000E-03	Demister Gas - C2H4	mol,vol %
63	.0000	.000E+00	.000000E+00	1.000000E-03	Demister Gas - C2H6	mol,vol %
64	.0160	3.079E-03	3.075240E-03	1.597500E-04	Demister Gas - H2S	mol,vol %
65	5.1700	2.887E-01	2.817772E-01	6.270000E-02	Demister Gas - H2	mol,vol %
66	.1070	1.523E-02	1.426310E-02	5.351250E-03	Demister Gas - NH3	mol,vol %
67	.4875	1.424E-02	1.296909E-02	5.875000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR4-3

```
69                                                  Freeboard Gas - O2              mol,vol %
70                                                  Freeboard Gas - CO              mol,vol %
71                                                  Freeboard Gas - CH4             mol,vol %
72                                                  Freeboard Gas - CO2             mol,vol %
73                                                  Freeboard Gas - C2H4            mol,vol %
74     .0000  .000E+00  .000000E+00                 Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - H2S             mol,vol %
76                                                  Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - NH3             mol,vol %
78                                                  Freeboard Gas - Ar              mol,vol %
79   22.7000 1.5                     1.500000E+00   Water Content in Freeboard Gas  mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00    Demister Gas - SO2              mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - SO2             mol,vol %
82   57.6000 1.345E+00 1.340281E+00 1.100000E-01   Sorbent - CaO                   Mass %
83   41.4667 1.068E+00 1.055831E+00 1.600000E-01   Sorbent - MgO                   Mass %
84     .8000 7.181E-02 6.324653E-02 3.400000E-02   Sorbent - SO3                   Mass %
85    1.2333 1.586E-01 5.164160E-02 1.500000E-01   Sorbent - Ash                   Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00    Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00    Demister gas # of Analyses,  dimensionless
88    2.0000  .000E+00  .000000E+00  .000000E+00    Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00    Unused
```

INPUT DATA FILE FOR TR4-4

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,      'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     3.5,    1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR4 - TEST POINT 4  <<CASE C>>  03/12/92  Pittsburgh Coal + Dolomite
SET POINT DATE:     3/12/92
SET POINT TIME:     16:00:00 - 20:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	129.0950	2.207E+00	2.076000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	126.5540	2.182E+00	2.049000E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	217.7650	4.039E+00	3.969000E+00	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	564.6640	1.311E+01	9.486000E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.6660	2.256E-01	2.090000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	36.1180	3.329E+00	3.175000E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	37.3560	1.159E+00	1.088000E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	13.4960	2.290E+00	2.276000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	5.2500	1.912E-01	7.700000E-02	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.5620	1.069E-01	1.010000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.1710	4.031E-02	3.500000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	601.3980	1.647E+01	6.813000E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	600.2860	1.307E+01	2.548000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	77.4080	1.815E+00	1.021000E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	253.0000	6.3447	6.325	.5	Coal Feed rate	lb/hr	
16	95.0000	2.4271	2.375	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	77.4460	3.123E+00	2.399000E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	136.8210	3.724E+01	3.718300E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	154.5650	1.453E+01	1.439300E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	182.4510	1.086E+01	1.067200E+01	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1523.8330	9.617E+00	7.735000E+00	5.714374E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1268.4800	7.099E+00	5.269000E+00	4.756800E+00	Orifice Temp (Upstream)	F	TI-3108
38	101.7590	4.571E+00	4.110000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	287.2130	1.412E+01	1.397300E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	275.4860	2.816E+00	1.983000E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	210.0980	2.002E+00	8.000000E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	394.5890	2.518E+00	1.529000E+00	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	85.5700	4.308E+00	4.278500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	49.7800	2.539E+00	2.489000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	5.3500	5.671E-01	2.675000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	16.5000	9.647E-01	8.250000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless. G SI	

INPUT DATA FILE FOR TR4-4

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	71.5414	1.204E+00	1.194450E+00	1.500000E-01	Coal - C	Mass %
2	4.6757	1.306E-01	1.258112E-01	3.500000E-02	Coal - H	Mass %
3	1.9014	9.733E-02	9.406120E-02	2.500000E-02	Coal - N	Mass %
4	3.3557	.16779	.16779		Coal - S	Mass %
5	11.1786	1.638E+00	1.635290E+00	1.000000E-01	Coal - Ash	Mass %
6	2.0829	4.408E-01	4.144761E-01	1.500000E-01	Coal - H2O	Mass %
7	12775.5700	2.231E+02	2.217231E+02	2.500000E+01	Coal - HHV	BTU/lb
8	39.2000	1.781E-01	9.597490E-02	1.500000E-01	CD Drain - C	Mass %
9	.2350	3.809E-02	1.503005E-02	3.500000E-02	CD Drain - H	Mass %
10	1.0000	2.505E-02	1.532943E-03	2.500000E-02	CD Drain - N	Mass %
11	3.6400	1.82	1.82		CD Drain - S	Mass %
12	59.1700	3.085E+00	3.074396E+00	2.500000E-01	CD Drain - Ash	Mass %
13	5510.0000	4.125E+01	3.281590E+01	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	2.4050	2.405	2.405		CD Drain - sfide S	Mass %
16	2.6600	1.500E-01	2.235532E-03	1.500000E-01	CD Drain - crbate C	Mass %
17	6.5300	3.265	3.265		CD Drain - Ash S	Mass %
18	19.6500				CD Drain - Ash CaO	Mass %
19	48.2000				CD Drain - Ash MgO	Mass %
20	69.0350	2.395E-01	1.867448E-01	1.500000E-01	PD Drain - C	Mass %
21	.6000	3.502E-02	1.139234E-03	3.500000E-02	PD Drain - H	Mass %
22	1.8050	5.790E-02	5.222972E-02	2.500000E-02	PD Drain - N	Mass %
23	2.6250	1.3125	1.3125		PD Drain - S	Mass %
24	33.6050	9.540E-01	9.206231E-01	2.500000E-01	PD Drain - Ash	Mass %
25	10392.5000	6.700E+01	6.216258E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	1.4050	1.405	1.405		PD Drain - sfide S	Mass %
28	1.3900	2.151E-01	1.541422E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	8.5700	4.285	4.285		PD Drain - Ash S	Mass %
30	20.9000				PD Drain - Ash CaO	Mass %
31	17.0500				PD Drain - Ash MgO	Mass %
32	64.8000	1.240E+00	1.231200E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.4800	4.625E-02	3.024000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.3500	7.963E-02	7.560000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	2.4500	1.225	1.225		CF/SD Drain - S	Mass %
36	38.7800	2.032E+00	2.016560E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9703.0000	1.957E+02	1.940600E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	1.5400	1.54	1.54		CF/SD Drain - sfide S	Mass %
40	.8300	2.766E-01	2.324000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	4.7300	2.365	2.365		CF/SD Drain - Ash S	Mass %
42	26.9000				CF/SD Drain - Ash CaO	Mass %
43	21.3000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	72.7500	1.390E+00	1.382250E+00	1.500000E-01	BD Drain - C	Mass %
46	.6800	5.532E-02	4.284000E-02	3.500000E-02	BD Drain - H	Mass %
47	2.1300	1.219E-01	1.192800E-01	2.500000E-02	BD Drain - N	Mass %
48	1.9600	.98	.98		BD Drain - S	Mass %
49	25.0900	1.328E+00	1.304680E+00	2.500000E-01	BD Drain - Ash	Mass %
50	11113.0000	2.237E+02	2.222600E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.7200	.72	.72		BD Drain - sfide S	Mass %
53	.8400	2.790E-01	2.352000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	5.3000	2.65	2.65		BD Drain - Ash S	Mass %
55	18.6000				BD Drain - Ash CaO	Mass %
56	13.2000				BD Drain - Ash MgO	Mass %
57	77.0000	8.711E-01	4.054975E-01	7.710000E-01	Demister Gas - N2	mol,vol %
58	0.8100	1.444E-01	1.441093E-01	9.099999E-03	Demister Gas - O2	mol,vol %
59	4.6867	1.038E-01	9.214148E-02	4.786666E-02	Demister Gas - CO	mol,vol %
60	1.5867	7.522E-02	7.330734E-02	1.686667E-02	Demister Gas - CH4	mol,vol %
61	8.6867	1.707E-01	1.463020E-01	8.786666E-02	Demister Gas - CO2	mol,vol %
62	.0567	6.423E-03	6.228645E-03	1.566667E-03	Demister Gas - C2H4	mol,vol %
63	.0233	2.154E-03	1.765612E-03	1.233333E-03	Demister Gas - C2H6	mol,vol %
64	.0363	7.961E-03	7.952931E-03	3.630000E-04	Demister Gas - H2S	mol,vol %
65	5.6233	1.851E-01	1.759943E-01	5.723333E-02	Demister Gas - H2	mol,vol %
66	.1968	2.566E-02	2.370088E-02	9.841667E-03	Demister Gas - NH3	mol,vol %
67	.4233	8.636E-03	6.869585E-03	5.233333E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR4-4

```
69                                                Freeboard Gas - O2              mol,vol %
70                                                Freeboard Gas - CO              mol,vol %
71                                                Freeboard Gas - CH4             mol,vol %
72                                                Freeboard Gas - CO2             mol,vol %
73                                                Freeboard Gas - C2H4            mol,vol %
74                                                Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S             mol,vol %
76                                                Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3             mol,vol %
78                                                Freeboard Gas - Ar              mol,vol %
79   20.4000 1.5                    1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2              mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2             mol,vol %
82   57.6000 1.345E+00 1.340281E+00 1.100000E-01 Sorbent - CaO                   Mass %
83   41.4667 1.068E+00 1.055831E+00 1.600000E-01 Sorbent - MgO                   Mass %
84     .8000 7.181E-02 6.324653E-02 3.400000E-02 Sorbent - SO3                   Mass %
85    1.2333 1.586E-01 5.164160E-02 1.500000E-01 Sorbent - Ash                   Mass %
86     .0000  .000E+00  .000000E+00  .000000E-00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88    2.0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR4-5

DEFAULT CONTROL PARAMETERS,

IPRINT	LEVEL	MAXCYC	ITIME	DEVICE
1,	3,	40,	0,	'A'

EPSMAX	CUTOF1	CUTOF2	ERRMIN	TOLERN	QALITY	EXPT	SENSTV	CORRCO	MAXPNT
.2,	3.0,	1.8,	1.,	.25,	1.,	.5,	.04,	.99,	20/

TR4 - TEST POINT 5 <<CASE C>> 03/13/92 Pittsburgh Coal + Dolomite '
SET POINT DATE: 3/13/92
SET POINT TIME: 05:30:00 - 09:30:00

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	193.1880	2.256E+00	2.128000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	189.2920	2.198E+00	2.066000E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	216.3890	3.558E+00	3.478000E+00	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	899.8740	9.283E+00	2.090000E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.4670	1.874E-01	1.670000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	21.0830	2.294E+00	2.065000E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	33.7680	1.111E+00	1.037000E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	11.4730	1.854E+00	1.837000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	3.9700	4.403E-01	4.040000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	5.4530	6.090E-01	6.080000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.2240	3.536E-01	3.530000E-01	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	601.9680	1.702E+01	8.051000E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	599.9150	1.293E+01	1.668000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	140.8100	9.445E+00	9.325000E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	370.0000	9.2635	9.25	.5	Coal Feed rate	lb/hr	
16	106.0000	2.6968	2.65	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	78.1000	2.017E+00	2.590000E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	140.5200	1.575E+01	1.561800E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	161.0430	1.400E+01	1.385900E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	190.4270	8.308E+00	8.064000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1637.7300	6.731E+00	2.754000E+00	6.141487E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1428.8820	5.658E+00	1.816000E+00	5.358307E+00	Orifice Temp (Upstream)	F	TI-3108
38	99.4210	6.645E+00	6.337000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	468.5600	1.383E+02	1.383130E+02	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	275.5980	2.709E+00	1.827000E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	210.3700	2.000E+00	4.100000E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	394.1380	2.401E+00	1.329000E+00	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	97.2000	4.886E+00	4.860000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	84.5500	4.257E+00	4.227500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	3.2200	5.253E-01	1.610000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	23.1400	1.260E+00	1.157000E+00	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless. G SI	

INPUT DATA FILE FOR TR4-5

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	71.5414	1.204E+00	1.194450E+00	1.500000E-01	Coal - C	Mass %
2	4.6757	1.306E-01	1.258112E-01	3.500000E-02	Coal - H	Mass %
3	1.9014	9.733E-02	9.406120E-02	2.500000E-02	Coal - N	Mass %
4	3.3557	.16779	.16779		Coal - S	Mass %
5	11.1786	1.638E+00	1.635290E+00	1.000000E-01	Coal - Ash	Mass %
6	2.0829	4.408E-01	4.144761E-01	1.500000E-01	Coal - H2O	Mass %
7	12775.5700	2.231E+02	2.217231E+02	2.500000E+01	Coal - HHV	BTU/lb
8	20.9350	1.878E-01	1.129726E-01	1.500000E-01	CD Drain - C	Mass %
9	.1850	3.830E-02	1.556135E-02	3.500000E-02	CD Drain - H	Mass %
10	.5600	3.756E-02	2.802587E-02	2.500000E-02	CD Drain - N	Mass %
11	8.5500	4.275	4.275		CD Drain - S	Mass %
12	94.7000	7.100E+00	7.096021E+00	2.500000E-01	CD Drain - Ash	Mass %
13	3543.0000	5.698E+01	5.120115E+01	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	8.0500	8.05	8.05		CD Drain - sfide S	Mass %
16	2.2550	1.628E-01	6.331722E-02	1.500000E-01	CD Drain - crbate C	Mass %
17	10.8500	2.553E+00	1.168898E+00	2.270000E+00	CD Drain - Ash S	Mass %
18	40.8500				CD Drain - Ash CaO	Mass %
19	30.3500				CD Drain - Ash MgO	Mass %
20	68.2533	5.478E-01	5.268988E-01	1.500000E-01	PD Drain - C	Mass %
21	.4433	3.628E-02	9.537730E-03	3.500000E-02	PD Drain - H	Mass %
22	1.8400	1.513E-01	1.491861E-01	2.500000E-02	PD Drain - N	Mass %
23	2.3600	1.18	1.18		PD Drain - S	Mass %
24	32.5167	6.807E-01	6.331378E-01	2.500000E-01	PD Drain - Ash	Mass %
25	10409.0000	6.995E+01	6.532948E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	1.2700	1.27	1.27		PD Drain - sfide S	Mass %
28	.7300	1.702E-01	8.036122E-02	1.500000E-01	PD Drain - crbate C	Mass %
29	5.6900	2.845	2.845		PD Drain - Ash S	Mass %
30	16.4333				PD Drain - Ash CaO	Mass %
31	13.8667				PD Drain - Ash MgO	Mass %
32	64.9100	1.242E+00	1.233290E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.4400	4.465E-02	2.772000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.5600	9.087E-02	8.735999E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	1.2100	.605	.605		CF/SD Drain - S	Mass %
36	36.1900	1.898E+00	1.881880E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9395.0000	1.896E+02	1.879000E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	.5500	.55	.55		CF/SD Drain - sfide S	Mass %
40	.5000	2.052E-01	1.400000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	2.4900	1.245	1.245		CF/SD Drain - Ash S	Mass %
42	11.6000				CF/SD Drain - Ash CaO	Mass %
43	9.9000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	73.7300	1.409E+00	1.400870E+00	1.500000E-01	BD Drain - C	Mass %
46	.5600	4.970E-02	3.528000E-02	3.500000E-02	BD Drain - H	Mass %
47	2.0600	1.180E-01	1.153600E-01	2.500000E-02	BD Drain - N	Mass %
48	2.1400	1.07	1.07		BD Drain - S	Mass %
49	24.6700	1.307E+00	1.282840E+00	2.500000E-01	BD Drain - Ash	Mass %
50	11158.0000	2.246E+02	2.231600E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.8900	.89	.89		BD Drain - sfide S	Mass %
53	.7700	2.626E-01	2.156000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	3.6500	1.825	1.825		BD Drain - Ash S	Mass %
55	13.8000				BD Drain - Ash CaO	Mass %
56	9.7000				BD Drain - Ash MgO	Mass %
57	69.3500	9.181E-01	6.005036E-01	6.945000E-01	Demister Gas - N2	mol,vol %
58	1.5875	4.045E-01	4.041424E-01	1.687500E-02	Demister Gas - O2	mol,vol %
59	8.1925	3.242E-01	3.134328E-01	8.292500E-02	Demister Gas - CO	mol,vol %
60	1.4050	7.113E-02	6.951609E-02	1.505000E-02	Demister Gas - CH4	mol,vol %
61	10.0325	2.977E-01	2.799354E-01	1.013250E-01	Demister Gas - CO2	mol,vol %
62	.0000	.000E+00	.000000E+00	1.000000E-03	Demister Gas - C2H4	mol,vol %
63	.0125	1.285E-02	1.279900E-02	1.125000E-03	Demister Gas - C2H6	mol,vol %
64	.0063	9.997E-04	9.976875E-04	6.325000E-05	Demister Gas - H2S	mol,vol %
65	7.7900	5.244E-01	5.184225E-01	7.889999E-02	Demister Gas - H2	mol,vol %
66	.1617	3.373E-02	3.274469E-02	8.086250E-03	Demister Gas - NH3	mol,vol %
67	.5275	1.268E-02	1.102387E-02	6.275000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR4-5

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69                                                  Freeboard Gas - O2              mol,vol %
70                                                  Freeboard Gas - CO              mol,vol %
71                                                  Freeboard Gas - CH4             mol,vol %
72                                                  Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00 1.000000E-03    Freeboard Gas - C2H4            mol,vol %
74                                                  Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - H2S             mol,vol %
76                                                  Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - NH3             mol,vol %
78                                                  Freeboard Gas - Ar              mol,vol %
79   18.1500 1.5                     1.500000E+00   Water Content in Freeboard Gas  mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00    Demister Gas - SO2              mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - SO2             mol,vol %
82   57.6000 1.345E+00 1.340281E+00 1.100000E-01    Sorbent - CaO                   Mass %
83   41.4667 1.068E+00 1.055831E+00 1.600000E-01    Sorbent - MgO                   Mass %
84     .8000 7.181E-02 6.324653E-02 3.400000E-02    Sorbent - SO3                   Mass %
85    1.2333 1.586E-01 5.164160E-02 1.500000E-01    Sorbent - Ash                   Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00    Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00    Demister gas # of Analyses,  dimensionless
88    2.0000  .000E+00  .000000E+00  .000000E+00    Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00    Unused
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INPUT DATA FILE FOR TR4-6

DEFAULT CONTROL PARAMETERS,

IPRINT	LEVEL	MAXCYC	ITIME	DEVICE
1,	3,	40,	0,	'A'

EPSMAX	CUTOF1	CUTOF2	ERRMIN	TOLERN	QALITY	EXPT	SENSTV	CORRCO	MAXPNT
.2,	3.5,	1.8,	1.,	.25,	1.,	.5,	.04,	.99,	20/

TR4 - TEST POINT 6 <<CASE C>> 03/13/92 Pittsburgh Coal + Dolomite
SET POINT DATE: 3/13/92
SET POINT TIME: 13:00:00 - 17:00:00

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	175.7790	2.986E+00	2.890000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	172.2310	2.953E+00	2.856000E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	218.0220	4.005E+00	3.934000E+00	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	820.1070	9.196E+00	1.658000E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.7030	2.584E-01	2.440000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	21.3370	3.406E+00	3.256000E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	33.5180	1.049E+00	9.700000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	8.5420	1.155E+00	1.128000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	5.3370	2.338E-01	1.550000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.5990	1.356E-01	1.310000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.4220	1.020E-01	1.000000E-01	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	599.1990	1.897E+01	1.162100E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	599.9060	1.300E+01	2.137000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	84.8250	1.809E+00	1.012000E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	396.0000	9.9126	9.9	.5	Coal Feed rate	lb/hr	
16	106.0000	2.6968	2.65	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	81.5910	2.454E+00	1.422000E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	290.9640	8.116E+01	8.113400E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	155.5790	9.699E+00	9.491000E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	182.3380	9.505E+00	9.292000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1601.7110	8.980E+00	6.676000E+00	6.006416E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1408.5060	9.114E+00	7.428000E+00	5.281898E+00	Orifice Temp (Upstream)	F	TI-3108
38	102.5380	5.292E+00	4.899000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	540.1920	1.598E+02	1.597860E+02	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	275.8430	2.882E+00	2.075000E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	210.2600	2.000E+00	3.200000E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	394.7140	2.490E+00	1.483000E+00	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	112.3600	5.640E+00	5.618000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	71.2300	3.596E+00	3.561500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	4.2500	5.433E-01	2.125000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	18.8900	1.069E+00	9.445000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless. G SI	

INPUT DATA FILE FOR TR4-6

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	71.5414	1.204E+00	1.194450E+00	1.500000E-01	Coal - C	Mass %
2	4.6757	1.306E-01	1.258112E-01	3.500000E-02	Coal - H	Mass %
3	1.9014	9.733E-02	9.406120E-02	2.500000E-02	Coal - N	Mass %
4	3.3557	.16779	.16779		- S	Mass %
5	11.1786	1.638E+00	1.635290E+00	1.000000E-01	Coal - Ash	Mass %
6	2.0829	4.408E-01	4.144761E-01	1.500000E-01	Coal - H2O	Mass %
712775	.5700	2.231E+02	2.217231E+02	2.500000E+01	Coal - HHV	BTU/lb
8	29.4350	7.503E-01	7.351705E-01	1.500000E-01	CD Drain - C	Mass %
9	.1850	3.530E-02	4.606881E-03	3.500000E-02	CD Drain - H	Mass %
10	.5950	3.633E-02	2.636406E-02	2.500000E-02	CD Drain - N	Mass %
11	7.1850	3.5925	3.5925		CD Drain - S	Mass %
12	84.8850	4.149E+00	4.141348E+00	2.500000E-01	CD Drain - Ash	Mass %
13	4714.5000	1.419E+02	1.397012E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	6.6100	6.61	6.61		CD Drain - sfide S	Mass %
16	1.7200	1.875E-01	1.124387E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	10.3000	5.15	5.15		CD Drain - Ash S	Mass %
18	42.8000				CD Drain - Ash CaO	Mass %
19	31.5000				CD Drain - Ash MgO	Mass %
20	64.1933	2.873E+00	2.869103E+00	1.500000E-01	PD Drain - C	Mass %
21	.4167	3.599E-02	8.368596E-03	3.500000E-02	PD Drain - H	Mass %
22	1.8433	6.835E-02	6.361184E-02	2.500000E-02	PD Drain - N	Mass %
23	2.8900	1.445	1.445		PD Drain - S	Mass %
24	32.6667	1.354E+00	1.330510E+00	2.500000E-01	PD Drain - Ash	Mass %
2510456	.0000	1.694E+02	1.675069E+02	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	1.6167	1.6167	1.6167		PD Drain - sfide S	Mass %
28	.7833	1.819E-01	1.029051E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	6.5033	3.25165	3.25165		PD Drain - Ash S	Mass %
30	17.4333				PD Drain - Ash CaO	Mass %
31	12.3000				Drain - Ash MgO	Mass %
32	64.4900	1.234E+00	1.225310E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.3700	4.205E-02	2.331000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.8300	1.055E-01	1.024800E-01	2.500000E-02	CF/SD Drain - N	Mass %
35	1.4800	.74	.74		CF/SD Drain - S	Mass %
36	36.5700	1.918E+00	1.901640E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9416.0000	1.900E+02	1.883200E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	.7200	.72	.72		CF/SD Drain - sfide S	Mass %
40	.3800	1.839E-01	1.064000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	2.9100	1.455	1.455		CF/SD Drain - Ash S	Mass %
42	26.1000				CF/SD Drain - Ash CaO	Mass %
43	18.1000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	70.7500	1.353E+00	1.344250E+00	1.500000E-01	BD Drain - C	Mass %
46	.5600	4.970E-02	3.528000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.8500	1.066E-01	1.036000E-01	2.500000E-02	BD Drain - N	Mass %
48	2.0600	1.03	1.03		BD Drain - S	Mass %
49	27.4200	1.448E+00	1.425840E+00	2.500000E-01	BD Drain - Ash	Mass %
5010814	.0000	2.177E+02	2.162800E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	1.0800	1.08	1.08		BD Drain - sfide S	Mass %
53	.4400	1.941E-01	1.232000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	4.7200	2.36	2.36		BD Drain - Ash S	Mass %
55	23.9000				BD Drain - Ash CaO	Mass %
56	15.2000				BD Drain - Ash MgO	Mass %
57	70.9000	1.166E+00	9.246498E-01	7.100000E-01	Demister Gas - N2	mol,vol %
58	.8710	5.240E-01	5.239131E-01	9.710000E-03	Demister Gas - O2	mol,vol %
59	8.2375	3.061E-01	2.945374E-01	8.337499E-02	Demister Gas - CO	mol,vol %
60	1.9675	4.430E-02	3.917849E-02	2.067500E-02	Demister Gas - CH4	mol,vol %
61	9.7050	3.869E-01	3.742312E-01	9.805000E-02	Demister Gas - CO2	mol,vol %
62	.0025	2.735E-03	2.535525E-03	1.025000E-03	Demister Gas - C2H4	mol,vol %
63	.0000	.000E+00	.000000E+00	1.000000E-03	Demister Gas - C2H6	mol,vol %
64	.0085	3.468E-03	3.466554E-03	8.500000E-05	Demister Gas - H2S	mol,vol %
65	5.9825	4.265E-01	4.205588E-01	7.082500E-02	Demister Gas - H2	mol,vol %
66	.1081	1.548E-02	1.451071E-02	5.402500E-03	Demister Gas - NH3	mol,vol %
67	.5200	1.983E-02	1.883807E-02	6.200000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR4-6

```
69                                                  Freeboard Gas - O2              mol,vol %
70                                                  Freeboard Gas - CO              mol,vol %
71                                                  Freeboard Gas - CH4             mol,vol %
72                                                  Freeboard Gas - CO2             mol,vol %
73                                                  Freeboard Gas - C2H4            mol,vol %
74                                                  Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S               mol,vol %
76                                                  Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3               mol,vol %
78                                                  Freeboard Gas - Ar              mol,vol %
79   16.6000 1.5                     1.500000E+00 Water Content in Freeboard Gas  mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2               mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2              mol,vol %
82   57.6000 1.345E+00 1.340281E+00 1.100000E-01 Sorbent - CaO                    Mass %
83   41.4667 1.068E+00 1.055831E+00 1.600000E-01 Sorbent - MgO                    Mass %
84     .8000 7.181E-02 6.324653E-02 3.400000E-02 Sorbent - SO3                    Mass %
85    1.2333 1.586E-01 5.164160E-02 1.500000E-01 Sorbent - Ash                    Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88    2.0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR4-7

DEFAULT CONTROL PARAMETERS,

```
  IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
    1,      3,     40,      0,      'A'

  EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
   .2,     3.0,    1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR4 - TEST POINT 7  <<CASE C>>  03/13/92  Pittsburgh Coal + Dolomite
SET POINT DATE:     3/13/92
SET POINT TIME:     22:00:00 - 02:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	177.9370	1.327E+00	1.095000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	174.7230	1.333E+00	1.102000E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	217.6890	2.483E+00	2.367000E+00	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	772.6620	1.088E+01	6.047000E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.6360	2.266E-01	2.100000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	45.9170	4.650E+00	4.541000E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	33.4530	1.558E+00	1.506000E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	15.1820	1.709E+00	1.691000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	5.1350	1.908E-01	7.600000E-02	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.4660	1.269E-01	1.220000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.3260	7.184E-02	6.900000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	600.9680	2.472E+01	1.964400E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	599.9880	1.505E+01	7.880000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	50.7850	3.996E+00	3.704000E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	450.0000	11.2611	11.25	.5	Coal Feed rate	lb/hr	
16	182.0000	4.5773	4.55	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	82.2560	2.162E+00	8.210000E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	386.7970	6.986E+01	6.983600E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	151.6620	1.335E+01	1.319500E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	176.1310	7.498E+00	7.226000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1547.0720	1.949E+01	1.860800E+01	5.801520E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1347.0200	8.826E+00	7.237000E+00	5.051325E+00	Orifice Temp (Upstream)	F	TI-3108
38	115.5020	8.113E+00	7.863000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	353.3190	7.624E+01	7.621200E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	274.8430	4.606E+00	4.149000E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	215.3780	1.074E+01	1.055000E+01	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	394.5600	2.194E+00	9.020000E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	195.8600	9.806E+00	9.793000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	64.5800	3.267E+00	3.229000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	25.5700	1.373E+00	1.278500E+00	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	16.8500	9.797E-01	8.425000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless. G SI	

INPUT DATA FILE FOR TR4-7

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	71.5414	1.204E+00	1.194450E+00	1.500000E-01	Coal - C	Mass %
2	4.6757	1.306E-01	1.258112E-01	3.500000E-02	Coal - H	Mass %
3	1.9014	9.733E-02	9.406120E-02	2.500000E-02	Coal - N	Mass %
4	3.3557	.16779	.16779		Coal - S	Mass %
5	11.1786	1.638E+00	1.635290E+00	1.000000E-01	Coal - Ash	Mass %
6	2.0829	4.408E-01	4.144761E-01	1.500000E-01	Coal - H2O	Mass %
7	12775.5700	2.231E+02	2.217231E+02	2.500000E+01	Coal - HHV	BTU/lb
8	47.2950	6.761E+00	6.759830E+00	1.500000E-01	CD Drain - C	Mass %
9	.3000	6.661E-02	5.667182E-02	3.500000E-02	CD Drain - H	Mass %
10	1.1900	1.892E-01	1.875201E-01	2.500000E-02	CD Drain - N	Mass %
11	3.8475	1.92375	1.92375		CD Drain - S	Mass %
12	52.3125	5.286E+00	5.279722E+00	2.500000E-01	CD Drain - Ash	Mass %
13	7017.0000	1.169E+03	1.169000E+03	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	1.9275	1.9275	1.9275		CD Drain - sfide S	Mass %
16	2.3750	5.396E-01	5.182838E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	7.7125	3.85625	3.85625		CD Drain - Ash S	Mass %
18	24.6500				CD Drain - Ash CaO	Mass %
19	18.2750				CD Drain - Ash MgO	Mass %
20	57.6250	1.641E+00	1.633952E+00	1.500000E-01	PD Drain - C	Mass %
21	.4600	3.551E-02	5.985503E-03	3.500000E-02	PD Drain - H	Mass %
22	1.6450	3.102E-02	1.836949E-02	2.500000E-02	PD Drain - N	Mass %
23	4.6150	2.3075	2.3075		PD Drain - S	Mass %
24	44.6700	1.580E+00	1.560037E+00	2.500000E-01	PD Drain - Ash	Mass %
25	8892.5000	3.012E+02	3.002029E+02	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	2.3400	2.34	2.34		PD Drain - sfide S	Mass %
28	1.9600	1.897E-01	1.160821E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	9.9600	4.98	4.98		PD Drain - Ash S	Mass %
30	33.9000				PD Drain - Ash CaO	Mass %
31	23.9500				PD Drain - Ash MgO	Mass %
32	69.4100	1.327E+00	1.318790E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.6000	5.152E-02	3.780000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	2.4300	1.384E-01	1.360800E-01	2.500000E-02	CF/SD Drain - N	Mass %
35	2.9800	1.49	1.49		CF/SD Drain - S	Mass %
36	30.4000	1.600E+00	1.580800E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	10581.0000	2.131E+02	2.116200E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	1.5100	1.51	1.51		CF/SD Drain - sfide S	Mass %
40	1.6800	4.937E-01	4.704000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	8.9100	4.455	4.455		CF/SD Drain - Ash S	Mass %
42	28.7000				CF/SD Drain - Ash CaO	Mass %
43	19.6000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	73.3400	1.402E+00	1.393460E+00	1.500000E-01	BD Drain - C	Mass %
46	.6400	5.339E-02	4.032000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.8100	1.044E-01	1.013600E-01	2.500000E-02	BD Drain - N	Mass %
48	2.3200	1.16	1.16		BD Drain - S	Mass %
49	25.0900	1.328E+00	1.304680E+00	2.500000E-01	BD Drain - Ash	Mass %
50	11109.0000	2.236E+02	2.221800E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	1.0600	1.06	1.06		BD Drain - sfide S	Mass %
53	.6400	2.337E-01	1.792000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	4.5800	2.29	2.29		BD Drain - Ash S	Mass %
55	16.7000				BD Drain - Ash CaO	Mass %
56	12.2000				BD Drain - Ash MgO	Mass %
57	74.7000	8.333E-01	3.671624E-01	7.480000E-01	Demister Gas - N2	mol,vol %
58	.4900	8.217E-02	8.196031E-02	5.900000E-03	Demister Gas - O2	mol,vol %
59	6.1467	9.538E-02	7.208089E-02	6.246666E-02	Demister Gas - CO	mol,vol %
60	2.1733	8.767E-02	8.467234E-02	2.273333E-02	Demister Gas - CH4	mol,vol %
61	9.0067	2.136E-01	1.932023E-01	9.106667E-02	Demister Gas - CO2	mol,vol %
62	.0500	7.556E-03	7.405138E-03	1.500000E-03	Demister Gas - C2H4	mol,vol %
63	.0333	7.284E-03	7.160747E-03	1.333333E-03	Demister Gas - C2H6	mol,vol %
64	.0290	6.300E-03	6.293092E-03	2.900000E-04	Demister Gas - H2S	mol,vol %
65	5.6467	2.276E-01	2.202696E-01	5.746666E-02	Demister Gas - H2	mol,vol %
66	.1604	1.801E-02	1.612063E-02	8.020001E-03	Demister Gas - NH3	mol,vol %
67	.4833	1.018E-02	8.347611E-03	5.833333E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR4-7

```
69                                                  Freeboard Gas - O2              mol,vol %
70                                                  Freeboard Gas - CO              mol,vol %
71                                                  Freeboard Gas - CH4             mol,vol %
72                                                  Freeboard Gas - CO2             mol,vol %
73                                                  Freeboard Gas - C2H4            mol,vol %
74                                                  Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - H2S             mol,vol %
76                                                  Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - NH3             mol,vol %
78                                                  Freeboard Gas - Ar              mol,vol %
79   15.3000 1.5                     1.500000E+00   Water Content in Freeboard Gas  mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00    Demister Gas - SO2              mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - SO2             mol,vol %
82   57.6000 1.345E+00 1.340281E+00 1.100000E-01   Sorbent - CaO                   Mass %
83   41.4667 1.068E+00 1.055831E+00 1.600000E-01   Sorbent - MgO                   Mass %
84     .8000 7.181E-02 6.324653E-02 3.400000E-02   Sorbent - SO3                   Mass %
85    1.2333 1.586E-01 5.164160E-02 1.500000E-01   Sorbent - Ash                   Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00    Unused
87    3.0000  .000E+00  .000000E+00  .000000E+00    Demister gas # of Analyses,  dimensionless
88    5.0000  .000E+00  .000000E+00  .000000E+00    Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00    Unused
```

INPUT DATA FILE FOR TR4-8

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,      'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     4.5,    1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR4 - TEST POINT 8  <<CASE C>>  03/14/92  Pittsburgh Coal + Dolomite
SET POINT DATE:     3/14/92
SET POINT TIME:     02:00:00 - 06:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	182.1940	1.893E+00	1.738000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	178.8380	1.815E+00	1.653000E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	.0000	.000E+00	.000000E+00	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	750.8760	1.274E+01	8.978000E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.6090	2.063E-01	1.880000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	47.0850	2.129E+00	1.879000E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	30.6700	8.757E-01	7.790000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	14.4960	2.874E+00	2.863000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	4.9650	2.254E-01	1.420000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.2800	1.981E-01	1.950000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.1360	8.635E-02	8.400000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	600.9190	2.327E+01	1.778500E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	600.4160	1.314E+01	2.896000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	40.0000	9.191E+00	9.068000E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	338.0000	8.4648	8.45	.5	Coal Feed rate	lb/hr	
16	150.0000	3.7832	3.75	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	82.2260	2.024E+00	3.090000E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	339.4310	8.712E+01	8.709300E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	162.4300	1.313E+01	1.297200E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	187.9210	7.542E+00	7.272000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1559.1930	2.012E+01	1.924800E+01	5.846973E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1366.8980	7.365E+00	5.289000E+00	5.125867E+00	Orifice Temp (Upstream)	F	TI-3108
38	125.0250	5.127E+00	4.721000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	378.6170	3.665E+01	3.659100E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	264.5450	2.126E+00	7.220000E-01	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	210.5050	2.001E+00	5.900000E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	395.0360	2.073E+00	5.460000E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	169.2500	8.477E+00	8.462501E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	90.5500	4.555E+00	4.527500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	3.3000	5.265E-01	1.650000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	18.0000	1.030E+00	9.000000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless. G SI	

INPUT DATA FILE FOR TR4-8

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	71.5414	1.204E+00	1.194450E+00	1.500000E-01	Coal - C	Mass %
2	4.6757	1.306E-01	1.258112E-01	3.500000E-02	Coal - H	Mass %
3	1.9014	9.733E-02	9.406120E-02	2.500000E-02	Coal - N	Mass %
4	3.3557	.16779	.16779		Coal - S	Mass %
5	11.1786	1.638E+00	1.635290E+00	1.000000E-01	Coal - Ash	Mass %
6	2.0829	4.408E-01	4.144761E-01	1.500000E-01	Coal - H2O	Mass %
712775	5700	2.231E+02	2.217231E+02	2.500000E+01	Coal - HHV	BTU/lb
8	52.5100	1.928E+00	1.922342E+00	1.500000E-01	CD Drain - C	Mass %
9	.2767	3.893E-02	1.705468E-02	3.500000E-02	CD Drain - H	Mass %
10	1.2533	6.905E-02	6.436087E-02	2.500000E-02	CD Drain - N	Mass %
11	3.4567	1.72835	1.72835		CD Drain - S	Mass %
12	46.9600	2.600E+00	2.588110E+00	2.500000E-01	CD Drain - Ash	Mass %
13	7634.3330	3.269E+02	3.259677E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	1.5933	1.5933	1.5933		CD Drain - sfide S	Mass %
16	2.4300	2.400E-01	1.873744E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	7.2200	3.61	3.61		CD Drain - Ash S	Mass %
18	28.8000				CD Drain - Ash CaO	Mass %
19	20.7000				CD Drain - Ash MgO	Mass %
20	69.5633	4.688E-01	4.441223E-01	1.500000E-01	PD Drain - C	Mass %
21	.5600	3.694E-02	1.181124E-02	3.500000E-02	PD Drain - H	Mass %
22	1.6533	4.909E-02	4.224794E-02	2.500000E-02	PD Drain - N	Mass %
23	2.8233	1.41165	1.41165		PD Drain - S	Mass %
24	29.1033	5.822E-01	5.257817E-01	2.500000E-01	PD Drain - Ash	Mass %
2510646	3300	8.991E+01	8.636027E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	1.2067	1.2067	1.2067		PD Drain - sfide S	Mass %
28	.9733	1.826E-01	1.040922E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	6.9967	3.49835	3.49835		PD Drain - Ash S	Mass %
30	16.9000				PD Drain - Ash CaO	Mass %
31	13.6667				PD Drain - Ash MgO	Mass %
32	69.0000	1.320E+00	1.311000E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.5400	4.881E-02	3.402000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.6500	9.572E-02	9.240000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	2.5200	1.26	1.26		CF/SD Drain - S	Mass %
36	29.6500	1.562E+00	1.541800E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
3710667	0000	2.148E+02	2.133400E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	1.2700	1.27	1.27		CF/SD Drain - sfide S	Mass %
40	1.5100	4.486E-01	4.228000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	8.4800	4.24	4.24		CF/SD Drain - Ash S	Mass %
42	28.1000				CF/SD Drain - Ash CaO	Mass %
43	20.5000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	72.3000	1.382E+00	1.373700E+00	1.500000E-01	BD Drain - C	Mass %
46	.6900	5.581E-02	4.347000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.9000	1.093E-01	1.064000E-01	2.500000E-02	BD Drain - N	Mass %
48	2.4900	1.245	1.245		BD Drain - S	Mass %
49	26.3400	1.392E+00	1.369680E+00	2.500000E-01	BD Drain - Ash	Mass %
5010995	0000	2.213E+02	2.199000E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	1.1800	1.18	1.18		BD Drain - sfide S	Mass %
53	.6900	2.446E-01	1.932000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	6.2200	3.11	3.11		BD Drain - Ash S	Mass %
55	27.0000				BD Drain - Ash CaO	Mass %
56	20.8000				BD Drain - Ash MgO	Mass %
57	75.3000	8.730E-01	4.399271E-01	7.540000E-01	Demister Gas - N2	mol,vol %
58	.9067	2.059E-01	2.056508E-01	1.006667E-02	Demister Gas - O2	mol,vol %
59	5.4000	2.458E-01	2.395578E-01	5.500000E-02	Demister Gas - CO	mol,vol %
60	2.2700	1.542E-01	1.523625E-01	2.370000E-02	Demister Gas - CH4	mol,vol %
61	9.5067	2.502E-01	2.309699E-01	9.606667E-02	Demister Gas - CO2	mol,vol %
62	.0300	1.357E-02	1.350941E-02	1.300000E-03	Demister Gas - C2H4	mol,vol %
63	.0200	1.067E-02	1.060507E-02	1.200000E-03	Demister Gas - C2H6	mol,vol %
64	.0946	2.136E-02	2.134198E-02	9.456666E-04	Demister Gas - H2S	mol,vol %
65	6.1233	2.813E-01	2.743050E-01	6.223333E-02	Demister Gas - H2	mol,vol %
66	.1393	1.738E-02	1.592102E-02	6.965000E-03	Demister Gas - NH3	mol,vol %
67	.5033	1.024E-02	8.278212E-03	6.033333E-03	Demister Gas - Ar	mol,vol %
68	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR4-8

```
69     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - O2              mol,vol %
70     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - CO              mol,vol %
71     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - CH4             mol,vol %
72     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - C2H4            mol,vol %
74     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S             mol,vol %
76     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3             mol,vol %
78     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - Ar              mol,vol %
79   15.0000 1.5                    1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2             mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2            mol,vol %
82   57.6000 1.345E+00 1.340281E+00 1.100000E-01 Sorbent - CaO                  Mass %
83   41.4667 1.068E+00 1.055831E+00 1.600000E-01 Sorbent - MgO                  Mass %
84     .8000 7.181E-02 6.324653E-02 3.400000E-02 Sorbent - SO3                  Mass %
85    1.2333 1.586E-01 5.164160E-02 1.500000E-01 Sorbent - Ash                  Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    3.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR5-1

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,      'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     4.5,    1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR5 - TEST POINT 1  <<CASE C>>  3/24/92  Pittsburgh Coal + Dolomite
SET POINT DATE:     3/24/92
SET POINT TIME:     11:00:00 - 15:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	134.2810	3.284E+00	3.197000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	131.8140	3.151E+00	3.134000E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	199.3530	2.270E+00	2.143000E+00	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	605.5160	2.051E+01	1.841000E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.1380	3.631E-01	3.530000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	30.4470	1.014E+00	1.660000E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	42.2050	6.874E-01	5.590000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	9.0460	6.871E-01	6.400000E-01	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	4.1510	1.212E+00	1.199000E+00	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.5430	2.109E-01	2.080000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.3290	3.441E-02	2.800000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	1399.6890	1.540E+01	3.491000E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	1289.9640	1.293E+01	1.652000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	90.0900	1.676E+00	7.480000E-01	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	229.0000	5.7468	5.725	.5	Coal Feed rate	lb/hr	
16	60.0000	1.5811	1.5	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	82.7710	2.654E+00	1.744000E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	103.4170	1.693E+01	1.681500E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	142.9770	1.037E+01	1.017200E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	190.1430	6.986E+00	6.694000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1610.2410	8.915E+00	6.559000E+00	6.038404E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1323.6460	7.855E+00	6.088000E+00	4.963672E+00	Orifice Temp (Upstream)	F	TI-3108
38	107.4350	3.758E+00	3.182000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	257.6580	2.666E+01	2.658400E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	285.4560	2.960E+00	2.182000E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	213.5110	2.014E+00	2.380000E-01	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.6010	2.178E+00	8.630000E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	45.3300	2.321E+00	2.266500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	40.2600	2.074E+00	2.013000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	3.6000	5.314E-01	1.800000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	6.6400	6.002E-01	3.320000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR5-1

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	74.6125	4.337E-01	4.069460E-01	1.500000E-01	Coal - C	Mass %
2	4.6800	5.305E-02	3.986874E-02	3.500000E-02	Coal - H	Mass %
3	2.0475	7.475E-02	7.044803E-02	2.500000E-02	Coal - N	Mass %
4	1.8825	.09413	.09413		Coal - S	Mass %
5	10.5200	3.889E-01	3.758122E-01	1.000000E-01	Coal - Ash	Mass %
6	1.4350	1.894E-01	1.156758E-01	1.500000E-01	Coal - H2O	Mass %
7	13098.2500	1.011E+02	9.799854E+01	2.500000E+01	Coal - HHV	BTU/lb
8	32.8100	3.907E+00	3.904390E+00	1.500000E-01	CD Drain - C	Mass %
9	.2900	6.299E-02	5.237400E-02	3.500000E-02	CD Drain - H	Mass %
10	.6500	1.087E-01	1.058200E-01	2.500000E-02	CD Drain - N	Mass %
11	2.9400	1.47	1.47		CD Drain - S	Mass %
12	66.5200	1.098E+01	1.097580E+01	2.500000E-01	CD Drain - Ash	Mass %
13	4640.0000	5.866E+02	5.860320E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	2.2100	2.2100	2.2100		CD Drain - sfide S	Mass %
16	2.7900	6.734E-01	6.564870E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	4.1900	2.095	2.095		CD Drain - Ash S	Mass %
18	38.6000				CD Drain - Ash CaO	Mass %
19	30.0000				CD Drain - Ash MgO	Mass %
20	69.3300	1.298E+00	1.289538E+00	1.500000E-01	PD Drain - C	Mass %
21	.5300	4.845E-02	3.349600E-02	3.500000E-02	PD Drain - H	Mass %
22	1.5200	8.813E-02	8.451200E-02	2.500000E-02	PD Drain - N	Mass %
23	1.6600	.83	.83		PD Drain - S	Mass %
24	29.8400	1.578E+00	1.557648E+00	2.500000E-01	PD Drain - Ash	Mass %
25	10464.0000	2.149E+02	2.134656E+02	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	.8400	.8400	.8400		PD Drain - sfide S	Mass %
28	.4800	1.019E-01	1.351680E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	5.5900	2.795	2.795		PD Drain - Ash S	Mass %
30	13.9000				PD Drain - Ash CaO	Mass %
31	9.4000				PD Drain - Ash MgO	Mass %
32	67.4300	1.290E+00	1.281170E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.4100	4.350E-02	2.583000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.6600	9.626E-02	9.286000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	1.2700	.635	.635		CF/SD Drain - S	Mass %
36	28.9700	1.527E+00	1.506440E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	10033.0000	2.022E+02	2.006600E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	.5000	.5000	.5000		CF/SD Drain - sfide S	Mass %
40	1.2100	3.705E-01	3.388000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	3.9600	1.98	1.98		CF/SD Drain - Ash S	Mass %
42	26.8000				CF/SD Drain - Ash CaO	Mass %
43	15.9000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	78.6300	1.501E+00	1.493970E+00	1.500000E-01	BD Drain - C	Mass %
46	.5600	4.970E-02	3.528000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.6700	9.680E-02	9.351999E-02	2.500000E-02	BD Drain - N	Mass %
48	1.1400	.57	.57		BD Drain - S	Mass %
49	18.7200	1.005E+00	9.734399E-01	2.500000E-01	BD Drain - Ash	Mass %
50	11960.0000	2.405E+02	2.392000E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.4100	.4100	.4100		BD Drain - sfide S	Mass %
53	.5600	2.170E-01	1.568000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	5.2000	2.6	2.6		BD Drain - Ash S	Mass %
55	25.9000				BD Drain - Ash CaO	Mass %
56	17.0000				BD Drain - Ash MgO	Mass %
57	76.2400	1.202E+00	9.287088E-01	7.634000E-01	Demister Gas - N2	mol,vol %
58	1.6120	1.845E+00	1.845039E+00	1.712000E-02	Demister Gas - O2	mol,vol %
59	6.3920	3.831E-01	3.775881E-01	6.491999E-02	Demister Gas - CO	mol,vol %
60	.9040	1.115E-01	1.110406E-01	1.004000E-02	Demister Gas - CH4	mol,vol %
61	7.8560	5.576E-01	5.519325E-01	7.956000E-02	Demister Gas - CO2	mol,vol %
62	.0026	4.456E-03	4.335897E-03	1.026000E-03	Demister Gas - C2H4	mol,vol %
63	.0000	.000E+00	.000000E+00	1.000000E-03	Demister Gas - C2H6	mol,vol %
64	.1252	4.243E-02	4.241322E-02	1.251600E-03	Demister Gas - H2S	mol,vol %
65	6.5984	5.863E-01	5.824807E-01	6.698400E-02	Demister Gas - H2	mol,vol %
66	.2390	8.825E-02	8.743425E-02	1.195000E-02	Demister Gas - NH3	mol,vol %
67	.4900	4.283E-02	4.242641E-02	5.900000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR5-1

```
69                                                  Freeboard Gas - O2              mol,vol %
70                                                  Freeboard Gas - CO              mol,vol %
71                                                  Freeboard Gas - CH4             mol,vol %
72                                                  Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00                 Freeboard Gas - C2H4            mol,vol %
74     .0000  .000E+00  .000000E+00                 Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - H2S             mol,vol %
76                                                  Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - NH3             mol,vol %
78                                                  Freeboard Gas - Ar              mol,vol %
79   17.9000 1.500E+00  .000000E+00 1.500000E+00    Water Content in Freeboard Gas  mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00    Demister Gas - SO2              mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - SO2             mol,vol %
82   67.2000 4.151E-01 4.002305E-01 1.100000E-01    Sorbent - CaO                   Mass %
83   30.8500 5.189E+00 5.186563E+00 1.600000E-01    Sorbent - MgO                   Mass %
84     .9500 2.080E-01 2.044237E-01 3.850000E-02    Sorbent - SO3                   Mass %
85     .7500 2.050E-01 1.398045E-01 1.500000E-01    Sorbent - Ash                   Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00    Unused
87    5.0000  .000E+00  .000000E+00  .000000E+00    Demister gas # of Analyses,  dimensionless
88    2.0000  .000E+00  .000000E+00  .000000E+00    Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00    Unused
```

INPUT DATA FILE FOR TR5-2

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,     'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     2.5,    1.2,     1.,    .25,    1.,     .5,   .04,    .99,  20/

TR5 - TEST POINT 2  <<CASE C>>  3/24/92  Pittsburgh Coal + Dolomite
SET POINT DATE:     3/24/92
SET POINT TIME:     19:00:00 - 23:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	154.8120	5.783E+00	5.734000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	152.0670	5.626E+00	5.617000E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	197.6080	1.129E+00	8.440000E-01	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	698.3970	1.754E+01	1.503200E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.2480	2.754E-01	2.620000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	29.2430	2.478E+00	2.267000E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	39.4660	1.039E+00	9.590000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	9.2450	8.889E-01	8.530000E-01	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	3.9280	1.953E+00	1.945000E+00	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.2860	2.733E-01	2.710000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.0190	8.440E-02	8.200000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	1399.1510	1.687E+01	7.720000E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	1287.0060	1.326E+01	3.407000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	89.8330	1.623E+00	6.190000E-01	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	236.0000	5.9211	5.9	.5	Coal Feed rate	lb/hr	
16	119.0000	3.0167	2.975	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	84.3900	2.444E+00	1.405000E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	97.3900	1.307E+01	1.291300E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	148.7750	1.514E+01	1.501100E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	180.4580	9.535E+00	9.323000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1618.6040	6.770E+00	2.998000E+00	6.069765E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1352.8260	6.612E+00	4.240000E+00	5.073098E+00	Orifice Temp (Upstream)	F	TI-3108
38	126.2220	6.078E+00	5.739000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	285.5260	3.690E+01	3.684200E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	289.4830	3.769E+00	3.194000E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	216.2920	3.182E+00	2.475000E+00	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	386.8650	2.029E+00	3.420000E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	62.8900	3.184E+00	3.144500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	62.2900	3.154E+00	3.114500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	16.0000	9.434E-01	8.000000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	6.4400	5.947E-01	3.220000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR5-2

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	74.6125	4.337E-01	4.069460E-01	1.500000E-01	Coal - C	Mass %
2	4.6800	5.305E-02	3.986874E-02	3.500000E-02	Coal - H	Mass %
3	2.0475	7.475E-02	7.044803E-02	2.500000E-02	Coal - N	Mass %
4	1.8825	.09413	.09413		Coal - S	Mass %
5	10.5200	3.889E-01	3.758122E-01	1.000000E-01	Coal - Ash	Mass %
6	1.4350	1.894E-01	1.156758E-01	1.500000E-01	Coal - H2O	Mass %
7	13098.2500	1.011E+02	9.799854E+01	2.500000E+01	Coal - HHV	BTU/lb
8	21.5550	2.710E+00	2.705725E+00	1.500000E-01	CD Drain - C	Mass %
9	.1350	3.548E-02	5.816267E-03	3.500000E-02	CD Drain - H	Mass %
10	.4450	3.813E-02	2.878498E-02	2.500000E-02	CD Drain - N	Mass %
11	2.3650	1.1825	1.1825		CD Drain - S	Mass %
12	79.5850	2.530E+00	2.517617E+00	2.500000E-01	CD Drain - Ash	Mass %
13	3133.5000	2.961E+02	2.950795E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	1.4650	1.4650	1.4650		CD Drain - sfide S	Mass %
16	1.7850	1.588E-01	5.202763E-02	1.500000E-01	CD Drain - crbate C	Mass %
17	2.7900	1.395	1.395		CD Drain - Ash S	Mass %
18	25.6500				CD Drain - Ash CaO	Mass %
19	18.5500				CD Drain - Ash MgO	Mass %
20	68.4250	6.197E-01	6.012382E-01	1.500000E-01	PD Drain - C	Mass %
21	.4650	3.588E-02	7.880632E-03	3.500000E-02	PD Drain - H	Mass %
22	1.5350	5.061E-02	4.400733E-02	2.500000E-02	PD Drain - N	Mass %
23	1.9900	.995	.995		PD Drain - S	Mass %
24	32.1800	9.270E-01	8.926764E-01	2.500000E-01	PD Drain - Ash	Mass %
25	10341.5000	8.980E+01	8.624799E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	1.0200	1.0200	1.0200		PD Drain - sfide S	Mass %
28	.7000	1.757E-01	9.153538E-02	1.500000E-01	PD Drain - crbate C	Mass %
29	6.0550	3.0275	3.0275		PD Drain - Ash S	Mass %
30	14.0500				PD Drain - Ash CaO	Mass %
31	9.6000				PD Drain - Ash MgO	Mass %
32	68.6800	1.314E+00	1.304920E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.4800	4.625E-02	3.024000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.3900	8.176E-02	7.784000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	1.5100	.755	.755		CF/SD Drain - S	Mass %
36	30.1100	1.586E+00	1.565720E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	10397.0000	2.094E+02	2.079400E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	.8400	.8400	.8400		CF/SD Drain - sfide S	Mass %
40	.6000	2.252E-01	1.680000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	4.7500	2.375	2.375		CF/SD Drain - Ash S	Mass %
42	28.1000				CF/SD Drain - Ash CaO	Mass %
43	14.2000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	74.3400	1.420E+00	1.412460E+00	1.500000E-01	BD Drain - C	Mass %
46	.5200	4.794E-02	3.276000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.7200	9.951E-02	9.632000E-02	2.500000E-02	BD Drain - N	Mass %
48	1.3600	.68	.68		BD Drain - S	Mass %
49	22.5500	1.199E+00	1.172600E+00	2.500000E-01	BD Drain - Ash	Mass %
50	11786.0000	2.370E+02	2.357200E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.5300	.5300	.5300		BD Drain - sfide S	Mass %
53	.4200	1.906E-01	1.176000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	4.7700	2.385	2.385		BD Drain - Ash S	Mass %
55	19.5000				BD Drain - Ash CaO	Mass %
56	12.3000				BD Drain - Ash MgO	Mass %
57	77.5250	8.866E-01	4.284336E-01	7.762500E-01	Demister Gas - N2	mol,vol %
58	2.0725	7.045E-01	7.041451E-01	2.172500E-02	Demister Gas - O2	mol,vol %
59	6.1600	2.201E-01	2.110491E-01	6.259999E-02	Demister Gas - CO	mol,vol %
60	1.4200	2.686E-01	2.681345E-01	1.520000E-02	Demister Gas - CH4	mol,vol %
61	8.7900	1.772E-01	1.532916E-01	8.889998E-02	Demister Gas - CO2	mol,vol %
62	.0000	.000E+00	.000000E+00	1.000000E-03	Demister Gas - C2H4	mol,vol %
63	.0000	.000E+00	.000000E+00	1.000000E-03	Demister Gas - C2H6	mol,vol %
64	.0067	1.096E-03	1.093563E-03	6.699999E-05	Demister Gas - H2S	mol,vol %
65	4.7453	1.321E-01	1.229179E-01	4.845250E-02	Demister Gas - H2	mol,vol %
66	.2097	2.918E-02	2.722859E-02	1.048375E-02	Demister Gas - NH3	mol,vol %
67	.5925	6.719E-02	6.683408E-02	6.924999E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR5-2

```
69                                                  Freeboard Gas - O2              mol,vol %
70                                                  Freeboard Gas - CO              mol,vol %
71                                                  Freeboard Gas - CH4             mol,vol %
72                                                  Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00                 Freeboard Gas - C2H4            mol,vol %
74     .0000  .000E+00  .000000E+00                 Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - H2S             mol,vol %
76                                                  Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - NH3             mol,vol %
78                                                  Freeboard Gas - Ar              mol,vol %
79   17.8000 1.500E+00  .000000E+00 1.500000E+00    Water Content in Freeboard Gas  mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00    Demister Gas - SO2              mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - SO2             mol,vol %
82   67.2000 4.151E-01 4.002305E-01 1.100000E-01    Sorbent - CaO                   Mass %
83   30.8500 5.189E+00 5.186563E+00 1.600000E-01    Sorbent - MgO                   Mass %
84     .9500 2.080E-01 2.044237E-01 3.850000E-02    Sorbent - SO3                   Mass %
85     .7500 2.050E-01 1.398045E-01 1.500000E-01    Sorbent - Ash                   Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00    Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00    Demister gas # of Analyses,  dimensionless
88    2.0000  .000E+00  .000000E+00  .000000E+00    Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00    Unused
```

INPUT DATA FILE FOR TR5-3

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,     'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     4.5,    1.8,     1.,    .25,    1.,     .5,   .04,    .99,  20/

TR5 - TEST POINT 3  <<CASE C>>  3/25/92  Pittsburgh Coal + Limestone
SET POINT DATE:     3/25/92
SET POINT TIME:     05:00:00 - 09:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	147.4040	1.982E+00	1.835000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	144.6930	1.972E+00	1.824000E+00	3.250000E-01	Orifice Pressure	PSIG	PI-3106
3	197.7990	8.588E-01	7.950000E-01	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	672.1410	1.133E+01	6.815000E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	1.6910	2.273E+00	2.271000E+00	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	31.1210	1.071E+00	3.840000E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	40.7880	1.224E+00	1.157000E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	8.9030	1.030E+00	9.980000E-01	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	.0120	1.763E-01	2.100000E-02	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.4380	2.742E-01	2.720000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.1350	4.472E-02	4.000000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	1399.9020	2.205E+01	1.616300E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	1286.4430	1.336E+01	3.747000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	100.0200	1.527E+00	2.880000E-01	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	237.0000	5.9461	5.925	.5	Coal Feed rate	lb/hr	
16	70.0000	1.82	1.75	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	79.2520	3.332E+00	2.665000E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	85.1090	1.504E+01	1.490800E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	138.8400	1.409E+01	1.394900E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	178.8950	5.361E+00	4.974000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1621.1650	8.016E+00	5.224000E+00	6.079369E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1363.8300	1.100E+01	9.739000E+00	5.114362E+00	Orifice Temp (Upstream)	F	TI-3108
38	119.7370	5.634E+00	5.267000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	257.8130	6.383E+01	6.379500E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	287.4240	3.747E+00	3.169000E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	216.6100	5.379E+00	4.993000E+00	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.0090	2.026E+00	3.240000E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	52.4000	2.667E+00	2.620000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	48.2400	2.463E+00	2.412000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	34.1300	1.778E+00	1.706500E+00	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	16.5800	9.681E-01	8.290000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR5-3

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	74.6125	4.337E-01	4.069460E-01	1.500000E-01	Coal - C	Mass %
2	4.6800	5.305E-02	3.986874E-02	3.500000E-02	Coal - H	Mass %
3	2.0475	7.475E-02	7.044803E-02	2.500000E-02	Coal - N	Mass %
4	1.8825	.09413	.09413		Coal - S	Mass %
5	10.5200	3.889E-01	3.758122E-01	1.000000E-01	Coal - Ash	Mass %
6	1.4350	1.894E-01	1.156758E-01	1.500000E-01	Coal - H2O	Mass %
7	13098.2500	1.011E+02	9.799854E+01	2.500000E+01	Coal - HHV	BTU/lb
8	21.9450	7.741E-01	7.593921E-01	1.500000E-01	CD Drain - C	Mass %
9	.1500	3.802E-02	1.483780E-02	3.500000E-02	CD Drain - H	Mass %
10	.5100	4.262E-02	3.452188E-02	2.500000E-02	CD Drain - N	Mass %
11	2.6350	1.3175	1.3175		CD Drain - S	Mass %
12	78.0800	5.085E+00	5.079143E+00	2.500000E-01	CD Drain - Ash	Mass %
13	3158.0000	2.096E+02	2.080554E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	2.2050	2.2050	2.2050		CD Drain - sfide S	Mass %
16	1.7550	1.501E-01	4.353737E-03	1.500000E-01	CD Drain - crbate C	Mass %
17	3.5500	1.775	1.775		CD Drain - Ash S	Mass %
18	57.1000				CD Drain - Ash CaO	Mass %
19	22.7500				CD Drain - Ash MgO	Mass %
20	68.7000	6.304E-01	6.122553E-01	1.500000E-01	PD Drain - C	Mass %
21	.5150	3.524E-02	4.134215E-03	3.500000E-02	PD Drain - H	Mass %
22	1.5050	4.072E-02	3.213929E-02	2.500000E-02	PD Drain - N	Mass %
23	1.7050	.8525	.8525		PD Drain - S	Mass %
24	30.4200	7.691E-01	7.273334E-01	2.500000E-01	PD Drain - Ash	Mass %
25	10411.5000	1.043E+02	1.012709E+02	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	.9250	.9250	.9250		PD Drain - sfide S	Mass %
28	.8000	1.781E-01	9.600481E-02	1.500000E-01	PD Drain - crbate C	Mass %
29	5.6950	2.8475	2.8475		PD Drain - Ash S	Mass %
30	29.2000				PD Drain - Ash CaO	Mass %
31	15.8000				PD Drain - Ash MgO	Mass %
32	69.1650	5.463E-01	5.253403E-01	1.500000E-01	CF/SD Drain - C	Mass %
33	.4700	3.539E-02	5.263598E-03	3.500000E-02	CF/SD Drain - H	Mass %
34	1.5200	4.356E-02	3.566769E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	1.4150	.7075	.7075		CF/SD Drain - S	Mass %
36	29.9950	7.571E-01	7.146351E-01	2.500000E-01	CF/SD Drain - Ash	Mass %
37	10407.5000	8.412E+01	8.032353E+01	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	.6850	.6850	.6850		CF/SD Drain - sfide S	Mass %
40	.6150	1.703E-01	8.062474E-02	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	4.7800	2.39	2.39		CF/SD Drain - Ash S	Mass %
42	29.9500				CF/SD Drain - Ash CaO	Mass %
43	15.1000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	68.4000	1.308E+00	1.299600E+00	1.500000E-01	BD Drain - C	Mass %
46	.6700	5.483E-02	4.221000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.6700	9.680E-02	9.351999E-02	2.500000E-02	BD Drain - N	Mass %
48	1.4800	.74	.74		BD Drain - S	Mass %
49	26.7900	1.415E+00	1.393080E+00	2.500000E-01	BD Drain - Ash	Mass %
50	10370.0000	2.089E+02	2.074000E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.4300	.4300	.4300		BD Drain - sfide S	Mass %
53	1.0200	3.226E-01	2.856000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	4.1300	2.065	2.065		BD Drain - Ash S	Mass %
55	34.9000				BD Drain - Ash CaO	Mass %
56	22.5000				BD Drain - Ash MgO	Mass %
57	76.5750	9.354E-01	5.358664E-01	7.667500E-01	Demister Gas - N2	mol,vol %
58	3.1175	7.996E-01	7.989180E-01	3.217500E-02	Demister Gas - O2	mol,vol %
59	6.1950	3.467E-01	3.409708E-01	6.294999E-02	Demister Gas - CO	mol,vol %
60	.9453	5.380E-02	5.277250E-02	1.045250E-02	Demister Gas - CH4	mol,vol %
61	7.8775	2.566E-01	2.438329E-01	7.977500E-02	Demister Gas - CO2	mol,vol %
62	.0000	.000E+00	.000000E+00	1.000000E-03	Demister Gas - C2H4	mol,vol %
63	.0000	.000E+00	.000000E+00	1.000000E-03	Demister Gas - C2H6	mol,vol %
64	.0005	2.654E-04	2.653676E-04	5.250000E-06	Demister Gas - H2S	mol,vol %
65	4.6137	2.487E-01	2.441653E-01	4.713750E-02	Demister Gas - H2	mol,vol %
66	.2018	1.916E-02	1.629121E-02	1.009125E-02	Demister Gas - NH3	mol,vol %
67	.5550	1.643E-02	1.507023E-02	6.550000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR5-3

69					Freeboard Gas - O2	mol,vol %
70					Freeboard Gas - CO	mol,vol %
71					Freeboard Gas - CH4	mol,vol %
72					Freeboard Gas - CO2	mol,vol %
73	.0000	.000E+00	.000000E+00		Freeboard Gas - C2H4	mol,vol %
74	.0000	.000E+00	.000000E+00		Freeboard Gas - C2H6	mol,vol %
75	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - H2S	mol,vol %
76					Freeboard Gas - H2	mol,vol %
77	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - NH3	mol,vol %
78					Freeboard Gas - Ar	mol,vol %
79	17.8000	1.500E+00	.000000E+00	1.500000E+00	Water Content in Freeboard Gas	mol,vol %
80	.0000	.000E+00	.000000E+00	.000000E+00	Demister Gas - SO2	mol,vol %
81	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - SO2	mol,vol %
82	97.0000	1.691E+00	1.687800E+00	1.100000E-01	Sorbent - CaO	Mass %
83	2.3000	7.858E-01	7.693500E-01	1.600000E-01	Sorbent - MgO	Mass %
84	.6000	2.688E-01	2.673000E-01	2.800000E-02	Sorbent - SO3	Mass %
85	.6000	2.866E-01	2.441994E-01	1.500000E-01	Sorbent - Ash	Mass %
86	.0000	.000E+00	.000000E+00	.000000E+00	Unused	
87	4.0000	.000E+00	.000000E+00	.000000E+00	Demister gas # of Analyses,	dimensionless
88	2.0000	.000E+00	.000000E+00	.000000E+00	Freeboard gas # of Analyses,	dimensionless
89	.0000	.000E+00	.000000E+00	.000000E+00	Unused	

INPUT DATA FILE FOR TR6-1

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                    DEFAULT CONTROL PARAMETERS,
                    ===========================

  IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
    1,      3,     10,      0,      'D'

  EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
    .5,     3.,     1.,     1.,     .25,     1.     .5,   .04,    .99   20/

TEST POINT 6-1       <<CASE C>>              05/14/93          ISSUE 0   REVISION 6
SET POINT DATE:      4/21/92
SET POINT TIME:      21:00:00 - 01:00:00
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DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	145.8558	3.826E+00	3.752113E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	143.0502	3.754E+00	3.677997E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	198.7528	7.752E-01	6.784061E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	754.1481	1.415E+01	1.087579E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.0000	.000E+00	8.361400E-03	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	31.6125	6.616E+00	6.540360E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	30.5325	8.910E-01	7.961966E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	8.8295	2.661E+00	2.649237E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	2.9904	3.357E-01	2.864367E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	2.0850	5.094E-02	3.701520E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.9851	5.860E-02	5.507730E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	834.9297	1.577E+01	4.864898E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	812.3353	1.473E+01	7.248697E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.0000	.000E+00	8.729300E-03	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	344.0000	8.6145	8.6	0.5	Coal Feed rate	lb/hr	
16	68.0000	1.772	1.7	0.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	85.6780	2.638E+00	1.719866E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	355.8332	1.032E+02	1.032147E+02	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	171.1925	1.233E+01	1.216286E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	195.5438	8.624E+00	8.388559E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1516.6740	8.313E+00	6.063373E+00	5.687527E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	787.4326	4.613E+00	3.544253E+00	2.952872E+00	Orifice Temp (Upstream)	F	TI-3108
38	147.6120	7.171E+00	6.886552E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	217.3637	4.212E+00	3.707257E+00	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	281.3477	3.072E+00	2.331122E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	211.1611	2.002E+00	8.576320E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.4382	2.023E+00	3.021222E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	46.3200	2.369E+00	2.316000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	44.7600	2.293E+00	2.238000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	3.7000	5.331E-01	1.850000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	8.1400	6.447E-01	4.070000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	76.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless. G SI	

INPUT DATA FILE FOR TR6-1

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement		
1	50.7660	1.019E+00	1.008097E+00	1.500000E-01	Coal - C		Mass %
2	3.6000	1.009E-01	9.460466E-02	3.500000E-02	Coal - H		Mass %
3	.9780	5.740E-02	5.166999E-02	2.500000E-02	Coal - N		Mass %
4	.7180	.0359	.0359		Coal - S	*	Mass %
5	5.5780	4.326E-01	4.209227E-01	1.000000E-01	Coal - Ash		Mass %
6	26.8740	1.383E+00	1.374476E+00	1.500000E-01	Coal - H2O		Mass %
7	8729.2000	1.549E+02	1.528607E+02	2.500000E+01	Coal - HHV		BTU/lb
8	18.2800	1.541E-01	3.543540E-02	1.500000E-01	CD Drain - C		Mass %
9	.0250	3.500E-02	2.656440E-04	3.500000E-02	CD Drain - H		Mass %
10	.3650	3.890E-02	2.980815E-02	2.500000E-02	CD Drain - N		Mass %
11	.6850	.3425	.3425		CD Drain - S	*	Mass %
12	56.2050	3.678E+00	3.668098E+00	2.500000E-01	CD Drain - Ash		Mass %
13	1457.0000	1.386E+02	1.363725E+02	2.500000E+01	CD Drain - HHV (dry)		BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S		Mass %
15	.3250	.325	.325		CD Drain - sfide S	*	Mass %
16	6.7100	6.522E-01	6.347352E-01	1.500000E-01	CD Drain - crbate C		Mass %
17	1.4400	0.72	0.72		CD Drain - Ash S	*	Mass %
18	90.05	0.	0.		CD Drain - Ash CaO	*	Mass %
19	2.05	0.	0.		CD Drain - Ash MgO	*	Mass %
20	69.9500	1.635E-01	6.514347E-02	1.500000E-01	PD Drain - C		Mass %
21	.5300	3.518E-02	3.562383E-03	3.500000E-02	PD Drain - H		Mass %
22	1.5900	2.579E-02	6.351467E-03	2.500000E-02	PD Drain - N		Mass %
23	.8500	.425	.425		PD Drain - S	*	Mass %
24	25.6800	2.648E-01	8.736420E-02	2.500000E-01	PD Drain - Ash		Mass %
25	10605.0000	5.076E+01	4.417817E+01	2.500000E+01	PD Drain - HHV (dry)		BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S		Mass %
27	.3000	.30	.30		PD Drain - sfide S	*	Mass %
28	.6500	1.718E-01	8.382345E-02	1.500000E-01	PD Drain - crbate C		Mass %
29	3.7500	1.875	1.875		PD Drain - Ash S	*	Mass %
30	28.95	0.	0.		PD Drain - Ash CaO	*	Mass %
31	6.05	0.	0.		PD Drain - Ash MgO	*	Mass %
32	67.9300	1.299E+00	1.290670E+00	1.500000E-01	CF/SD Drain - C		Mass %
33	.5400	4.881E-02	3.402000E-02	3.500000E-02	CF/SD Drain - H		Mass %
34	1.3000	7.697E-02	7.280000E-02	2.500000E-02	CF/SD Drain - N		Mass %
35	.9900	.495	.495		CF/SD Drain - S	*	Mass %
36	28.9500	1.526E+00	1.505400E+00	2.500000E-01	CF/SD Drain - Ash		Mass %
37	10280.0000	2.071E+02	2.056000E+02	2.500000E+01	CF/SD Drain - HHV (dry)		BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S		Mass %
39	.2400	.24	.24		CF/SD Drain - sfide S	*	Mass %
40	1.0500	3.301E-01	2.940000E-01	1.500000E-01	CF/SD Drain - cabate C		Mass %
41	3.7200	1.86	1.86		CF/SD Drain - Ash S	*	Mass %
42	29.50	0.	0.		CF/SD Drain - Ash CaO	*	Mass %
43	6.7	0.	0.		CF/SD Drain - Ash MgO	*	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation		dimensionlessf
45	71.2400	1.362E+00	1.353560E+00	1.500000E-01	BD Drain - C		Mass %
46	.7100	5.680E-02	4.473000E-02	3.500000E-02	BD Drain - H		Mass %
47	1.2000	7.170E-02	6.720001E-02	2.500000E-02	BD Drain - N		Mass %
48	1.0400	.52	.52		BD Drain - S	*	Mass %
49	23.7000	1.258E+00	1.232400E+00	2.500000E-01	BD Drain - Ash		Mass %
50	10689.0000	2.152E+02	2.137800E+02	2.500000E+01	BD Drain - HHV (dry)		BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S		Mass %
52	.2200	.22	.22		BD Drain - sfide S	*	Mass %
53	1.3800	4.145E-01	3.864000E-01	1.500000E-01	BD Drain - crbate C		Mass %
54	4.6500	2.325	2.325		BD Drain - Ash S	*	Mass %
55	41.7	0.	0.		BD Drain - Ash CaO	*	Mass %
56	9.0	0.	0.		BD Drain - Ash MgO	*	Mass %
57	71.4750	8.525E-01	4.631167E-01	7.157500E-01	Demister Gas - N2		mol,vol %
58	.6600	1.256E-01	1.254193E-01	7.600000E-03	Demister Gas - O2		mol,vol %
59	8.3075	1.120E-01	7.395346E-02	8.407500E-02	Demister Gas - CO		mol,vol %
60	1.3750	1.762E-01	1.755878E-01	1.475000E-02	Demister Gas - CH4		mol,vol %
61	7.9650	1.995E-01	1.824787E-01	8.065000E-02	Demister Gas - CO2		mol,vol %
62	.0275	3.376E-03	3.125916E-03	1.275000E-03	Demister Gas - C2H4		mol,vol %
63	.0200	5.148E-03	5.006493E-03	1.200000E-03	Demister Gas - C2H6		mol,vol %
64	.0175	3.069E-03	3.063869E-03	1.750000E-04	Demister Gas - H2S		mol,vol %
65	7.0975	3.355E-01	3.276529E-01	7.197500E-02	Demister Gas - H2		mol,vol %
66	.1740	7.157E-02	7.103606E-02	8.700000E-03	Demister Gas - NH3		mol,vol %
67	.5050	2.365E-02	2.286312E-02	6.050000E-03	Demister Gas - Ar		mol,vol %
68	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - N2		mol,vol %

INPUT DATA FILE FOR TR6-1

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69     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - O2              mol,vol %
70     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO              mol,vol %
71     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CH4             mol,vol %
72     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H4            mol,vol %
74     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S             mol,vol %
76     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3             mol,vol %
78     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - Ar              mol,vol %
79   11.9000 1.500E+00  .000000E+00 1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2             mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2            mol,vol %
82   96.0250 4.784E-01 4.655688E-01 1.100000E-01 Sorbent - CaO                  Mass %
83    1.4500 2.827E-01 2.330152E-01 1.600000E-01 Sorbent - MgO                  Mass %
84     .6500 1.093E-01 1.052782E-01 2.950000E-02 Sorbent - SO3                  Mass %
85    1.5000 1.736E-01 8.747770E-02 1.500000E-01 Sorbent - Ash                  Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

DATA INPUT FILE FOR TR6-2

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,     'B'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
 .25,      5.,   1.5,     1.,     .25,     1.,    .5,   .04,    .99,  20/

TR6 - TEST POINT 2   <<CASE C>>  05/14/93    ISSUE 0   REVISION 6
SET POINT DATE: 4/22/92
SET POINT TIME:     04:30:00 - 08:30:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	129.7741	5.019E+00	5.005214E+00	3.750000E-01	Carbonizer Pressure	PSIG	PI-3007
2	127.2896	4.934E+00	4.877035E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	198.9972	7.704E-01	6.730158E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	642.4038	2.155E+01	1.956466E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	2.1121	2.238E+00	2.236650E+00	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	38.2372	5.458E+00	5.365304E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	30.9449	1.218E+00	1.150373E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	6.2835	7.714E-01	7.298043E-01	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	1.8825	1.617E+00	1.607054E+00	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	2.0573	5.565E-02	4.326830E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.0862	5.058E-02	4.645630E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	838.3427	1.663E+01	7.173847E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	809.4174	1.408E+01	5.820072E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.0000	.000E+00	1.366410E-02	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	329.0000	8.2402	8.225	.5	Coal Feed rate	lb/hr	
16	67.0000	1.748	1.675	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	85.4240	3.045E+00	2.295942E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	462.2250	4.357E+01	4.352879E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	171.1189	1.248E+01	1.231580E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	200.8357	6.296E+00	5.970261E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1455.1150	1.128E+01	9.877182E+00	5.456681E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	762.4137	6.061E+00	5.344679E+00	2.859051E+00	Orifice Temp (Upstream)	F	TI-3108
38	153.2768	7.312E+00	7.033111E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	213.3065	3.124E+00	2.399370E+00	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	279.9404	5.543E+00	5.170098E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	211.1164	2.002E+00	8.747720E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.5801	2.020E+00	2.855590E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	69.4400	3.508E+00	3.472000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	46.6700	2.386E+00	2.333500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	5.8700	5.798E-01	2.935000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	12.3800	7.957E-01	6.190000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	76.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

DATA INPUT FILE FOR TR6-2

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement		
1	50.7660	1.019E+00	1.008097E+00	1.500000E-01	Coal - C		Mass %
2	3.6000	1.009E-01	9.460466E-02	3.500000E-02	Coal - H		Mass %
3	.9780	5.740E-02	5.166999E-02	2.500000E-02	Coal - N		Mass %
4	.7180	.0359	.0359		Coal - S		Mass %
5	5.5780	4.326E-01	4.209227E-01	1.000000E-01	Coal - Ash		Mass %
6	26.8740	1.383E+00	1.374476E+00	1.500000E-01	Coal - H2O		Mass %
7	8729.2000	1.549E+02	1.528607E+02	2.500000E+01	Coal - HHV		BTU/lb
8	12.7600	1.526E+00	1.518440E+00	1.500000E-01	CD Drain - C		Mass %
9	.0100	3.505E-02	1.806000E-03	3.500000E-02	CD Drain - H		Mass %
10	.2000	4.105E-02	3.256000E-02	2.500000E-02	CD Drain - N		Mass %
11	.6600	.33	.33		CD Drain - S		Mass %
12	59.3700	9.799E+00	9.796050E+00	2.500000E-01	CD Drain - Ash		Mass %
13	265.0000				CD Drain - HHV (dry)	*	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S		Mass %
15	.6500	.65	.65		CD Drain - sfide S		Mass %
16	8.1200	1.917E+00	1.910636E+00	1.500000E-01	CD Drain - crbate C		Mass %
17	1.2300	.615	.615		CD Drain - Ash S		Mass %
18	90.7000	0.	0.		CD Drain - Ash CaO		Mass %
19	.3000	0.	0.		CD Drain - Ash MgO		Mass %
20	70.9250	5.122E-01	4.897767E-01	1.500000E-01	PD Drain - C		Mass %
21	.6650	3.800E-02	1.480384E-02	3.500000E-02	PD Drain - H		Mass %
22	1.4550	3.877E-02	2.963290E-02	2.500000E-02	PD Drain - N		Mass %
23	.8600	.43	.43		PD Drain - S		Mass %
24	24.8300	5.218E-01	4.579647E-01	2.500000E-01	PD Drain - Ash		Mass %
25	10848.5000	6.412E+01	5.904967E+01	2.500000E+01	PD Drain - HHV (dry)		BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S		Mass %
27	.2750	.275	.275		PD Drain - sfide S		Mass %
28	.7900	1.643E-01	6.707628E-02	1.500000E-01	PD Drain - crbate C		Mass %
29	3.5850	1.7925	1.7925		PD Drain - Ash S		Mass %
30	24.1500				PD Drain - Ash CaO	*	Mass %
31	5.4500				PD Drain - Ash MgO	*	Mass %
32	65.5000	1.254E+00	1.244500E+00	1.500000E-01	CF/SD Drain - C		Mass %
33	.5500	4.925E-02	3.465000E-02	3.500000E-02	CF/SD Drain - H		Mass %
34	1.3900	8.176E-02	7.784000E-02	2.500000E-02	CF/SD Drain - N		Mass %
35	1.0900	.545	.545		CF/SD Drain - S		Mass %
36	30.9900	1.631E+00	1.611480E+00	2.500000E-01	CF/SD Drain - Ash		Mass %
37	10091.0000	2.034E+02	2.018200E+02	2.500000E+01	CF/SD Drain - HHV (dry)		BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S		Mass %
39	.2400	.24	.24		CF/SD Drain - sfide S		Mass %
40	1.0300	3.251E-01	2.884000E-01	1.500000E-01	CF/SD Drain - cabate C		Mass %
41	4.0300	2.015	2.015		CF/SD Drain - Ash S		Mass %
42	31.6000				CF/SD Drain - Ash CaO	*	Mass %
43	8.2000				CF/SD Drain - Ash MgO	*	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation		dimensionlessf
45	70.8400	1.354E+00	1.345960E+00	1.500000E-01	BD Drain - C		Mass %
46	.6100	5.198E-02	3.843000E-02	3.500000E-02	BD Drain - H		Mass %
47	1.4600	8.550E-02	8.176000E-02	2.500000E-02	BD Drain - N		Mass %
48	.8200	.41	.41		BD Drain - S		Mass %
49	23.8700	1.266E+00	1.241240E+00	2.500000E-01	BD Drain - Ash		Mass %
50	10962.0000	2.207E+02	2.192400E+02	2.500000E+01	BD Drain - HHV (dry)		BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S		Mass %
52	.3100	.31	.31		BD Drain - sfide S		Mass %
53	1.2500	3.808E-01	3.500000E-01	1.500000E-01	BD Drain - crbate C		Mass %
54	3.4200	1.71	1.71		BD Drain - Ash S		Mass %
55	26.1000				BD Drain - Ash CaO	*	Mass %
56	6.4000				BD Drain - Ash MgO	*	Mass %
57	75.1000	8.254E-01	3.402884E-01	7.520000E-01	Demister Gas - N2		mol,vol %
58	2.3700	6.768E-01	6.763172E-01	2.470000E-02	Demister Gas - O2		mol,vol %
59	6.3025	2.914E-01	2.842364E-01	6.402500E-02	Demister Gas - CO		mol,vol %
60	1.1675	7.074E-02	6.959999E-02	1.267500E-02	Demister Gas - CH4		mol,vol %
61	7.2975	1.883E-01	1.731777E-01	7.397500E-02	Demister Gas - CO2		mol,vol %
62	.0350	3.080E-03	2.768029E-03	1.350000E-03	Demister Gas - C2H4		mol,vol %
63	.0350	2.516E-03	2.123144E-03	1.350000E-03	Demister Gas - C2H6		mol,vol %
64	.0030	4.827E-04	4.817883E-04	3.000000E-05	Demister Gas - H2S		mol,vol %
65	5.2650	5.321E-01	5.294111E-01	5.365000E-02	Demister Gas - H2		mol,vol %
66	.3616	3.019E-02	2.417304E-02	1.808000E-02	Demister Gas - NH3		mol,vol %
67	.5125	1.461E-02	1.326085E-02	6.125000E-03	Demister Gas - Ar		mol,vol %
68	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - N2		mol,vol %

DATA INPUT FILE FOR TR6-2

```
69     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - O2              mol,vol %
70     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO              mol,vol %
71     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CH4             mol,vol %
72     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H4            mol,vol %
74     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S             mol,vol %
76     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3             mol,vol %
78     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - Ar              mol,vol %
79   11.7000 1.500E+00  .000000E+00 1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2             mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2            mol,vol %
82   96.0250 4.784E-01 4.655688E-01 1.100000E-01 Sorbent - CaO                  Mass %
83    1.4500 2.827E-01 2.330152E-01 1.600000E-01 Sorbent - MgO                  Mass %
84     .6500 1.093E-01 1.052782E-01 2.950000E-02 Sorbent - SO3                  Mass %
85    1.5000 1.736E-01 8.747770E-02 1.500000E-01 Sorbent - Ash                  Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR6-3

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     10,      0,      'B'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,      4.,    1.2,     1.,     .25,     1.,    .5,   .04,    .99,  20/

TR6 - TEST POINT 3    <<CASE C>>  05/14/93  ISSUE 0   REVISION 6
SET POINT DATE:      4/22/92
SET POINT TIME:      14:00:00 - 18:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	157.5001	2.194E+00	2.161484E+00	3.750000E-01	Carbonizer Pressure	PSIG	PI-3007
2	154.3297	2.291E+00	2.164936E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	198.4498	9.610E-01	8.847865E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	807.9099	1.495E+01	1.190448E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.4143	5.331E-01	5.262722E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	29.8308	1.072E+00	3.853659E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	29.0481	1.017E+00	9.349121E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	7.7401	8.229E-01	7.840169E-01	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	2.9530	2.143E-01	1.236661E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	2.0430	5.346E-02	4.040630E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.8407	3.585E-02	2.975530E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	819.2957	1.596E+01	5.440492E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	803.7838	1.301E+01	2.220632E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.0000	.000E+00	9.880500E-03	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	424.0000	10.6118	10.6118		Coal Feed rate	lb/hr	
16	45.0000	1.2311	1.2311		Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	83.9537	2.167E+00	8.337322E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	134.7837	2.429E+01	2.420861E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	169.4377	9.970E+00	9.767215E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	192.9056	1.226E+01	1.209665E+01	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1462.3360	7.878E+00	5.656138E+00	5.483760E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1267.1960	5.809E+00	3.341263E+00	4.751985E+00	Orifice Temp (Upstream)	F	TI-3108
38	150.1879	5.722E+00	5.361542E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	259.0507	5.473E+00	5.094701E+00	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	280.9521	3.027E+00	2.272775E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	211.0408	2.000E+00	3.785460E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.3643	2.035E+00	3.780434E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	39.9000	2.057E+00	1.995000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	67.7600	3.425E+00	3.388000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	6.7500	6.032E-01	3.375000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	8.2500	6.482E-01	4.125000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	76.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR6-3

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	50.7660	1.019E+00	1.008097E+00	1.500000E-01	Coal - C	Mass %
2	3.6000	1.009E-01	9.460466E-02	3.500000E-02	Coal - H	Mass %
3	.9780	5.740E-02	5.166999E-02	2.500000E-02	Coal - N	Mass %
4	.7180	.0359	.0359		Coal - S	Mass %
5	5.5780	4.326E-01	4.209227E-01	1.000000E-01	Coal - Ash	Mass %
6	26.8740	1.383E+00	1.374476E+00	1.500000E-01	Coal - H2O	Mass %
7	8729.2000	1.549E+02	1.528607E+02	2.500000E+01	Coal - HHV	BTU/lb
8	14.0900	1.683E+00	1.676710E+00	1.500000E-01	CD Drain - C	Mass %
9	.0200	3.519E-02	3.612000E-03	3.500000E-02	CD Drain - H	Mass %
10	.2600	4.916E-02	4.232800E-02	2.500000E-02	CD Drain - N	Mass %
11	1.7900	.895	.895		CD Drain - S	Mass %
12	62.0800	1.025E+01	1.024320E+01	2.500000E-01	CD Drain - Ash	Mass %
13	811.				CD Drain - HHV (dry)	BTU/lb Faulty measurement
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S	Mass %
15	1.6100	1.61	1.61		CD Drain - sfide S	Mass %
16	7.2900	1.722E+00	1.715337E+00	1.500000E-01	CD Drain - crbate C	Mass %
17	2.9000	1.45	1.45		CD Drain - Ash S	Mass %
18	87.4000	0.	0.		CD Drain - Ash CaO	Mass %
19	.5000	0.	0.		CD Drain - Ash MgO	Mass %
20	68.3500	2.938E-01	2.526697E-01	1.500000E-01	PD Drain - C	Mass %
21	.6200	3.681E-02	1.140140E-02	3.500000E-02	PD Drain - H	Mass %
22	1.2850	3.976E-02	3.091675E-02	2.500000E-02	PD Drain - N	Mass %
23	1.0350	.5175	.5175		PD Drain - S	Mass %
24	26.9200	5.504E-01	4.903338E-01	2.500000E-01	PD Drain - Ash	Mass %
25	10438.5000	4.924E+01	4.241851E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S	Mass %
27	.3450	.345	.345		PD Drain - sfide S	Mass %
28	1.0450	1.992E-01	1.310547E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	4.4850	2.2425	2.2425		PD Drain - Ash S	Mass %
30	31.1500				PD Drain - Ash CaO *	Mass %
31	5.5000				PD Drain - Ash MgO *	Mass %
32	64.2400	1.230E+00	1.220560E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.5500	4.925E-02	3.465000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.0000	6.133E-02	5.600000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	1.1700	.585	.585		CF/SD Drain - S	Mass %
36	32.1500	1.690E+00	1.671800E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9925.0000	2.001E+02	1.985000E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S	Mass %
39	.5500	.55	.55		CF/SD Drain - sfide S	Mass %
40	1.0300	3.251E-01	2.884000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	4.5400	2.27	2.27		CF/SD Drain - Ash S	Mass %
42	25.5000				CF/SD Drain - Ash CaO *	Mass %
43	6.2000				CF/SD Drain - Ash MgO *	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionlessf
45	63.8100	1.222E+00	1.212390E+00	1.500000E-01	BD Drain - C	Mass %
46	.6800	5.532E-02	4.284000E-02	3.500000E-02	BD Drain - H	Mass %
47	.9700	5.980E-02	5.432000E-02	2.500000E-02	BD Drain - N	Mass %
48	1.6500	.825	.825		BD Drain - S	Mass %
49	32.4700	1.707E+00	1.688440E+00	2.500000E-01	BD Drain - Ash	Mass %
50	9774.0000	1.971E+02	1.954800E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S	Mass %
52	.3600	.36	.36		BD Drain - sfide S	Mass %
53	1.0900	3.401E-01	3.052000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	4.6300	2.315	2.315		BD Drain - Ash S	Mass %
55	36.6000				BD Drain - Ash CaO *	Mass %
56	9.3000				BD Drain - Ash MgO *	
57	69.5750	1.204E+00	9.816108E-01	6.967499E-01	Demister Gas - N2	mol,vol %
58	1.8200	1.124E+00	1.124158E+00	1.920000E-02	Demister Gas - O2	mol,vol %
59	8.9025	7.210E-01	7.153521E-01	9.002500E-02	Demister Gas - CO	mol,vol %
60	1.6398	1.104E-01	1.090372E-01	1.739750E-02	Demister Gas - CH4	mol,vol %
61	8.3500	2.386E-01	2.231438E-01	8.450000E-02	Demister Gas - CO2	mol,vol %
62	.0250	1.831E-03	1.338288E-03	1.250000E-03	Demister Gas - C2H4	mol,vol %
63	.0350	2.516E-03	2.123146E-03	1.350000E-03	Demister Gas - C2H6	mol,vol %
64	.0099	1.209E-03	1.205427E-03	9.900000E-05	Demister Gas - H2S	mol,vol %
65	8.0425	3.455E-01	3.357435E-01	8.142500E-02	Demister Gas - H2	mol,vol %
66	.3034	1.141E-01	1.131140E-01	1.517250E-02	Demister Gas - NH3	mol,vol %
67	.5225	2.516E-02	2.437952E-02	6.225000E-03	Demister Gas - Ar	mol,vol %
68	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR6-3

```
69     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - O2              mol,vol %
70     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO              mol,vol %
71     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CH4             mol,vol %
72     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H4            mol,vol %
74     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S             mol,vol %
76     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3             mol,vol %
78     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - Ar              mol,vol %
79   11.6000 1.500E+00  .000000E+00 1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2             mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2            mol,vol %
82   96.0250 4.784E-01 4.655688E-01 1.100000E-01 Sorbent - CaO                  Mass %
83    1.4500 2.827E-01 2.330152E-01 1.600000E-01 Sorbent - MgO                  Mass %
84     .6500 1.093E-01 1.052782E-01 2.950000E-02 Sorbent - SO3                  Mass %
85    1.5000 1.736E-01 8.747770E-02 1.500000E-01 Sorbent - Ash                  Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR6-4

DEFAULT CONTROL PARAMETERS,

```
  IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
    1,      3,     10,      0,     'D'

  EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
   .5,      3.,    1.,     1.,     .25,     1.     .5,   .04,    .99   20/

TR6 - TEST POINT 4              <<CASE C>>          05/14/93          ISSUE 0   REVISION 6
SET POINT DATE:      4/22/92
SET POINT TIME:      21:00:00 - 01:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	191.8900	9.896E-01	1.183690E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	188.1576	1.1731	9.020156E-01	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	198.9604	6.633E-01	5.470873E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	1000.1210	9.616E+00	3.263197E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.0751	4.010E-01	3.918787E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	19.3570	1.397E+00	9.758372E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	23.8411	1.430E+00	1.373240E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	12.9433	6.911E-01	6.442894E-01	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	1.8718	2.330E-01	1.538931E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	2.0653	9.291E-02	8.607050E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.1938	4.489E-02	4.018980E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	802.8763	1.621E+01	6.140334E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	818.6280	1.315E+01	2.912466E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.0000	.000E+00	1.110560E-02	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	475.0000	11.8855	11.875	.5	Coal Feed rate	lb/hr	
16	55.0000	1.4631	1.375	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	90.1178	2.192E+00	8.974273E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	150.6559	6.001E+01	5.997364E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	159.7776	9.590E+00	9.379199E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	197.4908	8.146E+00	7.896765E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1548.6600	8.002E+00	5.505709E+00	5.807475E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1353.7510	9.008E+00	7.441313E+00	5.076566E+00	Orifice Temp (Upstream)	F	TI-3108
38	152.3064	7.056E+00	6.766934E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	285.7792	4.076E+00	3.551620E+00	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	282.4257	2.217E+00	9.560440E-01	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	211.0909	2.001E+00	5.831220E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.5830	2.013E+00	2.245512E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	57.1100	2.899E+00	2.855500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	49.9100	2.545E+00	2.495500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	1.3200	5.043E-01	6.600001E-02	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	25.5900	1.374E+00	1.279500E+00	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	76.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR6-4

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	50.7660	1.019E+00	1.008097E+00	1.500000E-01	Coal - C	Mass %
2	3.6000	1.009E-01	9.460466E-02	3.500000E-02	Coal - H	Mass %
3	.9780	5.740E-02	5.166999E-02	2.500000E-02	Coal - N	Mass %
4	.7180	.0359	.0359		Coal - S	Mass %
5	5.5780	4.326E-01	4.209227E-01	1.000000E-01	Coal - Ash	Mass %
6	26.8740	1.383E+00	1.374476E+00	1.500000E-01	Coal - H2O	Mass %
7	8729.2000	1.549E+02	1.528607E+02	2.500000E+01	Coal - HHV	BTU/lb
8	13.9500	8.136E-01	7.997023E-01	1.500000E-01	CD Drain - C	Mass %
9	.0200	3.517E-02	3.498852E-03	3.500000E-02	CD Drain - H	Mass %
10	.2150	3.324E-02	2.190781E-02	2.500000E-02	CD Drain - N	Mass %
11	1.2300	.615	.615		CD Drain - S	Mass %
12	62.0500	4.776E+00	4.769707E+00	2.500000E-01	CD Drain - Ash	Mass %
13	869.5000	4.871E+01	4.180100E+01	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S	Mass %
15	1.0700	1.07	1.07		CD Drain - sfide S	Mass %
16	6.6400	8.149E-01	8.009850E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	2.3250	1.1625	1.1625		CD Drain - Ash S	Mass %
18	87.5500	0.	0.		CD Drain - Ash CaO	Mass %
19	1.9000	0.	0.		CD Drain - Ash MgO	Mass %
20	68.4000	4.643E-01	4.394041E-01	1.500000E-01	PD Drain - C	Mass %
21	.5250	3.639E-02	9.957583E-03	3.500000E-02	PD Drain - H	Mass %
22	1.0050	3.744E-02	2.786703E-02	2.500000E-02	PD Drain - N	Mass %
23	.8550	.4275	.4275		PD Drain - S	Mass %
24	27.2800	7.516E-01	7.087615E-01	2.500000E-01	PD Drain - Ash	Mass %
25	10456.5000	8.160E+01	7.767397E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S	Mass %
27	.5600	.56	.56		PD Drain - sfide S	Mass %
28	.8050	1.896E-01	1.159463E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	3.8350	1.9175	1.9175		PD Drain - Ash S	Mass %
30	27.8	0.	0.		PD Drain - Ash CaO	Mass %
31	5.2	0.	0.		PD Drain - Ash MgO	Mass %
32	60.4100	1.158E+00	1.147790E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.4600	4.544E-02	2.898000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	.9600	5.929E-02	5.376000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	1.2100	.605	.605		CF/SD Drain - S	Mass %
36	36.6800	1.924E+00	1.907360E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9280.0000	1.873E+02	1.856000E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S	Mass %
39	.8400	.84	.84		CF/SD Drain - sfide S	Mass %
40	1.1600	3.578E-01	3.248000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	4.3500	2.175	2.175		CF/SD Drain - Ash S	Mass %
42	35.3	0.	0.		CF/SD Drain - Ash CaO	Mass %
43	9.2	0.	0.		CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionlessf
45	70.3300	1.345E+00	1.336270E+00	1.500000E-01	BD Drain - C	Mass %
46	.6000	5.152E-02	3.780000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.3100	7.750E-02	7.336000E-02	2.500000E-02	BD Drain - N	Mass %
48	.8600	.43	.43		BD Drain - S	Mass %
49	26.3500	1.393E+00	1.370200E+00	2.500000E-01	BD Drain - Ash	Mass %
50	10705.0000	2.156E+02	2.141000E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S	Mass %
52	.3800	.38	.38		BD Drain - sfide S	Mass %
53	.8100	2.719E-01	2.268000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	3.2300	1.615	1.615		BD Drain - Ash S	Mass %
55	29.0	0.	0.		BD Drain - Ash CaO	Mass %
56	6.7	0.	0.		BD Drain - Ash MgO	Mass %
57	67.5500	8.153E-01	4.550848E-01	6.765000E-01	Demister Gas - N2	mol,vol %
58	2.5125	5.318E-01	5.311458E-01	2.612500E-02	Demister Gas - O2	mol,vol %
59	10.5250	2.144E-01	1.861955E-01	1.062500E-01	Demister Gas - CO	mol,vol %
60	1.7175	7.462E-02	7.237779E-02	1.817500E-02	Demister Gas - CH4	mol,vol %
61	8.3475	1.906E-01	1.708821E-01	8.447500E-02	Demister Gas - CO2	mol,vol %
62	.0100	1.804E-03	1.429742E-03	1.100000E-03	Demister Gas - C2H4	mol,vol %
63	.0150	4.720E-03	4.577969E-03	1.150000E-03	Demister Gas - C2H6	mol,vol %
64	.0096	1.456E-03	1.452350E-03	0.960000E-04	Demister Gas - H2S	mol,vol %
65	6.9450	3.804E-01	3.738172E-01	7.045000E-02	Demister Gas - H2	mol,vol %
66	.2817	6.938E-02	6.793149E-02	1.408750E-02	Demister Gas - NH3	mol,vol %
67	.5400	1.387E-02	1.230360E-02	6.399999E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR6-4

```
69                                          Freeboard Gas - O2                mol,vol %
70                                          Freeboard Gas - CO                mol,vol %
71                                          Freeboard Gas - CH4               mol,vol %
72                                          Freeboard Gas - CO2               mol,vol %
73                                          Freeboard Gas - C2H4              mol,vol %
74                                          Freeboard Gas - C2H6              mol,vol %
75                                          Freeboard Gas - H2S               mol,vol %
76                                          Freeboard Gas - H2                mol,vol %
77                                          Freeboard Gas - NH3               mol,vol %
78                                          Freeboard Gas - Ar                mol,vol %
79   10.7000 1.500E+00  .000000E+00 1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2             mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2            mol,vol %
82   96.0250 4.784E-01 4.655688E-01 1.100000E-01 Sorbent - CaO                  Mass %
83    1.4500 2.827E-01 2.330152E-01 1.600000E-01 Sorbent - MgO                  Mass %
84     .6500 1.093E-01 1.052782E-01 2.950000E-02 Sorbent - SO3                  Mass %
85    1.5000 1.736E-01 8.747770E-02 1.500000E-01 Sorbent - Ash                  Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88    1.0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR6-5

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     25,     0,      'B'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,      4.,    1.2,     1.,    .25,     1.,    .5,   .04,    .99,  20/

TR6 - TEST POINT 5            <<CASE C>>          05/14/93          ISSUE 0   REVISION 6
SET POINT DATE:     4/23/92
SET POINT TIME:     04:00:00 - 08:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	189.6390	8.573E-01	7.709409E-01	3.750000E-01	Carbonizer Pressure	PSIG	PI-3007
2	185.9597	1.069E+00	7.611937E-01	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	199.2861	6.324E-01	5.092810E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	981.6144	1.008E+01	4.443716E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.1458	3.486E-01	3.380951E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	21.2765	1.507E+00	1.126897E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	22.0524	1.143E+00	1.070653E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	12.7000	6.215E-01	5.690469E-01	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	1.3909	5.301E-01	5.003390E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	2.0538	1.132E-01	1.076894E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.2412	5.340E-02	4.950810E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	813.0403	1.591E+01	5.295835E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	811.7349	1.541E+01	8.556474E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.0000	.000E+00	9.447800E-03	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	462.0000	11.5608	11.55	.5	Coal Feed rate	lb/hr	
16	17.0000	4.2793	4.25	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	88.4623	2.653E+00	1.743201E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	76.1048	2.824E+00	1.993744E+00	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	158.1271	1.028E+01	1.008854E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	193.6974	1.085E+01	1.065936E+01	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1562.5630	7.893E+00	5.288227E+00	5.859611E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1367.2120	5.907E+00	2.933096E+00	5.127045E+00	Orifice Temp (Upstream)	F	TI-3108
38	154.4930	8.986E+00	8.760403E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	260.6979	5.891E+00	5.540850E+00	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	279.9443	5.107E+00	4.698819E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	211.1078	2.001E+00	7.614590E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.7249	2.011E+00	2.142508E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	15.0000	9.014E-01	7.500000E-01	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	50.7900	2.588E+00	2.539500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	4.5300	5.489E-01	2.265000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	26.2200	1.403E+00	1.311000E+00	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	76.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR6-5

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	50.7660	1.019E+00	1.008097E+00	1.500000E-01	Coal - C	Mass %
2	3.6000	1.009E-01	9.460466E-02	3.500000E-02	Coal - H	Mass %
3	.9780	5.740E-02	5.166999E-02	2.500000E-02	Coal - N	Mass %
4	.7180	.0359	.0359		Coal - S	Mass %
5	5.5780	4.326E-01	4.209227E-01	1.000000E-01	Coal - Ash	Mass %
6	26.8740	1.383E+00	1.374476E+00	1.500000E-01	Coal - H2O	Mass %
7	8729.2000	1.549E+02	1.528607E+02	2.500000E+01	Coal - HHV	BTU/lb
8	13.6500	1.631E+00	1.624350E+00	1.500000E-01	CD Drain - C	Mass %
9	.0100	3.505E-02	1.806000E-03	3.500000E-02	CD Drain - H	Mass %
10	.1800	3.852E-02	2.930400E-02	2.500000E-02	CD Drain - N	Mass %
11	1.1100	.555	.555		CD Drain - S	Mass %
12	62.9300	1.039E+01	1.038345E+01	2.500000E-01	CD Drain - Ash	Mass %
13	711.0000	9.321E+01	8.979930E+01	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S	Mass %
15	.8600	.86	.86		CD Drain - sfide S	Mass %
16	6.9400	1.640E+00	1.632982E+00	1.500000E-01	CD Drain - crbate C	Mass %
17	2.0900	1.045	1.045		CD Drain - Ash S	Mass %
18	88.0000	0.	0.		CD Drain - Ash CaO	Mass %
19	1.3800	0.	0.		CD Drain - Ash MgO	Mass %
20	67.1300	2.230E-01	1.650722E-01	1.500000E-01	PD Drain - C	Mass %
21	.4650	3.588E-02	7.880632E-03	3.500000E-02	PD Drain - H	Mass %
22	1.2650	3.162E-02	1.935325E-02	2.500000E-02	PD Drain - N	Mass %
23	1.3250	.6625	.6625		PD Drain - S	Mass %
24	30.6300	2.778E-01	1.211085E-01	2.500000E-01	PD Drain - Ash	Mass %
25	10258.5000	2.998E+01	1.655572E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S	Mass %
27	.9250	.9250	.9250		PD Drain - sfide S	Mass %
28	.8400	1.846E-01	1.076516E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	4.7000	2.35	2.35		PD Drain - Ash S	Mass %
30	24.2000	0.	0.		PD Drain - Ash CaO	Mass %
31	5.3000	0.	0.		PD Drain - Ash MgO	Mass %
32	63.4600	1.215E+00	1.205740E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.4100	4.350E-02	2.583000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.0500	6.389E-02	5.880000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	1.2400	.62	.62		CF/SD Drain - S	Mass %
36	35.9900	1.888E+00	1.871480E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9411.0000	1.899E+02	1.882200E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S	Mass %
39	.7900	.79	.79		CF/SD Drain - sfide S	Mass %
40	1.0600	3.326E-01	2.968000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	4.0900	2.045	2.045		CF/SD Drain - Ash S	Mass %
42	32.9000	0.	0.		CF/SD Drain - Ash CaO	Mass %
43	7.4000	0.	0.		CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionlessf
45	68.4300	1.309E+00	1.300170E+00	1.500000E-01	BD Drain - C	Mass %
46	.5300	4.837E-02	3.339000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.4300	8.389E-02	8.008000E-02	2.500000E-02	BD Drain - N	Mass %
48	.9600	.48	.48		BD Drain - S	Mass %
49	28.5400	1.505E+00	1.484080E+00	2.500000E-01	BD Drain - Ash	Mass %
50	10452.0000	2.105E+02	2.090400E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S	Mass %
52	.4800	.48	.48		BD Drain - sfide S	Mass %
53	.8400	2.790E-01	2.352000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	4.1000	2.05	2.05		BD Drain - Ash S	Mass %
55	26.8000	0.	0.		BD Drain - Ash CaO	Mass %
56	5.3000	0.	0.		BD Drain - Ash MgO	Mass %
57	66.0250	7.678E-01	3.901156E-01	6.612500E-01	Demister Gas - N2	mol,vol %
58	.5800	7.534E-02	7.503331E-02	6.800001E-03	Demister Gas - O2	mol,vol %
59	11.3750	1.832E-01	1.428460E-01	1.147500E-01	Demister Gas - CO	mol,vol %
60	1.6650	7.666E-02	7.459635E-02	1.765000E-02	Demister Gas - CH4	mol,vol %
61	8.8050	2.543E-01	2.382176E-01	8.904999E-02	Demister Gas - CO2	mol,vol %
62	.0100	1.804E-03	1.429742E-03	1.100000E-03	Demister Gas - C2H4	mol,vol %
63	.0125	2.443E-03	2.168398E-03	1.125000E-03	Demister Gas - C2H6	mol,vol %
64	.0051	9.809E-04	9.795510E-04	5.100000E-05	Demister Gas - H2S	mol,vol %
65	8.7150	3.121E-01	2.994176E-01	8.815000E-02	Demister Gas - H2	mol,vol %
66	.1807	2.271E-02	2.083544E-02	9.033750E-03	Demister Gas - NH3	mol,vol %
67	.5150	7.558E-03	4.392989E-03	6.150000E-03	Demister Gas - Ar	mol,vol %
68	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR6-5

```
69     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - O2              mol,vol %
70     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO              mol,vol %
71     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CH4             mol,vol %
72     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H4            mol,vol %
74     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S             mol,vol %
76     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3             mol,vol %
78     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - Ar              mol,vol %
79   11.0000 1.500E+00  .000000E+00 1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2             mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2            mol,vol %
82   96.0250 4.784E-01 4.655688E-01 1.100000E-01 Sorbent - CaO                  Mass %
83    1.4500 2.827E-01 2.330152E-01 1.600000E-01 Sorbent - MgO                  Mass %
84     .6500 1.093E-01 1.052782E-02 2.950000E-02 Sorbent - SO3                  Mass %
85    1.5000 1.736E-01 8.747770E-02 1.500000E-01 Sorbent - Ash                  Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR6-6

DEFAULT CONTROL PARAMETERS,

```
  IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
    1,      3,     25,      0,      'B'

  EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
   .2,      5.,   1.5,     1.,     .25,     1.,    .5,   .04,    .99,  20/

TR6 - TEST POINT 6       <<CASE C>>     05/14/93     ISSUE 0   REVISION 6
SET POINT DATE:     4/23/92
SET POINT TIME:     18:00:00 - 22:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	143.5036	2.664E+00	2.637806E+00	3.750000E-01	Carbonizer Pressure	PSIG	PI-3007
2	140.6938	2.680E+00	2.572898E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	198.3507	9.521E-01	8.751571E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	641.6344	1.490E+01	1.183557E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.7916	2.233E-01	2.065359E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	28.2671	1.545E+00	1.177914E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	27.1413	1.168E+00	1.097861E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	11.3826	9.529E-01	9.195486E-01	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	1.9595	2.692E-01	2.046125E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	1.9271	8.291E-02	7.516390E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.9846	1.154E-01	1.136339E-01	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	795.1934	3.479E+01	3.139563E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	814.5884	1.310E+01	2.691221E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	112.4343	2.066E+00	1.420325E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	304.0000	7.6164	7.6	.5	Coal Feed rate	lb/hr	
16	36.0000	1.0296	.9	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	87.5497	2.322E+00	1.180574E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	133.3800	2.338E+01	2.329325E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	159.9332	1.194E+01	1.177082E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	192.2650	1.068E+01	1.049543E+01	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1535.6650	7.658E+00	5.048078E+00	5.758744E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1296.6780	7.046E+00	5.098646E+00	4.862542E+00	Orifice Temp (Upstream)	F	TI-3108
38	164.6425	6.262E+00	5.933699E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	299.1386	5.497E+01	5.493050E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	283.6328	2.432E+00	1.383560E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	211.1189	2.002E+00	7.786130E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.2620	2.033E+00	3.623704E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	50.2900	2.564E+00	2.514500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	58.7500	2.980E+00	2.937500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	5.3300	5.666E-01	2.665000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	28.2200	1.497E+00	1.411000E+00	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	76.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR6-6

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	62.7550	4.738E-01	4.484107E-01	1.500000E-01	Coal - C	Mass %
2	4.3950	5.507E-02	4.251444E-02	3.500000E-02	Coal - H	Mass %
3	1.5700	3.480E-02	2.420934E-02	2.500000E-02	Coal - N	Mass %
4	3.0450	.15225	.15225		Coal - S	Mass %
5	10.5900	1.134E-01	5.337207E-02	1.000000E-01	Coal - Ash	Mass %
6	10.8700	2.048E-01	1.396443E-01	1.500000E-01	Coal - H2O	Mass %
7	11170.0000	9.430E+01	9.092474E+01	2.500000E+01	Coal - HHV	BTU/lb
8	45.9800	5.474E+00	5.471620E+00	1.500000E-01	CD Drain - C	Mass %
9	.2400	5.571E-02	4.334400E-02	3.500000E-02	CD Drain - H	Mass %
10	.7400	1.230E-01	1.204720E-01	2.500000E-02	CD Drain - N	Mass %
11	3.3200	1.66	1.66		CD Drain - S	Mass %
12	49.0000	8.089E+00	8.085000E+00	2.500000E-01	CD Drain - Ash	Mass %
13	6628.0000	8.375E+02	8.371164E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S	Mass %
15	2.2300	2.23	2.23		CD Drain - sfide S	Mass %
16	3.4400	8.232E-01	8.094320E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	7.6600	3.83	3.83		CD Drain - Ash S	Mass %
18	30.0000	0.	0.		CD Drain - Ash CaO *	Mass %
19	.8000	0.	0.		CD Drain - Ash MgO	Mass %
20	74.3450	3.404E-01	3.055284E-01	1.500000E-01	PD Drain - C	Mass %
21	.7250	3.500E-02	4.486026E-04	3.500000E-02	PD Drain - H	Mass %
22	1.5650	3.054E-02	1.753479E-02	2.500000E-02	PD Drain - N	Mass %
23	2.3350	1.1675	1.1675		PD Drain - S	Mass %
24	22.8000	2.571E-01	6.016142E-02	2.500000E-01	PD Drain - Ash	Mass %
25	11424.0000	4.488E+01	3.727224E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S	Mass %
27	.4800	.48	.48		PD Drain - sfide S	Mass %
28	.2400	1.508E-01	1.510839E-02	1.500000E-01	PD Drain - crbate C	Mass %
29	2.5400	1.27	1.27		PD Drain - Ash S	Mass %
30	21.0000	0.	0.		PD Drain - Ash CaO	Mass %
31	2.4500	0.	0.		PD Drain - Ash MgO	Mass %
32	63.4300	1.214E+00	1.205170E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.6200	5.245E-02	3.906000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.5400	8.979E-02	8.623999E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	1.8800	.94	.94		CF/SD Drain - S	Mass %
36	33.1300	1.741E+00	1.722760E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9836.0000	1.983E+02	1.967200E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S	Mass %
39	.4100	.41	.41		CF/SD Drain - sfide S	Mass %
40	.1600	1.565E-01	4.480000E-02	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	.7400	.37	.37		CF/SD Drain - Ash S	Mass %
42	19.1000	0.	0.		CF/SD Drain - Ash CaO	Mass %
43	3.0000	0.	0.		CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	76.0100	1.452E+00	1.444190E+00	1.500000E-01	BD Drain - C	Mass %
46	.6900	5.581E-02	4.347000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.8700	1.077E-01	1.047200E-01	2.500000E-02	BD Drain - N	Mass %
48	1.5900	.795	.795		BD Drain - S	Mass %
49	18.4400	9.909E-01	9.588800E-01	2.500000E-01	BD Drain - Ash	Mass %
50	11970.0000	2.407E+02	2.394000E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S	Mass %
52	.3600	.36	.36		BD Drain - sfide S	Mass %
53	.2400	1.644E-01	6.720000E-02	1.500000E-01	BD Drain - crbate C	Mass %
54	.6200	.31	.31		BD Drain - Ash S	Mass %
55	14.0000	0.	0.		BD Drain - Ash CaO	Mass %
56	2.5000	0.	0.		BD Drain - Ash MgO	Mass %
57	74.7250	8.726E-01	4.489370E-01	7.482499E-01	Demister Gas - N2	mol,vol %
58	2.9100	5.782E-01	5.774473E-01	3.010000E-02	Demister Gas - O2	mol,vol %
59	4.7100	2.376E-01	2.327257E-01	4.810000E-02	Demister Gas - CO	mol,vol %
60	1.4300	7.442E-02	7.282741E-02	1.530000E-02	Demister Gas - CH4	mol,vol %
61	8.3100	3.238E-01	3.126450E-01	8.410000E-02	Demister Gas - CO2	mol,vol %
62	.0475	1.501E-02	1.493987E-02	1.475000E-03	Demister Gas - C2H4	mol,vol %
63	.0150	4.720E-03	4.577969E-03	1.150000E-03	Demister Gas - C2H6	mol,vol %
64	.0360	5.514E-03	5.505840E-03	3.600000E-04	Demister Gas - H2S	mol,vol %
65	6.8635	2.598E-01	2.503303E-01	6.963500E-02	Demister Gas - H2	mol,vol %
66	.2787	6.366E-02	6.212035E-02	1.393500E-02	Demister Gas - NH3	mol,vol %
67	.5175	2.554E-02	2.478424E-02	6.175000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR6-6

69					Freeboard Gas - O2	mol,vol %
70					Freeboard Gas - CO	mol,vol %
71					Freeboard Gas - CH4	mol,vol %
72					Freeboard Gas - CO2	mol,vol %
73					Freeboard Gas - C2H4	mol,vol %
74					Freeboard Gas - C2H6	mol,vol %
75	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - H2S	mol,vol %
76					Freeboard Gas - H2	mol,vol %
77	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - NH3	mol,vol %
78					Freeboard Gas - Ar	mol,vol %
79	23.8000	1.500E+00	.000000E+00	1.500000E+00	Water Content in Freeboard Gas	mol,vol %
80	.0000	.000E+00	.000000E+00	.000000E+00	Demister Gas - SO2	mol,vol %
81	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - SO2	mol,vol %
82	96.0250	4.784E-01	4.655688E-01	1.100000E-01	Sorbent - CaO	Mass %
83	1.4500	2.827E-01	2.330152E-01	1.600000E-01	Sorbent - MgO	Mass %
84	.6500	1.093E-01	1.052782E-01	2.950000E-02	Sorbent - SO3	Mass %
85	1.5000	1.736E-01	8.747770E-02	1.500000E-01	Sorbent - Ash	Mass %
86	.0000	.000E+00	.000000E+00	.000000E+00	Unused	
87	4.0000	.000E+00	.000000E+00	.000000E+00	Demister gas # of Analyses,	dimensionless
88	0.0000	.000E+00	.000000E+00	.000000E+00	Freeboard gas # of analyses,	dimensionless
89	.0000	.000E+00	.000000E+00	.000000E+00	Unused	

INPUT DATA FILE FOR TR6-7

DEFAULT CONTROL PARAMETERS,

```
  IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
    1,      3,     25,      0,      'B'

  EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
   .2,      5.,   1.5,     1.,     .25,     1.,    .5,   .04,    .99,  20/

TR6 - TEST POINT 7     <<CASE C>>   05/14/93      ISSUE 0   REVISION 6
SET POINT DATE:      4/23/92
SET POINT TIME:      23:00:00 - 03:30:00
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DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	122.4286	3.827E+00	3.808471E+00	3.750000E-01	Carbonizer Pressure	PSIG	PI-3007
2	120.1630	3.739E+00	3.719975E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	199.5031	6.866E-01	5.751672E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	561.4430	2.183E+01	1.987206E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.0928	2.380E-01	2.234061E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	32.1782	1.178E+00	6.217292E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	26.1320	7.651E-01	6.521839E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	7.7170	9.898E-01	9.578034E-01	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	2.1937	1.865E-01	6.435820E-02	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	1.9123	7.469E-02	6.597710E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	3.0994	4.294E-02	3.800220E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	800.8942	3.387E+01	3.036845E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	812.8758	1.304E+01	2.400687E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	58.0411	1.594E+00	5.378155E-01	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	232.0000	5.8215	5.8	.5	Coal Feed rate	lb/hr	
16	39.0000	1.0957	.975	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	89.1174	2.375E+00	1.280463E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	149.8113	3.1[illegible]E+01	3.189746E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	147.1373	1.259E+01	1.242577E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	190.5467	7.806E+00	7.545712E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1531.8990	7.966E+00	5.519351E+00	5.744621E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1266.6360	6.504E+00	4.443279E+00	4.749885E+00	Orifice Temp (Upstream)	F	TI-3108
38	160.6647	6.452E+00	6.133925E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	276.9276	5.220E+01	5.216063E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	282.4940	2.285E+00	1.105921E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	211.0285	2.001E+00	4.961260E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.7124	2.015E+00	2.423915E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	70.0900	3.540E+00	3.504500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	42.8900	2.202E+00	2.144500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	13.0700	8.228E-01	6.535000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	15.4700	9.210E-01	7.735000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	76.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR6-7

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	62.7550	4.738E-01	4.494107E-01	1.500000E-01	Coal - C	Mass %
2	4.3950	5.507E-02	4.251444E-02	3.500000E-02	Coal - H	Mass %
3	1.5700	3.480E-02	2.420934E-02	2.500000E-02	Coal - N	Mass %
4	3.0450	.15225	.15225		Coal - S	Mass %
5	10.5900	1.134E-01	5.337207E-02	1.000000E-01	Coal - Ash	Mass %
6	10.8700	2.049E-01	1.396443E-01	1.500000E-01	Coal - H2O	Mass %
7	11170.0000	9.430E+01	9.092474E+01	2.500000E+01	Coal - HHV	BTU/lb
8	47.2200	1.192E+00	1.182633E+00	1.500000E-01	CD Drain - C	Mass %
9	.3000	3.742E-02	1.324391E-02	3.500000E-02	CD Drain - H	Mass %
10	.8350	6.068E-02	5.528602E-02	2.500000E-02	CD Drain - N	Mass %
11	4.5550	2.2775	2.2775		CD Drain - S	Mass %
12	51.2100	3.115E+00	3.105396E+00	2.500000E-01	CD Drain - Ash	Mass %
13	6776.5000	1.152E+02	1.124866E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S	Mass %
15	2.9500	2.95	2.95		CD Drain - sfide S	Mass %
16	2.5150	1.677E-01	7.491765E-02	1.500000E-01	CD Drain - crbate C	Mass %
17	9.2050	4.6025	4.6025		CD Drain - Ash S	Mass %
18	12.2	0.	0.		CD Drain - Ash CaO *	Mass %
19	1.4000	0.	0.		CD Drain - Ash MgO	Mass %
20	74.0850	6.438E-01	6.260363E-01	1.500000E-01	PD Drain - C	Mass %
21	.6650	3.622E-02	9.326593E-03	3.500000E-02	PD Drain - H	Mass %
22	1.6400	2.574E-02	6.125688E-03	2.500000E-02	PD Drain - N	Mass %
23	2.9000	1.45	1.45		PD Drain - S	Mass %
24	23.5600	5.526E-01	4.928582E-01	2.500000E-01	PD Drain - Ash	Mass %
25	11297.5000	1.070E+02	1.040503E+02	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S	Mass %
27	.6750	.675	.675		PD Drain - sfide S	Mass %
28	.4200	1.505E-01	1.190086E-02	1.500000E-01	PD Drain - crbate C	Mass %
29	3.4050	1.7025	1.7025		PD Drain - Ash S	Mass %
30	21.9000	0.	0.		PD Drain - Ash CaO	Mass %
31	2.1000	0.	0.		PD Drain - Ash MgO	Mass %
32	72.2800	1.381E+00	1.373320E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.6700	5.483E-02	4.221000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.8800	1.082E-01	1.052800E-01	2.500000E-02	CF/SD Drain - N	Mass %
35	2.5300	1.265	1.265		CF/SD Drain - S	Mass %
36	23.1900	1.232E+00	1.205880E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	11319.0000	2.278E+02	2.263800E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S	Mass %
39	.6000	.6	.6		CF/SD Drain - sfide S	Mass %
40	.3200	1.747E-01	8.960000E-02	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	1.5300	.765	.765		CF/SD Drain - Ash S	Mass %
42	18.3000	0.	0.		CF/SD Drain - Ash CaO	Mass %
43	2.2000	0.	0.		CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	74.9800	1.432E+00	1.424620E+00	1.500000E-01	BD Drain - C	Mass %
46	.7300	5.779E-02	4.598000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.8500	1.066E-01	1.036000E-01	2.500000E-02	BD Drain - N	Mass %
48	2.1900	1.095	1.095		BD Drain - S	Mass %
49	19.4400	1.041E+00	1.010880E+00	2.500000E-01	BD Drain - Ash	Mass %
50	11801.0000	2.373E+02	2.360200E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S	Mass %
52	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfide S	Mass %
53	.2900	1.706E-01	8.120000E-02	1.500000E-01	BD Drain - crbate C	Mass %
54	.1300	.065	.065		BD Drain - Ash S	Mass %
55	14.2000	0.	0.		BD Drain - Ash CaO	Mass %
56	2.3000	0.	0.		BD Drain - Ash MgO	Mass %
57	74.5000	9.061E-01	5.143144E-01	7.460000E-01	Demister Gas - N2	mol,vol %
58	.5675	7.319E-02	7.288896E-02	6.675000E-03	Demister Gas - O2	mol,vol %
59	5.0675	1.699E-01	1.618474E-01	5.167500E-02	Demister Gas - CO	mol,vol %
60	1.5750	8.188E-02	8.015063E-02	1.675000E-02	Demister Gas - CH4	mol,vol %
61	7.6225	1.799E-01	1.625037E-01	7.722500E-02	Demister Gas - CO2	mol,vol %
62	.0425	4.684E-03	4.462164E-03	1.425000E-03	Demister Gas - C2H4	mol,vol %
63	.0175	6.824E-03	6.722540E-03	1.175000E-03	Demister Gas - C2H6	mol,vol %
64	.4127	7.061E-02	6.753287E-02	4.127000E-03	Demister Gas - H2S	mol,vol %
65	6.6300	2.738E-01	2.653894E-01	6.730000E-02	Demister Gas - H2	mol,vol %
66	.3389	6.492E-02	6.266502E-02	1.694625E-02	Demister Gas - NH3	mol,vol %
67	.4375	8.850E-03	7.030223E-03	5.375000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR6-7

69					Freeboard Gas - O2	mol,vol %
70					Freeboard Gas - CO	mol,vol %
71					Freeboard Gas - CH4	mol,vol %
72					Freeboard Gas - CO2	mol,vol %
73					Freeboard Gas - C2H4	mol,vol %
74					Freeboard Gas - C2H6	mol,vol %
75	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - H2S	mol,vol %
76					Freeboard Gas - H2	mol,vol %
77	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - NH3	mol,vol %
78					Freeboard Gas - Ar	mol,vol %
79	21.6000	1.500E+00	.000000E+00	1.500000E+00	Water Content in Freeboard Gas	mol,vol %
80	.0000	.000E+00	.000000E+00	.000000E+00	Demister Gas - SO2	mol,vol %
81	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - SO2	mol,vol %
82	96.0250	4.784E-01	4.655688E-01	1.100000E-01	Sorbent - CaO	Mass %
83	1.4500	2.827E-01	2.330152E-01	1.600000E-01	Sorbent - MgO	Mass %
84	.6500	1.093E-01	1.052782E-01	2.950000E-02	Sorbent - SO3	Mass %
85	1.5000	1.736E-01	8.747770E-02	1.5000 E-01	Sorbent - Ash	Mass %
86	.0000	.000E+00	.000000E+00	.000000E+00	Unused	
87	4.0000	.000E+00	.000000E+00	.000000E+00	Demister gas # of Analyses,	dimensionless
88	1.0000	.000E+00	.000000E+00	.000000E+00	Freeboard gas # of Analyses,	dimensionless
89	.0000	.000E+00	.000000E+00	.000000E+00	Unused	

INPUT DATA FILE FOR TR8-1

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     25,      0,     'B'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .3,      5.,    1.5,     1.,     .25,     5.,    .5,   .04,    .99,  20/

TR8 - TEST POINT 1  <<CASE D>>  05/13/93  Wyoming Coal + Limestone
SET POINT DATE:     6/10/92
SET POINT TIME:     20:00:00 - 01:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	128.5779	2.665E+00	2.638790E+00	3.750000E-01	Carbonizer Pressure	PSIG	PI-3007
2	128.2214	2.767E+00	2.663151E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	197.4446	7.847E-01	6.893520E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	613.8411	1.127E+01	6.730656E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	1.2556	1.787E-01	1.571402E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	40.0050	1.003E+00	7.724190E-02	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	27.9444	2.372E+00	2.338525E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	7.0038	1.142E+00	1.114639E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	1.8363	3.971E-01	3.564069E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	1.8389	1.051E-01	9.912330E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.4956	3.148E-02	2.431550E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	700.2296	1.509E+01	1.671141E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	699.9466	1.286E+01	1.054748E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	45.4987	2.264E+00	1.695809E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	300.0000	7.5167	7.5	.5	Coal Feed rate	lb/hr	
16	41.0000	1.1405	1.025	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	83.3413	3.475E+00	2.842320E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	84.1568	4.744E+00	4.301687E+00	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	183.6286	1.184E+01	1.167405E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	168.9853	4.243E+00	3.741930E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1395.9940	9.554E+00	7.992402E+00	5.234977E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	32.6622	6.590E-01	3.630770E-01	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	769.4049	6.872E+00	6.236996E+00	2.885268E+00	Orifice Temp (Upstream)	F	TI-3108
38	151.1355	4.840E+00	4.407088E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	237.0207	3.537E+00	2.917266E+00	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	279.6612	3.076E+00	2.336798E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	210.4878	2.002E+00	9.217690E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	386.8721	2.021E+00	2.889398E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	6.0400	5.841E-01	3.020000E-01	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	45.7200	2.340E+00	2.286000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	10.8700	7.385E-01	5.435000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	2.0400	5.103E-01	1.020000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	76.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	1.0931	5.466E-02	.000000E+00	5.465500E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR8-1

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	49.4833	4.933E-01	4.699250E-01	1.500000E-01	Coal - C	Mass %
2	3.3267	4.408E-02	2.680134E-02	3.500000E-02	Coal - H	Mass %
3	.8700	3.563E-02	2.538997E-02	2.500000E-02	Coal - N	Mass %
4	.6733	.03367	.03367		Coal - S	Mass %
5	5.0167	2.371E-01	2.149625E-01	1.000000E-01	Coal - Ash	Mass %
6	27.0700	9.692E-01	9.575665E-01	1.500000E-01	Coal - H2O	Mass %
7	8821.0000	1.256E+02	1.231286E+02	2.500000E+01	Coal - HHV	BTU/lb
8	18.5000	2.207E+00	2.201500E+00	1.500000E-01	CD Drain - C	Mass %
9	.0400	3.574E-02	7.224000E-03	3.500000E-02	CD Drain - H	Mass %
10	.1400	3.383E-02	2.279200E-02	2.500000E-02	CD Drain - N	Mass %
11	.8800	.44	.44		CD Drain - S	Mass %
12	57.0300	9.413E+00	9.409950E+00	2.500000E-01	CD Drain - Ash	Mass %
13	750.0000	9.797E+01	9.472500E+01	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S	Mass %
15	.7600	.76	.76		CD Drain - sfide S	Mass %
16	7.7700	1.834E+00	1.828281E+00	1.500000E-01	CD Drain - crbate C	Mass %
17	1.8000	.9	.9		CD Drain - Ash S	Mass %
18	20.6000				CD Drain - Ash CaO	Mass %
19	16.4000				CD Drain - Ash MgO	Mass %
20	71.7650	5.731E-01	5.531077E-01	1.500000E-01	PD Drain - C	Mass %
21	.7200	3.513E-02	3.014685E-03	3.500000E-02	PD Drain - H	Mass %
22	1.0150	3.036E-02	1.721713E-02	2.500000E-02	PD Drain - N	Mass %
23	.4000	.2	.2		PD Drain - S	Mass %
24	23.5500	4.666E-01	3.939825E-01	2.500000E-01	PD Drain - Ash	Mass %
25	10651.5000	1.021E+02	9.902307E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S	Mass %
27	.2250	.225	.225		PD Drain - sfide S	Mass %
28	1.1100	2.041E-01	1.383415E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	2.1700	1.085	1.085		PD Drain - Ash S	Mass %
30	27.7500				PD Drain - Ash CaO	Mass %
31	4.1500				PD Drain - Ash MgO	Mass %
32	64.8450	1.774E-01	9.472719E-02	1.500000E-01	CF/SD Drain - C	Mass %
33	.6100	4.498E-02	2.824606E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	.6650	1.165E-01	1.137948E-01	2.500000E-02	CF/SD Drain - N	Mass %
35	.4900	.245	.245		CF/SD Drain - S	Mass %
36	32.2800	9.106E-01	8.755671E-01	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9362.0000	4.820E+01	4.121068E+01	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S	Mass %
39	.2050	.205	.205		CF/SD Drain - sfide S	Mass %
40	1.3850	2.319E-01	1.768048E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	2.2500	1.125	1.125		CF/SD Drain - Ash S	Mass %
42	26.5000				CF/SD Drain - Ash CaO	Mass %
43	5.8000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	0.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	78.8500	6.146E-01	5.960045E-01	1.500000E-01	BD Drain - C	Mass %
46	.9750	3.787E-02	1.447357E-02	3.500000E-02	BD Drain - H	Mass %
47	1.0800	4.150E-02	3.312626E-02	2.500000E-02	BD Drain - N	Mass %
48	.7750	.3875	.3875		BD Drain - S	Mass %
49	17.4300	4.933E-01	4.252298E-01	2.500000E-01	BD Drain - Ash	Mass %
50	11922.5000	1.193E+02	1.166375E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S	Mass %
52	.0750	.0750	.0750		BD Drain - sfide S	Mass %
53	.7750	1.716E-01	8.325384E-02	1.500000E-01	BD Drain - crbate C	Mass %
54	5.0900	2.545	2.545		BD Drain - Ash S	Mass %
55	22.8000				BD Drain - Ash CaO	Mass %
56	3.4000				BD Drain - Ash MgO	Mass %
57	78.1750	8.624E-01	3.621034E-01	7.827500E-01	Demister Gas - N2	mol,vol %
58	.4300	1.004E-01	1.002248E-01	5.300000E-03	Demister Gas - O2	mol,vol %
59	3.9925	5.476E-02	3.637821E-02	4.092500E-02	Demister Gas - CO	mol,vol %
60	1.1850	6.687E-02	6.562879E-02	1.285000E-02	Demister Gas - CH4	mol,vol %
61	7.6375	1.898E-01	1.733188E-01	7.737499E-02	Demister Gas - CO2	mol,vol %
62	.0325	3.907E-03	3.675062E-03	1.325000E-03	Demister Gas - C2H4	mol,vol %
63	.0750	7.317E-03	7.105106E-03	1.750000E-03	Demister Gas - C2H6	mol,vol %
64	.3042	4.797E-02	4.787058E-02	3.042000E-03	Demister Gas - H2S	mol,vol %
65	6.2825	2.268E-01	2.176809E-01	6.382500E-02	Demister Gas - H2	mol,vol %
66	.2097	2.985E-02	2.794900E-02	1.048375E-02	Demister Gas - NH3	mol,vol %
67	.3325	7.317E-03	5.901695E-03	4.325000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR8-1

69					Freeboard Gas - O2	mol,vol %
70					Freeboard Gas - CO	mol,vol %
71					Freeboard Gas - CH4	mol,vol %
72					Freeboard Gas - CO2	mol,vol %
73					Freeboard Gas - C2H4	mol,vol %
74					Freeboard Gas - C2H6	mol,vol %
75	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - H2S	mol,vol %
76					Freeboard Gas - H2	mol,vol %
77	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - NH3	mol,vol %
78					Freeboard Gas - Ar	mol,vol %
79	19.1290	1.500E+00	.000000E+00	1.500000E+00	Water Content in Freeboard Gas	mol,vol %
80	.0000	.000E+00	.000000E+00	.000000E+00	Demister Gas - SO2	mol,vol %
81	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - SO2	mol,vol %
82	97.0200	1.356E+00	1.351070E+00	1.100000E-01	Sorbent - CaO	Mass %
83	1.8000	7.972E-01	7.810249E-01	1.600000E-01	Sorbent - MgO	Mass %
84	.7600	6.384E-02	5.477266E-02	3.280000E-02	Sorbent - SO3	Mass %
85	.3200	2.109E-01	1.483220E-01	1.500000E-01	Sorbent - Ash	Mass %
86	.0000	.000E+00	.000000E+00	.000000E+00	Unused	
87	4.0000	.000E+00	.000000E+00	.000000E+00	Demister gas # of Analyses,	dimensionless
88	1.0000	.000E+00	.000000E+00	.000000E+00	Freeboard gas # of Analyses,	dimensionless
89	.0000	.000E+00	.000000E+00	.000000E+00	Unused	

INPUT DATA FILE FOR TR8-2

DEFAULT CONTROL PARAMETERS,

```
  PRINT  LEVEL   MAXCYC  ITIME   DEVICE
    1,     3,     25,     0,      'B'

  EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
   .2,     5.,    1.5,     1.,    .25,     1.,    .5,   .04,    .99,  20/

TR8 - TEST POINT 2  <<CASE D>>  05/13/93  Wyoming Coal + Limestone
SET POINT DATE:     6/11/92
SET POINT TIME:     03:00:00 - 08:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	132.7104	1.944E+00	1.907223E+00	3.750000E-01	Carbonizer Pressure	PSIG	PI-3007
2	132.1889	2.031E+00	1.887314E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	197.9080	6.478E-01	5.282011E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	704.1376	1.182E+01	7.616150E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	1.1405	1.418E-01	1.134677E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	39.9963	1.005E+00	1.021790E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	31.0620	4.459E-01	1.971116E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	5.3313	7.610E-01	7.187620E-01	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	4.2849	1.160E+00	1.147029E+00	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	1.6953	1.479E-01	1.436861E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.4885	2.711E-02	1.830820E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	700.3181	1.510E+01	1.769342E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	699.8881	1.288E+01	1.210470E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	46.0135	1.692E+00	7.835462E-01	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	310.0000	7.7661	7.75	.5	Coal Feed rate	lb/hr	
16	55.0000	1.4631	1.375	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	76.8577	2.076E+00	5.562004E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	71.9988	2.263E+00	1.059155E+00	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	174.6623	1.267E+01	1.251447E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	166.9754	5.465E+00	5.085493E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1491.9130	1.055E+01	8.946856E+00	5.594674E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	32.3593	6.116E-01	2.674048E-01	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	817.9604	1.456E+01	1.423521E+01	3.067351E+00	Orifice Temp (Upstream)	F	TI-3108
38	143.4912	4.398E+00	3.916707E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	221.9940	3.303E+00	2.628612E+00	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	276.9071	2.527E+00	1.545205E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	210.6514	2.002E+00	8.711690E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.1649	2.009E+00	1.939998E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	26.5100	1.417E+00	1.325500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	34.2500	1.784E+00	1.712500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	4.4700	5.477E-01	2.235000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	1.2900	5.041E-01	6.450000E-02	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	76.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	1.0931	5.466E-02	.000000E+00	5.465500E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR8-2

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	49.4833	4.933E-01	4.689250E-01	1.500000E-01	Coal - C	Mass %
2	3.3267	4.408E-02	2.680134E-02	3.500000E-02	Coal - H	Mass %
3	.8700	3.563E-02	2.538997E-02	2.500000E-02	Coal - N	Mass %
4	.6733	.03367	.03367		Coal - S	Mass %
5	5.0167	2.371E-01	2.149625E-01	1.000000E-01	Coal - Ash	Mass %
6	27.0700	9.692E-01	9.575665E-01	1.500000E-01	Coal - H2O	Mass %
7	8821.0000	1.256E+02	1.231286E+02	2.500000E+01	Coal - HHV	BTU/lb
8	17.2100	2.053E+00	2.047990E+00	1.500000E-01	CD Drain - C	Mass %
9	.0200	3.519E-02	3.612000E-03	3.500000E-02	CD Drain - H	Mass %
10	.0700	2.747E-02	1.139600E-02	2.500000E-02	CD Drain - N	Mass %
11	1.0200	.51	.51		CD Drain - S	Mass %
12	57.5500	9.489E+00	9.485749E+00	2.500000E-01	CD Drain - Ash	Mass %
13	638.0000	8.437E+01	8.057940E+01	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S	Mass %
15	.7200	.72	.72		CD Drain - sfide S	Mass %
16	8.5800	2.024E+00	2.018874E+00	1.500000E-01	CD Drain - crbate C	Mass %
17	1.9200	.96	.96		CD Drain - Ash S	Mass %
18	84.8000				CD Drain - Ash CaO	Mass %
19	.5000				CD Drain - Ash MgO	Mass %
20	60.2550	5.393E-01	5.180051E-01	1.500000E-01	PD Drain - C	Mass %
21	.4850	3.508E-02	2.381452E-03	3.500000E-02	PD Drain - H	Mass %
22	.6700	2.912E-02	1.492654E-02	2.500000E-02	PD Drain - N	Mass %
23	.3900	.195	.195		PD Drain - S	Mass %
24	33.7650	9.417E-01	9.078683E-01	2.500000E-01	PD Drain - Ash	Mass %
25	8901.0000	8.044E+01	7.645133E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S	Mass %
27	.2100	.21	.21		PD Drain - sfide S	Mass %
28	1.6850	2.930E-01	2.516763E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	2.1100	1.055	1.055		PD Drain - Ash S	Mass %
30	26.7000				PD Drain - Ash CaO	Mass %
31	4.3500				PD Drain - Ash MgO	Mass %
32	64.5700	1.236E+00	1.226830E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.5100	4.751E-02	3.213000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	.6200	4.278E-02	3.472000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	.4400	.22	.22		CF/SD Drain - S	Mass %
36	32.4200	1.704E+00	1.685840E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9306.0000	1.878E+02	1.861200E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S	Mass %
39	.3100	.31	.31		CF/SD Drain - sfide S	Mass %
40	1.3700	4.119E-01	3.836000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	2.8400	1.42	1.42		CF/SD Drain - Ash S	Mass %
42	32.5000				CF/SD Drain - Ash CaO	Mass %
43	6.0000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	71.5100	1.367E+00	1.358690E+00	1.500000E-01	BD Drain - C	Mass %
46	.9400	6.879E-02	5.922000E-02	3.500000E-02	BD Drain - H	Mass %
47	.9700	5.980E-02	5.432000E-02	2.500000E-02	BD Drain - N	Mass %
48	.9600	.48	.48		BD Drain - S	Mass %
49	21.3400	1.137E+00	1.109680E+00	2.500000E-01	BD Drain - Ash	Mass %
50	11053.0000	2.225E+02	2.210600E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S	Mass %
52	.0200	.02	.02		BD Drain - sfide S	Mass %
53	1.2000	3.680E-01	3.360000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	4.5700	2.285	2.285		BD Drain - Ash S	Mass %
55	23.9000				BD Drain - Ash CaO	Mass %
56	3.7000				BD Drain - Ash MgO	Mass %
57	77.0667	8.838E-01	4.309086E-01	7.716666E-01	Demister Gas - N2	mol,vol %
58	.4500	8.543E-02	8.524967E-02	5.500000E-03	Demister Gas - O2	mol,vol %
59	4.7733	7.814E-02	6.107710E-02	4.873333E-02	Demister Gas - CO	mol,vol %
60	1.0467	6.119E-02	6.010122E-02	1.146667E-02	Demister Gas - CH4	mol,vol %
61	8.5500	2.343E-01	2.177814E-01	8.650000E-02	Demister Gas - CO2	mol,vol %
62	.0167	5.955E-03	5.840052E-03	1.166667E-03	Demister Gas - C2H4	mol,vol %
63	.0300	9.611E-03	9.522703E-03	1.300000E-03	Demister Gas - C2H6	mol,vol %
64	.0593	1.082E-02	1.080828E-02	5.930000E-04	Demister Gas - H2S	mol,vol %
65	6.3333	2.715E-01	2.637667E-01	6.433333E-02	Demister Gas - H2	mol,vol %
66	.2431	2.767E-02	2.485803E-02	1.215667E-02	Demister Gas - NH3	mol,vol %
67	.3700	8.728E-03	7.353874E-03	4.700000E-03	Demister Gas - Ar	mol,vol %
68	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR8-2

```
69     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - O2              mol,vol %
70     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO              mol,vol %
71     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CH4             mol,vol %
72     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H4            mol,vol %
74     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S             mol,vol %
76     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3             mol,vol %
78     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - Ar              mol,vol %
79   17.7520 1.500E+00  .000000E+00 1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2             mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2            mol,vol %
82   97.0200 1.356E+00 1.351070E+00 1.100000E-01 Sorbent - CaO                  Mass %
83    1.8000 .15        .15                     Sorbent - MgO ***              Mass %
84     .7600 6.384E-02 5.477266E-02 3.280000E-02 Sorbent - SO3                  Mass %
85     .3200 2.109E-01 1.483220E-01 1.500000E-01 Sorbent - Ash                  Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    3.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR8-3

DEFAULT CONTROL PARAMETERS,

```
  IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
    1,      3,     10,      0,      'B'

  EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
   .2,      5.,   1.5,     1.,     .25,     1.,    .5,   .04,    .99,  20/

TR8 - TEST POINT 3  <<CASE C>>  05/13/93  Wyoming Coal + Limestone
SET POINT DATE:     6/11/92
SET POINT TIME:     13:30:00 - 17:30:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	156.4884	2.366E+00	2.335979E+00	3.750000E-01	Carbonizer Pressure	PSIG	PI-3007
2	156.0706	2.443E+00	2.325373E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	197.2448	7.541E-01	6.542237E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	863.4936	2.839E+01	2.690861E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.8862	1.163E-01	7.934680E-02	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	34.0728	2.661E+00	2.465712E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	17.7959	2.550E+00	2.518751E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	5.3706	7.255E-01	6.810923E-01	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	6.7041	3.258E-01	2.747514E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	1.8440	1.032E-01	9.704700E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.3241	3.789E-02	3.218610E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	799.8051	1.517E+01	2.240725E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	800.2860	1.287E+01	1.080110E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	48.7440	6.033E+00	5.843054E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	393.0000	9.8377	9.825	.5	Coal Feed rate	lb/hr	
16	27.0000	.8400	.675	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	86.3411	2.295E+00	1.125338E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	237.9279	1.114E+02	1.113406E+02	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	172.2106	1.596E+01	1.583714E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	159.0698	6.301E+00	5.975027E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1533.2110	1.546E+01	1.435437E+01	5.749541E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	25.3701	6.411E-01	3.293601E-01	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	962.2587	7.247E+00	6.284528E+00	3.608470E+00	Orifice Temp (Upstream)	F	TI-3108
38	138.2234	3.466E+00	2.830478E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	243.0027	1.077E+01	1.058517E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	284.1965	2.598E+00	1.658306E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	210.8474	2.002E+00	9.151380E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	386.8989	2.015E+00	2.469102E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	16.7600	9.758E-01	8.380000E-01	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	33.9400	1.769E+00	1.697000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	7.5600	6.268E-01	3.780000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	7.6700	6.301E-01	3.835000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	76.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	1.0931	5.466E-02	.000000E+00	5.465500E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR8-3

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	49.4833	4.933E-01	4.699250E-01	1.500000E-01	Coal - C	Mass %
2	3.3267	4.408E-02	2.680134E-02	3.500000E-02	Coal - H	Mass %
3	.8700	3.563E-02	2.538997E-02	2.500000E-02	Coal - N	Mass %
4	.6733	.03367	.03367		Coal - S	Mass %
5	5.0167	2.371E-01	2.149625E-01	1.000000E-01	Coal - Ash	Mass %
6	27.0700	9.692E-01	9.575665E-01	1.500000E-01	Coal - H2O	Mass %
7	8821.0000	1.256E+02	1.231286E+02	2.500000E+01	Coal - HHV	BTU/lb
8	3.7400	4.697E-01	4.450600E-01	1.500000E-01	CD Drain - C	Mass %
9	.0300	3.542E-02	5.418000E-03	3.500000E-02	CD Drain - H	Mass %
10	.0700	2.747E-02	1.139600E-02	2.500000E-02	CD Drain - N	Mass %
11	1.0600	.53	.53		CD Drain - S	Mass %
12	95.1000	1.569E+01	1.569150E+01	2.500000E-01	CD Drain - Ash	Mass %
13	701.0000	9.200E+01	8.853630E+01	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S	Mass %
15	1.0600	1.06	1.06		CD Drain - sfide S	Mass %
16	.0900	1.515E-01	2.117700E-02	1.500000E-01	CD Drain - crbate C	Mass %
17	1.1200	.56	.56		CD Drain - Ash S	Mass %
18	93.9000				CD Drain - Ash CaO	Mass %
19	1.1000				CD Drain - Ash MgO	Mass %
20	64.3200	1.912E-01	1.184999E-01	1.500000E-01	PD Drain - C	Mass %
21	.6150	3.961E-02	1.855027E-02	3.500000E-02	PD Drain - H	Mass %
22	.7250	3.161E-02	1.934009E-02	2.500000E-02	PD Drain - N	Mass %
23	.7100	.355	.355		PD Drain - S	Mass %
24	31.1750	4.010E-01	3.134810E-01	2.500000E-01	PD Drain - Ash	Mass %
25	9756.5000	5.799E+01	5.232531E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S	Mass %
27	.7100	.71	.71		PD Drain - sfide S	Mass %
28	1.2200	2.239E-01	1.662623E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	3.1150	1.5575	1.5575		PD Drain - Ash S	Mass %
30	32.4500				PD Drain - Ash CaO	Mass %
31	4.5500				PD Drain - Ash MgO	Mass %
32	64.5900	1.236E+00	1.227210E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.5400	4.881E-02	3.402000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	.6500	4.416E-02	3.640000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	.4500	.225	.225		CF/SD Drain - S	Mass %
36	31.5700	1.661E+00	1.641640E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9672.0000	1.950E+02	1.934400E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S	Mass %
39	.2200	.22	.22		CF/SD Drain - sfide S	Mass %
40	1.3000	3.937E-01	3.640000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	3.1900	1.595	1.595		CF/SD Drain - Ash S	Mass %
42	31.0000				CF/SD Drain - Ash CaO	Mass %
43	7.0000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	65.7600	1.258E+00	1.249440E+00	1.500000E-01	BD Drain - C	Mass %
46	.7400	5.830E-02	4.662000E-02	3.500000E-02	BD Drain - H	Mass %
47	.5000	3.754E-02	2.800000E-02	2.500000E-02	BD Drain - N	Mass %
48	.7100	.355	.355		BD Drain - S	Mass %
49	30.1000	1.585E+00	1.565200E+00	2.500000E-01	BD Drain - Ash	Mass %
50	9935.0000	2.003E+02	1.987000E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S	Mass %
52	.5000	.5	.5		BD Drain - sfide S	Mass %
53	1.2700	3.859E-01	3.556000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	3.6100	1.805	1.805		BD Drain - Ash S	Mass %
55	32.0000				BD Drain - Ash CaO	Mass %
56	4.8000				BD Drain - Ash MgO	Mass %
57	72.0000	7.914E-01	3.263898E-01	7.210000E-01	Demister Gas - N2	mol.vol %
58	.2350	4.307E-02	4.293890E-02	3.350000E-03	Demister Gas - O2	mol.vol %
59	6.4975	7.207E-02	2.901489E-02	6.597500E-02	Demister Gas - CO	mol.vol %
60	1.5200	1.277E-01	1.266601E-01	1.620000E-02	Demister Gas - CH4	mol.vol %
61	9.5100	2.592E-01	2.407487E-01	9.610000E-02	Demister Gas - CO2	mol.vol %
62	.0100	1.804E-03	1.429742E-03	1.100000E-03	Demister Gas - C2H4	mol.vol %
63	.0475	6.719E-03	6.555195E-03	1.475000E-03	Demister Gas - C2H6	mol.vol %
64	.0262	8.187E-03	8.182705E-03	2.620000E-04	Demister Gas - H2S	mol.vol %
65	8.1950	2.890E-01	2.768908E-01	8.295000E-02	Demister Gas - H2	mol.vol %
66	.2738	3.660E-02	3.394963E-02	1.368750E-02	Demister Gas - NH3	mol.vol %
67	.4175	9.224E-03	7.635824E-03	5.175000E-03	Demister Gas - Ar	mol.vol %
68					Freeboard Gas - N2	mol.vol %

INPUT DATA FILE FOR TR8-3

```
69                                                Freeboard Gas - O2              mol,vol %
70                                                Freeboard Gas - CO              mol,vol %
71                                                Freeboard Gas - CH4             mol,vol %
72                                                Freeboard Gas - CO2             mol,vol %
73                                                Freeboard Gas - C2H4            mol,vol %
74                                                Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S             mol,vol %
76                                                Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3             mol,vol %
78                                                Freeboard Gas - Ar              mol,vol %
79   16.6600 1.500E+00  .000000E+00 1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2              mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2             mol,vol %
82   97.0200 1.356E+00 1.351070E+00 1.100000E-01 Sorbent - CaO                   Mass %
83    1.8000 7.972E-01 7.810249E-01 1.600000E-01 Sorbent - MgO                   Mass %
84     .7600 6.384E-02 5.477266E-02 3.280000E-02 Sorbent - SO3                   Mass %
85     .3200 2.109E-01 1.483220E-01 1.500000E-01 Sorbent - Ash                   Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88    2.0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR8-4

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     25,      0,      'B'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,      5.,    1.5,    1.,     .25,     1.,    .5,   .04,    .99,  20/

TR8 - TEST POINT 4  <<CASE C>>  05/13/93   Ill No.6 + Limestone
SET POINT DATE:     6/12/92
SET POINT TIME:     21:00:00 - 02:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	113.2288	2.653E+00	2.626614E+00	3.750000E-01	Carbonizer Pressure	PSIG	PI-3007
2	112.6871	2.735E+00	2.630538E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	197.5161	7.216E-01	6.165041E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	688.4787	1.355E+01	1.009330E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.5149	1.434E-01	1.155097E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	35.5141	1.747E+00	1.432667E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	19.2753	2.171E+00	2.133809E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	2.2711	6.842E-01	6.368561E-01	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	1.5062	2.001E-01	9.703860E-02	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	1.6387	1.816E-01	1.781898E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.6478	3.368E-02	2.710120E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	800.0941	1.553E+01	4.035186E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	800.3544	1.311E+01	2.737412E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	96.2838	1.599E+00	5.525844E-01	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	320.0000	8.0156	8.0	.5	Coal Feed rate	lb/hr	
16	76.0000	1.9647	1.9	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	"	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	83.7059	2.882E+00	2.074532E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	106.3503	1.820E+01	1.809332E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	171.6120	1.323E+01	1.307505E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	177.7745	9.067E+00	8.843460E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1588.4370	6.613E+00	2.873457E+00	5.956639E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	4.452900E-03	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1070.1610	7.477E+00	6.308469E+00	4.013103E+00	Orifice Temp (Upstream)	F	TI-3108
38	117.2758	6.274E+00	5.946481E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	320.4424	8.060E+01	8.057705E+01	2.000000E+00	Primary Cyclone Temperature	F	TI-3060
40	282.5286	2.738E+00	1.869306E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	250.3619	3.947E+01	3.941961E+01	2.000000E+00	Secondary Cyclone Temperature	F	TI-3096
42	386.8439	2.017E+00	2.647514E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	66.6700	3.371E+00	3.333500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	57.1800	2.902E+00	2.859000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	34.2200	1.783E+00	1.711000E+00	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	24.6200	1.329E+00	1.231000E+00	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	76.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	1.0931	5.466E-02	.000000E+00	5.465500E-02	Orifice Coefficient	dimensionless	* Original sigmwas112

INPUT DATA FILE FOR TR8-4

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement		
1	63.5600	2.057E-01	1.408222E-01	1.500000E-01	Coal - C	Mass %	
2	3.8150	3.501E-02	7.883413E-04	3.500000E-02	Coal - H	Mass %	
3	1.4500	3.218E-02	2.026574E-02	2.500000E-02	Coal - N	Mass %	
4	3.0300	.1515	.1515		Coal - S	Mass %	
5	10.9900	5.089E-01	4.989545E-01	1.000000E-01	Coal - Ash	Mass %	
6	9.2450	3.454E-01	3.111843E-01	1.500000E-01	Coal - H2O	Mass %	
7	11505.0000	3.328E+01	2.197338E+01	2.500000E+01	Coal - HHV	BTU/lb	
8	20.4400	2.437E+00	2.432360E+00	1.500000E-01	CD Drain - C	Mass %	
9	.1100	4.024E-02	1.986600E-02	3.500000E-02	CD Drain - H	Mass %	
10	.2600	4.916E-02	4.232800E-02	2.500000E-02	CD Drain - N	Mass %	
11	4.3500	2.175	2.175		CD Drain - S	Mass %	
12	72.6200	1.198E+01	1.198230E+01	2.500000E-01	CD Drain - Ash	Mass %	
13	2262.0000	2.868E+02	2.856906E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb	
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S	Mass %	
15	3.8700	3.87	3.87		CD Drain - sfide S	Mass %	
16	6.1000	1.443E+00	1.435330E+00	1.500000E-01	CD Drain - crbate C	Mass %	
17	6.4800	3.24	3.24		CD Drain - Ash S	Mass %	
18	73.7000				CD Drain - Ash CaO	Mass %	
19	.7000				CD Drain - Ash MgO	Mass %	
20	66.3300	2.008E-01	1.334996E-01	1.500000E-01	PD Drain - C	Mass %	
21	.5700	3.779E-02	1.425394E-02	3.500000E-02	PD Drain - H	Mass %	
22	1.1150	5.675E-02	5.094148E-02	2.500000E-02	PD Drain - N	Mass %	
23	2.0300	1.015	1.015		PD Drain - S	Mass %	
24	31.4450	2.501E-01	7.417723E-03	2.500000E-01	PD Drain - Ash	Mass %	
25	10372.5000	5.719E+01	5.143173E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb	
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S	Mass %	
27	1.0000	1.	1.		PD Drain - sfide S	Mass %	
28	.7300	1.542E-01	3.591303E-02	1.500000E-01	PD Drain - crbate C	Mass %	
29	5.9050	2.9525	2.9525		PD Drain - Ash S	Mass %	
30	23.8000				PD Drain - Ash CaO	Mass %	
31	.8000				PD Drain - Ash MgO	Mass %	
32	69.2750	1.734E-01	8.696531E-02	1.500000E-01	CF/SD Drain - C	Mass %	
33	.6700	3.563E-02	6.687665E-03	3.500000E-02	CF/SD Drain - H	Mass %	
34	1.0200	2.670E-02	9.376996E-03	2.500000E-02	CF/SD Drain - N	Mass %	
35	1.2350	.6175	.6175		CF/SD Drain - S	Mass %	
36	28.1250	4.140E-01	3.300029E-01	2.500000E-01	CF/SD Drain - Ash	Mass %	
37	10724.5000	2.688E+01	9.864694E+00	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb	
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S	Mass %	
39	.3950	.395	.395		CF/SD Drain - sfide S	Mass %	
40	.4800	1.529E-01	2.979609E-02	1.500000E-01	CF/SD Drain - cabate C	Mass %	
41	3.4950	1.7475	1.7475		CF/SD Drain - Ash S	Mass %	
42	17.8500				CF/SD Drain - Ash CaO	Mass %	
43	.8000				CF/SD Drain - Ash MgO	Mass %	
44	1.	.01715	.01715		Coeff in Dulong's correlation	dimensionless	
45	70.6300	1.350E+00	1.341970E+00	1.500000E-01	BD Drain - C	Mass %	
46	.7400	5.830E-02	4.662000E-02	3.500000E-02	BD Drain - H	Mass %	
47	1.1000	6.648E-02	6.160000E-02	2.500000E-02	BD Drain - N	Mass %	
48	1.3400	.67	.67		BD Drain - S	Mass %	
49	25.8800	1.369E+00	1.345760E+00	2.500000E-01	BD Drain - Ash	Mass %	
50	11000.0000	2.214E+02	2.200000E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb	
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S	Mass %	
52	.6000	.6	.6		BD Drain - sfide S	Mass %	
53	.4200	1.906E-01	1.176000E-01	1.500000E-01	BD Drain - crbate C	Mass %	
54	3.6700	1.835	1.835		BD Drain - Ash S	Mass %	
55	20.4000				BD Drain - Ash CaO	Mass %	
56	1.2000				BD Drain - Ash MgO	Mass %	
57	72.6000	8.578E-01	4.568280E-01	7.260001E-01	Demister Gas - N2	mol,vol %	
58	.2550	5.116E-02	5.110040E-02	2.550000E-03	Demister Gas - O2	mol,vol %	
59	5.6050	8.937E-02	6.960713E-02	5.605000E-02	Demister Gas - CO	mol,vol %	
60	1.5400	1.994E-01	1.988536E-01	1.540000E-02	Demister Gas - CH4	mol,vol %	
61	9.9625	2.621E-01	2.423929E-01	9.962501E-02	Demister Gas - CO2	mol,vol %	
62	.0375	2.810E-02	2.807903E-02	1.000000E-03	Demister Gas - C2H4	mol,vol %	
63	.0300	1.132E-02	1.127480E-02	1.000000E-03	Demister Gas - C2H6	mol,vol %	
64	.0151	1.0903-02	1.090188E-02	1.510000E-04	Demister Gas - H2S	mol,vol %	T sigma was re-
65	7.7850	2.274E-01	2.136210E-01	7.785000E-02	Demister Gas - H2	mol,vol %	revised 7/16/93
66	.2655	6.094E-02	5.947741E-02	1.327625E-02	Demister Gas - NH3	mol,vol %	to 72.2% of mean
67	.4650	8.800E-03	7.471047E-03	4.650000E-03	Demister Gas - Ar	mol,vol %	averaged over runs
68	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - N2	mol,vol %	6-1 to 8-10.

INPUT DATA FILE FOR TR8-4

```
69     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - O2              mol,vol %
70     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - CO              mol,vol %
71     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - CH4             mol,vol %
72     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - C2H4            mol,vol %
74     .0000   000E+00  .000000E+00  .000000E+00 Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S             mol,vol %
76     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3             mol,vol %
78     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - Ar              mol,vol %
79   21.6790 1.535E+00 3.251850E-01 1.500000E+00 Freeboard Water Vapor          mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2             mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2            mol,vol %
82   97.0200 1.356E+00 1.351070E+00 1.300000E-01 Sorbent - CaO                  Mass %
83    1.8000 7.972E-01 7.810249E-01 1.600000E-01 Sorbent - MgO                  Mass %
84     .7600 6.384E-02 5.477266E-02 3.280000E-02 Sorbent - SO3                  Mass %
85     .3200 2.109E-01 1.483220E-01 1.500000E-01 Sorbent - Ash                  Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88    0.0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR8-5

DEFAULT CONTROL PARAMETERS,

```
  IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
    1,      3,     25,      0,      'B'

  EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
   .2,      5.,   1.5,     1.,     .25,     1.,    .5,   .04,    .99,  20/

TR8 - TEST POINT 5  <<CASE C>>  05/13/93  Ill No. 6 + Limestone
SET POINT DATE:      6/13/92
SET POINT TIME:      07:00:00 - 11:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	160.5706	6.194E+00	6.182707E+00	3.750000E-01	Carbonizer Pressure	PSIG	PI-3007
2	159.8922	6.180E+00	6.134517E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	197.7524	5.626E-01	4.194438E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	954.1791	3.857E+01	3.749062E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.5553	1.441E-01	1.163335E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	40.1006	1.833E+00	1.536074E+00	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	21.2050	3.347E+00	3.322642E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	5.3992	2.294E+00	2.280203E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	3.6890	6.650E-01	6.415663E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	1.6049	9.041E-02	8.335860E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.3261	8.062E-02	7.810140E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	800.5272	1.537E+01	3.373310E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	799.8753	1.370E+01	4.832029E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	139.6737	7.417E+00	7.264067E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	427.0000	10.6867	10.675	.5	Coal Feed rate	lb/hr	
16	104.0000	2.6476	2.6	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	80.6818	2.846E+00	2.025400E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	79.8191	4.966E+00	4.545419E+00	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	158.0986	1.506E+01	1.492491E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	184.6454	1.937E+01	1.926271E+01	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1646.8000	8.296E+00	5.539544E+00	6.175500E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	3.999200E-03	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1209.6640	1.425E+01	1.350923E+01	4.536240E+00	Orifice Temp (Upstream)	F	TI-3108
38	116.6388	3.958E+00	3.415915E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	302.0842	9.553E+01	9.551140E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	282.4054	2.440E+00	1.397326E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	286.6529	1.090E+02	1.089669E+02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.0230	2.007E+00	1.686073E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	51.4700	2.622E+00	2.573500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	61.4400	3.112E+00	3.072000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	36.6700	1.900E+00	1.833500E+00	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	34.8600	1.813E+00	1.743000E+00	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	75.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	1.0931	5.466E-02	.000000E+00	5.465500E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR8-5

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	63.5600	2.057E-01	1.408222E-01	1.500000E-01	Coal - C	Mass %
2	3.8150	3.501E-02	7.883413E-04	3.500000E-02	Coal - H	Mass %
3	1.4500	3.218E-02	2.026574E-02	2.500000E-02	Coal - N	Mass %
4	3.0300	.1515	.1515		Coal - S	Mass %
5	10.9900	5.089E-01	4.989545E-01	1.000000E-01	Coal - Ash	Mass %
6	9.2450	3.454E-01	3.111843E-01	1.500000E-01	Coal - H2O	Mass %
7	11505.0000	3.328E+01	2.197338E+01	2.500000E+01	Coal - HHV	BTU/lb
8	8.5700	1.031E+00	1.019830E+00	1.500000E-01	CD Drain - C	Mass %
9	.1100	4.024E-02	1.986600E-02	3.500000E-02	CD Drain - H	Mass %
10	.0100	2.505E-02	1.628000E-03	2.500000E-02	CD Drain - N	Mass %
11	8.4600	4.23	4.23		CD Drain - S	Mass %
12	103.1100	1.701E+01	1.701315E+01	2.500000E-01	CD Drain - Ash	Mass %
13	1354.0000	1.728E+02	1.710102E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S	Mass %
15	7.9600	7.96	7.96		CD Drain - sfide S	Mass %
16	3.9300	9.368E-01	9.247290E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	8.6600	4.33	4.33		CD Drain - Ash S	Mass %
18	75.4000				CD Drain - Ash CaO	Mass %
19	.5000				CD Drain - Ash MgO	Mass %
20	65.7500	7.851E-01	7.706728E-01	1.500000E-01	PD Drain - C	Mass %
21	.5900	3.523E-02	3.991783E-03	3.500000E-02	PD Drain - H	Mass %
22	.9650	2.545E-02	4.739978E-03	2.500000E-02	PD Drain - N	Mass %
23	1.5150	.7575	.7575		PD Drain - S	Mass %
24	32.8350	7.707E-01	7.290253E-01	2.500000E-01	PD Drain - Ash	Mass %
25	10120.0000	1.395E+02	1.372330E+02	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S	Mass %
27	.6650	.665	.665		PD Drain - sfide S	Mass %
28	.5950	1.539E-01	3.426112E-02	1.500000E-01	PD Drain - crbate C	Mass %
29	4.6300	2.315	2.315		PD Drain - Ash S	Mass %
30	23.2000				PD Drain - Ash CaO	Mass %
31	.7500				PD Drain - Ash MgO	Mass %
32	63.9200	1.224E+00	1.214480E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.5400	4.881E-02	3.402000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	.9500	5.878E-02	5.320000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	1.4200	.71	.71		CF/SD Drain - S	Mass %
36	34.2600	1.799E+00	1.781520E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9890.0000	1.994E+02	1.978000E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S	Mass %
39	.7700	.77	.77		CF/SD Drain - sfide S	Mass %
40	.7800	2.650E-01	2.184000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	4.4800	2.24	2.24		CF/SD Drain - Ash S	Mass %
42	27.5000				CF/SD Drain - Ash CaO	Mass %
43	.8000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionlessf
45	69.9800	1.338E+00	1.329620E+00	1.500000E-01	BD Drain - C	Mass %
46	.5800	5.060E-02	3.654000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.2300	7.328E-02	6.888000E-02	2.500000E-02	BD Drain - N	Mass %
48	1.0500	.525	.525		BD Drain - S	Mass %
49	26.9200	1.422E+00	1.399840E+00	2.500000E-01	BD Drain - Ash	Mass %
50	10793.0000	2.173E+02	2.158600E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S	Mass %
52	.4600	.46	.46		BD Drain - sfide S	Mass %
53	.2500	1.655E-01	7.000000E-02	1.500000E-01	BD Drain - crbate C	Mass %
54	2.9200	1.46	1.46		BD Drain - Ash S	Mass %
55	18.7000				BD Drain - Ash CaO	Mass %
56	1.1000				BD Drain - Ash MgO	Mass %
57	70.0500	7.476E-01	2.583199E-01	7.015000E-01	Demister Gas - N2	mol,vol %
58	.2700	3.884E-02	3.866524E-02	3.700000E-03	Demister Gas - O2	mol,vol %
59	6.0825	1.931E-01	1.829616E-01	6.182499E-02	Demister Gas - CO	mol,vol %
60	1.5350	1.597E-01	1.588662E-01	1.635000E-02	Demister Gas - CH4	mol,vol %
61	12.1500	1.097E+00	1.090430E+00	1.225000E-01	Demister Gas - CO2	mol,vol %
73	.0000	3.384E-03	3.200000E-03	1.100000E-03	Freeboard Gas - C2H4	mol,vol %
63	.0200	2.051E-02	2.047840E-02	1.200000E-03	Demister Gas - C2H6	mol,vol %
64	.0022	9.623E-04	9.620058E-04	2.200000E-05	Demister Gas - H2S	mol,vol %
65	7.9025	2.725E-01	2.604615E-01	8.002500E-02	Demister Gas - H2	mol,vol %
66	.1577	1.325E-02	1.065046E-02	7.886251E-03	Demister Gas - NH3	mol,vol %
67	.5100	1.179E-02	1.008419E-02	6.100000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR8-5

69					Freeboard Gas - O2	mol,vol %
70					Freeboard Gas - CO	mol,vol %
71					Freeboard Gas - CH4	mol,vol %
72					Freeboard Gas - CO2	mol,vol %
62	.0000	.000E+00	.000000E+00	.000000E-03	Demister Gas - C2H4	mol,vol %
74	.0000	.000E+00	.000000E+00	.000000E-03	Freeboard Gas - C2H6	mol,vol %
75	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - H2S	mol,vol %
76					Freeboard Gas - H2	mol,vol %
77	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - NH3	mol,vol %
78					Freeboard Gas - Ar	mol,vol %
79	21.9090	1.500E+00	.000000E+00	1.500000E+00	Water Content in Freeboard Gas	mol,vol %
80	.0000	.000E+00	.000000E+00	.000000E+00	Demister Gas - SO2	mol,vol %
81	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - SO2	mol,vol %
82	97.0200	1.356E+00	1.351070E+00	1.100000E-01	Sorbent - CaO	Mass %
83	1.8000	7.972E-01	7.810249E-01	1.600000E-01	Sorbent - MgO	Mass %
84	.7600	6.384E-02	5.477266E-02	3.280000E-02	Sorbent - SO3	Mass %
85	.3200	2.109E-01	1.483220E-01	1.500000E-01	Sorbent - Ash	Mass %
86	.0000	.000E+00	.000000E+00	.000000E+00	Unused	
87	4.0000	.000E+00	.000000E+00	.000000E+00	Demister gas # of Analyses,	dimensionless
88	1.0000	.000E+00	.000000E+00	.000000E+00	Freeboard gas # of Analyses,	dimensionless
89	.0000	.000E+00	.000000E+00	.000000E+00	Unused	

INPUT DATA FILE FOR TR8-6

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     25,      0,      'B'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .3,      5.,    1.5,     1.,     .25,     1.,    .5,   .04,    .99,  20/

TR8 - TEST POINT 6/7 <<CASE C>>  05/13/93  Pitts No 8 + Dolomite
SET POINT DATE:      6/14/92
SET POINT TIME:      21:00:00 - 01:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	155.9950	1.102E+00	1.036484E+00	3.750000E-01	Carbonizer Pressure	PSIG	PI-3007
2	155.2241	1.312E+00	1.076570E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	197.1968	6.987E-01	5.895636E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	916.7810	1.626E+01	1.351388E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.7042	1.530E-01	1.272359E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	41.7508	1.409E+00	9.920185E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	5.4565	1.459E+00	1.403016E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	15.2914	1.537E+00	1.516377E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	3.2608	2.349E-01	1.566197E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	1.6320	5.647E-02	4.431420E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.3549	2.581E-02	1.631030E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	899.1883	1.587E+01	5.180538E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	899.7458	1.340E+01	3.901422E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	99.0871	1.864E+00	1.106509E+00	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	380.0000	9.5131	9.5	.5	Coal Feed rate	lb/hr	
16	124.0000	3.1401	3.1	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	85.1801	2.404E+00	1.333776E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	109.4354	1.965E+01	1.954990E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	186.0294	1.313E+01	1.298165E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	145.3126	6.743E+00	6.439700E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1635.1370	7.039E+00	3.456274E+00	6.131763E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	3.990400E-03	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1231.6480	5.173E+00	2.328710E+00	4.618680E+00	Orifice Temp (Upstream)	F	TI-3108
38	126.7065	5.549E+00	5.175559E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	402.7349	8.557E+01	8.554725E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	285.4608	2.579E+00	1.628406E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	233.8298	3.539E+01	3.533754E+01	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	386.7716	2.025E+00	3.149712E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	82.0200	4.131E+00	4.101000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	114.5400	5.749E+00	5.727000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	32.2500	1.688E+00	1.612500E+00	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	41.1100	2.115E+00	2.055500E+00	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	76.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	1.0931	5.466E-02	.000000E+00	5.465500E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR8-6

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	68.2100	6.356E-01	6.176881E-01	1.500000E-01	Coal - C	Mass %
2	4.2067	5.466E-02	4.198128E-02	3.500000E-02	Coal - H	Mass %
3	1.7533	4.059E-02	3.197945E-02	2.500000E-02	Coal - N	Mass %
4	4.0700	.2035	.2035		Coal - S	Mass %
5	13.3767	4.042E-01	3.916519E-01	1.000000E-01	Coal - Ash	Mass %
6	2.8167	1.772E-01	9.433937E-02	1.500000E-01	Coal - H2O	Mass %
7	12406.6700	1.313E+02	1.289222E+02	2.500000E+01	Coal - HHV	BTU/lb
8	35.8350	1.361E+00	1.352526E+00	1.500000E-01	CD Drain - C	Mass %
9	.2350	3.628E-02	9.552817E-03	3.500000E-02	CD Drain - H	Mass %
10	.6350	4.968E-02	4.292939E-02	2.500000E-02	CD Drain - N	Mass %
11	6.5150	3.2575	3.2575		CD Drain - S	Mass %
12	76.0200	5.561E+00	5.555717E+00	2.500000E-01	CD Drain - Ash	Mass %
13	5787.0000	1.727E+02	1.708337E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S	Mass %
15	4.5450	4.545	4.545		CD Drain - sfide S	Mass %
16	1.4500	1.829E-01	1.047163E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	8.6850	4.3425	4.3425		CD Drain - Ash S	Mass %
18	24.1500				CD Drain - Ash CaO	Mass %
19	17.2000				CD Drain - Ash MgO	Mass %
20	61.0550	1.828E-01	1.044087E-01	1.500000E-01	PD Drain - C	Mass %
21	.4700	3.500E-02	1.621487E-04	3.500000E-02	PD Drain - H	Mass %
22	1.1000	4.180E-02	3.349871E-02	2.500000E-02	PD Drain - N	Mass %
23	3.5250	1.7625	1.7625		PD Drain - S	Mass %
24	40.7650	5.787E-01	5.219426E-01	2.500000E-01	PD Drain - Ash	Mass %
25	9510.0000	5.576E+01	4.984489E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S	Mass %
27	1.8050	1.805	1.805		PD Drain - sfide S	Mass %
28	.8600	2.425E-01	1.905111E-01	1.500000E-01	PD Drain - crbate C	Mass %
29	8.3050	4.1525	4.1525		PD Drain - Ash S	Mass %
30	25.9500				PD Drain - Ash CaO	Mass %
31	17.5500				PD Drain - Ash MgO	Mass %
32	66.6000	1.274E+00	1.265400E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.5600	4.970E-02	3.528000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.2200	7.275E-02	6.832000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	2.1200	1.06	1.06		CF/SD Drain - S	Mass %
36	32.0000	1.683E+00	1.664000E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	10264.0000	2.068E+02	2.052800E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S	Mass %
39	.7900	.79	.79		CF/SD Drain - sfide S	Mass %
40	.8100	2.719E-01	2.268000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	5.8600	2.93	2.93		CF/SD Drain - Ash S	Mass %
42	23.5000				CF/SD Drain - Ash CaO	Mass %
43	12.8000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	68.1900	1.304E+00	1.295610E+00	1.500000E-01	BD Drain - C	Mass %
46	.6700	5.483E-02	4.221000E-02	3.500000E-02	BD Drain - H	Mass %
47	.9600	5.929E-02	5.376000E-02	2.500000E-02	BD Drain - N	Mass %
48	1.5600	.78	.78		BD Drain - S	Mass %
49	27.6600	1.460E+00	1.438320E+00	2.500000E-01	BD Drain - Ash	Mass %
50	10640.0000	2.143E+02	2.128000E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S	Mass %
52	.4600	.46	.46		BD Drain - sfide S	Mass %
53	.5000	2.052E-01	1.400000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	4.1800	2.09	2.09		BD Drain - Ash S	Mass %
55	24.2000				BD Drain - Ash CaO	Mass %
56	7.6000				BD Drain - Ash MgO	Mass %
57	72.2500	7.308E-01	1.029306E-01	7.235000E-01	Demister Gas - N2	mol.vol %
58	.3950	8.448E-03	6.846312E-03	4.950000E-03	Demister Gas - O2	mol.vol %
59	7.2250	9.813E-02	6.529132E-02	7.325000E-02	Demister Gas - CO	mol.vol %
60	1.6400	6.700E-02	6.470142E-02	1.740000E-02	Demister Gas - CH4	mol.vol %
61	9.9350	3.457E-01	3.308332E-01	1.003500E-01	Demister Gas - CO2	mol.vol %
62	.0100	2.068E-03	1.751069E-03	1.100000E-03	Demister Gas - C2H4	mol.vol %
63	.0100	1.881E-03	1.525407E-03	1.100000E-03	Demister Gas - C2H6	mol.vol %
64	.0093	1.479E-04	1.150203E-04	9.300000E-05	Demister Gas - H2S	mol.vol %
65	7.0200	1.667E-01	1.506992E-01	7.120000E-02	Demister Gas - H2	mol.vol %
66	.1195	1.384E-02	1.248609E-02	5.975000E-03	Demister Gas - NH3	mol.vol %
67	.5000	9.780E-03	7.722892E-03	6.000000E-03	Demister Gas - Ar	mol.vol %
68					Freeboard Gas - N2	mol.vol %

INPUT DATA FILE FOR TR8-6

69					Freeboard Gas - O2	mol,vol %
70					Freeboard Gas - CO	mol,vol %
71					Freeboard Gas - CH4	mol,vol %
72					Freeboard Gas - CO2	mol,vol %
73					Freeboard Gas - C2H4	mol,vol %
74					Freeboard Gas - C2H6	mol,vol %
75	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - H2S	mol,vol %
76					Freeboard Gas - H2	mol,vol %
77	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - NH3	mol,vol %
78					Freeboard Gas - Ar	mol,vol %
79	22.4170	1.500E+00	.000000E+00	1.500000E+00	Water Content in Freeboard Gas	mol,vol %
80	.0000	.000E+00	.000000E+00	.000000E+00	Demister Gas - SO2	mol,vol %
81	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - SO2	mol,vol %
82	60.6000	4.007E-01	3.853404E-01	1.100000E-01	Sorbent - CaO	Mass %
83	37.1667	6.678E+00	6.676050E+00	1.600000E-01	Sorbent - MgO	Mass %
84	.3703	2.316E-01	2.306408E-01	2.111000E-02	Sorbent - SO3	Mass %
85	2.1297	2.772E-01	2.330751E-01	1.500000E-01	Sorbent - Ash	Mass %
86	.0000	.000E+00	.000000E+00	.000000E+00	Unused	
87	2.0000	.000E+00	.000000E+00	.000000E+00	Demister gas # of Analyses,	dimensionless
88	1.0000	.000E+00	.000000E+00	.000000E+00	Freeboard gas # of Analyses,	dimensionless
89	.0000	.000E+00	.000000E+00	.000000E+00	Unused	

INPUT DATA FILE FOR TR8-8

DEFAULT CONTROL PARAMETERS,

```
  IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
    1,      3,     25,      0,      'B'

  EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
   .3,      5.,   1.5,     1.,     .25,     1.,    .5,   .04,    .99,  20/

TR8 - TEST POINT 8  <<CASE C>>  05/13/93  Pitts No 8 + Dolomite
SET POINT DATE:     6/16/92
SET POINT TIME:     02:00:00 - 06:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	143.4795	1.156E+00	1.093907E+00	3.750000E-01	Carbonizer Pressure	PSIG	PI-3007
2	142.5292	1.323E+00	1.090365E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	197.8129	6.082E-01	4.787969E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	837.7251	1.175E+01	7.505167E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.6151	1.542E-01	1.286320E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	43.6144	1.064E+00	3.644642E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	12.4293	1.473E+00	1.417303E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	16.1634	1.398E+00	1.375962E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	2.7209	1.965E-01	8.931000E-02	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	1.6834	7.140E-02	6.223540E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.4834	2.761E-02	1.903300E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	900.3094	1.587E+01	5.194554E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	899.9307	1.294E+01	1.721111E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	90.0042	1.504E+00	1.051089E-01	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	360.0000	9.0139	9.0	.5	Coal Feed rate	lb/hr	
16	80.0000	2.0616	2.	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	78.0664	2.264E+00	1.060396E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	81.7774	4.815E+00	4.380038E+00	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	175.7859	1.305E+01	1.289447E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	130.1413	3.596E+00	2.988675E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1610.8880	6.671E+00	2.829633E+00	6.040830E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	7.356000E-03	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1225.1410	5.757E+00	3.469569E+00	4.594279E+00	Orifice Temp (Upstream)	F	TI-3108
38	115.9235	4.972E+00	4.551755E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	352.4148	9.423E+01	9.421127E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	284.6917	2.408E+00	1.341232E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	215.8974	9.498E+00	9.285267E+00	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.1787	2.009E+00	1.885930E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	67.4500	3.409E+00	3.372500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	93.8700	4.720E+00	4.693500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	10.9300	7.407E-01	5.465000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	35.0800	1.824E+00	1.754000E+00	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	76.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	1.0931	5.466E-02	.000000E+00	5.465500E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR8-8

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	68.2100	6.356E-01	6.176881E-01	1.500000E-01	Coal - C	Mass %
2	4.2067	5.466E-02	4.198128E-02	3.500000E-02	Coal - H	Mass %
3	1.7533	4.059E-02	3.197945E-02	2.500000E-02	Coal - N	Mass %
4	4.0700	.2035	.2035		Coal - S	Mass %
5	13.3767	4.042E-01	3.916519E-01	1.000000E-01	Coal - Ash	Mass %
6	2.8167	1.772E-01	9.433937E-02	1.500000E-01	Coal - H2O	Mass %
712406	.6700	1.313E+02	1.289222E+02	2.500000E+01	Coal - HHV	BTU/lb
8	35.0150	5.583E-01	5.377434E-01	1.500000E-01	CD Drain - C	Mass %
9	.1450	3.553E-02	6.127373E-03	3.500000E-02	CD Drain - H	Mass %
10	.7200	5.392E-02	4.777017E-02	2.500000E-02	CD Drain - N	Mass %
11	8.7300	4.365	4.365		CD Drain - S	Mass %
12	80.3200	4.697E+00	4.690040E+00	2.500000E-01	CD Drain - Ash	Mass %
13	5777.5000	1.523E+02	1.501843E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S	Mass %
15	6.0100	6.01	6.01		CD Drain - sfide S	Mass %
16	2.2100	1.959E-01	1.259832E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	9.7650	4.8825	4.8825		CD Drain - Ash S	Mass %
18	22.5000				CD Drain - Ash CaO	Mass %
19	16.5500				CD Drain - Ash MgO	Mass %
20	71.0800	2.601E-01	2.124671E-01	1.500000E-01	PD Drain - C	Mass %
21	.4800	3.500E-02	1.843609E-04	3.500000E-02	PD Drain - H	Mass %
22	1.4450	2.637E-02	8.403247E-03	2.500000E-02	PD Drain - N	Mass %
23	3.0900	1.545	1.545		PD Drain - S	Mass %
24	26.6400	5.281E-01	4.652309E-01	2.500000E-01	PD Drain - Ash	Mass %
2511114	.5000	2.582E+01	6.442556E+00	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S	Mass %
27	.9600	.96	.96		PD Drain - sfide S	Mass %
28	.3300	1.677E-01	7.507742E-02	1.500000E-01	PD Drain - crbate C	Mass %
29	4.6000	2.3	2.3		Drain - Ash S	Mass %
30	13.9500				PD Drain - Ash CaO	Mass %
31	10.3000				PD Drain - Ash MgO	Mass %
32	73.5500	1.405E+00	1.397450E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.6900	5.581E-02	4.347000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.1500	6.908E-02	6.439999E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	2.4400	1.22	1.22		CF/SD Drain - S	Mass %
36	22.7800	1.211E+00	1.184560E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
3711495	.0000	2.313E+02	2.299000E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S	Mass %
39	.7400	.74	.74		CF/SD Drain - sfide S	Mass %
40	.5400	2.130E-01	1.512000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	4.2300	2.115	2.115		CF/SD Drain - Ash S	Mass %
42	14.0000				CF/SD Drain - Ash CaO	Mass %
43	9.5000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	70.6000	1.350E+00	1.341400E+00	1.500000E-01	BD Drain - C	Mass %
46	.7100	5.680E-02	4.473000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.2000	7.170E-02	6.720001E-02	2.500000E-02	BD Drain - N	Mass %
48	1.9000	.95	.95		BD Drain - S	Mass %
49	24.8400	1.316E+00	1.291680E+00	2.500000E-01	BD Drain - Ash	Mass %
5010984	.0000	2.211E+02	2.196800E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S	Mass %
52	.4300	.43	.43		BD Drain - sfide S	Mass %
53	.2100	1.611E-01	5.880000E-02	1.500000E-01	BD Drain - crbate C	Mass %
54	3.7200	1.86	1.86		BD Drain - Ash S	Mass %
55	15.5000				BD Drain - Ash CaO	Mass %
56	10.8000				BD Drain - Ash MgO	Mass %
57	73.5250	8.916E-01	5.029545E-01	7.362499E-01	Demister Gas - N2	mol,vol %
58	.9200	4.812E-01	4.811237E-01	1.020000E-02	Demister Gas - O2	mol,vol %
59	6.8725	2.217E-01	2.104212E-01	6.972500E-02	Demister Gas - CO	mol,vol %
60	1.5275	8.822E-02	8.670714E-02	1.627500E-02	Demister Gas - CH4	mol,vol %
61	8.9550	2.198E-01	2.002497E-01	9.055000E-02	Demister Gas - CO2	mol,vol %
62	.0100	1.804E-03	1.429742E-03	1.100000E-03	Demister Gas - C2H4	mol,vol %
63	.0125	2.443E-03	2.168398E-03	1.125000E-03	Demister Gas - C2H6	mol,vol %
64	.0020	9.832E-04	9.829954E-04	2.000000E-05	Demister Gas - H2S	mol,vol %
65	6.7225	4.536E-01	4.484096E-01	6.822500E-02	Demister Gas - H2	mol,vol %
66	.1149	1.647E-02	1.543309E-02	5.745000E-03	Demister Gas - NH3	mol,vol %
67	.5000	1.181E-02	1.016671E-02	6.000000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR8-8

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69                                                  Freeboard Gas - O2              mol,vol %
70                                                  Freeboard Gas - CO              mol,vol %
71                                                  Freeboard Gas - CH4             mol,vol %
72                                                  Freeboard Gas - CO2             mol,vol %
73                                                  Freeboard Gas - C2H4            mol,vol %
74                                                  Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - H2S             mol,vol %
76                                                  Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - NH3             mol,vol %
78                                                  Freeboard Gas - Ar              mol,vol %
79   21.4160 1.500E+00  .000000E+00 1.500000E+00    Water Content in Freeboard Gas  mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00    Demister Gas - SO2              mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00    Freeboard Gas - SO2             mol,vol %
82   60.6000 4.007E-01 3.853404E-01 1.100000E-01    Sorbent - CaO                   Mass %
83   37.1667 6.678E+00 6.676050E+00 1.600000E-01    Sorbent - MgO                   Mass %
84    1.0333 2.319E-01 2.282069E-01 4.100000E-02    Sorbent - SO3                   Mass %
85    1.4667 2.796E-01 2.359471E-01 1.500000E-01    Sorbent - Ash                   Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00    Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00    Demister gas # of Analyses,  dimensionless
88    1.0000  .000E+00  .000000E+00  .000000E+00    Freeboard gas # of Analyses,  dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00    Unused
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INPUT DATA FILE FOR TR8-9

DEFAULT CONTROL PARAMETERS,

IPRINT	LEVEL	MAXCYC	ITIME	DEVICE
1,	3,	25,	0,	'B'

EPSMAX	CUTOF1	CUTOF2	ERRMIN	TOLERN	QALITY	EXPT	SENSTV	CORRCO	MAXPNT
.2,	5.,	1.5,	1.,	.25,	1.,	.5,	.04,	.99,	20/

TR8 - TEST POINT 9 <<CASE C>> 05/13/93 Pitts No 8 + Dolomite
SET POINT DATE: 6/16/92
SET POINT TIME: 08:00:00 - 12:30:00

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	134.9982	2.787E+00	2.761642E+00	3.750000E-01	Carbonizer Pressure	PSIG	PI-3007
2	134.1696	2.905E+00	2.806380E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	197.6668	6.728E-01	5.585443E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	800.4061	1.144E+01	7.001454E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.6035	1.619E-01	1.377745E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	44.4757	1.077E+00	4.000722E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	13.3416	1.513E+00	1.458833E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	15.8643	2.027E+00	2.011221E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	2.6352	2.884E-01	2.292101E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	1.6796	8.580E-02	7.833950E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.5317	3.320E-02	2.650510E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	899.8546	1.568E+01	4.566387E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	899.8917	1.296E+01	1.871297E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	54.9885	1.513E+00	1.954207E-01	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	350.0000	8.7643	8.75	.5	Coal Feed rate	lb/hr	
16	84.0000	2.1587	2.1	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	79.9855	2.922E+00	2.130481E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	81.5452	5.028E+00	4.613290E+00	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	164.6789	1.219E+01	1.202586E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	136.3142	4.054E+00	3.526134E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1602.9510	1.130E+01	9.562967E+00	6.011066E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	7.465200E-03	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1206.0420	5.908E+00	3.801859E+00	4.522657E+00	Orifice Temp (Upstream)	F	TI-3108
38	122.5774	5.146E+00	4.741078E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	298.5981	8.942E+01	8.939994E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	284.5790	2.296E+00	1.127331E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	245.1273	3.793E+01	3.787841E+01	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.0869	2.009E+00	1.936429E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	73.6100	3.714E+00	3.680500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	68.1900	3.446E+00	3.409500E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	31.5500	1.655E+00	1.577500E+00	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	32.2400	1.688E+00	1.612000E+00	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	70.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	1.0931	5.466E-02	.000000E+00	5.465500E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR8-9

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	68.2100	6.356E-01	6.176881E-01	1.500000E-01	Coal - C	Mass %
2	4.2067	5.466E-02	4.198128E-02	3.500000E-02	Coal - H	Mass %
3	1.7533	4.059E-02	3.197945E-02	2.500000E-02	Coal - N	Mass %
4	4.0700	.2035	.2035		Coal - S	Mass %
5	13.3767	4.042E-01	3.916519E-01	1.000000E-01	Coal - Ash	Mass %
6	2.8167	1.772E-01	9.433937E-02	1.500000E-01	Coal - H2O	Mass %
7	12406.6700	1.313E+02	1.289222E+02	2.500000E+01	Coal - HHV	BTU/lb
8	50.5300	1.091E+00	1.080696E+00	1.500000E-01	CD Drain - C	Mass %
9	.2650	3.504E-02	1.565954E-03	3.500000E-02	CD Drain - H	Mass %
10	.8650	7.848E-02	7.439279E-02	2.500000E-02	CD Drain - N	Mass %
11	5.0600	2.53	2.53		CD Drain - S	Mass %
12	54.4250	2.148E+00	2.133453E+00	2.500000E-01	CD Drain - Ash	Mass %
13	8313.0000	1.938E+02	1.922128E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S	Mass %
15	2.9800	2.98	2.98		CD Drain - sfide S	Mass %
16	1.0100	1.704E-01	8.087286E-02	1.500000E-01	CD Drain - crbate C	Mass %
17	7.4700	3.735	3.735		CD Drain - Ash S	Mass %
18	20.4000				CD Drain - Ash CaO	Mass %
19	14.1500				CD Drain - Ash MgO	Mass %
20	69.5300	4.134E-01	3.851901E-01	1.500000E-01	PD Drain - C	Mass %
21	.4900	3.684E-02	1.148464E-02	3.500000E-02	PD Drain - H	Mass %
22	1.3150	3.257E-02	2.087588E-02	2.500000E-02	PD Drain - N	Mass %
23	3.3850	1.6925	1.6925		PD Drain - S	Mass %
24	29.6800	5.089E-01	4.432693E-01	2.500000E-01	PD Drain - Ash	Mass %
25	10799.0000	8.446E+01	8.067931E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S	Mass %
27	1.4200	1.42	1.42		PD Drain - sfide S	Mass %
28	.7150	1.784E-01	9.658758E-02	1.500000E-01	PD Drain - crbate C	Mass %
29	5.4850	2.7425	2.7425		PD Drain - Ash S	Mass %
30	14.7000				PD Drain - Ash CaO	Mass %
31	11.5500				PD Drain - Ash MgO	Mass %
32	74.6400	1.426E+00	1.418160E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.5300	4.837E-02	3.339000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.4000	8.229E-02	7.840000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	2.4400	1.22	1.22		CF/SD Drain - S	Mass %
36	22.5500	1.199E+00	1.172600E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	11491.0000	2.312E+02	2.298200E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S	Mass %
39	.6700	.67	.67		CF/SD Drain - sfide S	Mass %
40	.4000	1.872E-01	1.120000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	4.2400	2.12	2.12		CF/SD Drain - Ash S	Mass %
42	16.0000				CF/SD Drain - Ash CaO	Mass %
43	9.5000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	72.6300	1.388E+00	1.379970E+00	1.500000E-01	BD Drain - C	Mass %
46	.6200	5.245E-02	3.906000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.5100	8.818E-02	8.456000E-02	2.500000E-02	BD Drain - N	Mass %
48	1.8400	.92	.92		BD Drain - S	Mass %
49	23.2600	1.235E+00	1.209520E+00	2.500000E-01	BD Drain - Ash	Mass %
50	11303.0000	2.274E+02	2.260600E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S	Mass %
52	.4300	.43	.43		BD Drain - sfide S	Mass %
53	.4900	2.033E-01	1.372000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	3.1100	1.555	1.555		BD Drain - Ash S	Mass %
55	16.0000				BD Drain - Ash CaO	Mass %
56	10.5000				BD Drain - Ash MgO	Mass %
57	73.3500	8.453E-01	4.183832E-01	7.345000E-01	Demister Gas - N2	mol,vol %
58	.3625	1.083E-01	1.082373E-01	4.625000E-03	Demister Gas - O2	mol,vol %
59	7.5900	8.226E-02	2.919561E-02	7.690000E-02	Demister Gas - CO	mol,vol %
60	1.6125	1.574E-01	1.564322E-01	1.712500E-02	Demister Gas - CH4	mol,vol %
61	8.3200	2.038E-01	1.856139E-01	8.419999E-02	Demister Gas - CO2	mol,vol %
62	.0075	2.492E-03	2.247937E-03	1.075000E-03	Demister Gas - C2H4	mol,vol %
63	.0100	5.215E-03	5.097180E-03	1.100000E-03	Demister Gas - C2H6	mol,vol %
64	.0004	1.304E-04	1.303841E-04	4.000000E-06	Demister Gas - H2S	mol,vol %
65	6.6825	2.345E-01	2.244385E-01	6.782500E-02	Demister Gas - H2	mol,vol %
66	.1380	1.799E-02	1.661314E-02	6.898750E-03	Demister Gas - NH3	mol,vol %
67	.4750	9.556E-03	7.632578E-03	5.750000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR8-9

69					Freeboard Gas - O2	mol,vol %
70					Freeboard Gas - CO	mol,vol %
71					Freeboard Gas - CH4	mol,vol %
72					Freeboard Gas - CO2	mol,vol %
73					Freeboard Gas - C2H4	mol,vol %
74	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - C2H6	mol,vol %
75	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - H2S	mol,vol %
76					Freeboard Gas - H2	mol,vol %
77	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - NH3	mol,vol %
78					Freeboard Gas - Ar	mol,vol %
79	18.8770	1.500E+00	.000000E+00	1.500000E+00	Water Content in Freeboard Gas	mol,vol %
80	.0000	.000E+00	.000000E+00	.000000E+00	Demister Gas - SO2	mol,vol %
81	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - SO2	mol,vol %
82	60.6000	4.007E-01	3.853404E-01	1.100000E-01	Sorbent - CaO	Mass %
83	37.1667	6.678E+00	6.676050E+00	1.600000E-01	Sorbent - MgO	Mass %
84	1.0333	2.319E-01	2.282069E-01	4.100000E-02	Sorbent - SO3	Mass %
85	1.4667	2.796E-01	2.359471E-01	1.500000E-01	Sorbent - Ash	Mass %
86	.0000	.000E+00	.000000E+00	.000000E+00	Unused	
87	4.0000	.000E+00	.000000E+00	.000000E+00	Demister gas # of Analyses,	dimensionless
88	1.000				Freeboard gas # of Analyses,	dimensionless
89	.0000	.000E+00	.000000E+00	.000000E+00	Unused	

INPUT DATA FILE FOR TR8-10

DEFAULT CONTROL PARAMETERS,

```
  IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
    1,      3,     40,      0,     'B'

  EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
   .3,     3.5,   1.5,     1.,     .25,     1.,    .5,   .04,    .99,  20/

TR8 - TEST POINT 10  <<CASE C>>  05/13/93  Pitts No 8 + Dolomite
SET POINT DATE:      6/16/92
SET POINT TIME:      14:30:00 - 19:30:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	126.5349	4.725E+00	4.710407E+00	3.750000E-01	Carbonizer Pressure	PSIG	PI-3007
2	125.7735	4.756E+00	4.696803E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	197.3805	6.252E-01	5.002888E-01	3.750000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	737.8561	3.148E+01	3.015158E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.6788	1.255E-01	9.238750E-02	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	45.7521	1.094E+00	4.432611E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	4.7892	1.115E+00	1.040337E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	11.2655	4.650E+00	4.642980E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	2.4896	2.857E-01	2.258911E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	1.9040	1.692E-01	1.655776E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.5939	3.573E-02	2.961390E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	900.3812	1.568E+01	4.552724E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	900.1184	1.285E+01	8.855690E-01	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	55.0198	1.504E+00	1.076005E-01	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	350.0000	8.7643	8.7643		Coal Feed rate	lb/hr	
16	40.0000	1.1180	1.1180		Sorbent Feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	88.6162	2.223E+00	9.702278E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	158.0380	6.142E+01	6.138744E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	175.8295	1.307E+01	1.291245E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	134.0462	4.265E+00	3.766906E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1614.3130	9.810E+00	7.719409E+00	6.053674E+00	FreeBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	4.815500E-03	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1198.5880	5.603E+00	3.344704E+00	4.494705E+00	Orifice Temp (Upstream)	F	TI-3108
38	128.3954	3.024E+00	2.268799E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	368.1474	7.998E+01	7.995126E+01	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	286.2913	2.338E+00	1.211519E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	212.1183	3.270E+00	2.587683E+00	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	386.8876	2.010E+00	1.967914E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	93.8800	4.721E+00	4.694000E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	88.3400	4.445E+00	4.417000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	1.5200	5.057E-01	7.600000E-02	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	16.8100	9.780E-01	8.405000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	76.0000	2.759E+00	1.900000E+00	2.000000E+00	Ambient Temperature	F	
50	1.0931	5.466E-02	.000000E+00	5.465500E-02	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR8-10

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	68.2100	6.356E-01	6.176881E-01	1.500000E-01	Coal - C	Mass %
2	4.2067	5.466E-02	4.198128E-02	3.500000E-02	Coal - H	Mass %
3	1.7533	4.059E-02	3.197945E-02	2.500000E-02	Coal - N	Mass %
4	4.0700	.2035	.2035		Coal - S	Mass %
5	13.3767	4.042E-01	3.916519E-01	1.000000E-01	Coal - Ash	Mass %
6	2.8167	1.772E-01	9.433937E-02	1.500000E-01	Coal - H2O	Mass %
7	12406.6700	1.313E+02	1.289222E+02	2.500000E+01	Coal - HHV	BTU/lb
8	66.2200	1.983E+00	1.977177E+00	1.500000E-01	CD Drain - C	Mass %
9	.2300	3.557E-02	6.319621E-03	3.500000E-02	CD Drain - H	Mass %
10	1.2100	2.800E-02	1.260406E-02	2.500000E-02	CD Drain - N	Mass %
11	5.4850	2.7425	2.7425		CD Drain - S	Mass %
12	36.4750	4.836E+00	4.828065E+00	2.500000E-01	CD Drain - Ash	Mass %
13	9928.0000	8.908E+01	8.549536E+01	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-02	CD Drain - sfate S	Mass %
15	2.2350	2.235	2.235		CD Drain - sfide S	Mass %
16	.9700	1.831E-01	1.050306E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	5.4850	2.7425	2.7425		CD Drain - Ash S	Mass %
18	16.1000				CD Drain - Ash CaO	Mass %
19	12.1500				CD Drain - Ash MgO	Mass %
20	77.5150	7.152E-01	6.993203E-01	1.500000E-01	PD Drain - C	Mass %
21	.5350	3.838E-02	1.578097E-02	3.500000E-02	PD Drain - H	Mass %
22	1.3950	3.233E-02	2.050568E-02	2.500000E-02	PD Drain - N	Mass %
23	2.8300	1.415	1.415		PD Drain - S	Mass %
24	20.8750	4.925E-01	4.243068E-01	2.500000E-01	PD Drain - Ash	Mass %
25	11807.5000	1.126E+02	1.097488E+02	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-02	PD Drain - sfate S	Mass %
27	.8150	.815	.815		PD Drain - sfide S	Mass %
28	.2200	1.501E-01	6.546353E-03	1.500000E-01	PD Drain - crbate C	Mass %
29	3.2000	1.6	1.6		PD Drain - Ash S	Mass %
30	11.5500				PD Drain - Ash CaO	Mass %
31	7.7500				PD Drain - Ash MgO	Mass %
32	78.5000	1.498E+00	1.491500E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.4800	4.625E-02	3.024000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.3500	7.963E-02	7.560000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	2.0000	1.	1.		CF/SD Drain - S	Mass %
36	18.4200	9.899E-01	9.578400E-01	2.500000E-01	CF/SD Drain - Ash	Mass %
37	12005.0000	2.414E+02	2.401000E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-02	CF/SD Drain - sfate S	Mass %
39	.5000	.5	.5		CF/SD Drain - sfide S	Mass %
40	.2600	1.667E-01	7.280000E-02	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	1.2200	.61	.61		CF/SD Drain - Ash S	Mass %
42	9.6000				CF/SD Drain - Ash CaO	Mass %
43	6.6000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	73.2800	1.400E+00	1.392320E+00	1.500000E-01	BD Drain - C	Mass %
46	.6100	5.198E-02	3.843000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.4600	8.550E-02	8.176000E-02	2.500000E-02	BD Drain - N	Mass %
48	1.6800	.84	.84		BD Drain - S	Mass %
49	24.0600	1.276E+00	1.251120E+00	2.500000E-01	BD Drain - Ash	Mass %
50	11162.0000	2.246E+02	2.232400E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-02	BD Drain - sfate S	Mass %
52	.5800	.58	.58		BD Drain - sfide S	Mass %
53	.1500	1.558E-01	4.200000E-02	1.500000E-01	BD Drain - crbate C	Mass %
54	3.3200	1.66	1.66		BD Drain - Ash S	Mass %
55	19.3000				BD Drain - Ash CaO	Mass %
56	9.3000				BD Drain - Ash MgO	Mass %
57	72.6000	8.259E-01	3.918591E-01	7.270000E-01	Demister Gas - N2	mol,vol %
58	.2733	4.732E-02	4.717579E-02	3.733333E-03	Demister Gas - O2	mol,vol %
59	6.9033	1.121E-01	8.751491E-02	7.003333E-02	Demister Gas - CO	mol,vol %
60	2.1800	1.446E-01	1.428183E-01	2.280000E-02	Demister Gas - CH4	mol,vol %
61	7.9467	2.272E-01	2.124200E-01	8.046667E-02	Demister Gas - CO2	mol,vol %
62	.0100	2.068E-03	1.751069E-03	1.100000E-03	Demister Gas - C2H4	mol,vol %
63	.0167	1.796E-03	1.365107E-03	1.166667E-03	Demister Gas - C2H6	mol,vol %
64	.1313	2.426E-02	2.422536E-02	1.313000E-03	Demister Gas - H2S	mol,vol %
65	7.3100	3.024E-01	2.932207E-01	7.410000E-02	Demister Gas - H2	mol,vol %
66	.1481	2.168E-02	2.037227E-02	7.406667E-03	Demister Gas - NH3	mol,vol %
67	.4600	1.096E-02	9.422911E-03	5.600000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR8-10

69					Freeboard Gas - O2	mol,vol %
70					Freeboard Gas - CO	mol,vol %
71					Freeboard Gas - CH4	mol,vol %
72					Freeboard Gas - CO2	mol,vol %
73					Freeboard Gas - C2H4	mol,vol %
74					Freeboard Gas - C2H6	mol,vol %
75	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - H2S	mol,vol %
76					Freeboard Gas - H2	mol,vol %
77	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - NH3	mol,vol %
78					Freeboard Gas - Ar	mol,vol %
79	23.3580	1.500E+00	.000000E+00	1.500000E+00	Water Content in Freeboard Gas	mol,vol %
80	.0000	.000E+00	.000000E+00	.000000E+00	Demister Gas - SO2	mol,vol %
81	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - SO2	mol,vol %
82	60.6000	4.007E-01	3.853404E-01	1.100000E-01	Sorbent - CaO	Mass %
83	37.1667	6.678E+00	6.676050E+00	1.600000E-01	Sorbent - MgO	Mass %
84	1.0333	2.319E-01	2.282069E-01	4.100000E-02	Sorbent - SO3	Mass %
85	1.4667	2.796E-01	2.359471E-01	1.500000E-01	Sorbent - Ash	Mass %
86	.0000	.000E+00	.000000E+00	.000000E+00	Unused	
87	3.0000	.000E+00	.000000E+00	.000000E+00	Demister gas # of Analyses,	dimensionless
88	1.0000	.000E+00	.000000E+00	.000000E+00	Freeboard gas # of Analyses,	dimensionless
89	.0000	.000E+00	.000000E+00	.000000E+00	Unused	

INPUT DATA FILE FOR TR10-1

DEFAULT CONTROL PARAMETERS,

```
  IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
    1,      3,     40,     0,      'A'

  EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
   .2,     4.5,   1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR10 - TEST POINT 1  <<CASE D>>  9/1/92  Pittsburgh Coal + Limestone
SET POINT DATE:      9/1/92
SET POINT TIME:      02:00:00 - 06:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	113.6510	2.633E+00	2.524000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	111.4930	2.700E+00	2.594000E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	199.2540	1.012E+00	6.800000E-01	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	1158.4480	3.250E+01	3.121400E+01	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	6.3130	5.175E-01	5.105000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	.0000	.000E+00	1.300000E-02	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	23.8650	6.785E-01	5.480000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	2.8850	1.028E+00	9.970000E-01	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	.0000	.000E+00	7.677000E+00	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	2.2230	1.657E-01	1.620000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.0300	2.154E-02	8.000000E-03	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	1456.7340	6.515E+01	6.340200E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	1073.9430	4.780E+01	4.604400E+01	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	150.7250	1.617E+00	6.050000E-01	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	525.0000	13.1345	13.125	.5	Coal Feed rate	lb/hr	
16	143.0000	3.6088	3.575	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	79.7060	2.116E+00	6.900000E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	176.3300	1.224E+01	1.207300E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	514.8440	2.000E+00	.000000E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	288.4160	4.890E+01	4.886100E+01	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1652.2790	1.036E+01	8.307000E+00	6.196046E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	58.7600	6.145E-01	2.740000E-01	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones eat loss	KBTU/hr	
37	1115.8540	2.117E+01	2.075400E+01	4.184453E+00	Orifice Temp (Upstream)	F	TI-3108
38	156.1380	2.614E+00	1.683000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	2943.9100	2.000E+00	.000000E+00	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	256.6610	2.004E+00	1.250000E-01	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	352.9730	6.883E+01	6.880100E+01	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.9110	2.019E+00	2.730000E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	.0000				CD Flow; carbonizer discharge	lb/hr	
45	.0000				PD Flow; primary cyclone	lb/hr	
46	219.6500	1.099E+01	1.098250E+01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	72.3900	3.654E+00	3.619500E+00	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	2.1085	1.054E-01	.000000E+00	1.054246E-01	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR10-1

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	70.0450	6.992E-01	6.829650E-01	1.500000E-01	Coal - C	Mass %
2	4.9200	6.727E-02	5.744977E-02	3.500000E-02	Coal - H	Mass %
3	1.9550	3.056E-02	1.756865E-02	2.500000E-02	Coal - N	Mass %
4	3.2100	.1605	.1605		Coal - S	Mass %
5	10.4150	6.246E-01	6.165601E-01	1.000000E-01	Coal - Ash	Mass %
6	3.2125	1.978E-01	1.289648E-01	1.500000E-01	Coal - H2O	Mass %
7	12753.0000	1.258E+02	1.232615E+02	2.500000E+01	Coal - HHV	BTU/lb
8	26.3700	2.637E+01	2.636957E+01	1.500000E-01	CD Drain - C	Mass %
9	.1130	1.130E-01	1.074430E-01	3.500000E-02	CD Drain - H	Mass %
10	.4230	4.230E-01	4.222606E-01	2.500000E-02	CD Drain - N	Mass %
11	3.4320	1.716	1.716		CD Drain - S	Mass %
12	100.0000	1.650E+01	1.650000E+01	2.500000E-01	CD Drain - Ash	Mass %
13	.0000	.000E+00	.000000E+00	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	2.4900	2.4900	2.4900		CD Drain - sfide S	Mass %
16	4.6100	4.61	4.61		CD Drain - crbate C	Mass %
17	4.8900	2.445	2.445		CD Drain - Ash S	Mass %
18	57.3400				CD Drain - Ash CaO	Mass %
19	5.4740				CD Drain - Ash MgO	Mass %
20	68.8000	6.880E+01	6.879984E+01	1.500000E-01	PD Drain - C	Mass %
21	.5720	5.720E-01	5.709282E-01	3.500000E-02	PD Drain - H	Mass %
22	1.2220	1.222E+00	1.221744E+00	2.500000E-02	PD Drain - N	Mass %
23	1.7520	.876	.876		PD Drain - S	Mass %
24	100.0000	5.226E+00	5.220000E+00	2.500000E-01	PD Drain - Ash	Mass %
25	.0000	.000E+00	.000000E+00	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	.7110	.7110	.7110		PD Drain - sfide S	Mass %
28	.7660	.766	.766		PD Drain - crbate C	Mass %
29	4.1140	2.057	2.057		PD Drain - Ash S	Mass %
30	23.7000				PD Drain - Ash CaO	Mass %
31	5.8630				PD Drain - Ash MgO	Mass %
32	59.5700	7.216E+00	7.214370E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.3417	9.231E-02	8.542052E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.4150	1.451E-01	1.429346E-01	2.500000E-02	CF/SD Drain - N	Mass %
35	3.9167	1.95835	1.95835		CF/SD Drain - S	Mass %
36	43.3450	7.915E+00	7.911374E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9278.3330	9.280E+02	9.276482E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	2.3283	2.3283	2.3283		CF/SD Drain - sfide S	Mass %
40	1.1517	1.1517	1.1517		CF/SD Drain - cabate C *	Mass %
41	7.4650	3.7325	3.7325		CF/SD Drain - Ash S	Mass %
42	22.5833				CF/SD Drain - Ash CaO	Mass %
43	14.2167				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	65.5800	1.255E+00	1.246020E+00	1.500000E-01	BD Drain - C	Mass %
46	.7300	5.779E-02	4.599000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.6600	9.626E-02	9.296000E-02	2.500000E-02	BD Drain - N	Mass %
48	2.2200	1.11	1.11		BD Drain - S	Mass %
49	31.1200	1.637E+00	1.618240E+00	2.500000E-01	BD Drain - Ash	Mass %
50	10311.0000	2.077E+02	2.062200E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	1.1200	1.1200	1.1200		BD Drain - sfide S	Mass %
53	.1700	.17	.17		BD Drain - crbate C *	Mass %
54	5.6000	2.8	2.8		BD Drain - Ash S	Mass %
55	26.7000				BD Drain - Ash CaO	Mass %
56	15.7000				BD Drain - Ash MgO	Mass %
57	74.4000	8.310E-01	3.680912E-01	7.449999E-01	Demister Gas - N2	mol,vol %
58	1.0900	2.026E-01	2.022499E-01	1.190000E-02	Demister Gas - O2	mol,vol %
59	4.7300	1.542E-01	1.463976E-01	4.830000E-02	Demister Gas - CO	mol,vol %
60	1.9525	1.061E-01	1.041294E-01	2.052500E-02	Demister Gas - CH4	mol,vol %
61	8.9900	2.315E-01	2.128939E-01	9.090000E-02	Demister Gas - CO2	mol,vol %
62	.0575	6.218E-03	6.015550E-03	1.575000E-03	Demister Gas - C2H4	mol,vol %
63	.0100	1.030E-02	1.023920E-02	1.100000E-03	Demister Gas - C2H6	mol,vol %
64	.0645	2.317E-02	2.316481E-02	6.455000E-04	Demister Gas - H2S	mol,vol %
65	6.7200	2.879E-01	2.797438E-01	6.820000E-02	Demister Gas - H2	mol,vol %
66	.3456	4.978E-02	4.668301E-02	1.727875E-02	Demister Gas - NH3	mol,vol %
67	.4650	9.621E-03	7.787331E-03	5.650000E-03	Demister Gas - Ar	mol,vol %
68	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR10-1

```
69     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - O2              mol,vol %
70     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO              mol,vol %
71     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CH4             mol,vol %
72     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H4            mol,vol %
74     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H6            mol,vol %
75     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S             mol,vol %
76     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3             mol,vol %
78     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - Ar              mol,vol %
79   28.2300 1.500E+00  .000000E+00 1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2             mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2            mol,vol %
82   71.9000 3.732E-01 3.566013E-01 1.100000E-01 Sorbent - CaO                  Mass %
83   22.9500 4.126E+00 4.122584E+00 1.600000E-01 Sorbent - MgO                  Mass %
84    1.1000 1.646E-01 1.588669E-01 4.300000E-02 Sorbent - SO3                  Mass %
85    2.4000 3.999E-01 3.706986E-01 1.500000E-01 Sorbent - Ash                  Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR10-2

DEFAULT CONTROL PARAMETERS,

```
  IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
    1,      3,     40,      0,     'A'

  EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
   .2,     4.5,   1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR10 - TEST POINT 2  <<CASE D>>  9/1/92  Pittsburgh Coal + Limestone
SET POINT DATE:      9/1/92
SET POINT TIME:      16:30:00 - 21:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	68.6710	7.925E+00	7.889000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	67.5720	7.677E+00	7.640000E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	198.4320	1.068E+00	7.600000E-01	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	736.2110	1.132E+02	1.128710E+02	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	37.8540	9.732E+00	9.732000E+00	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	.0000	.000E+00	2.000000E-02	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	19.8870	1.198E+00	1.129000E+00	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	1.6570	1.616E+00	1.597000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	.0000	.000E+00	7.610000E+00	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	1.9400	5.860E-02	4.700000E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.0530	2.828E-02	2.000000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	1166.2240	2.973E+02	2.969360E+02	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	1150.3340	2.789E+01	2.476500E+01	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.1300	1.501E+00	5.900000E-02	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	232.0000	5.8215	5.8	.5	Coal Feed rate	lb/hr	
16	32.0000	.9434	.8	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	84.3100	2.410E+00	1.345000E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	85.0810	3.174E+00	2.465000E+00	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	514.8440	2.000E+00	.000000E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	193.7150	3.426E+01	3.420500E+01	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1617.5920	2.373E+01	2.293900E+01	6.065970E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	58.3830	6.634E-01	3.710000E-01	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	868.2880	3.760E+01	3.746300E+01	3.256080E+00	Orifice Temp (Upstream)	F	TI-3108
38	160.7530	5.169E+00	4.766000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	2943.9090	2.000E+00	.000000E+00	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	256.6380	2.006E+00	1.520000E-01	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	221.7150	2.814E+01	2.806500E+01	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.3700	2.028E+00	3.370000E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	.0000				CD Flow; carbonizer discharge	lb/hr	
45	.0000				PD Flow; primary cyclone	lb/hr	
46	47.5000	2.427E+00	2.375000E+00	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	101.6500	5.107E+00	5.082500E+00	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	2.1085	1.054E-01	.000000E+00	1.054246E-01	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR10-2

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	70.0450	6.992E-01	6.829650E-01	1.500000E-01	Coal - C	Mass %
2	4.9200	6.727E-02	5.744977E-02	3.500000E-02	Coal - H	Mass %
3	1.9550	3.056E-02	1.756865E-02	2.500000E-02	Coal - N	Mass %
4	3.2100	.1605	.1605		Coal - S	Mass %
5	10.4150	6.246E-01	6.165601E-01	1.000000E-01	Coal - Ash	Mass %
6	3.2125	1.978E-01	1.289648E-01	1.500000E-01	Coal - H2O	Mass %
7	12753.0000	1.258E+02	1.232615E+02	2.500000E+01	Coal - HHV	BTU/lb
8	26.3700	2.637E+01	2.636957E+01	1.500000E-01	CD Drain - C	Mass %
9	.1130	1.130E-01	1.074430E-01	3.500000E-02	CD Drain - H	Mass %
10	.4230	4.230E-01	4.222606E-01	2.500000E-02	CD Drain - N	Mass %
11	3.4320	1.716	1.716		CD Drain - S	Mass %
12	100.0000	1.650E+01	1.650000E+01	2.500000E-01	CD Drain - Ash	Mass %
13	.0000	.000E+00	.000000E+00	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	2.4900	2.4900	2.4900		CD Drain - sfide S	Mass %
16	4.6100	4.61	4.61		CD Drain - crbate C	Mass %
17	4.8900	2.445	2.445		CD Drain - Ash S	Mass %
18	57.3400				CD Drain - Ash CaO	Mass %
19	5.4740				CD Drain - Ash MgO	Mass %
20	68.8000	6.880E+01	6.879984E+01	1.500000E-01	PD Drain - C	Mass %
21	.5720	5.720E-01	5.709282E-01	3.500000E-02	PD Drain - H	Mass %
22	1.2220	1.222E+00	1.221744E+00	2.500000E-02	PD Drain - N	Mass %
23	1.7520	.876	.876		PD Drain - S	Mass %
24	100.0000	5.226E+00	5.220000E+00	2.500000E-01	PD Drain - Ash	Mass %
25	.0000	.000E+00	.000000E+00	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	.7110	.7110	.7110		PD Drain - sfide S	Mass %
28	.7660	.766	.766		PD Drain - crbate C	Mass %
29	4.1140	2.057	2.057		PD Drain - Ash S	Mass %
30	23.7000				PD Drain - Ash CaO	Mass %
31	5.8630				PD Drain - Ash MgO	Mass %
32	63.7200	1.448E+00	1.440137E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.3600	3.806E-02	1.496378E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.6200	3.679E-02	2.699173E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	3.9250	1.9625	1.9625		CF/SD Drain - S	Mass %
36	39.9750	2.013E+00	1.997162E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9789.0000	2.272E+02	2.257822E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	2.0550	2.0550	2.0550		CF/SD Drain - sfide S	Mass %
40	.4450	.445	.445		CF/SD Drain - cabate C *	Mass %
41	7.1700	3.585	3.585		CF/SD Drain - Ash S	Mass %
42	26.1500				CF/SD Drain - Ash CaO	Mass %
43	10.0500				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	66.8000	1.278E+00	1.269200E+00	1.500000E-01	BD Drain - C	Mass %
46	.6900	5.581E-02	4.347000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.9000	1.093E-01	1.064000E-01	2.500000E-02	BD Drain - N	Mass %
48	2.3400	1.17	1.17		BD Drain - S	Mass %
49	31.3200	1.648E+00	1.628640E+00	2.500000E-01	BD Drain - Ash	Mass %
50	10392.0000	2.093E+02	2.078400E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	1.1300	1.1300	1.1300		BD Drain - sfide S	Mass %
53	.3000	.3	.3		BD Drain - crbate C *	Mass %
54	5.2400	2.62	2.62		BD Drain - Ash S	Mass %
55	26.7000				BD Drain - Ash CaO	Mass %
56	13.3000				BD Drain - Ash MgO	Mass %
57	86.7750	9.490E-01	3.819734E-01	8.687500E-01	Demister Gas - N2	mol,vol %
58	.5275	1.015E-01	1.012562E-01	6.275000E-03	Demister Gas - O2	mol,vol %
59	3.3300	2.555E-01	2.531381E-01	3.430000E-02	Demister Gas - CO	mol,vol %
60	.7475	4.185E-02	4.098795E-02	8.475000E-03	Demister Gas - CH4	mol,vol %
61	4.8500	3.011E-01	2.970290E-01	4.950000E-02	Demister Gas - CO2	mol,vol %
62	.0625	8.737E-03	8.584509E-03	1.625000E-03	Demister Gas - C2H4	mol,vol %
63	.0000	.000E+00	.000000E+00	1.000000E-03	Demister Gas - C2H6	mol,vol %
64	.0128	4.738E-03	4.736349E-03	1.275000E-04	Demister Gas - H2S	mol,vol %
65	3.0000	1.074E-01	1.028645E-01	3.100000E-02	Demister Gas - H2	mol,vol %
66	.1506	2.394E-02	2.272016E-02	7.530000E-03	Demister Gas - NH3	mol,vol %
67	.3175	1.512E-02	1.452711E-02	4.175000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR10-2

```
69                                                Freeboard Gas - O2              mol,vol %
70                                                Freeboard Gas - CO              mol,vol %
71                                                Freeboard Gas - CH4             mol,vol %
72                                                Freeboard Gas - CO2             mol,vol %
73                                                Freeboard Gas - C2H4            mol,vol %
74                                                Freeboard Gas - C2H6            mol,vol %
75                                                Freeboard Gas - H2S             mol,vol %
76                                                Freeboard Gas - H2              mol,vol %
77                                                Freeboard Gas - NH3             mol,vol %
78                                                Freeboard Gas - Ar              mol,vol %
79   11.4400 1.500E+00  .000000E+00 1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2              mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2            mol,vol %
82   81.4000 1.421E+00 1.416360E+00 1.100000E-01 Sorbent - CaO                  Mass %
83   13.2000 4.418E+00 4.415400E+00 1.600000E-01 Sorbent - MgO                  Mass %
84     .8000 3.580E-01 3.564000E-01 3.400000E-02 Sorbent - SO3                  Mass %
85    2.9000 1.190E+00 1.180301E+00 1.500000E-01 Sorbent - Ash                  Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88    1.0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR10-3

DEFAULT CONTROL PARAMETERS,

```
  IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
    1,      3,     40,     0,      'A'

  EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
   .2,     4.5,   1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR10 - TEST POINT 3  <<CASE D>>  9/2/92  Pittsburgh Coal + Limestone
SET POINT DATE:      9/2/92
SET POINT TIME:      00:00:00 - 04:00:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	72.6950	3.331E+00	3.245000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	71.2720	3.282E+00	3.195000E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	199.0520	1.040E+00	7.210000E-01	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	845.2030	9.887E+00	3.992000E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	15.9090	7.788E+00	7.788000E+00	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6		1.000E+00	1.200000E-02	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	25.2980	6.624E-01	5.280000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	1.7610	1.490E+00	1.469000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	.0000	.000E+00	7.665000E+00	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	2.1320	4.264E-01	4.250000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.0710	2.500E-02	1.500000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	1480.5330	6.076E+01	5.888400E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	1140.6290	1.966E+01	1.490300E+01	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.2840	1.503E+00	8.800000E-02	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	300.0000	7.5166	7.5	.5	Coal Feed rate	lb/hr	
16	25.0000	.8004	.625	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	76.3120	2.095E+00	6.240000E-01	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	75.7140	2.287E+00	1.109000E+00	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	514.8440	2.000E+00	.000000E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	188.2860	1.729E+01	1.717800E+01	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1677.4820	2.295E+01	2.206800E+01	6.290557E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	58.2680	6.419E-01	3.310000E-01	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	917.1520	2.009E+01	1.979800E+01	3.439320E+00	Orifice Temp (Upstream)	F	TI-3108
38	157.1860	4.490E+00	4.020000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	2943.9100	2.000E+00	.000000E+00	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	256.7460	2.007E+00	1.640000E-01	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	227.0060	1.760E+01	1.748300E+01	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.8090	2.020E+00	2.820000E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	.0000				CD Flow; carbonizer discharge	lb/hr	
45	.0000				PD Flow; primary cyclone	lb/hr	
46	107.0000	5.373E+00	5.350000E+00	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	41.6200	2.140E+00	2.081000E+00	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	2.1085	1.054E-01	.000000E+00	1.054246E-01	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR10-3

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	70.0450	6.992E-01	6.829650E-01	1.500000E-01	Coal - C	Mass %
2	4.9200	6.727E-02	5.744977E-02	3.500000E-02	Coal - H	Mass %
3	1.9550	3.056E-02	1.756865E-02	2.500000E-02	Coal - N	Mass %
4	3.2100	.1605	.1605		Coal - S	Mass %
5	10.4150	6.246E-01	6.165601E-01	1.000000E-01	Coal - Ash	Mass %
6	3.2125	1.978E-01	1.289648E-01	1.500000E-01	Coal - H2O	Mass %
7	12753.0000	1.258E+02	1.232615E+02	2.500000E+01	Coal - HHV	BTU/lb
8	26.3700	2.637E+01	2.636957E+01	1.500000E-01	CD Drain - C	Mass %
9	.1130	1.130E-01	1.074430E-01	3.500000E-02	CD Drain - H	Mass %
10	.4230	4.230E-01	4.222606E-01	2.500000E-02	CD Drain - N	Mass %
11	3.4320	1.716	1.716		CD Drain - S	Mass %
12	100.0000	1.650E+01	1.650000E+01	2.500000E-01	CD Drain - Ash	Mass %
13	.0000	.000E+00	.000000E+00	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	2.4900	2.4900	2.4900		CD Drain - sfide S	Mass %
16	4.6100	4.61	4.61		CD Drain - crbate C	Mass %
17	4.8900	2.445	2.445		CD Drain - Ash S	Mass %
18	57.3400				CD Drain - Ash CaO	Mass %
19	5.4740				CD Drain - Ash MgO	Mass %
20	68.8000	6.880E+01	6.879984E+01	1.500000E-01	PD Drain - C	Mass %
21	.5720	5.720E-01	5.709282E-01	3.500000E-02	PD Drain - H	Mass %
22	1.2220	1.222E+00	1.221744E+00	2.500000E-02	PD Drain - N	Mass %
23	1.7520	.876	.876		PD Drain - S	Mass %
24	100.0000	5.226E+00	5.220000E+00	2.500000E-01	PD Drain - Ash	Mass %
25	.0000	.000E+00	.000000E+00	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	.7110	.7110	.7110		PD Drain - sfide S	Mass %
28	.7660	.766	.766		PD Drain - crbate C	Mass %
29	4.1140	2.057	2.057		PD Drain - Ash S	Mass %
30	23.7000				PD Drain - Ash CaO	Mass %
31	5.8630				PD Drain - Ash MgO	Mass %
32	64.0500	2.741E+00	2.737194E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.2467	3.543E-02	5.473445E-03	3.500000E-02	CF/SD Drain - H	Mass %
34	1.6800	4.547E-02	3.797511E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	4.9800	2.49	2.49		CF/SD Drain - S	Mass %
36	38.7067	3.774E+00	3.765302E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9879.0000	3.848E+02	3.840007E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	2.7600	2.7600	2.7600		CF/SD Drain - sfide S	Mass %
40	.8367	.8367	.8367		CF/SD Drain - cabate C *	Mass %
41	6.5867	3.29335	3.29335		CF/SD Drain - Ash S	Mass %
42	25.2667				CF/SD Drain - Ash CaO	Mass %
43	10.2667				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	68.8350	4.824E-01	4.585180E-01	1.500000E-01	BD Drain - C	Mass %
46	.5500	3.600E-02	8.407524E-03	3.500000E-02	BD Drain - H	Mass %
47	1.7100	4.384E-02	3.601822E-02	2.500000E-02	BD Drain - N	Mass %
48	2.2450	1.1225	1.1225		BD Drain - S	Mass %
49	28.6700	5.329E-01	4.705811E-01	2.500000E-01	BD Drain - Ash	Mass %
50	10637.5000	5.859E+01	5.299216E+01	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	1.0050	1.0050	1.0050		BD Drain - sfide S	Mass %
53	.2000	.2	.2		BD Drain - crbate C *	Mass %
54	4.2050	2.1025	2.1025		BD Drain - Ash S	Mass %
55	23.9000				BD Drain - Ash CaO	Mass %
56	11.4000				BD Drain - Ash MgO	Mass %
57	83.4250	9.347E-01	4.196443E-01	8.352500E-01	Demister Gas - N2	mol,vol %
58	.7450	1.801E-01	1.798576E-01	8.450000E-03	Demister Gas - O2	mol,vol %
59	4.9150	8.988E-02	7.458875E-02	5.015000E-02	Demister Gas - CO	mol,vol %
60	1.1350	1.016E-01	1.008327E-01	1.235000E-02	Demister Gas - CH4	mol,vol %
61	5.4925	3.003E-01	2.950958E-01	5.592500E-02	Demister Gas - CO2	mol,vol %
62	.0600	1.424E-02	1.414687E-02	1.600000E-03	Demister Gas - C2H4	mol,vol %
63	.0000	.000E+00	.000000E+00	1.000000E-03	Demister Gas - C2H6	mol,vol %
64	.0160	4.204E-03	4.200835E-03	1.602500E-04	Demister Gas - H2S	mol,vol %
65	3.9775	1.495E-01	1.438450E-01	4.077500E-02	Demister Gas - H2	mol,vol %
66	.1381	1.995E-02	1.871387E-02	6.905000E-03	Demister Gas - NH3	mol,vol %
67	.3850	8.168E-03	6.572778E-03	4.850000E-03	Demister Gas - Ar	mol,vol %
68	.0000	.000E+00	.000000E+00	1.000000E-03	Freeboard Gas - N2	mol,vol %

INPUT DATA FILE FOR TR10-3

```
69     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - O2              mol,vol %
70     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO              mol,vol %
71     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CH4             mol,vol %
72     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - CO2             mol,vol %
73     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H4            mol,vol %
74     .000   .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - C2H6            mol,vol %
75     .000   .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S             mol,vol %
76     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - H2              mol,vol %
77     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3             mol,vol %
78     .0000  .000E+00  .000000E+00 1.000000E-03 Freeboard Gas - Ar              mol,vol %
79   12.7400 1.500E+00  .000000E+00 1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2             mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2            mol,vol %
82   81.4000 1.421E+00 1.416360E+00 1.100000E-01 Sorbent - CaO                  Mass %
83   13.2000 4.418E+00 4.415400E+00 1.600000E-01 Sorbent - MgO                  Mass %
84     .8000 3.580E-01 3.564000E-01 3.4[illegible]0000E-02 Sorbent - SO3        Mass %
85    2.9000 1.190E+00 1.180301E+00 1.[illegible]0000E-01 Sorbent - Ash         Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
```

INPUT DATA FILE FOR TR10-4

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,      0,      'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     4.5,    1.8,     1.,     .25,    1.,     .5,   .04,    .99,  20/

TR10 - TEST POINT 4  <<CASE D>>  9/2/92  Pittsburgh Coal + Limestone
SET POINT DATE:      9/2/92
SET POINT TIME:      06:10:00 - 12:40:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	55.8910	1.754E+00	1.586000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	55.0890	1.268E+00	1.023000E+00	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	198.8890	9.366E-01	5.610000E-01	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	641.6060	1.027E+01	4.870000E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	22.2810	5.728E+00	5.727000E+00	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6		1.000E+00	7.000000E-03	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	25.3760	8.386E-01	7.370000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	1.0710	6.371E-01	5.860000E-01	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	.0000	.000E+00	7.657000E+00	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	1.7900	6.103E-02	5.000000E-02	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.0800	2.332E-02	1.200000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	1284.7590	3.253E+01	2.886500E+01	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	1142.0360	1.865E+01	1.354000E+01	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	.2650	1.503E+00	9.800000E-02	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	286.0000	7.1675	7.15	.5	Coal Feed rate	lb/hr	
16	25.0000	.8004	.625	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	77.2630	3.201E+00	2.499000E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	72.0050	3.077E+00	2.338000E+00	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	514.8440	2.000E+00	.000000E+00	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	201.6530	2.257E+01	2.248200E+01	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1570.7020	1.169E+01	1.009700E+01	5.890132E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	59.2000	6.318E-01	3.110000E-01	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	813.3990	2.066E+01	2.043200E+01	3.050246E+00	Orifice Temp (Upstream)	F	TI-3108
38	153.3450	2.932E+00	2.144000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	2943.9080	2.000E+00	1.000000E-03	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	257.2030	2.007E+00	1.660000E-01	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	220.8440	1.312E+01	1.296900E+01	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	387.7700	2.014E+00	2.410000E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	.0000				CD Flow; carbonizer discharge	lb/hr	
45	.0000				PD Flow; primary cyclone	lb/hr	
46	105.2200	5.285E+00	5.261000E+00	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	32.0100	1.677E+00	1.600500E+00	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	2.1085	1.054E-01	.000000E+00	1.054246E-01	Orifice Coefficient	dimensionless	

INPUT DATA FILE FOR TR10-4

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	70.0450	6.992E-01	6.829650E-01	1.500000E-01	Coal - C	Mass %
2	4.9200	6.727E-02	5.744977E-02	3.500000E-02	Coal - H	Mass %
3	1.9550	3.056E-02	1.756865E-02	2.500000E-02	Coal - N	Mass %
4	3.2100	.1605	.1605		Coal - S	Mass %
5	10.4150	6.246E-01	6.165601E-01	1.000000E-01	Coal - Ash	Mass %
6	3.2125	1.978E-01	1.289648E-01	1.500000E-01	Coal - H2O	Mass %
712750	.0000	1.126E+02	1.098153E+02	2.500000E+01	Coal - HHV	BTU/lb
8	26.3700	2.637E+01	2.636957E+01	1.500000E-01	CD Drain - C	Mass %
9	.1130	1.130E-01	1.074430E-01	3.500000E-02	CD Drain - H	Mass %
10	.4230	4.230E-01	4.222606E-01	2.500000E-02	CD Drain - N	Mass %
11	3.4320	1.716	1.716		CD Drain - S	Mass %
12	100.0000	1.650E+01	1.650000E+01	2.500000E-01	CD Drain - Ash	Mass %
13	.0000	.000E+00	.000000E+00	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	2.4900	2.4900	2.4900		CD Drain - sfide S	Mass %
16	4.6100	4.61	4.61		CD Drain - crbate C	Mass %
17	4.8900	2.445	2.445		CD Drain - Ash S	Mass %
18	57.3400				CD Drain - Ash CaO	Mass %
19	5.4740				CD Drain - Ash MgO	Mass %
20	68.8000	6.880E+01	6.879984E+01	1.500000E-01	PD Drain - C	Mass %
21	.5720	5.720E-01	5.709282E-01	3.500000E-02	PD Drain - H	Mass %
22	1.2220	1.222E+00	1.221744E+00	2.500000E-02	PD Drain - N	Mass %
23	1.7520	.876	.876		PD Drain - S	Mass %
24	100.0000	5.226E+00	5.220000E+00	2.500000E-01	PD Drain - Ash	Mass %
25	.0000	.000E+00	.000000E+00	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	.7110	.7110	.7110		PD Drain - sfide S	Mass %
28	.7660	.766	.766		PD Drain - crbate C	Mass %
29	4.1140	2.057	2.057		PD Drain - Ash S	Mass %
30	23.7000				PD Drain - Ash CaO	Mass %
31	5.8630				PD Drain - Ash MgO	Mass %
32	64.3675	1.379E+00	1.370453E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.3425	3.792E-02	1.458321E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.7375	2.704E-02	1.031062E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	5.4700	2.735	2.735		CF/SD Drain - S	Mass %
36	36.7025	1.861E+00	1.843844E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
3710	137.5000	2.266E+02	2.252339E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	2.8850	2.8850	2.8850		CF/SD Drain - sfide S	Mass %
40	.6575	.6575	.6575		CF/SD Drain - cabate C *	Mass %
41	5.8500	2.925	2.925		CF/SD Drain - Ash S	Mass %
42	21.3750				CF/SD Drain - Ash CaO	Mass %
43	7.9000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	73.6600	1.408E+00	1.398540E+00	1.500000E-01	BD Drain - C	Mass %
46	.7400	5.830E-02	4.662000E-02	3.500000E-02	BD Drain - H	Mass %
47	1.8800	1.082E-01	1.052800E-01	2.500000E-02	BD Drain - N	Mass %
48	2.1800	1.09	1.09		BD Drain - S	Mass %
49	22.7300	1.208E+00	1.181960E+00	2.500000E-01	BD Drain - Ash	Mass %
5011	629.0000	2.339E+02	2.325800E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.9200	.9200	.9200		BD Drain - sfide S	Mass %
53	.0340	.034	.034		BD Drain - crbate C *	Mass %
54	3.2400	1.62	1.62		BD Drain - Ash S	Mass %
55	17.4000				BD Drain - Ash CaO	Mass %
56	10.2000				BD Drain - Ash MgO	Mass %
57	85.6750	1.000E+00	5.144998E-01	8.577499E-01	Demister Gas - N2	mol,vol %
58	.9975	2.668E-01	2.665573E-01	1.097500E-02	Demister Gas - O2	mol,vol %
59	2.6125	1.173E-01	1.140761E-01	2.712500E-02	Demister Gas - CO	mol,vol %
60	1.1825	6.174E-02	6.039355E-02	1.282500E-02	Demister Gas - CH4	mol,vol %
61	4.8875	1.215E-01	1.107990E-01	4.987500E-02	Demister Gas - CO2	mol,vol %
62	.1275	1.685E-02	1.669316E-02	2.275000E-03	Demister Gas - C2H4	mol,vol %
63	.0075	7.754E-03	7.679401E-03	1.075000E-03	Demister Gas - C2H6	mol,vol %
64	.0305	5.509E-03	5.500728E-03	3.050000E-04	Demister Gas - H2S	mol,vol %
65	3.4000	1.319E-01	1.271748E-01	3.500000E-02	Demister Gas - H2	mol,vol %
66	.2085	2.781E-02	2.578462E-02	1.042500E-02	Demister Gas - NH3	mol,vol %
67	.3275	6.671E-03	5.121509E-03	4.275000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

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69                                                Freeboard Gas - O2              mol,vol %
70                                                Freeboard Gas - CO              mol,vol %
71                                                Freeboard Gas - CH4             mol,vol %
72                                                Freeboard Gas - CO2             mol,vol %
73                                                Freeboard Gas - C2H4            mol,vol %
74                                                Freeboard Gas - C2H6            mol,vol %
75                                                Freeboard Gas - H2S             mol,vol %
76                                                Freeboard Gas - H2              mol,vol %
77                                                Freeboard Gas - NH3             mol,vol %
78                                                Freeboard Gas - Ar              mol,vol %
79   15.9000 1.500E+00  .000000E+00 1.500000E+00 Water Content in Freeboard Gas mol,vol %
80     .0000  .000E+00  .000000E+00  .000000E+00 Demister Gas - SO2             mol,vol %
81     .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - SO2            mol,vol %
82   81.4000 1.421E+00 1.416360E+00 1.100000E-01 Sorbent - CaO                  Mass %
83   13.2000 4.418E+00 4.415400E+00 1.600000E-01 Sorbent - MgO                  Mass %
84     .8000 3.580E-01 3.564000E-01 3.400000E-02 Sorbent - SO3                  Mass %
85    2.9000 1.190E+00 1.180301E+00 1.500000E-01 Sorbent - Ash                  Mass %
86     .0000  .000E+00  .000000E+00  .000000E+00 Unused
87    4.0000  .000E+00  .000000E+00  .000000E+00 Demister gas # of Analyses,  dimensionless
88    1.0000  .000E+00  .000000E+00  .000000E+00 Freeboard gas # of Analyses, dimensionless
89     .0000  .000E+00  .000000E+00  .000000E+00 Unused
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APPENDIX D

COMPARISON OF UNRECONCILED AND RECONCILED VALUES OF PLANT AND LABORATORY MEASUREMENTS

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A total of 36 set points (steady-state periods) were achieved while operating the carbonizer in a jetting fluidized-bed mode, and 4 set points were achieved while operating the carbonizer in a circulating fluidized-bed mode. Table D.1 summarizes the coal and sorbent types used, date, duration, pressure, and bed and freeboard temperatures for each of these steady-state periods.

Tables comparing the reconciled (New) values of all the measurements to close all the elemental and energy balances under the constraints of the measurement accuracies, along with the unreconciled (Old) values of all the measurements for all the steady-state periods are given in this appendix. The tables can help one evaluate behavior of each instrument or analytic procedure, and identify where they may need improvement.

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Table D.1. SUMMARY OF STEADY-STATE PERIODS FROM CARBONIZER PILOT PLANT OPERATION

Set Point	Coal Feed	Sorbent Feed	Date	Duration, hours	Pressure, psig	Bed Temp., °F	Freeboard Temp., °F
TR1-1	Pittsburgh No 8	Dolomite	11/20/91	0300-0700	152.6	1584	1553
TR1-2	Pittsburgh No 8	Dolomite	11/21/91	0200-0600	132.9	1681	1651
TR1-3	Pittsburgh No 8	Dolomite	11/21/91	1000-1400	144.7	1608	1581
TR1-4	Pittsburgh No 8	Dolomite	11/21/91	2100-2330	125.4	1482	1440
TR2-1	Pittsburgh No 8	Dolomite	12/19/91	0100-0500	139.8	1698	1652
TR2-2	Pittsburgh No 8	Dolomite	12/19/91	1300-1700	128.3	1598	1567
TR2-3	Pittsburgh No 8	Dolomite	12/20/91	0100-0500	138.1	1797	1705
TR2-4	Pittsburgh No 8	Dolomite	12/20/91	1000-1400	191.8	1784	1738
TR2-5	Pittsburgh No 8	Dolomite	12/20/91	1600-1800	198.6	1679	1675
TR4-1	Pittsburgh No 8	Dolomite	3/10/92	2030-0030	153.3	1663	1626
TR4-2	Pittsburgh No 8	Dolomite	3/11/92	0430-0830	155.9	1608	1573
TR4-3	Pittsburgh No 8	Dolomite	3/12/92	0230-0630	125.2	1708	1643
TR4-4	Pittsburgh No 8	Dolomite	3/12/92	1600-2000	129.1	1607	1568
TR4-5	Pittsburgh No 8	Dolomite	3/13/92	0530-0930	193.2	1720	1691
TR4-6	Pittsburgh No 8	Dolomite	3/13/92	1300-1700	175.8	1713	1681
TR4-7	Pittsburgh No 8	Dolomite	3/13/92	2200-0200	177.9	1601	1582
TR4-8	Pittsburgh No 8	Dolomite	3/14/92	0200-0600	182.2	1618	1600
TR5-1	Pittsburgh No 8	Dolomite	3/24/92	1100-1500	134.3	1693	1653
TR5-2	Pittsburgh No 8	Dolomite	3/24/92	1900-2300	154.8	1701	1662
TR5-3	Pittsburgh No 8	Limestone	3/25/92	0500-0900	147.4	1706	1667
TR6-1	Wyoming	Limestone	4/21/92	2100-0100	145.9	1580	1567
TR6-2	Wyoming	Limestone	4/22/92	0430-0830	129.8	1509	1500
TR6-3	Wyoming	Limestone	4/22/92	1400-1800	157.5	1511	1515
TR6-4	Wyoming	Limestone	4/22/92	2100-0100	191.9	1609	1579
TR6-5	Wyoming	Limestone	4/23/92	0400-0800	189.6	1632	1593
TR6-6	Illinois No 6	Limestone	4/23/92	1800-2200	143.5	1600	1573
TR6-7	Illinois No 6	Limestone	4/23/92	2300-0330	122.4	1599	1573
TR8-1	Wyoming	Limestone	6/10/92	2000-0100	128.6	1476	1432
TR8-2	Wyoming	Limestone	6/11/92	0300-0800	132.7	1593	1541
TR8-3	Wyoming	Limestone	6/11/92	1330-1730	156.5	1613	1575
TR8-4	Illinois No 6	Limestone	6/12/92	2100-0200	113.2	1652	1623
TR8-5	Illinois No 6	Limestone	6/13/92	0700-1100	160.6	1715	1680
TR8-6/7	Pittsburgh No 8	Dolomite	6/14/92	2100-0100	156.0	1699	1675
TR8-8	Pittsburgh No 8	Dolomite	6/16/92	0200-0600	143.5	1707	1683
TR8-9	Pittsburgh No 8	Dolomite	6/16/92	0800-1230	135.0	1713	1683
TR8-10	Pittsburgh No 8	Dolomite	6/16/92	1430-1930	126.5	1729	1697
TR10-1*	Pittsburgh No 8	Limestone	9/1/92	0200-0600	113.7	1675	1652
TR10-2*	Pittsburgh No 8	Limestone	9/1/92	1630-2100	68.7	1675	1618
TR10-3*	Pittsburgh No 8	Limestone	9/2/92	0000-0400	72.7	1706	1677
TR10-4*	Pittsburgh No 8	Limestone	9/2/92	0610-1240	55.9	1601	1571

*The carbonizer was operated in a circulating fluidized-bed mode during Test TR10.

TR1 - TEST POINT 1 11/20/91 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	149.991	156.453
4	Total Air Feed	lb/hr	FIC-1055	627.897	622.979
6	Bed Drain N2 Feed	SCFM	FI-3028	74.1530	64.5743
7	N2 to spray tower	SCFM	FI-4051	43.9850	43.9059
8	Feed lockhopper comp N2	SCFM	FI-7008	12.1200	10.7529
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	26.6460	26.6225
10	Purge N2 to carbonizer	SCFM	FI-7021	6.99100	6.92702
11	Purge N2 to cyclones	SCFM	FI-7022	3.95700	3.95401
15	Coal Feed rate	lb/hr		329.000	337.884
16	Sorbent feed rate	lb/hr		89.0000	82.2600
22	Air Feed Temp	deg F	TI-1059	89.3450	89.3387
23	Bed Drain Temp	deg F	TIC-3027	96.3450	96.4024
24	Primary Cyclone Lockhopper Temp	F	TI-3070	144.277	144.285
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	178.968	179.028
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1505.33	1504.82
35	Carbonizer wall heat loss	KBTU/hr		100.000	95.324
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	233.239
37	Orifice Temp (Upstream)	F	TI-3108	1257.90	1258.15
38	Purge N2 Temp	F	TI-7012	86.3560	86.3532
44	CD Flow; carbonizer discharge	lb/hr		74.4000	80.5174
45	PD Flow; primary cyclone	lb/hr		78.2000	72.4759
46	SD/CF Flow; secondary cyclone	lb/hr		127.800	128.696
49	Ambient Temperature	F		60.0000	59.9048

	Lab Measurement				
1	Coal - C	Mass %		67.4946	66.9458
2	Coal - H	Mass %		4.57820	4.64002
3	Coal - N	Mass %		1.85360	1.85325
4	Coal - S	Mass %		3.17360	3.40120
5	Coal - Ash	Mass %		14.4255	14.3823
6	Coal - H2O	Mass %		2.17270	2.15923
7	Coal - HHV *	BTU/lb		12296.0	12056.0
8	CD Drain - C	Mass %		29.1880	31.1476
9	CD Drain - H	Mass %		.136000	.130908
10	CD Drain - N	Mass %		.742000	.738858
11	CD Drain - S	Mass %		7.08400	6.65677
12	CD Drain - Ash	Mass %		75.4940	75.9829
13	CD Drain - HHV (dry)	BTU/lb		4359.10	4638.49
15	CD Drain - sfide S	Mass %		4.65400	6.65677
16	CD Drain - crbate C	Mass %		3.39800	3.89710
18	CD Drain - Ash CaO	Mass %		13.5600	23.8012
19	CD Drain - Ash MgO	Mass %		19.0160	17.1097
20	PD Drain - C	Mass %		56.0780	62.4896

TR1 - TEST POINT 1 11/20/91 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
21	PD Drain - H	Mass %	.388000	.421356
22	PD Drain - N	Mass %	1.38600	1.53496
23	PD Drain - S	Mass %	6.14400	4.76271
24	PD Drain - Ash	Mass %	45.8400	45.2531
25	PD Drain - HHV (dry)	BTU/lb	8299.40	9340.05
27	PD Drain - sfide S	Mass %	2.38760	3.73975
28	PD Drain - crbate C	Mass %	2.32600	1.27833
30	PD Drain - Ash CaO	Mass %	9.1200	14.4656
31	PD Drain - Ash MgO	Mass %	17.9800	10.3987
32	CF/SD Drain - C	Mass %	71.1680	71.9977
33	CF/SD Drain - H	Mass %	.598000	.598723
34	CF/SD Drain - N	Mass %	2.09800	2.14116
35	CF/SD Drain - S	Mass %	2.92600	2.08114
36	CF/SD Drain - Ash	Mass %	28.4000	28.6089
37	CF/SD Drain - HHV (dry)	BTU/lb	10748.3	10928.5
39	CF/SD Drain - sfide S	Mass %	.778000	.869961
40	CF/SD Drain - cabate C	Mass %	1.06800	1.19072
42	CF/SD Drain - Ash CaO	Mass %	9.2800	15.2480
43	CF/SD Drain - Ash MgO	Mass %	14.0000	10.9612
50	BD Drain - HHV (dry)	BTU/lb	10685.4	.0
57	Demister Gas - N2	mol,vol %	81.9000	82.9063
58	Demister Gas - O2	mol,vol %	.258000	.181276
59	Demister Gas - CO	mol,vol %	4.88200	4.58456
60	Demister Gas - CH4	mol,vol %	1.81200	1.72262
61	Demister Gas - CO2	mol,vol %	6.17600	5.75599
62	Demister Gas - C2H4	mol,vol %	.076000	.072582
63	Demister Gas - C2H6	mol,vol %	.028000	.026709
64	Demister Gas - H2S	mol,vol %	.020000	.017653
65	Demister Gas - H2	mol,vol %	3.78600	3.59414
66	Demister Gas - NH3	mol,vol %	.164400	.154959
67	Demister Gas - Ar	mol,vol %	.320000	.405652
79	Water Content in Freeboard Gas	mol,vol %	11.5160	9.0651
82	Sorbent - CaO	Mass %	60.1167	56.9976
83	Sorbent - MgO	Mass %	37.3333	40.9732
84	Sorbent - SO3	Mass %	1.01670	1.10238
85	Sorbent - Ash	Mass %	2.91670	2.31027

TR1 - TEST POINT 2 11/21/91 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	130.436	138.262
4	Total Air Feed	lb/hr	FIC-1055	586.528	570.815
5	Transport N2 Feed	SCFM	FIC-1053	14.4420	9.5314
6	Bed Drain N2 Feed	SCFM	FI-3028	40.7180	39.8386
7	N2 to spray tower	SCFM	FI-4051	47.7030	47.4946
8	Feed lockhopper comp N2	SCFM	FI-7008	11.7730	9.4446
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	28.5670	28.5508
10	Purge N2 to carbonizer	SCFM	FI-7021	7.08400	7.03332
11	Purge N2 to cyclones	SCFM	FI-7022	4.02600	4.02212
15	Coal Feed rate	lb/hr		235.000	238.716
16	Sorbent feed rate	lb/hr		67.0000	66.1414
22	Air Feed Temp	deg F	TI-1059	84.9190	84.9158
23	Bed Drain Temp	deg F	TIC-3027	112.222	112.290
24	Primary Cyclone Lockhopper Temp	F	TI-3070	156.335	156.342
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	178.294	178.296
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1590.77	1590.78
35	Carbonizer wall heat loss	KBTU/hr		100.000	100.522
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	213.946
37	Orifice Temp (Upstream)	F	TI-3108	1266.69	1266.72
38	Purge N2 Temp	F	TI-7012	79.1970	79.1938
44	CD Flow; carbonizer discharge	lb/hr		50.6700	64.9104
45	PD Flow; primary cyclone	lb/hr		72.3000	74.8111
46	SD/CF Flow; secondary cyclone	lb/hr		43.1000	44.8617
49	Ambient Temperature	F		60.0000	59.9241

	Lab Measurement				
1	Coal - C	Mass %		67.4946	67.6330
2	Coal - H	Mass %		4.57820	4.63341
3	Coal - N	Mass %		1.85360	1.86279
4	Coal - S	Mass %		3.17360	3.27641
5	Coal - Ash	Mass %		14.4255	13.8753
6	Coal - H2O	Mass %		2.17270	2.18140
7	Coal - HHV	BTU/lb		12296.0	12179.9
8	CD Drain - C	Mass %		37.4250	32.4838
9	CD Drain - H	Mass %		.155000	.119795
10	CD Drain - N	Mass %		.790000	.612607
11	CD Drain - S	Mass %		9.78250	6.60091
12	CD Drain - Ash	Mass %		76.7475	77.8792
13	CD Drain - HHV (dry)	BTU/lb		5954.70	4776.29
14	CD Drain - sfate S	Mass %		.217500	.169632
15	CD Drain - sfide S	Mass %		6.55750	6.35661
16	CD Drain - crbate C	Mass %		1.81000	2.72078
18	CD Drain - Ash CaO	Mass %		21.8000	27.6630

TR1 - TEST POINT 2 11/21/91 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
19	CD Drain - Ash MgO	Mass %	18.1250	17.5264
20	PD Drain - C	Mass %	70.9450	68.8153
21	PD Drain - H	Mass %	.477500	.458243
22	PD Drain - N	Mass %	1.75750	1.68716
23	PD Drain - S	Mass %	3.57750	3.07588
24	PD Drain - Ash	Mass %	28.5725	29.5000
25	PD Drain - HHV (dry)	BTU/lb	10482.1	10084.5
27	PD Drain - sfide S	Mass %	1.39000	1.41535
28	PD Drain - crbate C	Mass %	.78000	1.08274
30	PD Drain - Ash CaO	Mass %	16.3500	21.0893
31	PD Drain - Ash MgO	Mass %	13.9500	13.3615
32	CF/SD Drain - C	Mass %	68.4725	65.9744
33	CF/SD Drain - H	Mass %	.440000	.420470
34	CF/SD Drain - N	Mass %	1.66500	1.59243
35	CF/SD Drain - S	Mass %	2.97250	2.69405
36	CF/SD Drain - Ash	Mass %	29.7300	31.0750
37	CF/SD Drain - HHV (dry)	BTU/lb	10280.3	9831.5
39	CF/SD Drain - sfide S	Mass %	.935000	.910013
40	CF/SD Drain - cabate C	Mass %	.76750	1.13673
42	CF/SD Drain - Ash CaO	Mass %	16.6250	21.3484
43	CF/SD Drain - Ash MgO	Mass %	13.6250	13.5257
50	BD Drain - HHV (dry)	BTU/lb	10686.1	.0
57	Demister Gas - N2	mol,vol %	81.4000	82.7161
58	Demister Gas - O2	mol,vol %	.440000	.114769
59	Demister Gas - CO	mol,vol %	6.56500	6.18462
60	Demister Gas - CH4	mol,vol %	.950000	.906146
61	Demister Gas - CO2	mol,vol %	5.66500	5.25861
62	Demister Gas - C2H4	mol,vol %	.020000	.019119
64	Demister Gas - H2S	mol,vol %	.027500	.024751
65	Demister Gas - H2	mol,vol %	3.87000	3.69290
66	Demister Gas - NH3	mol,vol %	.137500	.131463
67	Demister Gas - Ar	mol,vol %	.372500	.398984
79	Water Content in Freeboard Gas	mol,vol %	10.3810	7.6411
82	Sorbent - CaO	Mass %	60.1167	59.9248
83	Sorbent - MgO	Mass %	37.3333	37.9664
84	Sorbent - SO3	Mass %	1.01670	1.03131
85	Sorbent - Ash	Mass %	2.91670	2.46088

TR1 - TEST POINT 3 11/21/91 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	141.993	148.002
4	Total Air Feed	lb/hr	FIC-1055	658.519	611.043
5	Transport N2 Feed	SCFM	FIC-1053	16.9440	15.7978
6	Bed Drain N2 Feed	SCFM	FI-3028	29.8000	27.8151
7	N2 to spray tower	SCFM	FI-4051	47.2320	47.0389
8	Feed lockhopper comp N2	SCFM	FI-7008	14.1200	12.9766
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	27.6320	27.6036
10	Purge N2 to carbonizer	SCFM	FI-7021	7.04700	7.02324
11	Purge N2 to cyclones	SCFM	FI-7022	4.00400	4.00100
15	Coal Feed rate	lb/hr		354.000	341.928
16	Sorbent feed rate	lb/hr		98.0000	96.4689
22	Air Feed Temp	deg F	TI-1059	81.5810	81.5748
23	Bed Drain Temp	deg F	TIC-3027	248.305	250.379
24	Primary Cyclone Lockhopper Temp	F	TI-3070	150.985	150.990
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	173.938	173.939
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1531.95	1532.72
35	Carbonizer wall heat loss	KBTU/hr		100.000	105.252
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	212.938
37	Orifice Temp (Upstream)	F	TI-3108	1269.18	1269.55
38	Purge N2 Temp	F	TI-7012	82.2540	82.2495
44	CD Flow; carbonizer discharge	lb/hr		109.400	147.149
45	PD Flow; primary cyclone	lb/hr		100.900	106.830
46	SD/CF Flow; secondary cyclone	lb/hr		24.0000	23.8464
49	Ambient Temperature	F		60.0000	59.7687

	Lab Measurement				
1	Coal - C	Mass %		67.4946	64.6176
2	Coal - H	Mass %		4.57820	4.52017
3	Coal - N	Mass %		1.85360	1.84288
4	Coal - S	Mass %		3.17360	3.23571
5	Coal - Ash	Mass %		14.4255	14.6050
6	Coal - H2O	Mass %		2.17270	2.31658
7	Coal - HHV	BTU/lb		12296.0	11666.3
8	CD Drain - C	Mass %		43.5825	38.7057
9	CD Drain - H	Mass %		.247500	.205147
10	CD Drain - N	Mass %		1.09750	.91302
11	CD Drain - S	Mass %		5.79000	4.58763
12	CD Drain - Ash	Mass %		59.2650	60.9478
13	CD Drain - HHV (dry)	BTU/lb		6405.50	5808.35
15	CD Drain - sfide S	Mass %		3.42250	4.46109
16	CD Drain - crbate C	Mass %		3.01000	3.50583
18	CD Drain - Ash CaO	Mass %		15.9000	27.4563
19	CD Drain - Ash MgO	Mass %		19.8250	17.4479

TR1 - TEST POINT 3 11/21/91 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
20	PD Drain - C	Mass %	71.0550	69.9870
21	PD Drain - H	Mass %	.565000	.552056
22	PD Drain - N	Mass %	1.85250	1.80820
23	PD Drain - S	Mass %	3.95250	3.57285
24	PD Drain - Ash	Mass %	27.3575	27.8301
25	PD Drain - HHV (dry)	BTU/lb	10546.2	10425.1
27	PD Drain - sfide S	Mass %	1.12250	1.29240
28	PD Drain - crbate C	Mass %	.88750	1.07900
30	PD Drain - Ash CaO	Mass %	13.8000	18.9534
31	PD Drain - Ash MgO	Mass %	13.1000	12.0445
32	CF/SD Drain - C	Mass %	75.5650	76.5584
33	CF/SD Drain - H	Mass %	.712500	.723834
34	CF/SD Drain - N	Mass %	2.04750	2.07952
35	CF/SD Drain - S	Mass %	2.53000	2.59533
36	CF/SD Drain - Ash	Mass %	21.6425	21.3160
37	CF/SD Drain - HHV (dry)	BTU/lb	11255.1	11473.9
39	CF/SD Drain - sfide S	Mass %	.805000	.896299
40	CF/SD Drain - cabate C	Mass %	.867500	.653905
42	CF/SD Drain - Ash CaO	Mass %	11.4500	13.9850
43	CF/SD Drain - Ash MgO	Mass %	14.1000	8.8872
50	BD Drain - HHV (dry)	BTU/lb	10685.4	.0
57	Demister Gas - N2	mol,vol %	78.6333	80.2244
58	Demister Gas - O2	mol,vol %	.750000	.322793
59	Demister Gas - CO	mol,vol %	6.46670	6.16070
60	Demister Gas - CH4	mol,vol %	1.98670	1.97873
61	Demister Gas - CO2	mol,vol %	6.85670	6.07083
62	Demister Gas - C2H4	mol,vol %	.076700	.074726
63	Demister Gas - C2H6	mol,vol %	.030000	.029158
64	Demister Gas - H2S	mol,vol %	.014600	.014083
65	Demister Gas - H2	mol,vol %	4.14670	4.06872
66	Demister Gas - NH3	mol,vol %	.162500	.159156
67	Demister Gas - Ar	mol,vol %	.393300	.413942
79	Water Content in Freeboard Gas	mol,vol %	11.5620	8.6012
82	Sorbent - CaO	Mass %	60.1167	60.0142
83	Sorbent - MgO	Mass %	37.3333	38.1378
84	Sorbent - SO3	Mass %	1.01670	1.03007
85	Sorbent - Ash	Mass %	2.91670	2.20127

TR1 - TEST POINT 4 11/21/91 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	123.073	122.162
4	Total Air Feed	lb/hr	FIC-1055	559.767	537.714
5	Transport N2 Feed	SCFM	FIC-1053	12.7360	11.3446
6	Bed Drain N2 Feed	SCFM	FI-3028	13.7440	13.4623
7	N2 to spray tower	SCFM	FI-4051	47.9360	47.8626
8	Feed lockhopper comp N2	SCFM	FI-7008	10.4840	9.8998
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	28.7170	28.7117
10	Purge N2 to carbonizer	SCFM	FI-7021	7.03400	7.01658
11	Purge N2 to cyclones	SCFM	FI-7022	3.99300	3.99174
15	Coal Feed rate	lb/hr		395.000	386.677
16	Sorbent feed rate	lb/hr		97.0000	98.6644
22	Air Feed Temp	deg F	TI-1059	79.1610	79.1597
23	Bed Drain Temp	deg F	TIC-3027	190.732	190.897
24	Primary Cyclone Lockhopper Temp	F	TI-3070	156.997	157.008
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	160.634	160.641
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1393.72	1393.66
35	Carbonizer wall heat loss	KBTU/hr		100.000	98.000
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	217.469
37	Orifice Temp (Upstream)	F	TI-3108	1163.44	1163.56
38	Purge N2 Temp	F	TI-7012	82.6640	82.6624
44	CD Flow; carbonizer discharge	lb/hr		88.0000	90.8696
45	PD Flow; primary cyclone	lb/hr		97.600	116.462
46	SD/CF Flow; secondary cyclone	lb/hr		93.700	116.311
49	Ambient Temperature	F		60.0000	59.9282

	Lab Measurement				
1	Coal - C	Mass %		67.4946	66.0801
2	Coal - H	Mass %		4.57820	4.65280
3	Coal - N	Mass %		1.85360	1.86016
4	Coal - S	Mass %		3.17360	3.13897
5	Coal - Ash	Mass %		14.4255	13.9707
6	Coal - H2O	Mass %		2.17270	2.31544
7	Coal - HHV	BTU/lb		12296.0	12239.9
8	CD Drain - C	Mass %		56.6225	57.1360
9	CD Drain - H	Mass %		.317500	.321698
10	CD Drain - N	Mass %		1.58750	1.61427
11	CD Drain - S	Mass %		4.73500	5.90608
12	CD Drain - Ash	Mass %		42.2800	41.7802
13	CD Drain - HHV (dry)	BTU/lb		8634.00	9006.61
15	CD Drain - sfide S	Mass %		2.72250	3.37368
16	CD Drain - crbate C	Mass %		2.18500	2.07740
18	CD Drain - Ash CaO	Mass %		41.3750	42.5020
19	CD Drain - Ash MgO	Mass %		30.5000	26.2144

TR1 - TEST POINT 4 11/21/91 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
20	PD Drain - C	Mass %	66.9633	58.3470
21	PD Drain - H	Mass %	.543300	.472624
22	PD Drain - N	Mass %	1.86330	1.62735
23	PD Drain - S	Mass %	3.55330	3.34708
24	PD Drain - Ash	Mass %	30.5833	34.6220
25	PD Drain - HHV (dry)	BTU/lb	10408.0	9178.6
27	PD Drain - sfide S	Mass %	1.18670	1.11644
28	PD Drain - crbate C	Mass %	1.33330	1.10289
30	PD Drain - Ash CaO	Mass %	32.5667	24.3589
31	PD Drain - Ash MgO	Mass %	23.9333	15.0241
32	CF/SD Drain - C	Mass %	73.0233	60.8865
33	CF/SD Drain - H	Mass %	.670000	.557623
34	CF/SD Drain - N	Mass %	1.99330	1.66374
35	CF/SD Drain - S	Mass %	2.81330	2.43680
36	CF/SD Drain - Ash	Mass %	22.2767	31.0429
37	CF/SD Drain - HHV (dry)	BTU/lb	11575.3	9705.3
39	CF/SD Drain - sfide S	Mass %	.586700	.501597
40	CF/SD Drain - cabate C	Mass %	.730000	.579358
42	CF/SD Drain - Ash CaO	Mass %	27.7667	15.9818
43	CF/SD Drain - Ash MgO	Mass %	20.2333	9.8572
50	BD Drain - HHV (dry)	BTU/lb	10685.4	.0
57	Demister Gas - N2	mol,vol %	78.6667	79.1636
58	Demister Gas - O2	mol,vol %	.323300	.263790
59	Demister Gas - CO	mol,vol %	4.83670	4.75815
60	Demister Gas - CH4	mol,vol %	2.62000	2.57114
61	Demister Gas - CO2	mol,vol %	7.03330	6.79667
62	Demister Gas - C2H4	mol,vol %	.163300	.161471
63	Demister Gas - C2H6	mol,vol %	.246700	.242864
64	Demister Gas - H2S	mol,vol %	.020000	.019737
65	Demister Gas - H2	mol,vol %	4.83670	4.71231
66	Demister Gas - NH3	mol,vol %	.133300	.131109
67	Demister Gas - Ar	mol,vol %	.353300	.412484
79	Water Content in Freeboard Gas	mol,vol %	14.9900	11.5115
82	Sorbent - CaO	Mass %	60.1167	60.3155
83	Sorbent - MgO	Mass %	37.3333	37.2014
84	Sorbent - SO3	Mass %	1.01670	.99532
85	Sorbent - Ash	Mass %	2.91670	2.87125

TR2 - TEST POINT 1 12/19/91 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	137.119	157.632
4	Total Air Feed	lb/hr	FIC-1055	716.651	676.994
5	Transport N2 Feed	SCFM	FIC-1053	1.98300	1.56416
6	Bed Drain N2 Feed	SCFM	FI-3028	67.5100	66.7173
7	N2 to spray tower	SCFM	FI-4051	46.2190	45.8352
8	Feed lockhopper comp N2	SCFM	FI-7008	11.3560	10.2877
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	8.37000	8.35098
10	Purge N2 to c onizer	SCFM	FI-7021	6.91800	6.86859
11	Purge N2 to cyclones	SCFM	FI-7022	3.95600	3.95221
15	Coal Feed rate	lb/hr		234.000	235.470
16	Sorbent feed rate	lb/hr		118.000	115.084
22	Air Feed Temp	deg F	TI-1059	75.0820	75.0790
23	Bed Drain Temp	deg F	TIC-3027	157.078	157.429
24	Primary Cyclone Lockhopper Temp	F	TI-3070	161.535	161.552
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	171.324	171.326
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1605.54	1605.43
35	Carbonizer wall heat loss	KBTU/hr		100.000	95.009
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	234.059
37	Orifice Temp (Upstream)	F	TI-3108	1322.65	1322.88
38	Purge N2 Temp	F	TI-7012	91.8540	91.8323
44	CD Flow; carbonizer discharge	lb/hr		65.7100	85.1206
45	PD Flow; primary cyclone	lb/hr		97.530	104.254
46	SD/CF Flow; secondary cyclone	lb/hr		4.02000	4.02873
47	BD Flow; bag house	lb/hr		5.00000	5.03923
49	Ambient Temperature	F		60.0000	59.9252

	Lab Measurement				
1	Coal - C	Mass %		68.1918	68.0729
2	Coal - H	Mass %		4.58730	4.59291
3	Coal - N	Mass %		1.92270	1.91967
4	Coal - S	Mass %		4.50550	4.54813
5	Coal - Ash	Mass %		12.4518	12.4936
6	Coal - H2O	Mass %		2.28550	2.29073
7	Coal - HHV	BTU/lb		12554.1	12437.4
8	CD Drain - C	Mass %		34.7367	29.0901
9	CD Drain - H	Mass %		.156700	.120178
10	CD Drain - N	Mass %		.870000	.669700
11	CD Drain - S	Mass %		4.65330	5.08148
12	CD Drain - Ash	Mass %		71.2267	72.4540
13	CD Drain - HHV (dry)	BTU/lb		5288.67	4205.46
15	CD Drain - sfide S	Mass %		3.47000	4.39441
16	CD Drain - crbate C	Mass %		1.87000	3.61920
18	CD Drain - Ash CaO	Mass %		20.0667	33.3926

TR2 - TEST POINT 1 12/19/91 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
19	CD Drain - Ash MgO	Mass %	19.9333	23.7123
20	PD Drain - C	Mass %	57.3275	54.5735
21	PD Drain - H	Mass %	.380000	.353919
22	PD Drain - N	Mass %	1.61500	1.50753
23	PD Drain - S	Mass %	3.76500	4.00982
24	PD Drain - Ash	Mass %	45.6975	45.9665
25	PD Drain - HHV (dry)	BTU/lb	8735.75	8324.89
27	PD Drain - sfide S	Mass %	2.51750	3.26064
28	PD Drain - crbate C	Mass %	1.63250	2.23815
30	PD Drain - Ash CaO	Mass %	19.9000	29.3262
31	PD Drain - Ash MgO	Mass %	19.2500	20.8247
32	CF/SD Drain - C	Mass %	47.9700	48.0576
33	CF/SD Drain - H	Mass %	.360000	.359006
34	CF/SD Drain - N	Mass %	1.63000	1.62572
35	CF/SD Drain - S	Mass %	3.57000	3.70533
36	CF/SD Drain - Ash	Mass %	53.7600	53.5476
37	CF/SD Drain - HHV (dry)	BTU/lb	7451.00	7442.28
39	CF/SD Drain - sfide S	Mass %	2.26000	2.41795
40	CF/SD Drain - cabate C	Mass %	1.82000	2.01388
42	CF/SD Drain - Ash CaO	Mass %	19.9000	22.2849
43	CF/SD Drain - Ash MgO	Mass %	18.9000	15.8246
45	BD Drain - C	Mass %	68.9150	68.5329
46	BD Drain - H	Mass %	.660000	.654565
47	BD Drain - N	Mass %	1.82000	1.80515
48	BD Drain - S	Mass %	1.79500	1.78245
49	BD Drain - Ash	Mass %	26.5000	26.5123
50	BD Drain - HHV (dry)	BTU/lb	10360.0	10269.1
52	BD Drain - sfide S	Mass %	.540000	.546853
53	BD Drain - crbate C	Mass %	1.66500	1.82671
55	BD Drain - Ash CaO	Mass %	25.7500	28.9782
56	BD Drain - Ash MgO	Mass %	23.4500	20.5776
57	Demister Gas - N2	mol,vol %	79.0275	82.0050
58	Demister Gas - O2	mol,vol %	.210000	.032223
59	Demister Gas - CO	mol,vol %	8.13500	7.10027
60	Demister Gas - CH4	mol,vol %	1.33500	1.18572
61	Demister Gas - CO2	mol,vol %	7.76000	6.51917
62	Demister Gas - C2H4	mol,vol %	.010000	.008894
63	Demister Gas - C2H6	mol,vol %	.005000	.004445
64	Demister Gas - H2S	mol,vol %	.159700	.141579
65	Demister Gas - H2	mol,vol %	3.17250	2.81985
66	Demister Gas - NH3	mol,vol %	.047400	.042183
67	Demister Gas - Ar	mol,vol %	.435000	.437747
79	Water Content in Freeboard Gas	mol,vol %	8.70000	6.16333
82	Sorbent - CaO	Mass %	60.0000	58.7211
83	Sorbent - MgO	Mass %	40.3000	41.6982
84	Sorbent - SO3	Mass %	.750000	.769453
85	Sorbent - Ash	Mass %	1.45000	1.31124

TR2 - TEST POINT 2 12/19/91 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	125.701	139.555
4	Total Air Feed	lb/hr	FIC-1055	609.520	555.834
5	Transport N2 Feed	SCFM	FIC-1053	.568000	.479730
6	Bed Drain N2 Feed	SCFM	FI-3028	68.7530	67.9854
7	N2 to spray tower	SCFM	FI-4051	46.4520	46.1411
8	Feed lockhopper comp N2	SCFM	FI-7008	11.9560	10.7147
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	8.37200	8.34928
10	Purge N2 to carbonizer	SCFM	FI-7021	6.84400	6.80595
11	Purge N2 to cyclones	SCFM	FI-7022	3.91000	3.90692
15	Coal Feed rate	lb/hr		315.000	327.617
16	Sorbent feed rate	lb/hr		94.0000	88.5415
22	Air Feed Temp	deg F	TI-1059	81.8370	81.8380
23	Bed Drain Temp	deg F	TIC-3027	300.125	299.410
24	Primary Cyclone Lockhopper Temp	F	TI-3070	155.508	155.511
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	170.292	170.292
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1504.11	1503.99
35	Carbonizer wall heat loss	KBTU/hr		100.000	97.272
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	205.329
37	Orifice Temp (Upstream)	F	TI-3108	1255.04	1255.07
38	Purge N2 Temp	F	TI-7012	98.4110	98.4152
44	CD Flow; carbonizer discharge	lb/hr		151.260	173.700
45	PD Flow; primary cyclone	lb/hr		72.7700	72.8258
46	SD/CF Flow; secondary cyclone	lb/hr		7.06000	7.04673
47	BD Flow; bag house	lb/hr		11.8700	11.8432
49	Ambient Temperature	F		60.0000	60.0364

	Lab Measurement			
1	Coal - C	Mass %	68.1918	68.6883
2	Coal - H	Mass %	4.58730	4.65527
3	Coal - N	Mass %	1.92270	1.92914
4	Coal - S	Mass %	4.50550	4.58299
5	Coal - Ash	Mass %	12.4518	12.0713
6	Coal - H2O	Mass %	2.28550	2.24413
7	Coal - HHV	BTU/lb	12554.1	12677.4
8	CD Drain - C	Mass %	63.6400	53.5953
9	CD Drain - H	Mass %	.420000	.337823
10	CD Drain - N	Mass %	1.60670	1.30945
11	CD Drain - S	Mass %	4.55000	6.77238
12	CD Drain - Ash	Mass %	37.7167	41.4838
13	CD Drain - HHV (dry)	BTU/lb	9694.67	8258.47
15	CD Drain - sfide S	Mass %	2.34000	5.96965
16	CD Drain - crbate C	Mass %	1.17670	1.98163
18	CD Drain - Ash CaO	Mass %	14.9000	31.7103

TR2 - TEST POINT 2 12/19/91 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
19	CD Drain - Ash MgO	Mass %	14.3667	22.9109
20	PD Drain - C	Mass %	71.9550	70.3535
21	PD Drain - H	Mass %	.697500	.674957
22	PD Drain - N	Mass %	2.08750	2.02606
23	PD Drain - S	Mass %	3.51500	3.52839
24	PD Drain - Ash	Mass %	28.3625	29.3286
25	PD Drain - HHV (dry)	BTU/lb	11259.8	10955.9
27	PD Drain - sfide S	Mass %	1.23750	1.70501
28	PD Drain - crbate C	Mass %	.85000	1.01125
30	PD Drain - Ash CaO	Mass %	13.3750	17.9554
31	PD Drain - Ash MgO	Mass %	12.2250	12.9729
32	CF/SD Drain - C	Mass %	70.0250	69.8235
33	CF/SD Drain - H	Mass %	.710000	.706856
34	CF/SD Drain - N	Mass %	1.76500	1.75770
35	CF/SD Drain - S	Mass %	2.67000	2.78194
36	CF/SD Drain - Ash	Mass %	28.4300	28.4317
37	CF/SD Drain - HHV (dry)	BTU/lb	10767.5	10736.0
39	CF/SD Drain - sfide S	Mass %	1.17500	1.31700
40	CF/SD Drain - cabate C	Mass %	.735000	.799866
42	CF/SD Drain - Ash CaO	Mass %	15.3500	17.4574
43	CF/SD Drain - Ash MgO	Mass %	14.7000	12.6131
45	BD Drain - C	Mass %	75.9000	75.6566
46	BD Drain - H	Mass %	1.28000	1.27350
47	BD Drain - N	Mass %	2.13000	2.12123
48	BD Drain - S	Mass %	2.24000	2.27484
49	BD Drain - Ash	Mass %	19.8300	19.9034
50	BD Drain - HHV (dry)	BTU/lb	11970.0	11920.1
52	BD Drain - sfide S	Mass %	.670000	.737109
53	BD Drain - crbate C	Mass %	.570000	.633092
55	BD Drain - Ash CaO	Mass %	15.2000	17.3864
56	BD Drain - Ash MgO	Mass %	14.4000	12.5618
57	Demister Gas - N2	mol,vol %	78.2250	81.1120
58	Demister Gas - O2	mol,vol %	.270000	.005333
59	Demister Gas - CO	mol,vol %	5.90500	5.25059
60	Demister Gas - CH4	mol,vol %	2.39750	2.08431
61	Demister Gas - CO2	mol,vol %	7.12500	6.23264
62	Demister Gas - C2H4	mol,vol %	.160000	.128630
63	Demister Gas - C2H6	mol,vol %	.687500	.428892
64	Demister Gas - H2S	mol,vol %	.055800	.050263
65	Demister Gas - H2	mol,vol %	3.88500	3.46136
66	Demister Gas - NH3	mol,vol %	.162400	.147069
67	Demister Gas - Ar	mol,vol %	.412500	.384611
79	Water Content in Freeboard Gas	mol,vol %	11.6000	7.3533
82	Sorbent - CaO	Mass %	60.0000	58.2972
83	Sorbent - MgO	Mass %	40.3000	42.1202
84	Sorbent - SO3	Mass %	.750000	.796010
85	Sorbent - Ash	Mass %	1.45000	1.28665

TR2 - TEST POINT 3 12/20/91 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	135.312	150.685
4	Total Air Feed	lb/hr	FIC-1055	696.683	664.433
5	Transport N2 Feed	SCFM	FIC-1053	.542000	.451751
6	Bed Drain N2 Feed	SCFM	FI-3028	66.9290	66.0362
7	N2 to spray tower	SCFM	FI-4051	47.5270	47.3749
8	Feed lockhopper comp N2	SCFM	FI-7008	12.1880	9.5782
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	7.93600	7.92891
10	Purge N2 to carbonizer	SCFM	FI-7021	6.79200	6.74950
11	Purge N2 to cyclones	SCFM	FI-7022	3.88200	3.88077
15	Coal Feed rate	lb/hr		182.000	181.252
16	Sorbent feed rate	lb/hr		83.0000	79.5566
22	Air Feed Temp	deg F	TI-1059	80.1580	80.1518
23	Bed Drain Temp	deg F	TIC-3027	98.6450	98.8035
24	Primary Cyclone Lockhopper Temp	F	TI-3070	154.594	154.605
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	170.111	170.111
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1629.40	1629.41
35	Carbonizer wall heat loss	KBTU/hr		100.000	100.777
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	232.997
37	Orifice Temp (Upstream)	F	TI-3108	1323.71	1323.94
38	Purge N2 Temp	F	TI-7012	102.119	102.089
44	CD Flow; carbonizer discharge	lb/hr		29.3000	35.1642
45	PD Flow; primary cyclone	lb/hr		70.4500	83.3800
46	SD/CF Flow; secondary cyclone	lb/hr		3.14000	3.15775
47	BD Flow; bag house	lb/hr		8.21000	8.18830
49	Ambient Temperature	F		60.0000	59.8564

	Lab Measurement			
1	Coal - C	Mass %	68.1918	68.0778
2	Coal - H	Mass %	4.58730	4.59023
3	Coal - N	Mass %	1.92270	1.91893
4	Coal - S	Mass %	4.50550	4.58651
5	Coal - Ash	Mass %	12.4518	12.5711
6	Coal - H2O	Mass %	2.28550	2.30431
7	Coal - HHV	BTU/lb	12554.1	12317.7
8	CD Drain - C	Mass %	19.3933	18.6486
9	CD Drain - H	Mass %	.183300	.165633
10	CD Drain - N	Mass %	.606700	.557591
11	CD Drain - S	Mass %	10.5533	13.7880
12	CD Drain - Ash	Mass %	98.3400	98.6947
13	CD Drain - HHV (dry)	BTU/lb	3592.67	4106.83
15	CD Drain - sfide S	Mass %	8.8033	12.9222
16	CD Drain - crbate C	Mass %	2.14000	2.14411
18	CD Drain - Ash CaO	Mass %	18.8433	27.0129

TR2 - TEST POINT 3 12/20/91 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
19	CD Drain - Ash MgO	Mass %	19.5633	19.4665
20	PD Drain - C	Mass %	48.4050	44.7798
21	PD Drain - H	Mass %	.230000	.201289
22	PD Drain - N	Mass %	1.26250	1.10951
23	PD Drain - S	Mass %	4.46250	3.38466
24	PD Drain - Ash	Mass %	55.7150	56.4460
25	PD Drain - HHV (dry)	BTU/lb	7541.75	6797.63
27	PD Drain - sfide S	Mass %	3.00000	3.10817
28	PD Drain - crbate C	Mass %	1.49000	2.64753
30	PD Drain - Ash CaO	Mass %	20.0800	29.9908
31	PD Drain - Ash MgO	Mass %	20.0625	21.6126
32	CF/SD Drain - C	Mass %	58.1667	58.2934
33	CF/SD Drain - H	Mass %	.450000	.449734
34	CF/SD Drain - N	Mass %	1.50000	1.49928
35	CF/SD Drain - S	Mass %	2.49670	2.49525
36	CF/SD Drain - Ash	Mass %	40.8033	40.6916
37	CF/SD Drain - HHV (dry)	BTU/lb	8964.00	8956.61
39	CF/SD Drain - sfide S	Mass %	1.12000	1.14849
40	CF/SD Drain - cabate C	Mass %	1.17670	1.30770
42	CF/SD Drain - Ash CaO	Mass %	17.6300	19.3103
43	CF/SD Drain - Ash MgO	Mass %	16.2500	13.9158
45	BD Drain - C	Mass %	66.3300	66.7961
46	BD Drain - H	Mass %	1.09000	1.09697
47	BD Drain - N	Mass %	1.44000	1.44979
48	BD Drain - S	Mass %	1.64000	1.63810
49	BD Drain - Ash	Mass %	27.4900	27.3630
50	BD Drain - HHV (dry)	BTU/lb	10367.5	10438.8
52	BD Drain - sfide S	Mass %	.575000	.601306
53	BD Drain - crbate C	Mass %	.715000	.727316
55	BD Drain - Ash CaO	Mass %	19.2500	19.8706
56	BD Drain - Ash MgO	Mass %	16.6000	14.3195
57	Demister Gas - N2	mol,vol %	79.3333	80.8763
58	Demister Gas - O2	mol,vol %	1.00670	.47409
59	Demister Gas - CO	mol,vol %	7.58000	7.18132
60	Demister Gas - CH4	mol,vol %	.565000	.531723
61	Demister Gas - CO2	mol,vol %	6.12670	5.69991
63	Demister Gas - C2H6	mol,vol %	.010000	.009402
64	Demister Gas - H2S	mol,vol %	.042400	.038864
65	Demister Gas - H2	mol,vol %	2.29330	2.15919
66	Demister Gas - NH3	mol,vol %	.069700	.065407
67	Demister Gas - Ar	mol,vol %	.450000	.440942
79	Water Content in Freeboard Gas	mol,vol %	7.30000	5.89875
82	Sorbent - CaO	Mass %	60.0000	58.3369
83	Sorbent - MgO	Mass %	40.3000	42.0399
84	Sorbent - SO3	Mass %	.750000	.783744
85	Sorbent - Ash	Mass %	1.45000	1.33946

TR2 - TEST POINT 4 12/20/91 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	187.909	207.061
4	Total Air Feed	lb/hr	FIC-1055	984.537	959.483
5	Transport N2 Feed	SCFM	FIC-1053	.510000	.332614
6	Bed Drain N2 Feed	SCFM	FI-3028	67.0470	57.4430
7	N2 to spray tower	SCFM	FI-4051	44.4800	44.3888
8	Feed lockhopper comp N2	SCFM	FI-7008	13.7480	12.3844
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	5.92000	5.89409
10	Purge N2 to carbonizer	SCFM	FI-7021	6.69100	6.57481
11	Purge N2 to cyclones	SCFM	FI-7022	3.16300	3.14986
15	Coal Feed rate	lb/hr		376.000	373.847
16	Sorbent feed rate	lb/hr		99.0000	97.1819
22	Air Feed Temp	deg F	TI-1059	82.4480	82.4470
23	Bed Drain Temp	deg F	TIC-3027	294.921	295.265
24	Primary Cyclone Lockhopper Temp	F	TI-3070	154.658	154.673
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	170.830	170.830
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1669.07	1668.59
35	Carbonizer wall heat loss	KBTU/hr		100.000	92.076
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	235.638
37	Orifice Temp (Upstream)	F	TI-3108	1436.85	1437.15
38	Purge N2 Temp	F	TI-7012	106.746	106.743
44	CD Flow; carbonizer discharge	lb/hr		136.110	149.113
45	PD Flow; primary cyclone	lb/hr		82.4000	82.7399
46	SD/CF Flow; secondary cyclone	lb/hr		2.59000	2.55844
47	BD Flow; bag house	lb/hr		18.8100	18.8142
49	Ambient Temperature	F		60.0000	59.9710

	Lab Measurement			
1	Coal - C	Mass %	68.1918	67.9720
2	Coal - H	Mass %	4.58730	4.57767
3	Coal - N	Mass %	1.92270	1.91872
4	Coal - S	Mass %	4.50550	4.54522
5	Coal - Ash	Mass %	12.4518	12.6129
6	Coal - H2O	Mass %	2.28550	2.29325
7	Coal - HHV	BTU/lb	12554.1	12480.7
8	CD Drain - C	Mass %	45.2700	46.7352
9	CD Drain - H	Mass %	.147500	.148736
10	CD Drain - N	Mass %	1.09500	1.10641
11	CD Drain - S	Mass %	7.52500	9.04620
12	CD Drain - Ash	Mass %	65.3350	65.3358
13	CD Drain - HHV (dry)	BTU/lb	7229.50	8110.31
15	CD Drain - sfide S	Mass %	5.68250	8.26571
16	CD Drain - crbate C	Mass %	1.48000	1.53833
18	CD Drain - Ash CaO	Mass %	16.7200	23.8222

TR2 - TEST POINT 4 12/20/91 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
19	CD Drain - Ash MgO	Mass %	17.1625	16.6170
20	PD Drain - C	Mass %	63.6533	64.2921
21	PD Drain - H	Mass %	.396700	.398839
22	PD Drain - N	Mass %	1.55000	1.55839
23	PD Drain - S	Mass %	4.05330	4.22386
24	PD Drain - Ash	Mass %	38.5767	38.4673
25	PD Drain - HHV (dry)	BTU/lb	9808.7	10037.9
27	PD Drain - sfide S	Mass %	2.63000	3.11993
28	PD Drain - crbate C	Mass %	1.26330	1.24873
30	PD Drain - Ash CaO	Mass %	16.8000	20.0722
31	PD Drain - Ash MgO	Mass %	16.1333	14.0013
32	CF/SD Drain - C	Mass %	63.5050	64.4458
33	CF/SD Drain - H	Mass %	.485000	.492089
34	CF/SD Drain - N	Mass %	1.34000	1.35958
35	CF/SD Drain - S	Mass %	2.08000	2.14957
36	CF/SD Drain - Ash	Mass %	34.1250	33.8676
37	CF/SD Drain - HHV (dry)	BTU/lb	9781.50	9929.69
39	CF/SD Drain - sfide S	Mass %	.870000	.926827
40	CF/SD Drain - cabate C	Mass %	.790000	.809847
42	CF/SD Drain - Ash CaO	Mass %	16.3000	17.0110
43	CF/SD Drain - Ash MgO	Mass %	16.1000	11.8659
45	BD Drain - C	Mass %	66.4700	66.7017
46	BD Drain - H	Mass %	.430000	.430949
47	BD Drain - N	Mass %	1.65000	1.65368
48	BD Drain - S	Mass %	3.36000	3.51374
49	BD Drain - Ash	Mass %	34.1700	34.0006
50	BD Drain - HHV (dry)	BTU/lb	10145.0	10193.4
52	BD Drain - sfide S	Mass %	2.12000	2.32618
53	BD Drain - crbate C	Mass %	.98000	1.01526
55	BD Drain - Ash CaO	Mass %	18.4000	20.3880
56	BD Drain - Ash MgO	Mass %	16.8000	14.2215
57	Demister Gas - N2	mol,vol %	73.0250	74.4002
58	Demister Gas - O2	mol,vol %	.657500	.348540
59	Demister Gas - CO	mol,vol %	10.1575	9.7712
60	Demister Gas - CH4	mol,vol %	1.68330	1.58970
61	Demister Gas - CO2	mol,vol %	6.54500	6.21184
62	Demister Gas - C2H4	mol,vol %	.002500	.002346
64	Demister Gas - H2S	mol,vol %	.009300	.008697
65	Demister Gas - H2	mol,vol %	4.52000	4.26892
66	Demister Gas - NH3	mol,vol %	.275900	.262076
67	Demister Gas - Ar	mol,vol %	.490000	.502472
79	Water Content in Freeboard Gas	mol,vol %	6.75000	6.52065
82	Sorbent - CaO	Mass %	60.0000	59.0990
83	Sorbent - MgO	Mass %	40.3000	41.2242
84	Sorbent - SO3	Mass %	.750000	.784639
85	Sorbent - Ash	Mass %	1.45000	1.41219

TR2 - TEST POINT 5 12/20/91 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	194.518	204.311
4	Total Air Feed	lb/hr	FIC-1055	979.887	955.794
5	Transport N2 Feed	SCFM	FIC-1053	.514000	.317694
6	Bed Drain N2 Feed	SCFM	FI-3028	71.3250	49.4501
7	N2 to spray tower	SCFM	FI-4051	43.8150	43.7410
8	Feed lockhopper comp N2	SCFM	FI-7008	14.5620	12.8006
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	5.44000	5.43205
10	Purge N2 to carbonizer	SCFM	FI-7021	6.62400	6.51028
11	Purge N2 to cyclones	SCFM	FI-7022	2.88100	2.87840
15	Coal Feed rate	lb/hr		508.000	489.061
16	Sorbent feed rate	lb/hr		160.000	151.096
22	Air Feed Temp	deg F	TI-1059	83.8340	83.8294
23	Bed Drain Temp	deg F	TIC-3027	366.670	367.959
24	Primary Cyclone Lockhopper Temp	F	TI-3070	165.698	165.724
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	172.125	172.126
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1589.80	1589.47
35	Carbonizer wall heat loss	KBTU/hr		100.000	91.902
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	248.835
37	Orifice Temp (Upstream)	F	TI-3108	1400.01	1400.25
38	Purge N2 Temp	F	TI-7012	113.872	113.864
44	CD Flow; carbonizer discharge	lb/hr		165.180	212.091
45	PD Flow; primary cyclone	lb/hr		134.090	155.791
46	SD/CF Flow; secondary cyclone	lb/hr		5.71000	5.74862
47	BD Flow; bag house	lb/hr		14.5100	14.6730
49	Ambient Temperature	F		60.0000	59.8362

	Lab Measurement				
1	Coal - C	Mass %		68.1918	67.3244
2	Coal - H	Mass %		4.58730	4.51748
3	Coal - N	Mass %		1.92270	1.91512
4	Coal - S	Mass %		4.50550	4.51792
5	Coal - Ash	Mass %		12.4518	12.5861
6	Coal - H2O	Mass %		2.28550	2.37561
7	Coal - HHV	BTU/lb		12554.1	12256.3
8	CD Drain - C	Mass %		64.6400	52.8902
9	CD Drain - H	Mass %		.345000	.279265
10	CD Drain - N	Mass %		1.71000	1.37424
11	CD Drain - S	Mass %		4.07500	6.66300
12	CD Drain - Ash	Mass %		37.6100	39.9056
13	CD Drain - HHV (dry)	BTU/lb		9819.00	8594.15
15	CD Drain - sfide S	Mass %		2.30500	5.66397
16	CD Drain - crbate C	Mass %		1.17000	1.55415
18	CD Drain - Ash CaO	Mass %		16.4500	33.4341

TR2 - TEST POINT 5 12/20/91 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
19	CD Drain - Ash MgO	Mass %	16.2000	23.7734
20	PD Drain - C	Mass %	64.8450	57.8046
21	PD Drain - H	Mass %	.470000	.416046
22	PD Drain - N	Mass %	1.74500	1.53894
23	PD Drain - S	Mass %	3.49000	4.94008
24	PD Drain - Ash	Mass %	38.0150	38.9472
25	PD Drain - HHV (dry)	BTU/lb	9878.00	9069.49
27	PD Drain - sfide S	Mass %	2.33000	4.10454
28	PD Drain - crbate C	Mass %	1.46500	1.74516
30	PD Drain - Ash CaO	Mass %	18.1000	28.6584
31	PD Drain - Ash MgO	Mass %	17.3000	20.3776
32	CF/SD Drain - C	Mass %	63.3000	63.1225
33	CF/SD Drain - H	Mass %	.540000	.537740
34	CF/SD Drain - N	Mass %	1.44000	1.43364
35	CF/SD Drain - S	Mass %	2.96000	3.15382
36	CF/SD Drain - Ash	Mass %	35.0400	34.9807
37	CF/SD Drain - HHV (dry)	BTU/lb	9940.00	9922.35
39	CF/SD Drain - sfide S	Mass %	1.64000	1.84962
40	CF/SD Drain - cabate C	Mass %	1.02000	1.10960
42	CF/SD Drain - Ash CaO	Mass %	17.7000	20.1688
43	CF/SD Drain - Ash MgO	Mass %	17.1000	14.3411
45	BD Drain - C	Mass %	69.1100	68.5588
46	BD Drain - H	Mass %	.530000	.525940
47	BD Drain - N	Mass %	1.74000	1.72568
48	BD Drain - S	Mass %	2.78000	3.21233
49	BD Drain - Ash	Mass %	29.7600	29.9583
50	BD Drain - HHV (dry)	BTU/lb	10546.0	10527.0
52	BD Drain - sfide S	Mass %	1.95000	2.40132
53	BD Drain - crbate C	Mass %	.770000	.773842
55	BD Drain - Ash CaO	Mass %	17.0000	20.0867
56	BD Drain - Ash MgO	Mass %	16.5000	14.2827
57	Demister Gas - N2	mol,vol %	72.7667	73.9602
58	Demister Gas - O2	mol,vol %	2.09670	1.53041
59	Demister Gas - CO	mol,vol %	8.59000	8.23292
60	Demister Gas - CH4	mol,vol %	2.30000	2.33791
61	Demister Gas - CO2	mol,vol %	7.22500	6.70499
62	Demister Gas - C2H4	mol,vol %	.020000	.019768
63	Demister Gas - C2H6	mol,vol %	.023300	.023107
64	Demister Gas - H2S	mol,vol %	.017100	.016814
65	Demister Gas - H2	mol,vol %	3.43670	3.63698
66	Demister Gas - NH3	mol,vol %	.278300	.277263
67	Demister Gas - Ar	mol,vol %	.523300	.536703
79	Water Content in Freeboard Gas	mol,vol %	9.50000	9.11221
82	Sorbent - CaO	Mass %	60.0000	58.7271
83	Sorbent - MgO	Mass %	40.3000	41.7580
84	Sorbent - SO3	Mass %	.750000	.792048
85	Sorbent - Ash	Mass %	1.45000	1.22283

TR4 - TEST POINT 1 03/10/92 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	150.072	153.944
4	Total Air Feed	lb/hr	FIC-1055	683.974	666.389
5	Transport N2 Feed	SCFM	FIC-1053	.734000	.723088
6	Bed Drain N2 Feed	SCFM	FI-3028	47.0190	46.9736
7	N2 to spray tower	SCFM	FI-4051	39.1020	39.2192
8	Feed lockhopper comp N2	SCFM	FI-7008	15.8330	15.7302
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	4.77700	4.77631
10	Purge N2 to carbonizer	SCFM	FI-7021	6.08000	6.07375
11	Purge N2 to cyclones	SCFM	FI-7022	2.75100	2.75083
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	49.7850	55.5583
15	Coal Feed rate	lb/hr		259.000	232.756
16	Sorbent feed rate	lb/hr		97.6000	97.1818
22	Air Feed Temp	deg F	TI-1059	78.3990	78.3936
23	Bed Drain Temp	deg F	TIC-3027	98.4930	98.5650
24	Primary Cyclone Lockhopper Temp	F	TI-3070	168.420	168.429
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	181.637	181.637
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1582.86	1582.87
35	Carbonizer wall heat loss	KBTU/hr		100.000	100.066
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	225.897
37	Orifice Temp (Upstream)	F	TI-3108	1325.71	1325.85
38	Purge N2 Temp	F	TI-7012	146.844	146.673
42	Boiler Steam Temperature	F	TI-7041	387.840	387.828
44	CD Flow; carbonizer discharge	lb/hr		59.3700	81.1979
45	PD Flow; primary cyclone	lb/hr		66.4900	73.8947
46	SD/CF Flow; secondary cyclone	lb/hr		3.77000	3.76481
47	BD Flow; bag house	lb/hr		15.1500	15.5417
49	Ambient Temperature	F		60.0000	59.8678

	Lab Measurement				
1	Coal - C	Mass %		71.5414	68.0925
2	Coal - H	Mass %		4.67570	4.60477
3	Coal - N	Mass %		1.90140	1.87896
4	Coal - S	Mass %		3.35570	3.32448
5	Coal - Ash	Mass %		11.1786	12.1787
6	Coal - H2O	Mass %		2.08290	2.33068
7	Coal - HHV	BTU/lb		12775.6	12412.4
8	CD Drain - C	Mass %		27.9600	30.6639
9	CD Drain - H	Mass %		.120000	.131009
10	CD Drain - N	Mass %		.730000	.780959
11	CD Drain - S	Mass %		5.70000	6.22684
12	CD Drain - Ash	Mass %		76.5200	75.7233
13	CD Drain - HHV (dry)	BTU/lb		4090.00	5131.74
15	CD Drain - sfide S	Mass %		4.42000	5.61754

TR4 - TEST POINT 1 03/10/92 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	2.76000	2.23529
18	CD Drain - Ash CaO	Mass %	31.2000	30.7322
19	CD Drain - Ash MgO	Mass %	23.4000	22.2128
20	PD Drain - C	Mass %	56.9867	58.2120
21	PD Drain - H	Mass %	.373300	.378101
22	PD Drain - N	Mass %	1.38330	1.39987
23	PD Drain - S	Mass %	3.40330	3.08783
24	PD Drain - Ash	Mass %	44.2433	44.1581
25	PD Drain - HHV (dry)	BTU/lb	8796.67	9049.83
27	PD Drain - sfide S	Mass %	2.03670	2.29750
28	PD Drain - crbate C	Mass %	1.49330	1.38597
30	PD Drain - Ash CaO	Mass %	28.1667	28.2307
31	PD Drain - Ash MgO	Mass %	22.8333	20.4047
32	CF/SD Drain - C	Mass %	57.0700	58.7588
33	CF/SD Drain - H	Mass %	.380000	.391202
34	CF/SD Drain - N	Mass %	1.77000	1.82199
35	CF/SD Drain - S	Mass %	2.98000	3.07986
36	CF/SD Drain - Ash	Mass %	43.9400	43.0730
37	CF/SD Drain - HHV (dry)	BTU/lb	8704.00	8970.95
39	CF/SD Drain - sfide S	Mass %	1.78000	1.86797
40	CF/SD Drain - cabate C	Mass %	1.17000	1.18565
42	CF/SD Drain - Ash CaO	Mass %	27.8000	29.3747
43	CF/SD Drain - Ash MgO	Mass %	26.4000	21.2316
45	BD Drain - C	Mass %	69.6400	69.8769
46	BD Drain - H	Mass %	.620000	.621244
47	BD Drain - N	Mass %	2.28000	2.28379
48	BD Drain - S	Mass %	2.65000	2.55097
49	BD Drain - Ash	Mass %	27.3500	27.2677
50	BD Drain - HHV (dry)	BTU/lb	10886.0	10921.0
52	BD Drain - sfide S	Mass %	.960000	.962389
53	BD Drain - crbate C	Mass %	.480000	.474405
55	BD Drain - Ash CaO	Mass %	30.1000	30.8553
56	BD Drain - Ash MgO	Mass %	23.5000	22.3018
57	Demister Gas - N2	mol,vol %	77.2500	76.8141
58	Demister Gas - O2	mol,vol %	1.40000	1.44154
59	Demister Gas - CO	mol,vol %	5.88000	6.05402
60	Demister Gas - CH4	mol,vol %	1.13500	1.14987
61	Demister Gas - CO2	mol,vol %	7.46500	7.64589
62	Demister Gas - C2H4	mol,vol %	.010000	.009860
63	Demister Gas - C2H6	mol,vol %	.005000	.004911
64	Demister Gas - H2S	mol,vol %	.012600	.012279
65	Demister Gas - H2	mol,vol %	3.95000	3.94384
66	Demister Gas - NH3	mol,vol %	.232500	.226861
67	Demister Gas - Ar	mol,vol %	.450000	.486921
79	Water Content in Freeboard Gas	mol,vol %	12.0500	11.5573
82	Sorbent - CaO	Mass %	57.6000	57.5079
83	Sorbent - MgO	Mass %	41.4667	41.5658
84	Sorbent - SO3	Mass %	.800000	.803204
85	Sorbent - Ash	Mass %	1.23330	1.22309

TR4 - TEST POINT 2 03/11/92 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	152.640	157.376
4	Total Air Feed	lb/hr	FIC-1055	656.029	644.246
5	Transport N2 Feed	SCFM	FIC-1053	.533000	.494116
6	Bed Drain N2 Feed	SCFM	FI-3028	48.5630	48.3015
7	N2 to spray tower	SCFM	FI-4051	39.0980	38.9676
8	Feed lockhopper comp N2	SCFM	FI-7008	10.7080	10.3245
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	4.77000	4.76427
10	Purge N2 to carbonizer	SCFM	FI-7021	6.35200	6.32028
11	Purge N2 t. cyclones	SCFM	FI-7022	2.84900	2.84773
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	117.962	118.296
15	Coal Feed rate	lb/hr		297.000	270.658
16	Sorbent feed rate	lb/hr		90.0000	89.9297
22	Air Fe a Temp	deg F	TI-1059	78.9320	78.9295
23	Bed Drain Temp	deg F	TIC-3027	214.361	214.485
24	Primary Cyclone Lockhopper Temp	F	TI-3070	163.116	163.133
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	185.459	185.459
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1530.58	1530.51
35	Carbonizer wall heat loss	KBTU/hr		100.000	96.268
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	226.319
37	Orifice Temp (Upstream)	F	TI-3108	1292.18	1292.28
38	Purge N2 Temp	F	TI-7012	115.626	115.620
42	Boiler Steam Temperature	F	TI-7041	394.353	394.352
44	CD Flow; carbonizer discharge	lb/hr		82.170	111.650
45	PD Flow; primary cyclone	lb/hr		81.3800	88.1557
46	SD/CF Flow; secondary cyclone	lb/hr		4.09000	4.13913
47	BD Flow; bag house	lb/hr		7.73000	7.82672
49	Ambient Temperature	F		60.0000	59.9362

	Lab Measurement			
1	Coal - C	Mass %	71.5414	68.2704
2	Coal - H	Mass %	4.67570	4.68021
3	Coal - N	Mass %	1.90140	1.88196
4	Coal - S	Mass %	3.35570	3.32913
5	Coal - Ash	Mass %	11.1786	11.9552
6	Coal - H2O	Mass %	2.08290	2.36821
7	Coal - HHV	BTU/lb	12775.6	12528.0
8	CD Drain - C	Mass %	19.0400	40.9763
9	CD Drain - H	Mass %	.130000	.243671
10	CD Drain - N	Mass %	.430000	.818661
11	CD Drain - S	Mass %	9.92000	4.58356
12	CD Drain - Ash	Mass %	93.4600	86.2980
13	CD Drain - HHV (dry)	BTU/lb	2804.00	6225.23
15	CD Drain - sfide S	Mass %	8.65000	4.58356

TR4 - TEST POINT 2 03/11/92 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	4.23000	3.68143
18	CD Drain - Ash CaO	Mass %	28.8000	20.6357
19	CD Drain - Ash MgO	Mass %	23.8000	14.8433
20	PD Drain - C	Mass %	63.4633	65.7133
21	PD Drain - H	Mass %	.563300	.571664
22	PD Drain - N	Mass %	1.60330	1.63064
23	PD Drain - S	Mass %	4.16000	2.78936
24	PD Drain - Ash	Mass %	34.5567	34.3290
25	PD Drain - HHV (dry)	BTU/lb	10340.7	10545.6
27	PD Drain - sfide S	Mass %	1.74000	1.54472
28	PD Drain - crbate C	Mass %	1.07330	.99165
30	PD Drain - Ash CaO	Mass %	24.2333	22.2064
31	PD Drain - Ash MgO	Mass %	18.7000	15.9731
32	CF/SD Drain - C	Mass %	58.5500	59.1223
33	CF/SD Drain - H	Mass %	.490000	.494570
34	CF/SD Drain - N	Mass %	1.69000	1.70601
35	CF/SD Drain - S	Mass %	3.04000	3.02276
36	CF/SD Drain - Ash	Mass %	35.3700	35.0741
37	CF/SD Drain - HHV (dry)	BTU/lb	9954.0	10049.8
39	CF/SD Drain - sfide S	Mass %	1.54000	1.53627
40	CF/SD Drain - cabate C	Mass %	.810000	.802111
42	CF/SD Drain - Ash CaO	Mass %	25.4000	25.4447
43	CF/SD Drain - Ash MgO	Mass %	19.4000	18.3024
45	BD Drain - C	Mass %	68.1600	68.5900
46	BD Drain - H	Mass %	.770000	.774178
47	BD Drain - N	Mass %	2.20000	2.21256
48	BD Drain - S	Mass %	2.47000	2.43245
49	BD Drain - Ash	Mass %	27.1100	26.8576
50	BD Drain - HHV (dry)	BTU/lb	10261.0	10322.1
52	BD Drain - sfide S	Mass %	.940000	.932416
53	BD Drain - crbate C	Mass %	.400000	.395806
55	BD Drain - Ash CaO	Mass %	30.4000	30.3556
56	BD Drain - Ash MgO	Mass %	22.9000	21.8349
57	Demister Gas - N2	mol,vol %	75.9750	76.6969
58	Demister Gas - O2	mol,vol %	1.24500	1.09235
59	Demister Gas - CO	mol,vol %	4.39500	4.29242
60	Demister Gas - CH4	mol,vol %	1.69500	1.63692
61	Demister Gas - CO2	mol,vol %	8.80750	8.70244
62	Demister Gas - C2H4	mol,vol %	.032500	.031410
63	Demister Gas - C2H6	mol,vol %	.022500	.021650
64	Demister Gas - H2S	mol,vol %	.093100	.088506
65	Demister Gas - H2	mol,vol %	5.48000	5.17473
66	Demister Gas - NH3	mol,vol %	.352500	.331533
67	Demister Gas - Ar	mol,vol %	.450000	.479233
79	Water Content in Freeboard Gas	mol,vol %	22.0500	18.1289
82	Sorbent - CaO	Mass %	57.6000	57.6181
83	Sorbent - MgO	Mass %	41.4667	41.4449
84	Sorbent - SO3	Mass %	.800000	.800624
85	Sorbent - Ash	Mass %	1.23330	1.23634

TR4 - TEST POINT 3 03/12/92 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	122.788	124.194
4	Total Air Feed	lb/hr	FIC-1055	625.504	600.458
5	Transport N2 Feed	SCFM	FIC-1053	.938000	.711468
6	Bed Drain N2 Feed	SCFM	FI-3028	11.4580	11.1179
7	N2 to spray tower	SCFM	FI-4051	37.0700	37.0154
8	Feed lockhopper comp N2	SCFM	FI-7008	10.2400	9.7364
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	5.10800	5.10455
10	Purge N2 to carbonizer	SCFM	FI-7021	6.68000	6.65397
11	Purge N2 to cyclones	SCFM	FI-7022	3.25200	3.25115
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	95.9780	96.2819
15	Coal Feed rate	lb/hr		207.000	202.429
16	Sorbent feed rate	lb/hr		86.0000	85.8969
22	Air Feed Temp	deg F	TI-1059	81.1860	81.1840
23	Bed Drain Temp	deg F	TIC-3027	279.788	279.864
24	Primary Cyclone Lockhopper Temp	F	TI-3070	162.995	163.006
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	188.090	188.090
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1590.90	1590.86
35	Carbonizer wall heat loss	KBTU/hr		100.000	98.123
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	219.420
37	Orifice Temp (Upstream)	F	TI-3108	1310.59	1310.65
38	Purge N2 Temp	F	TI-7012	93.0860	93.0823
42	Boiler Steam Temperature	F	TI-7041	393.893	393.892
44	CD Flow; carbonizer discharge	lb/hr		65.3600	66.4765
45	PD Flow; primary cyclone	lb/hr		77.2900	78.8418
46	SD/CF Flow; secondary cyclone	lb/hr		6.51000	6.56055
47	BD Flow; bag house	lb/hr		4.69000	4.71185
49	Ambient Temperature	F		60.0000	59.9475

	Lab Measurement				
1	Coal - C	Mass %		71.5414	70.5602
2	Coal - H	Mass %		4.67570	4.74103
3	Coal - N	Mass %		1.90140	1.89459
4	Coal - S	Mass %		3.35570	3.33774
5	Coal - Ash	Mass %		11.1786	11.4779
6	Coal - H2O	Mass %		2.08290	2.18743
7	Coal - HHV	BTU/lb		12775.6	12643.7
8	CD Drain - C	Mass %		18.5967	23.0759
9	CD Drain - H	Mass %		.286700	.339956
10	CD Drain - N	Mass %		.456700	.570437
11	CD Drain - S	Mass %		6.43000	7.99763
12	CD Drain - Ash	Mass %		91.0967	89.6194
13	CD Drain - HHV (dry)	BTU/lb		2997.00	3876.29
15	CD Drain - sfide S	Mass %		5.52330	6.90351

TR4 - TEST POINT 3 03/12/92 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	1.60000	1.58043
18	CD Drain - Ash CaO	Mass %	28.7333	29.2790
19	CD Drain - Ash MgO	Mass %	22.1667	21.0557
20	PD Drain - C	Mass %	68.7467	70.2710
21	PD Drain - H	Mass %	.446700	.454639
22	PD Drain - N	Mass %	1.80670	1.84521
23	PD Drain - S	Mass %	1.64670	1.65888
24	PD Drain - Ash	Mass %	31.6433	31.1700
25	PD Drain - HHV (dry)	BTU/lb	10310.0	10569.9
27	PD Drain - sfide S	Mass %	.810000	.823547
28	PD Drain - crbate C	Mass %	.916700	.903383
30	PD Drain - Ash CaO	Mass %	31.8667	31.3101
31	PD Drain - Ash MgO	Mass %	24.5333	22.5163
32	CF/SD Drain - C	Mass %	56.5100	56.5622
33	CF/SD Drain - H	Mass %	.360000	.360171
34	CF/SD Drain - N	Mass %	1.23000	1.23125
35	CF/SD Drain - S	Mass %	1.82000	1.80296
36	CF/SD Drain - Ash	Mass %	43.3100	43.3164
37	CF/SD Drain - HHV (dry)	BTU/lb	8542.00	8552.42
39	CF/SD Drain - sfide S	Mass %	1.15000	1.13360
40	CF/SD Drain - cabate C	Mass %	1.02000	1.01067
42	CF/SD Drain - Ash CaO	Mass %	29.9000	29.0582
43	CF/SD Drain - Ash MgO	Mass %	19.6000	20.8969
45	BD Drain - C	Mass %	64.4100	64.8041
46	BD Drain - H	Mass %	.590000	.593418
47	BD Drain - N	Mass %	1.79000	1.80100
48	BD Drain - S	Mass %	1.48000	1.48557
49	BD Drain - Ash	Mass %	30.5700	30.3200
50	BD Drain - HHV (dry)	BTU/lb	9763.00	9825.18
52	BD Drain - sfide S	Mass %	.410000	.409755
53	BD Drain - crbate C	Mass %	.760000	.758525
55	BD Drain - Ash CaO	Mass %	28.5000	28.8590
56	BD Drain - Ash MgO	Mass %	21.8000	20.7536
57	Demister Gas - N2	mol,vol %	74.2750	74.5947
58	Demister Gas - O2	mol,vol %	.955000	.845040
59	Demister Gas - CO	mol,vol %	6.55500	6.55333
60	Demister Gas - CH4	mol,vol %	.872500	.840297
61	Demister Gas - CO2	mol,vol %	8.95500	9.11834
62	Demister Gas - C2H4	mol,vol %	.002500	.002426
64	Demister Gas - H2S	mol,vol %	.016000	.015532
65	Demister Gas - H2	mol,vol %	6.17000	5.78776
66	Demister Gas - NH3	mol,vol %	.107000	.103433
67	Demister Gas - Ar	mol,vol %	.487500	.534681
79	Water Content in Freeboard Gas	mol,vol %	22.7000	19.2333
82	Sorbent - CaO	Mass %	57.6000	57.8243
83	Sorbent - MgO	Mass %	41.4667	41.4399
84	Sorbent - SO3	Mass %	.800000	.800824
85	Sorbent - Ash	Mass %	1.23330	1.23495

TR4 - TEST POINT 4 03/12/92 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	126.554	127.800
4	Total Air Feed	lb/hr	FIC-1055	564.664	544.250
5	Transport N2 Feed	SCFM	FIC-1053	.666000	.597806
6	Bed Drain N2 Feed	SCFM	FI-3028	36.1180	35.1117
7	N2 to spray tower	SCFM	FI-4051	37.3560	37.2482
8	Feed lockhopper comp N2	SCFM	FI-7008	13.4960	12.8038
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	5.25000	5.24616
10	Purge N2 to carbonizer	SCFM	FI-7021	6.56200	6.52969
11	Purge N2 to cyclones	SCFM	FI-7022	3.17100	3.17019
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	77.4090	78.0810
15	Coal Feed rate	lb/hr		253.000	227.831
16	Sorbent feed rate	lb/hr		95.0000	94.6407
	Air Feed Temp	deg F	TI-1059	77.4460	77.4326
23	Bed Drain Temp	deg F	TIC-3027	136.821	137.166
24	Primary Cyclone Lockhopper Temp	F	TI-3070	154.565	154.573
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	182.451	182.451
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1523.83	1524.09
35	Carbonizer wall heat loss	KBTU/hr		100.000	106.952
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	211.132
37	Orifice Temp (Upstream)	F	TI-3108	1268.48	1268.53
38	Purge N2 Temp	F	TI-7012	101.759	101.746
42	Boiler Steam Temperature	F	TI-7041	394.589	394.587
44	CD Flow; carbonizer discharge	lb/hr		85.570	112.944
45	PD Flow; primary cyclone	lb/hr		49.7800	56.6050
46	SD/CF Flow; secondary cyclone	lb/hr		5.35000	5.48356
47	BD Flow; bag house	lb/hr		16.5000	17.0895
49	Ambient Temperature	F		60.0000	59.8069

	Lab Measurement				
1	Coal - C	Mass %		71.5414	68.3867
2	Coal - H	Mass %		4.67570	4.72174
3	Coal - N	Mass %		1.90140	1.88958
4	Coal - S	Mass %		3.35570	3.32627
5	Coal - Ash	Mass %		11.1786	11.5541
6	Coal - H2O	Mass %		2.08290	2.43290
7	Coal - HHV	BTU/lb		12775.6	12404.1
8	CD Drain - C	Mass %		39.2000	37.1833
9	CD Drain - H	Mass %		.235000	.209377
10	CD Drain - N	Mass %		1.00000	.90058
11	CD Drain - S	Mass %		3.64000	4.79638
12	CD Drain - Ash	Mass %		59.1700	58.6862
13	CD Drain - HHV (dry)	BTU/lb		5510.00	5254.24
15	CD Drain - sfide S	Mass %		2.40500	4.05500

TR4 - TEST POINT 4 03/12/92 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	2.66000	3.79503
18	CD Drain - Ash CaO	Mass %	19.6500	34.5826
19	CD Drain - Ash MgO	Mass %	48.2000	24.9688
20	PD Drain - C	Mass %	69.0350	66.6404
21	PD Drain - H	Mass %	.600000	.575361
22	PD Drain - N	Mass %	1.80500	1.73361
23	PD Drain - S	Mass %	2.62500	2.51920
24	PD Drain - Ash	Mass %	33.6050	34.1341
25	PD Drain - HHV (dry)	BTU/lb	10392.5	10086.6
27	PD Drain - sfide S	Mass %	1.40500	1.51034
28	PD Drain - crbate C	Mass %	1.39000	1.46166
30	PD Drain - Ash CaO	Mass %	20.9000	22.4807
31	PD Drain - Ash MgO	Mass %	17.0500	16.2312
32	CF/SD Drain - C	Mass %	64.8000	64.9745
33	CF/SD Drain - H	Mass %	.480000	.481102
34	CF/SD Drain - N	Mass %	1.35000	1.35353
35	CF/SD Drain - S	Mass %	2.45000	2.49002
36	CF/SD Drain - Ash	Mass %	38.7800	38.6612
37	CF/SD Drain - HHV (dry)	BTU/lb	9703.00	9744.10
39	CF/SD Drain - sfide S	Mass %	1.54000	1.58863
40	CF/SD Drain - cabate C	Mass %	.830000	.816329
42	CF/SD Drain - Ash CaO	Mass %	26.9000	27.1361
43	CF/SD Drain - Ash MgO	Mass %	21.3000	19.5924
45	BD Drain - C	Mass %	72.7500	72.5578
46	BD Drain - H	Mass %	.680000	.676807
47	BD Drain - N	Mass %	2.13000	2.12193
48	BD Drain - S	Mass %	1.96000	1.91946
49	BD Drain - Ash	Mass %	25.0900	25.2241
50	BD Drain - HHV (dry)	BTU/lb	11113.0	11097.1
52	BD Drain - sfide S	Mass %	.720000	.719472
53	BD Drain - crbate C	Mass %	.840000	.850725
55	BD Drain - Ash CaO	Mass %	18.6000	18.7435
56	BD Drain - Ash MgO	Mass %	13.2000	13.5329
57	Demister Gas - N2	mol,vol %	77.0000	77.4649
58	Demister Gas - O2	mol,vol %	.810000	.702192
59	Demister Gas - CO	mol,vol %	4.68670	4.65064
60	Demister Gas - CH4	mol,vol %	1.58670	1.54796
61	Demister Gas - CO2	mol,vol %	8.68670	8.64447
62	Demister Gas - C2H4	mol,vol %	.056700	.054765
63	Demister Gas - C2H6	mol,vol %	.023300	.022427
64	Demister Gas - H2S	mol,vol %	.036300	.035062
65	Demister Gas - H2	mol,vol %	5.62330	5.35786
66	Demister Gas - NH3	mol,vol %	.196800	.188737
67	Demister Gas - Ar	mol,vol %	.423300	.460779
79	Water Content in Freeboard Gas	mol,vol %	20.4000	15.7427
82	Sorbent - CaO	Mass %	57.6000	57.5641
83	Sorbent - MgO	Mass %	41.4667	41.5616
84	Sorbent - SO3	Mass %	.800000	.802671
85	Sorbent - Ash	Mass %	1.23330	1.17161

TR4 - TEST POINT 5 03/13/92 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	189.292	196.341
4	Total Air Feed	lb/hr	FIC-1055	899.874	895.495
5	Transport N2 Feed	SCFM	FIC-1053	.467000	.438216
6	Bed Drain N2 Feed	SCFM	FI-3028	21.0830	20.7306
7	N2 to spray tower	SCFM	FI-4051	33.7680	33.7096
8	Feed lockhopper comp N2	SCFM	FI-7008	11.4730	11.1882
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	3.97000	3.95694
10	Purge N2 to carbonizer	SCFM	FI-7021	5.45300	5.35946
11	Purge N2 to cyclones	SCFM	FI-7022	2.22400	2.21351
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	140.810	142.763
15	Coal Feed rate	lb/hr		370.000	329.148
16	Sorbent feed rate	lb/hr		106.000	106.126
22	Air Feed Temp	deg F	TI-1059	78.1000	78.0949
23	Bed Drain Temp	deg F	TIC-3027	140.520	140.549
24	Primary Cyclone Lockhopper Temp	F	TI-3070	161.043	161.088
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	190.427	190.428
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1637.73	1637.60
35	Carbonizer wall heat loss	KBTU/hr		100.000	95.275
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	240.328
37	Orifice Temp (Upstream)	F	TI-3108	1428.88	1429.06
38	Purge N2 Temp	F	TI-7012	99.4210	99.4104
42	Boiler Steam Temperature	F	TI-7041	394.138	394.136
44	CD Flow; carbonizer discharge	lb/hr		97.2000	97.1553
45	PD Flow; primary cyclone	lb/hr		84.5500	96.9669
46	SD/CF Flow; secondary cyclone	lb/hr		3.22000	3.25319
47	BD Flow; bag house	lb/hr		23.1400	23.6967
49	Ambient Temperature	F		60.0000	59.8541

	Lab Measurement			
1	Coal - C	Mass %	71.5414	70.9680
2	Coal - H	Mass %	4.67570	4.72622
3	Coal - N	Mass %	1.90140	1.93893
4	Coal - S	Mass %	3.35570	3.42235
5	Coal - Ash	Mass %	11.1786	9.2339
6	Coal - H2O	Mass %	2.08290	2.36513
7	Coal - HHV	BTU/lb	12775.6	12798.4
8	CD Drain - C	Mass %	20.9350	39.2422
9	CD Drain - H	Mass %	.185000	.373558
10	CD Drain - N	Mass %	.56000	1.05448
11	CD Drain - S	Mass %	8.55000	9.24971
12	CD Drain - Ash	Mass %	94.7000	88.0559
13	CD Drain - HHV (dry)	BTU/lb	3543.00	6763.66
15	CD Drain - sfide S	Mass %	8.05000	8.43896

TR4 - TEST POINT 5 03/13/92 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	2.25500	2.22735
18	CD Drain - Ash CaO	Mass %	40.8500	31.7393
19	CD Drain - Ash MgO	Mass %	30.3500	22.8394
20	PD Drain - C	Mass %	68.2533	62.9325
21	PD Drain - H	Mass %	.443300	.408736
22	PD Drain - N	Mass %	1.84000	1.69222
23	PD Drain - S	Mass %	2.36000	2.04350
24	PD Drain - Ash	Mass %	32.5167	33.8924
25	PD Drain - HHV (dry)	BTU/lb	10409.0	9627.9
27	PD Drain - sfide S	Mass %	1.27000	1.16443
28	PD Drain - crbate C	Mass %	.730000	.606556
30	PD Drain - Ash CaO	Mass %	16.4333	13.6408
31	PD Drain - Ash MgO	Mass %	13.8667	9.8158
32	CF/SD Drain - C	Mass %	64.9100	65.2833
33	CF/SD Drain - H	Mass %	.440000	.442562
34	CF/SD Drain - N	Mass %	1.56000	1.56897
35	CF/SD Drain - S	Mass %	1.21000	1.21984
36	CF/SD Drain - Ash	Mass %	36.1900	35.9047
37	CF/SD Drain - HHV (dry)	BTU/lb	9395.00	9451.56
39	CF/SD Drain - sfide S	Mass %	.550000	.557575
40	CF/SD Drain - cabate C	Mass %	.500000	.500138
42	CF/SD Drain - Ash CaO	Mass %	11.6000	11.7319
43	CF/SD Drain - Ash MgO	Mass %	9.90000	8.44221
45	BD Drain - C	Mass %	73.7300	73.2710
46	BD Drain - H	Mass %	.560000	.556637
47	BD Drain - N	Mass %	2.06000	2.04641
48	BD Drain - S	Mass %	2.14000	2.07048
49	BD Drain - Ash	Mass %	24.6700	25.0512
50	BD Drain - HHV (dry)	BTU/lb	11158.0	11099.3
52	BD Drain - sfide S	Mass %	.890000	.863984
53	BD Drain - crbate C	Mass %	.770000	.742785
55	BD Drain - Ash CaO	Mass %	13.8000	13.0531
56	BD Drain - Ash MgO	Mass %	9.70000	9.39292
57	Demister Gas - N2	mol,vol %	69.3500	69.6913
58	Demister Gas - O2	mol,vol %	1.58750	1.32801
59	Demister Gas - CO	mol,vol %	8.19250	8.23988
60	Demister Gas - CH4	mol,vol %	1.40500	1.40352
61	Demister Gas - CO2	mol,vol %	10.0325	9.6712
63	Demister Gas - C2H6	mol,vol %	.012500	.012651
64	Demister Gas - H2S	mol,vol %	.006300	.006123
65	Demister Gas - H2	mol,vol %	7.79000	7.98166
66	Demister Gas - NH3	mol,vol %	.161700	.158819
67	Demister Gas - Ar	mol,vol %	.527500	.572336
79	Water Content in Freeboard Gas	mol,vol %	18.1500	16.9747
82	Sorbent - CaO	Mass %	57.6000	57.6094
83	Sorbent - MgO	Mass %	41.4667	41.4553
84	Sorbent - SO3	Mass %	.800000	.799006
85	Sorbent - Ash	Mass %	1.23330	1.23628

TR4 - TEST POINT 6 03/13/92 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	172.231	174.806
4	Total Air Feed	lb/hr	FIC-1055	820.107	819.213
5	Transport N2 Feed	SCFM	FIC-1053	.703000	.670365
6	Bed Drain N2 Feed	SCFM	FI-3028	21.3370	20.9068
7	N2 to spray tower	SCFM	FI-4051	33.5180	33.5134
8	Feed lockhopper comp N2	SCFM	FI-7008	8.54200	8.39613
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	5.33700	5.33467
10	Purge N2 to carbonizer	SCFM	FI-7021	6.59900	6.58187
11	Purge N2 to cyclones	SCFM	FI-7022	3.42200	3.42098
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	84.8250	85.0919
15	Coal Feed rate	lb/hr		396.000	333.344
16	Sorbent feed rate	lb/hr		106.000	106.085
22	Air Feed Temp	deg F	TI-1059	81.5910	81.5831
23	Bed Drain Temp	deg F	TIC-3027	290.964	292.210
24	Primary Cyclone Lockhopper Temp	F	TI-3070	155.579	155.587
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	182.338	182.338
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1601.71	1601.79
35	Carbonizer wall heat loss	KBTU/hr		100.000	101.866
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	217.308
37	Orifice Temp (Upstream)	F	TI-3108	1408.51	1408.68
38	Purge N2 Temp	F	TI-7012	102.538	102.530
42	Boiler Steam Temperature	F	TI-7041	394.714	394.712
44	CD Flow; carbonizer discharge	lb/hr		112.360	117.662
45	PD Flow; primary cyclone	lb/hr		71.2300	85.2808
46	SD/CF Flow; secondary cyclone	lb/hr		4.25000	4.39337
47	BD Flow; bag house	lb/hr		18.8900	20.0535
49	Ambient Temperature	F		60.0000	59.8285

	Lab Measurement				
1	Coal - C	Mass %		71.5414	70.4718
2	Coal - H	Mass %		4.67570	4.79718
3	Coal - N	Mass %		1.90140	1.95870
4	- S	Mass %		3.35570	3.46206
5	Coal - Ash	Mass %		11.1786	8.2268
6	Coal - H2O	Mass %		2.08290	2.55760
7	Coal - HHV	BTU/lb		12775.6	12875.5
8	CD Drain - C	Mass %		29.4350	51.6542
9	CD Drain - H	Mass %		.185000	.329309
10	CD Drain - N	Mass %		.59500	1.03301
11	CD Drain - S	Mass %		7.18500	7.95948
12	CD Drain - Ash	Mass %		84.8850	81.1186
13	CD Drain - HHV (dry)	BTU/lb		4714.50	9013.15
15	CD Drain - sfide S	Mass %		6.61000	7.35742

TR4 - TEST POINT 6 03/13/92 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	1.72000	1.62047
18	CD Drain - Ash CaO	Mass %	42.8000	28.2257
19	CD Drain - Ash MgO	Mass %	31.5000	20.3001
20	PD Drain - C	Mass %	64.1933	58.3074
21	PD Drain - H	Mass %	.416700	.377136
22	PD Drain - N	Mass %	1.84330	1.66600
23	PD Drain - S	Mass %	2.89000	2.22587
24	PD Drain - Ash	Mass %	32.6667	34.9721
25	PD Drain - HHV (dry)	BTU/lb	10456.0	9531.5
27	PD Drain - sfide S	Mass %	1.61670	1.36632
28	PD Drain - crbate C	Mass %	.783300	.617311
30	PD Drain - Ash CaO	Mass %	17.4333	13.1907
31	Drain - Ash MgO	Mass %	12.3000	9.4868
32	CF/SD Drain - C	Mass %	64.4900	63.6296
33	CF/SD Drain - H	Mass %	.370000	.365079
34	CF/SD Drain - N	Mass %	1.83000	1.80555
35	CF/SD Drain - S	Mass %	1.48000	1.43933
36	CF/SD Drain - Ash	Mass %	36.5700	37.1151
37	CF/SD Drain - HHV (dry)	BTU/lb	9416.00	9291.83
39	CF/SD Drain - sfide S	Mass %	.720000	.694725
40	CF/SD Drain - cabate C	Mass %	.380000	.367006
42	CF/SD Drain - Ash CaO	Mass %	26.1000	24.5807
43	CF/SD Drain - Ash MgO	Mass %	18.1000	17.6786
45	BD Drain - C	Mass %	70.7500	68.2066
46	BD Drain - H	Mass %	.560000	.539625
47	BD Drain - N	Mass %	1.85000	1.78215
48	BD Drain - S	Mass %	2.06000	1.89227
49	BD Drain - Ash	Mass %	27.4200	28.9109
50	BD Drain - HHV (dry)	BTU/lb	10814.0	10429.0
52	BD Drain - sfide S	Mass %	1.08000	.99042
53	BD Drain - crbate C	Mass %	.440000	.410951
55	BD Drain - Ash CaO	Mass %	23.9000	20.7693
56	BD Drain - Ash MgO	Mass %	15.2000	14.9374
57	Demister Gas - N2	mol,vol %	70.9000	70.9580
58	Demister Gas - O2	mol,vol %	.871000	.822437
59	Demister Gas - CO	mol,vol %	8.23750	8.43584
60	Demister Gas - CH4	mol,vol %	1.96750	1.96259
61	Demister Gas - CO2	mol,vol %	9.70500	9.45892
62	Demister Gas - C2H4	mol,vol %	.002500	.002448
64	Demister Gas - H2S	mol,vol %	.008500	.008265
65	Demister Gas - H2	mol,vol %	6.98250	6.99388
66	Demister Gas - NH3	mol,vol %	.108100	.105245
67	Demister Gas - Ar	mol,vol %	.520000	.555018
79	Water Content in Freeboard Gas	mol,vol %	16.6000	14.3887
82	Sorbent - CaO	Mass %	57.6000	57.6208
83	Sorbent - MgO	Mass %	41.4667	41.4412
84	Sorbent - SO3	Mass %	.800000	.799294
85	Sorbent - Ash	Mass %	1.23330	1.23872

TR4 - TEST POINT 7 03/13/92 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	174.723	177.406
4	Total Air Feed	lb/hr	FIC-1055	772.662	769.563
5	Transport N2 Feed	SCFM	FIC-1053	.636000	.587966
6	Bed Drain N2 Feed	SCFM	FI-3028	45.9170	44.9313
7	N2 to spray tower	SCFM	FI-4051	33.4530	33.3467
8	Feed lockhopper comp N2	SCFM	FI-7008	15.1820	14.8197
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	5.13500	5.13346
10	Purge N2 to carbonizer	SCFM	FI-7021	6.46600	6.43910
11	Purge N2 to cyclones	SCFM	FI-7022	3.32600	3.32542
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	50.7850	51.7480
15	Coal Feed rate	lb/hr		450.000	412.241
16	Sorbent feed rate	lb/hr		182.000	181.551
22	Air Feed Temp	deg F	TI-1059	82.2560	82.2552
23	Bed Drain Temp	deg F	TIC-3027	386.797	387.124
24	Primary Cyclone Lockhopper Temp	F	TI-3070	151.662	151.675
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	176.131	176.133
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1547.07	1546.35
35	Carbonizer wall heat loss	KBTU/hr		100.000	96.441
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	217.745
37	Orifice Temp (Upstream)	F	TI-3108	1347.02	1347.19
38	Purge N2 Temp	F	TI-7012	115.502	115.497
42	Boiler Steam Temperature	F	TI-7041	394.560	394.560
44	CD Flow; carbonizer discharge	lb/hr		195.860	270.240
45	PD Flow; primary cyclone	lb/hr		64.5800	68.5445
46	SD/CF Flow; secondary cyclone	lb/hr		25.5700	26.1619
47	BD Flow; bag house	lb/hr		16.8500	17.0426
49	Ambient Temperature	F		60.0000	59.9682

	Lab Measurement			
1	Coal - C	Mass %	71.5414	68.0940
2	Coal - H	Mass %	4.67570	4.61396
3	Coal - N	Mass %	1.90140	1.87696
4	Coal - S	Mass %	3.35570	3.30337
5	Coal - Ash	Mass %	11.1786	12.1696
6	Coal - H2O	Mass %	2.08290	2.33334
7	Coal - HHV	BTU/lb	12775.6	12550.2
8	CD Drain - C	Mass %	47.2950	47.3605
9	CD Drain - H	Mass %	.300000	.289419
10	CD Drain - N	Mass %	1.19000	1.12742
11	CD Drain - S	Mass %	3.84750	3.40602
12	CD Drain - Ash	Mass %	52.3125	52.7650
13	CD Drain - HHV (dry)	BTU/lb	7017.00	7339.53
15	CD Drain - sfide S	Mass %	1.92750	2.40093

TR4 - TEST POINT 7 03/13/92 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	2.37500	2.69022
18	CD Drain - Ash CaO	Mass %	24.6500	29.3400
19	CD Drain - Ash MgO	Mass %	18.2750	21.1114
20	PD Drain - C	Mass %	57.6250	58.0753
21	PD Drain - H	Mass %	.460000	.461637
22	PD Drain - N	Mass %	1.64500	1.65031
23	PD Drain - S	Mass %	4.61500	4.66310
24	PD Drain - Ash	Mass %	44.6700	44.6865
25	PD Drain - HHV (dry)	BTU/lb	8892.50	9005.06
27	PD Drain - sfide S	Mass %	2.34000	2.70384
28	PD Drain - crbate C	Mass %	1.96000	1.85599
30	PD Drain - Ash CaO	Mass %	33.9000	34.0971
31	PD Drain - Ash MgO	Mass %	23.9500	24.5343
32	CF/SD Drain - C	Mass %	69.4100	69.3529
33	CF/SD Drain - H	Mass %	.600000	.598936
34	CF/SD Drain - N	Mass %	2.43000	2.42503
35	CF/SD Drain - S	Mass %	2.98000	2.93389
36	CF/SD Drain - Ash	Mass %	30.4000	30.4789
37	CF/SD Drain - HHV (dry)	BTU/lb	10581.0	10572.1
39	CF/SD Drain - sfide S	Mass %	1.51000	1.51705
40	CF/SD Drain - cabate C	Mass %	1.68000	1.67524
42	CF/SD Drain - Ash CaO	Mass %	28.7000	28.6111
43	CF/SD Drain - Ash MgO	Mass %	19.6000	20.5869
45	BD Drain - C	Mass %	73.3400	73.4624
46	BD Drain - H	Mass %	.640000	.640758
47	BD Drain - N	Mass %	1.81000	1.81200
48	BD Drain - S	Mass %	2.32000	2.31385
49	BD Drain - Ash	Mass %	25.0900	25.0224
50	BD Drain - HHV (dry)	BTU/lb	11109.0	11127.0
52	BD Drain - sfide S	Mass %	1.06000	1.07464
53	BD Drain - crbate C	Mass %	.640000	.643362
55	BD Drain - Ash CaO	Mass %	16.7000	16.9382
56	BD Drain - Ash MgO	Mass %	12.2000	12.1878
57	Demister Gas - N2	mol,vol %	74.7000	75.0564
58	Demister Gas - O2	mol,vol %	.490000	.434964
59	Demister Gas - CO	mol,vol %	6.14670	6.09861
60	Demister Gas - CH4	mol,vol %	2.17330	2.15484
61	Demister Gas - CO2	mol,vol %	9.00670	8.88172
62	Demister Gas - C2H4	mol,vol %	.050000	.049043
63	Demister Gas - C2H6	mol,vol %	.033300	.032707
64	Demister Gas - H2S	mol,vol %	.029000	.028401
65	Demister Gas - H2	mol,vol %	5.64670	5.52600
66	Demister Gas - NH3	mol,vol %	.160400	.156751
67	Demister Gas - Ar	mol,vol %	.483300	.499945
79	Water Content in Freeboard Gas	mol,vol %	15.3000	13.6120
82	Sorbent - CaO	Mass %	57.6000	57.6239
83	Sorbent - MgO	Mass %	41.4667	41.4629
84	Sorbent - SO3	Mass %	.800000	.801584
85	Sorbent - Ash	Mass %	1.23330	1.21160

TR4 - TEST POINT 8 03/14/92 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	178.838	172.069
4	Total Air Feed	lb/hr	FIC-1055	750.876	751.589
5	Transport N2 Feed	SCFM	FIC-1053	.609000	.599303
6	Bed Drain N2 Feed	SCFM	FI-3028	47.0850	46.9849
7	N2 to spray tower	SCFM	FI-4051	30.6700	30.5673
8	Feed lockhopper comp N2	SCFM	FI-7008	14.4960	14.3609
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	4.96500	4.96447
10	Purge N2 to carbonizer	SCFM	FI-7021	6.28000	6.27069
11	Purge N2 to cyclones	SCFM	FI-7022	3.13600	3.13580
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	40.0000	53.4811
15	Coal Feed rate	lb/hr		338.000	347.366
16	Sorbent feed rate	lb/hr		150.000	149.893
22	Air Feed Temp	deg F	TI-1059	82.2260	82.2267
23	Bed Drain Temp	deg F	TIC-3027	339.431	339.073
24	Primary Cyclone Lockhopper Temp	F	TI-3070	162.430	162.441
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	187.921	187.921
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1559.19	1558.36
35	Carbonizer wall heat loss	KBTU/hr		100.000	96.061
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	212.400
37	Orifice Temp (Upstream)	F	TI-3108	1366.90	1366.98
38	Purge N2 Temp	F	TI-7012	125.025	125.027
42	Boiler Steam Temperature	F	TI-7041	395.036	395.036
44	CD Flow; carbonizer discharge	lb/hr		169.250	204.398
45	PD Flow; primary cyclone	lb/hr		90.5500	90.3536
46	SD/CF Flow; secondary cyclone	lb/hr		3.30000	3.29864
47	BD Flow bag house	lb/hr		18.0000	17.9504
49	Ambient Temperature	F		60.0000	60.0255

	Lab Measurement				
1	Coal - C	Mass %		71.5414	71.4252
2	Coal - H	Mass %		4.67570	4.75201
3	Coal - N	Mass %		1.90140	1.90372
4	Coal - S	Mass %		3.35570	3.35864
5	Coal - Ash	Mass %		11.1786	10.9109
6	Coal - H2O	Mass %		2.08290	2.12969
7	Coal - HHV	BTU/lb		12775.6	12843.7
8	CD Drain - C	Mass %		52.5100	43.7779
9	CD Drain - H	Mass %		.276700	.221211
10	CD Drain - N	Mass %		1.25330	1.01023
11	CD Drain - S	Mass %		3.45670	3.54459
12	CD Drain - Ash	Mass %		46.9600	49.6567
13	CD Drain - HHV (dry)	BTU/lb		7634.33	6109.05
15	CD Drain - sfide S	Mass %		1.59330	1.97812

TR4 - TEST POINT 8 03/14/92 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	2.43000	3.49023
18	CD Drain - Ash CaO	Mass %	28.8000	38.7883
19	CD Drain - Ash MgO	Mass %	20.7000	28.0097
20	PD Drain - C	Mass %	69.5633	68.8715
21	PD Drain - H	Mass %	.560000	.553140
22	PD Drain - N	Mass %	1.65330	1.63626
23	PD Drain - S	Mass %	2.82330	3.01652
24	PD Drain - Ash	Mass %	29.1033	29.2394
25	PD Drain - HHV (dry)	BTU/lb	10646.3	10548.5
27	PD Drain - sfide S	Mass %	1.20670	1.38587
28	PD Drain - crbate C	Mass %	.97330	1.02323
30	PD Drain - Ash CaO	Mass %	16.9000	18.9044
31	PD Drain - Ash MgO	Mass %	13.6667	13.6512
32	CF/SD Drain - C	Mass %	69.0000	68.8112
33	CF/SD Drain - H	Mass %	.540000	.538258
34	CF/SD Drain - N	Mass %	1.65000	1.64489
35	CF/SD Drain - S	Mass %	2.52000	2.52821
36	CF/SD Drain - Ash	Mass %	29.6500	29.7149
37	CF/SD Drain - HHV (dry)	BTU/lb	10667.0	10633.5
39	CF/SD Drain - sfide S	Mass %	1.27000	1.28126
40	CF/SD Drain - cabate C	Mass %	1.51000	1.53149
42	CF/SD Drain - Ash CaO	Mass %	28.1000	28.4425
43	CF/SD Drain - Ash MgO	Mass %	20.5000	20.5388
45	BD Drain - C	Mass %	72.3000	72.2805
46	BD Drain - H	Mass %	.690000	.689319
47	BD Drain - N	Mass %	1.90000	1.89950
48	BD Drain - S	Mass %	2.49000	2.55551
49	BD Drain - Ash	Mass %	26.3400	26.3243
50	BD Drain - HHV (dry)	BTU/lb	10995.0	10996.8
52	BD Drain - sfide S	Mass %	1.18000	1.24123
53	BD Drain - crbate C	Mass %	.690000	.696788
55	BD Drain - Ash CaO	Mass %	27.0000	27.7607
56	BD Drain - Ash MgO	Mass %	20.8000	20.0465
57	Demister Gas - N2	mol,vol %	75.3000	76.0298
58	Demister Gas - O2	mol,vol %	.906700	.708852
59	Demister Gas - CO	mol,vol %	5.40000	5.33308
60	Demister Gas - CH4	mol,vol %	2.27000	2.21952
61	Demister Gas - CO2	mol,vol %	9.50670	9.16926
62	Demister Gas - C2H4	mol,vol %	.030000	.029949
63	Demister Gas - C2H6	mol,vol %	.020000	.019922
64	Demister Gas - H2S	mol,vol %	.094600	.095087
65	Demister Gas - H2	mol,vol %	6.12330	6.03804
66	Demister Gas - NH3	mol,vol %	.139300	.140348
67	Demister Gas - Ar	mol,vol %	.503300	.510041
79	Water Content in Freeboard Gas	mol,vol %	15.0000	11.3330
82	Sorbent - CaO	Mass %	57.6000	57.5421
83	Sorbent - MgO	Mass %	41.4667	41.5522
84	Sorbent - SO3	Mass %	.800000	.800413
85	Sorbent - Ash	Mass %	1.23330	1.20527

TR5 - TEST POINT 1 3/24/92 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	131.814	140.308
4	Total Air Feed	lb/hr	FIC-1055	605.516	636.081
5	Transport N2 Feed	SCFM	FIC-1053	.138000	.098613
6	Bed Drain N2 Feed	SCFM	FI-3028	30.4470	30.3370
7	N2 to spray tower	SCFM	FI-4051	42.2050	42.3168
8	Feed lockhopper comp N2	SCFM	FI-7008	9.04600	8.97147
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	4.15100	3.95730
10	Purge N2 to carbonizer	SCFM	FI-7021	6.54300	6.52012
11	Purge N2 to cyclones	SCFM	FI-7022	3.32900	3.32350
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	90.0900	90.6817
15	Coal Feed rate	lb/hr		229.000	203.819
16	Sorbent feed rate	lb/hr		60.0000	59.4012
22	Air Feed Temp	deg F	TI-1059	82.7710	82.7742
23	Bed Dr Temp	deg F	TIC-3027	103.417	103.405
24	Primary Cyclone Lockhopper Temp	F	TI-3070	142.977	142.980
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	190.143	190.143
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1610.24	1610.05
35	Carbonizer wall heat loss	KBTU/hr		100.000	94.214
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	212.064
37	Orifice Temp (Upstream)	F	TI-3108	1323.65	1323.72
38	Purge N2 Temp	F	TI-7012	107.435	107.437
42	Boiler Steam Temperature	F	TI-7041	387.601	387.202
44	CD Flow; carbonizer discharge	lb/hr		45.3300	68.9499
45	PD Flow; primary cyclone	lb/hr		40.2600	45.0452
46	SD/CF Flow; secondary cyclone	lb/hr		3.60000	3.78110
47	BD Flow; bag house	lb/hr		6.64000	6.96098
49	Ambient Temperature	F		60.0000	60.0448

	Lab Measurement				
1	Coal - C	Mass %		74.6125	72.8067
2	Coal - H	Mass %		4.68000	4.59691
3	Coal - N	Mass %		2.04750	2.01944
4	Coal - S	Mass %		1.88250	1.86665
5	Coal - Ash	Mass %		10.5200	11.7007
6	Coal - H2O	Mass %		1.43500	1.63194
7	Coal - HHV	BTU/lb		13098.3	12901.8
8	CD Drain - C	Mass %		32.8100	31.9645
9	CD Drain - H	Mass %		.290000	.285115
10	CD Drain - N	Mass %		.650000	.617552
11	CD Drain - S	Mass %		2.94000	2.33421
12	CD Drain - Ash	Mass %		66.5200	68.2097
13	CD Drain - HHV (dry)	BTU/lb		4640.00	4411.05
15	CD Drain - sfide S	Mass %		2.21000	2.17834

TR5 - TEST POINT 1 3/24/92 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	2.79000	2.12244
18	CD Drain - Ash CaO	Mass %	38.6000	41.3179
19	CD Drain - Ash MgO	Mass %	30.0000	19.3920
20	PD Drain - C	Mass %	69.3300	70.3499
21	PD Drain - H	Mass %	.530000	.536421
22	PD Drain - N	Mass %	1.52000	1.53175
23	PD Drain - S	Mass %	1.66000	1.33364
24	PD Drain - Ash	Mass %	29.8400	29.4295
25	PD Drain - HHV (dry)	BTU/lb	10464.0	10551.8
27	PD Drain - sfide S	Mass %	.840000	.867019
28	PD Drain - crbate C	Mass %	.480000	.466077
30	PD Drain - Ash CaO	Mass %	13.9000	13.9589
31	PD Drain - Ash MgO	Mass %	9.40000	6.55144
32	CF/SD Drain - C	Mass %	67.4300	68.7148
33	CF/SD Drain - H	Mass %	.410000	.418110
34	CF/SD Drain - N	Mass %	1.66000	1.69222
35	CF/SD Drain - S	Mass %	1.27000	1.25255
36	CF/SD Drain - Ash	Mass %	28.9700	28.1441
37	CF/SD Drain - HHV (dry)	BTU/lb	10033.0	10228.2
39	CF/SD Drain - sfide S	Mass %	.500000	.488512
40	CF/SD Drain - cabate C	Mass %	1.21000	1.18079
42	CF/SD Drain - Ash CaO	Mass %	26.8000	26.9926
43	CF/SD Drain - Ash MgO	Mass %	15.9000	12.6686
45	BD Drain - C	Mass %	78.6300	79.4658
46	BD Drain - H	Mass %	.560000	.566109
47	BD Drain - N	Mass %	1.67000	1.68712
48	BD Drain - S	Mass %	1.14000	1.11319
49	BD Drain - Ash	Mass %	18.7200	18.1075
50	BD Drain - HHV (dry)	BTU/lb	11960.0	12082.7
52	BD Drain - sfide S	Mass %	.410000	.405745
53	BD Drain - crbate C	Mass %	.560000	.549496
55	BD Drain - Ash CaO	Mass %	25.9000	26.7865
56	BD Drain - Ash MgO	Mass %	17.0000	12.5719
57	Demister Gas - N2	mol,vol %	76.2400	74.5471
58	Demister Gas - O2	mol,vol %	1.61200	2.82903
59	Demister Gas - CO	mol,vol %	6.39200	7.36817
60	Demister Gas - CH4	mol,vol %	.904000	.948798
61	Demister Gas - CO2	mol,vol %	7.85600	7.27043
62	Demister Gas - C2H4	mol,vol %	.002600	.002265
64	Demister Gas - H2S	mol,vol %	.125200	.100796
65	Demister Gas - H2	mol,vol %	6.59840	6.64063
66	Demister Gas - NH3	mol,vol %	.239000	.218866
67	Demister Gas - Ar	mol,vol %	.490000	.533155
79	Water Content in Freeboard Gas	mol,vol %	17.9000	12.3896
82	Sorbent - CaO	Mass %	67.2000	66.7596
83	Sorbent - MgO	Mass %	30.8500	31.3327
84	Sorbent - SO3	Mass %	.950000	.957076
85	Sorbent - Ash	Mass %	.750000	.700642

TR5 - TEST POINT 2 3/24/92 Pittsburgh Coal + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	152.067	151.702
4	Total Air Feed	lb/hr	FIC-1055	698.397	707.452
5	Transport N2 Feed	SCFM	FIC-1053	.248000	.23107
6	Bed Drain N2 Feed	SCFM	FI-3028	29.2430	29.0907
7	N2 to spray tower	SCFM	FI-4051	39.4660	39.5648
8	Feed lockhopper comp N2	SCFM	FI-7008	9.24500	9.19036
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	3.92800	3.87197
10	Purge N2 to carbonizer	SCFM	FI-7021	6.28600	6.26920
11	Purge N2 to cyclones	SCFM	FI-7022	3.01900	3.01658
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	89.8330	90.1898
15	Coal Feed rate	lb/hr		236.000	224.124
16	Sorbent feed rate	lb/hr		119.000	108.124
22	Air Feed Temp	deg F	TI-1059	84.3900	84.3937
23	Bed Drain Temp	deg F	TIC-3027	97.3900	97.3803
24	Primary Cyclone Lockhopper Temp	F	TI-3070	148.775	148.798
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	180.458	180.460
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1618.60	1618.40
35	Carbonizer wall heat loss	KBTU/hr		100.000	90.209
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	225.834
37	Orifice Temp (Upstream)	F	TI-3108	1352.83	1352.95
38	Purge N2 Temp	F	TI-7012	126.222	126.229
42	Boiler Steam Temperature	F	TI-7041	386.865	386.866
44	CD Flow; carbonizer discharge	lb/hr		62.8900	79.2447
45	PD Flow; primary cyclone	lb/hr		62.2900	68.1463
46	SD/CF Flow; secondary cyclone	lb/hr		16.0000	16.4680
47	BD Flow; bag house	lb/hr		6.44000	6.56774
49	Ambient Temperature	F		60.0000	60.0662

	Lab Measurement				
1	Coal - C	Mass %		74.6125	73.7194
2	Coal - H	Mass %		4.68000	4.64636
3	Coal - N	Mass %		2.04750	2.03486
4	Coal - S	Mass %		1.88250	1.86581
5	Coal - Ash	Mass %		10.5200	11.1047
6	Coal - H2O	Mass %		1.43500	1.52306
7	Coal - HHV	BTU/lb		13098.3	13009.6
8	CD Drain - C	Mass %		21.5550	19.8195
9	CD Drain - H	Mass %		.135000	.123592
10	CD Drain - N	Mass %		.445000	.407314
11	CD Drain - S	Mass %		2.36500	3.22417
12	CD Drain - Ash	Mass %		79.5850	81.1553
13	CD Drain - HHV (dry)	BTU/lb		3133.50	2993.83
15	CD Drain - sfide S	Mass %		1.46500	2.53654

TR5 - TEST POINT 2 3/24/92 Pittsburgh Coal + Dolomite

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	1.78500	1.46741
18	CD Drain - Ash CaO	Mass %	25.6500	51.2467
19	CD Drain - Ash MgO	Mass %	18.5500	25.4357
20	PD Drain - C	Mass %	68.4250	68.5960
21	PD Drain - H	Mass %	.465000	.462877
22	PD Drain - N	Mass %	1.53500	1.52850
23	PD Drain - S	Mass %	1.99000	2.19357
24	PD Drain - Ash	Mass %	32.1800	32.0605
25	PD Drain - HHV (dry)	BTU/lb	10341.5	10314.0
27	PD Drain - sfide S	Mass %	1.02000	1.36736
28	PD Drain - crbate C	Mass %	.700000	.953472
30	PD Drain - Ash CaO	Mass %	14.0500	19.7937
31	PD Drain - Ash MgO	Mass %	9.60000	9.82435
32	CF/SD Drain - C	Mass %	68.6800	68.6958
33	CF/SD Drain - H	Mass %	.480000	.479748
34	CF/SD Drain - N	Mass %	1.39000	1.38922
35	CF/SD Drain - S	Mass %	1.51000	1.56522
36	CF/SD Drain - Ash	Mass %	30.1100	30.1985
37	CF/SD Drain - HHV (dry)	BTU/lb	10397.0	10399.3
39	CF/SD Drain - sfide S	Mass %	.840000	.913127
40	CF/SD Drain - cabate C	Mass %	.600000	.598573
42	CF/SD Drain - Ash CaO	Mass %	28.1000	30.7544
43	CF/SD Drain - Ash MgO	Mass %	14.2000	15.2646
45	BD Drain - C	Mass %	74.3400	74.9119
46	BD Drain - H	Mass %	.520000	.523833
47	BD Drain - N	Mass %	1.72000	1.73260
48	BD Drain - S	Mass %	1.36000	1.39030
49	BD Drain - Ash	Mass %	22.5500	22.1473
50	BD Drain - HHV (dry)	BTU/lb	11786.0	11875.7
52	BD Drain - sfide S	Mass %	.530000	.561704
53	BD Drain - crbate C	Mass %	.420000	.425780
55	BD Drain - Ash CaO	Mass %	19.5000	20.8399
56	BD Drain - Ash MgO	Mass %	12.3000	10.3436
57	Demister Gas - N2	mol,vol %	77.5250	76.8128
58	Demister Gas - O2	mol,vol %	2.07250	2.45530
59	Demister Gas - CO	mol,vol %	6.16000	6.40281
60	Demister Gas - CH4	mol,vol %	1.42000	1.59067
61	Demister Gas - CO2	mol,vol %	8.79000	8.98749
64	Demister Gas - H2S	mol,vol %	.006700	.006396
65	Demister Gas - H2	mol,vol %	4.74530	4.49644
66	Demister Gas - NH3	mol,vol %	.209700	.199674
67	Demister Gas - Ar	mol,vol %	.592500	.570159
79	Water Content in Freeboard Gas	mol,vol %	17.8000	14.1808
82	Sorbent - CaO	Mass %	67.2000	65.5760
83	Sorbent - MgO	Mass %	30.8500	32.5479
84	Sorbent - SO3	Mass %	.95000	1.03040
85	Sorbent - Ash	Mass %	.750000	.595722

TR5 - TEST POINT 3 3/25/92 Pittsburgh Coal + Limestone

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	144.693	146.264
4	Total Air Feed	lb/hr	FIC-1055	672.141	676.005
5	Transport N2 Feed	SCFM	FIC-1053	1.69100	1.43840
6	Bed Drain N2 Feed	SCFM	FI-3028	31.1210	31.0020
7	N2 to spray tower	SCFM	FI-4051	40.7880	40.7263
8	Feed lockhopper comp N2	SCFM	FI-7008	8.90300	8.78853
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	.012000	.010671
10	Purge N2 to carbonizer	SCFM	FI-7021	6.43800	6.40753
11	Purge N2 to cyclones	SCFM	FI-7022	3.13500	3.13466
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	100.020	100.137
15	Coal Feed rate	lb/hr		237.000	220.296
16	Sorbent feed rate	lb/hr		70.0000	70.0892
22	Air Feed Temp	deg F	TI-1059	79.2520	79.2580
23	Bed Drain Temp	deg F	TIC-3027	85.1090	85.1013
24	Primary Cyclone Lockhopper Temp	F	TI-3070	138.840	138.855
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	178.895	178.897
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1621.17	1620.88
35	Carbonizer wall heat loss	KBTU/hr		100.000	90.171
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	226.920
37	Orifice Temp (Upstream)	F	TI-3108	1363.83	1364.17
38	Purge N2 Temp	F	TI-7012	119.737	119.743
42	Boiler Steam Temperature	F	TI-7041	387.009	387.010
44	CD Flow; carbonizer discharge	lb/hr		52.4000	54.2048
45	PD Flow; primary cyclone	lb/hr		48.2400	51.2727
46	SD/CF Flow; secondary cyclone	lb/hr		34.1300	35.2422
47	BD Flow; bag house	lb/hr		16.5800	16.1736
49	Ambient Temperature	F		60.0000	60.0547

	Lab Measurement				
1	Coal - C	Mass %		74.6125	73.6430
2	Coal - H	Mass %		4.68000	4.62524
3	Coal - N	Mass %		2.04750	2.02984
4	Coal - S	Mass %		1.88250	1.85515
5	Coal - Ash	Mass %		10.5200	11.2150
6	Coal - H2O	Mass %		1.43500	1.54820
7	Coal - HHV	BTU/lb		13098.3	12988.4
8	CD Drain - C	Mass %		21.9450	23.0184
9	CD Drain - H	Mass %		.150000	.159833
10	CD Drain - N	Mass %		.510000	.537158
11	CD Drain - S	Mass %		2.63500	4.48252
12	CD Drain - Ash	Mass %		78.0800	77.1204
13	CD Drain - HHV (dry)	BTU/lb		3158.00	3542.89
15	CD Drain - sfide S	Mass %		2.20500	4.01591

TR5 - TEST POINT 3 3/25/92 Pittsburgh Coal + Limestone

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	1.75500	1.69402
18	CD Drain - Ash CaO	Mass %	57.1000	68.8781
19	CD Drain - Ash MgO	Mass %	22.7500	1.6877
20	PD Drain - C	Mass %	68.7000	67.8659
21	PD Drain - H	Mass %	.515000	.510018
22	PD Drain - N	Mass %	1.50500	1.48746
23	PD Drain - S	Mass %	1.70500	1.87514
24	PD Drain - Ash	Mass %	30.4200	30.4653
25	PD Drain - HHV (dry)	BTU/lb	10411.5	10305.6
27	PD Drain - sfide S	Mass %	.92500	1.07980
28	PD Drain - crbate C	Mass %	.800000	.751539
30	PD Drain - Ash CaO	Mass %	29.2000	28.9497
31	PD Drain - Ash MgO	Mass %	15.8000	.7094
32	CF/SD Drain - C	Mass %	69.1650	69.3132
33	CF/SD Drain - H	Mass %	.470000	.471783
34	CF/SD Drain - N	Mass %	1.52000	1.52356
35	CF/SD Drain - S	Mass %	1.41500	1.49446
36	CF/SD Drain - Ash	Mass %	29.9950	29.7594
37	CF/SD Drain - HHV (dry)	BTU/lb	10407.5	10437.9
39	CF/SD Drain - sfide S	Mass %	.685000	.749282
40	CF/SD Drain - cabate C	Mass %	.615000	.595229
42	CF/SD Drain - Ash CaO	Mass %	29.9500	30.4412
43	CF/SD Drain - Ash MgO	Mass %	15.1000	.7459
45	BD Drain - C	Mass %	68.4000	71.6369
46	BD Drain - H	Mass %	.670000	.702651
47	BD Drain - N	Mass %	1.67000	1.74868
48	BD Drain - S	Mass %	1.48000	1.56721
49	BD Drain - Ash	Mass %	26.7900	24.2961
50	BD Drain - HHV (dry)	BTU/lb	10370.0	10861.0
52	BD Drain - sfide S	Mass %	.430000	.459890
53	BD Drain - crbate C	Mass %	1.02000	1.04723
55	BD Drain - Ash CaO	Mass %	34.9000	40.1559
56	BD Drain - Ash MgO	Mass %	22.5000	.9840
57	Demister Gas - N2	mol,vol %	76.5750	76.9241
58	Demister Gas - O2	mol,vol %	3.11750	2.80492
59	Demister Gas - CO	mol,vol %	6.19500	6.35349
60	Demister Gas - CH4	mol,vol %	.945300	.978415
61	Demister Gas - CO2	mol,vol %	7.87750	7.43718
64	Demister Gas - H2S	mol,vol %	.000500	.000498
65	Demister Gas - H2	mol,vol %	4.81370	4.81232
66	Demister Gas - NH3	mol,vol %	.201800	.202060
67	Demister Gas - Ar	mol,vol %	.555000	.568282
79	Water Content in Freeboard Gas	mol,vol %	17.3000	16.3852
82	Sorbent - CaO	Mass %	97.3000	96.9605
83	Sorbent - MgO	Mass %	2.30000	2.37585
84	Sorbent - SO3	Mass %	.600000	.590602
85	Sorbent - Ash	Mass %	.500000	.573067

TEST POINT 6-1 05/14/93 ISSUE 0

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	143.050	133.813
4	Total Air Feed	lb/hr	FIC-1055	754.148	755.051
6	Bed Drain N2 Feed	SCFM	FI-3028	31.6125	34.8065
7	N2 to spray tower	SCFM	FI-4051	30.5325	30.8493
8	Feed lockhopper comp N2	SCFM	FI-7008	8.8295	10.1142
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	2.99040	3.00612
10	Purge N2 to carbonizer	SCFM	FI-7021	2.08500	2.10959
11	Purge N2 to cyclones	SCFM	FI-7022	2.98510	2.98784
15	Coal Feed rate	lb/hr		344.000	330.383
16	Sorbent feed rate	lb/hr		68.0000	67.8237
22	Air Feed Temp	deg F	TI-1059	85.6780	85.6756
23	Bed Drain Temp	deg F	TIC-3027	355.833	356.138
24	Primary Cyclone Lockhopper Temp	F	TI-3070	171.193	171.263
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	195.544	195.547
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1516.67	1515.32
35	Carbonizer wall heat loss	KBTU/hr		100.000	58.984
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	371.168
37	Orifice Temp (Upstream)	F	TI-3108	787.433	787.818
38	Purge N2 Temp	F	TI-7012	147.612	147.607
44	CD Flow; carbonizer discharge	lb/hr		46.3200	64.2190
45	PD Flow; primary cyclone	lb/hr		44.7600	45.5756
46	SD/CF Flow; secondary cyclone	lb/hr		3.70000	3.69214
47	BD Flow; bag house	lb/hr		8.14000	8.10796
49	Ambient Temperature	F		76.0000	75.9976

	Lab Measurement			
1	Coal - C	Mass %	50.7660	49.1030
2	Coal - H	Mass %	3.60000	3.57065
3	Coal - N	Mass %	.978000	.958037
4	Coal - S	Mass %	.718000	.651750
5	Coal - Ash	Mass %	5.57800	5.79670
6	Coal - H2O	Mass %	26.8740	28.1714
7	Coal - HHV	BTU/lb	8729.20	8497.75
8	CD Drain - C	Mass %	18.2800	14.6878
9	CD Drain - H	Mass %	.025000	.017580
10	CD Drain - N	Mass %	.365000	.303402
11	CD Drain - S	Mass %	.68500	1.50269
12	CD Drain - Ash	Mass %	56.2050	66.5256
13	CD Drain - HHV (dry)	BTU/lb	1457.00	1201.19
15	CD Drain - sfide S	Mass %	.325000	.707212
16	CD Drain - crbate C	Mass %	6.71000	5.39225
18	CD Drain - Ash CaO	Mass %	90.0500	75.5305
19	CD Drain - Ash MgO	Mass %	2.05000	1.15819

Index KD	Measurement		Old Value	New Value
20	PD Drain - C	Mass %	69.9500	72.1147
21	PD Drain - H	Mass %	.530000	.547645
22	PD Drain - N	Mass %	1.59000	1.65242
23	PD Drain - S	Mass %	.85000	1.79356
24	PD Drain - Ash	Mass %	25.6800	25.4438
25	PD Drain - HHV (dry)	BTU/lb	10605.0	10825.7
27	PD Drain - sfide S	Mass %	.300000	.556663
28	PD Drain - crbate C	Mass %	.650000	.657989
30	PD Drain - Ash CaO	Mass %	28.9500	31.1756
31	PD Drain - Ash MgO	Mass %	6.05000	.47805
32	CF/SD Drain - C	Mass %	67.9300	69.4481
33	CF/SD Drain - H	Mass %	.540000	.552054
34	CF/SD Drain - N	Mass %	1.30000	1.32911
35	CF/SD Drain - S	Mass %	.99000	1.08226
36	CF/SD Drain - Ash	Mass %	28.9500	28.0036
37	CF/SD Drain - HHV (dry)	BTU/lb	10280.0	10492.1
39	CF/SD Drain - sfide S	Mass %	.240000	.255091
40	CF/SD Drain - cabate C	Mass %	1.05000	1.05924
42	CF/SD Drain - Ash CaO	Mass %	29.5000	31.7450
43	CF/SD Drain - Ash MgO	Mass %	6.70000	.48678
45	BD Drain - C	Mass %	71.2400	73.3820
46	BD Drain - H	Mass %	.710000	.731002
47	BD Drain - N	Mass %	1.20000	1.23596
48	BD Drain - S	Mass %	1.04000	1.23558
49	BD Drain - Ash	Mass %	23.7000	22.8733
50	BD Drain - HHV (dry)	BTU/lb	10689.0	10895.4
52	BD Drain - sfide S	Mass %	.220000	.249177
53	BD Drain - crbate C	Mass %	1.38000	1.41211
55	BD Drain - Ash CaO	Mass %	41.7000	45.7503
56	BD Drain - Ash MgO	Mass %	9.00000	.70154
57	Demister Gas - N2	mol,vol %	71.4750	71.2047
58	Demister Gas - O2	mol,vol %	.66000	1.32199
59	Demister Gas - CO	mol,vol %	8.30750	9.14661
60	Demister Gas - CH4	mol,vol %	1.37500	1.42794
61	Demister Gas - CO2	mol,vol %	7.96500	8.92602
62	Demister Gas - C2H4	mol,vol %	.027500	.028803
63	Demister Gas - C2H6	mol,vol %	.020000	.020943
64	Demister Gas - H2S	mol,vol %	.017500	.020178
65	Demister Gas - H2	mol,vol %	7.09750	7.18889
66	Demister Gas - NH3	mol,vol %	.174000	.174790
67	Demister Gas - Ar	mol,vol %	.505000	.539175
79	Water Content in Freeboard Gas	mol,vol %	11.9000	11.7286
82	Sorbent - CaO	Mass %	96.0250	96.3885
83	Sorbent - MgO	Mass %	1.45000	1.47803
84	Sorbent - SO3	Mass %	.650000	.634167
85	Sorbent - Ash	Mass %	1.50000	1.49925

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	127.290	118.942
4	Total Air Feed	lb/hr	FIC-1055	642.404	656.138
5	Transport N2 Feed	SCFM	FIC-1053	2.11210	3.07521
6	Bed Drain N2 Feed	SCFM	FI-3028	38.2372	40.5860
7	N2 to spray tower	SCFM	FI-3051	30.9449	31.1858
8	Feed lockhopper comp N2	SCFM	FI-7008	6.28350	6.61547
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	1.88250	2.27166
10	Purge N2 to carbonizer	SCFM	FI-7021	2.05730	2.08125
11	Purge N2 to cyclones	SCFM	FI-7022	3.08620	3.09837
15	Coal Feed rate	lb/hr		329.000	310.572
16	Sorbent feed rate	lb/hr		67.0000	66.6567
22	Air Feed Temp	deg F	TI-1059	85.4240	85.4163
23	Bed Drain Temp	deg F	TIC-3027	462.225	462.405
24	Primary Cyclone Lockhopper Temp	F	TI-3070	171.119	171.181
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	200.836	200.838
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1455.11	1453.40
35	Carbonizer wall heat loss	KBTU/hr		100.000	69.300
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	342.511
37	Orifice Temp (Upstream)	F	TI-3108	762.414	762.918
38	Purge N2 Temp	F	TI-7012	153.277	153.260
44	CD Flow; carbonizer discharge	lb/hr		69.4400	70.8923
45	PD Flow; primary cyclone	lb/hr		46.6700	47.3361
46	SD/CF Flow; secondary cyclone	lb/hr		5.87000	5.79965
47	BD Flow; bag house	lb/hr		12.3800	12.4686
49	Ambient Temperature	F		76.0000	75.9936

	Lab Measurement		Old Value	New Value
1	Coal - C	Mass %	50.7660	48.3547
2	Coal - H	Mass %	3.60000	3.48908
3	Coal - N	Mass %	.978000	.953607
4	Coal - S	Mass %	.718000	.691551
5	Coal - Ash	Mass %	5.57800	5.90645
6	Coal - H2O	Mass %	26.8740	28.3321
7	Coal - HHV	BTU/lb	8729.20	8405.90
8	CD Drain - C	Mass %	12.7600	15.9670
9	CD Drain - H	Mass %	.010000	.015435
10	CD Drain - N	Mass %	.200000	.311649
11	CD Drain - S	Mass %	.66000	2.12517
12	CD Drain - Ash	Mass %	59.3700	59.9944
13	CD Drain - HHV (dry)	BTU/lb	265.00	1047.04
15	CD Drain - sfide S	Mass %	.65000	1.31159
16	CD Drain - crbate C	Mass %	8.12000	8.87760
18	CD Drain - Ash CaO	Mass %	90.7000	75.4805

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Index KD	Measurement		Old Value	New Value
19	CD Drain - Ash MgO	Mass %	.300000	.875457
20	PD Drain - C	Mass %	70.9250	73.2806
21	PD Drain - H	Mass %	.665000	.687698
22	PD Drain - N	Mass %	1.45500	1.50473
23	PD Drain - S	Mass %	.860000	.982246
24	PD Drain - Ash	Mass %	24.8300	24.3379
25	PD Drain - HHV (dry)	BTU/lb	10848.5	11063.7
27	PD Drain - sfide S	Mass %	.275000	.281208
28	PD Drain - crbate C	Mass %	.790000	.798588
30	PD Drain - Ash CaO	Mass %	24.1500	25.9958
31	PD Drain - Ash MgO	Mass %	5.45000	.30151
32	CF/SD Drain - C	Mass %	65.5000	67.8948
33	CF/SD Drain - H	Mass %	.550000	.570234
34	CF/SD Drain - N	Mass %	1.39000	1.44089
35	CF/SD Drain - S	Mass %	1.09000	1.14368
36	CF/SD Drain - Ash	Mass %	30.9900	29.9215
37	CF/SD Drain - HHV (dry)	BTU/lb	10091.0	10366.1
39	CF/SD Drain - sfide S	Mass %	.240000	.246047
40	CF/SD Drain - cabate C	Mass %	1.03000	1.05807
42	CF/SD Drain - Ash CaO	Mass %	31.6000	34.3966
43	CF/SD Drain - Ash MgO	Mass %	8.20000	.39895
45	BD Drain - C	Mass %	70.8400	72.2604
46	BD Drain - H	Mass %	.610000	.622254
47	BD Drain - N	Mass %	1.46000	1.48876
48	BD Drain - S	Mass %	.82000	1.26556
49	BD Drain - Ash	Mass %	23.8700	23.4843
50	BD Drain - HHV (dry)	BTU/lb	10962.0	11104.7
52	BD Drain - sfide S	Mass %	.310000	.719330
53	BD Drain - crbate C	Mass %	1.25000	1.27333
55	BD Drain - Ash CaO	Mass %	26.1000	30.1861
56	BD Drain - Ash MgO	Mass %	6.40000	.35011
57	Demister Gas - N2	mol,vol %	75.1000	74.0984
58	Demister Gas - O2	mol,vol %	2.37000	3.53055
59	Demister Gas - CO	mol,vol %	6.30250	6.83622
60	Demister Gas - CH4	mol,vol %	1.16750	1.22338
61	Demister Gas - CO2	mol,vol %	7.29750	7.66686
62	Demister Gas - C2H4	mol,vol %	.035000	.035556
63	Demister Gas - C2H6	mol,vol %	.035000	.035545
64	Demister Gas - H2S	mol,vol %	.003000	.003048
65	Demister Gas - H2	mol,vol %	5.26500	5.63820
66	Demister Gas - NH3	mol,vol %	.361600	.367723
67	Demister Gas - Ar	mol,vol %	.512500	.564540
79	Water Content in Freeboard Gas	mol,vol %	11.7000	12.6923
82	Sorbent - CaO	Mass %	96.0250	96.7167
83	Sorbent - MgO	Mass %	1.45000	1.12176
84	Sorbent - SO3	Mass %	.650000	.651937
85	Sorbent - Ash	Mass %	1.50000	1.50959

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	154.330	168.290
4	Total Air Feed	lb/hr	FIC-1055	807.910	799.758
5	Transport N2 Feed	SCFM	FIC-1053	.414300	.384041
6	Bed Drain N2 Feed	SCFM	FI-3028	29.8308	29.7700
7	N2 to spray tower	SCFM	FI-4051	29.0481	29.1237
8	Feed lockhopper comp N2	SCFM	FI-7008	7.74010	7.69339
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	2.95300	2.95029
10	Purge N2 to carbonizer	SCFM	FI-7021	2.04300	2.03997
11	Purge N2 to cyclones	SCFM	FI-7022	2.84070	2.84025
15	Coal Feed rate	lb/hr		424.000	397.825
16	Sorbent feed rate	lb/hr		45.0000	44.9235
22	Air Feed Temp	deg F	TI-1059	83.9537	83.9505
23	Bed Drain Temp	deg F	TIC-3027	134.784	134.803
24	Primary Cyclone Lockhopper Temp	F	TI-3070	169.438	169.443
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	192.906	192.906
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1462.34	1462.35
35	Carbonizer wall heat loss	KBTU/hr		100.000	100.370
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	211.776
37	Orifice Temp (Upstream)	F	TI-3108	1267.20	1267.24
38	Purge N2 Temp	F	TI-7012	150.188	150.183
44	CD Flow; carbonizer discharge	lb/hr		39.9000	44.5058
45	PD Flow; primary cyclone	lb/hr		67.7600	69.8800
46	SD/CF Flow; secondary cyclone	lb/hr		6.75000	6.70294
47	BD Flow; bag house	lb/hr		8.25000	8.12980
49	Ambient Temperature	F		76.0000	75.9947

Lab Measurement					
1	Coal - C	Mass %		50.7660	48.7022
2	Coal - H	Mass %		3.60000	3.49601
3	Coal - N	Mass %		.978000	.961879
4	Coal - S	Mass %		.718000	.699807
5	Coal - Ash	Mass %		5.57800	5.92881
6	Coal - H2O	Mass %		26.8740	27.7476
7	Coal - HHV	BTU/lb		8729.20	8489.81
8	CD Drain - C	Mass %		14.0900	14.6041
9	CD Drain - H	Mass %		.020000	.024316
10	CD Drain - N	Mass %		.260000	.309145
11	CD Drain - S	Mass %		1.79000	3.62195
12	CD Drain - Ash	Mass %		62.0800	65.3285
13	CD Drain - HHV (dry)	BTU/lb	Faulty measurement	811.00	1287.34
15	CD Drain - sfide S	Mass %		1.61000	2.63807
16	CD Drain - crbate C	Mass %		7.29000	7.12691
18	CD Drain - Ash CaO	Mass %		87.4000	57.9990

Index KD	Measurement		Old Value	New Value
19	CD Drain - Ash MgO	Mass %	.500000	.833112
20	PD Drain - C	Mass %	68.3500	70.6836
21	PD Drain - H	Mass %	.620000	.642542
22	PD Drain - N	Mass %	1.28500	1.33069
23	PD Drain - S	Mass %	1.03500	1.21672
24	PD Drain - Ash	Mass %	26.9200	26.7438
25	PD Drain - HHV (dry)	BTU/lb	10438.5	10597.0
27	PD Drain - sfide S	Mass %	.345000	.397180
28	PD Drain - crbate C	Mass %	1.04500	1.04748
30	PD Drain - Ash CaO	Mass %	31.1500	32.6658
31	PD Drain - Ash MgO	Mass %	5.50000	.46922
32	CF/SD Drain - C	Mass %	64.2400	66.8700
33	CF/SD Drain - H	Mass %	.550000	.572759
34	CF/SD Drain - N	Mass %	1.00000	1.04115
35	CF/SD Drain - S	Mass %	1.17000	1.24417
36	CF/SD Drain - Ash	Mass %	32.1500	31.6311
37	CF/SD Drain - HHV (dry)	BTU/lb	9925.0	10126.8
39	CF/SD Drain - sfide S	Mass %	.550000	.581506
40	CF/SD Drain - cabate C	Mass %	1.03000	1.06360
42	CF/SD Drain - Ash CaO	Mass %	25.5000	27.4711
43	CF/SD Drain - Ash MgO	Mass %	6.20000	.39460
45	BD Drain - C	Mass %	63.8100	66.5104
46	BD Drain - H	Mass %	.680000	.709176
47	BD Drain - N	Mass %	.97000	1.01135
48	BD Drain - S	Mass %	1.65000	1.74938
49	BD Drain - Ash	Mass %	32.4700	31.5228
50	BD Drain - HHV (dry)	BTU/lb	9774.0	10050.1
52	BD Drain - sfide S	Mass %	.360000	.378655
53	BD Drain - crbate C	Mass %	1.09000	1.12752
55	BD Drain - Ash CaO	Mass %	36.6000	39.9394
56	BD Drain - Ash MgO		9.30000	.57370
57	Demister Gas - N2	mol,vol %	69.5750	68.9830
58	Demister Gas - O2	mol,vol %	1.82000	2.42000
59	Demister Gas - CO	mol,vol %	8.90250	9.84090
60	Demister Gas - CH4	mol,vol %	1.63980	1.60329
61	Demister Gas - CO2	mol,vol %	8.35000	8.37953
62	Demister Gas - C2H4	mol,vol %	.025000	.022973
63	Demister Gas - C2H6	mol,vol %	.035000	.032193
64	Demister Gas - H2S	mol,vol %	.009900	.009115
65	Demister Gas - H2	mol,vol %	8.04250	7.84176
66	Demister Gas - NH3	mol,vol %	.303400	.295651
67	Demister Gas - Ar	mol,vol %	.522500	.571554
79	Water Content in Freeboard Gas	mol,vol %	11.6000	12.5308
82	Sorbent - CaO	Mass %	96.0250	96.4536
83	Sorbent - MgO	Mass %	1.45000	1.38549
84	Sorbent - SO3	Mass %	.650000	.652191
85	Sorbent - Ash	Mass %	1.50000	1.50871

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	188.158	201.535
4	Total Air Feed	lb/hr	FIC-1055	1000.12	992.63
5	Transport N2 Feed	SCFM	FIC-1053	.075100	.055795
6	Bed Drain N2 Feed	SCFM	FI-3028	9.3570	19.2897
7	N2 to spray tower	SCFM	FI-4051	23.8411	23.8505
8	Feed lockhopper comp N2	SCFM	FI-7008	12.9433	12.9100
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	1.87180	1.86951
10	Purge N2 to carbonizer	SCFM	FI-7021	2.06530	2.06083
11	Purge N2 to cyclones	SCFM	FI-7022	2.19380	2.19336
15	Coal Feed rate	lb/hr		475.000	443.457
16	Sorbent feed rate	lb/hr		55.0000	54.9843
22	Air Feed Temp	deg F	TI-1059	90.1178	90.1108
23	Bed Drain Temp	deg F	TIC-3027	150.656	150.930
24	Primary Cyclone Lockhopper Temp	F	TI-3070	159.778	159.783
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	197.491	197.491
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1548.66	1548.68
35	Carbonizer wall heat loss	KBTU/hr		100.000	100.483
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	220.552
37	Orifice Temp (Upstream)	F	TI-3108	1353.75	1353.99
38	Purge N2 Temp	F	TI-7012	152.306	152.295
44	CD Flow; carbonizer discharge	lb/hr		57.1100	60.3778
45	PD Flow; primary cyclone	lb/hr		49.9100	50.5758
46	SD/CF Flow; secondary cyclone	lb/hr		1.32000	1.30605
47	BD Flow; bag house	lb/hr		25.5900	25.5852
49	Ambient Temperature	F		76.0000	75.9900

	Lab Measurement			
1	Coal - C	Mass %	50.7660	49.1779
2	Coal - H	Mass %	3.60000	3.49420
3	Coal - N	Mass %	.978000	.963319
4	Coal - S	Mass %	.718000	.695881
5	Coal - Ash	Mass %	5.57800	5.96374
6	Coal - H2O	Mass %	26.8740	27.5954
7	Coal - HHV	BTU/lb	8729.20	8432.14
8	CD Drain - C	Mass %	13.9500	14.5694
9	CD Drain - H	Mass %	.020000	.022992
10	CD Drain - N	Mass %	.215000	.246601
11	CD Drain - S	Mass %	1.23000	3.44240
12	CD Drain - Ash	Mass %	62.0500	64.9013
13	CD Drain - HHV (dry)	BTU/lb	869.50	1139.68
15	CD Drain - sfide S	Mass %	1.07000	2.39317
16	CD Drain - crbate C	Mass %	6.64000	6.96209
18	CD Drain - Ash CaO	Mass %	87.5500	60.8915

Index KD	Measurement		Old Value	New Value
19	CD Drain - Ash MgO	Mass %	1.90000	.93694
20	PD Drain - C	Mass %	68.4000	71.1290
21	PD Drain - H	Mass %	.525000	.547510
22	PD Drain - N	Mass %	1.00500	1.04755
23	PD Drain - S	Mass %	.85500	1.24957
24	PD Drain - Ash	Mass %	27.2800	27.0218
25	PD Drain - HHV (dry)	BTU/lb	10456.5	10649.7
27	PD Drain - sfide S	Mass %	.560000	.741990
28	PD Drain - crbate C	Mass %	.805000	.818856
30	PD Drain - Ash CaO	Mass %	27.8000	29.2041
31	PD Drain - Ash MgO	Mass %	5.20000	.44936
32	CF/SD Drain - C	Mass %	60.4100	63.8007
33	CF/SD Drain - H	Mass %	.460000	.486140
34	CF/SD Drain - N	Mass %	.96000	1.01451
35	CF/SD Drain - S	Mass %	1.21000	1.27932
36	CF/SD Drain - Ash	Mass %	36.6800	35.4851
37	CF/SD Drain - HHV (dry)	BTU/lb	9280.00	9652.95
39	CF/SD Drain - sfide S	Mass %	.840000	.876899
40	CF/SD Drain - cabate C	Mass %	1.16000	1.19435
42	CF/SD Drain - Ash CaO	Mass %	35.3000	38.3673
43	CF/SD Drain - Ash MgO	Mass %	9.20000	.59036
45	BD Drain - C	Mass %	70.3300	71.9891
46	BD Drain - H	Mass %	.600000	.614676
47	BD Drain - N	Mass %	1.31000	1.34069
48	BD Drain - S	Mass %	.860000	.980861
49	BD Drain - Ash	Mass %	26.3500	25.4948
50	BD Drain - HHV (dry)	BTU/lb	10705.0	10912.6
52	BD Drain - sfide S	Mass %	.380000	.423330
53	BD Drain - crbate C	Mass %	.810000	.819417
55	BD Drain - Ash CaO	Mass %	29.0000	30.8444
56	BD Drain - Ash MgO	Mass %	6.70000	.47460
57	Demister Gas - N2	mol,vol %	67.5500	68.1701
58	Demister Gas - O2	mol,vol %	2.51250	2.84401
59	Demister Gas - CO	mol,vol %	10.5250	10.8409
60	Demister Gas - CH4	mol,vol %	1.71750	1.71222
61	Demister Gas - CO2	mol,vol %	8.34750	8.42441
62	Demister Gas - C2H4	mol,vol %	.010000	.009598
63	Demister Gas - C2H6	mol,vol %	.015000	.014522
64	Demister Gas - H2S	mol,vol %	.009600	.009271
65	Demister Gas - H2	mol,vol %	6.94500	7.06461
66	Demister Gas - NH3	mol,vol %	.281700	.279660
67	Demister Gas - Ar	mol,vol %	.540000	.630640
79	Water Content in Freeboard Gas	mol,vol %	10.7000	12.5687
82	Sorbent - CaO	Mass %	96.0250	96.3589
83	Sorbent - MgO	Mass %	1.45000	1.48268
84	Sorbent - SO3	Mass %	.650000	.650075
85	Sorbent - Ash	Mass %	1.50000	1.50834

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	185.960	198.601
4	Total Air Feed	lb/hr	FIC-1055	981.614	970.898
5	Transport N2 Feed	SCFM	FIC-1053	.145800	.124651
6	Bed Drain N2 Feed	SCFM	FI-3028	21.2765	21.1851
7	N2 to spray tower	SCFM	FI-4051	22.0524	22.1012
8	Feed lockhopper comp N2	SCFM	FI-7008	12.7000	12.6623
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	1.39090	1.37721
10	Purge N2 to carbonizer	SCFM	FI-7021	2.05380	2.04693
11	Purge N2 to cyclones	SCFM	FI-7022	2.24120	2.23982
15	Coal Feed rate	lb/hr		462.000	429.559
16	Sorbent feed rate	lb/hr		17.0000	20.4609
22	Air Feed Temp	deg F	TI-1059	88.4623	88.4564
23	Bed Drain Temp	deg F	TIC-3027	76.1048	76.1049
24	Primary Cyclone Lockhopper Temp	F	TI-3070	158.127	158.134
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	193.697	193.698
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1562.56	1562.50
35	Carbonizer wall heat loss	KBTU/hr		100.000	98.317
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	220.151
37	Orifice Temp (Upstream)	F	TI-3108	1367.21	1367.31
38	Purge N2 Temp	F	TI-7012	154.493	154.481
44	CD Flow; carbonizer discharge	lb/hr		15.0000	19.4276
45	PD Flow; primary cyclone	lb/hr		50.7900	53.2817
46	SD/CF Flow; secondary cyclone	lb/hr		4.53000	4.51189
47	BD Flow; bag house	lb/hr		26.2200	26.4396
49	Ambient Temperature	F		76.0000	75.9944

	Lab Measurement				
1	Coal - C	Mass %		50.7660	48.9037
2	Coal - H	Mass %		3.60000	3.52292
3	Coal - N	Mass %		.978000	.960306
4	Coal - S	Mass %		.718000	.674464
5	Coal - Ash	Mass %		5.57800	5.89482
6	Coal - H2O	Mass %		26.8740	27.9297
7	Coal - HHV	BTU/lb		8729.20	8463.55
8	CD Drain - C	Mass %		13.6500	11.1524
9	CD Drain - H	Mass %		.010000	.008883
10	CD Drain - N	Mass %		.180000	.166373
11	CD Drain - S	Mass %		1.11000	1.73012
12	CD Drain - Ash	Mass %		62.9300	71.4225
13	CD Drain - HHV (dry)	BTU/lb		711.000	752.045
15	CD Drain - sfide S	Mass %		.86000	1.12348
16	CD Drain - crbate C	Mass %		6.94000	5.23208
18	CD Drain - Ash CaO	Mass %		88.0000	36.9542

Index KD	Measurement		Old Value	New Value
19	CD Drain - Ash MgO	Mass %	1.38000	.48289
20	PD Drain - C	Mass %	67.1300	65.9744
21	PD Drain - H	Mass %	.465000	.466271
22	PD Drain - N	Mass %	1.26500	1.27107
23	PD Drain - S	Mass %	1.32500	3.86085
24	PD Drain - Ash	Mass %	30.6300	30.6231
25	PD Drain - HHV (dry)	BTU/lb	10258.5	10362.8
27	PD Drain - sfide S	Mass %	.92500	1.93819
28	PD Drain - crbate C	Mass %	.840000	.779720
30	PD Drain - Ash CaO	Mass %	24.2000	22.9590
31	PD Drain - Ash MgO	Mass %	5.30000	.30001
32	CF/SD Drain - C	Mass %	63.4600	63.9539
33	CF/SD Drain - H	Mass %	.410000	.413758
34	CF/SD Drain - N	Mass %	1.05000	1.05963
35	CF/SD Drain - S	Mass %	1.24000	1.42186
36	CF/SD Drain - Ash	Mass %	35.9900	35.0340
37	CF/SD Drain - HHV (dry)	BTU/lb	9411.00	9600.08
39	CF/SD Drain - sfide S	Mass %	.790000	.865974
40	CF/SD Drain - cabate C	Mass %	1.06000	1.05059
42	CF/SD Drain - Ash CaO	Mass %	32.9000	34.9792
43	CF/SD Drain - Ash MgO	Mass %	7.40000	.45708
45	BD Drain - C	Mass %	68.4300	69.7529
46	BD Drain - H	Mass %	.530000	.541186
47	BD Drain - N	Mass %	1.43000	1.45904
48	BD Drain - S	Mass %	.96000	1.41562
49	BD Drain - Ash	Mass %	28.5400	27.9742
50	BD Drain - HHV (dry)	BTU/lb	10452.0	10625.6
52	BD Drain - sfide S	Mass %	.480000	.640954
53	BD Drain - crbate C	Mass %	.840000	.815145
55	BD Drain - Ash CaO	Mass %	26.8000	24.2274
56	BD Drain - Ash MgO	Mass %	5.30000	.31658
57	Demister Gas - N2	mol,vol %	66.0250	66.9991
58	Demister Gas - O2	mol,vol %	.580000	.698414
59	Demister Gas - CO	mol,vol %	11.3750	11.9312
60	Demister Gas - CH4	mol,vol %	1.66500	1.65768
61	Demister Gas - CO2	mol,vol %	8.80500	9.28931
62	Demister Gas - C2H4	mol,vol %	.010000	.009761
63	Demister Gas - C2H6	mol,vol %	.012500	.012212
64	Demister Gas - H2S	mol,vol %	.005100	.005050
65	Demister Gas - H2	mol,vol %	8.71500	8.62878
66	Demister Gas - NH3	mol,vol %	.180700	.176542
67	Demister Gas - Ar	mol,vol %	.515000	.591995
79	Water Content in Freeboard Gas	mol,vol %	11.0000	12.4476
82	Sorbent - CaO	Mass %	96.0250	96.8713
83	Sorbent - MgO	Mass %	1.45000	1.26583
84	Sorbent - SO3	Mass %	.650000	.537940
85	Sorbent - Ash	Mass %	1.50000	1.32494

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	140.694	142.564
4	Total Air Feed	lb/hr	FIC-1055	641.634	634.073
5	Transport N2 Feed	SCFM	FIC-1053	.791600	.773133
6	Bed Drain N2 Feed	SCFM	FI-3028	28.2671	28.1393
7	N2 to spray tower	SCFM	FI-4051	27.1413	27.1223
8	Feed lockhopper comp N2	SCFM	FI-7008	11.3826	11.3038
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	1.95950	1.95585
10	Purge N2 to carbonizer	SCFM	FI-7021	1.92710	1.92024
11	Purge N2 to cyclones	SCFM	FI-7022	2.98460	2.98303
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	112.434	112.699
15	Coal Feed rate	lb/hr		304.000	291.831
16	Sorbent feed rate	lb/hr		36.0000	35.9415
22	Air Feed Temp	deg F	TI-1059	87.5497	87.5506
23	Bed Drain Temp	deg F	TIC-3027	133.380	133.371
24	Primary Cyclone Lockhopper Temp	F	TI-3070	159.933	159.941
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	192.265	192.266
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1535.67	1535.54
35	Carbonizer wall heat loss	KBTU/hr		100.000	95.328
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	214.852
37	Orifice Temp (Upstream)	F	TI-3108	1296.68	1296.76
38	Purge N2 Temp	F	TI-7012	164.643	164.644
42	Boiler Steam Temperature	F	TI-7041	387.262	387.262
44	CD Flow; carbonizer discharge	lb/hr		50.2900	77.6610
45	PD Flow; primary cyclone	lb/hr		58.7500	61.8214
46	SD/CF Flow; secondary cyclone	lb/hr		5.33000	5.37613
47	BD Flow; bag house	lb/hr		28.2200	28.8613
49	Ambient Temperature	F		76.0000	76.0008

	Lab Measurement				
1	Coal - C	Mass %		62.7550	61.8469
2	Coal - H	Mass %		4.39500	4.34262
3	Coal - N	Mass %		1.57000	1.55251
4	Coal - S	Mass %		3.04500	2.94213
5	Coal - Ash	Mass %		10.5900	11.0209
6	Coal - H2O	Mass %		10.8700	11.3437
7	Coal - HHV	BTU/lb		11170.0	11044.3
8	CD Drain - C	Mass %		45.9800	44.5336
9	CD Drain - H	Mass %		.240000	.241279
10	CD Drain - N	Mass %		.740000	.731691
11	CD Drain - S	Mass %		3.32000	7.48529
12	CD Drain - Ash	Mass %		49.0000	50.8396
13	CD Drain - HHV (dry)	BTU/lb		6628.00	6374.39
15	CD Drain - sfide S	Mass %		2.23000	4.10735

Index KD	Measurement		Old Value	New Value
18	CD Drain - Ash CaO	Mass %	30.0000	38.3898
19	CD Drain - Ash MgO	Mass %	.800000	.587086
20	PD Drain - C	Mass %	74.3450	73.4814
21	PD Drain - H	Mass %	.725000	.719619
22	PD Drain - N	Mass %	1.56500	1.55340
23	PD Drain - S	Mass %	2.33500	2.76566
24	PD Drain - Ash	Mass %	22.8000	22.7230
25	PD Drain - HHV (dry)	BTU/lb	11424.0	11438.2
27	PD Drain - sfide S	Mass %	.480000	.576194
28	PD Drain - crbate C	Mass %	.240000	.234305
30	PD Drain - Ash CaO	Mass %	21.0000	23.5998
31	PD Drain - Ash MgO	Mass %	2.45000	.36091
32	CF/SD Drain - C	Mass %	63.4300	63.8279
33	CF/SD Drain - H	Mass %	.620000	.624027
34	CF/SD Drain - N	Mass %	1.54000	1.54978
35	CF/SD Drain - S	Mass %	1.88000	1.91725
36	CF/SD Drain - Ash	Mass %	33.1300	32.5411
37	CF/SD Drain - HHV (dry)	BTU/lb	9836.00	9921.88
39	CF/SD Drain - sfide S	Mass %	.410000	.416690
40	CF/SD Drain - cabate C	Mass %	.160000	.160029
42	CF/SD Drain - Ash CaO	Mass %	19.1000	20.6372
43	CF/SD Drain - Ash MgO	Mass %	3.00000	.31560
45	BD Drain - C	Mass %	76.0100	77.2957
46	BD Drain - H	Mass %	.690000	.701986
47	BD Drain - N	Mass %	1.87000	1.90062
48	BD Drain - S	Mass %	1.59000	1.73136
49	BD Drain - Ash	Mass %	18.4400	18.2124
50	BD Drain - HHV (dry)	BTU/lb	11970.0	12037.2
52	BD Drain - sfide S	Mass %	.360000	.393951
53	BD Drain - crbate C	Mass %	.240000	.243498
55	BD Drain - Ash CaO	Mass %	14.0000	15.4367
56	BD Drain - Ash MgO	Mass %	2.50000	.23607
57	Demister Gas - N2	mol,vol %	74.7250	74.8952
58	Demister Gas - O2	mol,vol %	2.91000	2.83737
59	Demister Gas - CO	mol,vol %	4.71000	4.78367
60	Demister Gas - CH4	mol,vol %	1.43000	1.43068
61	Demister Gas - CO2	mol,vol %	8.31000	8.33376
62	Demister Gas - C2H4	mol,vol %	.047500	.047410
63	Demister Gas - C2H6	mol,vol %	.015000	.014757
64	Demister Gas - H2S	mol,vol %	.036000	.035729
65	Demister Gas - H2	mol,vol %	6.86350	6.76417
66	Demister Gas - NH3	mol,vol %	.278700	.274220
67	Demister Gas - Ar	mol,vol %	.517500	.583004
79	Water Content in Freeboard Gas	mol,vol %	23.8000	21.7501
82	Sorbent - CaO	Mass %	96.0250	96.4121
83	Sorbent - MgO	Mass %	1.45000	1.47441
84	Sorbent - SO3	Mass %	.650000	.652265
85	Sorbent - Ash	Mass %	1.50000	1.46118

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	120.163	111.168
4	Total Air Feed	lb/hr	FIC-1055	561.443	512.723
5	Transport N2 Feed	SCFM	FIC-1053	.092800	.107927
6	Bed Drain N2 Feed	SCFM	FI-3028	32.1782	32.2528
7	N2 to spray tower	SCFM	FI-4051	26.1320	26.0892
8	Feed lockhopper comp N2	SCFM	FI-7008	7.71700	7.77965
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	2.19370	2.19529
10	Purge N2 to carbonizer	SCFM	FI-7021	1.91230	1.91703
11	Purge N2 to cyclones	SCFM	FI-7022	3.09940	3.09977
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	58.0411	58.6400
15	Coal Feed rate	lb/hr		232.000	236.168
16	Sorbent feed rate	lb/hr		39.0000	38.7260
22	Air Feed Temp	deg F	TI-1059	89.1174	89.1113
23	Bed Drain Temp	deg F	TIC-3027	148.811	149.962
24	Primary Cyclone Lockhopper Temp	F	TI-3070	147.137	147.140
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	190.547	190.547
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1531.90	1532.04
35	Carbonizer wall heat loss	KBTU/hr		100.000	106.322
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	207.042
37	Orifice Temp (Upstream)	F	TI-3108	1266.64	1266.66
38	Purge N2 Temp	F	TI-7012	160.665	160.648
42	Boiler Steam Temperature	F	TI-7041	387.712	387.711
44	CD Flow; carbonizer discharge	lb/hr		70.0900	80.3309
45	PD Flow; primary cyclone	lb/hr		42.8900	42.2386
46	SD/CF Flow; secondary cyclone	lb/hr		13.0700	13.0182
47	BD Flow; bag house	lb/hr		15.4700	15.3899
49	Ambient Temperature	F		76.0000	75.9942

	Lab Measurement				
1	Coal - C	Mass %		62.7550	63.0715
2	Coal - H	Mass %		4.39500	4.43715
3	Coal - N	Mass %		1.57000	1.57566
4	Coal - S	Mass %		3.04500	3.09206
5	Coal - Ash	Mass %		10.5900	10.4374
6	Coal - H2O	Mass %		10.8700	10.7344
7	Coal - HHV	BTU/lb		11170.0	11190.2
8	CD Drain - C	Mass %		47.2200	47.7712
9	CD Drain - H	Mass %		.300000	.267830
10	CD Drain - N	Mass %		.835000	.757379
11	CD Drain - S	Mass %		4.55500	1.74367
12	CD Drain - Ash	Mass %		51.2100	52.3737
13	CD Drain - HHV (dry)	BTU/lb		5776.50	5727.88
15	CD Drain - sfide S	Mass %		2.95000	1.74367

Index KD	Measurement		Old Value	New Value
18	CD Drain - Ash CaO	Mass %	12.2000	40.4221
19	CD Drain - Ash MgO	Mass %	1.40000	.63309
20	PD Drain - C	Mass %	74.0850	73.6441
21	PD Drain - H	Mass %	.665000	.656642
22	PD Drain - N	Mass %	1.64000	1.62438
23	PD Drain - S	Mass %	2.90000	2.68351
24	PD Drain - Ash	Mass %	23.5600	23.1698
25	PD Drain - HHV (dry)	BTU/lb	11297.5	11388.4
27	PD Drain - sfide S	Mass %	.675000	.726177
28	PD Drain - crbate C	Mass %	.420000	.449251
30	PD Drain - Ash CaO	Mass %	21.9000	30.7071
31	PD Drain - Ash MgO	Mass %	2.10000	.48093
32	CF/SD Drain - C	Mass %	72.2800	72.2020
33	CF/SD Drain - H	Mass %	.670000	.667303
34	CF/SD Drain - N	Mass %	1.88000	1.87676
35	CF/SD Drain - S	Mass %	2.53000	2.49146
36	CF/SD Drain - Ash	Mass %	23.1900	23.1035
37	CF/SD Drain - HHV (dry)	BTU/lb	11319.0	11331.4
39	CF/SD Drain - sfide S	Mass %	.600000	.624950
40	CF/SD Drain - cabate C	Mass %	.320000	.335398
42	CF/SD Drain - Ash CaO	Mass %	18.3000	22.0047
43	CF/SD Drain - Ash MgO	Mass %	2.20000	.34463
45	BD Drain - C	Mass %	74.9800	75.1820
46	BD Drain - H	Mass %	.730000	.729704
47	BD Drain - N	Mass %	1.85000	1.85430
48	BD Drain - S	Mass %	2.19000	2.15099
49	BD Drain - Ash	Mass %	19.4400	19.3245
50	BD Drain - HHV (dry)	BTU/lb	11801.0	11821.0
53	BD Drain - crbate C	Mass %	.290000	.309118
55	BD Drain - Ash CaO	Mass %	14.2000	16.8065
56	BD Drain - Ash MgO	Mass %	2.30000	.26322
57	Demister Gas - N2	mol,vol %	74.5000	76.3906
58	Demister Gas - O2	mol,vol %	.567500	.655389
59	Demister Gas - CO	mol,vol %	5.06750	5.36272
60	Demister Gas - CH4	mol,vol %	1.57500	1.58488
61	Demister Gas - CO2	mol,vol %	7.62250	8.20206
62	Demister Gas - C2H4	mol,vol %	.042500	.044394
63	Demister Gas - C2H6	mol,vol %	.017500	.018033
64	Demister Gas - H2S	mol,vol %	.412700	.378139
65	Demister Gas - H2	mol,vol %	6.63000	6.51333
66	Demister Gas - NH3	mol,vol %	.338900	.340044
67	Demister Gas - Ar	mol,vol %	.437500	.510349
79	Water Content in Freeboard Gas	mol,vol %	21.6000	17.0483
82	Sorbent - CaO	Mass %	96.0250	96.4950
83	Sorbent - MgO	Mass %	1.45000	1.51129
84	Sorbent - SO3	Mass %	.650000	.657603
85	Sorbent - Ash	Mass %	1.50000	1.33606

TR8 - TEST POINT 1 05/13/93 Wyoming Coal + Limestone

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	128.221	106.475
4	Total Air Feed	lb/hr	FIC-1055	613.841	600.149
5	Transport N2 Feed	SCFM	FIC-1053	1.25560	1.30131
6	Bed Drain N2 Feed	SCFM	FI-3028	40.0050	40.2616
7	N2 to spray tower	SCFM	FI-4051	27.9444	29.6318
8	Feed Lockhopper comp N2	SCFM	FI-7008	7.00380	7.29591
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	1.83630	1.89212
10	Purge N2 to carbonizer	SCFM	FI-7021	1.83890	1.86578
11	Purge N2 to cyclones	SCFM	FI-7022	2.49560	2.50003
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	45.4987	46.4521
15	Coal Feed rate	lb/hr		300.000	288.369
16	Sorbent feed rate	lb/hr		41.0000	37.1817
22	Air Feed Temp	deg F	TI-1059	83.3413	83.2724
23	Bed Drain Temp	deg F	TIC-3027	84.1568	84.1621
24	Primary Cyclone Lockhopper Temp	F	TI-3070	183.629	183.687
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	168.995	168.997
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1395.99	1396.15
27	N2 to Opacity Meter	SCFM	FI-7029	32.6622	32.7548
35	Carbonizer wall heat loss	KBTU/hr		100.000	103.924
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	331.010
37	Orifice Temp (Upstream)	F	TI-3108	769.405	770.058
38	Purge N2 Temp	F	TI-7012	151.135	151.084
42	Boiler Steam Temperature	F	TI-7041	386.872	386.869
44	CD Flow; carbonizer discharge	lb/hr		6.0400	29.9858
45	PD Flow; primary cyclone	lb/hr		45.7200	53.1189
46	SD/CF Flow; secondary cyclone	lb/hr		10.8700	11.6120
47	BD Flow; bag house	lb/hr		2.04000	2.13954
49	Ambient Temperature	F		76.0000	75.9564

	Lab Measurement			
1	Coal - C	Mass %	49.4833	47.8979
2	Coal - H	Mass %	3.32670	3.26187
3	Coal - N	Mass %	.870000	.840573
4	Coal - S	Mass %	.673300	.665756
5	Coal - Ash	Mass %	5.01670	5.21642
6	Coal - H2O	Mass %	27.0700	29.2401
7	Coal - HHV	BTU/lb	8821.00	8166.33
8	CD Drain - C	Mass %	18.5000	17.8162
9	CD Drain - H	Mass %	.040000	.025206
10	CD Drain - N	Mass %	.140000	.100177
11	CD Drain - S	Mass %	.880000	.118381
12	CD Drain - Ash	Mass %	57.0300	50.7437
13	CD Drain - HHV (dry)	BTU/lb	750.00	1016.95

TR8 - TEST POINT 1 05/13/93 Wyoming Coal + Limestone

Index KD	Measurement		Old Value	New Value
15	CD Drain - sfide S	Mass %	.760000	.118381
18	CD Drain - Ash CaO	Mass %	20.6000	74.7783
19	CD Drain - Ash MgO	Mass %	16.4000	1.5324
20	PD Drain - C	Mass %	71.7650	65.6235
21	PD Drain - H	Mass %	.720000	.656156
22	PD Drain - N	Mass %	1.01500	.92751
23	PD Drain - S	Mass %	.400000	.198784
24	PD Drain - Ash	Mass %	23.5500	27.0280
25	PD Drain - HHV (dry)	BTU/lb	10651.5	9892.2
27	PD Drain - sfide S	Mass %	.225000	.133757
28	PD Drain - crbate C	Mass %	1.11000	1.03237
30	PD Drain - Ash CaO	Mass %	27.7500	39.9911
31	PD Drain - Ash MgO	Mass %	4.15000	.81952
32	CF/SD Drain - C	Mass %	64.8450	62.0421
33	CF/SD Drain - H	Mass %	.610000	.582939
34	CF/SD Drain - N	Mass %	.665000	.638782
35	CF/SD Drain - S	Mass %	.490000	.424079
36	CF/SD Drain - Ash	Mass %	32.2800	33.9668
37	CF/SD Drain - HHV (dry)	BTU/lb	9362.00	8963.18
39	CF/SD Drain - sfide S	Mass %	.205000	.179280
40	CF/SD Drain - cabate C	Mass %	1.38500	1.32387
42	CF/SD Drain - Ash CaO	Mass %	26.5000	36.0377
43	CF/SD Drain - Ash MgO	Mass %	5.80000	.73850
45	BD Drain - C	Mass %	78.8500	79.9182
46	BD Drain - H	Mass %	.975000	.988542
47	BD Drain - N	Mass %	1.08000	1.09516
48	BD Drain - S	Mass %	.775000	.772972
49	BD Drain - Ash	Mass %	17.4300	16.9028
50	BD Drain - HHV (dry)	BTU/lb	11922.5	12094.6
52	BD Drain - sfide S	Mass %	.075000	.071193
53	BD Drain - crbate C	Mass %	.775000	.745764
55	BD Drain - Ash CaO	Mass %	22.8000	22.7029
56	BD Drain - Ash MgO	Mass %	3.40000	.46524
57	Demister Gas - N2	mol,vol %	78.1750	74.7233
58	Demister Gas - O2	mol,vol %	.43000	1.06723
59	Demister Gas - CO	mol,vol %	3.99250	4.84130
60	Demister Gas - CH4	mol,vol %	1.18500	1.29404
61	Demister Gas - CO2	mol,vol %	7.63750	9.47855
62	Demister Gas - C2H4	mol,vol %	.032500	.035617
63	Demister Gas - C2H6	mol,vol %	.075000	.082117
64	Demister Gas - H2S	mol,vol %	.304200	.112837
65	Demister Gas - H2	mol,vol %	6.28250	6.55444
66	Demister Gas - NH3	mol,vol %	.209700	.225119
67	Demister Gas - Ar	mol,vol %	.332500	.341885
79	Water Content in Freeboard Gas	mol,vol %	19.1290	15.1673
82	Sorbent - CaO	Mass %	97.0200	96.3965
83	Sorbent - MgO	Mass %	1.80000	1.38770
84	Sorbent - SO3	Mass %	.760000	.840551
85	Sorbent - Ash	Mass %	.320000	.375258

TR8 - TEST POINT 2 05/13/93 Wyoming Coal + Limestone

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	132.189	119.463
4	Total Air Feed	lb/hr	FIC-1055	704.138	691.382
5	Transport N2 Feed	SCFM	FIC-1053	1.14050	1.16188
6	Bed Drain N2 Feed	SCFM	FI-3028	39.9963	40.1479
7	N2 to spray tower	SCFM	FI-4051	31.0620	31.2814
8	Feed lockhopper comp N2	SCFM	FI-7008	5.33130	5.44605
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	4.28490	4.48619
10	Purge N2 to carbonizer	SCFM	FI-7021	1.69530	1.71760
11	Purge N2 to cyclones	SCFM	FI-7022	2.48850	2.49320
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	46.0135	46.4719
15	Coal Feed rate	lb/hr		310.000	283.682
16	Sorbent feed rate	lb/hr		55.0000	54.4634
22	Air Feed Temp	deg F	TI-1059	76.8577	76.8238
23	Bed Drain Temp	deg F	TIC-3027	71.9988	72.0009
24	Primary Cyclone Lockhopper Temp	F	TI-3070	174.662	174.716
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	166.975	166.977
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1491.91	1492.15
27	N2 to Opacity Meter	SCFM	FI-7029	32.3593	32.4654
35	Carbonizer wall heat loss	KBTU/hr		100.000	104.647
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	357.172
37	Orifice Temp (Upstream)	F	TI-3108	817.960	821.774
38	Purge N2 Temp	F	TI-7012	143.491	143.442
42	Boiler Steam Temperature	F	TI-7041	387.165	387.161
44	CD Flow; carbonizer discharge	lb/hr		26.5100	46.1392
45	PD Flow; primary cyclone	lb/hr		34.2500	35.9234
46	SD/CF Flow; secondary cyclone	lb/hr		4.47000	4.60385
47	BD Flow; bag house	lb/hr		1.29000	1.43296
49	Ambient Temperature	F		76.0000	75.9463

	Lab Measurement				
1	Coal - C	Mass %		49.4833	46.3736
2	Coal - H	Mass %		3.32670	3.16469
3	Coal - N	Mass %		.870000	.818942
4	Coal - S	Mass %		.673300	.626777
5	Coal - Ash	Mass %		5.01670	5.47489
6	Coal - H2O	Mass %		27.0700	30.6687
7	Coal - HHV	BTU/lb		8821.00	7906.03
8	CD Drain - C	Mass %		17.2100	12.6666
9	CD Drain - H	Mass %		.020000	.015197
10	CD Drain - N	Mass %		.070000	.059322
11	CD Drain - S	Mass %		1.02000	1.16034
12	CD Drain - Ash	Mass %		57.5500	71.5036
13	CD Drain - HHV (dry)	BTU/lb		638.00	1010.93

TR8 - TEST POINT 2 05/13/93 Wyoming Coal + Limestone

Index KD	Measurement		Old Value	New Value
15	CD Drain - sfide S	Mass %	.720000	.659506
16	CD Drain - crbate C	Mass %	8.58000	5.52405
18	CD Drain - Ash CaO	Mass %	84.8000	78.3182
19	CD Drain - Ash MgO	Mass %	.50000	1.19711
20	PD Drain - C	Mass %	60.2550	62.1590
21	PD Drain - H	Mass %	.485000	.498182
22	PD Drain - N	Mass %	.670000	.690663
23	PD Drain - S	Mass %	.390000	.456902
24	PD Drain - Ash	Mass %	33.7650	33.5221
25	PD Drain - HHV (dry)	BTU/lb	8901.00	9081.48
27	PD Drain - sfide S	Mass %	.210000	.239553
28	PD Drain - crbate C	Mass %	1.68500	1.77396
30	PD Drain - Ash CaO	Mass %	26.7000	29.1552
31	PD Drain - Ash MgO	Mass %	4.35000	.44564
32	CF/SD Drain - C	Mass %	64.5700	65.5233
33	CF/SD Drain - H	Mass %	.510000	.517164
34	CF/SD Drain - N	Mass %	.620000	.629183
35	CF/SD Drain - S	Mass %	.440000	.452720
36	CF/SD Drain - Ash	Mass %	32.4200	31.8952
37	CF/SD Drain - HHV (dry)	BTU/lb	9306.00	9447.34
39	CF/SD Drain - sfide S	Mass %	.310000	.313783
40	CF/SD Drain - cabate C	Mass %	1.37000	1.38150
42	CF/SD Drain - Ash CaO	Mass %	32.5000	37.1984
43	CF/SD Drain - Ash MgO	Mass %	6.00000	.56858
45	BD Drain - C	Mass %	71.5100	75.2359
46	BD Drain - H	Mass %	.940000	.988069
47	BD Drain - N	Mass %	.97000	1.01988
48	BD Drain - S	Mass %	.96000	1.01082
49	BD Drain - Ash	Mass %	21.3400	20.9515
50	BD Drain - HHV (dry)	BTU/lb	11053.0	11215.4
52	BD Drain - sfide S	Mass %	.020000	.018700
53	BD Drain - crbate C	Mass %	1.20000	1.30785
55	BD Drain - Ash CaO	Mass %	23.9000	28.6908
56	BD Drain - Ash MgO	Mass %	3.70000	.43854
57	Demister Gas - N2	mol,vol %	77.0667	74.9143
58	Demister Gas - O2	mol,vol %	.450000	.885156
59	Demister Gas - CO	mol,vol %	4.77330	5.43666
60	Demister Gas - CH4	mol,vol %	1.04670	1.13472
61	Demister Gas - CO2	mol,vol %	8.5500	10.1578
62	Demister Gas - C2H4	mol,vol %	.016700	.017997
63	Demister Gas - C2H6	mol,vol %	.030000	.032555
64	Demister Gas - H2S	mol,vol %	.059300	.067793
65	Demister Gas - H2	mol,vol %	6.33330	6.63254
66	Demister Gas - NH3	mol,vol %	.243100	.254599
67	Demister Gas - Ar	mol,vol %	.370000	.465882
79	Water Content in Freeboard Gas	mol,vol %	17.7520	14.8335
82	Sorbent - CaO	Mass %	97.0200	97.4928
83	Sorbent - MgO	Mass %	1.80000	1.49019
84	Sorbent - SO3	Mass %	.760000	.766413
85	Sorbent - Ash	Mass %	.320000	.250609

TR8 - TEST POINT 3 05/13/93 Wyoming Coal + Limestone

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	156.071	144.242
4	Total Air Feed	lb/hr	FIC-1055	863.494	823.063
5	Transport N2 Feed	SCFM	FIC-1053	.886200	.927650
6	Bed Drain N2 Feed	SCFM	FI-3028	34.0728	35.0212
7	N2 to spray tower	SCFM	FI-4051	17.7959	19.5899
8	Feed lockhopper comp N2	SCFM	FI-7008	5.37060	5.62917
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	6.70410	6.73345
10	Purge N2 to carbonizer	SCFM	FI-7021	1.84400	1.88078
11	Purge N2 to cyclones	SCFM	FI-7022	2.32410	2.32751
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	48.7440	53.1011
15	Coal Feed rate	lb/hr		393.000	362.842
16	Sorbent feed rate	lb/hr		27.0000	27.0208
22	Air Feed Temp	deg F	TI-1059	86.3411	86.3028
23	Bed Drain Temp	deg F	TIC-3027	237.928	239.941
24	Primary Cyclone Lockhopper Temp	F	TI-3070	172.211	172.292
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	159.070	159.072
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1533.21	1532.71
27	N2 to Opacity Meter	SCFM	FI-7029	25.3701	25.4279
35	Carbonizer wall heat loss	KBTU/hr		100.000	96.186
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	351.747
37	Orifice Temp (Upstream)	F	TI-3108	962.259	963.324
38	Purge N2 Temp	F	TI-7012	138.223	138.202
42	Boiler Steam Temperature	F	TI-7041	386.899	386.895
44	CD Flow; carbonizer discharge	lb/hr		16.7600	21.3162
45	PD Flow; primary cyclone	lb/hr		33.9400	35.8218
46	SD/CF Flow; secondary cyclone	lb/hr		7.56000	7.61785
47	BD Flow; bag house	lb/hr		7.67000	7.82454
49	Ambient Temperature	F		76.0000	75.9493

	Lab Measurement			
1	Coal - C	Mass %	49.4833	46.6382
2	Coal - H	Mass %	3.32670	3.18805
3	Coal - N	Mass %	.870000	.825354
4	Coal - S	Mass %	.673300	.608911
5	Coal - Ash	Mass %	5.01670	5.42132
6	Coal - H2O	Mass %	27.0700	30.2361
7	Coal - HHV	BTU/lb	8821.00	7965.93
8	CD Drain - C	Mass %	3.74000	2.71914
9	CD Drain - H	Mass %	.030000	.028723
10	CD Drain - N	Mass %	.070000	.070246
11	CD Drain - S	Mass %	1.06000	3.17162
12	CD Drain - Ash	Mass %	95.1000	95.5245
13	CD Drain - HHV (dry)	BTU/lb	701.000	850.154

TR8 - TEST POINT 3 05/13/93 Wyoming Coal + Limestone

Index KD	Measurement		Old Value	New Value
15	CD Drain - sfide S	Mass %	1.06000	2.09141
16	CD Drain - crbate C	Mass %	.090000	.073688
18	CD Drain - Ash CaO	Mass %	93.9000	45.9067
19	CD Drain - Ash MgO	Mass %	1.10000	.91305
20	PD Drain - C	Mass %	64.3200	65.0632
21	PD Drain - H	Mass %	.615000	.626875
22	PD Drain - N	Mass %	.725000	.741889
23	PD Drain - S	Mass %	.71000	2.27841
24	PD Drain - Ash	Mass %	31.1750	31.1887
25	PD Drain - HHV (dry)	BTU/lb	9756.50	9945.84
27	PD Drain - sfide S	Mass %	.71000	1.44536
28	PD Drain - crbate C	Mass %	1.22000	1.18255
30	PD Drain - Ash CaO	Mass %	32.4500	34.5225
31	PD Drain - Ash MgO	Mass %	4.55000	.68663
32	CF/SD Drain - C	Mass %	64.5900	66.9723
33	CF/SD Drain - H	Mass %	.540000	.559218
34	CF/SD Drain - N	Mass %	.650000	.673972
35	CF/SD Drain - S	Mass %	.450000	.507109
36	CF/SD Drain - Ash	Mass %	31.5700	30.7493
37	CF/SD Drain - HHV (dry)	BTU/lb	9672.00	9939.19
39	CF/SD Drain - sfide S	Mass %	.220000	.238499
40	CF/SD Drain - cabate C	Mass %	1.30000	1.31342
42	CF/SD Drain - Ash CaO	Mass %	31.0000	33.3709
43	CF/SD Drain - Ash MgO	Mass %	7.00000	.66372
45	BD Drain - C	Mass %	65.7600	67.6220
46	BD Drain - H	Mass %	.740000	.760703
47	BD Drain - N	Mass %	.500000	.514755
48	BD Drain - S	Mass %	.710000	.916319
49	BD Drain - Ash	Mass %	30.1000	29.8749
50	BD Drain - HHV (dry)	BTU/lb	9935.0	10103.9
52	BD Drain - sfide S	Mass %	.500000	.589317
53	BD Drain - crbate C	Mass %	1.27000	1.27401
55	BD Drain - Ash CaO	Mass %	32.0000	34.4034
56	BD Drain - Ash MgO	Mass %	4.80000	.68426
57	Demister Gas - N2	mol,vol %	72.0000	69.5388
58	Demister Gas - O2	mol,vol %	.235000	.607154
59	Demister Gas - CO	mol,vol %	6.49750	7.47193
60	Demister Gas - CH4	mol,vol %	1.52000	1.69440
61	Demister Gas - CO2	mol,vol %	9.5100	11.2867
62	Demister Gas - C2H4	mol,vol %	.010000	.010444
63	Demister Gas - C2H6	mol,vol %	.047500	.049954
64	Demister Gas - H2S	mol,vol %	.026200	.036431
65	Demister Gas - H2	mol,vol %	8.19500	8.51841
66	Demister Gas - NH3	mol,vol %	.273800	.283585
67	Demister Gas - Ar	mol,vol %	.417500	.502238
79	Water Content in Freeboard Gas	mol,vol %	16.6600	14.2383
82	Sorbent - CaO	Mass %	97.0200	96.9964
83	Sorbent - MgO	Mass %	1.80000	1.92919
84	Sorbent - SO3	Mass %	.760000	.758197
85	Sorbent - Ash	Mass %	.320000	.316234

TR8 - TEST POINT 4 05/13/93 Ill No.6 + Limestone

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	112.687	107.209
4	Total Air Feed	lb/hr	FIC-1055	688.479	668.527
5	Transport N2 Feed	SCFM	FIC-1053	.514900	.526297
6	Bed Drain N2 Feed	SCFM	FI-3028	35.5141	35.6530
7	N2 to spray tower	SCFM	FI-4051	19.2753	20.0334
8	Feed lockhopper comp N2	SCFM	FI-7008	2.27110	2.32548
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	1.50620	1.50940
10	Purge N2 to carbonizer	SCFM	FI-7021	1.63870	1.65313
11	Purge N2 to cyclones	SCFM	FI-7022	2.64780	2.64834
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	96.2838	96.6840
15	Coal Feed rate	lb/hr		320.000	302.410
16	Sorbent feed rate	lb/hr		76.0000	75.6247
22	Air Feed Temp	deg F	TI-1059	83.7059	83.6832
23	Bed Drain Temp	deg F	TIC-3027	106.350	106.444
24	Primary Cyclone Lockhopper Temp	F	TI-3070	171.612	171.692
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	177.775	177.797
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1588.44	1588.10
35	Carbonizer wall heat loss	KBTU/hr		100.000	83.999
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	327.226
37	Orifice Temp (Upstream)	F	TI-3108	1070.16	1070.90
38	Purge N2 Temp	F	TI-7012	117.276	117.246
42	Boiler Steam Temperature	F	TI-7041	386.844	386.841
44	CD Flow; carbonizer discharge	lb/hr		66.6700	84.7591
45	PD Flow; primary cyclone	lb/hr		57.1800	60.7610
46	SD/CF Flow; secondary cyclone	lb/hr		34.2200	35.4672
47	BD Flow; bag house	lb/hr		24.6200	25.4368
49	Ambient Temperature	F		76.0000	75.9852

	Lab Measurement				
1	Coal - C	Mass %		63.5600	62.4176
2	Coal - H	Mass %		3.81500	3.77032
3	Coal - N	Mass %		1.45000	1.42772
4	Coal - S	Mass %		3.03000	2.96882
5	Coal - Ash	Mass %		10.9900	11.6225
6	Coal - H2O	Mass %		9.24500	9.68198
7	Coal - HHV	BTU/lb		11505.0	11277.0
8	CD Drain - C	Mass %		20.4400	25.9029
9	CD Drain - H	Mass %		.110000	.145913
10	CD Drain - N	Mass %		.260000	.373869
11	CD Drain - S	Mass %		4.35000	7.93499
12	CD Drain - Ash	Mass %		72.6200	67.9352
13	CD Drain - HHV (dry)	BTU/lb		2262.00	5110.70
15	CD Drain - sfide S	Mass %		3.87000	6.72257

TR8 - TEST POINT 4 05/13/93 Ill No.6 + Limestone

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	6.10000	5.33943
18	CD Drain - Ash CaO	Mass %	73.7000	57.7432
19	CD Drain - Ash MgO	Mass %	.700000	.997272
20	PD Drain - C	Mass %	66.3300	68.3588
21	PD Drain - H	Mass %	.570000	.585145
22	PD Drain - N	Mass %	1.11500	1.14913
23	PD Drain - S	Mass %	2.03000	2.26536
24	PD Drain - Ash	Mass %	31.4450	31.4034
25	PD Drain - HHV (dry)	BTU/lb	10372.5	10616.7
27	PD Drain - sfide S	Mass %	1.00000	1.18230
28	PD Drain - crbate C	Mass %	.730000	.710903
30	PD Drain - Ash CaO	Mass %	23.8000	25.2590
31	PD Drain - Ash MgO	Mass %	.800000	.436243
32	CF/SD Drain - C	Mass %	69.2750	70.4215
33	CF/SD Drain - H	Mass %	.670000	.679891
34	CF/SD Drain - N	Mass %	1.02000	1.03696
35	CF/SD Drain - S	Mass %	1.23500	1.26859
36	CF/SD Drain - Ash	Mass %	28.1250	28.0953
37	CF/SD Drain - HHV (dry)	BTU/lb	10724.5	10808.2
39	CF/SD Drain - sfide S	Mass %	.395000	.410951
40	CF/SD Drain - cabate C	Mass %	.480000	.476848
42	CF/SD Drain - Ash CaO	Mass %	17.8500	19.6238
43	CF/SD Drain - Ash MgO	Mass %	.800000	.338918
45	BD Drain - C	Mass %	70.6300	72.1832
46	BD Drain - H	Mass %	.740000	.753666
47	BD Drain - N	Mass %	1.10000	1.12376
48	BD Drain - S	Mass %	1.34000	1.39900
49	BD Drain - Ash	Mass %	25.8800	26.0567
50	BD Drain - HHV (dry)	BTU/lb	11000.0	11080.4
52	BD Drain - sfide S	Mass %	.600000	.637931
53	BD Drain - crbate C	Mass %	.420000	.425136
55	BD Drain - Ash CaO	Mass %	20.4000	22.6143
56	BD Drain - Ash MgO	Mass %	1.20000	.39057
57	Demister Gas - N2	mol,vol %	72.6000	72.2306
58	Demister Gas - O2	mol,vol %	.255000	.423190
59	Demister Gas - CO	mol,vol %	5.60500	6.00501
60	Demister Gas - CH4	mol,vol %	1.54000	1.58471
61	Demister Gas - CO2	mol,vol %	9.9625	11.2244
62	Demister Gas - C2H4	mol,vol %	.037500	.039967
63	Demister Gas - C2H6	mol,vol %	.030000	.030627
64	Demister Gas - H2S	mol,vol %	.015100	.015671
65	Demister Gas - H2	mol,vol %	7.78500	7.62535
66	Demister Gas - NH3	mol,vol %	.265500	.261589
67	Demister Gas - Ar	mol,vol %	.465000	.558906
79	Freeboard Water Vapor	mol,vol %	21.6790	17.8571
82	Sorbent - CaO	Mass %	97.0200	97.2540
83	Sorbent - MgO	Mass %	1.80000	1.67966
84	Sorbent - SO3	Mass %	.760000	.764020
85	Sorbent - Ash	Mass %	.320000	.302295

TR8 - TEST POINT 5 05/13/93 Ill No. 6 + Limestone

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	159.892	161.344
4	Total Air Feed	lb/hr	FIC-1055	954.179	935.470
5	Transport N2 Feed	SCFM	FIC-1053	.555300	.540917
6	Bed Drain N2 Feed	SCFM	FI-3028	40.1006	39.9176
7	N2 to spray tower	SCFM	FI-4051	21.2050	21.3807
8	Feed lockhopper comp N2	SCFM	FI-7008	5.39920	5.17024
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	3.68900	3.69323
10	Purge N2 to carbonizer	SCFM	FI-7021	1.60490	1.59588
11	Purge N2 to cyclones	SCFM	FI-7022	2.32610	2.32661
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	139.674	144.660
15	Coal Feed rate	lb/hr		427.000	388.052
16	Sorbent feed rate	lb/hr		104.000	101.156
22	Air Feed Temp	deg F	TI-1059	80.6818	80.6700
23	Bed Drain Temp	deg F	TIC-3027	79.8191	79.8219
24	Primary Cyclone Lockhopper Temp	F	TI-3070	158.099	158.227
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	184.645	184.774
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1646.80	1645.40
35	Carbonizer wall heat loss	KBTU/hr		100.000	68.784
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	348.954
37	Orifice Temp (Upstream)	F	TI-3108	1209.66	1214.08
38	Purge N2 Temp	F	TI-7012	116.639	116.634
42	Boiler Steam Temperature	F	TI-7041	387.023	387.021
44	CD Flow; carbonizer discharge	lb/hr		51.4700	94.0512
45	PD Flow; primary cyclone	lb/hr		61.4400	66.0435
46	SD/CF Flow; secondary cyclone	lb/hr		36.6700	38.7530
47	BD Flow; bag house	lb/hr		34.8600	36.5574
49	Ambient Temperature	F		76.0000	75.9927

	Lab Measurement				
1	Coal - C	Mass %		63.5600	61.4069
2	Coal - H	Mass %		3.81500	3.71122
3	Coal - N	Mass %		1.45000	1.41270
4	Coal - S	Mass %		3.03000	2.94698
5	Coal - Ash	Mass %		10.9900	12.0752
6	Coal - H2O	Mass %		9.2450	10.2475
7	Coal - HHV	BTU/lb		11505.0	11182.4
8	CD Drain - C	Mass %		8.5700	21.0183
9	CD Drain - H	Mass %		.110000	.426841
10	CD Drain - N	Mass %		.010000	.029553
11	CD Drain - S	Mass %		8.4600	10.3156
12	CD Drain - Ash	Mass %		103.110	94.054
13	CD Drain - HHV (dry)	BTU/lb		1354.00	6599.60
15	CD Drain - sfide S	Mass %		7.9600	10.3156

TR8 - TEST POINT 5 05/13/93 Ill No. 6 + Limestone

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	3.93000	2.07648
18	CD Drain - Ash CaO	Mass %	75.4000	49.7264
19	CD Drain - Ash MgO	Mass %	.500000	.641631
20	PD Drain - C	Mass %	65.7500	67.3611
21	PD Drain - H	Mass %	.590000	.603814
22	PD Drain - N	Mass %	.965000	.986930
23	PD Drain - S	Mass %	1.51500	1.44655
24	PD Drain - Ash	Mass %	32.8350	32.6900
25	PD Drain - HHV (dry)	BTU/lb	10120.0	10299.9
27	PD Drain - sfide S	Mass %	.665000	.719605
28	PD Drain - crbate C	Mass %	.595000	.564616
30	PD Drain - Ash CaO	Mass %	23.2000	25.9913
31	PD Drain - Ash MgO	Mass %	.750000	.335371
32	CF/SD Drain - C	Mass %	63.9200	64.8506
33	CF/SD Drain - H	Mass %	.540000	.547640
34	CF/SD Drain - N	Mass %	.950000	.962354
35	CF/SD Drain - S	Mass %	1.42000	1.38858
36	CF/SD Drain - Ash	Mass %	34.2600	34.4580
37	CF/SD Drain - HHV (dry)	BTU/lb	9890.00	9958.43
39	CF/SD Drain - sfide S	Mass %	.770000	.818921
40	CF/SD Drain - cabate C	Mass %	.780000	.758121
42	CF/SD Drain - Ash CaO	Mass %	27.5000	31.0283
43	CF/SD Drain - Ash MgO	Mass %	.800000	.400365
45	BD Drain - C	Mass %	69.9800	71.7478
46	BD Drain - H	Mass %	.580000	.594652
47	BD Drain - N	Mass %	1.23000	1.25960
48	BD Drain - S	Mass %	1.05000	1.04591
49	BD Drain - Ash	Mass %	26.9200	26.9293
50	BD Drain - HHV (dry)	BTU/lb	10793.0	10888.6
52	BD Drain - sfide S	Mass %	.460000	.479558
53	BD Drain - crbate C	Mass %	.250000	.249308
55	BD Drain - Ash CaO	Mass %	18.7000	21.1924
56	BD Drain - Ash MgO	Mass %	1.10000	.27345
57	Demister Gas - N2	mol,vol %	70.0500	70.1581
58	Demister Gas - O2	mol,vol %	.270000	.298201
59	Demister Gas - CO	mol,vol %	6.08250	6.32987
60	Demister Gas - CH4	mol,vol %	1.53500	1.69756
61	Demister Gas - CO2	mol,vol %	12.1500	12.8058
63	Demister Gas - C2H6	mol,vol %	.020000	.021741
64	Demister Gas - H2S	mol,vol %	.002200	.002130
65	Demister Gas - H2	mol,vol %	7.90250	7.95867
66	Demister Gas - NH3	mol,vol %	.157700	.152857
67	Demister Gas - Ar	mol,vol %	.510000	.575121
79	Water Content in Freeboard Gas	mol,vol %	21.9090	17.7568
82	Sorbent - CaO	Mass %	97.0200	97.6721
83	Sorbent - MgO	Mass %	1.80000	1.26028
84	Sorbent - SO3	Mass %	.760000	.780428
85	Sorbent - Ash	Mass %	.320000	.287163

TR8 - TEST POINT 6/7 05/13/93 Pitts No 8 + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	155.224	150.156
4	Total Air Feed	lb/hr	FIC-1055	916.781	879.661
5	Transport N2 Feed	SCFM	FIC-1053	.704200	.691307
6	Bed Drain N2 Feed	SCFM	FI-3028	41.7508	41.6321
7	N2 to spray tower	SCFM	FI-4051	5.45650	5.38387
8	Feed lockhopper comp N2	SCFM	FI-7008	15.2914	15.1619
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	3.26090	3.26057
10	Purge N2 to carbonizer	SCFM	FI-7021	1.63200	1.62724
11	Purge N2 to cyclones	SCFM	FI-7022	2.35490	2.35486
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	99.0871	99.7781
15	Coal Feed rate	lb/hr		380.000	375.655
16	Sorbent feed rate	lb/hr		124.000	119.978
22	Air Feed Temp	deg F	TI-1059	85.1801	85.1709
23	Bed Drain Temp	deg F	TIC-3027	109.435	109.492
24	Primary Cyclone Lockhopper Temp	F	TI-3070	186.029	186.204
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	145.313	145.325
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1635.14	1634.27
35	Carbonizer wall heat loss	KBTU/hr		100.000	71.864
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	340.402
37	Orifice Temp (Upstream)	F	TI-3108	1231.65	1232.15
38	Purge N2 Temp	F	TI-7012	126.307	126.291
42	Boiler Steam Temperature	F	TI-7041	386.772	386.770
44	CD Flow; carbonizer discharge	lb/hr		82.0200	98.2111
45	PD Flow; primary cyclone	lb/hr		114.540	120.566
46	SD/CF Flow; secondary cyclone	lb/hr		32.2500	32.6025
47	BD Flow; bag house	lb/hr		41.1100	41.1472
49	Ambient Temperature	F		76.0000	75.9927

Lab Measurement				
1	Coal - C	Mass %	68.2100	68.0546
2	Coal - H	Mass %	4.20670	4.23415
3	Coal - N	Mass %	1.75330	1.74949
4	Coal - S	Mass %	4.07000	4.04745
5	Coal - Ash	Mass %	13.3767	13.5248
6	Coal - H2O	Mass %	2.81670	2.87861
7	Coal - HHV	BTU/lb	12406.7	12315.1
8	CD Drain - C	Mass %	35.8350	31.6757
9	CD Drain - H	Mass %	.235000	.208718
10	CD Drain - N	Mass %	.635000	.579976
11	CD Drain - S	Mass %	6.51500	8.91474
12	CD Drain - Ash	Mass %	76.0200	75.9572
13	CD Drain - HHV (dry)	BTU/lb	5787.00	6058.72
15	CD Drain - sfide S	Mass %	4.54500	6.13165

TR8 - TEST POINT 6/7 05/13/93 Pitts No 8 + Dolomite

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	1.45000	1.17499
18	CD Drain - Ash CaO	Mass %	24.1500	27.8531
19	CD Drain - Ash MgO	Mass %	17.2000	16.4027
20	PD Drain - C	Mass %	61.0550	61.3027
21	PD Drain - H	Mass %	.470000	.468826
22	PD Drain - N	Mass %	1.10000	1.10997
23	PD Drain - S	Mass %	3.52500	4.16859
24	PD Drain - Ash	Mass %	40.7650	40.7394
25	PD Drain - HHV (dry)	BTU/lb	9510.00	9802.33
27	PD Drain - sfide S	Mass %	1.80500	2.11610
28	PD Drain - crbate C	Mass %	.860000	.841160
30	PD Drain - Ash CaO	Mass %	25.9500	28.7402
31	PD Drain - Ash MgO	Mass %	17.5500	16.9252
32	CF/SD Drain - C	Mass %	66.6000	67.0470
33	CF/SD Drain - H	Mass %	.560000	.561383
34	CF/SD Drain - N	Mass %	1.22000	1.22842
35	CF/SD Drain - S	Mass %	2.12000	2.16673
36	CF/SD Drain - Ash	Mass %	32.0000	31.9760
37	CF/SD Drain - HHV (dry)	BTU/lb	10264.0	10331.0
39	CF/SD Drain - sfide S	Mass %	.790000	.802271
40	CF/SD Drain - cabate C	Mass %	.810000	.811413
42	CF/SD Drain - Ash CaO	Mass %	23.5000	23.1262
43	CF/SD Drain - Ash MgO	Mass %	12.8000	13.6191
45	BD Drain - C	Mass %	68.1900	71.1897
46	BD Drain - H	Mass %	.670000	.695483
47	BD Drain - N	Mass %	.96000	1.00234
48	BD Drain - S	Mass %	1.56000	1.63262
49	BD Drain - Ash	Mass %	27.6600	27.3311
50	BD Drain - HHV (dry)	BTU/lb	10640.0	10839.4
52	BD Drain - sfide S	Mass %	.460000	.466419
53	BD Drain - crbate C	Mass %	.500000	.512351
55	BD Drain - Ash CaO	Mass %	24.2000	18.0959
56	BD Drain - Ash MgO	Mass %	7.6000	10.6567
57	Demister Gas - N2	mol,vol %	72.2500	72.8729
58	Demister Gas - O2	mol,vol %	.395000	.392684
59	Demister Gas - CO	mol,vol %	7.22500	7.34009
60	Demister Gas - CH4	mol,vol %	1.64000	1.55899
61	Demister Gas - CO2	mol,vol %	9.9350	10.6109
62	Demister Gas - C2H4	mol,vol %	.010000	.009751
63	Demister Gas - C2H6	mol,vol %	.010000	.009743
64	Demister Gas - H2S	mol,vol %	.009300	.009077
65	Demister Gas - H2	mol,vol %	7.02000	6.48147
66	Demister Gas - NH3	mol,vol %	.119500	.115872
67	Demister Gas - Ar	mol,vol %	.500000	.598480
79	Water Content in Freeboard Gas	mol,vol %	22.4170	15.6959
82	Sorbent - CaO	Mass %	60.6000	61.3404
83	Sorbent - MgO	Mass %	37.1667	36.1235
84	Sorbent - SO3	Mass %	.370300	.378345
85	Sorbent - Ash	Mass %	2.12970	2.15778

TR8 - TEST POINT 8 05/13/93 Pitts No 8 + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	142.529	140.197
4	Total Air Feed	lb/hr	FIC-1055	837.725	823.024
5	Transport N2 Feed	SCFM	FIC-1053	.615100	.600269-
6	Bed Drain N2 Feed	SCFM	FI-3028	43.6144	43.5121
7	N2 to spray tower	SCFM	FI-4051	12.4293	12.2994
8	Feed lockhopper comp N2	SCFM	FI-7008	16.1634	16.0289
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	2.72090	2.71908
10	Purge N2 to carbonizer	SCFM	FI-7021	1.68340	1.67653
11	Purge N2 to cyclones	SCFM	FI-7022	2.48340	2.48314
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	90.0042	90.4799
15	Coal Feed rate	lb/hr		360.000	342.846
16	Sorbent feed rate	lb/hr		80.0000	79.4732
22	Air Feed Temp	deg F	TI-1059	78.0664	78.0529
23	Bed Drain Temp	deg F	TIC-3027	81.7774	81.7836
24	Primary Cyclone Lockhopper Temp	F	TI-3070	175.786	175.900
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	130.141	130.142
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1610.89	1610.49
35	Carbonizer wall heat loss	KBTU/hr		100.000	84.226
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	312.525
37	Orifice Temp (Upstream)	F	TI-3108	1225.14	1225.61
38	Purge N2 Temp	F	TI-7012	115.924	115.901
42	Boiler Steam Temperature	F	TI-7041	387.179	387.176
44	CD Flow; carbonizer discharge	lb/hr		67.450	103.878
45	PD Flow; primary cyclone	lb/hr		93.8700	99.9964
46	SD/CF Flow; secondary cyclone	lb/hr		10.9300	11.0864
47	BD Flow; bag house	lb/hr		35.0800	36.0382
49	Ambient Temperature	F		76.0000	75.9887

Lab Measurement				
1	Coal - C	Mass %	68.2100	67.3560
2	Coal - H	Mass %	4.20670	4.19235
3	Coal - N	Mass %	1.75330	1.73680
4	Coal - S	Mass %	4.07000	4.01563
5	Coal - Ash	Mass %	13.3767	14.0166
6	Coal - H2O	Mass %	2.81670	2.98902
7	Coal - HHV	BTU/lb	12406.7	12189.9
8	CD Drain - C	Mass %	35.0150	30.0448
9	CD Drain - H	Mass %	.145000	.114980
10	CD Drain - N	Mass %	.720000	.585059
11	CD Drain - S	Mass %	8.73000	9.33887
12	CD Drain - Ash	Mass %	80.3200	79.3668
13	CD Drain - HHV (dry)	BTU/lb	5777.50	5877.78
15	CD Drain - sfide S	Mass %	5.01000	7.13852

TR8 - TEST POINT 8 05/13/93 Pitts No 8 + Dolomite

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	2.21000	3.21047
18	CD Drain - Ash CaO	Mass %	22.5000	24.4110
19	CD Drain - Ash MgO	Mass %	16.5500	14.9255
20	PD Drain - C	Mass %	71.0800	71.8595
21	PD Drain - H	Mass %	.480000	.482088
22	PD Drain - N	Mass %	1.44500	1.46073
23	PD Drain - S	Mass %	3.09000	3.23033
24	PD Drain - Ash	Mass %	26.6400	26.3253
25	PD Drain - HHV (dry)	BTU/lb	11114.5	11321.7
27	PD Drain - sfide S	Mass %	.96000	1.07721
28	PD Drain - crbate C	Mass %	.330000	.316444
30	PD Drain - Ash CaO	Mass %	13.9500	14.5163
31	PD Drain - Ash MgO	Mass %	10.3000	8.8756
32	CF/SD Drain - C	Mass %	73.5500	74.2157
33	CF/SD Drain - H	Mass %	.690000	.695143
34	CF/SD Drain - N	Mass %	1.15000	1.15996
35	CF/SD Drain - S	Mass %	2.44000	2.46804
36	CF/SD Drain - Ash	Mass %	22.7800	22.7546
37	CF/SD Drain - HHV (dry)	BTU/lb	11495.0	11526.6
39	CF/SD Drain - sfide S	Mass %	.740000	.752792
40	CF/SD Drain - cabate C	Mass %	.540000	.565192
42	CF/SD Drain - Ash CaO	Mass %	14.0000	14.6577
43	CF/SD Drain - Ash MgO	Mass %	9.50000	8.96210
45	BD Drain - C	Mass %	70.6000	72.8385
46	BD Drain - H	Mass %	.710000	.729398
47	BD Drain - N	Mass %	1.20000	1.23763
48	BD Drain - S	Mass %	1.90000	1.96695
49	BD Drain - Ash	Mass %	24.8400	25.0715
50	BD Drain - HHV (dry)	BTU/lb	10984.0	11071.5
52	BD Drain - sfide S	Mass %	.430000	.448855
53	BD Drain - crbate C	Mass %	.210000	.214601
55	BD Drain - Ash CaO	Mass %	15.5000	16.3757
56	BD Drain - Ash MgO	Mass %	10.8000	10.0125
57	Demister Gas - N2	mol,vol %	73.5250	74.6745
58	Demister Gas - O2	mol,vol %	.920000	.814401
59	Demister Gas - CO	mol,vol %	6.87250	7.08421
60	Demister Gas - CH4	mol,vol %	1.52750	1.47530
61	Demister Gas - CO2	mol,vol %	8.95500	9.13554
62	Demister Gas - C2H4	mol,vol %	.010000	.009710
63	Demister Gas - C2H6	mol,vol %	.012500	.012131
64	Demister Gas - H2S	mol,vol %	.002000	.001943
65	Demister Gas - H2	mol,vol %	6.72250	6.09833
66	Demister Gas - NH3	mol,vol %	.114900	.110920
67	Demister Gas - Ar	mol,vol %	.500000	.583029
79	Water Content in Freeboard Gas	mol,vol %	21.4160	14.9851
82	Sorbent - CaO	Mass %	60.6000	60.5524
83	Sorbent - MgO	Mass %	37.1667	37.0232
84	Sorbent - SO3	Mass %	1.03330	1.03472
85	Sorbent - Ash	Mass %	1.46670	1.38971

TR8 - TEST POINT 9 05/13/93 Pitts No 8 + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	134.170	130.763
4	Total Air Feed	lb/hr	FIC-1055	800.406	782.670
5	Transport N2 Feed	SCFM	FIC-1053	.603500	.587394
6	Bed Drain N2 Feed	SCFM	FI-3028	44.4757	44.3686
7	N2 to spray tower	SCFM	FI-4051	13.3416	13.3142
8	Feed lockhopper comp N2	SCFM	FI-7008	15.8643	15.6627
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	2.63520	2.63307
10	Purge N2 to carbonizer	SCFM	FI-7021	1.67960	1.67106
11	Purge N2 to cyclones	SCFM	FI-7022	2.53170	2.53146
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	54.9885	55.5359
15	Coal Feed rate	lb/hr		350.000	337.016
16	Sorbent feed rate	lb/hr		84.0000	79.9304
22	Air Feed Temp	deg F	TI-1059	79.9855	79.9742
23	Bed Drain Temp	deg F	TIC-3027	81.5452	81.5487
24	Primary Cyclone Lockhopper Temp	F	TI-3070	164.679	164.744
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	136.314	136.317
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1602.95	1601.71
35	Carbonizer wall heat loss	KBTU/hr		100.000	81.625
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	299.630
37	Orifice Temp (Upstream)	F	TI-3108	1206.04	1206.45
38	Purge N2 Temp	F	TI-7012	122.577	122.565
42	Boiler Steam Temperature	F	TI-7041	387.087	387.086
44	CD Flow; carbonizer discharge	lb/hr		73.610	102.857
45	PD Flow; primary cyclone	lb/hr		68.1900	74.6986
46	SD/CF Flow; secondary cyclone	lb/hr		31.5500	32.4115
47	BD Flow; bag house	lb/hr		32.2400	33.1361
49	Ambient Temperature	F		70.0000	69.9942

	Lab Measurement			
1	Coal - C	Mass %	68.2100	67.5973
2	Coal - H	Mass %	4.20670	4.21525
3	Coal - N	Mass %	1.75330	1.74184
4	Coal - S	Mass %	4.07000	3.97986
5	Coal - Ash	Mass %	13.3767	13.8307
6	Coal - H2O	Mass %	2.81670	2.95875
7	Coal - HHV	BTU/lb	12406.7	12268.0
8	CD Drain - C	Mass %	50.5300	37.7133
9	CD Drain - H	Mass %	.265000	.202755
10	CD Drain - N	Mass %	.865000	.670930
11	CD Drain - S	Mass %	5.06000	8.63459
12	CD Drain - Ash	Mass %	54.4250	56.5960
13	CD Drain - HHV (dry)	BTU/lb	8313.00	7147.11
15	CD Drain - sfide S	Mass %	2.98000	5.42883

TR8 - TEST POINT 9 05/13/93 Pitts No 8 + Dolomite

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	1.01000	.72115
18	CD Drain - Ash CaO	Mass %	20.4000	32.3811
19	CD Drain - Ash MgO	Mass %	14.1500	19.9077
20	PD Drain - C	Mass %	69.5300	65.5621
21	PD Drain - H	Mass %	.490000	.460430
22	PD Drain - N	Mass %	1.31500	1.24500
23	PD Drain - S	Mass %	3.38500	4.30029
24	PD Drain - Ash	Mass %	29.6800	30.0629
25	PD Drain - HHV (dry)	BTU/lb	10799.0	10476.2
27	PD Drain - sfide S	Mass %	1.42000	1.88130
28	PD Drain - crbate C	Mass %	.715000	.922165
30	PD Drain - Ash CaO	Mass %	14.7000	20.2432
31	PD Drain - Ash MgO	Mass %	11.5500	12.4454
32	CF/SD Drain - C	Mass %	74.6400	74.4885
33	CF/SD Drain - H	Mass %	.530000	.526785
34	CF/SD Drain - N	Mass %	1.40000	1.39806
35	CF/SD Drain - S	Mass %	2.44000	2.62813
36	CF/SD Drain - Ash	Mass %	22.5500	22.6357
37	CF/SD Drain - HHV (dry)	BTU/lb	11491.0	11506.3
39	CF/SD Drain - sfide S	Mass %	.670000	.749396
40	CF/SD Drain - cabate C	Mass %	.400000	.399220
42	CF/SD Drain - Ash CaO	Mass %	16.0000	16.2359
43	CF/SD Drain - Ash MgO	Mass %	9.50000	9.98175
45	BD Drain - C	Mass %	72.6300	73.0382
46	BD Drain - H	Mass %	.620000	.620461
47	BD Drain - N	Mass %	1.51000	1.51839
48	BD Drain - S	Mass %	1.84000	1.94918
49	BD Drain - Ash	Mass %	23.2600	23.5128
50	BD Drain - HHV (dry)	BTU/lb	11303.0	11304.0
52	BD Drain - sfide S	Mass %	.430000	.467774
53	BD Drain - crbate C	Mass %	.490000	.495593
55	BD Drain - Ash CaO	Mass %	16.0000	16.8508
56	BD Drain - Ash MgO	Mass %	10.5000	10.3598
57	Demister Gas - N2	mol,vol %	73.3500	74.5841
58	Demister Gas - O2	mol,vol %	.362500	.456581
59	Demister Gas - CO	mol,vol %	7.59000	7.85488
60	Demister Gas - CH4	mol,vol %	1.61250	1.47446
61	Demister Gas - CO2	mol,vol %	8.32000	8.85294
62	Demister Gas - C2H4	mol,vol %	.007500	.007305
63	Demister Gas - C2H6	mol,vol %	.010000	.009670
64	Demister Gas - H2S	mol,vol %	.000400	.000390
65	Demister Gas - H2	mol,vol %	6.68250	6.06374
66	Demister Gas - NH3	mol,vol %	.138000	.133162
67	Demister Gas - Ar	mol,vol %	.475000	.562733
79	Water Content in Freeboard Gas	mol,vol %	18.8770	12.1685
82	Sorbent - CaO	Mass %	60.6000	60.4590
83	Sorbent - MgO	Mass %	37.1667	37.1699
84	Sorbent - SO3	Mass %	1.03330	1.07427
85	Sorbent - Ash	Mass %	1.46670	1.29679

TR8 - TEST POINT 10 05/13/93 Pitts No 8 + Dolomite

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	125.773	113.271
4	Total Air Feed	lb/hr	FIC-1055	737.856	661.668
5	Transport N2 Feed	SCFM	FIC-1053	.678800	.674401
6	Bed Drain N2 Feed	SCFM	FI-3028	45.7521	45.7138
7	N2 to spray [illegible]er	SCFM	FI-4051	4.78920	4.68763
8	Feed lockhop[illegible]er comp N2	SCFM	FI-7008	11.2655	11.1025
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	2.48960	2.49087
10	Purge N2 to carbonizer	SCFM	FI-7021	1.90400	1.89807
11	Purge N2 to cyclones	SCFM	FI-7022	2.59390	2.59406
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	55.0198	55.7164
15	Coal Feed rate	lb/hr		350.000	337.713
16	Sorbent feed rate	lb/hr		40.0000	39.7601
22	Air Feed Temp	deg F	TI-1059	88.6162	88.6097
23	Bed Drain Temp	deg F	TIC-3027	158.038	158.836
24	Primary Cyclone Lockhopper Temp	F	TI-3070	175.829	175.913
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	134.046	134.046
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1614.31	1613.68
35	Carbonizer wall heat loss	KBTU/hr		100.000	85.977
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	286.682
37	Orifice Temp (Upstream)	F	TI-3108	1198.59	1198.87
38	Purge N2 Temp	F	TI-7012	128.395	128.390
42	Boiler Steam Temperature	F	TI-7041	386.888	386.887
44	CD Flow; carbonizer discharge	lb/hr		93.880	120.749
45	PD Flow; primary cyclone	lb/hr		88.3400	94.4658
46	SD/CF Flow; secondary cyclone	lb/hr		1.52000	1.56870
47	BD Flow; bag house	lb/hr		16.8100	17.2153
49	Ambient Temperature	F		76.0000	75.9936

	Lab Measurement		Old	New
1	Coal - C	Mass %	68.2100	67.6574
2	Coal - H	Mass %	4.20670	4.21851
3	Coal - N	Mass %	1.75330	1.74502
4	Coal - S	Mass %	4.07000	3.99878
5	Coal - Ash	Mass %	13.3767	13.5532
6	Coal - H2O	Mass %	2.81670	2.86213
7	Coal - HHV	BTU/lb	12406.7	12284.8
8	CD Drain - C	Mass %	66.2200	53.3859
9	CD Drain - H	Mass %	.230000	.234275
10	CD Drain - N	Mass %	1.21000	.88662
11	CD Drain - S	Mass %	5.48500	7.03912
12	CD Drain - Ash	Mass %	36.4750	40.3617
13	CD Drain - HHV (dry)	BTU/lb	9928.00	8966.79
15	CD Drain - sfide S	Mass %	2.23500	3.33253

TR8 - TEST POINT 10 05/13/93 Pitts No 8 + Dolomite

Index KD	Measurement		Old Value	New Value
16	CD Drain - crbate C	Mass %	.97000	1.19568
18	CD Drain - Ash CaO	Mass %	16.1000	19.9152
19	CD Drain - Ash MgO	Mass %	12.1500	12.1138
20	PD Drain - C	Mass %	77.5150	75.2617
21	PD Drain - H	Mass %	.535000	.516909
22	PD Drain - N	Mass %	1.39500	1.35871
23	PD Drain - S	Mass %	2.83000	3.16514
24	PD Drain - Ash	Mass %	20.8750	21.0822
25	PD Drain - HHV (dry)	BTU/lb	11807.5	11739.6
27	PD Drain - sfide S	Mass %	.815000	.927132
28	PD Drain - crbate C	Mass %	.220000	.214391
30	PD Drain - Ash CaO	Mass %	11.5500	12.2544
31	PD Drain - Ash MgO	Mass %	7.75000	7.45394
32	CF/SD Drain - C	Mass %	78.5000	78.4710
33	CF/SD Drain - H	Mass %	.480000	.479759
34	CF/SD Drain - N	Mass %	1.35000	1.34959
35	CF/SD Drain - S	Mass %	2.00000	1.99274
36	CF/SD Drain - Ash	Mass %	18.4200	17.8861
37	CF/SD Drain - HHV (dry)	BTU/lb	12005.0	12077.5
39	CF/SD Drain - sfide S	Mass %	.500000	.490813
40	CF/SD Drain - cabate C	Mass %	.260000	.254997
42	CF/SD Drain - Ash CaO	Mass %	9.60000	9.98077
43	CF/SD Drain - Ash MgO	Mass %	6.60000	6.07098
45	BD Drain - C	Mass %	73.2800	73.1697
46	BD Drain - H	Mass %	.610000	.607785
47	BD Drain - N	Mass %	1.46000	1.45784
48	BD Drain - S	Mass %	1.68000	1.69259
49	BD Drain - Ash	Mass %	24.0600	24.6913
50	BD Drain - HHV (dry)	BTU/lb	11162.0	11072.4
52	BD Drain - sfide S	Mass %	.580000	.572010
53	BD Drain - crbate C	Mass %	.150000	.144576
55	BD Drain - Ash CaO	Mass %	19.3000	17.8745
56	BD Drain - Ash MgO	Mass %	9.3000	10.8725
57	Demister Gas - N2	mol,vol %	72.6000	74.2503
58	Demister Gas - O2	mol,vol %	.273300	.301837
59	Demister Gas - CO	mol,vol %	6.90330	7.26677
60	Demister Gas - CH4	mol,vol %	2.18000	2.12622
61	Demister Gas - CO2	mol,vol %	7.94670	8.31618
62	Demister Gas - C2H4	mol,vol %	.010000	.010135
63	Demister Gas - C2H6	mol,vol %	.016700	.016919
64	Demister Gas - H2S	mol,vol %	.131300	.135972
65	Demister Gas - H2	mol,vol %	7.31000	6.87228
66	Demister Gas - NH3	mol,vol %	.148100	.148625
67	Demister Gas - Ar	mol,vol %	.460000	.554829
79	Water Content in Freeboard Gas	mol,vol %	23.3580	13.3357
82	Sorbent - CaO	Mass %	60.6000	60.6775
83	Sorbent - MgO	Mass %	37.1667	36.9082
84	Sorbent - SO3	Mass %	1.03330	1.03414
85	Sorbent - Ash	Mass %	1.46670	1.38006

TR10 - TEST POINT 1 9/1/92 Pittsburgh Coal + Limestone

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	111.493	91.325
4	Total Air Feed	lb/hr	FIC-1055	1158.45	1126.46
5	Transport N2 Feed	SCFM	FIC-1053	6.31300	6.35119
7	N2 to spray tower	SCFM	FI-4051	23.8650	24.0599
8	Feed lockhopper comp N2	SCFM	FI-7008	2.88500	2.96086
10	Purge N2 to carbonizer	SCFM	FI-7021	2.22300	2.23523
11	Purge N2 to cyclones	SCFM	FI-7022	2.03000	2.03251
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	150.725	151.097
15	Coal Feed rate	lb/hr		525.000	507.590
16	Sorbent feed rate	lb/hr		143.000	136.995
22	Air Feed Temp	deg F	TI-1059	79.7060	79.7050
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	288.416	299.048
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1652.28	1647.67
27	N2 to Opacity Meter	SCFM	FI-7029	58.7600	58.8317
35	Carbonizer wall heat loss	KBTU/hr		100.000	45.546
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	420.944
37	Orifice Temp (Upstream)	F	TI-3108	1115.85	1133.22
38	Purge N2 Temp	F	TI-7012	156.138	156.138
42	Boiler Steam Temperature	F	TI-7041	387.911	387.911
46	SD/CF Flow; secondary cyclone	lb/hr		219.650	306.950
47	BD Flow; bag house	lb/hr		72.3900	77.4231
49	Ambient Temperature	F		60.0000	59.9684

	Lab Measurement				
1	Coal - C	Mass %		70.0450	69.1381
2	Coal - H	Mass %		4.92000	4.92561
3	Coal - N	Mass %		1.95500	1.94561
4	Coal - S	Mass %		3.21000	3.19619
5	Coal - Ash	Mass %		10.4150	10.7089
6	Coal - H2O	Mass %		3.21250	3.35786
7	Coal - HHV	BTU/lb		12753.0	12677.7
13	CD Drain - HHV (dry)	BTU/lb		.0E+00	.0E+00
25	PD Drain - HHV (dry)	BTU/lb		.0E+00	.0E+00
32	CF/SD Drain - C	Mass %		59.5700	58.1141
33	CF/SD Drain - H	Mass %		.341700	.292466
34	CF/SD Drain - N	Mass %		1.41500	1.31360
35	CF/SD Drain - S	Mass %		3.91670	4.41065
36	CF/SD Drain - Ash	Mass %		43.3450	44.2461
37	CF/SD Drain - HHV (dry)	BTU/lb		9278.33	9353.11
39	CF/SD Drain - sfide S	Mass %		2.32830	3.73451
40	CF/SD Drain - cabate C *	Mass %		1.15170	1.81894
42	CF/SD Drain - Ash CaO	Mass %		22.5833	34.5469
43	CF/SD Drain - Ash MgO	Mass %		14.2167	11.3959

TR10 - TEST POINT 1 9/1/92 Pittsburgh Coal + Limestone

Index KD	Measurement		Old Value	New Value
45	BD Drain - C	Mass %	65.5800	63.5570
46	BD Drain - H	Mass %	.730000	.703180
47	BD Drain - N	Mass %	1.66000	1.60458
48	BD Drain - S	Mass %	2.22000	2.28757
49	BD Drain - Ash	Mass %	31.1200	32.2791
50	BD Drain - HHV (dry)	BTU/lb	10311.0	10014.4
52	BD Drain - sfide S	Mass %	1.12000	1.31663
53	BD Drain - crbate C	Mass %	.170000	.173549
55	BD Drain - Ash CaO	Mass %	26.7000	34.8693
56	BD Drain - Ash MgO	Mass %	15.7000	11.5022
57	Demister Gas - N2	mol,vol %	74.4000	72.1633
58	Demister Gas - O2	mol,vol %	1.09000	1.66106
59	Demister Gas - CO	mol,vol %	4.73000	5.18118
60	Demister Gas - CH4	mol,vol %	1.95250	2.06170
61	Demister Gas - CO2	mol,vol %	8.99000	9.81236
62	Demister Gas - C2H4	mol,vol %	.057500	.061507
63	Demister Gas - C2H6	mol,vol %	.010000	.010654
64	Demister Gas - H2S	mol,vol %	.064500	.068842
65	Demister Gas - H2	mol,vol %	6.72000	6.84309
66	Demister Gas - NH3	mol,vol %	.345600	.361895
67	Demister Gas - Ar	mol,vol %	.465000	.599562
79	Water Content in Freeboard Gas	mol,vol %	28.2300	20.6790
82	Sorbent - CaO	Mass %	71.9000	71.4716
83	Sorbent - MgO	Mass %	22.9500	23.5761
84	Sorbent - SO3	Mass %	1.10000	1.14505
85	Sorbent - Ash	Mass %	2.40000	2.15722

TR10 - TEST POINT 2 9/1/92 Pittsburgh Coal + Limestone

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	67.5720	46.2128
4	Total Air Feed	lb/hr	FIC-1055	736.211	598.985
5	Transport N2 Feed	SCFM	FIC-1053	37.8540	44.7230
7	N2 to spray tower	SCFM	FI-4051	19.8870	20.3447
8	Feed lockhopper comp N2	SCFM	FI-7008	1.65700	2.79761
10	Purge N2 to carbonizer	SCFM	FI-7021	1.94000	1.98136
11	Purge N2 to cyclones	SCFM	FI-7022	2.05300	2.05490
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	.130000	.132519
15	Coal Feed rate	lb/hr	/	232.000	230.197
16	Sorbent feed rate	lb/hr		32.0000	32.3298
22	Air Feed Temp	deg F	TI-1059	84.3100	84.2991
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	193.715	194.058
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1617.59	1614.70
27	N2 to Opacity Meter	SCFM	FI-7029	58.3830	58.4276
35	Carbonizer wall heat loss	KBTU/hr		100.000	86.883
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	300.848
37	Orifice Temp (Upstream)	F	TI-3108	868.288	883.026
38	Purge N2 Temp	F	TI-7012	160.753	160.734
46	SD/CF Flow; secondary cyclone	lb/hr		47.5000	48.5431
47	BD Flow; bag house	lb/hr		101.650	103.631
49	Ambient Temperature	F		60.0000	59.7912

	Lab Measurement		Old	New
1	Coal - C	Mass %	70.0450	70.0515
2	Coal - H	Mass %	4.92000	4.93711
3	Coal - N	Mass %	1.95500	1.95251
4	Coal - S	Mass %	3.21000	3.15230
5	Coal - Ash	Mass %	10.4150	10.4848
6	Coal - H2O	Mass %	3.21250	3.25472
7	Coal - HHV	BTU/lb	12753.0	12660.9
13	CD Drain - HHV (dry)	BTU/lb	.0E+00	.0E+00
25	PD Drain - HHV (dry)	BTU/lb	.0E+00	.0E+00
32	CF/SD Drain - C	Mass %	63.7200	62.8565
33	CF/SD Drain - H	Mass %	.360000	.359579
34	CF/SD Drain - N	Mass %	1.62000	1.62451
35	CF/SD Drain - S	Mass %	3.92500	6.05580
36	CF/SD Drain - Ash	Mass %	39.9750	39.7286
37	CF/SD Drain - HHV (dry)	BTU/lb	9789.0	10118.0
39	CF/SD Drain - sfide S	Mass %	2.05500	3.12575
40	CF/SD Drain - cabate C *	Mass %	.445000	.419470
42	CF/SD Drain - Ash CaO	Mass %	26.1500	29.7912
43	CF/SD Drain - Ash MgO	Mass %	10.0500	5.0888
45	BD Drain - C	Mass %	66.8000	67.0222

TR10 - TEST POINT 2 9/1/92 Pittsburgh Coal + Limestone

Index KD	Measurement		Old Value	New Value
46	BD Drain - H	Mass %	.690000	.694366
47	BD Drain - N	Mass %	1.90000	1.92803
48	BD Drain - S	Mass %	2.34000	4.02100
49	BD Drain - Ash	Mass %	31.3200	30.4120
50	BD Drain - HHV (dry)	BTU/lb	10392.0	10864.1
52	BD Drain - sfide S	Mass %	1.13000	1.86302
53	BD Drain - crbate C	Mass %	.300000	.281141
55	BD Drain - Ash CaO	Mass %	26.7000	29.2046
56	BD Drain - Ash MgO	Mass %	13.3000	4.9886
57	Demister Gas - N2	mol,vol %	86.7750	82.8924
58	Demister Gas - O2	mol,vol %	.527500	.679711
59	Demister Gas - CO	mol,vol %	3.33000	4.47215
60	Demister Gas - CH4	mol,vol %	.747500	.946821
61	Demister Gas - CO2	mol,vol %	4.85000	6.32408
62	Demister Gas - C2H4	mol,vol %	.062500	.080359
64	Demister Gas - H2S	mol,vol %	.012800	.016910
65	Demister Gas - H2	mol,vol %	3.00000	3.71630
66	Demister Gas - NH3	mol,vol %	.150600	.191751
67	Demister Gas - Ar	mol,vol %	.317500	.452939
79	Water Content in Freeboard Gas	mol,vol %	11.4400	8.2884
82	Sorbent - CaO	Mass %	81.4000	80.9308
83	Sorbent - MgO	Mass %	13.2000	13.8241
84	Sorbent - SO3	Mass %	.800000	.784969
85	Sorbent - Ash	Mass %	2.90000	2.76007

TR10 - TEST POINT 3 9/2/92 Pittsburgh Coal + Limestone

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	71.2720	56.6083
4	Total Air Feed	lb/hr	FIC-1055	845.203	836.002
5	Transport N2 Feed	SCFM	FIC-1053	15.9090	23.0797
7	N2 to spray tower	SCFM	FI-4051	25.2980	25.6160
8	Feed lockhopper comp N2	SCFM	FI-7008	1.76100	3.13290
10	Purge N2 to carbonizer	SCFM	FI-7021	2.13200	2.52460
11	Purge N2 to cyclones	SCFM	FI-7022	2.07100	2.07395
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	.284000	.300497
15	Coal Feed rate	lb/hr		300.000	285.716
16	Sorbent feed rate	lb/hr		25.0000	25.3025
22	Air Feed Temp	deg F	TI-1059	76.3120	76.2992
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	188.286	188.629
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1677.48	1671.10
27	N2 to Opacity Meter	SCFM	FI-7029	58.2680	58.3437
35	Carbonizer wall heat loss	KBTU/hr		100.000	74.108
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	357.661
37	Orifice Temp (Upstream)	F	TI-3108	917.152	924.404
38	Purge N2 Temp	F	TI-7012	157.186	157.177
46	SD/CF Flow; secondary cyclone	lb/hr		107.000	122.273
47	BD Flow; bag house	lb/hr		41.6200	42.1063
49	Ambient Temperature	F		60.0000	59.7191

	Lab Measurement				
1	Coal - C	Mass %		70.0450	69.3893
2	Coal - H	Mass %		4.92000	4.93596
3	Coal - N	Mass %		1.95500	1.94146
4	Coal - S	Mass %		3.21000	3.15915
5	Coal - Ash	Mass %		10.4150	10.8488
6	Coal - H2O	Mass %		3.21250	3.40583
7	Coal - HHV	BTU/lb		12753.0	12556.8
13	CD Drain - HHV (dry)	BTU/lb		.0E+00	.0E+00
25	PD Drain - HHV (dry)	BTU/lb		.0E+00	.0E+00
32	CF/SD Drain - C	Mass %		64.0500	65.9685
33	CF/SD Drain - H	Mass %		.246700	.254513
34	CF/SD Drain - N	Mass %		1.68000	1.77085
35	CF/SD Drain - S	Mass %		4.98000	6.56171
36	CF/SD Drain - Ash	Mass %		38.7067	36.7502
37	CF/SD Drain - HHV (dry)	BTU/lb		9879.0	11492.9
39	CF/SD Drain - sfide S	Mass %		2.76000	2.80696
40	CF/SD Drain - cabate C *	Mass %		.836700	.452574
42	CF/SD Drain - Ash CaO	Mass %		25.2667	21.0786
43	CF/SD Drain - Ash MgO	Mass %		10.2667	3.4765
45	BD Drain - C	Mass %		68.8350	70.5470

TR10 - TEST POINT 3 9/2/92 Pittsburgh Coal + Limestone

Index KD	Measurement		Old Value	New Value
46	BD Drain - H	Mass %	.550000	.562584
47	BD Drain - N	Mass %	1.71000	1.75509
48	BD Drain - S	Mass %	2.24500	2.47328
49	BD Drain - Ash	Mass %	28.6700	27.9304
50	BD Drain - HHV (dry)	BTU/lb	10637.5	10957.9
52	BD Drain - sfide S	Mass %	1.00500	1.07931
53	BD Drain - crbate C	Mass %	.200000	.197157
55	BD Drain - Ash CaO	Mass %	23.9000	21.9272
56	BD Drain - Ash MgO	Mass %	11.4000	3.6164
57	Demister Gas - N2	mol,vol %	83.4250	79.7174
58	Demister Gas - O2	mol,vol %	.74500	1.36324
59	Demister Gas - CO	mol,vol %	4.91500	5.92076
60	Demister Gas - CH4	mol,vol %	1.13500	1.23445
61	Demister Gas - CO2	mol,vol %	5.49250	7.03135
62	Demister Gas - C2H4	mol,vol %	.060000	.067526
64	Demister Gas - H2S	mol,vol %	.016000	.018092
65	Demister Gas - H2	mol,vol %	3.97750	4.22851
66	Demister Gas - NH3	mol,vol %	.138100	.152437
67	Demister Gas - Ar	mol,vol %	.385000	.555298
79	Water Content in Freeboard Gas	mol,vol %	12.7400	8.3448
82	Sorbent - CaO	Mass %	81.4000	81.1623
83	Sorbent - MgO	Mass %	13.2000	13.3860
84	Sorbent - SO3	Mass %	.800000	.789457
85	Sorbent - Ash	Mass %	2.90000	2.96223

TR10 - TEST POINT 4 9/2/92 Pittsburgh Coal + Limestone

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

Index KD	Plant Measurement			Old Value	New Value
2	Orifice Pressure	PSIG	PI-3106	55.0890	42.3942
4	Total Air Feed	lb/hr	FIC-1055	641.606	615.680
5	Transport N2 Feed	SCFM	FIC-1053	22.2810	29.2912
7	N2 to spray tower	SCFM	FI-4051	25.3760	25.7856
8	Feed lockhopper comp N2	SCFM	FI-7008	1.07100	1.85071
10	Purge N2 to carbonizer	SCFM	FI-7021	1.79000	1.86469
11	Purge N2 to cyclones	SCFM	FI-7022	2.08000	2.08380
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	.265000	.286620
15	Coal Feed rate	lb/hr		286.000	259.976
16	Sorbent feed rate	lb/hr		25.0000	24.7076
22	Air Feed Temp	deg F	TI-1059	77.2630	77.2432
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	201.653	202.156
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1570.70	1569.78
27	N2 to Opacity Meter	SCFM	FI-7029	59.2000	59.3028
35	Carbonizer wall heat loss	KBTU/hr		100.000	82.541
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	318.338
37	Orifice Temp (Upstream)	F	TI-3108	813.399	818.137
38	Purge N2 Temp	F	TI-7012	153.345	153.341
46	SD/CF Flow; secondary cyclone	lb/hr		105.220	137.657
47	BD Flow; bag house	lb/hr		32.0100	33.6286
49	Ambient Temperature	F		60.0000	59.7691

	Lab Measurement				
1	Coal - C	Mass %		70.0450	68.3681
2	Coal - H	Mass %		4.92000	4.94361
3	Coal - N	Mass %		1.95500	1.92705
4	Coal - S	Mass %		3.21000	3.14520
5	Coal - Ash	Mass %		10.4150	11.3693
6	Coal - H2O	Mass %		3.21250	3 [illegible]012
7	Coal - HHV	BTU/lb		12750.0	12482.1
13	CD Drain - HHV (dry)	BTU/lb		.0E+00	.0E+00
25	PD Drain - HH[illegible]ry)	BTU/lb		.0E+00	.0E+00
32	CF/SD Drain	Mass %		64.3675	68.4034
33	CF/SD Drain -	Mass %		.342500	.342561
34	CF/SD Drain - N	Mass %		1.73750	1.81785
35	CF/SD Drain - S	Mass %		5.47000	5.21818
36	CF/SD Drain - Ash	Mass %		36.7025	35.0589
37	CF/SD Drain - HHV (dry)	BTU/lb		10137.5	11237.9
39	CF/SD Drain - sfide S	Mass %		2.88500	2.97670
40	CF/SD Drain - cabate C *	Mass %		.657500	.570464
42	CF/SD Drain - Ash CaO	Mass %		21.3750	21.8439
43	CF/SD Drain - Ash MgO	Mass %		7.90000	3.49391
45	BD Drain - C	Mass %		73.6600	75.6477

TR10 - TEST POINT 4 9/2/92 Pittsburgh Coal + Limestone

Index KD	Measurement		Old Value	New Value
46	BD Drain - H	Mass %	.740000	.750545
47	BD Drain - N	Mass %	1.88000	1.92545
48	BD Drain - S	Mass %	2.18000	2.26584
49	BD Drain - Ash	Mass %	22.7300	21.0958
50	BD Drain - HHV (dry)	BTU/lb	11629.0	11985.2
52	BD Drain - sfide S	Mass %	.920000	.989037
53	BD Drain - crbate C	Mass %	.034000	.032756
55	BD Drain - Ash CaO	Mass %	17.4000	18.3803
56	BD Drain - Ash MgO	Mass %	10.2000	2.9398
57	Demister Gas - N2	mol,vol %	85.6750	82.2623
58	Demister Gas - O2	mol,vol %	.99750	1.71545
59	Demister Gas - CO	mol,vol %	2.61250	3.26487
60	Demister Gas - CH4	mol,vol %	1.18250	1.28337
61	Demister Gas - CO2	mol,vol %	4.88750	6.52248
62	Demister Gas - C2H4	mol,vol %	.127500	.143303
63	Demister Gas - C2H6	mol,vol %	.007500	.008276
64	Demister Gas - H2S	mol,vol %	.030500	.034353
65	Demister Gas - H2	mol,vol %	3.40000	3.49824
66	Demister Gas - NH3	mol,vol %	.208500	.223940
67	Demister Gas - Ar	mol,vol %	.327500	.499941
79	Water Content in Freeboard Gas	mol,vol %	15.9000	10.4431
82	Sorbent - CaO	Mass %	81.4000	81.7020
83	Sorbent - MgO	Mass %	13.2000	13.0682
84	Sorbent - SO3	Mass %	.800000	.807819
85	Sorbent - Ash	Mass %	2.90000	2.72202

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APPENDIX E

RECONCILED MATERIAL AND ENERGY BALANCES

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A total of 36 set points (steady-state periods) were achieved while operating the carbonizer in a jetting fluidized-bed mode, and 4 set points were achieved while operating the carbonizer in a circulating fluidized-bed mode. Table E.1 summarizes the coal and sorbent types used, date, duration, pressure, and bed and freeboard temperatures for each of these steady-state periods. Table E.2 summarizes the reconciled minimum and maximum values of the bed temperature, pressure, coal feed rate, and sorbent feed rate by coal and sorbent type.

The reconciled material and energy balances, showing 100% total energy, total mass, and elemental closures, for each of the steady-state periods are given in this appendix. The location of various nodes (referred in these tables) is presented in Figure E.1.

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Table E.1. SUMMARY OF STEADY-STATE PERIODS FROM CARBONIZER PILOT PLANT OPERATION

Set Point	Coal Feed	Sorbent Feed	Date	Duration, hours	Pressure, psig	Bed Temp., °F	Freeboard Temp., °F
TR1-1	Pittsburgh No 8	Dolomite	11/20/91	0300-0700	152.6	1584	1553
TR1-2	Pittsburgh No 8	Dolomite	11/21/91	0200-0600	132.9	1681	1651
TR1-3	Pittsburgh No 8	Dolomite	11/21/91	1000-1400	144.7	1608	1581
TR1-4	Pittsburgh No 8	Dolomite	11/21/91	2100-2330	125.4	1482	1440
TR2-1	Pittsburgh No 8	Dolomite	12/19/91	0100-0500	139.8	1698	1652
TR2-2	Pittsburgh No 8	Dolomite	12/19/91	1300-1700	128.3	1598	1567
TR2-3	Pittsburgh No 8	Dolomite	12/20/91	0100-0500	138.1	1797	1705
TR2-4	Pittsburgh No 8	Dolomite	12/20/91	1000-1400	191.8	1784	1738
TR2-5	Pittsburgh No 8	Dolomite	12/20/91	1600-1800	198.6	1679	1675
TR4-1	Pittsburgh No 8	Dolomite	3/10/92	2030-0030	153.3	1663	1626
TR4-2	Pittsburgh No 8	Dolomite	3/11/92	0430-0830	155.9	1608	1573
TR4-3	Pittsburgh No 8	Dolomite	3/12/92	0230-0630	125.2	1708	1643
TR4-4	Pittsburgh No 8	Dolomite	3/12/92	1600-2000	129.1	1607	1568
TR4-5	Pittsburgh No 8	Dolomite	3/13/92	0530-0930	193.2	1720	1691
TR4-6	Pittsburgh No 8	Dolomite	3/13/92	1300-1700	175.8	1713	1681
TR4-7	Pittsburgh No 8	Dolomite	3/13/92	2200-0200	177.9	1601	1582
TR4-8	Pittsburgh No 8	Dolomite	3/14/92	0200-0600	182.2	1618	1600
TR5-1	Pittsburgh No 8	Dolomite	3/24/92	1100-1500	134.3	1693	1653
TR5-2	Pittsburgh No 8	Dolomite	3/24/92	1900-2300	154.8	1701	1662
TR5-3	Pittsburgh No 8	Limestone	3/25/92	0500-0900	147.4	1706	1667
TR6-1	Wyoming	Limestone	4/21/92	2100-0100	145.9	1580	1567
TR6-2	Wyoming	Limestone	4/22/92	0430-0830	129.8	1509	1500
TR6-3	Wyoming	Limestone	4/22/92	1400-1800	157.5	1511	1515
TR6-4	Wyoming	Limestone	4/22/92	2100-0100	191.9	1609	1579
TR6-5	Wyoming	Limestone	4/23/92	0400-0800	189.6	1632	1593
TR6-6	Illinois No 6	Limestone	4/23/92	1800-2200	143.5	1600	1573
TR6-7	Illinois No 6	Limestone	4/23/92	2300-0330	122.4	1599	1573
TR8-1	Wyoming	Limestone	6/10/92	2000-0100	128.6	1476	1432
TR8-2	Wyoming	Limestone	6/11/92	0300-0800	132.7	1593	1541
TR8-3	Wyoming	Limestone	6/11/92	1330-1730	156.5	1613	1575
TR8-4	Illinois No 6	Limestone	6/12/92	2100-0200	113.2	1652	1623
TR8-5	Illinois No 6	Limestone	6/13/92	0700-1100	160.6	1715	1680
TR8-6/7	Pittsburgh No 8	Dolomite	6/14/92	2100-0100	156.0	1699	1675
TR8-8	Pittsburgh No 8	Dolomite	6/16/92	0200-0600	143.5	1707	1683
TR8-9	Pittsburgh No 8	Dolomite	6/16/92	0800-1230	135.0	1713	1683
TR8-10	Pittsburgh No 8	Dolomite	6/16/92	1430-1930	126.5	1729	1697
TR10-1*	Pittsburgh No 8	Limestone	9/1/92	0200-0600	113.7	1675	1652
TR10-2*	Pittsburgh No 8	Limestone	9/1/92	1630-2100	68.7	1675	1618
TR10-3*	Pittsburgh No 8	Limestone	9/2/92	0000-0400	72.7	1706	1677
TR10-4*	Pittsburgh No 8	Limestone	9/2/92	0610-1240	55.9	1601	1571

*The carbonizer was operated in a circulating fluidized-bed mode during Test TR10.

Table E.2. SUMMARY OF STEADY-STATE PERIODS BY COAL AND SORBENT TYPE

	Coal	Sorbent	Total Set Points	Bed Temperature, °F		Pressure, psig		Coal Feed, lb/h		Sorbent Feed, lb/h	
				Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
A.	Jetting Fluidized-Bed Mode										
	Pittsburgh	Dolomite	23	1482	1797	125	199	181	489	40	182
	Illinois	Limestone	4	1599	1715	113	161	236	388	36	101
	Wyoming	Limestone	8	1476	1632	129	192	284	444	21	68
B.	Circulating Fluidized-Bed Mode										
	Pittsburgh	Limestone	4	1601	1706	56	114	230	508	25	137

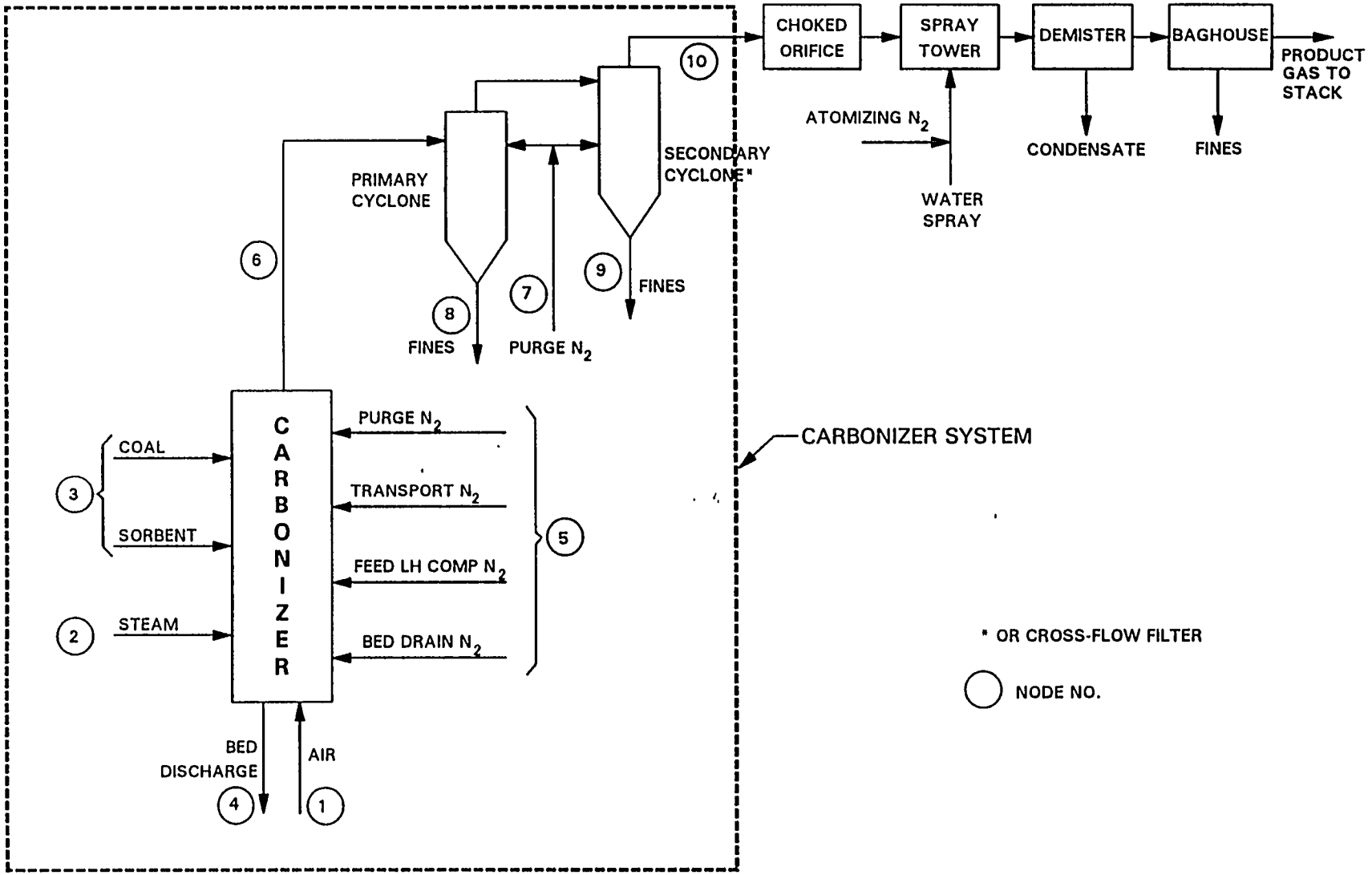

Figure E.1. NODE IDENTIFICATION FOR BALAID PROGRAM

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	3.67	.00	.00	.00	3.67
2	Methane		.00	.00	.00	.00	.00	13.98	.00	.00	.00	13.98
3	Ammonia		.00	.00	.00	.00	.00	1.34	.00	.00	.00	1.34
4	Water Vapor		.00	.00	.00	.00	.00	68.39	.00	.00	.00	68.39
5	Carbon Monoxide		.00	.00	.00	.00	.00	64.96	.00	.00	.00	64.96
6	Nitrogen		.00	.00	.00	.00	364.30	835.49	135.42	.00	.00	970.91
7	Air, dry		622.99	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	1.03	.00	.00	.00	1.03
9	Ethane		.00	.00	.00	.00	.00	.41	.00	.00	.00	.41
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.30	.00	.00	.00	.30
11	Argon		.00	.00	.00	.00	.00	8.03	.00	.00	.00	8.03
12	Carbon Dioxide		.00	.00	.00	.00	.00	128.15	.00	.00	.00	128.15
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	7.29	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	3.65	.00	1.82	.00	.30	1.53	.00
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	37.23	14.15	.00	11.64	.00	6.36	5.28	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	Calcium Sulfide		.00	.00	.43	12.00	.00	8.50	.00	5.97	2.53	.00
20	Calcium Carbonate		.00	.00	43.59	9.21	.00	6.55	.00	.01	6.54	.00
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	1.00	.59	.00	.42	.00	.19	.23	.00
23	Coal Ash		.00	.00	48.60	18.41	.00	30.18	.00	14.09	16.10	.00
24	Coal organic matter		.00	.00	282.00	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	22.52	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	45.56	.00	45.56	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	96.50	.00	.00	96.50	.00
28	BD char organic		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	TOTAL GAS FLOW		623.0	.0	.0	.0	364.3	1125.7	135.4	.0	.0	1261.2
	TOTAL MASS FLOW		623.0	.0	420.1	80.5	364.3	1326.9	135.4	72.5	128.7	1261.2

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	89.3
2	Steam to Carbonizer	100.0
3	Coal & Sorbent Feeds	59.9
4	Carbonizer Drain	96.4
5	N2 Purges to carbonizer	86.4
6	Freeboard gas	1504.8
7	N2 Purges to cyclones	86.4
8	Primary cyclone Drain	144.3
9	Secondary cyclone Drain	179.0
10	Dusty gas to orifice	1258.2

TR1 - TEST POINT 1 11/20/91 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.8	623.0	.00	.0	470.5	144.5	.00	.00	8.035	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	4017.0	420.1	16.49	236.7	6.3	70.9	13.73	11.68	.000	17.70	49.60
N2 Purges to carbonizer	.8	364.3	.00	.0	364.3	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.3	135.4	.00	.0	135.4	.0	.00	.00	.000	.00	.00
Total Inflow	4020.0	1542.9	16.49	236.7	976.5	215.4	13.73	11.68	8.035	17.70	49.60

OUTFLOWS

Carbonizer Drain	337.9	80.5	.10	24.9	.6	13.9	5.28	5.33	.000	10.35	19.00
Primary cyclone Drain	660.0	72.5	.30	44.4	1.1	3.7	2.01	3.38	.000	3.32	14.28
Secondary cyclone Drain	1401.6	128.7	.77	92.9	2.8	8.7	2.44	2.69	.000	4.02	16.32
Dusty gas to orifice	1387.2	1261.2	15.32	74.5	972.0	191.0	.00	.29	8.035	.00	.00
Heat Loss	233.2										
Total Outflow	4020.0	1542.9	16.49	236.7	976.5	215.4	13.73	11.68	8.035	17.70	49.60
Loss	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	3.48	.00	.00	.00	3.48
2	Methane	.00	.00	.00	.00	.00	6.80	.00	.00	.00	6.80
3	Ammonia	.00	.00	.00	.00	.00	1.05	.00	.00	.00	1.05
4	Water Vapor	.00	.00	.00	.00	.00	50.10	.00	.00	.00	50.10
5	Carbon Monoxide	.00	.00	.00	.00	.00	81.05	.00	.00	.00	81.05
6	Nitrogen	.00	.00	.00	.00	291.64	723.96	144.26	.00	.00	868.23
7	Air, dry	570.82	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.25	.00	.00	.00	.25
9	Ethane	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.39	.00	.00	.00	.39
11	Argon	.00	.00	.00	.00	.00	7.36	.00	.00	.00	7.36
12	Carbon Dioxide	.00	.00	.00	.00	.00	108.28	.00	.00	.00	108.28
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	5.21	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	7.40	.00	3.99	.00	2.19	1.80	.00
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	27.87	2.43	.00	1.62	.00	1.44	.18	.00
18	Calcium Oxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	Calcium Sulfide	.00	.00	.33	8.97	.00	3.25	.00	2.33	.92	.00
20	Calcium Carbonate	.00	.00	37.08	11.33	.00	8.92	.00	4.89	4.04	.00
21	Calcium Sulfate	.00	.00	.00	.45	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.86	.55	.00	.31	.00	.19	.12	.00
23	Coal Ash	.00	.00	33.12	14.62	.00	18.51	.00	11.48	7.03	.00
24	Coal organic matter	.00	.00	200.39	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	19.17	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	52.30	.00	52.30	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	30.78	.00	.00	30.78	.00
28	BD char organic	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	TOTAL GAS FLOW	570.8	.0	.0	.0	291.6	982.7	144.3	.0	.0	1127.0
	TOTAL MASS FLOW	570.8	.0	304.9	64.9	291.6	1102.4	144.3	74.8	44.9	1127.0

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	84.9
2	Steam to Carbonizer	300.0
3	Coal & Sorbent Feeds	59.9
4	Carbonizer Drain	112.3
5	N2 Purges to carbonizer	79.2
6	Freeboard gas	1590.8
7	N2 Purges to cyclones	79.2
8	Primary cyclone Drain	156.3
9	Secondary cyclone Drain	178.3
10	Dusty gas to orifice	1266.7

TR1 - TEST POINT 2 11/21/91 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.1	570.8	.00	.0	431.1	132.4	.000	.000	7.362	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.000	.000	.000	.00	.00
Coal & Sorbent Feeds	2861.8	304.9	11.64	169.9	4.4	53.9	8.035	7.966	.000	15.03	33.99
N2 Purges to carbonizer	.2	291.6	.00	.0	291.6	.0	.000	.000	.000	.00	.00
N2 Purges to cyclones	.1	144.3	.00	.0	144.3	.0	.000	.000	.000	.00	.00
Total Inflow	2863.2	1311.6	11.64	169.9	871.4	186.3	8.035	7.966	7.362	15.03	33.99

OUTFLOWS

Carbonizer Drain	282.9	64.9	.08	20.4	.4	10.0	5.160	4.138	.000	9.65	15.17
Primary cyclone Drain	748.7	74.8	.34	50.3	1.2	4.0	1.738	2.249	.000	3.25	11.66
Secondary cyclone Drain	439.3	44.9	.19	29.6	.7	2.8	1.137	1.208	.000	2.13	7.15
Dusty gas to orifice	1178.4	1127.0	11.04	69.6	869.1	169.5	.000	.371	7.362	.00	.00
Heat Loss	213.9										
Total Outflow	2863.2	1311.6	11.64	169.9	871.4	186.3	8.035	7.966	7.362	15.03	33.99
Loss	.0	.0	.00	.0	.0	.0	.000	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index			Mass Flows, Pounds per hour									
I	Species Name	J=	1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	4.05	.00	.00	.00	4.05
2	Methane		.00	.00	.00	.00	.00	15.67	.00	.00	.00	15.67
3	Ammonia		.00	.00	.00	.00	.00	1.34	.00	.00	.00	1.34
4	Water Vapor		.00	.00	.00	.00	.00	60.93	.00	.00	.00	60.93
5	Carbon Monoxide		.00	.00	.00	.00	.00	85.20	.00	.00	.00	85.20
6	Nitrogen		.00	.00	.00	.00	281.74	744.68	139.98	.00	.00	884.65
7	Air, dry		611.05	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	1.04	.00	.00	.00	1.04
9	Ethane		.00	.00	.00	.00	.00	.43	.00	.00	.00	.43
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.24	.00	.00	.00	.24
11	Argon		.00	.00	.00	.00	.00	7.88	.00	.00	.00	7.88
12	Carbon Dioxide		.00	.00	.00	.00	.00	131.91	.00	.00	.00	131.91
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	7.92	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	7.73	.00	2.15	.00	1.99	.17	.00
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	40.78	16.34	.00	3.76	.00	3.18	.58	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	Calcium Sulfide		.00	.00	.47	14.67	.00	3.52	.00	3.04	.47	.00
20	Calcium Carbonate		.00	.00	54.09	23.30	.00	6.22	.00	5.63	.59	.00
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	1.13	.90	.00	.23	.00	.20	.03	.00
23	Coal Ash		.00	.00	49.94	30.95	.00	18.99	.00	15.84	3.16	.00
24	Coal organic matter		.00	.00	284.07	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	53.27	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	76.95	.00	76.95	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	18.86	.00	.00	18.86	.00
28	BD char organic		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	TOTAL GAS FLOW		611.1	.0	.0	.0	281.7	1053.4	140.0	.0	.0	1193.3
	TOTAL MASS FLOW		611.1	.0	438.4	147.2	281.7	1184.0	140.0	106.8	23.8	1193.3

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	81.6
2	Steam to Carbonizer	500.0
3	Coal & Sorbent Feeds	59.8
4	Carbonizer Drain	250.4
5	N2 Purges to carbonizer	82.2
6	Freeboard gas	1532.7
7	N2 Purges to cyclones	82.3
8	Primary cyclone Drain	151.0
9	Secondary cyclone Drain	173.9
10	Dusty gas to orifice	1269.6

TR1 - TEST POINT 3 11/21/91 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.7	611.1	.00	.0	461.5	141.7	.00	.00	7.881	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	3922.3	438.4	16.34	233.2	6.3	86.5	11.76	11.27	.000	21.92	51.06
N2 Purges to carbonizer	.4	281.7	.00	.0	281.7	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.2	140.0	.00	.0	140.0	.0	.00	.00	.000	.00	.00
Total Inflow	3923.5	1471.2	16.34	233.2	889.5	228.2	11.76	11.27	7.881	21.92	51.06

OUTFLOWS

Carbonizer Drain	816.2	147.2	.30	56.6	1.3	23.5	9.37	6.71	.000	17.48	31.84
Primary cyclone Drain	1106.2	106.8	.58	73.2	1.9	5.3	2.11	3.74	.000	3.94	16.04
Secondary cyclone Drain	272.7	23.8	.17	18.0	.5	.7	.27	.61	.000	.50	3.18
Dusty gas to orifice	1515.5	1193.3	15.30	85.5	885.8	198.7	.00	.22	7.881	.00	.00
Heat Loss	212.9										
Total Outflow	3923.5	1471.2	16.34	233.2	889.5	228.2	11.76	11.27	7.881	21.92	51.06
Loss	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	4.12	.00	.00	.00	4.12
2	Methane		.00	.00	.00	.00	.00	17.87	.00	.00	.00	17.87
3	Ammonia		.00	.00	.00	.00	.00	.97	.00	.00	.00	.97
4	Water Vapor		.00	.00	.00	.00	.00	69.62	.00	.00	.00	69.62
5	Carbon Monoxide		.00	.00	.00	.00	.00	57.74	.00	.00	.00	57.74
6	Nitrogen		.00	.00	.00	.00	184.79	591.98	144.84	.00	.00	736.82
7	Air, dry		537.72	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	1.96	.00	.00	.00	1.96
9	Ethane		.00	.00	.00	.00	.00	3.16	.00	.00	.00	3.16
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.29	.00	.00	.00	.29
11	Argon		.00	.00	.00	.00	.00	6.93	.00	.00	.00	6.93
12	Carbon Dioxide		.00	.00	.00	.00	.00	129.58	.00	.00	.00	129.58
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	8.95	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	9.94	.00	9.58	.00	6.02	3.57	.00
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	40.84	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	1.96	.00	3.15	.00	1.54	1.61	.00
19	Calcium Sulfide		.00	.00	.47	6.89	.00	4.22	.00	2.91	1.32	.00
20	Calcium Carbonate		.00	.00	55.84	15.71	.00	16.26	.00	10.63	5.63	.00
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	1.51	.77	.00	.74	.00	.46	.28	.00
23	Coal Ash		.00	.00	54.02	1.58	.00	52.44	.00	23.68	28.76	.00
24	Coal organic matter		.00	.00	323.71	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	54.02	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	71.23	.00	71.23	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	75.16	.00	.00	75.16	.00
28	BD char organic		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	TOTAL GAS FLOW		537.7	.0	.0	.0	184.8	884.2	144.8	.0	.0	1029.1
	TOTAL MASS FLOW		537.7	.0	485.3	90.9	184.8	1117.0	144.8	116.5	116.3	1029.1

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	79.2
2	Steam to Carbonizer	300.0
3	Coal & Sorbent Feeds	59.9
4	Carbonizer Drain	190.9
5	N2 Purges to carbonizer	82.7
6	Freeboard gas	1393.7
7	N2 Purges to cyclones	82.7
8	Primary cyclone Drain	157.0
9	Secondary cyclone Drain	160.6
10	Dusty gas to orifice	1163.6

TR1 - TEST POINT 4 11/21/91 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.3	537.7	.00	.0	406.1	124.7	.00	.00	6.935	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	4664.6	485.3	18.99	268.0	7.2	88.8	11.77	12.35	.000	22.62	55.53
N2 Purges to carbonizer	.3	184.8	.00	.0	184.8	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.2	144.8	.00	.0	144.8	.0	.00	.00	.000	.00	.00
Total Inflow	4665.3	1352.7	18.99	268.0	742.9	213.6	11.77	12.35	6.935	22.62	55.53

OUTFLOWS

Carbonizer Drain	800.0	90.9	.29	51.9	1.5	12.0	5.99	5.36	.000	11.52	2.35
Primary cyclone Drain	1062.2	116.5	.55	67.5	1.9	7.9	3.63	3.87	.000	6.97	24.14
Secondary cyclone Drain	1126.9	116.3	.65	71.0	1.9	4.6	2.15	2.84	.000	4.13	29.04
Dusty gas to orifice	1458.8	1029.1	17.50	77.7	737.6	189.0	.00	.27	6.935	.00	.00
Heat Loss	217.5										
Total Outflow	4665.3	1352.7	18.99	268.0	742.9	213.6	11.77	12.35	6.935	22.62	55.53
Loss	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	2.85	.00	.00	.00	2.85
2	Methane		.00	.00	.00	.00	.00	9.53	.00	.00	.00	9.53
3	Ammonia		.00	.00	.00	.00	.00	.36	.00	.00	.00	.36
4	Water Vapor		.00	.00	.00	.00	.00	48.48	.00	.00	.00	48.48
5	Carbon Monoxide		.00	.00	.00	.00	.00	99.63	.00	.00	.00	99.63
6	Nitrogen		.00	.00	.00	.00	378.40	891.62	54.49	.00	.00	946.11
7	Air, dry		677.01	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.12	.00	.00	.00	.12
9	Ethane		.00	.00	.00	.00	.00	.07	.00	.00	.00	.07
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	2.42	.00	.00	.00	2.42
11	Argon		.00	.00	.00	.00	.00	8.73	.00	.00	.00	8.73
12	Carbon Dioxide		.00	.00	.00	.00	.00	143.72	.00	.00	.00	143.72
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	5.39	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	14.16	.00	8.37	.00	7.87	.29	.21
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	51.99	.49	.00	4.37	.00	4.13	.10	.14
18	Calcium Oxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	Calcium Sulfide		.00	.00	.41	8.29	.00	7.82	.00	7.55	.21	.06
20	Calcium Carbonate		.00	.00	61.90	24.69	.00	15.43	.00	14.28	.54	.61
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.78	.45	.00	.33	.00	.31	.01	.01
23	Coal Ash		.00	.00	29.42	14.46	.00	14.96	.00	13.60	.93	.43
24	Coal organic matter		.00	.00	200.66	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	22.58	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	56.52	.00	56.52	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	1.95	.00	.00	1.95	.00
28	BD char organic		.00	.00	.00	.00	.00	3.58	.00	.00	.00	3.58
	TOTAL GAS FLOW		677.0	.0	.0	.0	378.4	1207.5	54.5	.0	.0	1262.0
	TOTAL MASS FLOW		677.0	.0	350.6	85.1	378.4	1320.8	54.5	104.3	4.0	1267.0

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	75.1
2	Steam to Carbonizer	.0
3	Coal & Sorbent Feeds	59.9
4	Carbonizer Drain	157.4
5	N2 Purges to carbonizer	91.8
6	Freeboard gas	1605.4
7	N2 Purges to cyclones	91.8
8	Primary cyclone Drain	161.6
9	Secondary cyclone Drain	171.3
10	Dusty gas to orifice	1322.9

TR2 - TEST POINT 1 12/19/91 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	-.3	677.0	.00	.0	511.3	157.0	.00	.00	8.731	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	2849.4	350.6	11.42	175.1	4.5	78.4	14.99	10.89	.000	25.02	30.20
N2 Purges to carbonizer	1.4	378.4	.00	.0	378.4	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.2	54.5	.00	.0	54.5	.0	.00	.00	.000	.00	.00
Total Inflow	2850.7	1460.5	11.42	175.1	948.7	235.4	14.99	10.89	8.731	25.02	30.20

OUTFLOWS

Carbonizer Drain	334.6	85.1	.10	24.4	.6	17.7	8.68	4.26	.000	14.49	14.91
Primary cyclone Drain	847.1	104.3	.36	56.1	1.6	12.3	5.94	4.12	.000	9.91	13.91
Secondary cyclone Drain	29.4	4.0	.01	1.9	.1	.4	.20	.15	.000	.34	.94
Dusty gas to orifice	1405.5	1267.0	10.94	92.7	946.5	204.9	.17	2.36	8.731	.28	.44
Heat Loss	234.1										
Total Outflow	2850.7	1460.5	11.42	175.1	948.7	235.4	14.99	10.89	8.731	25.02	30.20
Loss	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index		Mass Flows, Pounds per hour									
I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	3.26	.00	.00	.00	3.26
2	Methane	.00	.00	.00	.00	.00	15.61	.00	.00	.00	15.61
3	Ammonia	.00	.00	.00	.00	.00	1.17	.00	.00	.00	1.17
4	Water Vapor	.00	.00	.00	.00	.00	53.06	.00	.00	.00	53.06
5	Carbon Monoxide	.00	.00	.00	.00	.00	68.66	.00	.00	.00	68.66
6	Nitrogen	.00	.00	.00	.00	380.83	801.93	54.28	.00	.00	856.21
7	Air, dry	555.84	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	1.68	.00	.00	.00	1.68
9	Ethane	.00	.00	.00	.00	.00	6.02	.00	.00	.00	6.02
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.80	.00	.00	.00	.80
11	Argon	.00	.00	.00	.00	.00	7.17	.00	.00	.00	7.17
12	Carbon Dioxide	.00	.00	.00	.00	.00	128.06	.00	.00	.00	128.06
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	7.35	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	8.12	.00	1.87	.00	1.45	.20	.23
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	40.39	16.63	.00	2.84	.00	2.59	.11	.14
18	Calcium Oxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	Calcium Sulfide	.00	.00	.33	22.72	.00	3.11	.00	2.71	.21	.20
20	Calcium Carbonate	.00	.00	47.24	8.19	.00	3.67	.00	2.88	.33	.46
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.59	.49	.00	.10	.00	.08	.01	.01
23	Coal Ash	.00	.00	39.55	26.12	.00	13.42	.00	10.89	1.12	1.41
24	Coal organic matter	.00	.00	280.72	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	91.43	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	52.22	.00	52.22	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	5.07	.00	.00	5.07	.00
28	BD char organic	.00	.00	.00	.00	.00	9.40	.00	.00	.00	9.40
	TOTAL GAS FLOW	555.8	.0	.0	.0	380.8	1087.4	54.3	.0	.0	1141.7
	TOTAL MASS FLOW	555.8	.0	416.2	173.7	380.8	1179.1	54.3	72.8	7.0	1153.5

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	81.8
2	Steam to Carbonizer	.0
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	299.4
5	N2 Purges to carbonizer	98.4
6	Freeboard gas	1504.0
7	N2 Purges to cyclones	98.4
8	Primary cyclone Drain	155.5
9	Secondary cyclone Drain	170.3
10	Dusty gas to orifice	1255.1

TR2 - TEST POINT 2 12/19/91 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.6	555.8	.00	.0	419.8	128.9	.00	.00	7.169	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	4091.8	416.2	16.07	236.5	6.3	71.3	11.64	15.16	.000	19.10	40.14
N2 Purges to carbonizer	2.0	380.8	.00	.0	380.8	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.3	54.3	.00	.0	54.3	.0	.00	.00	.000	.00	.00
Total Inflow	4094.8	1407.1	16.07	236.5	861.2	200.2	11.64	15.16	7.169	19.10	40.14

OUTFLOWS

Carbonizer Drain	1374.9	173.7	.57	90.6	2.2	16.6	9.69	11.45	.000	15.90	26.61
Primary cyclone Drain	790.9	72.8	.48	49.7	1.4	3.4	1.62	2.49	.000	2.66	10.97
Secondary cyclone Drain	75.2	7.0	.05	4.9	.1	.3	.15	.19	.000	.25	1.13
Dusty gas to orifice	1648.5	1153.5	14.98	91.2	857.4	179.8	.18	1.02	7.169	.29	1.42
Heat Loss	205.3										
Total Outflow	4094.8	1407.1	16.07	236.5	861.2	200.2	11.64	15.16	7.169	19.10	40.14
Loss	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index		Mass Flows, Pounds per hour									
I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	2.22	.00	.00	.00	2.22
2	Methane	.00	.00	.00	.00	.00	4.36	.00	.00	.00	4.36
3	Ammonia	.00	.00	.00	.00	.00	.57	.00	.00	.00	.57
4	Water Vapor	.00	.00	.00	.00	.00	44.38	.00	.00	.00	44.38
5	Carbon Monoxide	.00	.00	.00	.00	.00	102.78	.00	.00	.00	102.78
6	Nitrogen	.00	.00	.00	.00	366.79	870.28	52.30	.00	.00	922.59
7	Air, dry	664.44	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	Ethane	.00	.00	.00	.00	.00	.14	.00	.00	.00	.14
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.68	.00	.00	.00	.68
11	Argon	.00	.00	.00	.00	.00	8.57	.00	.00	.00	8.57
12	Carbon Dioxide	.00	.00	.00	.00	.00	128.17	.00	.00	.00	128.17
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	4.18	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	5.17	.00	10.15	.00	9.64	.17	.33
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	36.23	3.10	.00	1.10	.00	1.09	.01	.00
18	Calcium Oxide	.00	.00	.00	.00	.00	.08	.00	.00	.00	.08
19	Calcium Sulfide	.00	.00	.29	10.06	.00	6.02	.00	5.83	.08	.11
20	Calcium Carbonate	.00	.00	42.49	2.50	.00	17.93	.00	17.09	.33	.51
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.55	.21	.00	.34	.00	.32	.01	.01
23	Coal Ash	.00	.00	22.79	7.87	.00	14.92	.00	12.98	.68	1.25
24	Coal organic matter	.00	.00	154.29	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	6.26	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	36.43	.00	36.43	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	1.88	.00	.00	1.88	.00
28	BD char organic	.00	.00	.00	.00	.00	5.88	.00	.00	.00	5.88
	TOTAL GAS FLOW	664.4	.0	.0	.0	366.8	1162.2	52.3	.0	.0	1214.5
	TOTAL MASS FLOW				Node assignments				83.4	3.2	1222.6

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	80.2
2	Steam to Carbonizer	.0
3	Coal & Sorbent Feeds	59.9
4	Carbonizer Drain	98.8
5	N2 Purges to carbonizer	102.1
6	Freeboard gas	1629.4
7	N2 Purges to cyclones	102.1
8	Primary cyclone Drain	154.6
9	Secondary cyclone Drain	170.1
10	Dusty gas to orifice	1323.9

TR2 - TEST POINT 3 12/20/91 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.5	664.4	.000	.0	501.8	154.1	.00	.000	8.569	.00	.00
Steam to Carbonizer	.0	.0	.000	.0	.0	.0	.00	.000	.000	.00	.00
Coal & Sorbent Feeds	2177.8	260.8	8.787	133.7	3.5	55.5	10.44	8.443	.000	17.18	23.34
N2 Purges to carbonizer	2.3	366.8	.000	.0	366.8	.0	.00	.000	.000	.00	.00
N2 Purges to cyclones	.3	52.3	.000	.0	52.3	.0	.00	.000	.000	.00	.00
Total Inflow	2180.9	1344.3	8.787	133.7	924.3	209.6	10.44	8.443	8.569	17.18	23.34

OUTFLOWS

Carbonizer Drain	114.4	35.2	.057	6.5	.2	5.0	4.01	4.770	.000	6.59	8.08
Primary cyclone Drain	550.7	83.4	.168	37.3	.9	12.6	6.13	2.820	.000	10.08	13.31
Secondary cyclone Drain	28.1	3.2	.014	1.8	.0	.2	.11	.078	.000	.18	.68
Dusty gas to orifice	1254.7	1222.6	8.548	88.1	923.2	191.7	.20	.775	8.569	.33	1.27
Heat Loss	233.0										
Total Outflow	2180.9	1344.3	8.787	133.7	924.3	209.6	10.44	8.443	8.569	17.18	23.34
Loss	.0	.0	.000	.0	.0	.0	.00	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index		Mass Flows, Pounds per hour									
I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.0	.0	.0	.0	.0	5.5	.0	.0	.0	5.5
2	Methane	.0	.0	.0	.0	.0	16.2	.0	.0	.0	16.2
3	Ammonia	.0	.0	.0	.0	.0	2.8	.0	.0	.0	2.8
4	Water Vapor	.0	.0	.0	.0	.0	65.9	.0	.0	.0	65.9
5	Carbon Monoxide	.0	.0	.0	.0	.0	174.1	.0	.0	.0	174.1
6	Nitrogen	.0	.0	.0	.0	339.9	1066.1	40.1	.0	.0	1106.2
7	Air, dry	959.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	Ethlyene	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9	Ethane	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10	Hydrogen Sulfide	.0	.0	.0	.0	.0	.2	.0	.0	.0	.2
11	Argon	.0	.0	.0	.0	.0	12.4	.0	.0	.0	12.4
12	Carbon Dioxide	.0	.0	.0	.0	.0	173.9	.0	.0	.0	173.9
13	Sulfur Dioxide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	Water Moisture	.0	.0	8.6	.0	.0	.0	.0	.0	.0	.0
15	Magnesium Oxide	.0	.0	.0	9.2	.0	3.0	.0	2.3	.1	.6
16	Magnesium Sulfide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	Magnesium Carbonate	.0	.0	43.5	13.0	.0	4.9	.0	4.3	.0	.5
18	Calcium Oxide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19	Calcium Sulfide	.0	.0	.3	26.4	.0	6.7	.0	5.7	.1	1.0
20	Calcium Carbonate	.0	.0	52.7	2.8	.0	4.4	.0	3.3	.2	.9
21	Calcium Sulfate	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	Sorbent Inerts	.0	.0	.7	.5	.0	.2	.0	.1	.0	.0
23	Coal Ash	.0	.0	47.2	30.1	.0	17.1	.0	13.6	.5	3.0
24	Coal organic matter	.0	.0	318.1	.0	.0	.0	.0	.0	.0	.0
25	CD char organic	.0	.0	.0	67.1	.0	.0	.0	.0	.0	.0
26	PD char organic	.0	.0	.0	.0	.0	53.4	.0	53.4	.0	.0
27	SD char organic	.0	.0	.0	.0	.0	1.7	.0	.0	1.7	.0
28	BD char organic	.0	.0	.0	.0	.0	12.7	.0	.0	.0	12.7
	TOTAL GAS FLOW	959.5	.0	.0	.0	339.9	1517.2	40.1	.0	.0	1557.2
	TOTAL MASS FLOW	959.5	.0	471.0	149.1	339.9	1621.3	40.1	82.7	2.6	1576.0

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	82.4
2	Steam to Carbonizer	.0
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	295.3
5	N2 Purges to carbonizer	106.7
6	Freeboard gas	1668.6
7	N2 Purges to cyclones	106.7
8	Primary cyclone Drain	154.7
9	Secondary cyclone Drain	170.8
10	Dusty gas to orifice	1437.1

TR2 - TEST POINT 4 12/20/91 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.3	959.5	.00	.0	725.	222.5	.00	.00	12.37	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	0.	.0	.00	.00	.00	.00	.00
Coal & Sorbent Feeds	4598.2	471.0	18.07	266.6	7.	80.3	12.53	17.15	.00	21.28	47.87
N2 Purges to carbonizer	2.5	339.9	.00	.0	340.	.0	.00	.00	.00	.00	.00
N2 Purges to cyclones	.3	40.1	.00	.0	40.	.0	.00	.00	.00	.00	.00
Total Inflow	4602.2	1810.4	18.07	266.6	1112.	302.9	12.53	17.15	12.37	21.28	47.87

OUTFLOWS

Carbonizer Drain	1137.2	149.1	.21	66.4	2.	12.4	9.30	12.85	.00	15.80	30.58
Primary cyclone Drain	814.9	82.7	.32	51.9	1.	4.9	2.62	3.41	.00	4.46	13.78
Secondary cyclone Drain	25.3	2.6	.01	1.7	0.	.1	.06	.06	.00	.11	.50
Dusty gas to orifice	2389.3	1576.0	17.53	146.6	1109.	285.4	.54	.83	12.37	.91	3.00
Heat Loss	235.6										
Total Outflow	4602.2	1810.4	18.07	266.6	1112.	302.9	12.53	17.15	12.37	21.28	47.87
Loss	.0	.0	.00	.0	0.	.0	.00	.00	.00	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.0	.0	.0	.0	.0	4.8	.0	.0	.0	4.8
2	Methane	.0	.0	.0	.0	.0	24.7	.0	.0	.0	24.7
3	Ammonia	.0	.0	.0	.0	.0	3.1	.0	.0	.0	3.1
4	Water Vapor	.0	.0	.0	.0	.0	92.2	.0	.0	.0	92.2
5	Carbon Monoxide	.0	.0	.0	.0	.0	151.9	.0	.0	.0	151.9
6	Nitrogen	.0	.0	.0	.0	305.9	1029.0	36.8	.0	.0	1065.8
7	Air, dry	955.8	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	Ethlyene	.0	.0	.0	.0	.0	.4	.0	.0	.0	.4
9	Ethane	.0	.0	.0	.0	.0	.5	.0	.0	.0	.5
10	Hydrogen Sulfide	.0	.0	.0	.0	.0	.4	.0	.0	.0	.4
11	Argon	.0	.0	.0	.0	.0	12.3	.0	.0	.0	12.3
12	Carbon Dioxide	.0	.0	.0	.0	.0	194.3	.0	.0	.0	194.3
13	Sulfur Dioxide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	Water Moisture	.0	.0	11.6	.0	.0	.0	.0	.0	.0	.0
15	Magnesium Oxide	.0	.0	.0	14.0	.0	8.2	.0	7.5	.2	.4
16	Magnesium Sulfide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	Magnesium Carbonate	.0	.0	68.3	11.9	.0	10.1	.0	9.6	.1	.4
18	Calcium Oxide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19	Calcium Sulfide	.0	.0	.6	26.4	.0	15.1	.0	14.1	.2	.8
20	Calcium Carbonate	.0	.0	81.2	12.7	.0	11.7	.0	10.8	.4	.5
21	Calcium Sulfate	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	Sorbent Inerts	.0	.0	1.0	.6	.0	.4	.0	.4	.0	.0
23	Coal Ash	.0	.0	61.6	34.7	.0	26.8	.0	23.6	1.0	2.2
24	Coal organic matter	.0	.0	415.9	.0	.0	.0	.0	.0	.0	.0
25	CD char organic	.0	.0	.0	111.8	.0	.0	.0	.0	.0	.0
26	PD char organic	.0	.0	.0	.0	.0	89.8	.0	89.8	.0	.0
27	SD char organic	.0	.0	.0	.0	.0	3.8	.0	.0	3.8	.0
28	BD char organic	.0	.0	.0	.0	.0	10.4	.0	.0	.0	10.4
	TOTAL GAS FLOW	955.8	.0	.0	.0	305.9	1513.6	36.8	.0	.0	1550.4
	TOTAL MASS FLOW	955.8	.0	640.2	212.1	305.9	1689.8	36.8	155.8	5.7	1565.1

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	83.8
2	Steam to Carbonizer	.0
3	Coal & Sorbent Feeds	59.8
4	Carbonizer Drain	368.0
5	N2 Purges to carbonizer	113.9
6	Freeboard gas	1589.5
7	N2 Purges to cyclones	113.9
8	Primary cyclone Drain	165.7
9	Secondary cyclone Drain	172.1
10	Dusty gas to orifice	1400.3

TR2 - TEST POINT 5 12/20/91 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.6	955.8	.00	.0	722.	221.7	.00	.00	12.33	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	0.	.0	.00	.00	.00	.00	.00
Coal & Sorbent Feeds	5889.2	640.2	23.39	348.7	9.	121.3	19.70	22.34	.00	32.84	62.51
N2 Purges to carbonizer	2.8	305.9	.00	.0	306.	.0	.00	.00	.00	.00	.00
N2 Purges to cyclones	.3	36.8	.00	.0	37.	.0	.00	.00	.00	.00	.00
Total Inflow	5893.9	1938.7	23.39	348.7	1074.	342.9	19.70	22.34	12.33	32.84	62.51

OUTFLOWS

Carbonizer Drain	1757.6	212.1	.58	109.6	3.	18.4	11.85	13.80	.00	19.75	35.31
Primary cyclone Drain	1373.6	155.8	.63	88.2	2.	13.6	7.30	7.54	.00	12.17	24.00
Secondary cyclone Drain	56.4	5.7	.03	3.7	0.	.3	.18	.18	.00	.29	.98
Dusty gas to orifice	2457.5	1565.1	22.15	147.4	1069.	310.5	.38	.82	12.33	.63	2.22
Heat Loss	248.8										
Total Outflow	5893.9	1938.7	23.39	348.7	1074.	342.9	19.70	22.34	12.33	32.84	62.51
Loss	.0	.0	.00	.0	0.	.0	.00	.00	.00	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	4.05	.00	.00	.00	4.05
2	Methane		.00	.00	.00	.00	.00	9.39	.00	.00	.00	9.39
3	Ammonia		.00	.00	.00	.00	.00	1.97	.00	.00	.00	1.97
4	Water Vapor		.00	55.54	.00	.00	.00	91.54	.00	.00	.00	91.54
5	Carbon Monoxide		.00	.00	.00	.00	.00	86.31	.00	.00	.00	86.31
6	Nitrogen		.00	.00	.00	.00	307.81	811.75	33.34	.00	.00	845.09
7	Air, dry		666.40	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.14	.00	.00	.00	.14
9	Ethane		.00	.00	.00	.00	.00	.08	.00	.00	.00	.08
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.21	.00	.00	.00	.21
11	Argon		.00	.00	.00	.00	.00	8.59	.00	.00	.00	8.59
12	Carbon Dioxide		.00	.00	.00	.00	.00	171.27	.00	.00	.00	171.27
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	5.42	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	13.29	.00	7.91	.00	6.63	.34	.95
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	44.35	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	2.38	.00	2.30	.00	1.45	.14	.70
19	Calcium Sulfide		.00	.00	.37	9.99	.00	4.29	.00	3.80	.15	.34
20	Calcium Carbonate		.00	.00	51.84	14.72	.00	9.47	.00	8.49	.36	.61
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.62	.39	.00	.23	.00	.19	.01	.03
23	Coal Ash		.00	.00	28.35	16.76	.00	11.59	.00	9.65	.52	1.42
24	Coal organic matter		.00	.00	198.99	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	23.67	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	43.68	.00	43.68	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	2.24	.00	.00	2.24	.00
28	BD char organic		.00	.00	.00	.00	.00	11.49	.00	.00	.00	11.49
	TOTAL GAS FLOW		666.4	55.5	.0	.0	307.8	1185.3	33.3	.0	.0	1218.6
	TOTAL MASS FLOW		666.4	55.5	329.9	81.2	307.8	1278.5	33.3	73.9	3.8	1234.2

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	78.4
2	Steam to Carbonizer	387.8
3	Coal & Sorbent Feeds	59.9
4	Carbonizer Drain	98.6
5	N2 Purges to carbonizer	146.7
6	Freeboard gas	1582.9
7	N2 Purges to cyclones	146.8
8	Primary cyclone Drain	168.4
9	Secondary cyclone Drain	181.6
10	Dusty gas to orifice	1325.8

TR4 - TEST POINT 1 03/10/92 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.2	666.4	.00	.0	503.2	154.6	.00	.000	8.594	.00	.00
Steam to Carbonizer	66.2	55.5	6.22	.0	.0	49.3	.00	.000	.000	.00	.00
Coal & Sorbent Feeds	2822.1	329.9	11.32	171.0	4.4	72.6	12.79	7.902	.000	20.96	28.97
N2 Purges to carbonizer	5.3	307.8	.00	.0	307.8	.0	.00	.000	.000	.00	.00
N2 Purges to cyclones	.6	33.3	.00	.0	33.3	.0	.00	.000	.000	.00	.00
Total Inflow	2894.4	1393.0	17.54	171.0	848.8	276.5	12.79	7.902	8.594	20.96	28.97

OUTFLOWS

Carbonizer Drain	387.1	81.2	.10	24.2	.6	13.0	8.02	4.921	.000	13.14	17.15
Primary cyclone Drain	658.7	73.9	.28	42.8	1.0	7.1	4.00	2.271	.000	6.55	9.84
Secondary cyclone Drain	33.4	3.8	.01	2.2	.1	.3	.20	.113	.000	.33	.53
Dusty gas to orifice	1589.3	1234.2	17.14	101.8	847.1	256.0	.57	.597	8.594	.94	1.45
Heat Loss	225.9										
Total Outflow	2894.4	1393.0	17.54	171.0	848.8	276.5	12.79	7.902	8.594	20.96	28.97
Loss	.0	.0	.00	.0	.0	.0	.00	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	5.04	.00	.00	.00	5.04
2	Methane		.00	.00	.00	.00	.00	12.69	.00	.00	.00	12.69
3	Ammonia		.00	.00	.00	.00	.00	2.73	.00	.00	.00	2.73
4	Water Vapor		.00	118.27	.00	.00	.00	150.50	.00	.00	.00	150.50
5	Carbon Monoxide		.00	.00	.00	.00	.00	58.08	.00	.00	.00	58.08
6	Nitrogen		.00	.00	.00	.00	289.83	776.62	33.71	.00	.00	810.34
7	Air, dry		644.26	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.43	.00	.00	.00	.43
9	Ethane		.00	.00	.00	.00	.00	.31	.00	.00	.00	.31
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	1.46	.00	.00	.00	1.46
11	Argon		.00	.00	.00	.00	.00	8.31	.00	.00	.00	8.31
12	Carbon Dioxide		.00	.00	.00	.00	.00	185.01	.00	.00	.00	185.01
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	6.41	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	8.17	.00	5.60	.00	4.85	.28	.47
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	40.93	12.13	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	.74	.00	.26	.11	.37
19	Calcium Sulfide		.00	.00	.34	11.25	.00	3.39	.00	3.08	.15	.17
20	Calcium Carbonate		.00	.00	48.08	19.05	.00	7.86	.00	7.31	.29	.26
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.58	.42	.00	.17	.00	.14	.01	.01
23	Coal Ash		.00	.00	32.36	18.81	.00	13.55	.00	12.19	.63	.72
24	Coal organic matter		.00	.00	231.89	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	41.83	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	60.32	.00	60.32	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	2.67	.00	.00	2.67	.00
28	BD char organic		.00	.00	.00	.00	.00	5.82	.00	.00	.00	5.82
	TOTAL GAS FLOW		644.3	118.3	.0	.0	289.8	1201.2	33.7	.0	.0	1234.9
	TOTAL MASS FLOW		644.3	118.3	360.6	111.7	289.8	1301.3	33.7	88.2	4.1	1242.7

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	78.9
2	Steam to Carbonizer	394.4
3	Coal & Sorbent Feeds	59.9
4	Carbonizer Drain	214.5
5	N2 Purges to carbonizer	115.6
6	Freeboard gas	1530.5
7	N2 Purges to cyclones	115.6
8	Primary cyclone Drain	163.1
9	Secondary cyclone Drain	185.5
10	Dusty gas to orifice	1292.3

TR4 - TEST POINT 2 03/11/92 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.3	644.3	.00	.0	486.5	149.4	.00	.000	8.309	.00	.00
Steam to Carbonizer	141.4	118.3	13.23	.0	.0	105.0	.00	.000	.000	.00	.00
Coal & Sorbent Feeds	3328.6	360.6	13.38	196.4	5.1	72.4	11.80	9.162	.000	19.44	32.94
N2 Purges to carbonizer	2.8	289.8	.00	.0	289.8	.0	.00	.000	.000	.00	.00
N2 Purges to cyclones	.3	33.7	.00	.0	33.7	.0	.00	.000	.000	.00	.00
Total Inflow	3473.3	1446.7	26.62	196.4	815.2	326.8	11.80	9.162	8.309	19.44	32.94

OUTFLOWS

Carbonizer Drain	664.6	111.7	.27	44.7	.9	19.3	8.42	4.998	.000	13.88	19.23
Primary cyclone Drain	922.0	88.2	.51	58.2	1.4	5.5	2.93	2.468	.000	4.82	12.33
Secondary cyclone Drain	41.2	4.1	.02	2.6	.1	.3	.17	.130	.000	.28	.64
Dusty gas to orifice	1619.2	1242.7	25.83	91.0	812.8	301.8	.28	1.565	8.309	.47	.74
Heat Loss	226.3										
Total Outflow	3473.3	1446.7	26.62	196.4	815.2	326.8	11.80	9.162	8.309	19.44	32.94
Loss	.0	.0	.00	.0	.0	.0	.00	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	4.55	.00	.00	.00	4.55
2	Methane	.00	.00	.00	.00	.00	5.26	.00	.00	.00	5.26
3	Ammonia	.00	.00	.00	.00	.00	.69	.00	.00	.00	.69
4	Water Vapor	.00	96.26	.00	.00	.00	127.13	.00	.00	.00	127.13
5	Carbon Monoxide	.00	.00	.00	.00	.00	71.59	.00	.00	.00	71.59
6	Nitrogen	.00	.00	.00	.00	124.98	579.74	37.01	.00	00	616.75
7	Air, dry	600.47	.00	.00	.00	.00	.00	.00	.00	00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.03	.00	.00	00	.03
9	Ethane	.00	.00	.00	.00	.00	.00	.00	.00	00	.00
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.21	.00	.00	.00	.21
11	Argon	.00	.00	.00	.00	.00	7.74	.00	.00	.00	7.74
12	Carbon Dioxide	.00	.00	.00	.00	.00	156.51	.00	.00	.00	156.51
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	4.43	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	12.33	.00	6.35	.00	5.46	.59	.30
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	39.09	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	4.44	.00	3.79	.00	3.19	.38	.22
19	Calcium Sulfide	.00	.00	.33	10.15	.00	1.65	.00	1.44	.17	.04
20	Calcium Carbonate	.00	.00	45.93	8.61	.00	6.71	.00	5.85	.55	.31
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.56	.37	.00	.19	.00	.16	.02	.01
23	Coal Ash	.00	.00	23.24	15.22	.00	8.02	.00	6.39	1.07	.56
24	Coal organic matter	.00	.00	174.77	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	15.36	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	56.36	.00	56.36	00	.00
27	SD char organic	.00	.00	.00	.00	.00	3.78	.00	.00	3.78	.00
28	BD char organic	.00	.00	.00	.00	.00	3.27	.00	00	00	3.27
	TOTAL GAS FLOW	600.5	96.3	.0	.0	125.0	953.4	37.0	.0	.0	990.5
	TOTAL MASS FLOW	600.5	96.3	288.3	66.5	125.0	1043.6	37.0	78.8	5.6	995.2

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	81.2
2	Steam to Carbonizer	393.9
3	Coal & Sorbent Feeds	59.9
4	Carbonizer Drain	279.9
5	N2 Purges to carbonizer	93.1
6	Freeboard gas	1590.9
7	N2 Purges to cyclones	93.1
8	Primary cyclone Drain	163.0
9	Secondary cyclone Drain	188.1
10	Dusty gas to orifice	1310.7

TR4 - TEST POINT 3 03/12/92 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.6	600.5	.00	.0	453.5	139.3	.00	.000	7.744	.00	.00
Steam to Carbonizer	115.0	96.3	10.77	.0	.0	85.5	.00	.000	.000	.00	.00
Coal & Sorbent Feeds	2500.3	288.3	10.09	153.9	3.8	60.0	11.27	6.901	.000	18.57	23.79
N2 Purges to carbonizer	.5	125.0	.00	.0	125.0	.0	.00	.000	.000	.00	.00
N2 Purges to cyclones	.1	37.0	.00	.0	37.0	.0	.00	.000	.000	.00	.00
Total Inflow	2616.5	1147.0	20.86	153.9	619.3	284.7	11.27	6.901	7.744	18.57	23.79

OUTFLOWS

Carbonizer Drain	230.1	66.5	.22	15.1	.4	10.3	7.44	5.228	.000	12.26	15.58
Primary cyclone Drain	830.4	78.8	.35	54.6	1.4	5.9	3.29	1.289	.000	5.42	6.55
Secondary cyclone Drain	55.8	6.6	.02	3.7	.1	.6	.36	.118	.000	.59	1.09
Dusty gas to orifice	1280.8	995.2	20.27	80.5	617.4	267.9	.18	.266	7.744	.30	.57
Heat Loss	219.4										
Total Outflow	2616.5	1147.0	20.86	153.9	619.3	284.7	11.27	6.901	7.744	18.57	23.79
Loss	.0	.0	.00	.0	.0	.0	.00	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	4.42	.00	.00	.00	4.42
2	Methane		.00	.00	.00	.00	.00	10.16	.00	.00	.00	10.16
3	Ammonia		.00	.00	.00	.00	.00	1.32	.00	.00	.00	1.32
4	Water Vapor		.00	78.06	.00	.00	.00	107.60	.00	.00	.00	107.60
5	Carbon Monoxide		.00	.00	.00	.00	.00	53.29	.00	.00	.00	53.29
6	Nitrogen		.00	.00	.00	.00	243.78	655.62	37.28	.00	.00	692.89
7	Air, dry		544.26	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.63	.00	.00	.00	.63
9	Ethane		.00	.00	.00	.00	.00	.28	.00	.00	.00	.28
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.49	.00	.00	.00	.49
11	Argon		.00	.00	.00	.00	.00	7.02	.00	.00	.00	7.02
12	Carbon Dioxide		.00	.00	.00	.00	.00	155.64	.00	.00	.00	155.64
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	5.54	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	12.95	.00	3.24	.00	2.33	.40	.52
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	43.18	7.71	.00	1.60	.00	1.47	.00	.13
18	Calcium Oxide		.00	.00	.00	.00	.00	.20	.00	.00	.20	.00
19	Calcium Sulfide		.00	.00	.36	10.36	.00	2.32	.00	1.86	.19	.27
20	Calcium Carbonate		.00	.00	50.52	26.75	.00	6.31	.00	4.91	.36	1.05
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.58	.47	.00	.11	.00	.09	.01	.02
23	Coal Ash		.00	.00	26.32	14.70	.00	11.63	.00	8.48	.83	2.32
24	Coal organic matter		.00	.00	195.97	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	40.01	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	37.47	.00	37.47	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	3.50	.00	.00	3.50	.00
28	BD char organic		.00	.00	.00	.00	.00	12.79	.00	.00	.00	12.79
	TOTAL GAS FLOW		544.3	78.1	.0	.0	243.8	996.5	37.3	.0	.0	1033.7
	TOTAL MASS FLOW		544.3	78.1	322.5	112.9	243.8	1075.6	37.3	56.6	5.5	1050.8

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	77.4
2	Steam to Carbonizer	394.6
3	Coal & Sorbent Feeds	59.8
4	Carbonizer Drain	237.2
5	N2 Purges to carbonizer	201.7
6	Freeboard gas	1524.1
7	N2 Purges to cyclones	201.8
8	Primary cyclone Drain	254.6
9	Secondary cyclone Drain	232.5
10	Dusty gas to orifice	1258.5

TR4 - TEST POINT 4 03/12/92 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.1	544.3	.00	.0	411.0	126.2	.00	.300	7.019	.00	.00
Steam to Carbonizer	93.3	78.1	8.74	.0	.0	69.3	.00	.300	.000	.00	.00
Coal & Sorbent Feeds	2760.8	322.5	11.38	168.0	4.3	71.2	12.45	7.738	.000	20.43	26.91
N2 Purges to carbonizer	1.5	243.8	.00	.0	243.8	.0	.00	.300	.000	.00	.00
N2 Purges to cyclones	.2	37.3	.00	.0	37.3	.0	.00	.300	.000	.00	.00
Total Inflow	2855.9	1225.9	20.11	168.0	696.4	266.8	12.45	7.738	7.019	20.43	26.91

OUTFLOWS

Carbonizer Drain	563.8	112.9	.24	42.2	1.0	22.4	10.03	5.445	.000	16.47	15.17
Primary cyclone Drain	566.3	56.6	.31	36.5	.9	4.1	1.83	1.378	.000	3.00	8.57
Secondary cyclone Drain	53.0	5.5	.03	3.4	.1	.4	.24	.130	.000	.39	.84
Dusty gas to orifice	1461.7	1050.8	19.54	86.0	694.3	239.9	.35	.784	7.019	.57	2.34
Heat Loss	211.1										
Total Outflow	2855.9	1225.9	20.11	168.0	696.4	266.8	12.45	7.738	7.019	20.43	26.91
Loss	.0	.0	.00	.0	.0	.0	.00	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	9.07	.00	.00	.00	9.07
2	Methane	.00	.00	.00	.00	.00	12.69	.00	.00	.00	12.69
3	Ammonia	.00	.00	.00	.00	.00	1.52	.00	.00	.00	1.52
4	Water Vapor	.00	142.73	.00	.00	.00	169.21	.00	.00	.00	169.21
5	Carbon Monoxide	.00	.00	.00	.00	.00	130.03	.00	.00	.00	130.03
6	Nitrogen	.00	.00	.00	.00	167.04	845.30	27.33	.00	.00	872.63
7	Air, dry	895.51	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	Ethane	.00	.00	.00	.00	.00	.21	.00	.00	.00	.21
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.12	.00	.00	.00	.12
11	Argon	.00	.00	.00	.00	.00	11.55	.00	.00	.00	11.55
12	Carbon Dioxide	.00	.00	.00	.00	.00	239.79	.00	.00	.00	239.79
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	7.78	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	19.30	.00	3.35	.00	2.99	.10	.26
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	48.31	.00	.00	.94	.00	.35	.00	.59
18	Calcium Oxide	.00	.00	.00	2.67	.00	.03	.00	.00	.03	.00
19	Calcium Sulfide	.00	.00	.40	18.22	.00	2.98	.00	2.49	.04	.45
20	Calcium Carbonate	.00	.00	56.72	17.81	.00	5.24	.00	4.38	.13	.73
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.69	.58	.00	.11	.00	.09	.00	.02
23	Coal Ash	.00	.00	30.39	.92	.00	29.47	.00	24.64	.83	4.01
24	Coal organic matter	.00	.00	290.97	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	37.66	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	62.02	.00	62.02	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	2.13	.00	.00	2.13	.00
28	BD char organic	.00	.00	.00	.00	.00	17.65	.00	.00	.00	17.65
	TOTAL GAS FLOW	895.5	142.7	.0	.0	167.0	1419.5	27.3	.0	3	1446.8
	TOTAL MASS FLOW	895.5	142.7	435.3	97.2	167.0	1543.4	27.3	97.0	3.3	1470.5

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	78.1
2	Steam to Carbonizer	394.1
3	Coal & Sorbent Feeds	59.9
4	Carbonizer Drain	140.5
5	N2 Purges to carbonizer	99.4
6	Freeboard gas	1637.6
7	N2 Purges to cyclones	99.4
8	Primary cyclone Drain	161.1
9	Secondary cyclone Drain	190.4
10	Dusty gas to orifice	1429.1

TR4 - TEST POINT 5 03/13/92 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.2	895.5	.00	.0	676.3	207.7	.00	.00	11.55	.00	.00
Steam to Carbonizer	170.6	142.7	15.97	.0	.0	126.8	.00	.00	.00	.00	.00
Coal & Sorbent Feeds	4139.1	435.3	16.43	247.3	6.4	85.8	13.93	11.44	.00	22.94	31.08
N2 Purges to carbonizer	.9	167.0	.00	.0	167.0	.0	.00	.00	.00	.00	.00
N2 Purges to cyclones	.2	27.3	.00	.0	27.3	.0	.00	.00	.00	.00	.00
Total Inflow	4311.0	1667.9	32.40	247.3	877.0	420.2	13.93	11.44	11.55	22.94	31.08

OUTFLOWS

Carbonizer Drain	603.8	97.2	.36	37.7	1.0	17.0	11.64	8.87	.00	19.16	1.50
Primary cyclone Drain	927.8	97.0	.39	59.8	1.6	3.5	1.91	1.94	.00	3.14	24.73
Secondary cyclone Drain	30.7	3.3	.01	2.1	.0	.1	.06	.04	.00	.09	.83
Dusty gas to orifice	2508.3	1470.5	31.64	147.8	874.4	399.7	.33	.59	11.55	.54	4.02
Heat Loss	240.3										
Total Outflow	4311.0	1667.9	32.40	247.3	877.0	420.2	13.93	11.44	11.55	22.94	31.08
Loss	.0	.0	.00	.0	.0	.0	.00	.00	.00	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	7.19	.00	.00	.00	7.19
2	Methane	.00	.00	.00	.00	.00	16.06	.00	.00	.00	16.06
3	Ammonia	.00	.00	.00	.00	.00	.91	.00	.00	.00	.91
4	Water Vapor	.00	85.07	.00	.00	.00	127.12	.00	.00	.00	127.12
5	Carbon Monoxide	.00	.00	.00	.00	.00	120.56	.00	.00	.00	120.56
6	Nitrogen	.00	.00	.00	.00	161.90	783.26	38.78	.00	.00	822.04
7	Air, dry	819.23	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.04	.00	.00	.00	.04
9	Ethane	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.14	.00	.00	.00	.14
11	Argon	.00	.00	.00	.00	.00	10.57	.00	.00	.00	10.57
12	Carbon Dioxide	.00	.00	.00	.00	.00	212.39	.00	.00	.00	212.39
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	8.52	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	19.05	.00	3.62	.00	2.48	.28	.87
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	48.28	.00	.00	.86	.00	.86	.00	.00
18	Calcium Oxide	.00	.00	.00	2.85	.00	.74	.00	.00	.26	.47
19	Calcium Sulfide	.00	.00	.40	19.15	.00	3.19	.00	2.68	.07	.45
20	Calcium Carbonate	.00	.00	56.72	15.62	.00	4.27	.00	3.45	.13	.69
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.69	.57	.00	.12	.00	.09	.01	.03
23	Coal Ash	.00	.00	27.42	.30	.00	27.12	.00	22.99	.81	3.32
24	Coal organic matter	.00	.00	297.40	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	60.14	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	52.74	.00	52.74	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	2.83	.00	.00	2.83	.00
28	BD char organic	.00	.00	.00	.00	.00	14.24	.00	.00	.00	14.24
	TOTAL GAS FLOW	819.2	85.1	.0	.0	161.9	1278.2	38.8	.0	.0	1317.0
	TOTAL MASS FLOW	819.2	85.1	439.4	117.7	161.9	1388.0	38.8	85.3	4.4	1337.1

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	81.6
2	Steam to Carbonizer	394.7
3	Coal & Sorbent Feeds	59.8
4	Carbonizer Drain	292.2
5	N2 Purges to carbonizer	102.5
6	Freeboard gas	1601.8
7	N2 Purges to cyclones	102.5
8	Primary cyclone Drain	155.6
9	Secondary cyclone Drain	182.3
10	Dusty gas to orifice	1408.7

TR4 - TEST POINT 6 03/13/92 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.9	819.2	.00	.0	618.7	190.0	.00	.00	10.57	.00	.00
Steam to Carbonizer	101.7	85.1	9.52	.0	.0	75.5	.00	.00	.00	.00	.00
Coal & Sorbent Feeds	4218.5	439.4	16.95	248.6	6.5	90.7	13.92	11.72	.00	22.93	28.11
N2 Purges to carbonizer	1.0	161.9	.00	.0	161.9	.0	.00	.00	.00	.00	.00
N2 Purges to cyclones	.2	38.8	.00	.0	38.8	.0	.00	.00	.00	.00	.00
Total Inflow	4322.3	1544.4	26.47	248.6	825.9	356.2	13.92	11.72	10.57	22.93	28.11

OUTFLOWS

Carbonizer Drain	1008.7	117.7	.38	59.7	1.2	15.9	11.49	9.21	.00	18.93	.87
Primary cyclone Drain	806.2	85.3	.33	50.7	1.5	3.1	1.74	1.94	.00	2.87	23.08
Secondary cyclone Drain	40.7	4.4	.02	2.7	.1	.2	.17	.06	.00	.28	.82
Dusty gas to orifice	2249.4	1337.1	25.74	135.4	823.1	337.0	.52	.51	10.57	.86	3.35
Heat Loss	217.3										
Total Outflow	4322.3	1544.4	26.47	248.6	825.9	356.2	13.92	11.72	10.57	22.93	28.11
Loss	.0	.0	.00	.0	.0	.0	.00	.00	.00	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	5.76	.00	.00	.00	5.76
2	Methane	.00	.00	.00	.00	.00	17.87	.00	.00	.00	17.87
3	Ammonia	.00	.00	.00	.00	.00	1.38	.00	.00	.00	1.38
4	Water Vapor	.00	51.73	.00	.00	.00	123.36	.00	.00	.00	123.36
5	Carbon Monoxide	.00	.00	.00	.00	.00	88.31	.00	.00	.00	88.31
6	Nitrogen	.00	.00	.00	.00	295.76	878.46	37.46	.00	.00	915.92
7	Air, dry	769.58	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.71	.00	.00	.00	.71
9	Ethane	.00	.00	.00	.00	.00	.51	.00	.00	.00	.51
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.50	.00	.00	.00	.50
11	Argon	.00	.00	.00	.00	.00	9.93	.00	.00	.00	9.93
12	Carbon Dioxide	.00	.00	.00	.00	.00	202.08	.00	.00	.00	202.08
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	9.62	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	27.55	.00	9.08	.00	7.37	1.28	.43
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	82.66	5.18	.00	.83	.00	.00	.67	.16
18	Calcium Oxide	.00	.00	.00	.00	.00	1.24	.00	1.24	.00	.00
19	Calcium Sulfide	.00	.00	.69	14.57	.00	5.37	.00	4.09	.87	.41
20	Calcium Carbonate	.00	.00	97.05	54.29	.00	13.86	.00	10.40	2.76	.71
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	1.15	.88	.00	.28	.00	.22	.05	.01
23	Coal Ash	.00	.00	50.17	40.81	.00	9.36	.00	4.70	2.18	2.47
24	Coal organic matter	.00	.00	352.46	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	126.97	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	40.53	.00	40.53	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	18.36	.00	.00	18.36	.00
28	BD char organic	.00	.00	.00	.00	.00	12.85	.00	.00	.00	12.85
	TOTAL GAS FLOW	769.6	51.7	.0	.0	295.8	1328.9	37.5	.0	.0	1366.3
	TOTAL MASS FLOW	769.6	51.7	593.8	270.2	295.8	1440.6	37.5	68.5	26.2	1383.4

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	82.3
2	Steam to Carbonizer	394.6
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	387.1
5	N2 Purges to carbonizer	115.5
6	Freeboard gas	1546.3
7	N2 Purges to cyclones	115.5
8	Primary cyclone Drain	151.7
9	Secondary cyclone Drain	176.1
10	Dusty gas to orifice	1347.2

TR4 - TEST POINT 7 03/13/92 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.0	769.6	.00	.0	581.2	178.5	.00	.00	9.925	.00	.00
Steam to Carbonizer	61.8	51.7	5.79	.0	.0	45.9	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	5048.7	593.8	20.10	304.1	7.7	133.5	23.83	13.92	.000	39.25	51.32
N2 Purges to carbonizer	2.8	295.8	.00	.0	295.8	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.4	37.5	.00	.0	37.5	.0	.00	.00	.000	.00	.00
Total Inflow	5114.7	1748.3	25.89	304.1	922.1	357.9	23.83	13.92	9.925	39.25	51.32

OUTFLOWS

Carbonizer Drain	1959.2	270.2	.78	127.7	3.0	39.9	18.11	9.18	.000	29.83	41.69
Primary cyclone Drain	606.0	68.5	.31	39.0	1.1	8.3	4.44	3.13	.000	7.32	4.92
Secondary cyclone Drain	274.5	26.2	.15	17.7	.6	2.2	.96	.75	.000	1.59	2.23
Dusty gas to orifice	2057.2	1383.4	24.64	119.8	917.4	307.5	.31	.86	9.925	.51	2.49
Heat Loss	217.7										
Total Outflow	5114.7	1748.3	25.89	304.1	922.1	357.9	23.83	13.92	9.925	39.25	51.32
Loss	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	6.17	.00	.00	.00	6.17
2	Methane		.00	.00	.00	.00	.00	18.06	.00	.00	.00	18.06
3	Ammonia		.00	.00	.00	.00	.00	1.21	.00	.00	.00	1.21
4	Water Vapor		.00	53.47	.00	.00	.00	99.10	.00	.00	.00	99.10
5	Carbon Monoxide		.00	.00	.00	.00	.00	75.76	.00	.00	.00	75.76
6	Nitrogen		.00	.00	.00	.00	302.12	871.44	35.88	.00	.00	907.32
7	Air, dry		751.60	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.43	.00	.00	.00	.43
9	Ethane		.00	.00	.00	.00	.00	.30	.00	.00	.00	.30
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	1.64	.00	.00	.00	1.64
11	Argon		.00	.00	.00	.00	.00	9.69	.00	.00	.00	9.69
12	Carbon Dioxide		.00	.00	.00	.00	.00	204.65	.00	.00	.00	204.65
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	7.40	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	27.25	.00	3.62	.00	2.50	.18	.94
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	68.38	1.50	.00	2.31	.00	2.26	.05	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	.34	.00	.00	.00	.34
19	Calcium Sulfide		.00	.00	.57	8.95	.00	3.39	.00	2.80	.09	.50
20	Calcium Carbonate		.00	.00	80.00	56.70	.00	6.37	.00	4.97	.36	1.03
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.95	.81	.00	.14	.00	.10	.01	.03
23	Coal Ash		.00	.00	37.90	22.58	.00	15.32	.00	13.35	.29	1.69
24	Coal organic matter		.00	.00	302.07	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	86.62	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	64.36	.00	64.36	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	2.32	.00	.00	2.32	.00
28	BD char organic		.00	.00	.00	.00	.00	13.43	.00	.00	.00	13.43
	TOTAL GAS FLOW		751.6	53.5	.0	.0	302.1	1288.5	35.9	.0	.0	1324.3
	TOTAL MASS FLOW		751.6	53.5	497.3	204.4	302.1	1400.1	35.9	90.4	3.3	1342.3

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	82.2
2	Steam to Carbonizer	395.0
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	339.1
5	N2 Purges to carbonizer	125.0
6	Freeboard gas	1558.4
7	N2 Purges to cyclones	125.0
8	Primary cyclone Drain	162.4
9	Secondary cyclone Drain	187.9
10	Dusty gas to orifice	1367.0

TR4 - TEST POINT 8 03/14/92 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.9	751.6	.00	.0	567.6	174.3	.00	.00	9.693	.00	.00
Steam to Carbonizer	63.9	53.5	5.98	.0	.0	47.5	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	4358.2	497.3	17.33	267.5	6.6	103.0	19.71	11.92	.000	32.35	38.85
N2 Purges to carbonizer	3.6	302.1	.00	.0	302.1	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.4	35.9	.00	.0	35.9	.0	.00	.00	.000	.00	.00
Total Inflow	4427.1	1640.3	23.32	267.5	912.2	324.8	19.71	11.92	9.693	32.35	38.85

OUTFLOWS

Carbonizer Drain	1234.0	204.4	.44	88.0	2.0	38.9	16.86	7.13	.000	27.68	23.39
Primary cyclone Drain	946.3	90.4	.50	61.9	1.5	4.7	2.16	2.71	.000	3.55	13.45
Secondary cyclone Drain	34.9	3.3	.02	2.3	.1	.3	.12	.08	.000	.20	.29
Dusty gas to orifice	1999.5	1342.3	22.36	115.3	908.7	281.0	.57	2.00	9.693	.93	1.71
Heat Loss	212.4										
Total Outflow	4427.1	1640.3	23.32	267.5	912.2	324.8	19.71	11.92	9.693	32.35	38.85
Loss	.0	.0	.00	.0	.0	.0	.00	.00	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	6.75	.00	.00	.00	6.75
2	Methane	.00	.00	.00	.00	.00	7.68	.00	.00	.00	7.68
3	Ammonia	.00	.00	.00	.00	.00	1.88	.00	.00	.00	1.88
4	Water Vapor	.00	90.66	.00	.00	.00	91.80	.00	.00	.00	91.80
5	Carbon Monoxide	.00	.00	.00	.00	.00	104.11	.00	.00	.00	104.11
6	Nitrogen	.00	.00	.00	.00	203.41	685.05	32.25	.00	.00	717.30
7	Air, dry	636.09	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.03	.00	.00	.00	.03
9	Ethane	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	1.73	.00	.00	.00	1.73
11	Argon	.00	.00	.00	.00	.00	8.20	.00	.00	.00	8.20
12	Carbon Dioxide	.00	.00	.00	.00	.00	161.40	.00	.00	.00	161.40
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	3.33	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	8.89	.00	1.17	.00	.87	.14	.16
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	21.04	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	9.72	.00	.34	.00	.19	.05	.11
19	Calcium Sulfide	.00	.00	.28	3.29	.00	.99	.00	.88	.04	.06
20	Calcium Carbonate	.00	.00	37.86	11.89	.00	2.45	.00	1.76	.37	.32
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.22	.20	.00	.03	.00	.02	.00	.00
23	Coal Ash	.00	.00	23.85	14.19	.00	9.66	.00	8.57	.52	.58
24	Coal organic matter	.00	.00	176.65	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	20.77	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	32.76	.00	32.76	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	2.67	.00	.00	2.67	.00
28	BD char organic	.00	.00	.00	.00	.00	5.72	.00	.00	.00	5.72
	TOTAL GAS FLOW	636.1	90.7	.0	.0	203.4	1068.6	32.2	.0	.0	1100.9
	TOTAL MASS FLOW	636.1	90.7	263.2	69.0	203.4	1124.4	32.2	45.0	3.8	1107.9

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	82.8
2	Steam to Carbonizer	387.6
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	103.4
5	N2 Purges to carbonizer	107.4
6	Freeboard gas	1610.0
7	N2 Purges to cyclones	107.4
8	Primary cyclone Drain	143.0
9	Secondary cyclone Drain	190.1
10	Dusty gas to orifice	1323.7

TR5 - TEST POINT 1 3/24/92 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.9	636.1	.00	.0	480.4	147.5	.000	.000	8.204	.00	.00
Steam to Carbonizer	108.1	90.7	10.15	.0	.0	80.5	.000	.000	.000	.00	.00
Coal & Sorbent Feeds	2587.5	263.2	9.74	155.9	4.1	44.0	6.065	3.928	.000	15.32	24.07
N2 Purges to carbonizer	1.5	203.4	.00	.0	203.4	.0	.000	.000	.000	.00	.00
N2 Purges to cyclones	.2	32.2	.00	.0	32.2	.0	.000	.000	.000	.00	.00
Total Inflow	2698.3	1225.6	19.89	155.9	720.1	272.1	6.065	3.928	8.204	15.32	24.07

OUTFLOWS

Carbonizer Drain	294.6	69.0	.19	21.5	.4	12.0	5.362	1.569	.000	13.54	14.39
Primary cyclone Drain	473.3	45.0	.24	31.8	.7	1.2	.526	.603	.000	1.33	8.59
Secondary cyclone Drain	38.6	3.8	.02	2.6	.1	.2	.081	.047	.000	.21	.52
Dusty gas to orifice	1679.6	1107.9	19.44	100.0	719.0	258.6	.096	1.708	8.204	.24	.58
Heat Loss	212.1										
Total Outflow	2698.3	1225.6	19.89	155.9	720.1	272.1	6.065	3.928	8.204	15.32	24.07
Loss	.0	.0	.00	.0	.0	.0	.000	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	4.49	.00	.00	.00	4.49
2	Methane		.00	.00	.00	.00	.00	12.65	.00	.00	.00	12.65
3	Ammonia		.00	.00	.00	.00	.00	1.69	.00	.00	.00	1.69
4	Water Vapor		.00	90.17	.00	.00	.00	110.68	.00	.00	.00	110.68
5	Carbon Monoxide		.00	.00	.00	.00	.00	88.90	.00	.00	.00	88.90
6	Nitrogen		.00	.00	.00	.00	198.33	734.08	30.51	.00	.00	764.59
7	Air, dry		707.46	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	Ethane		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.11	.00	.00	.00	.11
11	Argon		.00	.00	.00	.00	.00	9.12	.00	.00	.00	9.12
12	Carbon Dioxide		.00	.00	.00	.00	.00	196.07	.00	.00	.00	196.07
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	3.41	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	15.95	.00	2.80	.00	1.88	.76	.15
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	39.72	.00	.00	.50	.00	.50	.00	.00
18	Calcium Oxide		.00	.00	.00	23.41	.00	.92	.00	.00	.81	.11
19	Calcium Sulfide		.00	.00	.54	4.41	.00	2.50	.00	2.07	.34	.08
20	Calcium Carbonate		.00	.00	67.52	9.45	.00	5.82	.00	4.76	.82	.24
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.35	.29	.00	.06	.00	.04	.01	.00
23	Coal Ash		.00	.00	24.89	10.61	.00	14.28	.00	11.39	2.07	.82
24	Coal organic matter		.00	.00	195.83	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	15.12	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	47.50	.00	47.50	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	11.66	.00	.00	11.66	.00
28	BD char organic		.00	.00	.00	.00	.00	5.16	.00	.00	.00	5.16
	TOTAL GAS FLOW		707.5	90.2	.0	.0	198.3	1157.8	30.5	.0	.0	1188.3
	TOTAL MASS FLOW		707.5	90.2	332.3	79.2	198.3	1249.0	30.5	68.1	16.5	1194.9

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	84.4
2	Steam to Carbonizer	386.9
3	Coal & Sorbent Feeds	60.1
4	Carbonizer Drain	97.4
5	N2 Purges to carbonizer	126.2
6	Freeboard gas	1618.4
7	N2 Purges to cyclones	126.2
8	Primary cyclone Drain	148.8
9	Secondary cyclone Drain	180.5
10	Dusty gas to orifice	1352.9

TR5 - TEST POINT 2 3/24/92 Pittsburgh Coal + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.3	707.5	.00	.0	534.3	164.1	.00	.000	9.124	.00	.00
Steam to Carbonizer	107.5	90.2	10.09	.0	.0	80.1	.00	.000	.000	.00	.00
Coal & Sorbent Feeds	2840.1	332.3	10.80	179.0	4.6	69.5	11.45	4.423	.000	27.34	25.24
N2 Purges to carbonizer	2.4	198.3	.00	.0	198.3	.0	.00	.000	.000	.00	.00
N2 Purges to cyclones	.4	30.5	.00	.0	30.5	.0	.00	.000	.000	.00	.00
Total Inflow	2951.6	1358.7	20.89	179.0	767.7	313.6	11.45	4.423	9.124	27.34	25.24

OUTFLOWS

Carbonizer Drain	224.4	79.2	.10	15.3	.3	17.5	9.62	2.491	.000	22.97	10.91
Primary cyclone Drain	697.6	68.1	.31	46.2	1.0	3.3	1.28	1.479	.000	3.06	11.43
Secondary cyclone Drain	170.6	16.5	.08	11.3	.2	.9	.46	.258	.000	1.10	2.08
Dusty gas to orifice	1633.1	1194.9	20.40	106.1	766.1	291.8	.09	.194	9.124	.22	.82
Heat Loss	225.8										
Total Outflow	2951.6	1358.7	20.89	179.0	767.7	313.6	11.45	4.423	9.124	27.34	25.24
Loss	.0	.0	.00	.0	.0	.0	.00	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	4.78	.00	.00	.00	4.78
2	Methane		.00	.00	.00	.00	.00	7.73	.00	.00	.00	7.73
3	Ammonia		.00	.00	.00	.00	.00	1.69	.00	.00	.00	1.69
4	Water Vapor		.00	100.11	.00	.00	.00	126.23	.00	.00	.00	126.23
5	Carbon Monoxide		.00	.00	.00	.00	.00	87.61	.00	.00	.00	87.61
6	Nitrogen		.00	.00	.00	.00	210.98	722.70	13.93	.00	.00	736.63
7	Air, dry		676.02	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	Ethane		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.01	.00	.00	.00	.01
11	Argon		.00	.00	.00	.00	.00	8.72	.00	.00	.00	8.72
12	Carbon Dioxide		.00	.00	.00	.00	.00	161.14	.00	.00	.00	161.14
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	3.41	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	.71	.00	.23	.00	.11	.08	.04
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	1.95	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	20.70	.00	4.16	.00	1.75	1.75	.67
19	Calcium Sulfide		.00	.00	.21	4.90	.00	2.01	.00	1.24	.59	.17
20	Calcium Carbonate		.00	.00	67.70	7.65	.00	6.38	.00	3.21	1.74	1.43
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.23	.17	.00	.05	.00	.03	.02	.01
23	Coal Ash		.00	.00	24.71	7.88	.00	16.83	.00	9.16	5.95	1.72
24	Coal organic matter		.00	.00	192.18	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	12.19	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	35.78	.00	35.78	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	25.11	.00	.00	25.11	.00
28	BD char organic		.00	.00	.00	.00	.00	12.14	.00	.00	.00	12.14
	TOTAL GAS FLOW		676.0	100.1	.0	.0	211.0	1120.6	13.9	.0	.0	1134.5
	TOTAL MASS FLOW		676.0	100.1	290.4	54.2	211.0	1223.3	13.9	51.3	35.2	1150.7

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	79.3
2	Steam to Carbonizer	387.0
3	Coal & Sorbent Feeds	60.1
4	Carbonizer Drain	85.1
5	N2 Purges to carbonizer	119.7
6	Freeboard gas	1620.9
7	N2 Purges to cyclones	119.7
8	Primary cyclone Drain	138.9
9	Secondary cyclone Drain	178.9
10	Dusty gas to orifice	1364.2

TR5 - TEST POINT 3 3/25/92 Pittsburgh Coal + Limestone

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.4	676.0	.00	.0	510.5	156.8	.0000	.000	8.718	.00	.00
Steam to Carbonizer	119.3	100.1	11.20	.0	.0	88.9	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	2807.5	290.4	10.57	170.6	4.5	47.8	.5629	4.180	.000	27.23	24.93
N2 Purges to carbonizer	2.2	211.0	.00	.0	211.0	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	.1	13.9	.00	.0	13.9	.0	.0000	.000	.000	.00	.00
Total Inflow	2929.6	1291.4	21.77	170.6	739.9	293.5	.5629	4.180	8.718	27.23	24.93

OUTFLOWS

Carbonizer Drain	177.5	54.2	.09	12.5	.3	9.9	.4256	2.430	.000	20.58	8.05
Primary cyclone Drain	525.3	51.3	.26	34.7	.8	2.1	.0667	.960	.000	3.23	9.19
Secondary cyclone Drain	366.8	35.2	.17	24.4	.5	1.4	.0470	.525	.000	2.28	5.97
Dusty gas to orifice	1633.1	1150.7	21.26	99.1	738.3	280.2	.0236	.265	8.718	1.14	1.73
Heat Loss	226.9										
Total Outflow	2929.6	1291.4	21.77	170.6	739.9	293.5	.5629	4.180	8.718	27.23	24.93
Loss	.0	.0	.00	.0	.0	.0	.0000	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	7.36	.00	.00	.00	7.36
2	Methane		.00	.00	.00	.00	.00	11.63	.00	.00	.00	11.63
3	Ammonia		.00	.00	.00	.00	.00	1.51	.00	.00	.00	1.51
4	Water Vapor		.00	.00	.00	.00	.00	99.90	.00	.00	.00	99.90
5	Carbon Monoxide		.00	.00	.00	.00	.00	130.03	.00	.00	.00	130.03
6	Nitrogen		.00	.00	.00	.00	208.29	779.33	26.55	.00	.00	805.87
7	Air, dry		755.06	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.41	.00	.00	.00	.41
9	Ethane		.00	.00	.00	.00	.00	.32	.00	.00	.00	.32
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.35	.00	.00	.00	.35
11	Argon		.00	.00	.00	.00	.00	9.74	.00	.00	.00	9.74
12	Carbon Dioxide		.00	.00	.00	.00	.00	199.38	.00	.00	.00	199.38
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	93.05	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	.49	.00	.07	.00	.06	.01	.01
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	1.19	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	15.31	.00	2.18	.00	1.77	.13	.28
19	Calcium Sulfide		.00	.00	.22	1.02	.00	.64	.00	.57	.02	.05
20	Calcium Carbonate		.00	.00	65.84	28.86	.00	3.78	.00	2.50	.33	.95
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.58	.50	.00	.07	.00	.06	.01	.01
23	Coal Ash		.00	.00	19.15	11.35	.00	7.80	.00	6.49	.58	.73
24	Coal organic matter		.00	.00	218.16	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	6.69	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	34.13	.00	34.13	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	2.63	.00	.00	2.63	.00
28	BD char organic		.00	.00	.00	.00	.00	6.07	.00	.00	.00	6.07
	TOTAL GAS FLOW		755.1	.0	.0	.0	208.3	1239.9	26.5	.0	.0	1266.5
	TOTAL MASS FLOW		755.1	.0	398.2	64.2	208.3	1297.3	26.5	45.6	3.7	1274.6

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	85.7
2	Steam to Carbonizer	387.4
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	356.1
5	N2 Purges to carbonizer	147.6
6	Freeboard gas	1515.3
7	N2 Purges to cyclones	147.6
8	Primary cyclone Drain	171.3
9	Secondary cyclone Drain	195.5
10	Dusty gas to orifice	787.8

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********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.6	755.1	.00	.0	570.2	175.1	.0000	.000	9.738	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	2756.7	398.2	22.21	170.3	3.2	153.7	.3427	2.251	.000	26.49	19.73
N2 Purges to carbonizer	3.6	208.3	.00	.0	208.3	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	.5	26.5	.00	.0	26.5	.0	.0000	.000	.000	.00	.00
Total Inflow	2762.4	1388.1	22.21	170.3	808.2	328.8	.3427	2.251	9.738	26.49	19.73

OUTFLOWS

Carbonizer Drain	77.9	64.2	.01	9.4	.2	18.4	.2984	.965	.000	23.06	11.85
Primary cyclone Drain	492.6	45.6	.25	32.9	.8	1.7	.0334	.817	.000	2.58	6.55
Secondary cyclone Drain	38.8	3.7	.02	2.6	.0	.2	.0030	.040	.000	.23	.59
Dusty gas to orifice	1781.9	1274.6	21.93	125.4	807.2	308.5	.0078	.429	9.738	.61	.74
Heat Loss	371.2										
Total Outflow	2762.4	1388.1	22.21	170.3	808.2	328.8	.3427	2.251	9.738	26.49	19.73
Loss	.0	.0	.00	.0	.0	.0	.0000	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	5.91	.00	.00	.00	5.91
2	Methane		.00	.00	.00	.00	.00	10.21	.00	.00	.00	10.21
3	Ammonia		.00	.00	.00	.00	.00	3.26	.00	.00	.00	3.26
4	Water Vapor		.00	.00	.00	.00	.00	98.18	.00	.00	.00	98.18
5	Carbon Monoxide		.00	.00	.00	.00	.00	99.61	.00	.00	.00	99.61
6	Nitrogen		.00	.00	.00	.00	231.89	726.48	23.78	.00	.00	750.26
7	Air, dry		656.15	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.52	.00	.00	.00	.52
9	Ethane		.00	.00	.00	.00	.00	.56	.00	.00	.00	.56
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.05	.00	.00	.00	.05
11	Argon		.00	.00	.00	.00	.00	8.46	.00	.00	.00	8.46
12	Carbon Dioxide		.00	.00	.00	.00	.00	175.52	.00	.00	.00	175.52
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	87.97	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	.37	.00	.04	.00	.03	.01	.00
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.01	.00	.00	.00	.01
17	Magnesium Carbonate		.00	.00	.89	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	1.09	.00	1.28	.00	.99	.29	.00
19	Calcium Sulfide		.00	.00	.22	2.09	.00	.52	.00	.30	.03	.18
20	Calcium Carbonate		.00	.00	64.98	52.45	.00	4.99	.00	3.15	.51	1.32
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.57	.50	.00	.07	.00	.05	.01	.01
23	Coal Ash		.00	.00	18.34	8.56	.00	9.79	.00	7.13	.91	1.75
24	Coal organic matter		.00	.00	204.24	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	5.83	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	35.68	.00	35.68	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	4.05	.00	.00	4.05	.00
28	BD char organic		.00	.00	.00	.00	.00	9.18	.00	.00	.00	9.18
	TOTAL GAS FLOW		656.1	.0	.0	.0	231.9	1128.8	23.8	.0	.0	1152.5
	TOTAL MASS FLOW		656.1	.0	377.2	70.9	231.9	1194.4	23.8	47.3	5.8	1165.0

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	85.4
2	Steam to Carbonizer	387.6
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	462.4
5	N2 Purges to carbonizer	153.3
6	Freeboard gas	1453.4
7	N2 Purges to cyclones	153.3
8	Primary cyclone Drain	171.2
9	Secondary cyclone Drain	200.8
10	Dusty gas to orifice	762.9

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********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.3	656.1	.00	.0	495.5	152.2	.0000	.000	8.462	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	2560.7	377.2	20.68	158.1	3.0	147.9	.2558	2.247	.000	26.14	18.92
N2 Purges to carbonizer	4.4	231.9	.00	.0	231.9	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	.4	23.8	.00	.0	23.8	.0	.0000	.000	.000	.00	.00
Total Inflow	2566.8	1289.0	20.68	158.1	754.1	300.1	.2558	2.247	8.462	26.14	18.92

OUTFLOWS

Carbonizer Drain	74.2	70.9	.01	11.3	.2	25.6	.2245	1.507	.000	22.94	9.06
Primary cyclone Drain	523.7	47.3	.33	34.7	.7	1.8	.0209	.465	.000	2.14	7.17
Secondary cyclone Drain	60.2	5.8	.03	3.9	.1	.3	.0042	.066	.000	.43	.92
Dusty gas to orifice	1566.2	1165.0	20.31	108.2	753.1	272.3	.0062	.209	8.462	.63	1.77
Heat Loss	342.5										
Total Outflow	2566.8	1289.0	20.68	158.1	754.1	300.1	.2558	2.247	8.462	26.14	18.92
Loss	.0	.0	.00	.0	.0	.0	.0000	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Index Mass FlowsPounds per hour

I	Species Name	J=	1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	8.80	.00	.00	.00	8.80
2	Methane		.00	.00	.00	.00	.00	14.32	.00	.00	.00	14.32
3	Ammonia		.00	.00	.00	.00	.00	2.80	.00	.00	.00	2.80
4	Water Vapor		.00	.00	.00	.00	.00	112.88	.00	.00	.00	112.88
5	Carbon Monoxide		.00	.00	.00	.00	.00	153.48	.00	.00	.00	153.48
6	Nitrogen		.00	.00	.00	.00	176.66	780.93	25.65	.00	.00	806.58
7	Air, dry		799.77	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.36	.00	.00	.00	.36
9	Ethane		.00	.00	.00	.00	.00	.54	.00	.00	.00	.54
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.17	.00	.00	.00	.17
11	Argon		.00	.00	.00	.00	.00	10.31	.00	.00	.00	10.31
12	Carbon Dioxide		.00	.00	.00	.00	.00	205.33	.00	.00	.00	205.33
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	110.36	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	.24	.00	.11	.00	.09	.01	.01
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	.74	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	2.92	.00	2.20	.18	.54
19	Calcium Sulfide		.00	.00	.15	2.64	.00	.78	.00	.62	.09	.07
20	Calcium Carbonate		.00	.00	43.65	26.43	.00	7.46	.00	6.10	.59	.76
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.38	.26	.00	.12	.00	.10	.01	.02
23	Coal Ash		.00	.00	23.59	11.01	.00	12.57	.00	10.16	1.26	1.16
24	Coal organic matter		.00	.00	263.86	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	3.91	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	50.61	.00	50.61	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	4.56	.00	.00	4.56	.00
28	BD char organic		.00	.00	.00	.00	.00	5.57	.00	.00	.00	5.57
	TOTAL GAS FLOW		799.8	.0	.0	.0	176.7	1289.9	25.6	.0	.0	1315.6
	TOTAL MASS FLOW		799.8	.0	442.7	44.5	176.7	1374.6	25.6	69.9	6.7	1323.7

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	84.0
2	Steam to Carbonizer	387.4
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	134.8
5	N2 Purges to carbonizer	150.2
6	Freeboard gas	1462.3
7	N2 Purges to cyclones	150.2
8	Primary cyclone Drain	169.4
9	Secondary cyclone Drain	192.9
10	Dusty gas to orifice	1267.2

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********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.3	799.8	.00	.0	604.0	185.5	.0000	.000	10.31	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.0000	.000	.00	.00	.00
Coal & Sorbent Feeds	3343.7	442.7	26.26	199.1	3.8	168.9	.2129	2.851	.00	17.56	23.97
N2 Purges to carbonizer	3.2	176.7	.00	.0	176.7	.0	.0000	.000	.00	.00	.00
N2 Purges to cyclones	.5	25.6	.00	.0	25.6	.0	.0000	.000	.00	.00	.00
Total Inflow	3348.7	1444.8	26.26	199.1	810.1	354.4	.2129	2.851	10.31	17.56	23.97

OUTFLOWS

Carbonizer Drain	49.9	44.5	.01	6.5	.1	12.8	.1461	1.612	.00	12.05	11.28
Primary cyclone Drain	740.0	69.9	.45	49.4	.9	3.6	.0529	.850	.00	4.36	10.25
Secondary cyclone Drain	67.8	6.7	.04	4.5	.1	.3	.0050	.083	.00	.42	1.27
Dusty gas to orifice	2279.3	1323.7	25.76	138.7	809.0	337.7	.0089	.305	10.31	.73	1.17
Heat Loss	211.8										
Total Outflow	3348.7	1444.8	26.26	199.1	810.1	354.4	.2129	2.851	10.31	17.56	23.97
Loss	.0	.0	.00	.0	.0	.0	.0000	.000	.00	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	9.06	.00	.00	.00	9.06
2	Methane		.00	.00	.00	.00	.00	17.47	.00	.00	.00	17.47
3	Ammonia		.00	.00	.00	.00	.00	3.03	.00	.00	.00	3.03
4	Water Vapor		.00	.00	.00	.00	.00	130.95	.00	.00	.00	130.95
5	Carbon Monoxide		.00	.00	.00	.00	.00	193.11	.00	.00	.00	193.11
6	Nitrogen		.00	.00	.00	.00	151.99	902.36	17.99	.00	.00	920.35
7	Air, dry		992.65	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.17	.00	.00	.00	.17
9	Ethane		.00	.00	.00	.00	.00	.28	.00	.00	.00	.28
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.20	.00	.00	.00	.20
11	Argon		.00	.00	.00	.00	.00	12.80	.00	.00	.00	12.80
12	Carbon Dioxide		.00	.00	.00	.00	.00	235.78	.00	.00	.00	235.78
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	122.34	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	.37	.00	.10	.00	.06	.00	.03
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	.97	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	1.71	.00	2.33	.00	1.40	.08	.84
19	Calcium Sulfide		.00	.00	.18	3.25	.00	1.11	.00	.84	.03	.24
20	Calcium Carbonate		.00	.00	53.37	35.03	.00	5.33	.00	3.45	.13	1.75
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.47	.37	.00	.10	.00	.06	.00	.03
23	Coal Ash		.00	.00	26.45	14.26	.00	12.19	.00	8.13	.22	3.84
24	Coal organic matter		.00	.00	294.64	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	5.39	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	36.62	.00	36.62	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	.84	.00	.00	.84	.00
28	BD char organic		.00	.00	.00	.00	.00	18.85	.00	.00	.00	18.85
	TOTAL GAS FLOW		992.6	.0	.0	.0	152.0	1505.2	18.0	.0	.0	1523.2
	TOTAL MASS FLOW		992.6	.0	498.4	60.4	152.0	1582.7	18.0	50.6	1.3	1548.8

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	90.1
2	Steam to Carbonizer	387.6
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	150.9
5	N2 Purges to carbonizer	152.3
6	Freeboard gas	1548.7
7	N2 Purges to cyclones	152.3
8	Primary cyclone Drain	159.8
9	Secondary cyclone Drain	197.5
10	Dusty gas to orifice	1354.0

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	3.1	992.6	.00	.0	749.6	230.2	.0000	.000	12.80	.00	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.0000	.000	.00	.00	.00
Coal & Sorbent Feeds	3698.0	498.4	29.19	224.6	4.3	188.5	.2788	3.167	.00	21.47	26.92
N2 Purges to carbonizer	2.8	152.0	.00	.0	152.0	.0	.0000	.000	.00	.00	.00
N2 Purges to cyclones	.3	18.0	.00	.0	18.0	.0	.0000	.000	.00	.00	.00
Total Inflow	3704.3	1661.0	29.19	224.6	923.9	418.7	.2788	3.167	12.80	21.47	26.92

OUTFLOWS

Carbonizer Drain	60.0	60.4	.01	8.8	.1	17.4	.2214	2.078	.00	17.05	14.63
Primary cyclone Drain	536.9	50.6	.28	36.0	.5	2.1	.0370	.632	.00	2.85	8.19
Secondary cyclone Drain	12.6	1.3	.01	.8	.0	.1	.0016	.017	.00	.13	.22
Dusty gas to orifice	2874.3	1548.8	28.89	179.0	923.2	399.1	.0187	.440	12.80	1.44	3.87
Heat Loss	220.6										
Total Outflow	3704.3	1661.0	29.19	224.6	923.9	418.7	.2788	3.167	12.80	21.47	26.92
Loss	.0	.0	.00	.0	.0	.0	.0000	.000	.00	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Index		Mass FlowsPounds per hour									
I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	9.72	.00	.00	.00	9.72
2	Methane	.00	.00	.00	.00	.00	14.86	.00	.00	.00	14.86
3	Ammonia	.00	.00	.00	.00	.00	1.68	.00	.00	.00	1.68
4	Water Vapor	.00	.00	.00	.00	.00	127.96	.00	.00	.00	127.96
5	Carbon Monoxide	.00	.00	.00	.00	.00	186.77	.00	.00	.00	186.77
6	Nitrogen	.00	.00	.00	.00	159.53	894.34	16.02	.00	.00	910.36
7	Air, dry	970.91	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.15	.00	.00	.00	.15
9	Ethane	.00	.00	.00	.00	.00	.21	.00	.00	.00	.21
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.10	.00	.00	.00	.10
11	Argon	.00	.00	.00	.00	.00	12.52	.00	.00	.00	12.52
12	Carbon Dioxide	.00	.00	.00	.00	.00	228.47	.00	.00	.00	228.47
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	119.94	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	.07	.00	.08	.00	.05	.01	.02
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	.31	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	.00	.00	.75	.00	.00	.26	.49
19	Calcium Sulfide	.00	.00	.06	.49	.00	2.79	.00	2.32	.09	.38
20	Calcium Carbonate	.00	.00	19.95	8.47	.00	5.65	.00	3.46	.40	1.80
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.15	.07	.00	.08	.00	.05	.01	.02
23	Coal Ash	.00	.00	25.32	9.03	.00	16.30	.00	10.71	.82	4.76
24	Coal organic matter	.00	.00	284.27	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	1.30	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	36.69	.00	36.69	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	2.93	.00	.00	2.93	.00
28	BD char organic	.00	.00	.00	.00	.00	18.96	.00	.00	.00	18.96
	TOTAL GAS FLOW	970.9	.0	.0	.0	159.5	1476.8	16.0	.0	.0	1492.8
	TOTAL MASS FLOW	970.9	.0	450.0	19.4	159.5	1561.0	16.0	53.3	4.5	1519.2

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	88.5
2	Steam to Carbonizer	387.7
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	76.1
5	N2 Purges to carbonizer	154.5
6	Freeboard gas	1562.5
7	N2 Purges to cyclones	154.5
8	Primary cyclone Drain	158.1
9	Secondary cyclone Drain	193.7
10	Dusty gas to orifice	1367.3

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	2.7	970.9	.00	.0	733.2	225.2	.0000	.000	12.52	.000	.00
Steam to Carbonizer	.0	.0	.00	.0	.0	.0	.0000	.000	.00	.000	.00
Coal & Sorbent Feeds	3620.1	450.0	28.56	212.5	4.1	168.3	.0884	2.922	.00	8.018	25.48
N2 Purges to carbonizer	3.1	159.5	.00	.0	159.5	.0	.0000	.000	.00	.000	.00
N2 Purges to cyclones	.3	16.0	.00	.0	16.0	.0	.0000	.000	.00	.000	.00
Total Inflow	3626.1	1596.5	28.56	212.5	912.9	393.5	.0884	2.922	12.52	8.018	25.48

OUTFLOWS

Carbonizer Drain	13.1	19.4	.00	2.2	.0	4.1	.0404	.336	.00	3.665	9.10
Primary cyclone Drain	546.1	53.3	.25	35.2	.7	1.7	.0295	2.057	.00	2.677	10.76
Secondary cyclone Drain	43.2	4.5	.02	2.9	.0	.3	.0044	.064	.00	.395	.83
Dusty gas to orifice	2803.6	1519.2	28.29	172.3	912.1	387.4	.0141	.465	12.52	1.281	4.79
Heat Loss	220.2										
Total Outflow	3626.1	1596.5	28.56	212.5	912.9	393.5	.0884	2.922	12.52	8.018	25.48
Loss	.0	.0	.00	.0	.0	.0	.0000	.000	.00	.000	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Index I	Species Name	Mass FlowsPounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	6.11	.00	.00	.00	6.11
2	Methane	.00	.00	.00	.00	.00	10.29	.00	.00	.00	10.29
3	Ammonia	.00	.00	.00	.00	.00	2.09	.00	.00	.00	2.09
4	Water Vapor	.00	112.67	.00	.00	.00	168.77	.00	.00	.00	168.77
5	Carbon Monoxide	.00	.00	.00	.00	.00	60.08	.00	.00	.00	60.08
6	Nitrogen	.00	.00	.00	.00	186.62	666.11	21.87	.00	.00	687.99
7	Air, dry	634.08	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.60	.00	.00	.00	.60
9	Ethane	.00	.00	.00	.00	.00	.20	.00	.00	.00	.20
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.55	.00	.00	.00	.55
11	Argon	.00	.00	.00	.00	.00	8.18	.00	.00	.00	8.18
12	Carbon Dioxide	.00	.00	.00	.00	.00	164.44	.00	.00	.00	164.44
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	33.10	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	.00	.00	.07	.00	.05	.01	.01
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	.63	.48	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	.00	.00	2.58	.00	2.02	.28	.28
19	Calcium Sulfide	.00	.00	.12	7.18	.00	1.11	.00	.80	.05	.26
20	Calcium Carbonate	.00	.00	34.90	17.09	.00	1.86	.00	1.21	.07	.59
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.30	.23	.00	.07	.00	.05	.01	.01
23	Coal Ash	.00	.00	32.16	16.83	.00	15.33	.00	9.66	1.34	4.34
24	Coal organic matter	.00	.00	226.57	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	35.84	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	48.04	.00	48.04	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	3.62	.00	.00	3.62	.00
28	BD char organic	.00	.00	.00	.00	.00	23.38	.00	.00	.00	23.38
	TOTAL GAS FLOW	634.1	112.7	.0	.0	186.6	1087.4	21.9	.0	.0	1109.3
	TOTAL MASS FLOW	634.1	112.7	327.8	77.7	186.6	1183.5	21.9	61.8	5.4	1138.2

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	87.6
2	Steam to Carbonizer	387.3
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	133.4
5	N2 Purges to carbonizer	164.6
6	Freeboard gas	1535.5
7	N2 Purges to cyclones	164.6
8	Primary cyclone Drain	159.9
9	Secondary cyclone Drain	192.3
10	Dusty gas to orifice	1296.8

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.6	634.1	.00	.0	478.8	147.1	.0000	.000	8.178	.00	.00
Steam to Carbonizer	134.3	112.7	12.61	.0	.0	100.1	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	3196.1	327.8	16.38	184.8	4.5	66.8	.1812	8.639	.000	14.04	32.46
N2 Purges to carbonizer	4.1	186.6	.00	.0	186.6	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	.5	21.9	.00	.0	21.9	.0	.0000	.000	.000	.00	.00
Total Inflow	3336.6	1283.0	28.99	184.8	691.9	313.9	.1812	8.639	8.178	14.04	32.46

OUTFLOWS

Carbonizer Drain	474.4	77.7	.19	34.6	.6	8.5	.1398	5.813	.000	10.83	17.06
Primary cyclone Drain	705.8	61.8	.44	45.4	1.0	1.2	.0306	1.710	.000	2.37	9.71
Secondary cyclone Drain	53.3	5.4	.03	3.4	.1	.1	.0033	.103	.000	.26	1.35
Dusty gas to orifice	1888.2	1138.2	28.32	101.3	690.3	304.1	.0075	1.013	8.178	.58	4.35
Heat Loss	214.9										
Total Outflow	3336.6	1283.0	28.99	184.8	691.9	313.9	.1812	8.639	8.178	14.04	32.46
Loss	.0	.0	.00	.0	.0	.0	.0000	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Index I	Species Name	Mass FlowsPounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	4.52	.00	.00	.00	4.52
2	Methane	.00	.00	.00	.00	.00	8.75	.00	.00	.00	8.75
3	Ammonia	.00	.00	.00	.00	.00	1.99	.00	.00	.00	1.99
4	Water Vapor	.00	58.62	.00	.00	.00	105.03	.00	.00	.00	105.03
5	Carbon Monoxide	.00	.00	.00	.00	.00	51.68	.00	.00	.00	51.68
6	Nitrogen	.00	.00	.00	.00	186.27	573.73	23.45	.00	.00	597.18
7	Air, dry	512.73	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.43	.00	.00	.00	.43
9	Ethane	.00	.00	.00	.00	.00	.19	.00	.00	.00	.19
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	4.43	.00	.00	.00	4.43
11	Argon	.00	.00	.00	.00	.00	6.61	.00	.00	.00	6.61
12	Carbon Dioxide	.00	.00	.00	.00	.00	124.18	.00	.00	.00	124.18
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	25.34	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	.00	.00	.07	.00	.05	.01	.01
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	.69	.56	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	.00	.00	2.18	.00	1.58	.32	.28
19	Calcium Sulfide	.00	.00	.13	3.15	.00	.87	.00	.69	.18	.00
20	Calcium Carbonate	.00	.00	37.61	25.98	.00	2.34	.00	1.58	.36	.40
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.29	.24	.00	.06	.00	.04	.01	.01
23	Coal Ash	.00	.00	24.65	14.41	.00	10.24	.00	5.59	2.21	2.45
24	Coal organic matter	.00	.00	186.17	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	36.00	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	32.71	.00	32.71	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	9.93	.00	.00	9.93	.00
28	BD char organic	.00	.00	.00	.00	.00	12.25	.00	.00	.00	12.25
	TOTAL GAS FLOW	512.73	58.62	.00	.00	186.27	881.54	23.45	.00	.00	904.99
	TOTAL MASS FLOW	512.73	58.62	274.89	80.33	186.27	952.19	23.45	42.24	13.02	920.38

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	89.1
2	Steam to Carbonizer	387.7
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	150.0
5	N2 Purges to carbonizer	160.6
6	Freeboard gas	1532.0
7	N2 Purges to cyclones	160.7
8	Primary cyclone Drain	147.1
9	Secondary cyclone Drain	190.5
10	Dusty gas to orifice	1266.7

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.5	512.7	.00	.0	387.2	118.9	.0000	.000	6.613	.00	.00
Steam to Carbonizer	69.9	58.6	6.56	.0	.0	52.1	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	2613.8	274.9	13.32	153.6	3.7	56.6	.2000	7.360	.000	15.13	24.94
N2 Purges to carbonizer	3.9	186.3	.00	.0	186.3	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	.5	23.5	.00	.0	23.5	.0	.0000	.000	.000	.00	.00
Total Inflow	2689.5	1056.0	19.88	153.6	600.6	227.6	.2000	7.360	6.613	15.13	24.94

OUTFLOWS

Carbonizer Drain	451.9	80.3	.22	38.4	.6	12.8	.1606	1.401	.000	12.15	14.64
Primary cyclone Drain	479.6	42.2	.28	31.1	.7	1.2	.0284	1.133	.000	2.15	5.63
Secondary cyclone Drain	147.3	13.0	.09	9.4	.2	.3	.0063	.324	.000	.47	2.22
Dusty gas to orifice	1403.7	920.4	19.30	74.7	599.1	213.4	.0047	4.502	6.613	.36	2.46
Heat Loss	207.0										
Total Outflow	2689.5	1056.0	19.88	153.6	600.6	227.6	.2000	7.360	6.613	15.13	24.94
Loss	.0	.0	.00	.0	.0	.0	.0000	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	6.49	.00	.00	.00	6.49
2	Methane	.00	.00	.00	.00	.00	10.20	.00	.00	.00	10.20
3	Ammonia	.00	.00	.00	.00	.00	1.88	.00	.00	.00	1.88
4	Water Vapor	.00	46.44	.00	.00	.00	123.05	.00	.00	.00	123.05
5	Carbon Monoxide	.00	.00	.00	.00	.00	63.88	.00	.00	.00	63.88
6	Nitrogen	.00	.00	.00	.00	224.66	678.13	164.52	.00	.00	842.65
7	Air, dry	600.16	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.49	.00	.00	.00	.49
9	Ethane	.00	.00	.00	.00	.00	1.21	.00	.00	.00	1.21
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	1.89	.00	.00	.00	1.89
11	Argon	.00	.00	.00	.00	.00	7.74	.00	.00	.00	7.74
12	Carbon Dioxide	.00	.00	.00	.00	.00	204.96	.00	.00	.00	204.96
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	84.30	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	.00	.00	.15	.00	.12	.03	.00
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	.87	.56	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	.00	.00	3.76	.00	3.09	.66	.00
19	Calcium Sulfide	.00	.00	.16	.09	.00	.21	.00	.16	.05	.00
20	Calcium Carbonate	.00	.00	36.13	23.21	.00	6.02	.00	4.62	1.27	.13
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.02	.01	.00	.01	.00	.00	.00	.00
23	Coal Ash	.00	.00	15.04	2.80	.00	12.25	.00	9.60	2.43	.22
24	Coal organic matter	.00	.00	189.01	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	3.32	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	35.54	.00	35.54	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	7.17	.00	.00	7.17	.00
28	BD char organic	.00	.00	.00	.00	.00	1.77	.00	.00	.00	1.77
	TOTAL GAS FLOW	600.2	46.4	.0	.0	224.7	1099.9	164.5	.0	.0	1264.5
	TOTAL MASS FLOW	600.2	46.4	325.5	30.0	224.7	1166.8	164.5	53.1	11.6	1266.6

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	83.3
2	Steam to Carbonizer	386.9
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	84.2
5	N2 Purges to carbonizer	151.1
6	Freeboard gas	1396.2
7	N2 Purges to cyclones	151.1
8	Primary cyclone Drain	183.7
9	Secondary cyclone Drain	169.0
10	Dusty gas to orifice	770.1

TR8 - TEST POINT 1 05/13/93 Wyoming Coal + Limestone

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.9	600.2	.00	.0	453.2	139.2	.0000	.000	7.740	.00	.00
Steam to Carbonizer	55.3	46.4	5.20	.0	.0	41.2	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	2326.9	325.5	18.84	142.6	2.4	129.8	.2517	1.991	.000	14.56	15.06
N2 Purges to carbonizer	4.1	224.7	.00	.0	224.7	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	3.0	164.5	.00	.0	164.5	.0	.0000	.000	.000	.00	.00
Total Inflow	2390.3	1361.3	24.04	142.6	844.8	310.3	.2517	1.991	7.740	14.56	15.06

OUTFLOWS

Carbonizer Drain	30.3	30.0	.01	6.1	.0	11.4	.1616	.041	.000	9.35	2.81
Primary cyclone Drain	526.2	53.1	.35	35.2	.5	3.1	.0717	.107	.000	4.14	9.60
Secondary cyclone Drain	104.2	11.6	.07	7.2	.1	.8	.0175	.049	.000	1.01	2.43
Dusty gas to orifice	1398.8	1266.6	23.61	94.1	844.2	294.9	.0010	1.794	7.740	.06	.22
Heat Loss	331.0										
Total Outflow	2390.3	1361.3	24.04	142.6	844.8	310.3	.2517	1.991	7.740	14.56	15.06
Loss	.0	.0	.00	.0	.0	.0	.0000	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Mass FlowsPounds per hour

Index I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	7.00	.00	.00	.00	7.00
2	Methane	.00	.00	.00	.00	.00	9.53	.00	.00	.00	9.53
3	Ammonia	.00	.00	.00	.00	.00	2.27	.00	.00	.00	2.27
4	Water Vapor	.00	46.46	.00	.00	.00	122.22	.00	.00	.00	122.22
5	Carbon Monoxide	.00	.00	.00	.00	.00	79.71	.00	.00	.00	79.71
6	Nitrogen	.00	.00	.00	.00	214.69	736.95	174.70	.00	.00	911.65
7	Air, dry	691.39	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.26	.00	.00	.00	.26
9	Ethane	.00	.00	.00	.00	.00	.51	.00	.00	.00	.51
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	1.21	.00	.00	.00	1.21
11	Argon	.00	.00	.00	.00	.00	8.92	.00	.00	.00	8.92
12	Carbon Dioxide	.00	.00	.00	.00	.00	233.99	.00	.00	.00	233.99
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	86.98	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	.39	.00	.06	.00	.05	.01	.00
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	.96	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	13.41	.00	.61	.00	.39	.22	.00
19	Calcium Sulfide	.00	.00	.21	.68	.00	.23	.00	.19	.03	.00
20	Calcium Carbonate	.00	.00	53.22	21.24	.00	5.99	.00	5.31	.53	.15
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.08	.07	.00	.01	.00	.01	.00	.00
23	Coal Ash	.00	.00	15.53	6.79	.00	8.74	.00	7.77	.80	.17
24	Coal organic matter	.00	.00	181.15	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	3.56	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	22.20	.00	22.20	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	3.01	.00	.00	3.01	.00
28	BD char organic	.00	.00	.00	.00	.00	1.10	.00	.00	.00	1.10
	TOTAL GAS FLOW	691.4	46.5	.0	.0	214.7	1202.6	174.7	.0	.0	1377.3
	TOTAL MASS FLOW	691.4	46.5	338.1	46.1	214.7	1244.5	174.7	35.9	4.6	1378.7

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	76.8
2	Steam to Carbonizer	387.2
3	Coal & Sorbent Feeds	75.9
4	Carbonizer Drain	72.0
5	N2 Purges to carbonizer	143.4
6	Freeboard gas	1492.2
7	N2 Purges to cyclones	143.5
8	Primary cyclone Drain	174.7
9	Secondary cyclone Drain	167.0
10	Dusty gas to orifice	821.8

TR8 - TEST POINT 2 05/13/93 Wyoming Coal + Limestone

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.0	691.4	.00	.0	522.1	160.4	.0000	.000	8.917	.00	.00
Steam to Carbonizer	55.4	46.5	5.20	.0	.0	41.3	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	2201.8	338.1	18.71	138.1	2.3	139.8	.2764	1.872	.000	21.43	15.61
N2 Purges to carbonizer	3.5	214.7	.00	.0	214.7	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	2.9	174.7	.00	.0	174.7	.0	.0000	.000	.000	.00	.00
Total Inflow	2263.5	1465.4	23.91	138.1	913.8	341.4	.2764	1.872	8.917	21.43	15.61

OUTFLOWS

Carbonizer Drain	44.6	46.1	.01	5.8	.0	14.2	.2382	.535	.000	18.47	6.85
Primary cyclone Drain	326.4	35.9	.18	22.3	.2	2.7	.0324	.164	.000	2.51	7.78
Secondary cyclone Drain	43.5	4.6	.02	3.0	.0	.3	.0050	.021	.000	.39	.80
Dusty gas to orifice	1492.0	1378.7	23.70	106.9	913.5	324.3	.0008	1.152	8.917	.06	.17
Heat Loss	357.2										
Total Outflow	2263.5	1465.4	23.91	138.1	913.8	341.4	.2764	1.872	8.917	21.43	15.61
Loss	.0	.0	.00	.0	.0	.0	.0000	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Mass FlowsPounds per hour

Index I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	9.60	.00	.00	.00	9.60
2	Methane	.00	.00	.00	.00	.00	15.20	.00	.00	.00	15.20
3	Ammonia	.00	.00	.00	.00	.00	2.70	.00	.00	.00	2.70
4	Water Vapor	.00	53.09	.00	.00	.00	136.84	.00	.00	.00	136.84
5	Carbon Monoxide	.00	.00	.00	.00	.00	117.03	.00	.00	.00	117.03
6	Nitrogen	.00	.00	.00	.00	192.48	814.45	152.75	.00	.00	967.20
7	Air, dry	823.08	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.16	.00	.00	.00	.16
9	Ethane	.00	.00	.00	.00	.00	.84	.00	.00	.00	.84
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.69	.00	.00	.00	.69
11	Argon	.00	.00	.00	.00	.00	10.61	.00	.00	.00	10.61
12	Carbon Dioxide	.00	.00	.00	.00	.00	277.76	.00	.00	.00	277.76
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	109.68	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	.19	.00	.11	.00	.08	.02	.02
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	.62	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide	.00	.00	.00	8.49	.00	1.51	.00	.97	.28	.26
19	Calcium Sulfide	.00	.00	.10	1.00	.00	1.31	.00	1.17	.04	.10
20	Calcium Carbonate	.00	.00	26.25	.13	.00	5.19	.00	3.53	.83	.83
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.05	.03	.00	.02	.00	.01	.00	.00
23	Coal Ash	.00	.00	19.67	10.66	.00	9.01	.00	6.39	1.33	1.30
24	Coal organic matter	.00	.00	233.47	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	.82	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	23.67	.00	23.67	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	5.12	.00	.00	5.12	.00
28	BD char organic	.00	.00	.00	.00	.00	5.32	.00	.00	.00	5.32
	TOTAL GAS FLOW	823.1	53.1	.0	.0	192.5	1385.9	152.7	.0	.0	1538.6
	TOTAL MASS FLOW	823.1	53.1	389.8	21.3	192.5	1437.2	152.7	35.8	7.6	1546.5

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	86.3
2	Steam to Carbonizer	386.9
3	Coal & Sorbent Feeds	75.9
4	Carbonizer Drain	239.9
5	N2 Purges to carbonizer	138.2
6	Freeboard gas	1532.7
7	N2 Purges to cyclones	138.2
8	Primary cyclone Drain	172.3
9	Secondary cyclone Drain	159.1
10	Dusty gas to orifice	963.3

TR8 - TEST POINT 3 05/13/93 Wyoming Coal + Limestone

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.8	823.1	.00	.0	621.6	190.9	.0000	.000	10.61	.00	.00
Steam to Carbonizer	63.3	53.1	5.94	.0	.0	47.1	.0000	.000	.00	.00	.00
Coal & Sorbent Feeds	2870.0	389.8	23.84	172.5	3.0	157.8	.1774	2.256	.00	10.57	19.72
N2 Purges to carbonizer	2.9	192.5	.00	.0	192.5	.0	.0000	.000	.00	.00	.00
N2 Purges to cyclones	2.3	152.7	.00	.0	152.7	.0	.0000	.000	.00	.00	.00
Total Inflow	2940.3	1611.2	29.78	172.5	969.8	395.9	.1774	2.256	10.61	10.57	19.72

OUTFLOWS

Carbonizer Drain	15.8	21.3	.01	.6	.0	2.6	.1121	.676	.00	6.68	10.69
Primary cyclone Drain	353.5	35.8	.22	23.3	.3	2.0	.0463	.816	.00	2.76	6.40
Secondary cyclone Drain	75.7	7.6	.04	5.1	.1	.5	.0094	.039	.00	.56	1.33
Dusty gas to orifice	2143.6	1546.5	29.51	143.5	969.5	390.8	.0096	.725	10.61	.57	1.30
Heat Loss	351.7										
Total Outflow	2940.3	1611.2	29.78	172.5	969.8	395.9	.1774	2.256	10.61	10.57	19.72
Loss	.0	.0	.00	.0	.0	.0	.0000	.000	.00	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	6.14	.00	.00	.00	6.14
2	Methane		.00	.00	.00	.00	.00	10.16	.00	.00	.00	10.16
3	Ammonia		.00	.00	.00	.00	.00	1.78	.00	.00	.00	1.78
4	Water Vapor		.00	96.66	.00	.00	.00	138.38	.00	.00	.00	138.38
5	Carbon Monoxide		.00	.00	.00	.00	.00	67.22	.00	.00	.00	67.22
6	Nitrogen		.00	.00	.00	.00	177.86	683.91	18.41	.00	.00	702.32
7	Air, dry		668.54	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.45	.00	.00	.00	.45
9	Ethane		.00	.00	.00	.00	.00	.37	.00	.00	.00	.37
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.21	.00	.00	.00	.21
11	Argon		.00	.00	.00	.00	.00	8.62	.00	.00	.00	8.62
12	Carbon Dioxide		.00	.00	.00	.00	.00	197.42	.00	.00	.00	197.42
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	29.88	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	.57	.00	.14	.00	.08	.03	.03
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	1.50	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	2.15	.00	3.17	.00	1.55	.91	.71
19	Calcium Sulfide		.00	.00	.29	12.82	.00	2.31	.00	1.62	.33	.37
20	Calcium Carbonate		.00	.00	73.70	37.71	.00	5.91	.00	3.60	1.41	.90
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.13	.10	.00	.03	.00	.01	.01	.00
23	Coal Ash		.00	.00	35.15	12.50	.00	22.65	.00	11.09	7.06	4.51
24	Coal organic matter		.00	.00	237.38	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	18.90	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	42.82	.00	42.82	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	25.72	.00	.00	25.72	.00
28	BD char organic		.00	.00	.00	.00	.00	18.92	.00	.00	.00	18.92
	TOTAL GAS FLOW		668.5	96.7	.0	.0	177.9	1114.7	18.4	.0	.0	1133.1
	TOTAL MASS FLOW		668.5	96.7	378.0	84.8	177.9	1236.3	18.4	60.8	35.5	1158.5

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	83.7
2	Steam to Carbonizer	386.8
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	106.4
5	N2 Purges to carbonizer	117.2
6	Freeboard gas	1588.1
7	N2 Purges to cyclones	117.3
8	Primary cyclone Drain	171.7
9	Secondary cyclone Drain	177.8
10	Dusty gas to orifice	1070.9

TR8 - TEST POINT 4 05/13/93 Ill No.6 + Limestone

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.1	668.5	.00	.0	504.9	155.1	.0000	.000	8.622	.00	.00
Steam to Carbonizer	115.2	96.7	10.82	.0	.0	85.8	.0000	.000	.000	.00	.00
Coal & Sorbent Feeds	3353.5	378.0	14.75	197.8	4.3	86.7	.4325	9.109	.000	29.68	35.28
N2 Purges to carbonizer	1.8	177.9	.00	.0	177.9	.0	.0000	.000	.000	.00	.00
N2 Purges to cyclones	.2	18.4	.00	.0	18.4	.0	.0000	.000	.000	.00	.00
Total Inflow	3471.7	1339.5	25.56	197.8	705.5	327.5	.4325	9.109	8.622	29.68	35.28

OUTFLOWS

Carbonizer Drain	395.3	84.8	.12	22.0	.3	18.9	.3463	6.726	.000	23.76	12.60
Primary cyclone Drain	641.4	60.8	.36	41.5	.7	2.2	.0502	1.376	.000	3.44	11.10
Secondary cyclone Drain	383.1	35.5	.24	25.0	.4	.9	.0204	.450	.000	1.40	7.06
Dusty gas to orifice	1724.7	1158.5	24.84	109.4	704.1	305.5	.0156	.557	8.622	1.07	4.51
Heat Loss	327.2										
Total Outflow	3471.7	1339.5	25.56	197.8	705.5	327.5	.4325	9.109	8.622	29.68	35.28
Loss	.0	.0	.00	.0	.0	.0	.0000	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Index — Mass FlowsPounds per hour

I	Species Name	J=	1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	8.62	.00	.00	.00	8.62
2	Methane		.00	.00	.00	.00	.00	14.64	.00	.00	.00	14.64
3	Ammonia		.00	.00	.00	.00	.00	1.40	.00	.00	.00	1.40
4	Water Vapor		.00	144.62	.00	.00	.00	189.26	.00	.00	.00	189.26
5	Carbon Monoxide		.00	.00	.00	.00	.00	95.31	.00	.00	.00	95.31
6	Nitrogen		.00	.00	.00	.00	209.16	918.43	26.66	.00	.00	945.09
7	Air, dry		935.49	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	Ethane		.00	.00	.00	.00	.00	.35	.00	.00	.00	.35
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.04	.00	.00	.00	.04
11	Argon		.00	.00	.00	.00	.00	12.06	.00	.00	.00	12.06
12	Carbon Dioxide		.00	.00	.00	.00	.00	302.94	.00	.00	.00	302.94
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	39.76	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	.57	.00	.15	.00	.07	.05	.03
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	1.51	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	17.90	.00	6.61	.00	3.04	2.22	1.35
19	Calcium Sulfide		.00	.00	.40	21.83	.00	2.18	.00	1.07	.71	.39
20	Calcium Carbonate		.00	.00	99.08	16.27	.00	6.32	.00	3.11	2.45	.76
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.16	.13	.00	.03	.00	.02	.01	.01
23	Coal Ash		.00	.00	46.86	19.11	.00	27.75	.00	13.09	7.66	6.99
24	Coal organic matter		.00	.00	301.43	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	18.24	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	45.65	.00	45.65	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	25.64	.00	.00	25.64	.00
28	BD char organic		.00	.00	.00	.00	.00	27.02	.00	.00	.00	27.02
	TOTAL GAS FLOW		935.5	144.6	.0	.0	209.2	1543.1	26.7	.0	.0	1569.7
	TOTAL MASS FLOW		935.5	144.6	489.2	94.1	209.2	1684.4	26.7	66.0	38.8	1606.3

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	80.7
2	Steam to Carbonizer	387.0
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	79.8
5	N2 Purges to carbonizer	116.6
6	Freeboard gas	1645.4
7	N2 Purges to cyclones	116.6
8	Primary cyclone Drain	158.2
9	Secondary cyclone Drain	184.8
10	Dusty gas to orifice	1214.1

TR8 - TEST POINT 5 05/13/93 Ill No. 6 + Limestone

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.8	935.5	.00	.0	706.5	217.0	.0000	.00	12.06	.00	.00
Steam to Carbonizer	172.4	144.6	16.18	.0	.0	128.4	.0000	.00	.00	.00	.00
Coal & Sorbent Feeds	4263.3	489.2	18.85	250.4	5.5	115.5	.4344	11.61	.00	39.90	47.02
N2 Purges to carbonizer	2.1	209.2	.00	.0	209.2	.0	.0000	.00	.00	.00	.00
N2 Purges to cyclones	.3	26.7	.00	.0	26.7	.0	.0000	.00	.00	.00	.00
Total Inflow	4438.8	1805.1	35.03	250.4	947.8	460.9	.4344	11.61	12.06	39.90	47.02

OUTFLOWS

Carbonizer Drain	555.4	94.1	.40	19.8	.0	13.1	.3423	9.70	.00	31.44	19.24
Primary cyclone Drain	678.1	66.0	.40	44.5	.7	2.4	.0437	.96	.00	4.01	13.11
Secondary cyclone Drain	384.6	38.8	.21	25.1	.4	1.8	.0322	.54	.00	2.96	7.68
Dusty gas to orifice	2471.7	1606.3	34.02	161.0	946.7	443.5	.0162	.42	12.06	1.49	7.00
Heat Loss	349.0										
Total Outflow	4438.8	1805.1	35.03	250.4	947.8	460.9	.4344	11.61	12.06	39.90	47.02
Loss	.0	.0	.00	.0	.0	.0	.0000	.00	.00	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass FlowsPounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	6.39	.00	.00	.00	6.39
2	Methane		.00	.00	.00	.00	.00	12.23	.00	.00	.00	12.23
3	Ammonia		.00	.00	.00	.00	.00	.96	.00	.00	.00	.96
4	Water Vapor		.00	99.75	.00	.00	.00	155.05	.00	.00	.00	155.05
5	Carbon Monoxide		.00	.00	.00	.00	.00	100.50	.00	.00	.00	100.50
6	Nitrogen		.00	.00	.00	.00	261.81	929.18	24.87	.00	.00	954.05
7	Air, dry		879.68	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.13	.00	.00	.00	.13
9	Ethane		.00	.00	.00	.00	.00	.14	.00	.00	.00	.14
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.15	.00	.00	.00	.15
11	Argon		.00	.00	.00	.00	.00	11.34	.00	.00	.00	11.34
12	Carbon Dioxide		.00	.00	.00	.00	.00	228.26	.00	.00	.00	228.26
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	10.81	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	12.24	.00	10.93	.00	8.31	1.42	1.20
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	48.47	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	4.86	.00	6.35	.00	4.92	.72	.72
19	Calcium Sulfide		.00	.00	.22	13.55	.00	6.76	.00	5.74	.59	.43
20	Calcium Carbonate		.00	.00	69.91	9.62	.00	12.41	.00	8.45	2.20	1.76
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	1.38	.73	.00	.65	.00	.50	.08	.07
23	Coal Ash		.00	.00	50.81	23.76	.00	27.05	.00	15.37	4.96	6.71
24	Coal organic matter		.00	.00	314.04	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	33.46	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	77.28	.00	77.28	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	22.62	.00	.00	22.62	.00
28	BD char organic		.00	.00	.00	.00	.00	30.26	.00	.00	.00	30.26
	TOTAL GAS FLOW		879.7	99.8	.0	.0	261.8	1444.3	24.9	.0	.0	1469.2
	TOTAL MASS FLOW		879.7	99.8	495.6	98.2	261.8	1638.7	24.9	120.6	32.6	1510.4

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	85.2
2	Steam to Carbonizer	386.8
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	109.5
5	N2 Purges to carbonizer	126.3
6	Freeboard gas	1634.3
7	N2 Purges to cyclones	126.3
8	Primary cyclone Drain	186.2
9	Secondary cyclone Drain	145.3
10	Dusty gas to orifice	1232.2

TR8 - TEST POINT 6/7 05/13/93 Pitts No 8 + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.7	879.7	.00	.0	664.3	204.0	.00	.00	11.34	.00	.00
Steam to Carbonizer	118.9	99.8	11.16	.0	.0	88.6	.00	.00	.00	.00	.00
Coal & Sorbent Feeds	4543.8	495.6	17.12	270.9	6.6	91.4	13.97	15.30	.00	28.12	52.19
N2 Purges to carbonizer	3.2	261.8	.00	.0	261.8	.0	.00	.00	.00	.00	.00
N2 Purges to cyclones	.3	24.9	.00	.0	24.9	.0	.00	.00	.00	.00	.00
Total Inflow	4667.9	1761.7	28.28	270.9	957.6	384.0	13.97	15.30	11.34	28.12	52.19

OUTFLOWS

Carbonizer Drain	555.1	98.2	.20	31.1	.6	10.9	7.38	8.76	.00	14.85	24.49
Primary cyclone Drain	1167.4	120.6	.57	73.9	1.3	8.8	5.01	5.03	.00	10.09	15.87
Secondary cyclone Drain	335.5	32.6	.18	21.9	.4	1.8	.86	.71	.00	1.72	5.05
Dusty gas to orifice	2269.6	1510.4	27.33	144.1	955.3	362.6	.72	.81	11.34	1.45	6.78
Heat Loss	340.4										
Total Outflow	4667.9	1761.7	28.28	270.9	957.6	384.0	13.97	15.30	11.34	28.12	52.19
Loss	.0	.0	.00	.0	.0	.0	.00	.00	.00	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Index — Mass FlowsPounds per hour

I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	5.97	.00	.00	.00	5.97
2	Methane	.00	.00	.00	.00	.00	11.50	.00	.00	.00	11.50
3	Ammonia	.00	.00	.00	.00	.00	.92	.00	.00	.00	.92
4	Water Vapor	.00	90.46	.00	.00	.00	139.54	.00	.00	.00	139.54
5	Carbon Monoxide	.00	.00	.00	.00	.00	96.43	.00	.00	.00	96.43
6	Nitrogen	.00	.00	.00	.00	273.79	897.88	23.04	.00	.00	920.92
7	Air, dry	823.04	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	.13	.00	.00	.00	.13
9	Ethane	.00	.00	.00	.00	.00	.18	.00	.00	.00	.18
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.03	.00	.00	.00	.03
11	Argon	.00	.00	.00	.00	.00	10.61	.00	.00	.00	10.61
12	Carbon Dioxide	.00	.00	.00	.00	.00	195.39	.00	.00	.00	195.39
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	10.25	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	6.26	.00	3.42	.00	2.34	.18	.90
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	33.00	12.65	.00	.10	.00	.00	.10	.00
18	Calcium Oxide	.00	.00	.00	.00	.00	1.30	.00	.46	.00	.84
19	Calcium Sulfide	.00	.00	.40	16.69	.00	2.98	.00	2.42	.19	.36
20	Calcium Carbonate	.00	.00	45.49	12.77	.00	3.68	.00	2.64	.40	.64
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.59	.46	.00	.13	.00	.09	.01	.03
23	Coal Ash	.00	.00	48.06	24.16	.00	23.89	.00	16.42	1.65	5.83
24	Coal organic matter	.00	.00	284.55	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	30.89	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	75.64	.00	75.64	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	8.56	.00	.00	8.56	.00
28	BD char organic	.00	.00	.00	.00	.00	27.43	.00	.00	.00	27.43
	TOTAL GAS FLOW	823.0	90.5	.0	.0	273.8	1358.6	23.0	.0	.0	1381.6
	TOTAL MASS FLOW	823.0	90.5	422.3	103.9	273.8	1505.7	23.0	100.0	11.1	1417.7

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	78.1
2	Steam to Carbonizer	387.2
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	81.8
5	N2 Purges to carbonizer	115.9
6	Freeboard gas	1610.5
7	N2 Purges to cyclones	115.9
8	Primary cyclone Drain	175.9
9	Secondary cyclone Drain	130.1
10	Dusty gas to orifice	1225.6

12:40:44] TR8 - TEST POINT 8 05/13/93 Pitts No 8 + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.2	823.0	.00	.0	621.5	190.9	.000	.00	10.61	.00	.00
Steam to Carbonizer	107.8	90.5	10.12	.0	.0	80.3	.000	.00	.00	.00	.00
Coal & Sorbent Feeds	4125.4	422.3	15.52	241.1	6.0	69.2	9.512	13.94	.00	18.44	48.65
N2 Purges to carbonizer	2.6	273.8	.00	.0	273.8	.0	.000	.00	.00	.00	.00
N2 Purges to cyclones	.2	23.0	.00	.0	23.0	.0	.000	.00	.00	.00	.00
Total Inflow	4236.3	1632.6	25.64	241.1	924.3	340.4	9.512	13.94	10.61	18.44	48.65

OUTFLOWS

Carbonizer Drain	560.7	103.9	.12	31.2	.6	15.8	7.421	9.70	.00	14.38	24.63
Primary cyclone Drain	1126.9	100.0	.48	71.9	1.5	2.3	1.409	3.23	.00	2.73	16.50
Secondary cyclone Drain	127.3	11.1	.08	8.2	.1	.3	.136	.27	.00	.26	1.66
Dusty gas to orifice	2108.8	1417.7	24.96	129.8	922.1	322.0	.546	.74	10.61	1.06	5.86
Heat Loss	312.5										
Total Outflow	4236.3	1632.6	25.64	241.1	924.3	340.4	9.512	13.94	10.61	18.44	48.65
Loss	.0	.0	.00	.0	.0	.0	.000	.00	.00	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	5.69	.00	.00	.00	5.69
2	Methane		.00	.00	.00	.00	.00	11.02	.00	.00	.00	11.02
3	Ammonia		.00	.00	.00	.00	.00	1.06	.00	.00	.00	1.06
4	Water Vapor		.00	55.52	.00	.00	.00	106.45	.00	.00	.00	106.45
5	Carbon Monoxide		.00	.00	.00	.00	.00	102.50	.00	.00	.00	102.50
6	Nitrogen		.00	.00	.00	.00	275.88	869.37	22.87	.00	.00	892.24
7	Air, dry		782.68	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.10	.00	.00	.00	.10
9	Ethane		.00	.00	.00	.00	.00	.14	.00	.00	.00	.14
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.01	.00	.00	.00	.01
11	Argon		.00	.00	.00	.00	.00	10.09	.00	.00	.00	10.09
12	Carbon Dioxide		.00	.00	.00	.00	.00	181.51	.00	.00	.00	181.51
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	9.97	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	11.59	.00	3.52	.00	1.98	.73	.81
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	33.31	.00	.00	1.70	.00	1.70	.00	.00
18	Calcium Oxide		.00	.00	.00	5.62	.00	.44	.00	.00	.16	.28
19	Calcium Sulfide		.00	.00	.41	12.56	.00	4.06	.00	3.16	.55	.35
20	Calcium Carbonate		.00	.00	45.65	6.18	.00	6.17	.00	3.73	1.08	1.37
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.56	.40	.00	.15	.00	.10	.03	.03
23	Coal Ash		.00	.00	46.61	24.25	.00	22.36	.00	12.67	4.62	5.07
24	Coal organic matter		.00	.00	280.44	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	42.25	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	51.37	.00	51.37	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	25.25	.00	.00	25.25	.00
28	BD char organic		.00	.00	.00	.00	.00	25.24	.00	.00	.00	25.24
	TOTAL GAS FLOW		782.7	55.5	.0	.0	275.9	1287.9	22.9	.0	.0	1310.8
	TOTAL MASS FLOW		782.7	55.5	417.0	102.9	275.9	1428.2	22.9	74.7	32.4	1343.9

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	80.0
2	Steam to Carbonizer	387.1
3	Coal & Sorbent Feeds	70.0
4	Carbonizer Drain	81.5
5	N2 Purges to carbonizer	122.6
6	Freeboard gas	1601.7
7	N2 Purges to cyclones	122.6
8	Primary cyclone Drain	164.7
9	Secondary cyclone Drain	136.3
10	Dusty gas to orifice	1206.4

TR8 - TEST POINT 9 05/13/93 Pitts No 8 + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.6	782.7	.00	.0	591.1	181.5	.000	.00	10.09	.00	.00
Steam to Carbonizer	66.2	55.5	6.21	.0	.0	49.3	.000	.00	.00	.00	.00
Coal & Sorbent Feeds	4079.8	417.0	15.32	238.0	5.9	68.8	9.602	13.60	.00	18.51	47.17
N2 Purges to carbonizer	3.1	275.9	.00	.0	275.9	.0	.000	.00	.00	.00	.00
N2 Purges to cyclones	.3	22.9	.00	.0	22.9	.0	.000	.00	.00	.00	.00
Total Inflow	4149.9	1553.9	21.54	238.0	895.7	299.7	9.602	13.60	10.09	18.51	47.17

OUTFLOWS

Carbonizer Drain	697.6	102.9	.21	38.8	.7	9.2	6.989	8.88	.00	13.47	24.66
Primary cyclone Drain	774.4	74.7	.34	49.0	.9	3.5	1.685	3.21	.00	3.25	12.76
Secondary cyclone Drain	371.7	32.4	.17	24.1	.5	.9	.442	.85	.00	.85	4.65
Dusty gas to orifice	2006.5	1343.9	20.81	126.1	893.6	286.1	.487	.65	10.09	.94	5.10
Heat Loss	299.6										
Total Outflow	4149.9	1553.9	21.54	238.0	895.7	299.7	9.602	13.60	10.09	18.51	47.17
Loss	.0	.0	.00	.0	.0	.0	.000	.00	.00	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass FlowsPounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	5.47	.00	.00	.00	5.47
2	Methane		.00	.00	.00	.00	.00	13.46	.00	.00	.00	13.46
3	Ammonia		.00	.00	.00	.00	.00	1.00	.00	.00	.00	1.00
4	Water Vapor		.00	55.70	.00	.00	.00	103.52	.00	.00	.00	103.52
5	Carbon Monoxide		.00	.00	.00	.00	.00	80.31	.00	.00	.00	80.31
6	Nitrogen		.00	.00	.00	.00	263.03	765.04	22.52	.00	.00	787.56
7	Air, dry		661.68	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.11	.00	.00	.00	.11
9	Ethane		.00	.00	.00	.00	.00	.20	.00	.00	.00	.20
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	1.83	.00	.00	.00	1.83
11	Argon		.00	.00	.00	.00	.00	8.53	.00	.00	.00	8.53
12	Carbon Dioxide		.00	.00	.00	.00	.00	144.41	.00	.00	.00	144.41
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	10.00	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	2.98	.00	1.93	.00	1.46	.01	.46
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	16.46	6.12	.00	.06	.00	.06	.01	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	.47	.00	.00	.00	.47
19	Calcium Sulfide		.00	.00	.20	9.05	.00	2.21	.00	1.97	.02	.22
20	Calcium Carbonate		.00	.00	22.81	4.76	.00	1.85	.00	1.62	.03	.21
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.29	.22	.00	.07	.00	.06	.00	.02
23	Coal Ash		.00	.00	46.11	28.64	.00	17.47	.00	14.52	.23	2.72
24	Coal organic matter		.00	.00	281.61	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	68.97	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	74.78	.00	74.78	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	1.28	.00	.00	1.28	.00
28	BD char organic		.00	.00	.00	.00	.00	13.12	.00	.00	.00	13.12
	TOTAL GAS FLOW		661.7	55.7	.0	.0	263.0	1123.9	22.5	.0	.0	1146.4
	TOTAL MASS FLOW		661.7	55.7	377.5	120.8	263.0	1237.1	22.5	94.5	1.6	1163.6

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	88.6
2	Steam to Carbonizer	386.9
3	Coal & Sorbent Feeds	76.0
4	Carbonizer Drain	158.8
5	N2 Purges to carbonizer	128.4
6	Freeboard gas	1613.7
7	N2 Purges to cyclones	128.4
8	Primary cyclone Drain	175.9
9	Secondary cyclone Drain	134.0
10	Dusty gas to orifice	1198.9

TR8 - TEST POINT 10 05/13/93 Pitts No 8 + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.8	661.7	.00	.0	499.7	153.5	.000	.00	8.533	.000	.00
Steam to Carbonizer	66.4	55.7	6.23	.0	.0	49.5	.000	.00	.000	.000	.00
Coal & Sorbent Feeds	4121.8	377.5	15.37	233.6	5.9	48.7	4.745	13.59	.000	9.244	46.40
N2 Purges to carbonizer	3.4	263.0	.00	.0	263.0	.0	.000	.00	.000	.000	.00
N2 Purges to cyclones	.3	22.5	.00	.0	22.5	.0	.000	.00	.000	.000	.00
Total Inflow	4193.6	1380.4	21.60	233.6	791.1	251.6	4.745	13.59	8.533	9.244	46.40

OUTFLOWS

Carbonizer Drain	1057.6	120.8	.22	64.5	1.2	7.0	3.560	8.56	.000	6.937	28.86
Primary cyclone Drain	1105.0	94.5	.49	71.1	1.3	1.4	.895	2.99	.000	1.744	14.58
Secondary cyclone Drain	18.9	1.6	.01	1.2	.0	.0	.010	.03	.000	.020	.23
Dusty gas to orifice	1725.4	1163.6	20.88	96.8	788.6	243.2	.279	2.01	8.533	.243	2.73
Heat Loss	286.7										
Total Outflow	4193.6	1380.4	21.60	233.6	791.1	251.6	4.745	13.59	8.533	9.244	46.40
Loss	.0	.0	.00	.0	.0	.0	.000	.00	.000	.000	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins

Reconciled Species Flows at Each Node

Index I	Species Name	Mass Flows, Pounds per hour J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.0	.0	.0	.0	.0	9.5	.0	.0	.0	9.5
2	Methane	.0	.0	.0	.0	.0	22.9	.0	.0	.0	22.9
3	Ammonia	.0	.0	.0	.0	.0	4.3	.0	.0	.0	4.3
4	Water Vapor	.0	151.1	.0	.0	.0	232.4	.0	.0	.0	232.4
5	Carbon Monoxide	.0	.0	.0	.0	.0	100.4	.0	.0	.0	100.4
6	Nitrogen	.0	.0	.0	.0	51.1	903.0	269.6	.0	.0	1172.6
7	Air, dry	1126.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	Ethlyene	.0	.0	.0	.0	.0	1.2	.0	.0	.0	1.2
9	Ethane	.0	.0	.0	.0	.0	.2	.0	.0	.0	.2
10	Hydrogen Sulfide	.0	.0	.0	.0	.0	1.6	.0	.0	.0	1.6
11	Argon	.0	.0	.0	.0	.0	14.5	.0	.0	.0	14.5
12	Carbon Dioxide	.0	.0	.0	.0	.0	298.8	.0	.0	.0	298.8
13	Sulfur Dioxide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	Water Moisture	.0	.0	17.0	.0	.0	.0	.0	.0	.0	.0
15	Magnesium Oxide	.0	.0	.0	.0	.0	18.1	.0	.0	15.1	3.0
16	Magnesium Sulfide	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	Magnesium Carbonate	.0	.0	37.8	.0	.0	.0	.0	.0	.0	.0
18	Calcium Oxide	.0	.0	.0	.0	.0	7.3	.0	.0	.8	6.5
19	Calcium Sulfide	.0	.0	.8	.0	.0	27.6	.0	.0	25.2	2.4
20	Calcium Carbonate	.0	.0	96.7	.0	.0	46.6	.0	.0	45.4	1.2
21	Calcium Sulfate	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	Sorbent Inerts	.0	.0	1.7	.0	.0	1.7	.0	.0	1.4	.3
23	Coal Ash	.0	.0	54.4	.0	.0	54.4	.0	.0	43.5	10.9
24	Coal organic matter	.0	.0	436.2	.0	.0	.0	.0	.0	.0	.0
25	CD char organic	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
26	FD char organic	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
27	SD char organic	.0	.0	.0	.0	.0	175.6	.0	.0	175.6	.0
28	BD char organic	.0	.0	.0	.0	.0	53.3	.0	.0	.0	53.3
	TOTAL GAS FLOW	1126.5	151.1	.0	.0	51.1	1588.9	269.6	.0	.0	1858.5
	TOTAL MASS FLOW	1126.5	151.1	644.6	.0	51.1	1973.3	269.6	.0	307.0	1935.9

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	79.7
2	Steam to Carbonizer	387.9
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	176.3
5	N2 Purges to carbonizer	156.1
6	Freeboard gas	1647.7
7	N2 Purges to cyclones	156.1
8	Primary cyclone Drain	514.8
9	Secondary cyclone Drain	299.0
10	Dusty gas to orifice	1133.2

TR10 - TEST POINT 1 9/1/92 Pittsburgh Coal + Limestone

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.7	1126.5	.00	.0	851.	261.3	.00	.00	14.53	.00	.00
Steam to Carbonizer	180.1	151.1	16.90	.0	0.	134.2	.00	.00	.00	.00	.00
Coal & Sorbent Feeds	6337.3	644.6	26.91	367.9	10.	117.2	10.90	16.58	.00	39.17	56.01
N2 Purges to carbonizer	1.0	51.1	.00	.0	51.	.0	.00	.00	.00	.00	.00
N2 Purges to cyclones	5.3	269.6	.00	.0	270.	.0	.00	.00	.00	.00	.00
Total Inflow	6524.4	2242.8	43.81	367.9	1181.	512.6	10.90	16.58	14.53	39.17	56.01

OUTFLOWS

Carbonizer Drain	.0	.0	.00	.0	0.	.0	.00	.00	.00	.00	.00
Primary cyclone Drain	.0	.0	.00	.0	0.	.0	.00	.00	.00	.00	.00
Secondary cyclone Drain	2810.5	307.0	.88	174.2	4.	28.0	9.11	13.22	.00	32.74	44.88
Dusty gas to orifice	3293.0	1935.9	42.94	193.8	1177.	484.6	1.79	3.36	14.53	6.43	11.13
Heat Loss	420.9										
Total Outflow	6524.4	2242.8	43.81	367.9	1181.	512.6	10.90	16.58	14.53	39.17	56.01
Loss	.0	.0	.00	.0	0.	.0	.00	.00	.00	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	3.43	.00	.00	.00	3.43
2	Methane		.00	.00	.00	.00	.00	6.95	.00	.00	.00	6.95
3	Ammonia		.00	.00	.00	.00	.00	1.49	.00	.00	.00	1.49
4	Water Vapor		.00	.13	.00	.00	.00	51.10	.00	.00	.00	51.10
5	Carbon Monoxide		.00	.00	.00	.00	.00	57.31	.00	.00	.00	57.31
6	Nitrogen		.00	.00	.00	.00	219.24	672.07	267.87	.00	.00	939.95
7	Air, dry		598.99	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	1.03	.00	.00	.00	1.03
9	Ethane		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	.26	.00	.00	.00	.26
11	Argon		.00	.00	.00	.00	.00	7.73	.00	.00	.00	7.73
12	Carbon Dioxide		.00	.00	.00	.00	.00	127.34	.00	.00	.00	127.34
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	7.49	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	.00	.00	2.54	.00	.00	.96	1.59
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	5.32	.00	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	6.59	.00	.00	2.09	4.50
19	Calcium Sulfide		.00	.00	.13	.00	.00	7.71	.00	.00	3.33	4.38
20	Calcium Carbonate		.00	.00	26.38	.00	.00	4.10	.00	.00	1.65	2.45
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.51	.00	.00	.51	.00	.00	.19	.32
23	Coal Ash		.00	.00	24.14	.00	.00	24.14	.00	.00	8.46	15.67
24	Coal organic matter		.00	.00	198.57	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	31.87	.00	.00	31.87	.00
28	BD char organic		.00	.00	.00	.00	.00	74.73	.00	.00	.00	74.73
	TOTAL GAS FLOW		599.0	.1	.0	.0	219.2	928.7	267.9	.0	.0	1196.6
	TOTAL MASS FLOW		599.0	.1	262.5	.0	219.2	1080.9	267.9	.0	48.5	1300.2

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	84.3
2	Steam to Carbonizer	387.4
3	Coal & Sorbent Feeds	59.8
4	Carbonizer Drain	85.1
5	N2 Purges to carbonizer	160.7
6	Freeboard gas	1614.7
7	N2 Purges to cyclones	160.7
8	Primary cyclone Drain	514.8
9	Secondary cyclone Drain	194.1
10	Dusty gas to orifice	883.0

TR10 - TEST POINT 2 9/1/92 Pittsburgh Coal + Limestone

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	1.1	599.0	.00	.0	452.3	138.9	.000	.000	7.725	.00	.00
Steam to Carbonizer	.2	.1	.01	.0	.0	.1	.000	.000	.000	.00	.00
Coal & Sorbent Feeds	2890.2	262.5	12.20	165.2	4.5	36.5	1.533	7.314	.000	10.63	24.64
N2 Purges to carbonizer	4.6	219.2	.00	.0	219.2	.0	.000	.000	.000	.00	.00
N2 Purges to cyclones	5.6	267.9	.00	.0	267.9	.0	.000	.000	.000	.00	.00
Total Inflow	2901.5	1348.8	12.22	165.2	944.0	175.6	1.533	7.314	7.725	10.63	24.64

OUTFLOWS

Carbonizer Drain	.0	.0	.00	.0	.0	.0	.000	.000	.000	.00	.00
Primary cyclone Drain	.0	.0	.00	.0	.0	.0	.000	.000	.000	.00	.00
Secondary cyclone Drain	482.4	48.5	.17	29.7	.8	1.8	.577	2.865	.000	4.00	8.65
Dusty gas to orifice	2118.3	1300.2	12.05	135.4	943.2	173.8	.956	4.449	7.725	6.63	15.99
Heat Loss	300.8										
Total Outflow	2901.5	1348.8	12.22	165.2	944.0	175.6	1.533	7.314	7.725	10.63	24.64
Loss	.0	.0	.00	.0	.0	.0	.000	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.0	.0	.0	.0	.0	4.7	.0	.0	.0	4.7
2	Methane		.0	.0	.0	.0	.0	10.8	.0	.0	.0	10.8
3	Ammonia		.0	.0	.0	.0	.0	1.4	.0	.0	.0	1.4
4	Water Vapor		.0	.3	.0	.0	.0	61.6	.0	.0	.0	61.6
5	Carbon Monoxide		.0	.0	.0	.0	.0	90.5	.0	.0	.0	90.5
6	Nitrogen		.0	.0	.0	.0	127.3	760.2	267.6	.0	.0	1027.8
7	Air, dry		836.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	Ethlyene		.0	.0	.0	.0	.0	1.0	.0	.0	.0	1.0
9	Ethane		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10	Hydrogen Sulfide		.0	.0	.0	.0	.0	.3	.0	.0	.0	.3
11	Argon		.0	.0	.0	.0	.0	10.8	.0	.0	.0	10.8
12	Carbon Dioxide		.0	.0	.0	.0	.0	168.9	.0	.0	.0	168.9
13	Sulfur Dioxide		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	Water Moisture		.0	.0	9.7	.0	.0	.0	.0	.0	.0	.0
15	Magnesium Oxide		.0	.0	.0	.0	.0	1.9	.0	.0	1.5	.4
16	Magnesium Sulfide		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	Magnesium Carbonate		.0	.0	4.0	.0	.0	.0	.0	.0	.0	.0
18	Calcium Oxide		.0	.0	.0	.0	.0	2.3	.0	.0	.8	1.4
19	Calcium Sulfide		.0	.0	.1	.0	.0	8.4	.0	.0	7.4	1.0
20	Calcium Carbonate		.0	.0	20.7	.0	.0	5.1	.0	.0	4.4	.7
21	Calcium Sulfate		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	Sorbent Inerts		.0	.0	.4	.0	.0	.4	.0	.0	.3	.1
23	Coal Ash		.0	.0	31.0	.0	.0	31.0	.0	.0	24.0	7.0
24	Coal organic matter		.0	.0	245.0	.0	.0	.0	.0	.0	.0	.0
25	CD char organic		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
26	PD char organic		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
27	SD char organic		.0	.0	.0	.0	.0	83.7	.0	.0	83.7	.0
28	BD char organic		.0	.0	.0	.0	.0	31.5	.0	.0	.0	31.5
	TOTAL GAS FLOW		836.0	.3	.0	.0	127.3	1110.2	267.6	.0	.0	1377.8
	TOTAL MASS FLOW		836.0	.3	311.0	.0	127.3	1274.6	267.6	.0	122.3	1419.9

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	76.3
2	Steam to Carbonizer	387.8
3	Coal & Sorbent Feeds	59.7
4	Carbonizer Drain	75.7
5	N2 Purges to carbonizer	157.2
6	Freeboard gas	1671.1
7	N2 Purges to cyclones	157.1
8	Primary cyclone Drain	514.8
9	Secondary cyclone Drain	188.6
10	Dusty gas to orifice	924.4

TR10 - TEST POINT 3 9/2/92 Pittsburgh Coal + Limestone

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	-.1	836.0	.00	.0	631.	193.9	.000	.000	10.78	.000	.00
Steam to Carbonizer	.4	.3	.03	.0	0.	.3	.000	.000	.00	.000	.00
Coal & Sorbent Feeds	3568.2	311.0	15.19	201.3	6.	38.9	1.164	9.072	.00	8.361	31.42
N2 Purges to carbonizer	2.5	127.3	.00	.0	127.	.0	.000	.000	.00	.000	.00
N2 Purges to cyclones	5.3	267.6	.00	.0	268.	.0	.000	.000	.00	.000	.00
Total Inflow	3576.2	1542.2	15.23	201.3	1032.	233.1	1.164	9.072	10.78	8.361	31.42

OUTFLOWS

Carbonizer Drain	.0	.0	.00	.0	0.	.0	.000	.000	.00	.000	.00
Primary cyclone Drain	.0	.0	.00	.0	0.	.0	.000	.000	.00	.000	.00
Secondary cyclone Drain	1385.9	122.3	.30	77.5	2.	3.0	.905	7.704	.00	6.500	24.38
Dusty gas to orifice	1832.7	1419.9	14.93	123.9	1030.	230.1	.259	1.368	10.78	1.861	7.05
Heat Loss	357.7										
Total Outflow	3576.2	1542.2	15.23	201.3	1032.	233.1	1.164	9.072	10.78	8.361	31.42
Loss	.0	.0	.00	.0	0.	.0	.000	.000	.00	.000	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

Reconciled Species Flows at Each Node

Index		Mass Flows, Pounds per hour									
I	Species Name	J= 1	2	3	4	5	6	7	8	9	10
1	Hydrogen	.00	.00	.00	.00	.00	3.31	.00	.00	.00	3.31
2	Methane	.00	.00	.00	.00	.00	9.66	.00	.00	.00	9.66
3	Ammonia	.00	.00	.00	.00	.00	1.79	.00	.00	.00	1.79
4	Water Vapor	.00	.29	.00	.00	.00	61.05	.00	.00	.00	61.05
5	Carbon Monoxide	.00	.00	.00	.00	.00	42.92	.00	.00	.00	42.92
6	Nitrogen	.00	.00	.00	.00	146.18	611.61	271.88	.00	.00	883.49
7	Air, dry	615.69	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene	.00	.00	.00	.00	.00	1.89	.00	.00	.00	1.89
9	Ethane	.00	.00	.00	.00	.00	.12	.00	.00	.00	.12
10	Hydrogen Sulfide	.00	.00	.00	.00	.00	.55	.00	.00	.00	.55
11	Argon	.00	.00	.00	.00	.00	7.94	.00	.00	.00	7.94
12	Carbon Dioxide	.00	.00	.00	.00	.00	134.72	.00	.00	.00	134.72
13	Sulfur Dioxide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture	.00	.00	9.31	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide	.00	.00	.00	.00	.00	1.64	.00	.00	1.43	.21
16	Magnesium Sulfide	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate	.00	.00	3.85	.00	.00	.42	.00	.00	.42	.00
18	Calcium Oxide	.00	.00	.00	.00	.00	.68	.00	.00	.00	.68
19	Calcium Sulfide	.00	.00	.10	.00	.00	9.66	.00	.00	8.90	.76
20	Calcium Carbonate	.00	.00	20.38	.00	.00	5.91	.00	.00	5.82	.09
21	Calcium Sulfate	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts	.00	.00	.38	.00	.00	.38	.00	.00	.34	.04
23	Coal Ash	.00	.00	29.56	.00	.00	29.56	.00	.00	24.74	4.82
24	Coal organic matter	.00	.00	221.11	.00	.00	.00	.00	.00	.00	.00
25	CD char organic	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	PD char organic	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	SD char organic	.00	.00	.00	.00	.00	96.01	.00	.00	96.01	.00
28	BD char organic	.00	.00	.00	.00	.00	27.03	.00	.00	.00	27.03
	TOTAL GAS FLOW	615.7	.3	.0	.0	146.2	875.6	271.9	.0	.0	1147.4
	TOTAL MASS FLOW	615.7	.3	284.7	.0	146.2	1046.8	271.9	.0	137.7	1181.1

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	77.2
2	Steam to Carbonizer	387.8
3	Coal & Sorbent Feeds	59.8
4	Carbonizer Drain	72.0
5	N2 Purges to carbonizer	153.3
6	Freeboard gas	1569.8
7	N2 Purges to cyclones	153.3
8	Primary cyclone Drain	514.8
9	Secondary cyclone Drain	202.2
10	Dusty gas to orifice	818.1

TR10 - TEST POINT 4 9/2/92 Pittsburgh Coal + Limestone

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.0	615.7	.00	.0	465.0	142.8	.000	.000	7.940	.000	.00
Steam to Carbonizer	.3	.3	.03	.0	.0	.3	.000	.000	.000	.000	.00
Coal & Sorbent Feeds	3226.1	284.7	13.89	180.7	5.0	37.6	1.109	8.222	.000	8.216	29.94
N2 Purges to carbonizer	2.8	146.2	.00	.0	146.2	.0	.000	.000	.000	.000	.00
N2 Purges to cyclones	5.1	271.9	.00	.0	271.9	.0	.000	.000	.000	.000	.00
Total Inflow	3234.4	1318.7	13.93	180.7	888.0	180.6	1.109	8.222	7.940	8.216	29.94

OUTFLOWS

Carbonizer Drain	.0	.0	.00	.0	.0	.0	.000	.000	.000	.000	.00
Primary cyclone Drain	.0	.0	.00	.0	.0	.0	.000	.000	.000	.000	.00
Secondary cyclone Drain	1523.9	137.7	.46	90.9	2.4	3.6	.982	6.936	.000	7.275	25.08
Dusty gas to orifice	1392.1	1181.1	13.47	89.8	885.6	177.0	.127	1.287	7.940	.942	4.86
Heat Loss	318.3										
Total Outflow	3234.4	1318.7	13.93	180.7	888.0	180.6	1.109	8.222	7.940	8.216	29.94
Loss	.0	.0	.00	.0	.0	.0	.000	.000	.000	.000	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

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APPENDIX F

UNRECONCILED AND RECONCILED COMPOSITIONS OF SOLID STREAMS

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A total of 36 set points (steady-state periods) were achieved while operating the carbonizer in a jetting fluidized-bed mode, and 4 set points were achieved while operating the carbonizer in a circulating fluidized-bed mode. Table F.1 summarizes the coal and sorbent types used, date, duration, pressure, and bed and freeboard temperatures for each of these steady-state periods.

Tables summarizing the unreconciled and reconciled compositions of all the solids streams for each of the steady-state periods are given in this appendix.

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Table F.1. SUMMARY OF STEADY-STATE PERIODS FROM CARBONIZER PILOT PLANT OPERATION

Set Point	Coal Feed	Sorbent Feed	Date	Duration, hours	Pressure, psig	Bed Temp., °F	Freeboard Temp., °F
TR1-1	Pittsburgh No 8	Dolomite	11/20/91	0300-0700	152.6	1584	1553
TR1-2	Pittsburgh No 8	Dolomite	11/21/91	0200-0600	132.9	1681	1651
TR1-3	Pittsburgh No 8	Dolomite	11/21/91	1000-1400	144.7	1608	1581
TR1-4	Pittsburgh No 8	Dolomite	11/21/91	2100-2330	125.4	1482	1440
TR2-1	Pittsburgh No 8	Dolomite	12/19/91	0100-0500	139.8	1698	1652
TR2-2	Pittsburgh No 8	Dolomite	12/19/91	1300-1700	128.3	1598	1567
TR2-3	Pittsburgh No 8	Dolomite	12/20/91	0100-0500	138.1	1797	1705
TR2-4	Pittsburgh No 8	Dolomite	12/20/91	1000-1400	191.8	1784	1738
TR2-5	Pittsburgh No 8	Dolomite	12/20/91	1600-1800	198.6	1679	1675
TR4-1	Pittsburgh No 8	Dolomite	3/10/92	2030-0030	153.3	1663	1626
TR4-2	Pittsburgh No 8	Dolomite	3/11/92	0430-0830	155.9	1608	1573
TR4-3	Pittsburgh No 8	Dolomite	3/12/92	0230-0630	125.2	1708	1643
TR4-4	Pittsburgh No 8	Dolomite	3/12/92	1600-2000	129.1	1607	1568
TR4-5	Pittsburgh No 8	Dolomite	3/13/92	0530-0930	193.2	1720	1691
TR4-6	Pittsburgh No 8	Dolomite	3/13/92	1300-1700	175.8	1713	1681
TR4-7	Pittsburgh No 8	Dolomite	3/13/92	2200-0200	177.9	1601	1582
TR4-8	Pittsburgh No 8	Dolomite	3/14/92	0200-0600	182.2	1618	1600
TR5-1	Pittsburgh No 8	Dolomite	3/24/92	1100-1500	134.3	1693	1653
TR5-2	Pittsburgh No 8	Dolomite	3/24/92	1900-2300	154.8	1701	1662
TR5-3	Pittsburgh No 8	Limestone	3/25/92	0500-0900	147.4	1706	1667
TR6-1	Wyoming	Limestone	4/21/92	2100-0100	145.9	1580	1567
TR6-2	Wyoming	Limestone	4/22/92	0430-0830	129.8	1509	1500
TR6-3	Wyoming	Limestone	4/22/92	1400-1800	157.5	1511	1515
TR6-4	Wyoming	Limestone	4/22/92	2100-0100	191.9	1609	1579
TR6-5	Wyoming	Limestone	4/23/92	0400-0800	189.6	1632	1593
TR6-6	Illinois No 6	Limestone	4/23/92	1800-2200	143.5	1600	1573
TR6-7	Illinois No 6	Limestone	4/23/92	2300-0330	122.4	1599	1573
TR8-1	Wyoming	Limestone	6/10/92	2000-0100	128.6	1476	1432
TR8-2	Wyoming	Limestone	6/11/92	0300-0800	132.7	1593	1541
TR8-3	Wyoming	Limestone	6/11/92	1330-1730	156.5	1613	1575
TR8-4	Illinois No 6	Limestone	6/12/92	2100-0200	113.2	1652	1623
TR8-5	Illinois No 6	Limestone	6/13/92	0700-1100	160.6	1715	1680
TR8-6/7	Pittsburgh No 8	Dolomite	6/14/92	2100-0100	156.0	1699	1675
TR8-8	Pittsburgh No 8	Dolomite	6/16/92	0200-0600	143.5	1707	1683
TR8-9	Pittsburgh No 8	Dolomite	6/16/92	0800-1230	135.0	1713	1683
TR8-10	Pittsburgh No 8	Dolomite	6/16/92	1430-1930	126.5	1729	1697
TR10-1*	Pittsburgh No 8	Limestone	9/1/92	0200-0600	113.7	1675	1652
TR10-2*	Pittsburgh No 8	Limestone	9/1/92	1630-2100	68.7	1675	1618
TR10-3*	Pittsburgh No 8	Limestone	9/2/92	0000-0400	72.7	1706	1677
TR10-4*	Pittsburgh No 8	Limestone	9/2/92	0610-1240	55.9	1601	1571

*The carbonizer was operated in a circulating fluidized-bed mode during Test TR10.

TR1 - TEST POINT 1 11/20/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.578	.000	.135	.380	.600	.000
C	67.495	.000	25.650	52.640	70.310	.000
N	1.854	.000	.738	1.357	2.104	.000
O	6.302	.000	.000	.000	.000	.000
S	3.174	.000	2.417	3.879	2.154	.000
Water Moisture	2.172	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	4.436	.431	1.312	.000
Magnesium Carbonate	.000	41.552	20.589	15.984	5.597	.000
Calcium Sulfide	.000	.487	10.415	5.261	1.756	.000
Calcium Carbonate	.000	56.409	3.721	.007	2.282	.000
Sorbent Inerts	.000	1.552	.494	.199	.128	.000
Coal Ash	14.426	.000	31.404	20.062	13.756	.000
TOTAL	100.000	100.000	100.000	100.000	100.000	.000

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.640	.000	.130	.413	.601	.000
C	66.946	.000	27.103	59.945	71.019	.000
N	1.853	.000	.735	1.503	2.148	.000
O	6.618	.000	.000	.000	.000	.000
S	3.401	.000	.000	1.002	1.215	.000
Water Moisture	2.159	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	4.528	.411	1.185	.000
Magnesium Carbonate	.000	45.263	17.577	8.781	4.100	.000
Calcium Sulfide	.000	.525	14.898	8.241	1.963	.000
Calcium Carbonate	.000	52.992	11.433	.008	5.085	.000
Sorbent Inerts	.000	1.220	.729	.260	.177	.000
Coal Ash	14.382	.000	22.868	19.437	12.507	.000
TOTAL	100.000	100.000	100.000	100.000	100.000	.000

TR1 - TEST POINT 2 11/21/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.578	.000	.150	.467	.440	.000
C	67.495	.000	34.398	68.566	67.675	.000
N	1.854	.000	.763	1.717	1.664	.000
O	6.302	.000	.000	.000	.000	.000
S	3.174	.000	2.905	2.138	2.037	.000
Water Moisture	2.172	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	10.957	2.911	3.850	.000
Magnesium Carbonate	.000	41.552	5.185	2.059	.415	.000
Calcium Sulfide	.000	.487	14.251	3.056	2.103	.000
Calcium Carbonate	.000	56.409	8.412	3.907	5.900	.000
Calcium Sulfate	.000	.000	.892	.000	.000	.000
Sorbent Inerts	.000	1.552	.784	.221	.240	.000
Coal Ash	14.426	.000	21.303	14.957	15.676	.000
TOTAL	100.000	100.000	100.000	100.000	100.000	.000

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.633	.000	.116	.448	.420	.000
C	67.633	.000	28.746	66.189	64.809	.000
N	1.863	.000	.592	1.649	1.592	.000
O	6.538	.000	.000	.000	.000	.000
S	3.276	.000	.072	1.623	1.783	.000
Water Moisture	2.181	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	11.395	2.932	4.011	.000
Magnesium Carbonate	.000	42.140	3.739	1.924	.398	.000
Calcium Sulfide	.000	.493	13.815	3.112	2.047	.000
Calcium Carbonate	.000	56.062	17.459	6.533	8.995	.000
Calcium Sulfate	.000	.000	.696	.000	.000	.000
Sorbent Inerts	.000	1.306	.854	.250	.272	.000
Coal Ash	13.875	.000	22.516	15.341	15.672	.000
TOTAL	100.000	100.000	100.000	100.000	100.000	.000

TR1 - TEST POINT 3 11/21/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.578	.000	.246	.553	.701	.000
C	67.495	.000	40.298	68.720	73.454	.000
N	1.854	.000	1.090	1.814	2.013	.000
O	6.302	.000	.000	.000	.000	.000
S	3.174	.000	2.352	2.772	1.696	.000
Water Moisture	2.172	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	4.091	1.869	.894	.000
Magnesium Carbonate	.000	41.552	15.855	3.434	4.406	.000
Calcium Sulfide	.000	.487	7.649	2.474	1.781	.000
Calcium Carbonate	.000	56.409	6.092	3.167	1.878	.000
Sorbent Inerts	.000	1.552	.454	.179	.118	.000
Coal Ash	14.426	.000	21.874	15.019	13.057	.000
TOTAL	100.000	100.000	100.000	100.000	100.000	.000

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.520	.000	.204	.541	.712	.000
C	64.618	.000	34.962	67.486	74.641	.000
N	1.843	.000	.907	1.771	2.045	.000
O	8.862	.000	.000	.000	.000	.000
S	3.236	.000	.126	2.233	1.671	.000
Water Moisture	2.316	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	5.253	1.858	.704	.000
Magnesium Carbonate	.000	42.272	11.107	2.980	2.424	.000
Calcium Sulfide	.000	.492	9.970	2.848	1.983	.000
Calcium Carbonate	.000	56.070	15.832	5.268	2.480	.000
Sorbent Inerts	.000	1.166	.610	.189	.108	.000
Coal Ash	14.605	.000	21.030	14.825	13.232	.000
TOTAL	100.000	100.000	100.000	100.000	100.000	.000

TR1 - TEST POINT 4 11/21/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.578	.000	.317	.540	.672	.000
C	67.495	.000	54.368	65.187	72.463	.000
N	1.854	.000	1.585	1.851	1.998	.000
O	6.302	.000	.000	.000	.000	.000
S	3.174	.000	2.010	2.351	2.232	.000
Water Moisture	2.172	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	12.879	7.270	4.518	.000
Magnesium Carbonate	.000	41.552	.000	.000	.000	.000
Calcium Oxide	.000	.000	2.526	1.648	1.755	.000
Calcium Sulfide	.000	.487	6.118	2.652	1.323	.000
Calcium Carbonate	.000	56.409	18.184	11.035	6.097	.000
Sorbent Inerts	.000	1.552	.848	.480	.301	.000
Coal Ash	14.426	.000	1.164	6.987	8.641	.000
TOTAL	100.000	100.000	100.000	100.000	100.000	.000

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.653	.000	.321	.469	.559	.000
C	66.080	.000	54.988	56.857	60.449	.000
N	1.860	.000	1.612	1.616	1.668	.000
O	7.982	.000	.000	.000	.000	.000
S	3.139	.000	2.529	2.216	1.940	.000
Water Moisture	2.315	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	10.938	5.167	3.067	.000
Magnesium Carbonate	.000	41.396	.000	.000	.000	.000
Calcium Oxide	.000	.000	2.154	1.322	1.382	.000
Calcium Sulfide	.000	.477	7.582	2.495	1.131	.000
Calcium Carbonate	.000	56.600	17.289	9.128	4.839	.000
Sorbent Inerts	.000	1.527	.844	.399	.237	.000
Coal Ash	13.971	.000	1.742	20.330	24.729	.000
TOTAL	100.000	100.000	100.000	100.000	100.000	.000

TR2 - TEST POINT 1 12/19/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.587	.000	.154	.375	.353	.665
C	68.192	.000	32.356	54.949	45.220	67.780
N	1.923	.000	.856	1.593	1.597	1.834
O	6.055	.000	.000	.000	.000	.000
S	4.506	.000	1.165	1.231	1.284	1.265
Water Moisture	2.285	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	13.618	6.600	8.722	4.891
Magnesium Carbonate	.000	43.777	.752	4.349	2.582	2.871
Calcium Sulfide	.000	.351	7.687	5.589	4.983	1.225
Calcium Carbonate	.000	55.119	14.448	8.259	11.796	10.576
Sorbent Inerts	.000	.753	.340	.217	.253	.166
Coal Ash	12.452	.000	28.623	16.838	23.211	8.727

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.593	.000	.118	.349	.352	.660
C	68.073	.000	25.075	51.635	45.116	67.232
N	1.920	.000	.659	1.487	1.593	1.819
O	6.082	.000	.000	.000	.000	.000
S	4.548	.000	.676	.739	1.261	1.245
Water Moisture	2.290	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	16.637	7.549	7.106	4.193
Magnesium Carbonate	.000	45.179	.578	3.965	2.503	2.732
Calcium Sulfide	.000	.359	9.735	7.239	5.331	1.240
Calcium Carbonate	.000	53.783	29.005	13.694	13.472	12.099
Sorbent Inerts	.000	.679	.532	.297	.261	.173
Coal Ash	12.494	.000	16.984	13.046	23.004	8.606

TR2 - TEST POINT 2 12/19/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.587	.000	.409	.677	.701	1.271
C	68.192	.000	60.814	69.024	68.376	74.797
N	1.923	.000	1.564	2.026	1.742	2.115
O	6.055	.000	.000	.000	.000	.000
S	4.506	.000	2.152	2.211	1.475	1.559
Water Moisture	2.285	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	2.500	1.733	3.328	2.251
Magnesium Carbonate	.000	43.777	5.807	3.415	1.666	1.223
Calcium Sulfide	.000	.351	5.126	2.703	2.609	1.497
Calcium Carbonate	.000	55.119	2.653	2.822	4.066	3.265
Sorbent Inerts	.000	.753	.132	.089	.104	.072
Coal Ash	12.452	.000	18.842	15.299	15.933	11.950

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.655	.000	.329	.655	.698	1.264
C	68.689	.000	50.251	67.313	68.113	74.493
N	1.929	.000	1.275	1.967	1.735	2.106
O	5.829	.000	.000	.000	.000	.000
S	4.583	.000	.782	1.770	1.446	1.527
Water Moisture	2.244	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	4.677	1.993	2.777	1.923
Magnesium Carbonate	.000	45.614	9.573	3.558	1.595	1.171
Calcium Sulfide	.000	.371	13.078	3.724	2.924	1.647
Calcium Carbonate	.000	53.348	4.714	3.957	4.684	3.848
Sorbent Inerts	.000	.666	.283	.113	.108	.076
Coal Ash	12.071	.000	15.039	14.951	15.921	11.945

TR2 - TEST POINT 3 12/20/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.587	.000	.180	.230	.445	1.124
C	68.192	.000	16.973	46.878	56.388	67.674
N	1.923	.000	.597	1.262	1.484	1.485
O	6.055	.000	.000	.000	.000	.000
S	4.506	.000	1.722	1.461	1.362	1.098
Water Moisture	2.285	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	14.076	10.439	6.376	4.707
Magnesium Carbonate	.000	43.777	10.146	1.527	.386	.000
Calcium Oxide	.000	.000	.000	.000	.000	.977
Calcium Sulfide	.000	.351	19.487	6.745	2.494	1.334
Calcium Carbonate	.000	55.119	5.499	10.593	9.244	6.145
Sorbent Inerts	.000	.753	.441	.270	.172	.132
Coal Ash	12.452	.000	30.881	20.594	21.649	15.323

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.590	.000	.163	.201	.445	1.131
C	68.078	.000	16.236	42.099	56.384	68.142
N	1.919	.000	.549	1.109	1.483	1.495
O	5.951	.000	.000	.000	.000	.000
S	4.587	.000	.852	.276	1.333	1.069
Water Moisture	2.304	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	14.691	11.566	5.420	4.041
Magnesium Carbonate	.000	45.537	8.806	1.306	.382	.000
Calcium Oxide	.000	.000	.000	.000	.000	1.021
Calcium Sulfide	.000	.366	28.604	6.988	2.557	1.395
Calcium Carbonate	.000	53.404	7.123	20.494	10.328	6.251
Sorbent Inerts	.000	.694	.602	.388	.179	.129
Coal Ash	12.571	.000	22.375	15.572	21.489	15.326

TR2 - TEST POINT 4 12/20/91 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.587	.000	.141	.387	.488	.422
C	68.192	.000	41.722	60.926	63.072	64.286
N	1.923	.000	1.043	1.514	1.348	1.620
O	6.055	.000	.000	.000	.000	.000
S	4.506	.000	1.755	1.390	1.217	1.217
Water Moisture	2.285	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	6.626	3.258	5.525	4.226
Magnesium Carbonate	.000	43.777	8.489	5.899	.000	2.947
Calcium Oxide	.000	.000	.000	.000	.354	.000
Calcium Sulfide	.000	.351	12.183	5.779	1.969	4.683
Calcium Carbonate	.000	55.119	1.674	3.278	6.621	4.518
Sorbent Inerts	.000	.753	.252	.153	.135	.149
Coal Ash	12.452	.000	26.116	17.417	19.272	15.932

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.578	.000	.142	.389	.495	.423
C	67.972	.000	43.063	61.564	63.998	64.479
N	1.919	.000	1.054	1.522	1.367	1.623
O	6.080	.000	.000	.000	.000	.000
S	4.545	.000	.744	1.078	1.230	1.166
Water Moisture	2.293	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	6.183	2.757	4.042	3.422
Magnesium Carbonate	.000	44.715	8.704	5.236	.000	2.770
Calcium Oxide	.000	.000	.000	.000	.361	.000
Calcium Sulfide	.000	.357	17.721	6.856	2.037	5.138
Calcium Carbonate	.000	54.195	1.881	3.946	6.737	5.016
Sorbent Inerts	.000	.732	.354	.180	.138	.163
Coal Ash	12.613	.000	20.154	16.473	19.485	15.800

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.587	.000	.337	.460	.544	.528
C	68.192	.000	61.984	62.055	62.764	68.089
N	1.923	.000	1.670	1.709	1.451	1.734
O	6.055	.000	.000	.000	.000	.000
S	4.506	.000	1.729	1.136	1.330	.827
Water Moisture	2.285	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	3.629	3.600	5.003	3.498
Magnesium Carbonate	.000	43.777	4.857	5.940	2.165	2.916
Calcium Sulfide	.000	.351	5.065	5.133	3.719	4.372
Calcium Carbonate	.000	55.119	3.756	4.902	5.996	2.931
Sorbent Inerts	.000	.753	.146	.163	.151	.122
Coal Ash	12.452	.000	16.828	14.903	16.876	14.983

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.518	.000	.273	.407	.542	.524
C	67.325	.000	50.134	54.888	62.495	67.536
N	1.915	.000	1.342	1.507	1.445	1.719
O	6.763	.000	.000	.000	.000	.000
S	4.518	.000	.976	.818	1.314	.808
Water Moisture	2.375	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	5.583	4.839	4.070	2.977
Magnesium Carbonate	.000	45.234	5.611	6.133	2.062	2.690
Calcium Sulfide	.000	.370	12.447	9.043	4.194	5.384
Calcium Carbonate	.000	53.763	5.987	6.958	6.871	3.231
Sorbent Inerts	.000	.633	.271	.228	.148	.125
Coal Ash	12.586	.000	16.377	15.180	16.860	15.005

TR4 - TEST POINT 1 03/10/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.676	.000	.117	.372	.371	.620
C	71.542	.000	24.527	55.228	54.532	69.193
N	1.901	.000	.711	1.377	1.727	2.281
O	5.264	.000	.000	.000	.000	.000
S	3.356	.000	1.246	1.360	1.171	1.691
Water Moisture	2.082	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	17.427	10.054	11.316	6.430
Magnesium Carbonate	.000	45.535	.000	.000	.000	.000
Calcium Oxide	.000	.000	3.169	1.918	3.550	4.314
Calcium Sulfide	.000	.378	9.680	4.561	3.907	2.161
Calcium Carbonate	.000	53.439	22.385	12.384	9.511	4.002
Sorbent Inerts	.000	.647	.498	.266	.255	.176
Coal Ash	11.179	.000	20.241	12.481	13.661	9.131

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.605	.000	.128	.376	.382	.622
C	68.093	.000	27.669	56.554	56.164	69.436
N	1.879	.000	.760	1.393	1.777	2.285
O	7.590	.000	.000	.000	.000	.000
S	3.325	.000	.593	.787	1.182	1.589
Water Moisture	2.330	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	16.371	8.967	8.921	6.084
Magnesium Carbonate	.000	45.636	.000	.000	.000	.000
Calcium Oxide	.000	.000	2.928	1.967	3.755	4.517
Calcium Sulfide	.000	.380	12.303	5.145	4.100	2.167
Calcium Carbonate	.000	53.342	18.129	11.494	8.638	3.955
Sorbent Inerts	.000	.642	.482	.264	.263	.179
Coal Ash	12.179	.000	20.637	13.052	13.818	8.166

TR4 - TEST POINT 2 03/11/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.676	.000	.127	.565	.511	.787
C	71.542	.000	14.464	62.627	60.169	69.270
N	1.901	.000	.420	1.609	1.761	2.249
O	5.264	.000	.000	.000	.000	.000
S	3.356	.000	1.240	2.429	1.563	1.564
Water Moisture	2.082	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	16.134	6.487	7.150	6.347
Magnesium Carbonate	.000	45.535	11.693	.000	.000	.000
Calcium Oxide	.000	.000	.000	.321	2.614	4.835
Calcium Sulfide	.000	.378	19.009	3.930	3.611	2.162
Calcium Carbonate	.000	53.439	20.544	8.978	7.034	3.407
Sorbent Inerts	.000	.647	.563	.180	.200	.180
Coal Ash	11.179	.000	15.807	12.873	15.387	9.198

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.680	.000	.238	.574	.515	.791
C	68.271	.000	36.423	64.968	60.774	69.714
N	1.882	.000	.800	1.637	1.778	2.262
O	7.515	.000	.000	.000	.000	.000
S	3.329	.000	.000	1.249	1.549	1.533
Water Moisture	2.368	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	7.318	5.504	6.689	5.995
Magnesium Carbonate	.000	45.514	10.862	.000	.000	.000
Calcium Oxide	.000	.000	.000	.292	2.597	4.778
Calcium Sulfide	.000	.379	10.073	3.489	3.602	2.145
Calcium Carbonate	.000	53.459	17.36	8.295	8.965	3.372
Sorbent Inerts	.000	.649	.573	.164	.200	.179
Coal Ash	11.955	.000	16.848	13.828	15.331	9.231

TR4 - TEST POINT 3 03/12/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.676	.000	.282	.440	.359	.606
C	71.542	.000	16.713	66.874	55.294	65.385
N	1.901	.000	.449	1.781	1.226	1.839
O	5.264	.000	.000	.000	.000	.000
S	3.356	.000	.892	.825	.668	1.099
Water Moisture	2.082	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	19.856	7.654	8.459	6.846
Magnesium Carbonate	.000	45.535	.000	.000	.000	.000
Calcium Oxide	.000	.000	8.892	4.325	6.154	4.568
Calcium Sulfide	.000	.378	12.221	1.797	2.579	.948
Calcium Carbonate	.000	53.439	13.110	7.531	8.470	6.506
Sorbent Inerts	.000	.647	.551	.213	.276	.192
Coal Ash	11.179	.000	27.035	8.559	16.517	12.012

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.741	.000	.334	.448	.359	.610
C	70.561	.000	21.136	68.390	55.355	65.791
N	1.895	.000	.561	1.819	1.227	1.850
O	5.801	.000	.000	.000	.000	.000
S	3.338	.000	1.076	.824	.667	1.105
Water Moisture	2.187	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	18.555	6.919	9.020	6.464
Magnesium Carbonate	.000	45.508	.000	.000	.000	.000
Calcium Oxide	.000	.000	6.672	4.043	5.864	4.614
Calcium Sulfide	.000	.379	15.274	1.827	2.542	.947
Calcium Carbonate	.000	53.464	12.950	7.422	8.392	6.493
Sorbent Inerts	.000	.648	.553	.206	.269	.193
Coal Ash	11.478	.000	22.889	8.101	16.306	11.933

TR4 - TEST POINT 4 03/12/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.676	.000	.236	.580	.458	.672
C	71.542	.000	36.730	65.370	61.085	71.080
N	1.901	.000	1.005	1.744	1.289	2.105
O	5.264	.000	.000	.000	.000	.000
S	3.356	.000	1.241	1.178	.868	1.226
Water Moisture	2.082	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	25.056	4.201	7.888	2.908
Magnesium Carbonate	.000	45.535	7.555	2.795	.000	.765
Calcium Oxide	.000	.000	.000	.000	3.689	.000
Calcium Sulfide	.000	.378	5.440	3.055	3.309	1.601
Calcium Carbonate	.000	53.439	13.312	7.875	8.605	6.011
Sorbent Inerts	.000	.647	.250	.145	.213	.099
Coal Ash	11.179	.000	9.173	13.056	14.595	13.533

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.722	.000	.210	.556	.459	.669
C	68.387	.000	33.562	62.987	61.265	70.879
N	1.890	.000	.905	1.675	1.292	2.097
O	7.689	.000	.000	.000	.000	.000
S	3.326	.000	.745	.975	.861	1.186
Water Moisture	2.432	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	11.466	4.109	7.233	3.017
Magnesium Carbonate	.000	45.622	6.826	2.605	.000	.747
Calcium Oxide	.000	.000	.000	.000	3.725	.000
Calcium Sulfide	.000	.380	9.172	3.284	3.413	1.600
Calcium Carbonate	.000	53.384	23.685	8.678	6.496	6.121
Sorbent Inerts	.000	.615	.415	.251	.204	.095
Coal Ash	11.554	.000	13.012	14.980	15.051	13.588

TR4 - TEST POINT 5 03/13/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.676	.000	.183	.434	.427	.546
C	71.542	.000	18.447	66.132	62.463	71.168
N	1.901	.000	.553	1.802	1.513	2.009
O	5.264	.000	.000	.000	.000	.000
S	3.356	.000	.494	1.068	.640	1.219
Water Moisture	2.082	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	28.383	4.215	3.474	1.109
Magnesium Carbonate	.000	45.535	.000	.422	.000	2.563
Calcium Oxide	.000	.000	13.900	.000	.874	.000
Calcium Sulfide	.000	.378	17.888	2.799	1.200	1.953
Calcium Carbonate	.000	53.439	18.557	5.457	4.041	3.217
Sorbent Inerts	.000	.647	.818	.112	.087	.071
Coal Ash	11.179	.000	.778	17.560	25.281	16.145

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.726	.000	.369	.400	.429	.543
C	70.968	.000	36.553	61.042	62.825	70.746
N	1.939	.000	1.041	1.657	1.522	1.996
O	7.346	.000	.000	.000	.000	.000
S	3.422	.000	.801	.361	.642	1.177
Water Moisture	2.364	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	19.861	3.085	2.940	1.097
Magnesium Carbonate	.000	45.523	.000	.362	.000	2.507
Calcium Oxide	.000	.000	2.753	.000	.875	.000
Calcium Sulfide	.000	.378	18.752	2.566	1.217	1.896
Calcium Carbonate	.000	53.450	18.329	4.521	4.042	3.062
Sorbent Inerts	.000	.649	.592	.097	.088	.068
Coal Ash	9.234	.000	.949	25.409	25.422	16.907

TR4 - TEST POINT 6 03/13/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.676	.000	.182	.425	.360	.560
C	71.542	.000	27.242	64.714	62.403	70.281
N	1.901	.000	.585	1.881	1.781	1.849
O	5.264	.000	.000	.000	.000	.000
S	3.356	.000	.565	1.299	.740	.980
Water Moisture	2.082	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	26.283	3.521	6.443	4.166
Magnesium Carbonate	.000	45.535	.000	1.213	.000	.000
Calcium Oxide	.000	.000	16.452	.000	6.338	2.609
Calcium Sulfide	.000	.378	14.620	3.713	1.577	2.429
Calcium Carbonate	.000	53.439	14.088	5.222	3.082	3.665
Sorbent Inerts	.000	.647	.765	.124	.199	.140
Coal Ash	11.179	.000	-.781	17.887	17.077	13.321

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.797	.000	.324	.385	.355	.539
C	70.472	.000	49.180	58.876	61.578	67.768
N	1.959	.000	1.015	1.700	1.757	1.781
O	8.526	.000	.000	.000	.000	.000
S	3.462	.000	.592	.877	.725	.901
Water Moisture	2.557	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	16.186	2.903	6.387	4.317
Magnesium Carbonate	.000	45.510	.000	1.011	.000	.000
Calcium Oxide	.000	.000	2.419	.000	6.029	2.352
Calcium Sulfide	.000	.378	16.273	3.138	1.522	2.228
Calcium Carbonate	.000	53.462	13.273	4.049	2.977	3.423
Sorbent Inerts	.000	.650	.484	.101	.191	.129
Coal Ash	8.227	.000	.255	26.959	18.479	16.561

TR4 - TEST POINT 7 03/13/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.676	.000	.299	.451	.584	.631
C	71.542	.000	44.814	54.596	65.899	71.621
N	1.901	.000	1.187	1.613	2.364	1.783
O	5.264	.000	.000	.000	.000	.000
S	3.356	.000	1.915	2.231	1.430	1.241
Water Moisture	2.082	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	8.415	10.493	4.566	2.554
Magnesium Carbonate	.000	45.535	2.348	.000	2.575	.966
Calcium Oxide	.000	.000	.000	1.862	.000	.000
Calcium Sulfide	.000	.378	4.327	5.164	3.306	2.350
Calcium Carbonate	.000	53.439	16.957	16.019	10.564	4.107
Sorbent Inerts	.000	.647	.275	.318	.182	.088
Coal Ash	11.179	.000	19.461	7.252	8.529	14.659

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.614	.000	.289	.453	.583	.631
C	68.094	.000	44.565	55.139	65.848	71.738
N	1.877	.000	1.125	1.619	2.359	1.785
O	7.609	.000	.000	.000	.000	.000
S	3.303	.000	1.003	1.922	1.379	1.221
Water Moisture	2.333	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	10.196	10.753	4.878	2.548
Magnesium Carbonate	.000	45.528	1.918	.000	2.567	.956
Calcium Oxide	.000	.000	.000	1.806	.000	.000
Calcium Sulfide	.000	.379	5.390	5.967	3.321	2.382
Calcium Carbonate	.000	53.457	20.088	15.169	10.535	4.147
Sorbent Inerts	.000	.636	.325	.314	.178	.088
Coal Ash	12.170	.000	15.102	6.858	8.351	14.504

TR4 - TEST POINT 8 03/14/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.676	.000	.272	.557	.537	.684
C	71.542	.000	49.258	68.175	67.174	70.987
N	1.901	.000	1.233	1.643	1.642	1.883
O	5.264	.000	.000	.000	.000	.000
S	3.356	.000	1.833	1.607	1.244	1.299
Water Moisture	2.082	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	9.131	2.713	5.377	5.431
Magnesium Carbonate	.000	45.535	.899	2.595	1.407	.000
Calcium Oxide	.000	.000	.000	.000	.000	1.810
Calcium Sulfide	.000	.378	3.526	2.689	2.844	2.632
Calcium Carbonate	.000	53.439	18.848	4.981	10.854	5.700
Sorbent Inerts	.000	.647	.285	.105	.178	.151
Coal Ash	11.179	.000	14.713	14.926	8.742	9.423

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.752	.000	.218	.550	.536	.683
C	71.426	.000	39.626	67.437	66.965	70.960
N	1.904	.000	.994	1.626	1.637	1.883
O	5.520	.000	.000	.000	.000	.000
S	3.359	.000	1.541	1.621	1.241	1.303
Water Moisture	2.129	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	13.331	2.771	5.402	5.231
Magnesium Carbonate	.000	45.618	.732	2.502	1.407	.000
Calcium Oxide	.000	.000	.000	.000	.000	1.867
Calcium Sulfide	.000	.379	4.378	3.100	2.870	2.769
Calcium Carbonate	.000	53.371	27.738	5.505	11.032	5.756
Sorbent Inerts	.000	.633	.397	.115	.176	.152
Coal Ash	10.911	.000	11.046	14.773	8.734	9.396

TR5 - TEST POINT 1 3/24/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.680	.000	.283	.532	.411	.562
C	74.613	.000	29.265	69.144	66.320	78.402
N	2.048	.000	.634	1.526	1.663	1.677
O	4.823	.000	.000	.000	.000	.000
S	1.883	.000	.712	.824	.771	.733
Water Moisture	1.435	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	19.454	2.817	4.613	3.196
Magnesium Carbonate	.000	34.905	.000	.000	.000	.000
Calcium Oxide	.000	.000	8.564	.439	1.242	1.523
Calcium Sulfide	.000	.463	4.848	1.898	1.127	.926
Calcium Carbonate	.000	64.226	22.664	4.017	10.098	4.686
Sorbent Inerts	.000	.406	.279	.046	.087	.054
Coal Ash	10.520	.000	13.298	18.756	13.669	8.239

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.597	.000	.278	.539	.419	.569
C	72.807	.000	29.092	70.183	67.636	79.252
N	2.019	.000	.602	1.538	1.695	1.694
O	5.378	.000	.000	.000	.000	.000
S	1.867	.000	.152	.469	.765	.710
Water Moisture	1.631	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	12.895	1.936	3.571	2.286
Magnesium Carbonate	.000	35.418	.000	.000	.000	.000
Calcium Oxide	.000	.000	14.099	.417	1.231	1.582
Calcium Sulfide	.000	.466	4.778	1.959	1.101	.917
Calcium Carbonate	.000	63.737	17.242	3.900	9.854	4.598
Sorbent Inerts	.000	.379	.288	.043	.080	.051
Coal Ash	11.701	.000	20.575	19.015	13.548	8.340

TR5 - TEST POINT 2 3/24/92 Pittsburgh Coal + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.680	.000	.132	.460	.481	.527
C	74.613	.000	19.276	66.998	68.232	74.925
N	2.048	.000	.434	1.519	1.393	1.743
O	4.823	.000	.000	.000	.000	.000
S	1.883	.000	.877	.960	.671	.841
Water Moisture	1.435	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	14.394	2.678	4.285	2.811
Magnesium Carbonate	.000	34.905	.000	.790	.000	.000
Calcium Oxide	.000	.000	9.279	.000	4.200	1.530
Calcium Sulfide	.000	.463	3.214	2.271	1.894	1.209
Calcium Carbonate	.000	64.226	14.503	4.833	5.011	3.547
Sorbent Inerts	.000	.406	.222	.050	.095	.050
Coal Ash	10.520	.000	37.670	19.442	13.738	12.816

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.646	.000	.121	.458	.481	.531
C	73.720	.000	17.893	66.916	68.249	75.499
N	2.035	.000	.397	1.512	1.392	1.756
O	5.106	.000	.000	.000	.000	.000
S	1.866	.000	.670	.817	.654	.840
Water Moisture	1.523	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	20.126	2.762	4.620	2.322
Magnesium Carbonate	.000	35.732	.000	.740	.000	.000
Calcium Oxide	.000	000	29.544	.000	4.906	1.667
Calcium Sulfide	.000	.501	5.565	3.044	2.059	1.281
Calcium Carbonate	.000	32.445	11.922	5.981	4.999	3.596
Sorbent Inerts	.000	.321	.368	.057	.085	.042
Coal Ash	11.105	000	13.393	18.712	12.555	12.465

TR5 - TEST POINT 3 3/25/92 Pittsburgh Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.680	.000	.150	.514	.469	.678
C	74.613	.000	20.195	67.772	68.358	68.233
N	2.048	.000	.510	1.502	1.516	1.691
O	4.823	.000	.000	.000	.000	.000
S	1.883	.000	.430	.779	.728	1.063
Water Moisture	1.435	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	17.768	4.797	4.517	6.104
Magnesium Carbonate	.000	2.698	.000	.000	.000	.000
Calcium Oxide	.000	.000	32.541	3.523	4.900	3.884
Calcium Sulfide	.000	.303	4.963	2.077	1.537	.980
Calcium Carbonate	.000	96.662	14.628	6.654	5.110	8.607
Sorbent Inerts	.000	.336	.276	.055	.055	.059
Coal Ash	10.520	.000	8.538	12.327	12.810	8.701

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.625	.000	.160	.509	.470	.712
C	73.643	.000	21.330	66.988	68.525	71.483
N	2.030	.000	.537	1.485	1.519	1.771
O	5.084	.000	.000	.000	.000	.000
S	1.855	.000	.467	.794	.743	1.121
Water Moisture	1.548	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	1.302	.216	.221	.242
Magnesium Carbonate	.000	2.786	.000	.000	.000	.000
Calcium Oxide	.000	.000	38.195	3.416	4.955	4.114
Calcium Sulfide	.000	.298	9.039	2.425	1.681	1.048
Calcium Carbonate	.000	96.594	14.120	6.251	4.946	8.837
Sorbent Inerts	.000	.321	.314	.052	.053	.058
Coal Ash	11.215	.000	14.536	17.865	16.884	10.614

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********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.600	.000	.027	.542	.542	.719
C	50.770	.000	12.679	70.875	67.082	70.777
N	.978	.000	.400	1.626	1.304	1.216
O	11.487	.000	.000	.000	.000	.000
S	.718	.000	.395	.569	.752	.831
Water Moisture	26.869	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	1.263	1.589	1.946	2.161
Magnesium Carbonate	.000	1.727	.000	.000	.000	.000
Calcium Oxide	.000	.000	20.509	3.963	3.228	3.095
Calcium Sulfide	.000	.333	.801	.690	.542	.502
Calcium Carbonate	.000	97.086	61.275	5.540	8.776	11.650
Sorbent Inerts	.000	.854	.866	.119	.134	.156
Coal Ash	5.578	.000	1.785	14.493	15.695	8.893

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.571	.000	.018	.548	.552	.731
C	49.107	.000	9.296	71.457	68.389	71.970
N	.958	.000	.303	1.652	1.329	1.236
O	11.749	.000	.000	.000	.000	.000
S	.652	.000	.795	1.237	.827	.986
Water Moisture	28.166	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.770	.122	.136	.160
Magnesium Carbonate	.000	1.753	.000	.000	.000	.000
Calcium Oxide	.000	.000	23.834	3.886	3.498	3.436
Calcium Sulfide	.000	.324	1.591	1.253	.574	.561
Calcium Carbonate	.000	97.073	44.934	5.483	8.827	11.767
Sorbent Inerts	.000	.850	.782	.123	.138	.163
Coal Ash	5.797	.000	17.677	14.239	15.730	8.990

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.600	.000	.011	.675	.555	.618
C	50.770	.000	5.017	71.218	65.104	70.480
N	.978	.000	.216	1.477	1.404	1.479
O	11.487	.000	.000	.000	.000	.000
S	.718	.000	.011	.594	.858	.517
Water Moisture	26.869	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.193	1.374	2.566	1.439
Magnesium Sulfide	.000	.000	.000	.000	.000	.151
Magnesium Carbonate	.000	1.727	.000	.000	.000	.000
Calcium Oxide	.000	.000	16.002	1.855	4.609	.000
Calcium Sulfide	.000	.333	1.581	.628	.545	.513
Calcium Carbonate	.000	97.086	73.153	6.685	8.667	10.550
Sorbent Inerts	.000	.854	.910	.095	.154	.099
Coal Ash	5.578	.000	2.896	15.398	15.536	14.155

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.489	.000	.015	.688	.570	.622
C	48.359	.000	7.089	72.481	66.837	70.987
N	.954	.000	.312	1.505	1.441	1.489
O	12.273	.000	.000	.000	.000	.000
S	.692	.000	.014	.701	.898	.546
Water Moisture	28.327	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.525	.073	.119	.000
Magnesium Sulfide	.000	.000	.000	.000	.000	.115
Magnesium Carbonate	.000	1.331	.000	.000	.000	.000
Calcium Oxide	.000	.000	1.541	2.102	4.922	.000
Calcium Sulfide	.000	.333	2.351	.633	.554	1.471
Calcium Carbonate	.000	97.479	73.377	6.663	8.817	10.611
Sorbent Inerts	.000	.857	.007	.099	.161	.111
Coal Ash	5.907	.000	12.269	15.056	15.682	14.048

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.600	.000	.022	.634	.562	.690
C	50.770	.000	.362	68.814	64.543	63.643
N	.978	.000	.282	1.314	1.021	.984
O	11.487	.000	.000	.000	.000	.000
S	.718	.000	.195	.705	.633	1.309
Water Moisture	26.869	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.336	1.514	2.035	3.064
Magnesium Carbonate	.000	1.727	.000	.000	.000	.000
Calcium Oxide	.000	.000	18.844	2.968	2.478	6.256
Calcium Sulfide	.000	.333	3.922	.794	1.264	.822
Calcium Carbonate	.000	97.086	65.771	8.903	8.764	9.217
Sorbent Inerts	.000	.854	.918	.134	.131	.188
Coal Ash	5.578	.000	2.348	14.220	18.569	13.827

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.496	.000	.024	.643	.573	.709
C	48.706	.000	7.477	69.636	65.806	65.383
N	.962	.000	.309	1.331	1.041	1.011
O	12.465	.000	.000	.000	.000	.000
S	.700	.000	.984	.820	.663	1.371
Water Moisture	27.742	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.544	.125	.125	.181
Magnesium Carbonate	.000	1.644	.000	.000	.000	.000
Calcium Oxide	.000	.000	.000	3.151	2.706	5.663
Calcium Sulfide	.000	.333	5.936	.894	1.308	.852
Calcium Carbonate	.000	97.167	59.389	8.729	8.863	9.396
Sorbent Inerts	.000	.856	.593	.137	.136	.197
Coal Ash	5.929	.000	24.744	14.536	18.778	14.237

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.600	.000	.022	.539	.467	.604
C	50.770	.000	8.031	69.458	60.209	70.015
N	.978	.000	.236	1.033	.976	1.319
O	11.487	.000	.000	.000	.000	.000
S	.718	.000	.176	.303	.376	.483
Water Moisture	26.869	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	1.295	1.458	3.429	1.778
Magnesium Carbonate	.000	1.727	.000	.000	.000	.000
Calcium Oxide	.000	.000	23.568	2.924	6.161	3.218
Calcium Sulfide	.000	.333	2.645	1.295	1.921	.861
Calcium Carbonate	.000	97.086	60.792	6.893	9.823	5.798
Sorbent Inerts	.000	.854	.932	.122	.206	.120
Coal Ash	5.578	.000	2.302	15.975	16.433	14.803

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.494	.000	.023	.548	.486	.615
C	49.182	.000	7.607	70.310	62.606	71.170
N	.963	.000	.247	1.048	1.015	1.341
O	12.111	.000	.000	.000	.000	.000
S	.696	.000	1.049	.508	.402	.558
Water Moisture	27.590	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.608	.121	.209	.121
Magnesium Carbonate	.000	1.759	.000	.000	.000	.000
Calcium Oxide	.000	.000	2.827	2.770	6.504	3.297
Calcium Sulfide	.000	.332	5.385	1.670	1.973	.853
Calcium Carbonate	.000	97.054	58.015	6.824	9.953	5.828
Sorbent Inerts	.000	.855	.619	.124	.213	.123
Coal Ash	5.964	.000	23.619	16.079	16.638	14.895

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.600	.000	.011	.470	.406	.536
C	50.770	.000	7.242	66.962	61.841	68.296
N	.978	.000	.194	1.278	1.041	1.445
O	11.487	.000	.000	.000	.000	.000
S	.718	.000	.270	.484	.446	.485
Water Moisture	26.869	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.937	1.640	2.639	1.528
Magnesium Carbonate	.000	1.727	.000	.000	.000	.000
Calcium Oxide	.000	.000	23.174	1.892	5.460	2.917
Calcium Sulfide	.000	.333	2.089	2.102	1.762	1.091
Calcium Carbonate	.000	97.086	62.416	7.071	8.754	7.073
Sorbent Inerts	.000	.854	.934	.117	.183	.121
Coal Ash	5.578	.000	2.735	18.065	17.467	16.508

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.523	.000	.009	.466	.414	.541
C	48.907	.000	5.920	65.195	62.903	68.938
N	.960	.000	.166	1.271	1.060	1.459
O	12.115	.000	.000	.000	.000	.000
S	.675	.000	.607	1.923	.556	.775
Water Moisture	27.924	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.345	.092	.160	.089
Magnesium Carbonate	.000	1.499	.000	.000	.000	.000
Calcium Oxide	.000	.000	.000	.000	5.835	1.850
Calcium Sulfide	.000	.274	2.528	4.361	1.949	1.442
Calcium Carbonate	.000	97.477	43.599	6.497	8.755	6.793
Sorbent Inerts	.000	.750	.361	.096	.168	.093
Coal Ash	5.895	.000	46.465	20.099	18.202	18.021

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.395	.000	.252	.720	.619	.699
C	62.757	.000	45.713	73.573	63.138	76.710
N	1.570	.000	.777	1.554	1.537	1.893
O	6.775	.000	.000	.000	.000	.000
S	3.045	.000	1.144	1.842	1.467	1.245
Water Moisture	10.867	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.000	.555	.992	.467
Magnesium Carbonate	.000	1.727	.861	.000	.000	.000
Calcium Oxide	.000	.000	.000	2.808	4.853	.842
Calcium Sulfide	.000	.333	5.267	1.072	.921	.820
Calcium Carbonate	.000	97.086	20.232	1.986	1.330	2.025
Sorbent Inerts	.000	.854	.241	.074	.099	.041
Coal Ash	10.590	.000	25.513	15.818	25.045	15.259

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.343	.000	.241	.720	.624	.702
C	61.849	.000	41.803	73.247	63.668	77.052
N	1.553	.000	.732	1.553	1.550	1.901
O	6.952	.000	.000	.000	.000	.000
S	2.942	.000	3.378	2.189	1.501	1.337
Water Moisture	11.341	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.000	.082	.103	.043
Magnesium Carbonate	.000	1.749	.624	.000	.000	.000
Calcium Oxide	.000	.000	.000	3.261	5.240	.985
Calcium Sulfide	.000	.333	9.242	1.297	.938	.886
Calcium Carbonate	.000	97.090	22.011	1.952	1.334	2.029
Sorbent Inerts	.000	.828	.296	.081	.102	.043
Coal Ash	11.021	.000	21.672	15.617	24.943	15.021

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.395	.000	.326	.654	.669	.731
C	62.757	.000	50.804	72.484	71.804	74.765
N	1.570	.000	.907	1.614	1.876	1.852
O	6.775	.000	.000	.000	.000	.000
S	3.045	.000	1.743	2.189	1.926	2.192
Water Moisture	10.867	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.000	.487	.509	.448
Magnesium Carbonate	.000	1.727	1.629	.000	.000	.000
Calcium Oxide	.000	.000	.000	1.986	1.697	1.408
Calcium Sulfide	.000	.333	7.210	1.495	1.347	.000
Calcium Carbonate	.000	97.086	2.108	3.444	2.661	2.419
Sorbent Inerts	.000	.854	.106	.079	.066	.043
Coal Ash	10.590	.000	35.167	15.568	17.446	16.142

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.437	.000	.268	.657	.667	.730
C	63.073	.000	43.791	73.195	71.867	74.873
N	1.576	.000	.757	1.624	1.877	1.854
O	6.652	.000	.000	.000	.000	.000
S	3.092	.000	.000	1.957	1.867	2.151
Water Moisture	10.732	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.000	.111	.080	.051
Magnesium Carbonate	.000	1.791	.694	.000	.000	.000
Calcium Oxide	.000	.000	.000	3.747	2.425	1.804
Calcium Sulfide	.000	.336	3.924	1.634	1.406	.000
Calcium Carbonate	.000	97.116	32.341	3.744	2.795	2.576
Sorbent Inerts	.000	.757	.293	.099	.070	.045
Coal Ash	10.438	.000	17.932	13.232	15.947	15.916

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.327	.000	.046	.727	.606	.986
C	49.487	.000	15.493	71.355	63.042	78.926
N	.870	.000	.161	1.025	.661	1.092
O	13.561	.000	.000	.000	.000	.000
S	.673	.000	.138	.177	.283	.708
Water Moisture	27.065	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.000	.987	1.860	.599
Magnesium Carbonate	.000	2.128	22.485	.000	.000	.000
Calcium Oxide	.000	.000	.000	.969	1.718	.227
Calcium Sulfide	.000	.387	1.965	.511	.458	.171
Calcium Carbonate	.000	97.305	21.369	9.341	11.465	6.528
Sorbent Inerts	.000	.181	.045	.022	.028	.013
Coal Ash	5.017	.000	38.299	14.886	19.880	10.751

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.252	.000	.029	.663	.579	.999
C	47.902	.000	10.919	65.231	60.318	80.035
N	.841	.000	.115	.937	.635	1.107
O	12.878	.000	.000	.000	.000	.000
S	.666	.000	.000	.066	.243	.709
Water Moisture	29.234	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.000	.224	.249	.079
Magnesium Carbonate	.000	2.348	1.869	.000	.000	.000
Calcium Oxide	.000	.000	.000	5.812	5.708	.233
Calcium Sulfide	.000	.428	.306	.304	.401	.162
Calcium Carbonate	.000	97.181	77.403	8.688	10.959	6.282
Sorbent Inerts	.000	.043	.034	.008	.009	.003
Coal Ash	5.227	.000	9.325	18.068	20.899	10.389

TR8 - TEST POINT 2 05/13/93 Wyoming Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.327	.000	.021	.494	.511	.974
C	49.487	.000	9.026	59.662	63.355	72.882
N	.870	.000	.073	.682	.622	1.005
O	13.561	.000	.000	.000	.000	.000
S	.673	.000	.314	.183	.130	.974
Water Moisture	27.065	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.301	1.496	1.950	.418
Magnesium Carbonate	.000	2.128	.000	.000	.000	.838
Calcium Oxide	.000	.000	7.827	.795	3.607	.000
Calcium Sulfide	.000	.387	1.695	.481	.699	.047
Calcium Carbonate	.000	97.305	74.781	14.303	11.444	9.371
Sorbent Inerts	.000	.181	.168	.030	.035	.017
Coal Ash	5.017	.000	5.794	21.872	17.647	13.473

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.165	.000	.015	.498	.517	.988
C	46.378	.000	7.143	60.385	64.142	73.928
N	.819	.000	.059	.691	.629	1.020
O	12.873	.000	.000	.000	.000	.000
S	.627	.000	.501	.217	.139	.992
Water Moisture	30.663	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.856	.149	.181	.000
Magnesium Carbonate	.000	1.760	.000	.000	.000	.192
Calcium Oxide	.000	.000	29.055	1.072	4.865	.000
Calcium Sulfide	.000	.390	1.484	.539	.706	.042
Calcium Carbonate	.000	97.708	46.032	14.782	11.512	10.670
Sorbent Inerts	.000	.142	.144	.025	.030	.015
Coal Ash	5.475	.000	14.711	21.641	17.277	12.152

TR8 - TEST POINT 3 05/13/93 Wyoming Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.327	.000	.031	.627	.547	.753
C	49.487	.000	3.761	64.377	64.163	65.652
N	.870	.000	.072	.740	.659	.509
O	13.561	.000	.000	.000	.000	.000
S	.673	.000	.000	.000	.233	.214
Water Moisture	27.065	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	1.078	1.447	2.240	1.471
Magnesium Carbonate	.000	2.128	.000	.000	.000	.000
Calcium Oxide	.000	.000	89.669	3.243	3.378	2.879
Calcium Sulfide	.000	.387	2.458	1.630	.502	1.145
Calcium Carbonate	.000	97.305	.773	10.372	10.982	10.774
Sorbent Inerts	.000	.181	.303	.034	.033	.032
Coal Ash	5.017	.000	1.855	17.530	17.261	16.571

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.188	.000	.029	.627	.559	.761
C	46.642	.000	2.645	63.881	65.659	66.348
N	.825	.000	.070	.742	.674	.515
O	13.083	.000	.000	.000	.000	.000
S	.609	.000	1.080	.833	.269	.327
Water Moisture	30.230	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.872	.214	.204	.204
Magnesium Carbonate	.000	2.277	.000	.000	.000	.000
Calcium Oxide	.000	.000	39.850	2.718	3.712	3.299
Calcium Sulfide	.000	.386	4.706	3.252	.537	1.326
Calcium Carbonate	.000	97.159	.614	9.854	10.945	10.616
Sorbent Inerts	.000	.178	.143	.035	.033	.034
Coal Ash	5.422	.000	49.990	17.844	17.409	16.570

TR8 - TEST POINT 4 05/13/93 Ill No.6 + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.815	.000	.110	.580	.677	.754
C	63.562	.000	14.290	66.735	69.524	71.542
N	1.450	.000	.259	1.134	1.031	1.121
O	7.910	.000	.000	.000	.000	.000
S	3.030	.000	.478	1.048	.849	.754
Water Moisture	9.243	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.507	.256	.227	.316
Magnesium Carbonate	.000	2.128	.000	.000	.000	.000
Calcium Oxide	.000	.000	18.207	2.367	2.110	2.312
Calcium Sulfide	.000	.387	8.678	2.289	.898	1.376
Calcium Carbonate	.000	97.305	50.655	6.188	4.042	3.566
Sorbent Inerts	.000	.181	.176	.025	.017	.018
Coal Ash	10.990	.000	6.640	19.378	20.625	18.240

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.770	.000	.146	.585	.680	.754
C	62.419	.000	20.563	67.648	69.945	71.758
N	1.428	.000	.374	1.149	1.037	1.124
O	7.911	.000	.000	.000	.000	.000
S	2.969	.000	1.212	1.083	.858	.761
Water Moisture	9.880	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.677	.137	.095	.102
Magnesium Carbonate	.000	1.984	.000	.000	.000	.000
Calcium Oxide	.000	.000	2.539	2.545	2.568	2.792
Calcium Sulfide	.000	.389	15.127	2.660	.925	1.435
Calcium Carbonate	.000	97.457	44.494	5.924	3.974	3.543
Sorbent Inerts	.000	.171	.122	.025	.017	.018
Coal Ash	11.623	.000	14.745	18.244	19.902	17.713

TR8 - TEST POINT 5 05/13/93 Ill No. 6 + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.815	.000	.105	.595	.546	.590
C	63.562	.000	4.442	65.739	63.809	70.984
N	1.450	.000	.010	.974	.960	1.252
O	7.910	.000	.000	.000	.000	.000
S	3.030	.000	.479	.858	.657	.601
Water Moisture	9.243	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.494	.248	.277	.301
Magnesium Carbonate	.000	2.128	.000	.000	.000	.000
Calcium Oxide	.000	.000	43.531	3.709	4.480	3.117
Calcium Sulfide	.000	.387	17.147	1.510	1.751	1.054
Calcium Carbonate	.000	97.305	31.351	5.003	6.569	2.121
Sorbent Inerts	.000	.181	.245	.025	.031	.017
Coal Ash	10.990	.000	2.198	21.339	20.920	19.963

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	3.711	.000	.427	.604	.548	.595
C	61.411	.000	18.942	66.797	64.092	71.499
N	1.413	.000	.030	.987	.962	1.260
O	8.198	.000	.000	.000	.000	.000
S	2.947	.000	.000	.727	.570	.566
Water Moisture	10.245	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.603	.110	.138	.074
Magnesium Carbonate	.000	1.490	.000	.000	.000	.000
Calcium Oxide	.000	.000	19.031	4.602	5.720	3.704
Calcium Sulfide	.000	.397	23.212	1.619	1.843	1.079
Calcium Carbonate	.000	97.951	17.303	4.705	6.317	2.077
Sorbent Inerts	.000	.162	.138	.025	.031	.017
Coal Ash	12.076	.000	20.315	19.825	19.779	19.130

TR8 - TEST POINT 6/7 05/13/93 Pitts No 8 + Dolomite

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.234	.000	.209	.469	.561	.695
C	68.055	.000	30.501	60.462	66.236	70.677
N	1.750	.000	.580	1.110	1.228	1.002
O	5.511	.000	.000	.000	.000	.000
S	4.047	.000	2.783	2.052	1.364	1.166
Water Moisture	2.878	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	12.459	6.895	4.355	2.913
Magnesium Carbonate	.000	40.395	.000	.000	.000	.000
Calcium Oxide	.000	.000	4.945	4.080	2.203	1.738
Calcium Sulfide	.000	.182	13.797	4.762	1.805	1.050
Calcium Carbonate	.000	58.269	9.791	7.009	6.762	4.269
Sorbent Inerts	.000	1.153	.744	.412	.260	.174
Coal Ash	13.525	.000	24.191	12.749	15.225	16.315

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.207	.000	.225	.471	.562	.689
C	68.211	.000	32.952	60.285	66.067	69.600
N	1.753	.000	.609	1.102	1.225	.987
O	5.567	.000	.000	.000	.000	.000
S	4.070	.000	1.888	1.723	1.336	1.131
Water Moisture	2.816	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	12.531	7.165	4.113	2.161
Magnesium Carbonate	.000	41.377	.000	.000	.000	.000
Calcium Oxide	.000	.000	3.487	3.411	2.366	3.655
Calcium Sulfide	.000	.178	9.801	4.068	1.785	1.064
Calcium Carbonate	.000	57.312	11.579	7.177	6.778	4.284
Sorbent Inerts	.000	1.133	.618	.372	.265	.242
Coal Ash	13.377	.000	26.310	14.228	15.502	16.186

TR8 - TEST POINT 8 05/13/93 Pitts No 8 + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.207	.000	.134	.480	.695	.730
C	68.211	.000	30.310	70.697	73.545	72.353
N	1.753	.000	.665	1.444	1.158	1.233
O	5.567	.000	.000	.000	.000	.000
S	4.070	.000	2.513	2.128	1.712	1.511
Water Moisture	2.816	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	10.450	2.742	1.726	2.758
Magnesium Carbonate	.000	41.575	3.833	.000	.949	.000
Calcium Oxide	.000	.000	.000	.496	.000	2.177
Calcium Sulfide	.000	.498	12.495	2.159	1.677	.995
Calcium Carbonate	.000	57.143	12.465	2.748	3.407	1.799
Sorbent Inerts	.000	.784	.404	.090	.078	.096
Coal Ash	13.377	.000	26.731	17.017	15.053	16.350

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.192	.000	.115	.482	.695	.729
C	67.357	.000	26.834	71.543	73.651	72.624
N	1.737	.000	.585	1.461	1.160	1.238
O	5.694	.000	.000	.000	.000	.000
S	4.016	.000	2.200	2.153	1.715	1.518
Water Moisture	2.988	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	6.023	2.337	1.593	2.510
Magnesium Carbonate	.000	41.517	12.181	.000	.933	.000
Calcium Oxide	.000	.000	.000	.460	.000	2.319
Calcium Sulfide	.000	.500	16.063	2.424	1.694	1.010
Calcium Carbonate	.000	57.238	12.293	2.637	3.603	1.788
Sorbent Inerts	.000	.745	.445	.088	.077	.094
Coal Ash	14.017	.000	23.261	16.416	14.880	16.170

TR8 - TEST POINT 9 05/13/93 Pitts No 8 + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.207	.000	.259	.483	.531	.625
C	68.211	.000	48.456	67.777	74.312	72.763
N	1.753	.000	.846	1.295	1.401	1.523
O	5.567	.000	.000	.000	.000	.000
S	4.070	.000	2.035	1.935	1.772	1.422
Water Moisture	2.816	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	7.536	2.343	2.144	2.463
Magnesium Carbonate	.000	41.575	.000	2.161	.000	.000
Calcium Oxide	.000	.000	1.149	.000	.569	.688
Calcium Sulfide	.000	.498	6.561	3.147	1.509	.976
Calcium Carbonate	.000	57.143	8.235	3.303	3.336	4.118
Sorbent Inerts	.000	.784	.263	.104	.087	.091
Coal Ash	13.377	.000	24.659	17.451	14.339	15.331

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.215	.000	.203	.460	.527	.620
C	67.598	.000	36.992	64.640	74.089	72.543
N	1.742	.000	.671	1.245	1.398	1.518
O	5.676	.000	.000	.000	.000	.000
S	3.980	.000	3.206	2.419	1.879	1.481
Water Moisture	2.958	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	11.267	2.656	2.259	2.436
Magnesium Carbonate	.000	41.674	.000	2.271	.000	.000
Calcium Oxide	.000	.000	5.463	.000	.500	.830
Calcium Sulfide	.000	.519	12.216	4.233	1.686	1.053
Calcium Carbonate	.000	57.112	6.009	4.988	3.327	4.130
Sorbent Inerts	.000	.695	.393	.131	.079	.085
Coal Ash	13.831	.000	23.580	16.957	14.256	15.304

TR8 - TEST POINT 10 05/13/93 Pitts No 8 + Dolomite

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.207	.000	.217	.526	.477	.615
C	68.211	.000	61.503	76.032	77.749	73.716
N	1.753	.000	1.141	1.372	1.342	1.472
O	5.567	.000	.000	.000	.000	.000
S	4.070	.000	3.063	1.982	1.491	1.109
Water Moisture	2.816	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	2.439	1.562	.979	2.255
Magnesium Carbonate	.000	41.575	3.636	.062	.478	.000
Calcium Oxide	.000	.000	.000	.000	.000	2.952
Calcium Sulfide	.000	.498	4.740	1.804	1.118	1.316
Calcium Carbonate	.000	57.143	3.302	1.730	1.585	1.260
Sorbent Inerts	.000	.784	.134	.057	.043	.113
Coal Ash	13.377	.000	19.825	14.873	14.739	15.192

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.219	.000	.184	.517	.480	.608
C	67.658	.000	52.190	75.047	78.216	73.025
N	1.745	.000	.987	1.359	1.350	1.458
O	5.765	.000	.000	.000	.000	.000
S	3.999	.000	3.757	2.238	1.502	1.121
Water Moisture	2.961	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	2.465	1.543	.896	2.685
Magnesium Carbonate	.000	41.394	5.072	.059	.397	.000
Calcium Oxide	.000	.000	.000	.000	.000	2.738
Calcium Sulfide	.000	.500	7.499	2.086	1.104	1.287
Calcium Carbonate	.000	57.367	3.942	1.717	1.654	1.205
Sorbent Inerts	.000	.740	.183	.059	.041	.100
Coal Ash	13.653	.000	23.722	15.375	14.361	15.774

TR10 - TEST POINT 1 9/1/92 Pittsburgh Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.920	.000	.000	.000	.334	.754
C	70.046	.000	.000	.000	57.041	67.536
N	1.955	.000	.000	.000	1.382	1.714
O	6.243	.000	.000	.000	.000	.000
S	3.210	.000	.000	.080	1.551	1.136
Water Moisture	3.212	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.000	.000	6.017	5.045
Magnesium Carbonate	.000	26.919	.000	.000	.000	.000
Calcium Oxide	.000	.000	.000	.000	.331	5.737
Calcium Sulfide	.000	.556	.000	.000	5.116	2.602
Calcium Carbonate	.000	71.180	.000	.000	9.371	1.463
Sorbent Inerts	.000	1.346	.000	.000	.319	.286
Coal Ash	10.415	.000	.000	.000	18.540	13.728
TOTAL	100.000	100.000	.000	.000	100.000	100.000

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.926	.000	.000	.000	.286	.726
C	69.139	.000	.000	.000	54.968	65.443
N	1.946	.000	.000	.000	1.283	1.657
O	6.728	.000	.000	.000	.000	.000
S	3.196	.000	.000	.000	.660	1.002
Water Moisture	3.357	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.000	.000	4.923	3.833
Magnesium Carbonate	.000	27.609	.000	.000	.000	.000
Calcium Oxide	.000	.000	.000	.000	.255	8.407
Calcium Sulfide	.000	.578	.000	.000	8.205	3.059
Calcium Carbonate	.000	70.606	.000	.000	14.800	1.493
Sorbent Inerts	.000	1.208	.000	.000	.450	.351
Coal Ash	10.709	.000	.000	.000	14.170	14.028
TOTAL	100.000	100.000	.000	.000	100.000	100.000

TR10 - TEST POINT 2 9/1/92 Pittsburgh Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.920	.000	.000	.000	.351	.696
C	70.046	.000	.000	.000	61.670	67.045
N	1.955	.000	.000	.000	1.579	1.916
O	6.243	.000	.000	.000	.000	.000
S	3.210	.000	.000	.000	1.823	1.220
Water Moisture	3.212	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.000	.000	3.916	4.200
Magnesium Carbonate	.000	15.733	.000	.000	.000	.000
Calcium Oxide	.000	.000	.000	.000	4.660	5.026
Calcium Sulfide	.000	.411	.000	.000	4.507	2.564
Calcium Carbonate	.000	82.204	.000	.000	3.614	2.520
Sorbent Inerts	.000	1.652	.000	.000	.363	.300
Coal Ash	10.415	.000	.000	.000	17.518	14.514
TOTAL	100.000	100.000	.000	.000	100.000	100.000

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.937	.000	.000	.000	.350	.700
C	70.052	.000	.000	.000	60.853	67.288
N	1.953	.000	.000	.000	1.583	1.944
O	6.167	.000	.000	.000	.000	.000
S	3.152	.000	.000	.000	2.856	2.176
Water Moisture	3.254	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.000	.000	1.970	1.530
Magnesium Carbonate	.000	16.445	.000	.000	.000	.000
Calcium Oxide	.000	.000	.000	.000	4.298	4.346
Calcium Sulfide	.000	.402	.000	.000	6.855	4.226
Calcium Carbonate	.000	81.583	.000	.000	3.407	2.362
Sorbent Inerts	.000	1.570	.000	.000	.393	.305
Coal Ash	10.485	.000	.000	.000	17.434	15.124
TOTAL	100.000	100.000	.000	.000	100.000	100.000

TR10 - TEST POINT 3 9/2/92 Pittsburgh Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.920	.000	.000	.000	.237	.555
C	70.046	.000	.000	.000	60.695	69.307
N	1.955	.000	.000	.000	1.613	1.727
O	6.243	.000	.000	.000	.000	.000
S	3.210	.000	.000	.000	2.132	1.252
Water Moisture	3.212	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.000	.000	3.816	3.300
Magnesium Carbonate	.000	15.733	.000	.000	.000	.000
Calcium Oxide	.000	.000	.000	.000	1.004	4.201
Calcium Sulfide	.000	.411	.000	.000	5.963	2.284
Calcium Carbonate	.000	82.204	.000	.000	6.695	1.683
Sorbent Inerts	.000	1.652	.000	.000	.335	.247
Coal Ash	10.415	.000	.000	.000	17.512	15.445
TOTAL	100.000	100.000	.000	.000	100.000	100.000

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.936	.000	.000	.000	.244	.568
C	69.390	.000	.000	.000	62.906	71.038
N	1.941	.000	.000	.000	1.700	1.772
O	8.320	.000	.000	.000	.000	.000
S	3.159	.000	.000	.000	3.605	1.408
Water Moisture	3.405	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.000	.000	1.227	1.020
Magnesium Carbonate	.000	15.952	.000	.000	.000	.000
Calcium Oxide	.000	.000	.000	.000	.695	3.348
Calcium Sulfide	.000	.405	.000	.000	6.065	2.452
Calcium Carbonate	.000	81.956	.000	.000	3.621	1.859
Sorbent Inerts	.000	1.687	.000	.000	.271	.226
Coal Ash	10.849	.000	.000	.000	19.666	16.508
TOTAL	100.000	100.000	.000	.000	100.000	100.000

TR10 - TEST POINT 4 9/2/92 Pittsburgh Coal + Limestone

********** Unreconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.920	.000	.000	.000	.331	.748
C	70.046	.000	.000	.000	61.514	74.383
N	1.955	.000	.000	.000	1.678	1.899
O	6.243	.000	.000	.000	.000	.000
S	3.210	.000	.000	.000	2.496	1.273
Water Moisture	3.212	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.000	.000	2.611	2.342
Magnesium Carbonate	.000	15.733	.000	.000	.394	.000
Calcium Oxide	.000	.000	.000	.000	.000	2.210
Calcium Sulfide	.000	.411	.000	.000	6.268	2.091
Calcium Carbonate	.000	82.204	.000	.000	4.823	.286
Sorbent Inerts	.000	1.652	.000	.000	.270	.142
Coal Ash	10.415	.000	.000	.000	19.616	14.625
TOTAL	100.000	100.000	.000	.000	100.000	100.000

********** Reconciled LEVEL1 Summary Printout **********

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.944	.000	.000	.000	.331	.758
C	68.369	.000	.000	.000	65.495	76.392
N	1.927	.000	.000	.000	1.755	1.945
O	6.667	.000	.000	.000	.000	.000
S	3.145	.000	.000	.000	2.164	1.290
Water Moisture	3.579	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	.000	.000	1.036	.627
Magnesium Carbonate	.000	15.568	.000	.000	.308	.000
Calcium Oxide	.000	.000	.000	.000	.000	2.015
Calcium Sulfide	.000	.415	.000	.000	6.467	2.248
Calcium Carbonate	.000	82.467	.000	.000	4.224	.276
Sorbent Inerts	.000	1.550	.000	.000	.246	.131
Coal Ash	11.369	.000	.000	.000	17.974	14.318
TOTAL	100.000	100.000	.000	.000	100.000	100.000

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APPENDIX G

UNRECONCILED AND RECONCILED COMPOSITIONS OF FREEBOARD GAS, ORIFICE GAS, AND DEMISTER GAS

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A total of 36 set points (steady-state periods) were achieved while operating the carbonizer in a jetting fluidized-bed mode, and 4 set points were achieved while operating the carbonizer in a circulating fluidized-bed mode. Table G.1 summarizes the coal and sorbent types used, date, duration, pressure, and bed and freeboard temperatures for each of these steady-state periods.

Tables comparing the unreconciled and reconciled flow rates and compositions (wet as well as moisture-free) of the freeboard gas, orifice gas, and demister gas for each of the steady-state periods are given in this appendix.

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Table G.1. SUMMARY OF STEADY-STATE PERIODS FROM CARBONIZER PILOT PLANT OPERATION

Set Point	Coal Feed	Sorbent Feed	Date	Duration, hours	Pressure, psig	Bed Temp., °F	Freeboard Temp., °F
TR1-1	Pittsburgh No 8	Dolomite	11/20/91	0300-0700	152.6	1584	1553
TR1-2	Pittsburgh No 8	Dolomite	11/21/91	0200-0600	132.9	1681	1651
TR1-3	Pittsburgh No 8	Dolomite	11/21/91	1000-1400	144.7	1608	1581
TR1-4	Pittsburgh No 8	Dolomite	11/21/91	2100-2330	125.4	1482	1440
TR2-1	Pittsburgh No 8	Dolomite	12/19/91	0100-0500	139.8	1698	1652
TR2-2	Pittsburgh No 8	Dolomite	12/19/91	1300-1700	128.3	1598	1567
TR2-3	Pittsburgh No 8	Dolomite	12/20/91	0100-0500	138.1	1797	1705
TR2-4	Pittsburgh No 8	Dolomite	12/20/91	1000-1400	191.8	1784	1738
TR2-5	Pittsburgh No 8	Dolomite	12/20/91	1600-1800	198.6	1679	1675
TR4-1	Pittsburgh No 8	Dolomite	3/10/92	2030-0030	153.3	1663	1626
TR4-2	Pittsburgh No 8	Dolomite	3/11/92	0430-0830	155.9	1608	1573
TR4-3	Pittsburgh No 8	Dolomite	3/12/92	0230-0630	125.2	1708	1643
TR4-4	Pittsburgh No 8	Dolomite	3/12/92	1600-2000	129.1	1607	1568
TR4-5	Pittsburgh No 8	Dolomite	3/13/92	0530-0930	193.2	1720	1691
TR4-6	Pittsburgh No 8	Dolomite	3/13/92	1300-1700	175.8	1713	1681
TR4-7	Pittsburgh No 8	Dolomite	3/13/92	2200-0200	177.9	1601	1582
TR4-8	Pittsburgh No 8	Dolomite	3/14/92	0200-0600	182.2	1618	1600
TR5-1	Pittsburgh No 8	Dolomite	3/24/92	1100-1500	134.3	1693	1653
TR5-2	Pittsburgh No 8	Dolomite	3/24/92	1900-2300	154.8	1701	1662
TR5-3	Pittsburgh No 8	Limestone	3/25/92	0500-0900	147.4	1706	1667
TR6-1	Wyoming	Limestone	4/21/92	2100-0100	145.9	1580	1567
TR6-2	Wyoming	Limestone	4/22/92	0430-0830	129.8	1509	1500
TR6-3	Wyoming	Limestone	4/22/92	1400-1800	157.5	1511	1515
TR6-4	Wyoming	Limestone	4/22/92	2100-0100	191.9	1609	1579
TR6-5	Wyoming	Limestone	4/23/92	0400-0800	189.6	1632	1593
TR6-6	Illinois No 6	Limestone	4/23/92	1800-2200	143.5	1600	1573
TR6-7	Illinois No 6	Limestone	4/23/92	2300-0330	122.4	1599	1573
TR8-1	Wyoming	Limestone	6/10/92	2000-0100	128.6	1476	1432
TR8-2	Wyoming	Limestone	6/11/92	0300-0800	132.7	1593	1541
TR8-3	Wyoming	Limestone	6/11/92	1330-1730	156.5	1613	1575
TR8-4	Illinois No 6	Limestone	6/12/92	2100-0200	113.2	1652	1623
TR8-5	Illinois No 6	Limestone	6/13/92	0700-1100	160.6	1715	1680
TR8-6/7	Pittsburgh No 8	Dolomite	6/14/92	2100-0100	156.0	1699	1675
TR8-8	Pittsburgh No 8	Dolomite	6/16/92	0200-0600	143.5	1707	1683
TR8-9	Pittsburgh No 8	Dolomite	6/16/92	0800-1230	135.0	1713	1683
TR8-10	Pittsburgh No 8	Dolomite	6/16/92	1430-1930	126.5	1729	1697
TR10-1*	Pittsburgh No 8	Limestone	9/1/92	0200-0600	113.7	1675	1652
TR10-2*	Pittsburgh No 8	Limestone	9/1/92	1630-2100	68.7	1675	1618
TR10-3*	Pittsburgh No 8	Limestone	9/2/92	0000-0400	72.7	1706	1677
TR10-4*	Pittsburgh No 8	Limestone	9/2/92	0610-1240	55.9	1601	1571

*The carbonizer was operated in a circulating fluidized-bed mode during Test TR10.

TR1 - TEST POINT 1 11/20/91 Pittsburgh Coal + Dolomite

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	1.829	4.540	5.131	1.818	4.341	4.774
Methane	.876	2.173	2.456	.871	2.081	2.288
Ammonia	.079	.197	.223	.078	.187	.206
Water Vapor	4.641	11.516	.000	3.796	9.065	.000
Carbon Monoxide	2.359	5.854	6.616	2.319	5.538	6.090
Nitrogen	27.320	67.795	76.619	29.823	71.213	78.312
Ethlyene	.037	.091	.103	.037	.088	.096
Ethane	.014	.034	.038	.014	.032	.035
Hydrogen Sulfide	.010	.024	.027	.009	.021	.023
Argon	.149	.370	.418	.201	.480	.528
Carbon Dioxide	2.984	7.406	8.370	2.912	6.953	7.646
TOTAL GAS	40.297	100.000	100.000	41.879	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	1.829	4.053	4.518	1.818	3.892	4.237
Methane	.876	1.940	2.162	.871	1.865	2.030
Ammonia	.079	.176	.196	.078	.168	.183
Water Vapor	4.641	10.282	.000	3.796	8.127	.000
Carbon Monoxide	2.359	5.227	5.826	2.319	4.965	5.404
Nitrogen	32.158	71.248	79.412	34.657	74.192	80.755
Ethlyene	.037	.081	.091	.037	.079	.086
Ethane	.014	.030	.033	.014	.029	.031
Hydrogen Sulfide	.010	.021	.024	.009	.019	.021
Argon	.149	.330	.368	.201	.431	.469
Carbon Dioxide	2.984	6.612	7.370	2.912	6.233	6.785
TOTAL GAS	45.136	100.000	100.000	46.713	100.000	100.000

TR1 - TEST POINT 1 11/20/91 Pittsburgh Coal + Dolomite

DEMISTER GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	1.829	3.512	3.856	1.818	3.389	3.647
Methane	.876	1.681	1.845	.871	1.624	1.748
Ammonia	.079	.153	.167	.078	.146	.157
Water Vapor	4.641	8.909	.000	3.796	7.076	.000
Carbon Monoxide	2.359	4.529	4.972	2.319	4.322	4.652
Nitrogen	39.112	75.086	82.430	41.599	77.531	83.434
Ethlyene	.037	.071	.077	.037	.068	.074
Ethane	.014	.026	.029	.014	.025	.027
Hydrogen Sulfide	.010	.019	.020	.009	.017	.018
Argon	.149	.286	.314	.201	.375	.403
Carbon Dioxide	2.984	5.729	6.290	2.912	5.427	5.840
TOTAL GAS	52.089	100.000	100.000	53.654	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	1.731	5.028	5.611	1.728	4.747	5.140
Methane	.425	1.234	1.377	.424	1.165	1.261
Ammonia	.062	.179	.199	.062	.169	.183
Water Vapor	3.574	10.381	.000	2.781	7.641	.000
Carbon Monoxide	2.937	8.530	9.518	2.894	7.950	8.608
Nitrogen	22.989	66.767	74.501	25.843	71.005	76.879
Ethlyene	.009	.026	.029	.009	.025	.027
Hydrogen Sulfide	.012	.036	.040	.012	.032	.034
Argon	.158	.459	.512	.184	.506	.548
Carbon Dioxide	2.534	7.360	8.213	2.460	6.760	7.319
TOTAL GAS	34.432	100.000	100.000	36.396	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	1.731	4.374	4.808	1.728	4.159	4.457
Methane	.425	1.074	1.180	.424	1.020	1.094
Ammonia	.062	.155	.171	.062	.148	.159
Water Vapor	3.574	9.030	.000	2.781	6.694	.000
Carbon Monoxide	2.937	7.420	8.156	2.894	6.965	7.465
Nitrogen	28.142	71.093	78.150	30.992	74.599	79.950
Ethlyene	.009	.023	.025	.009	.022	.023
Hydrogen Sulfide	.012	.031	.034	.012	.028	.030
Argon	.158	.399	.438	.184	.444	.475
Carbon Dioxide	2.534	6.402	7.038	2.460	5.922	6.347
TOTAL GAS	39.585	100.000	100.000	41.545	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	1.731	3.674	3.975	1.728	3.522	3.734
Methane	.425	.902	.976	.424	.864	.916
Ammonia	.062	.131	.141	.062	.125	.133
Water Vapor	3.574	7.585	.000	2.781	5.669	.000
Carbon Monoxide	2.937	6.232	6.744	2.894	5.899	6.253
Nitrogen	35.684	75.719	81.933	38.501	78.487	83.204
Ethlyene	.009	.019	.021	.009	.018	.019
Hydrogen Sulfide	.012	.026	.028	.012	.024	.025
Argon	.158	.335	.362	.184	.376	.398
Carbon Dioxide	2.534	5.378	5.819	2.460	5.016	5.317
TOTAL GAS	47.126	100.000	100.000	49.054	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	1.984	5.248	5.934	2.009	5.108	5.589
Methane	.950	2.514	2.843	.977	2.484	2.718
Ammonia	.078	.206	.233	.079	.200	.219
Water Vapor	4.371	11.562	.000	3.382	8.601	.000
Carbon Monoxide	3.094	8.184	9.254	3.042	7.735	8.463
Nitrogen	23.816	63.000	71.236	26.582	67.599	73.961
Ethlyene	.037	.097	.110	.037	.094	.103
Ethane	.014	.038	.043	.014	.037	.040
Hydrogen Sulfide	.007	.018	.021	.007	.018	.019
Argon	.172	.455	.515	.197	.502	.549
Carbon Dioxide	3.280	8.677	9.812	2.997	7.622	8.339
TOTAL GAS	37.803	100.000	100.000	39.323	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	1.984	4.635	5.162	2.009	4.533	4.907
Methane	.950	2.220	2.473	.977	2.204	2.386
Ammonia	.078	.182	.202	.079	.177	.192
Water Vapor	4.371	10.211	.000	3.382	7.632	.000
Carbon Monoxide	3.094	7.228	8.050	3.042	6.863	7.430
Nitrogen	28.818	67.323	74.979	31.578	71.252	77.139
Ethlyene	.037	.086	.095	.037	.083	.090
Ethane	.014	.034	.037	.014	.032	.035
Hydrogen Sulfide	.007	.016	.018	.007	.016	.017
Argon	.172	.402	.448	.197	.445	.482
Carbon Dioxide	3.280	7.664	8.535	2.997	6.763	7.322
TOTAL GAS	42.805	100.000	100.000	44.319	100.000	100.000

DEMISTER GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	1.984	3.946	4.322	2.009	3.881	4.153
Methane	.950	1.891	2.071	.977	1.888	2.020
Ammonia	.078	.155	.169	.079	.152	.162
Water Vapor	4.371	8.694	.000	3.382	6.535	.000
Carbon Monoxide	3.094	6.154	6.740	3.042	5.877	6.288
Nitrogen	36.285	72.177	79.050	39.015	75.383	80.653
Ethlyene	.037	.073	.080	.037	.071	.076
Ethane	.014	.029	.031	.014	.028	.030
Hydrogen Sulfide	.007	.014	.015	.007	.013	.014
Argon	.172	.342	.375	.197	.381	.408
Carbon Dioxide	3.280	6.525	7.147	2.997	5.791	6.196
TOTAL GAS	50.272	100.000	100.000	51.756	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.064	6.063	7.132	2.041	6.081	6.872
Methane	1.118	3.284	3.863	1.114	3.318	3.749
Ammonia	.057	.167	.197	.057	.169	.191
Water Vapor	5.104	14.990	.000	3.864	11.511	.000
Carbon Monoxide	2.064	6.063	7.132	2.061	6.140	6.939
Nitrogen	20.313	59.654	70.173	21.131	62.946	71.134
Ethlyene	.070	.205	.241	.070	.208	.235
Ethane	.105	.309	.364	.105	.313	.354
Hydrogen Sulfide	.009	.025	.029	.009	.025	.029
Argon	.145	.425	.500	.174	.517	.584
Carbon Dioxide	3.002	8.816	10.370	2.944	8.771	9.911
TOTAL GAS	34.051	100.000	100.000	33.570	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.064	5.263	6.051	2.041	5.269	5.853
Methane	1.118	2.851	3.278	1.114	2.875	3.194
Ammonia	.057	.145	.167	.057	.147	.163
Water Vapor	5.104	13.014	.000	3.864	9.975	.000
Carbon Monoxide	2.064	5.263	6.051	2.061	5.321	5.910
Nitrogen	25.484	64.973	74.694	26.301	67.891	75.414
Ethlyene	.070	.178	.204	.070	.181	.201
Ethane	.105	.268	.309	.105	.272	.302
Hydrogen Sulfide	.009	.022	.025	.009	.022	.025
Argon	.145	.369	.424	.174	.448	.498
Carbon Dioxide	3.002	7.654	8.799	2.944	7.600	8.442
TOTAL GAS	39.222	100.000	100.000	38.741	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.064	4.411	4.951	2.041	4.408	4.810
Methane	1.118	2.389	2.682	1.114	2.405	2.624
Ammonia	.057	.122	.136	.057	.123	.134
Water Vapor	5.104	10.906	.000	3.864	8.345	.000
Carbon Monoxide	2.064	4.411	4.951	2.061	4.451	4.856
Nitrogen	33.062	70.645	79.293	33.868	73.138	79.797
Ethlyene	.070	.149	.167	.070	.151	.165
Ethane	.105	.225	.253	.105	.227	.248
Hydrogen Sulfide	.009	.018	.020	.009	.018	.020
Argon	.145	.309	.347	.174	.375	.409
Carbon Dioxide	3.002	6.414	7.199	2.944	6.358	6.937
TOTAL GAS	46.800	100.000	100.000	46.307	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	1.414	3.688	4.040	1.413	3.235	3.447
Methane	.595	1.552	1.700	.594	1.360	1.450
Ammonia	.021	.055	.060	.021	.048	.052
Water Vapor	3.335	8.700	.000	2.691	6.163	.000
Carbon Monoxide	3.626	9.458	10.359	3.557	8.146	8.681
Nitrogen	25.618	66.827	73.194	31.827	72.890	77.678
Ethlyene	.004	.012	.013	.004	.010	.011
Ethane	.002	.006	.006	.002	.005	.005
Hydrogen Sulfide	.071	.186	.203	.071	.162	.173
Argon	.190	.495	.542	.219	.501	.533
Carbon Dioxide	3.459	9.022	9.882	3.266	7.479	7.970
TOTAL GAS	38.335	100.000	100.000	43.664	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	1.414	3.510	3.827	1.413	3.097	3.291
Methane	.595	1.477	1.610	.594	1.302	1.384
Ammonia	.021	.052	.057	.021	.046	.049
Water Vapor	3.335	8.279	.000	2.691	5.900	.000
Carbon Monoxide	3.626	9.000	9.813	3.557	7.798	8.287
Nitrogen	27.567	68.431	74.608	33.772	74.046	78.689
Ethlyene	.004	.011	.012	.004	.010	.010
Ethane	.002	.006	.006	.002	.005	.005
Hydrogen Sulfide	.071	.177	.193	.071	.155	.165
Argon	.190	.471	.513	.219	.479	.509
Carbon Dioxide	3.459	8.586	9.360	3.266	7.160	7.609
TOTAL GAS	40.284	100.000	100.000	45.609	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	1.414	2.971	3.195	1.413	2.672	2.816
Methane	.595	1.250	1.344	.594	1.124	1.184
Ammonia	.021	.044	.048	.021	.040	.042
Water Vapor	3.335	7.008	.000	2.691	5.092	.000
Carbon Monoxide	3.626	7.619	8.193	3.557	6.729	7.090
Nitrogen	34.874	73.278	78.801	41.018	77.605	81.768
Ethlyene	.004	.009	.010	.004	.008	.009
Ethane	.002	.005	.005	.002	.004	.004
Hydrogen Sulfide	.071	.150	.161	.071	.134	.141
Argon	.190	.399	.429	.219	.414	.436
Carbon Dioxide	3.459	7.267	7.815	3.266	6.178	6.510
TOTAL GAS	47.591	100.000	100.000	52.856	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	1.649	4.511	5.103	1.616	4.035	4.355
Methane	1.018	2.784	3.149	.973	2.429	2.622
Ammonia	.069	.189	.213	.069	.171	.185
Water Vapor	4.241	11.600	.000	2.945	7.353	.000
Carbon Monoxide	2.507	6.857	7.757	2.451	6.120	6.606
Nitrogen	23.498	64.272	72.705	28.625	71.470	77.143
Ethlyene	.068	.186	.210	.060	.150	.162
Ethane	.292	.798	.903	.200	.500	.540
Hydrogen Sulfide	.024	.065	.073	.023	.059	.063
Argon	.170	.465	.526	.179	.448	.484
Carbon Dioxide	3.025	8.274	9.359	2.910	7.265	7.841
TOTAL GAS	36.560	100.000	100.000	40.052	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	1.649	4.284	4.814	1.616	3.848	4.139
Methane	1.018	2.644	2.971	.973	2.317	2.492
Ammonia	.069	.179	.201	.069	.164	.176
Water Vapor	4.241	11.015	.000	2.945	7.014	.000
Carbon Monoxide	2.507	6.511	7.317	2.451	5.838	6.278
Nitrogen	25.440	66.073	74.252	30.563	72.787	78.277
Ethlyene	.068	.176	.198	.060	.143	.154
Ethane	.292	.758	.852	.200	.477	.513
Hydrogen Sulfide	.024	.062	.069	.023	.056	.060
Argon	.170	.442	.496	.179	.427	.460
Carbon Dioxide	3.025	7.856	8.829	2.910	6.930	7.452
TOTAL GAS	38.502	100.000	100.000	41.990	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	1.649	3.598	3.964	1.616	3.279	3.487
Methane	1.018	2.220	2.446	.973	1.974	2.100
Ammonia	.069	.150	.166	.069	.139	.148
Water Vapor	4.241	9.251	.000	2.945	5.976	.000
Carbon Monoxide	2.507	5.468	6.026	2.451	4.974	5.290
Nitrogen	32.784	71.508	78.797	37.858	76.814	81.696
Ethlyene	.068	.148	.163	.060	.122	.130
Ethane	.292	.637	.702	.200	.406	.432
Hydrogen Sulfide	.024	.052	.057	.023	.048	.051
Argon	.170	.371	.409	.179	.364	.387
Carbon Dioxide	3.025	6.598	7.270	2.910	5.904	6.279
TOTAL GAS	45.846	100.000	100.000	49.285	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	1.098	2.909	3.138	1.103	2.642	2.808
Methane	.271	.717	.773	.272	.651	.691
Ammonia	.033	.088	.095	.033	.080	.085
Water Vapor	2.757	7.300	.000	2.463	5.899	.000
Carbon Monoxide	3.631	9.614	10.371	3.669	8.787	9.338
Nitrogen	26.821	71.022	76.615	31.066	74.394	79.058
Ethane	.005	.013	.014	.005	.012	.012
Hydrogen Sulfide	.020	.054	.058	.020	.048	.051
Argon	.194	.514	.554	.215	.514	.546
Carbon Dioxide	2.934	7.770	8.382	2.912	6.974	7.412
TOTAL GAS	37.765	100.000	100.000	41.758	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	1.098	2.771	2.979	1.103	2.529	2.680
Methane	.271	.683	.734	.272	.623	.660
Ammonia	.033	.084	.091	.033	.077	.081
Water Vapor	2.757	6.956	.000	2.463	5.646	.000
Carbon Monoxide	3.631	9.160	9.845	3.669	8.411	8.914
Nitrogen	28.690	72.388	77.800	32.933	75.490	80.008
Ethane	.005	.012	.013	.005	.011	.012
Hydrogen Sulfide	.020	.051	.055	.020	.046	.048
Argon	.194	.490	.526	.215	.492	.521
Carbon Dioxide	2.934	7.404	7.958	2.912	6.676	7.075
TOTAL GAS	39.633	100.000	100.000	43.625	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	1.098	2.330	2.474	1.103	2.158	2.268
Methane	.271	.574	.610	.272	.532	.558
Ammonia	.033	.071	.075	.033	.065	.069
Water Vapor	2.757	5.847	.000	2.463	4.819	.000
Carbon Monoxide	3.631	7.700	8.179	3.669	7.179	7.542
Nitrogen	36.204	76.789	81.558	40.422	79.082	83.086
Ethane	.005	.010	.011	.005	.009	.010
Hydrogen Sulfide	.020	.043	.046	.020	.039	.041
Argon	.194	.412	.437	.215	.420	.441
Carbon Dioxide	2.934	6.224	6.611	2.912	5.698	5.986
TOTAL GAS	47.147	100.000	100.000	51.115	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.695	5.266	5.648	2.716	4.841	5.179
Methane	1.004	1.961	2.103	1.011	1.803	1.929
Ammonia	.165	.321	.345	.167	.297	.318
Water Vapor	3.455	6.750	.000	3.657	6.521	.000
Carbon Monoxide	6.057	11.835	12.692	6.216	11.082	11.855
Nitrogen	33.619	65.689	70.444	38.056	67.847	72.579
Ethlyene	.001	.003	.003	.001	.003	.003
Hydrogen Sulfide	.006	.011	.012	.006	.010	.011
Argon	.275	.537	.576	.310	.552	.591
Carbon Dioxide	3.903	7.626	8.178	3.952	7.045	7.536
TOTAL GAS	51.179	100.000	100.000	56.091	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.695	5.123	5.483	2.716	4.721	5.042
Methane	1.004	1.908	2.042	1.011	1.758	1.877
Ammonia	.165	.313	.335	.167	.290	.310
Water Vapor	3.455	6.566	.000	3.657	6.359	.000
Carbon Monoxide	6.057	11.512	12.321	6.216	10.806	11.540
Nitrogen	35.055	66.626	71.308	39.486	68.646	73.307
Ethlyene	.001	.003	.003	.001	.003	.003
Hydrogen Sulfide	.006	.011	.011	.006	.010	.010
Argon	.275	.522	.559	.310	.539	.575
Carbon Dioxide	3.903	7.418	7.939	3.952	6.870	7.336
TOTAL GAS	52.615	100.000	100.000	57.521	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.695	4.519	4.797	2.716	4.208	4.460
Methane	1.004	1.683	1.786	1.011	1.567	1.661
Ammonia	.165	.276	.293	.167	.258	.274
Water Vapor	3.455	5.792	.000	3.657	5.667	.000
Carbon Monoxide	6.057	10.155	10.779	6.216	9.631	10.210
Nitrogen	42.087	70.560	74.898	46.503	72.055	76.384
Ethlyene	.001	.002	.003	.001	.002	.002
Hydrogen Sulfide	.006	.009	.010	.006	.009	.009
Argon	.275	.461	.489	.310	.480	.509
Carbon Dioxide	3.903	6.543	6.946	3.952	6.123	6.491
TOTAL GAS	59.647	100.000	100.000	64.538	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.230	4.170	4.608	2.395	4.266	4.693
Methane	1.492	2.791	3.084	1.540	2.742	3.017
Ammonia	.181	.338	.373	.183	.325	.358
Water Vapor	5.079	9.500	.000	5.117	9.112	.000
Carbon Monoxide	5.573	10.423	11.518	5.422	9.656	10.624
Nitrogen	33.905	63.416	70.073	36.732	65.415	71.973
Ethlyene	.013	.024	.027	.013	.023	.026
Ethane	.015	.028	.031	.015	.027	.030
Hydrogen Sulfide	.011	.021	.023	.011	.020	.022
Argon	.279	.522	.576	.309	.550	.605
Carbon Dioxide	4.687	8.767	9.687	4.416	7.864	8.653
TOTAL GAS	53.465	100.000	100.000	56.153	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.230	4.070	4.486	2.395	4.168	4.576
Methane	1.492	2.724	3.002	1.540	2.679	2.941
Ammonia	.181	.330	.363	.183	.318	.349
Water Vapor	5.079	9.272	.000	5.117	8.904	.000
Carbon Monoxide	5.573	10.173	11.213	5.422	9.436	10.358
Nitrogen	35.221	64.294	70.865	38.046	66.205	72.676
Ethlyene	.013	.024	.026	.013	.023	.025
Ethane	.015	.028	.030	.015	.026	.029
Hydrogen Sulfide	.011	.020	.022	.011	.019	.021
Argon	.279	.509	.561	.309	.537	.589
Carbon Dioxide	4.687	8.557	9.431	4.416	7.684	8.436
TOTAL GAS	54.781	100.000	100.000	57.467	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.230	3.613	3.937	2.395	3.721	4.042
Methane	1.492	2.418	2.635	1.540	2.392	2.598
Ammonia	.181	.293	.319	.183	.284	.308
Water Vapor	5.079	8.231	.000	5.117	7.948	.000
Carbon Monoxide	5.573	9.031	9.841	5.422	8.422	9.149
Nitrogen	42.148	68.302	74.429	44.961	69.835	75.864
Ethlyene	.013	.021	.023	.013	.020	.022
Ethane	.015	.024	.027	.015	.024	.026
Hydrogen Sulfide	.011	.018	.020	.011	.017	.019
Argon	.279	.452	.492	.309	.479	.521
Carbon Dioxide	4.687	7.596	8.277	4.416	6.859	7.451
TOTAL GAS	61.708	100.000	100.000	64.382	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	1.959	4.556	5.180	2.007	4.565	5.162
Methane	.563	1.309	1.488	.585	1.331	1.505
Ammonia	.115	.268	.305	.115	.263	.297
Water Vapor	5.182	12.050	.000	5.081	11.557	.000
Carbon Monoxide	2.916	6.782	7.711	3.081	7.008	7.924
Nitrogen	28.358	65.946	74.982	28.976	65.904	74.516
Ethlyene	.005	.012	.013	.005	.011	.013
Ethane	.002	.006	.007	.002	.006	.006
Hydrogen Sulfide	.006	.015	.017	.006	.014	.016
Argon	.192	.447	.508	.215	.489	.553
Carbon Dioxide	3.702	8.610	9.789	3.892	8.851	10.008
TOTAL GAS	43.002	100.000	100.000	43.967	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	1.959	4.433	5.022	2.007	4.445	5.009
Methane	.563	1.274	1.443	.585	1.296	1.460
Ammonia	.115	.261	.296	.115	.256	.288
Water Vapor	5.182	11.725	.000	5.081	11.253	.000
Carbon Monoxide	2.916	6.599	7.476	3.081	6.824	7.689
Nitrogen	29.548	66.864	75.745	30.166	66.802	75.272
Ethlyene	.005	.011	.013	.005	.011	.013
Ethane	.002	.006	.006	.002	.006	.006
Hydrogen Sulfide	.006	.014	.016	.006	.014	.016
Argon	.192	.435	.493	.215	.476	.537
Carbon Dioxide	3.702	8.378	9.491	3.892	8.618	9.710
TOTAL GAS	44.192	100.000	100.000	45.157	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	1.959	3.889	4.335	2.007	3.908	4.338
Methane	.563	1.117	1.246	.585	1.140	1.265
Ammonia	.115	.229	.255	.115	.225	.250
Water Vapor	5.182	10.287	.000	5.081	9.894	.000
Carbon Monoxide	2.916	5.789	6.453	3.081	6.000	6.659
Nitrogen	35.730	70.930	79.063	36.367	70.810	78.586
Ethlyene	.005	.010	.011	.005	.010	.011
Ethane	.002	.005	.005	.002	.005	.005
Hydrogen Sulfide	.006	.012	.014	.006	.012	.014
Argon	.192	.382	.425	.215	.419	.465
Carbon Dioxide	3.702	7.350	8.193	3.892	7.577	8.409
TOTAL GAS	50.374	100.000	100.000	51.358	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.521	5.579	7.158	2.500	5.425	6.626
Methane	.780	1.726	2.214	.791	1.716	2.096
Ammonia	.162	.359	.460	.160	.348	.425
Water Vapor	9.963	22.050	.000	8.354	18.129	.000
Carbon Monoxide	2.022	4.475	5.741	2.074	4.500	5.496
Nitrogen	25.434	56.291	72.215	27.722	60.161	73.482
Ethlyene	.015	.033	.042	.015	.033	.040
Ethane	.010	.023	.029	.010	.023	.028
Hydrogen Sulfide	.043	.095	.122	.043	.093	.113
Argon	.181	.402	.515	.208	.451	.551
Carbon Dioxide	4.052	8.967	11.504	4.204	9.123	11.143
TOTAL GAS	45.183	100.000	100.000	46.080	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.521	5.435	6.921	2.500	5.287	6.421
Methane	.780	1.681	2.141	.791	1.672	2.031
Ammonia	.162	.350	.445	.160	.339	.411
Water Vapor	9.963	21.477	.000	8.354	17.668	.000
Carbon Monoxide	2.022	4.359	5.551	2.074	4.385	5.326
Nitrogen	26.639	57.426	73.133	28.926	61.174	74.302
Ethlyene	.015	.032	.041	.015	.032	.039
Ethane	.010	.022	.028	.010	.022	.027
Hydrogen Sulfide	.043	.092	.118	.043	.090	.110
Argon	.181	.391	.498	.208	.440	.534
Carbon Dioxide	4.052	8.734	11.124	4.204	8.891	10.798
TOTAL GAS	46.387	100.000	100.000	47.284	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.521	4.796	5.917	2.500	4.677	5.544
Methane	.780	1.483	1.830	.791	1.480	1.754
Ammonia	.162	.308	.381	.160	.300	.355
Water Vapor	9.963	18.952	.000	8.354	15.631	.000
Carbon Monoxide	2.022	3.846	4.745	2.074	3.880	4.599
Nitrogen	32.820	62.432	77.031	35.086	65.650	77.813
Ethlyene	.015	.028	.035	.015	.028	.034
Ethane	.010	.020	.024	.010	.020	.023
Hydrogen Sulfide	.043	.081	.101	.043	.080	.095
Argon	.181	.345	.426	.208	.389	.461
Carbon Dioxide	4.052	7.707	9.510	4.204	7.866	9.323
TOTAL GAS	52.569	100.000	100.000	53.445	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.335	6.371	8.242	2.257	6.153	7.618
Methane	.330	.901	1.165	.328	.893	1.106
Ammonia	.040	.110	.143	.040	.110	.136
Water Vapor	8.319	22.700	.000	7.057	19.233	.000
Carbon Monoxide	2.480	6.768	8.756	2.556	6.966	8.625
Nitrogen	19.578	53.425	69.113	20.694	56.404	69.836
Ethlyene	.001	.003	.003	.001	.003	.003
Hydrogen Sulfide	.006	.017	.021	.006	.017	.020
Argon	.168	.459	.594	.194	.528	.654
Carbon Dioxide	3.388	9.246	11.962	3.556	9.693	12.001
TOTAL GAS	36.646	100.000	100.000	36.689	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.335	6.149	7.874	2.257	5.939	7.293
Methane	.330	.870	1.113	.328	.862	1.059
Ammonia	.040	.107	.137	.040	.106	.130
Water Vapor	8.319	21.910	.000	7.057	18.565	.000
Carbon Monoxide	2.480	6.533	8.366	2.556	6.724	8.257
Nitrogen	20.900	55.046	70.490	22.015	57.919	71.123
Ethlyene	.001	.002	.003	.001	.002	.003
Hydrogen Sulfide	.006	.016	.020	.006	.016	.020
Argon	.168	.443	.568	.194	.510	.626
Carbon Dioxide	3.388	8.925	11.429	3.556	9.356	11.489
TOTAL GAS	37.968	100.000	100.000	38.010	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.335	5.327	6.575	2.257	5.146	6.133
Methane	.330	.753	.930	.328	.747	.890
Ammonia	.040	.092	.114	.040	.092	.110
Water Vapor	8.319	18.980	.000	7.057	16.088	.000
Carbon Monoxide	2.480	5.659	6.985	2.556	5.827	6.944
Nitrogen	26.760	61.057	75.360	27.867	63.533	75.714
Ethlyene	.001	.002	.003	.001	.002	.003
Hydrogen Sulfide	.006	.014	.017	.006	.014	.016
Argon	.168	.384	.474	.194	.442	.527
Carbon Dioxide	3.388	7.731	9.542	3.556	8.108	9.662
TOTAL GAS	43.829	100.000	100.000	43.862	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.212	5.823	7.315	2.192	5.778	6.857
Methane	.624	1.643	2.064	.633	1.669	1.981
Ammonia	.077	.204	.256	.077	.204	.242
Water Vapor	7.748	20.400	.000	5.973	15.743	.000
Carbon Monoxide	1.843	4.853	6.097	1.903	5.015	5.952
Nitrogen	21.863	57.560	72.312	23.403	61.686	73.212
Ethlyene	.022	.059	.074	.022	.059	.070
Ethane	.009	.024	.030	.009	.024	.029
Hydrogen Sulfide	.014	.038	.047	.014	.038	.045
Argon	.152	.401	.504	.176	.463	.550
Carbon Dioxide	3.417	8.995	11.301	3.536	9.322	11.063
TOTAL GAS	37.982	100.000	100.000	37.938	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.212	5.626	7.007	2.192	5.582	6.583
Methane	.624	1.587	1.977	.633	1.613	1.902
Ammonia	.077	.197	.245	.077	.197	.232
Water Vapor	7.748	19.709	.000	5.973	15.209	.000
Carbon Monoxide	1.843	4.689	5.840	1.903	4.845	5.714
Nitrogen	23.194	58.997	73.480	24.733	62.985	74.282
Ethlyene	.022	.057	.071	.022	.057	.067
Ethane	.009	.023	.029	.009	.023	.028
Hydrogen Sulfide	.014	.036	.045	.014	.037	.043
Argon	.152	.387	.482	.176	.447	.528
Carbon Dioxide	3.417	8.691	10.824	3.536	9.006	10.621
TOTAL GAS	39.313	100.000	100.000	39.269	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.212	4.891	5.902	2.192	4.854	5.594
Methane	.624	1.380	1.665	.633	1.402	1.616
Ammonia	.077	.171	.207	.077	.171	.197
Water Vapor	7.748	17.135	.000	5.973	13.226	.000
Carbon Monoxide	1.843	4.076	4.919	1.903	4.213	4.855
Nitrogen	29.100	64.353	77.660	30.622	67.812	78.147
Ethlyene	.022	.049	.060	.022	.050	.057
Ethane	.009	.020	.024	.009	.020	.023
Hydrogen Sulfide	.014	.032	.038	.014	.032	.037
Argon	.152	.337	.406	.176	.389	.448
Carbon Dioxide	3.417	7.556	9.118	3.536	7.831	9.025
TOTAL GAS	45.219	100.000	100.000	45.158	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	4.264	7.974	9.743	4.497	8.126	9.788
Methane	.769	1.438	1.757	.791	1.429	1.721
Ammonia	.089	.166	.202	.089	.162	.195
Water Vapor	9.705	18.150	.000	9.393	16.975	.000
Carbon Monoxide	4.484	8.386	10.246	4.642	8.389	10.105
Nitrogen	28.408	53.129	64.910	30.174	54.531	65.680
Ethane	.007	.013	.016	.007	.013	.016
Hydrogen Sulfide	.003	.006	.008	.003	.006	.008
Argon	.250	.468	.571	.289	.522	.629
Carbon Dioxide	5.491	10.270	12.547	5.448	9.847	11.860
TOTAL GAS	53.469	100.000	100.000	55.334	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	4.264	7.831	9.529	4.497	7.986	9.584
Methane	.769	1.412	1.719	.791	1.404	1.685
Ammonia	.089	.163	.198	.089	.159	.191
Water Vapor	9.705	17.824	.000	9.393	16.681	.000
Carbon Monoxide	4.484	8.236	10.022	4.642	8.244	9.894
Nitrogen	29.387	53.972	65.678	31.149	55.318	66.393
Ethane	.007	.013	.015	.007	.013	.015
Hydrogen Sulfide	.003	.006	.008	.003	.006	.007
Argon	.250	.459	.559	.289	.513	.616
Carbon Dioxide	5.491	10.085	12.273	5.448	9.676	11.613
TOTAL GAS	54.448	100.000	100.000	56.309	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	4.264	7.132	8.514	4.497	7.295	8.607
Methane	.769	1.286	1.536	.791	1.283	1.513
Ammonia	.089	.148	.177	.089	.145	.171
Water Vapor	9.705	16.232	.000	9.393	15.238	.000
Carbon Monoxide	4.484	7.500	8.953	4.642	7.531	8.885
Nitrogen	34.725	58.082	69.337	36.479	59.182	69.821
Ethane	.007	.011	.014	.007	.012	.014
Hydrogen Sulfide	.003	.006	.007	.003	.006	.007
Argon	.250	.418	.499	.289	.469	.553
Carbon Dioxide	5.491	9.185	10.964	5.448	8.839	10.429
TOTAL GAS	59.787	100.000	100.000	61.638	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	3.460	7.131	8.550	3.568	7.277	8.499
Methane	.975	2.009	2.409	1.001	2.042	2.385
Ammonia	.054	.110	.132	.054	.109	.128
Water Vapor	8.054	16.600	.000	7.056	14.389	.000
Carbon Monoxide	4.082	8.413	10.087	4.304	8.777	10.252
Nitrogen	26.840	55.322	66.334	27.959	57.015	66.597
Ethlyene	.001	.003	.003	.001	.003	.003
Hydrogen Sulfide	.004	.009	.010	.004	.009	.010
Argon	.238	.491	.589	.264	.539	.630
Carbon Dioxide	4.809	9.911	11.884	4.826	9.841	11.495
TOTAL GAS	48.516	100.000	100.000	49.038	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	3.460	6.933	8.267	3.568	7.077	8.228
Methane	.975	1.954	2.330	1.001	1.986	2.309
Ammonia	.054	.107	.128	.054	.106	.124
Water Vapor	8.054	16.139	.000	7.056	13.994	.000
Carbon Monoxide	4.082	8.179	9.753	4.304	8.536	9.925
Nitrogen	28.225	56.562	67.448	29.343	58.195	67.664
Ethlyene	.001	.002	.003	.001	.002	.003
Hydrogen Sulfide	.004	.008	.010	.004	.008	.010
Argon	.238	.478	.570	.264	.525	.610
Carbon Dioxide	4.809	9.636	11.491	4.826	9.571	11.128
TOTAL GAS	49.901	100.000	100.000	50.423	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	3.460	6.268	7.338	3.568	6.404	7.332
Methane	.975	1.766	2.068	1.001	1.797	2.058
Ammonia	.054	.097	.114	.054	.096	.110
Water Vapor	8.054	14.590	.000	7.056	12.663	.000
Carbon Monoxide	4.082	7.394	8.657	4.304	7.724	8.844
Nitrogen	33.524	60.732	71.107	34.642	62.170	71.184
Ethlyene	.001	.002	.003	.001	.002	.003
Hydrogen Sulfide	.004	.008	.009	.004	.008	.009
Argon	.238	.432	.506	.264	.475	.543
Carbon Dioxide	4.809	8.711	10.199	4.826	8.661	9.917
TOTAL GAS	55.200	100.000	100.000	55.721	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.851	5.730	6.766	2.857	5.679	6.574
Methane	1.097	2.206	2.604	1.114	2.214	2.563
Ammonia	.081	.163	.192	.081	.161	.186
Water Vapor	7.613	15.300	.000	6.848	13.612	.000
Carbon Monoxide	3.104	6.238	7.365	3.153	6.267	7.255
Nitrogen	30.174	60.641	71.595	31.357	62.332	72.153
Ethlyene	.025	.051	.060	.025	.050	.058
Ethane	.017	.034	.040	.017	.034	.039
Hydrogen Sulfide	.015	.029	.035	.015	.029	.034
Argon	.233	.468	.553	.248	.494	.572
Carbon Dioxide	4.548	9.140	10.791	4.592	9.127	10.566
TOTAL GAS	49.759	100.000	100.000	50.307	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.851	5.580	6.557	2.857	5.532	6.377
Methane	1.097	2.148	2.524	1.114	2.157	2.487
Ammonia	.081	.159	.186	.081	.157	.181
Water Vapor	7.613	14.899	.000	6.848	13.260	.000
Carbon Monoxide	3.104	6.075	7.138	3.153	6.105	7.038
Nitrogen	31.512	61.671	72.469	32.695	63.307	72.985
Ethlyene	.025	.049	.058	.025	.049	.057
Ethane	.017	.033	.039	.017	.033	.038
Hydrogen Sulfide	.015	.029	.034	.015	.028	.033
Argon	.233	.456	.536	.248	.481	.555
Carbon Dioxide	4.548	8.901	10.459	4.592	8.891	10.250
TOTAL GAS	51.097	100.000	100.000	51.644	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.851	5.057	5.846	2.857	5.019	5.706
Methane	1.097	1.946	2.250	1.114	1.957	2.225
Ammonia	.081	.144	.166	.081	.142	.162
Water Vapor	7.613	13.502	.000	6.848	12.031	.000
Carbon Monoxide	3.104	5.505	6.364	3.153	5.540	6.297
Nitrogen	36.801	65.266	75.454	37.966	66.706	75.829
Ethlyene	.025	.045	.052	.025	.045	.051
Ethane	.017	.030	.034	.017	.030	.034
Hydrogen Sulfide	.015	.026	.030	.015	.026	.029
Argon	.233	.413	.478	.248	.437	.496
Carbon Dioxide	4.548	8.066	9.325	4.592	8.068	9.171
TOTAL GAS	56.385	100.000	100.000	56.916	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	3.139	6.195	7.288	3.062	6.309	7.115
Methane	1.164	2.297	2.702	1.126	2.319	2.615
Ammonia	.071	.141	.166	.071	.147	.165
Water Vapor	7.599	15.000	.000	5.501	11.333	.000
Carbon Monoxide	2.768	5.463	6.427	2.705	5.572	6.284
Nitrogen	30.737	60.671	71.378	31.107	64.089	72.280
Ethlyene	.015	.030	.036	.015	.031	.035
Ethane	.010	.020	.024	.010	.021	.023
Hydrogen Sulfide	.048	.096	.113	.048	.099	.112
Argon	.237	.468	.551	.243	.500	.564
Carbon Dioxide	4.873	9.618	11.315	4.650	9.580	10.805
TOTAL GAS	50.662	100.000	100.000	48.537	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	3.139	6.042	7.078	3.062	6.147	6.910
Methane	1.164	2.240	2.624	1.126	2.259	2.540
Ammonia	.071	.137	.161	.071	.143	.161
Water Vapor	7.599	14.630	.000	5.501	11.042	.000
Carbon Monoxide	2.768	5.329	6.242	2.705	5.429	6.103
Nitrogen	32.018	61.641	72.205	32.387	65.012	73.081
Ethlyene	.015	.030	.035	.015	.030	.034
Ethane	.010	.020	.023	.010	.020	.023
Hydrogen Sulfide	.048	.093	.109	.048	.097	.109
Argon	.237	.457	.535	.243	.487	.548
Carbon Dioxide	4.873	9.381	10.989	4.650	9.334	10.493
TOTAL GAS	51.943	100.000	100.000	49.818	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	3.139	5.526	6.380	3.062	5.603	6.230
Methane	1.164	2.049	2.365	1.126	2.060	2.290
Ammonia	.071	.126	.145	.071	.130	.145
Water Vapor	7.599	13.381	.000	5.501	10.065	.000
Carbon Monoxide	2.768	4.874	5.627	2.705	4.949	5.503
Nitrogen	36.867	64.916	74.944	37.220	68.106	75.728
Ethlyene	.015	.027	.031	.015	.028	.031
Ethane	.010	.018	.021	.010	.018	.021
Hydrogen Sulfide	.048	.085	.099	.048	.088	.098
Argon	.237	.418	.482	.243	.444	.494
Carbon Dioxide	4.873	8.580	9.906	4.650	8.509	9.461
TOTAL GAS	56.792	100.000	100.000	54.650	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.838	7.270	8.855	3.350	8.144	9.296
Methane	.389	.996	1.213	.479	1.164	1.328
Ammonia	.103	.263	.321	.110	.268	.306
Water Vapor	6.988	17.900	.000	5.096	12.390	.000
Carbon Monoxide	2.749	7.043	8.578	3.717	9.037	10.315
Nitrogen	22.359	57.271	69.758	24.453	59.455	67.863
Ethlyene	.001	.003	.003	.001	.003	.003
Hydrogen Sulfide	.054	.138	.168	.051	.124	.141
Argon	.180	.461	.561	.205	.499	.570
Carbon Dioxide	3.379	8.656	10.543	3.667	8.917	10.178
TOTAL GAS	39.041	100.000	100.000	41.130	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.838	7.056	8.540	3.350	7.923	9.008
Methane	.389	.967	1.170	.479	1.132	1.287
Ammonia	.103	.256	.309	.110	.261	.297
Water Vapor	6.988	17.374	.000	5.096	12.052	.000
Carbon Monoxide	2.749	6.835	8.273	3.717	8.791	9.995
Nitrogen	23.542	58.527	70.834	25.605	60.559	68.858
Ethlyene	.001	.003	.003	.001	.003	.003
Hydrogen Sulfide	.054	.134	.162	.051	.120	.137
Argon	.180	.447	.541	.205	.486	.552
Carbon Dioxide	3.379	8.401	10.168	3.667	8.674	9.863
TOTAL GAS	40.223	100.000	100.000	42.281	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.838	6.052	7.112	3.350	6.840	7.635
Methane	.389	.829	.974	.479	.977	1.091
Ammonia	.103	.219	.258	.110	.225	.252
Water Vapor	6.988	14.902	.000	5.096	10.406	.000
Carbon Monoxide	2.749	5.863	6.890	3.717	7.590	8.471
Nitrogen	30.214	64.428	75.710	32.295	65.947	73.606
Ethlyene	.001	.002	.003	.001	.002	.003
Hydrogen Sulfide	.054	.115	.135	.051	.104	.116
Argon	.180	.384	.451	.205	.419	.468
Carbon Dioxide	3.379	7.206	8.468	3.667	7.489	8.359
TOTAL GAS	46.896	100.000	100.000	48.971	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.243	5.124	6.234	2.229	5.145	5.995
Methane	.671	1.533	1.865	.788	1.820	2.121
Ammonia	.099	.226	.275	.099	.228	.266
Water Vapor	7.793	17.800	.000	6.144	14.181	.000
Carbon Monoxide	2.912	6.652	8.092	3.174	7.326	8.536
Nitrogen	25.667	58.626	71.321	26.204	60.483	70.477
Hydrogen Sulfide	.003	.007	.009	.003	.007	.009
Argon	.236	.540	.657	.228	.527	.614
Carbon Dioxide	4.155	9.491	11.547	4.455	10.283	11.982
TOTAL GAS	43.781	100.000	100.000	43.324	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.243	4.999	6.049	2.229	5.018	5.824
Methane	.671	1.496	1.810	.788	1.775	2.060
Ammonia	.099	.221	.267	.099	.223	.259
Water Vapor	7.793	17.364	.000	6.144	13.833	.000
Carbon Monoxide	2.912	6.489	7.852	3.174	7.146	8.293
Nitrogen	26.765	59.638	72.170	27.293	61.452	71.317
Hydrogen Sulfide	.003	.007	.009	.003	.007	.008
Argon	.236	.527	.638	.228	.514	.597
Carbon Dioxide	4.155	9.259	11.205	4.455	10.031	11.641
TOTAL GAS	44.879	100.000	100.000	44.413	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.243	4.388	5.178	2.229	4.399	5.006
Methane	.671	1.313	1.549	.788	1.556	1.771
Ammonia	.099	.194	.229	.099	.195	.222
Water Vapor	7.793	15.245	.000	6.144	12.125	.000
Carbon Monoxide	2.912	5.697	6.722	3.174	6.264	7.128
Nitrogen	33.005	64.565	76.178	33.548	66.211	75.347
Hydrogen Sulfide	.003	.006	.007	.003	.006	.007
Argon	.236	.463	.546	.228	.451	.513
Carbon Dioxide	4.155	8.129	9.591	4.455	8.793	10.006
TOTAL GAS	51.119	100.000	100.000	50.668	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.260	5.338	6.494	2.369	5.540	6.626
Methane	.463	1.094	1.331	.482	1.126	1.347
Ammonia	39	.233	.284	.099	.233	.278
Water Vapor	37	17.800	.000	7.007	16.385	.000
Carbon Monoxide	3.035	7.167	8.719	3.128	7.315	8.748
Nitrogen	24.886	58.772	71.498	25.797	60.327	72.149
Hydrogen Sulfide	.000	.001	.001	.000	.001	.001
Argon	.204	.481	.586	.218	.510	.610
Carbon Dioxide	3.859	9.114	11.088	3.661	8.562	10.240
TOTAL GAS	42.344	100.000	100.000	42.762	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.260	5.276	6.402	2.369	5.477	6.535
Methane	.463	1.081	1.312	.482	1.113	1.329
Ammonia	.099	.231	.280	.099	.230	.274
Water Vapor	7.537	17.593	.000	7.007	16.197	.000
Carbon Monoxide	3.035	7.084	8.597	3.128	7.231	8.628
Nitrogen	25.384	59.250	71.900	26.295	60.783	72.531
Hydrogen Sulfide	.000	.001	.001	.000	.001	.001
Argon	.204	.476	.577	.218	.504	.602
Carbon Dioxide	3.859	9.008	10.931	3.661	8.464	10.100
TOTAL GAS	42.841	100.000	100.000	43.259	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.260	4.586	5.413	2.369	4.767	5.550
Methane	.463	.940	1.109	.482	.969	1.128
Ammonia	.099	.201	.237	.099	.200	.233
Water Vapor	7.537	15.292	.000	7.007	14.098	.000
Carbon Monoxide	3.035	6.157	7.269	3.128	6.294	7.327
Nitrogen	31.832	64.582	76.240	32.733	65.864	76.674
Hydrogen Sulfide	.000	.000	.001	.000	.000	.001
Argon	.204	.414	.488	.218	.439	.511
Carbon Dioxide	3.859	7.830	9.243	3.661	7.367	8.577
TOTAL GAS	49.289	100.000	100.000	49.698	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow	mole %	mole %	Flow	mole %	mole %
-------	(mol/hr)	Wet	Dry	(mol/hr)	Wet	Dry
Hydrogen	3.771	7.478	8.488	3.649	7.718	8.743
Methane	.730	1.449	1.644	.725	1.533	1.737
Ammonia	.092	.183	.208	.089	.188	.213
Water Vapor	6.000	11.900	.000	5.545	11.729	.000
Carbon Monoxide	4.413	8.753	9.935	4.642	9.819	11.124
Nitrogen	30.896	61.275	69.551	27.819	58.841	66.659
Ethlyene	.015	.029	.033	.015	.031	.035
Ethane	.011	.021	.024	.011	.022	.025
Hydrogen Sulfide	.009	.018	.021	.010	.022	.025
Argon	.253	.501	.569	.244	.516	.584
Carbon Dioxide	4.232	8.392	9.526	4.530	9.582	10.856
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TOTAL GAS	50.422	100.000	100.000	47.278	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow	mole %	mole %	Flow	mole %	mole %
-------	(mol/hr)	Wet	Dry	(mol/hr)	Wet	Dry
Hydrogen	3.771	7.341	8.312	3.649	7.566	8.549
Methane	.730	1.422	1.610	.725	1.503	1.698
Ammonia	.092	.180	.204	.089	.184	.208
Water Vapor	6.000	11.681	.000	5.545	11.498	.000
Carbon Monoxide	4.413	8.592	9.729	4.642	9.626	10.877
Nitrogen	31.841	61.987	70.185	28.766	59.650	67.399
Ethlyene	.015	.028	.032	.015	.030	.034
Ethane	.011	.021	.023	.011	.022	.025
Hydrogen Sulfide	.009	.018	.020	.010	.021	.024
Argon	.253	.492	.557	.244	.505	.571
Carbon Dioxide	4.232	8.238	9.327	4.530	9.394	10.615
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TOTAL GAS	51.367	100.000	100.000	48.226	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	3.771	6.710	7.512	3.649	6.871	7.672
Methane	.730	1.300	1.455	.725	1.365	1.524
Ammonia	.092	.165	.184	.089	.167	.187
Water Vapor	6.000	10.678	.000	5.545	10.442	.000
Carbon Monoxide	4.413	7.854	8.793	4.642	8.742	9.762
Nitrogen	36.668	65.252	73.053	33.643	63.355	70.743
Ethlyene	.015	.026	.029	.015	.028	.031
Ethane	.011	.019	.021	.011	.020	.022
Hydrogen Sulfide	.009	.017	.019	.010	.019	.022
Argon	.253	.450	.503	.244	.459	.513
Carbon Dioxide	4.232	7.530	8.430	4.530	8.531	9.526
TOTAL GAS	56.194	100.000	100.000	53.103	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.775	6.086	6.893	2.933	6.831	7.824
Methane	.615	1.350	1.528	.636	1.482	1.698
Ammonia	.191	.418	.473	.191	.445	.510
Water Vapor	5.335	11.700	.000	5.450	12.692	.000
Carbon Monoxide	3.322	7.286	8.251	3.556	8.282	9.486
Nitrogen	29.261	64.170	72.673	25.932	60.396	69.176
Ethlyene	.018	.040	.046	.018	.043	.049
Ethane	.018	.040	.046	.018	.043	.049
Hydrogen Sulfide	.002	.003	.004	.002	.004	.004
Argon	.214	.470	.533	.212	.493	.565
Carbon Dioxide	3.847	8.436	9.554	3.988	9.288	10.639
TOTAL GAS	45.600	100.000	100.000	42.937	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.775	5.983	6.761	2.933	6.698	7.650
Methane	.615	1.327	1.499	.636	1.453	1.660
Ammonia	.191	.411	.464	.191	.437	.499
Water Vapor	5.335	11.502	.000	5.450	12.446	.000
Carbon Monoxide	3.322	7.162	8.093	3.556	8.121	9.276
Nitrogen	30.047	64.777	73.196	26.781	61.164	69.859
Ethlyene	.018	.040	.045	.018	.042	.048
Ethane	.018	.040	.045	.018	.042	.048
Hydrogen Sulfide	.002	.003	.004	.002	.004	.004
Argon	.214	.462	.522	.212	.484	.553
Carbon Dioxide	3.847	8.293	9.371	3.988	9.108	10.403
TOTAL GAS	46.385	100.000	100.000	43.786	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.775	5.412	6.041	2.933	6.020	6.779
Methane	.615	1.200	1.340	.636	1.306	1.471
Ammonia	.191	.372	.415	.191	.393	.442
Water Vapor	5.335	10.404	.000	5.450	11.187	.000
Carbon Monoxide	3.322	6.479	7.231	3.556	7.299	8.219
Nitrogen	34.939	68.137	76.050	31.712	65.094	73.293
Ethlyene	.018	.036	.040	.018	.038	.043
Ethane	.018	.036	.040	.018	.038	.043
Hydrogen Sulfide	.002	.003	.003	.002	.003	.004
Argon	.214	.418	.467	.212	.435	.490
Carbon Dioxide	3.847	7.502	8.373	3.988	8.186	9.218
TOTAL GAS	51.278	100.000	100.000	48.716	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	4.108	8.913	10.082	4.366	8.732	9.983
Methane	.838	1.817	2.056	.893	1.785	2.041
Ammonia	.155	.336	.380	.165	.329	.376
Water Vapor	5.347	11.600	.000	6.266	12.531	.000
Carbon Monoxide	4.547	9.866	11.160	5.479	10.958	12.527
Nitrogen	26.572	57.648	65.213	27.876	55.747	63.733
Ethlyene	.013	.028	.031	.013	.026	.029
Ethane	.018	.039	.044	.018	.036	.041
Hydrogen Sulfide	.005	.011	.012	.005	.010	.012
Argon	.225	.489	.553	.258	.516	.590
Carbon Dioxide	4.265	9.253	10.468	4.666	9.330	10.667
TOTAL GAS	46.094	100.000	100.000	50.004	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	4.108	8.739	9.861	4.366	8.575	9.778
Methane	.838	1.782	2.010	.893	1.753	1.999
Ammonia	.155	.330	.372	.165	.323	.369
Water Vapor	5.347	11.374	.000	6.266	12.306	.000
Carbon Monoxide	4.547	9.673	10.915	5.479	10.761	12.271
Nitrogen	27.488	58.473	65.978	28.791	56.543	64.477
Ethlyene	.013	.027	.031	.013	.025	.029
Ethane	.018	.038	.043	.018	.035	.040
Hydrogen Sulfide	.005	.011	.012	.005	.010	.011
Argon	.225	.480	.541	.258	.507	.578
Carbon Dioxide	4.265	9.073	10.238	4.666	9.163	10.448
TOTAL GAS	47.010	100.000	100.000	50.920	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	4.108	7.961	8.882	4.366	7.864	8.864
Methane	.838	1.623	1.811	.893	1.608	1.812
Ammonia	.155	.300	.335	.165	.296	.334
Water Vapor	5.347	10.362	.000	6.266	11.285	.000
Carbon Monoxide	4.547	8.813	9.831	5.479	9.868	11.124
Nitrogen	32.080	62.169	69.356	33.396	60.146	67.797
Ethlyene	.013	.025	.028	.013	.023	.026
Ethane	.018	.035	.039	.018	.032	.036
Hydrogen Sulfide	.005	.010	.011	.005	.009	.010
Argon	.225	.437	.487	.258	.465	.524
Carbon Dioxide	4.265	8.266	9.221	4.666	8.403	9.472
TOTAL GAS	51.602	100.000	100.000	55.524	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	4.229	7.827	8.765	4.493	7.769	8.885
Methane	1.046	1.936	2.168	1.089	1.883	2.153
Ammonia	.172	.317	.356	.178	.308	.352
Water Vapor	5.781	10.700	.000	7.269	12.569	.000
Carbon Monoxide	6.409	11.862	13.283	6.894	11.921	13.635
Nitrogen	31.029	57.429	64.310	32.210	55.697	63.703
Ethlyene	.006	.011	.013	.006	.011	.012
Ethane	.009	.017	.019	.009	.016	.018
Hydrogen Sulfide	.006	.011	.012	.006	.010	.012
Argon	.261	.482	.540	.320	.554	.634
Carbon Dioxide	5.083	9.408	10.535	5.357	9.264	10.596
TOTAL GAS	54.031	100.000	100.000	57.832	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	4.229	7.735	8.650	4.493	7.683	8.774
Methane	1.046	1.913	2.139	1.089	1.862	2.126
Ammonia	.172	.314	.351	.178	.304	.347
Water Vapor	5.781	10.574	.000	7.269	12.431	.000
Carbon Monoxide	6.409	11.722	13.108	6.894	11.790	13.464
Nitrogen	31.672	57.929	64.779	32.853	56.183	64.159
Ethlyene	.006	.011	.012	.006	.010	.012
Ethane	.009	.017	.019	.009	.016	.018
Hydrogen Sulfide	.006	.011	.012	.006	.010	.012
Argon	.261	.477	.533	.320	.548	.626
Carbon Dioxide	5.083	9.297	10.396	5.357	9.162	10.463
TOTAL GAS	54.674	100.000	100.000	58.474	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow	mole %	mole %	Flow	mole %	mole %
	(mol/hr)	Wet	Dry	(mol/hr)	Wet	Dry
Hydrogen	4.229	7.236	8.031	4.493	7.218	8.172
Methane	1.046	1.790	1.986	1.089	1.749	1.981
Ammonia	.172	.294	.326	.178	.286	.324
Water Vapor	5.781	9.892	.000	7.269	11.678	.000
Carbon Monoxide	6.409	10.966	12.170	6.894	11.076	12.540
Nitrogen	35.441	60.643	67.300	36.623	58.838	66.617
Ethlyene	.006	.010	.012	.006	.010	.011
Ethane	.009	.016	.017	.009	.015	.017
Hydrogen Sulfide	.006	.010	.011	.006	.009	.011
Argon	.261	.446	.495	.320	.515	.583
Carbon Dioxide	5.083	8.698	9.652	5.357	8.607	9.745
TOTAL GAS	58.443	100.000	100.000	62.245	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	4.746	8.847	9.941	4.822	8.451	9.652
Methane	.907	1.690	1.899	.926	1.623	1.854
Ammonia	.098	.183	.206	.099	.173	.197
Water Vapor	5.901	11.000	.000	7.103	12.448	.000
Carbon Monoxide	6.195	11.548	12.975	6.668	11.685	13.346
Nitrogen	30.720	57.268	64.346	31.924	55.947	63.901
Ethlyene	.005	.010	.011	.005	.010	.011
Ethane	.007	.013	.014	.007	.012	.014
Hydrogen Sulfide	.003	.005	.006	.003	.005	.006
Argon	.266	.497	.558	.313	.549	.627
Carbon Dioxide	4.795	8.939	10.044	5.191	9.098	10.391
TOTAL GAS	53.643	100.000	100.000	57.062	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	4.746	8.754	9.823	4.822	8.367	9.543
Methane	.907	1.672	1.877	.926	1.607	1.833
Ammonia	.098	.182	.204	.099	.171	.195
Water Vapor	5.901	10.883	.000	7.103	12.324	.000
Carbon Monoxide	6.195	11.426	12.821	6.668	11.569	13.195
Nitrogen	31.294	57.720	64.769	32.496	56.384	64.309
Ethlyene	.005	.010	.011	.005	.009	.011
Ethane	.007	.013	.014	.007	.012	.014
Hydrogen Sulfide	.003	.005	.006	.003	.005	.006
Argon	.266	.491	.551	.313	.544	.620
Carbon Dioxide	4.795	8.844	9.924	5.191	9.007	10.274
TOTAL GAS	54.217	100.000	100.000	57.634	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	4.746	8.225	9.162	4.822	7.889	8.926
Methane	.907	1.571	1.750	.926	1.515	1.715
Ammonia	.098	.171	.190	.099	.161	.183
Water Vapor	5.901	10.226	.000	7.103	11.620	.000
Carbon Monoxide	6.195	10.735	11.958	6.668	10.908	12.342
Nitrogen	34.781	60.275	67.141	35.990	58.877	66.618
Ethlyene	.005	.009	.011	.005	.009	.010
Ethane	.007	.012	.013	.007	.011	.013
Hydrogen Sulfide	.003	.005	.005	.003	.005	.005
Argon	.266	.462	.514	.313	.513	.580
Carbon Dioxide	4.795	8.310	9.256	5.191	8.493	9.609
TOTAL GAS	57.704	100.000	100.000	61.128	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow	mole %	mole %	Flow	mole %	mole %
	(mol/hr)	Wet	Dry	(mol/hr)	Wet	Dry
Hydrogen	3.005	7.030	9.226	3.033	7.041	8.998
Methane	.626	1.465	1.922	.641	1.489	1.903
Ammonia	.122	.285	.375	.123	.285	.365
Water Vapor	10.174	23.800	.000	9.368	21.750	.000
Carbon Monoxide	2.062	4.824	6.331	2.145	4.979	6.363
Nitrogen	22.907	53.585	70.322	23.778	55.203	70.547
Ethlyene	.021	.049	.064	.021	.049	.063
Ethane	.007	.015	.020	.007	.015	.020
Hydrogen Sulfide	.016	.037	.048	.016	.037	.048
Argon	.170	.397	.521	.205	.475	.607
Carbon Dioxide	3.639	8.512	11.170	3.736	8.675	11.086
TOTAL GAS	42.750	100.000	100.000	43.073	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow	mole %	mole %	Flow	mole %	mole %
	(mol/hr)	Wet	Dry	(mol/hr)	Wet	Dry
Hydrogen	3.005	6.904	9.010	3.033	6.916	8.794
Methane	.626	1.438	1.877	.641	1.463	1.860
Ammonia	.122	.280	.366	.123	.280	.357
Water Vapor	10.174	23.373	.000	9.368	21.363	.000
Carbon Monoxide	2.062	4.738	6.183	2.145	4.891	6.219
Nitrogen	23.689	54.418	71.017	24.558	56.001	71.214
Ethlyene	.021	.048	.062	.021	.048	.062
Ethane	.007	.015	.020	.007	.015	.019
Hydrogen Sulfide	.016	.036	.047	.016	.037	.046
Argon	.170	.390	.509	.205	.467	.594
Carbon Dioxide	3.639	8.359	10.909	3.736	8.520	10.835
TOTAL GAS	43.531	100.000	100.000	43.854	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	3.005	6.285	7.983	3.033	6.300	7.822
Methane	.626	1.309	1.663	.641	1.332	1.654
Ammonia	.122	.255	.324	.123	.255	.317
Water Vapor	10.174	21.275	.000	9.368	19.460	.000
Carbon Monoxide	2.062	4.313	5.478	2.145	4.455	5.532
Nitrogen	27.980	58.508	74.320	28.846	59.920	74.398
Ethlyene	.021	.043	.055	.021	.044	.055
Ethane	.007	.014	.017	.007	.014	.017
Hydrogen Sulfide	.016	.033	.042	.016	.033	.041
Argon	.170	.355	.451	.205	.425	.528
Carbon Dioxide	3.639	7.609	9.665	3.736	7.761	9.637
TOTAL GAS	47.822	100.000	100.000	48.141	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.390	6.439	8.213	2.241	6.553	7.899
Methane	.568	1.530	1.951	.545	1.594	1.922
Ammonia	.122	.329	.420	.117	.342	.412
Water Vapor	8.015	21.600	.000	5.830	17.048	.000
Carbon Monoxide	1.826	4.922	6.278	1.845	5.395	6.504
Nitrogen	21.121	56.918	72.599	20.480	59.889	72.197
Ethlyene	.015	.041	.053	.015	.045	.054
Ethane	.006	.017	.022	.006	.018	.022
Hydrogen Sulfide	.149	.401	.511	.130	.380	.459
Argon	.149	.400	.511	.166	.484	.584
Carbon Dioxide	2.747	7.403	9.443	2.822	8.252	9.947
TOTAL GAS	37.109	100.000	100.000	34.197	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.390	6.297	7.984	2.241	6.396	7.673
Methane	.568	1.496	1.897	.545	1.556	1.867
Ammonia	.122	.322	.408	.117	.334	.401
Water Vapor	8.015	21.124	.000	5.830	16.641	.000
Carbon Monoxide	1.826	4.813	6.102	1.845	5.266	6.317
Nitrogen	21.958	57.868	73.365	21.317	60.847	72.994
Ethlyene	.015	.040	.051	.015	.044	.052
Ethane	.006	.017	.021	.006	.018	.021
Hydrogen Sulfide	.149	.392	.497	.130	.371	.445
Argon	.149	.392	.496	.166	.472	.567
Carbon Dioxide	2.747	7.240	9.179	2.822	8.054	9.662
TOTAL GAS	37.946	100.000	100.000	35.034	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.390	5.679	7.015	2.241	5.722	6.723
Methane	.568	1.349	1.667	.545	1.392	1.636
Ammonia	.122	.290	.359	.117	.299	.351
Water Vapor	8.015	19.050	.000	5.830	14.888	.000
Carbon Monoxide	1.826	4.341	5.362	1.845	4.711	5.536
Nitrogen	26.090	62.005	76.596	25.442	64.971	76.336
Ethlyene	.015	.036	.045	.015	.039	.046
Ethane	.006	.015	.019	.006	.016	.019
Hydrogen Sulfide	.149	.353	.437	.130	.332	.390
Argon	.149	.353	.436	.166	.423	.497
Carbon Dioxide	2.747	6.529	8.066	2.822	7.206	8.466
TOTAL GAS	42.077	100.000	100.000	39.158	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	3.373	6.557	8.108	3.220	7.623	9.093
Methane	.636	1.237	1.529	.636	1.505	1.795
Ammonia	.113	.219	.271	.111	.262	.312
Water Vapor	9.839	19.129	.000	6.830	16.167	.000
Carbon Monoxide	2.143	4.167	5.153	2.280	5.398	6.439
Nitrogen	30.841	59.963	74.146	24.206	57.295	68.345
Ethlyene	.017	.034	.042	.017	.041	.049
Ethane	.040	.078	.097	.040	.096	.114
Hydrogen Sulfide	.163	.318	.393	.055	.131	.157
Argon	.168	.327	.404	.194	.459	.547
Carbon Dioxide	4.100	7.971	9.857	4.657	11.023	13.149
TOTAL GAS	51.434	100.000	100.000	42.248	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	3.373	5.888	7.109	3.220	6.692	7.800
Methane	.636	1.111	1.341	.636	1.321	1.540
Ammonia	.113	.197	.237	.111	.230	.268
Water Vapor	9.839	17.176	.000	6.830	14.194	.000
Carbon Monoxide	2.143	3.742	4.518	2.280	4.739	5.523
Nitrogen	36.690	64.051	77.333	30.079	62.507	72.847
Ethlyene	.017	.030	.037	.017	.036	.042
Ethane	.040	.070	.085	.040	.084	.098
Hydrogen Sulfide	.163	.285	.344	.055	.115	.134
Argon	.168	.294	.355	.194	.403	.469
Carbon Dioxide	4.100	7.158	8.642	4.657	9.678	11.279
TOTAL GAS	57.283	100.000	100.000	48.121	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	3.373	5.466	6.503	3.220	6.099	7.005
Methane	.636	1.031	1.227	.636	1.204	1.383
Ammonia	.113	.182	.217	.111	.209	.241
Water Vapor	9.839	15.946	.000	6.830	12.935	.000
Carbon Monoxide	2.143	3.474	4.133	2.280	4.319	4.960
Nitrogen	41.108	66.625	79.264	34.764	65.833	75.614
Ethlyene	.017	.028	.034	.017	.033	.038
Ethane	.040	.065	.078	.040	.076	.088
Hydrogen Sulfide	.163	.265	.315	.055	.105	.121
Argon	.168	.273	.324	.194	.367	.421
Carbon Dioxide	4.100	6.645	7.906	4.657	8.820	10.130
TOTAL GAS	61.700	100.000	100.000	52.806	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	3.486	6.798	8.265	3.472	7.590	8.912
Methane	.576	1.123	1.366	.594	1.299	1.525
Ammonia	.134	.261	.317	.133	.291	.342
Water Vapor	9.103	17.752	.000	6.784	14.833	.000
Carbon Monoxide	2.627	5.123	6.229	2.846	6.222	7.305
Nitrogen	30.396	59.277	72.071	26.306	57.516	67.534
Ethlyene	.009	.018	.022	.009	.021	.024
Ethane	.017	.032	.039	.017	.037	.044
Hydrogen Sulfide	.033	.064	.077	.035	.078	.091
Argon	.193	.376	.457	.223	.488	.573
Carbon Dioxide	4.706	9.177	11.157	5.317	11.625	13.649
TOTAL GAS	51.278	100.000	100.000	45.737	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	3.486	6.066	7.207	3.472	6.680	7.682
Methane	.576	1.002	1.191	.594	1.143	1.314
Ammonia	.134	.233	.277	.133	.256	.295
Water Vapor	9.103	15.841	.000	6.784	13.054	.000
Carbon Monoxide	2.627	4.572	5.432	2.846	5.475	6.297
Nitrogen	36.582	63.661	75.644	32.542	62.614	72.014
Ethlyene	.009	.016	.019	.009	.018	.021
Ethane	.017	.029	.034	.017	.033	.038
Hydrogen Sulfide	.033	.057	.067	.035	.068	.079
Argon	.193	.335	.398	.223	.429	.494
Carbon Dioxide	4.706	8.189	9.730	5.317	10.230	11.766
TOTAL GAS	57.464	100.000	100.000	51.973	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	3.486	5.588	6.543	3.472	6.099	6.925
Methane	.576	.924	1.081	.594	1.043	1.185
Ammonia	.134	.214	.251	.133	.234	.266
Water Vapor	9.103	14.594	.000	6.784	11.919	.000
Carbon Monoxide	2.627	4.212	4.931	2.846	5.000	5.676
Nitrogen	41.493	66.522	77.889	37.487	65.862	74.775
Ethlyene	.009	.015	.017	.009	.017	.019
Ethane	.017	.026	.031	.017	.030	.034
Hydrogen Sulfide	.033	.052	.061	.035	.062	.071
Argon	.193	.309	.362	.223	.392	.445
Carbon Dioxide	4.706	7.544	8.833	5.317	9.341	10.605
TOTAL GAS	62.375	100.000	100.000	56.918	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	4.767	8.187	9.823	4.763	8.929	10.411
Methane	.884	1.518	1.822	.947	1.776	2.071
Ammonia	.159	.274	.328	.159	.297	.347
Water Vapor	9.700	16.660	.000	7.586	14.238	.000
Carbon Monoxide	3.779	6.491	7.788	4.178	7.832	9.132
Nitrogen	33.119	56.880	68.251	29.072	54.497	63.544
Ethlyene	.006	.010	.012	.006	.011	.013
Ethane	.028	.047	.057	.028	.052	.061
Hydrogen Sulfide	.015	.026	.031	.020	.038	.045
Argon	.237	.407	.488	.266	.498	.581
Carbon Dioxide	5.532	9.500	11.399	6.311	11.831	13.795
TOTAL GAS	58.226	100.000	100.000	53.347	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	4.767	7.487	8.833	4.763	8.101	9.303
Methane	.884	1.389	1.638	.947	1.611	1.850
Ammonia	.159	.250	.295	.159	.270	.310
Water Vapor	9.700	15.237	.000	7.596	12.918	.000
Carbon Monoxide	3.779	5.936	7.003	4.178	7.106	8.160
Nitrogen	38.557	60.564	71.450	34.525	58.716	67.426
Ethlyene	.006	.009	.011	.006	.010	.011
Ethane	.028	.043	.051	.028	.048	.055
Hydrogen Sulfide	.015	.024	.028	.020	.035	.040
Argon	.237	.372	.439	.266	.452	.519
Carbon Dioxide	5.532	8.689	10.251	6.311	10.734	12.326
TOTAL GAS	63.664	100.000	100.000	58.799	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	4.767	7.170	8.395	4.763	7.696	8.772
Methane	.884	1.330	1.557	.947	1.531	1.745
Ammonia	.159	.240	.280	.159	.256	.292
Water Vapor	9.700	14.592	.000	7.596	12.272	.000
Carbon Monoxide	3.779	5.685	6.656	4.178	6.750	7.695
Nitrogen	41.371	62.233	72.865	37.622	60.782	69.284
Ethlyene	.006	.009	.010	.006	.009	.011
Ethane	.028	.042	.049	.028	.045	.051
Hydrogen Sulfide	.015	.023	.027	.020	.033	.038
Argon	.237	.356	.417	.266	.429	.489
Carbon Dioxide	5.532	8.321	9.743	6.311	10.197	11.623
TOTAL GAS	66.477	100.000	100.000	61.897	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	3.147	6.914	8.828	3.047	7.085	8.625
Methane	.622	1.368	1.746	.633	1.472	1.792
Ammonia	.107	.236	.301	.105	.243	.296
Water Vapor	9.866	21.679	.000	7.681	17.857	.000
Carbon Monoxide	2.266	4.978	6.356	2.400	5.579	6.792
Nitrogen	25.258	55.500	70.862	24.413	56.754	69.091
Ethlyene	.015	.033	.043	.016	.037	.045
Ethane	.012	.027	.034	.012	.028	.035
Hydrogen Sulfide	.006	.013	.017	.006	.015	.018
Argon	.183	.403	.514	.216	.502	.611
Carbon Dioxide	4.027	8.848	11.298	4.486	10.428	12.695
TOTAL GAS	45.510	100.000	100.000	43.015	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	3.147	6.816	8.669	3.047	6.978	8.467
Methane	.622	1.348	1.715	.633	1.450	1.760
Ammonia	.107	.232	.296	.105	.239	.290
Water Vapor	9.866	21.371	.000	7.681	17.588	.000
Carbon Monoxide	2.266	4.907	6.241	2.400	5.495	6.668
Nitrogen	25.915	56.133	71.389	25.070	57.405	69.656
Ethlyene	.015	.033	.042	.016	.037	.044
Ethane	.012	.026	.033	.012	.028	.034
Hydrogen Sulfide	.006	.013	.017	.006	.014	.017
Argon	.183	.397	.505	.216	.494	.600
Carbon Dioxide	4.027	8.723	11.093	4.486	10.271	12.463
TOTAL GAS	46.167	100.000	100.000	43.672	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	3.147	6.394	7.997	3.047	6.506	7.782
Methane	.622	1.265	1.582	.633	1.352	1.617
Ammonia	.107	.218	.273	.105	.223	.267
Water Vapor	9.866	20.047	.000	7.681	16.399	.000
Carbon Monoxide	2.266	4.604	5.758	2.400	5.124	6.129
Nitrogen	28.962	58.849	73.605	28.237	60.285	72.110
Ethlyene	.015	.031	.039	.016	.034	.041
Ethane	.012	.025	.031	.012	.026	.031
Hydrogen Sulfide	.006	.012	.016	.006	.013	.016
Argon	.183	.373	.466	.216	.461	.551
Carbon Dioxide	4.027	8.182	10.234	4.486	9.577	11.455
TOTAL GAS	49.214	100.000	100.000	46.840	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	4.106	6.925	8.868	4.278	7.231	8.792
Methane	.798	1.345	1.723	.912	1.542	1.875
Ammonia	.082	.138	.177	.082	.139	.169
Water Vapor	12.991	21.909	.000	10.506	17.757	.000
Carbon Monoxide	3.160	5.330	6.826	3.403	5.751	6.993
Nitrogen	31.573	53.249	68.188	32.784	55.413	67.377
Ethane	.010	.018	.022	.012	.020	.024
Hydrogen Sulfide	.001	.002	.002	.001	.002	.002
Argon	.259	.436	.559	.302	.510	.621
Carbon Dioxide	6.313	10.647	13.635	6.884	11.635	14.147
TOTAL GAS	59.293	100.000	100.000	59.163	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	4.106	6.816	8.690	4.278	7.116	8.623
Methane	.798	1.324	1.688	.912	1.518	1.839
Ammonia	.082	.136	.173	.082	.137	.166
Water Vapor	12.991	21.563	.000	10.506	17.476	.000
Carbon Monoxide	3.160	5.246	6.688	3.403	5.660	6.859
Nitrogen	32.524	53.987	68.828	33.736	56.119	68.003
Ethane	.010	.017	.022	.012	.019	.024
Hydrogen Sulfide	.001	.002	.002	.001	.002	.002
Argon	.259	.429	.548	.302	.502	.609
Carbon Dioxide	6.313	10.479	13.360	6.884	11.451	13.875
TOTAL GAS	60.244	100.000	100.000	60.115	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	4.106	6.457	8.114	4.278	6.738	8.073
Methane	.798	1.254	1.576	.912	1.437	1.722
Ammonia	.082	.129	.162	.082	.129	.155
Water Vapor	12.991	20.426	.000	10.506	16.545	.000
Carbon Monoxide	3.160	4.970	6.245	3.403	5.359	6.421
Nitrogen	35.876	56.412	70.893	37.116	58.455	70.044
Ethane	.010	.016	.021	.012	.018	.022
Hydrogen Sulfide	.001	.002	.002	.001	.002	.002
Argon	.259	.407	.511	.302	.476	.570
Carbon Dioxide	6.313	9.927	12.475	6.884	10.841	12.990
TOTAL GAS	63.597	100.000	100.000	63.495	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	3.349	5.821	7.503	3.168	5.778	6.854
Methane	.782	1.360	1.753	.762	1.390	1.648
Ammonia	.057	.099	.128	.057	.103	.123
Water Vapor	12.897	22.417	.000	8.607	15.696	.000
Carbon Monoxide	3.447	5.991	7.722	3.588	6.543	7.761
Nitrogen	32.018	55.649	71.729	33.168	60.488	71.749
Ethlyene	.005	.008	.011	.005	.009	.010
Ethane	.005	.008	.011	.005	.009	.010
Hydrogen Sulfide	.004	.008	.010	.004	.008	.010
Argon	.230	.400	.516	.284	.518	.614
Carbon Dioxide	4.740	8.238	10.619	5.187	9.459	11.220
TOTAL GAS	57.534	100.000	100.000	54.834	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	3.349	5.733	7.357	3.168	5.686	6.724
Methane	.782	1.339	1.719	.762	1.368	1.617
Ammonia	.057	.098	.125	.057	.102	.120
Water Vapor	12.897	22.076	.000	8.607	15.446	.000
Carbon Monoxide	3.447	5.900	7.572	3.588	6.439	7.615
Nitrogen	32.905	56.323	72.280	34.055	61.117	72.282
Ethlyene	.005	.008	.010	.005	.009	.010
Ethane	.005	.008	.010	.005	.009	.010
Hydrogen Sulfide	.004	.008	.010	.004	.008	.009
Argon	.230	.394	.506	.284	.510	.603
Carbon Dioxide	4.740	8.113	10.411	5.187	9.308	11.009
TOTAL GAS	58.422	100.000	100.000	55.722	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	3.349	5.649	7.220	3.168	5.600	6.605
Methane	.782	1.320	1.687	.762	1.347	1.589
Ammonia	.057	.096	.123	.057	.100	.118
Water Vapor	12.897	21.755	.000	8.607	15.213	.000
Carbon Monoxide	3.447	5.814	7.431	3.588	6.342	7.480
Nitrogen	33.768	56.959	72.796	34.907	61.702	72.774
Ethlyene	.005	.008	.010	.005	.008	.010
Ethane	.005	.008	.010	.005	.008	.010
Hydrogen Sulfide	.004	.007	.010	.004	.008	.009
Argon	.230	.388	.496	.284	.502	.592
Carbon Dioxide	4.740	7.995	10.218	5.187	9.168	10.813
TOTAL GAS	59.285	100.000	100.000	56.573	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	3.170	5.945	7.565	2.964	5.733	6.744
Methane	.720	1.351	1.719	.717	1.387	1.632
Ammonia	.054	.102	.129	.054	.104	.123
Water Vapor	11.419	21.416	.000	7.746	14.985	.000
Carbon Monoxide	3.240	6.077	7.734	3.443	6.660	7.834
Nitrogen	30.266	56.763	72.232	32.051	62.005	72.934
Ethlyene	.005	.009	.011	.005	.009	.011
Ethane	.006	.011	.014	.006	.011	.013
Hydrogen Sulfide	.001	.002	.002	.001	.002	.002
Argon	.216	.406	.517	.266	.514	.605
Carbon Dioxide	4.222	7.919	10.077	4.440	8.589	10.103
TOTAL GAS	53.320	100.000	100.000	51.691	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	3.170	5.854	7.419	2.964	5.644	6.620
Methane	.720	1.330	1.686	.717	1.365	1.602
Ammonia	.054	.100	.127	.054	.103	.120
Water Vapor	11.419	21.091	.000	7.746	14.750	.000
Carbon Monoxide	3.240	5.985	7.585	3.443	6.556	7.690
Nitrogen	31.089	57.420	72.767	32.873	62.600	73.431
Ethlyene	.005	.009	.011	.005	.009	.011
Ethane	.006	.011	.014	.006	.011	.013
Hydrogen Sulfide	.001	.002	.002	.001	.002	.002
Argon	.216	.400	.507	.266	.506	.594
Carbon Dioxide	4.222	7.799	9.883	4.440	8.454	9.917
TOTAL GAS	54.143	100.000	100.000	52.513	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	3.170	5.649	7.093	2.964	5.442	6.345
Methane	.720	1.284	1.612	.717	1.317	1.535
Ammonia	.054	.097	.121	.054	.099	.115
Water Vapor	11.419	20.352	.000	7.746	14.224	.000
Carbon Monoxide	3.240	5.775	7.251	3.443	6.322	7.370
Nitrogen	33.054	58.911	73.965	34.818	63.935	74.537
Ethlyene	.005	.008	.011	.005	.009	.010
Ethane	.006	.011	.013	.006	.011	.013
Hydrogen Sulfide	.001	.002	.002	.001	.002	.002
Argon	.216	.386	.484	.266	.488	.569
Carbon Dioxide	4.222	7.525	9.448	4.440	8.153	9.504
TOTAL GAS	56.108	100.000	100.000	54.458	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow	mole %	mole %	Flow	mole %	mole %
	(mol/hr)	Wet	Dry	(mol/hr)	Wet	Dry
Hydrogen	3.034	5.998	7.394	2.825	5.817	6.623
Methane	.732	1.447	1.784	.687	1.415	1.610
Ammonia	.063	.124	.153	.062	.128	.145
Water Vapor	9.549	18.877	.000	5.909	12.169	.000
Carbon Monoxide	3.446	6.813	8.398	3.659	7.536	8.580
Nitrogen	29.767	58.845	72.537	31.033	63.906	72.760
Ethlyene	.003	.007	.008	.003	.007	.008
Ethane	.005	.009	.011	.005	.009	.011
Hydrogen Sulfide	.000	.000	.000	.000	.000	.000
Argon	.208	.412	.508	.253	.520	.592
Carbon Dioxide	3.778	7.468	9.206	4.124	8.493	9.670
TOTAL GAS	50.586	100.000	100.000	48.560	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow	mole %	mole %	Flow	mole %	mole %
	(mol/hr)	Wet	Dry	(mol/hr)	Wet	Dry
Hydrogen	3.034	5.903	7.250	2.825	5.721	6.499
Methane	.732	1.424	1.749	.687	1.391	1.580
Ammonia	.063	.122	.150	.062	.126	.143
Water Vapor	9.549	18.577	.000	5.909	11.967	.000
Carbon Monoxide	3.446	6.705	8.234	3.659	7.411	8.418
Nitrogen	30.584	59.499	73.073	31.849	64.503	73.272
Ethlyene	.003	.007	.008	.003	.007	.008
Ethane	.005	.009	.011	.005	.009	.010
Hydrogen Sulfide	.000	.000	.000	.000	.000	.000
Argon	.208	.405	.498	.253	.512	.581
Carbon Dioxide	3.778	7.349	9.026	4.124	8.353	9.488
TOTAL GAS	51.403	100.000	100.000	49.376	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	3.034	5.670	6.902	2.825	5.487	6.199
Methane	.732	1.368	1.665	.687	1.334	1.507
Ammonia	.063	.117	.143	.062	.120	.136
Water Vapor	9.549	17.845	.000	5.909	11.478	.000
Carbon Monoxide	3.446	6.440	7.839	3.659	7.108	8.030
Nitrogen	32.693	61.095	74.365	33.954	65.955	74.506
Ethlyene	.003	.006	.008	.003	.007	.007
Ethane	.005	.008	.010	.005	.009	.010
Hydrogen Sulfide	.000	.000	.000	.000	.000	.000
Argon	.208	.389	.474	.253	.491	.554
Carbon Dioxide	3.778	7.060	8.593	4.124	8.011	9.050
TOTAL GAS	53.512	100.000	100.000	51.481	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow	mole %	mole %	Flow	mole %	mole %
	(mol/hr)	Wet	Dry	(mol/hr)	Wet	Dry
Hydrogen	2.924	6.039	7.879	2.712	6.293	7.261
Methane	.872	1.801	2.350	.839	1.947	2.246
Ammonia	.059	.122	.160	.059	.136	.157
Water Vapor	11.310	23.358	.000	5.746	13.336	.000
Carbon Monoxide	2.761	5.703	7.441	2.867	6.654	7.678
Nitrogen	27.072	55.912	72.952	27.309	63.375	73.127
Ethlyene	.004	.008	.011	.004	.009	.011
Ethane	.007	.014	.018	.007	.015	.018
Hydrogen Sulfide	.053	.108	.142	.054	.125	.144
Argon	.179	.370	.483	.214	.496	.572
Carbon Dioxide	3.179	6.565	8.566	3.281	7.615	8.787
TOTAL GAS	48.419	100.000	100.000	43.091	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow	mole %	mole %	Flow	mole %	mole %
	(mol/hr)	Wet	Dry	(mol/hr)	Wet	Dry
Hydrogen	2.924	5.940	7.712	2.712	6.177	7.108
Methane	.872	1.772	2.300	.839	1.911	2.199
Ammonia	.059	.120	.156	.059	.134	.154
Water Vapor	11.310	22.977	.000	5.746	13.091	.000
Carbon Monoxide	2.761	5.610	7.283	2.867	6.532	7.516
Nitrogen	27.875	56.632	73.525	28.113	64.046	73.693
Ethlyene	.004	.008	.011	.004	.009	.010
Ethane	.007	.014	.018	.007	.015	.017
Hydrogen Sulfide	.053	.107	.139	.054	.122	.141
Argon	.179	.364	.472	.214	.487	.560
Carbon Dioxide	3.179	6.458	8.384	3.281	7.475	8.601
TOTAL GAS	49.222	100.000	100.000	43.895	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.924	5.850	7.561	2.712	6.075	6.973
Methane	.872	1.745	2.255	.839	1.880	2.157
Ammonia	.059	.119	.153	.059	.131	.151
Water Vapor	11.310	22.629	.000	5.746	12.874	.000
Carbon Monoxide	2.761	5.525	7.141	2.867	6.424	7.373
Nitrogen	28.633	57.289	74.044	28.854	64.643	74.194
Ethlyene	.004	.008	.010	.004	.009	.010
Ethane	.007	.013	.017	.007	.015	.017
Hydrogen Sulfide	.053	.105	.136	.054	.120	.138
Argon	.179	.358	.463	.214	.479	.549
Carbon Dioxide	3.179	6.360	8.220	3.281	7.351	8.438
TOTAL GAS	49.979	100.000	100.000	44.636	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	4.971	6.385	8.896	4.735	7.591	9.570
Methane	1.444	1.855	2.585	1.427	2.287	2.883
Ammonia	.256	.328	.458	.250	.401	.506
Water Vapor	21.977	28.230	.000	12.900	20.679	.000
Carbon Monoxide	3.499	4.494	6.262	3.585	5.747	7.246
Nitrogen	38.648	49.645	69.172	32.233	51.671	65.141
Ethlyene	.043	.055	.076	.043	.068	.086
Ethane	.007	.010	.013	.007	.012	.015
Hydrogen Sulfide	.048	.061	.085	.048	.076	.096
Argon	.308	.396	.551	.364	.583	.735
Carbon Dioxide	6.650	8.542	11.901	6.790	10.885	13.722
TOTAL GAS	77.848	100.000	100.000	62.381	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	4.971	5.683	7.591	4.735	6.576	8.012
Methane	1.444	1.651	2.205	1.427	1.981	2.414
Ammonia	.256	.292	.390	.250	.348	.424
Water Vapor	21.977	25.128	.000	12.900	17.916	.000
Carbon Monoxide	3.499	4.000	5.343	3.585	4.979	6.066
Nitrogen	48.258	55.178	73.697	41.855	58.129	70.816
Ethlyene	.043	.049	.065	.043	.059	.072
Ethane	.007	.008	.011	.007	.010	.012
Hydrogen Sulfide	.048	.055	.073	.048	.066	.081
Argon	.308	.352	.470	.364	.505	.615
Carbon Dioxide	6.650	7.603	10.155	6.790	9.430	11.488
TOTAL GAS	87.459	100.000	100.000	72.004	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	4.971	5.448	7.177	4.735	6.246	7.527
Methane	1.444	1.583	2.085	1.427	1.882	2.268
Ammonia	.256	.280	.369	.250	.330	.398
Water Vapor	21.977	24.089	.000	12.900	17.017	.000
Carbon Monoxide	3.499	3.835	5.052	3.585	4.729	5.699
Nitrogen	52.031	57.032	75.130	45.659	60.230	72.581
Ethlyene	.043	.047	.061	.043	.056	.068
Ethane	.007	.008	.011	.007	.010	.012
Hydrogen Sulfide	.048	.052	.069	.048	.063	.076
Argon	.308	.338	.445	.364	.480	.578
Carbon Dioxide	6.650	7.289	9.602	6.790	8.957	10.793
TOTAL GAS	91.232	100.000	100.000	75.808	100.000	100.000

FREEBOARD GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	1.766	3.510	3.964	1.700	4.968	5.417
Methane	.440	.875	.988	.433	1.266	1.380
Ammonia	.089	.176	.199	.088	.256	.279
Water Vapor	5.754	11.440	.000	2.837	8.288	.000
Carbon Monoxide	1.960	3.897	4.400	2.046	5.978	6.519
Nitrogen	37.216	73.995	83.553	23.990	70.094	76.429
Ethlyene	.037	.073	.083	.037	.107	.117
Hydrogen Sulfide	.008	.015	.017	.008	.023	.025
Argon	.173	.344	.388	.193	.565	.616
Carbon Dioxide	2.854	5.675	6.408	2.893	8.454	9.218
TOTAL GAS	50.296	100.000	100.000	34.226	100.000	100.000

ORIFICE GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	1.766	2.950	3.264	1.700	3.883	4.152
Methane	.440	.735	.813	.433	.989	1.058
Ammonia	.089	.148	.164	.088	.200	.214
Water Vapor	5.754	9.614	.000	2.837	6.478	.000
Carbon Monoxide	1.960	3.275	3.623	2.046	4.673	4.997
Nitrogen	46.771	78.146	86.458	33.552	76.625	81.933
Ethlyene	.037	.061	.068	.037	.084	.090
Hydrogen Sulfide	.008	.013	.014	.008	.018	.019
Argon	.173	.289	.320	.193	.442	.472
Carbon Dioxide	2.854	4.769	5.276	2.893	6.608	7.066
TOTAL GAS	59.851	100.000	100.000	43.788	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	1.766	2.803	3.085	1.700	3.617	3.850
Methane	.440	.698	.769	.433	.922	.981
Ammonia	.089	.141	.155	.088	.187	.199
Water Vapor	5.754	9.134	.000	2.837	6.035	.000
Carbon Monoxide	1.960	3.111	3.424	2.046	4.353	4.633
Nitrogen	49.915	79.237	87.202	36.769	78.224	83.248
Ethlyene	.037	.058	.064	.037	.078	.083
Hydrogen Sulfide	.008	.012	.013	.008	.016	.018
Argon	.173	.275	.302	.193	.411	.438
Carbon Dioxide	2.854	4.531	4.987	2.893	6.156	6.551
TOTAL GAS	62.995	100.000	100.000	47.004	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.431	4.654	5.333	2.308	5.628	6.140
Methane	.694	1.328	1.522	.674	1.643	1.792
Ammonia	.084	.162	.185	.083	.203	.221
Water Vapor	6.654	12.740	.000	3.422	8.345	.000
Carbon Monoxide	3.004	5.750	6.590	3.231	7.880	8.597
Nitrogen	35.748	68.440	78.432	27.135	66.173	72.197
Ethlyene	.037	.070	.080	.037	.090	.098
Hydrogen Sulfide	.010	.019	.021	.010	.024	.026
Argon	.215	.412	.472	.270	.658	.718
Carbon Dioxide	3.356	6.426	7.364	3.837	9.358	10.210
TOTAL GAS	52.232	100.000	100.000	41.006	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.431	3.935	4.410	2.308	4.564	4.896
Methane	.694	1.123	1.258	.674	1.332	1.429
Ammonia	.084	.137	.153	.083	.165	.176
Water Vapor	6.654	10.773	.000	3.422	6.768	.000
Carbon Monoxide	3.004	4.862	5.449	3.231	6.391	6.855
Nitrogen	45.287	73.314	82.165	36.687	72.563	77.831
Ethlyene	.037	.059	.067	.037	.073	.078
Hydrogen Sulfide	.010	.016	.018	.010	.020	.021
Argon	.215	.348	.390	.270	.534	.573
Carbon Dioxide	3.356	5.434	6.090	3.837	7.590	8.141
TOTAL GAS	61.771	100.000	100.000	50.558	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	2.431	3.696	4.112	2.308	4.226	4.508
Methane	.694	1.055	1.173	.674	1.234	1.316
Ammonia	.084	.128	.143	.083	.152	.163
Water Vapor	6.654	10.117	.000	3.422	6.266	.000
Carbon Monoxide	3.004	4.567	5.081	3.231	5.917	6.313
Nitrogen	49.286	74.937	83.372	40.737	74.598	79.585
Ethlyene	.037	.056	.062	.037	.067	.072
Hydrogen Sulfide	.010	.015	.017	.010	.018	.019
Argon	.215	.327	.364	.270	.494	.527
Carbon Dioxide	3.356	5.103	5.678	3.837	7.027	7.497
TOTAL GAS	65.771	100.000	100.000	54.608	100.000	100.000

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	1.779	4.173	4.952	1.642	5.060	5.650
Methane	.619	1.451	1.726	.602	1.856	2.073
Ammonia	.109	.256	.304	.105	.324	.362
Water Vapor	6.780	15.900	.000	3.389	10.443	.000
Carbon Monoxide	1.367	3.206	3.812	1.532	4.722	5.273
Nitrogen	29.196	68.465	81.409	21.832	67.280	75.125
Ethlyene	.067	.156	.186	.067	.207	.231
Ethane	.004	.009	.011	.004	.012	.013
Hydrogen Sulfide	.016	.037	.045	.016	.050	.055
Argon	.148	.347	.413	.199	.613	.684
Carbon Dioxide	2.558	5.998	7.132	3.061	9.434	10.534
TOTAL GAS	42.643	100.000	100.000	32.449	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	1.779	3.400	3.906	1.642	3.895	4.235
Methane	.619	1.183	1.359	.602	1.429	1.554
Ammonia	.109	.209	.240	.105	.249	.271
Water Vapor	6.780	12.956	.000	3.389	8.039	.000
Carbon Monoxide	1.367	2.613	3.002	1.532	3.635	3.953
Nitrogen	38.884	74.303	85.363	31.537	74.813	81.352
Ethlyene	.067	.128	.146	.067	.160	.173
Ethane	.004	.008	.009	.004	.009	.010
Hydrogen Sulfide	.016	.031	.035	.016	.038	.042
Argon	.148	.283	.325	.199	.472	.513
Carbon Dioxide	2.558	4.888	5.615	3.061	7.262	7.897
TOTAL GAS	52.331	100.000	100.000	42.154	100.000	100.000

DEMISTER GAS COMPOSITION

	RAW			RECONCILED		
Species	Flow (mol/hr)	mole % Wet	mole % Dry	Flow (mol/hr)	mole % Wet	mole % Dry
Hydrogen	1.779	3.158	3.590	1.642	3.551	3.832
Methane	.619	1.098	1.249	.602	1.303	1.406
Ammonia	.109	.194	.220	.105	.227	.245
Water Vapor	6.780	12.034	.000	3.389	7.330	.000
Carbon Monoxide	1.367	2.427	2.759	1.532	3.315	3.577
Nitrogen	42.896	76.133	86.548	35.613	77.034	83.127
Ethlyene	.067	.118	.135	.067	.145	.157
Ethane	.004	.007	.008	.004	.008	.009
Hydrogen Sulfide	.016	.028	.032	.016	.035	.038
Argon	.148	.263	.299	.199	.430	.464
Carbon Dioxide	2.558	4.540	5.161	3.061	6.622	7.145
TOTAL GAS	56.343	100.000	100.000	46.231	100.000	100.000

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APPENDIX H

SAMPLE INPUT/OUTPUT FROM BALAID RECONCILIATION PROGRAM

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As an example, a copy of the input data file for set point TR4-2 and the output produced by the BALAID program when this data file is processed, is given in this appendix. As seen here, the program generates a tremendous amount of useful information.

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SAMPLE INPUT FOR BALAID PROGRAM

DEFAULT CONTROL PARAMETERS,

```
 IPRINT  LEVEL   MAXCYC  ITIME   DEVICE
   1,      3,     40,     0,      'A'

 EPSMAX  CUTOF1  CUTOF2  ERRMIN  TOLERN  QALITY  EXPT  SENSTV  CORRCO MAXPNT
  .2,     3.0,    1.8,    1.,     .25,    1.,     .5,   .04,    .99,  20/

TR4 - TEST POINT 2  <<CASE C>>  03/11/92  Pittsburgh Coal + Dolomite
SET POINT DATE:     3/11/92
SET POINT TIME:     04:30:00 - 08:30:00
```

DP	Mean Value	Sigma	T Sigma	P sigma	Plant Measurement		
1	155.9030	1.256E+00	1.008000E+00	7.500000E-01	Carbonizer Pressure	PSIG	PI-3007
2	152.6400	1.244E+00	9.930000E-01	7.500000E-01	Orifice Pressure	PSIG	PI-3106
3	217.4810	2.576E+00	2.464000E+00	7.500000E-01	Boiler Steam Pressure	PSIG	PI-7040
4	656.0290	1.006E+01	4.404000E+00	9.045000E+00	Total Air Feed	lb/hr	FIC-1055
5	.5330	1.829E-01	1.620000E-01	8.500000E-02	Transport N2 Feed	SCFM	FIC-1053
6	48.5630	1.230E+00	7.160000E-01	1.000000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	39.0980	9.205E-01	8.290000E-01	4.000000E-01	N2 to spray tower	SCFM	FI-4051
8	10.7080	1.804E+00	1.787000E+00	2.500000E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	4.7700	2.174E-01	1.290000E-01	1.750000E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.3520	1.492E-01	1.450000E-01	3.500000E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.8490	4.833E-02	4.400000E-02	2.000000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	600.8400	1.703E+01	8.066000E+00	1.500000E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	600.6260	1.308E+01	2.609000E+00	1.282000E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	117.9620	1.638E+00	6.590000E-01	1.500000E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	297.0000	7.4418	7.425	.5	Coal Feed rate	lb/hr	
16	90.0000	2.3049	2.25	.5	Sorbent feed rate	lb/hr	
17	.0000	.000E+00	.000000E+00	.000000E+00	Run duration	hr	
18	.0000	.000E+00	.000000E+00	.000000E+00	Initial bed density	lb/cu ft	
19	.0000	.000E+00	.000000E+00	.000000E+00	Final bed density	lb/cu ft	
20	.0000	.000E+00	.000000E+00	.000000E+00	Initial Bed Level	ft	
21	.0000	.000E+00	.000000E+00	.000000E+00	Final Bed Level	ft	
22	78.9320	2.289E+00	1.113000E+00	2.000000E+00	Air Feed Temp	deg F	TI-1059
23	214.3610	4.004E+01	3.999100E+01	2.000000E+00	Bed Drain Temp	deg F	TIC-3027
24	163.1160	1.102E+01	1.084000E+01	2.000000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	185.4590	7.619E+00	7.352000E+00	2.000000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1530.5770	6.244E+00	2.458000E+00	5.739664E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.000E+00	.000000E+00	5.500000E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.000E+00	.000000E+00	.000000E+00	unused		
29	.0000	.000E+00	.000000E+00	.000000E+00	unused		
30	.0000	.000E+00	.000000E+00	.000000E+00	unused		
31	.0000	.000E+00	.000000E+00	.000000E+00	unused		
32	.0000	.000E+00	.000000E+00	.000000E+00	unused		
33	.0000	.000E+00	.000000E+00	.000000E+00	unused		
34	.0000	.000E+00	.000000E+00	.000000E+00	unused		
35	100.0000	3.041E+01	3.000000E+01	5.000000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	6.083E+01	6.000000E+01	1.000000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1292.1770	5.915E+00	3.392000E+00	4.845664E+00	Orifice Temp (Upstream)	F	TI-3108
38	115.6260	5.136E+00	4.731000E+00	2.000000E+00	Purge N2 Temp	F	TI-7012
39	342.0250	1.003E+01	9.833000E+00	2.000000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	272.7190	5.245E+00	4.849000E+00	2.000000E+00	15 lb Steam Temperature	F	TI-3089
41	209.3490	2.002E+00	7.900000E-02	2.000000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	394.3530	2.195E+00	9.050000E-01	2.000000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.000E+00	.000000E+00	.000000E+00	unused		
44	82.1700	4.139E+00	4.108500E+00	5.000000E-01	CD Flow; carbonizer discharge	lb/hr	
45	81.3800	4.100E+00	4.069000E+00	5.000000E-01	PD Flow; primary cyclone	lb/hr	
46	4.0900	5.402E-01	2.045000E-01	5.000000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	7.7300	6.320E-01	3.865000E-01	5.000000E-01	BD Flow; bag house	lb/hr	
48	.0000	.000E+00	.000000E+00	.000000E+00	unused		
49	60.0000	1.513E+01	1.500000E+01	2.000000E+00	Ambient Temperature	F	
50	.9000	4.500E-02	.000000E+00	4.500000E-02	Orifice Coefficient	dimensionless. G SI	

DL	Mean Value	Sigma	T Sigma	P sigma	Lab Measurement	
1	71.5414	1.204E+00	1.194450E+00	1.500000E-01	Coal - C	Mass %
2	4.6757	1.306E-01	1.258112E-01	3.500000E-02	Coal - H	Mass %
3	1.9014	9.733E-02	9.406120E-02	2.500000E-02	Coal - N	Mass %
4	3.3557	.16779	.16779		Coal - S	Mass %
5	11.1786	1.638E+00	1.635290E+00	1.000000E-01	Coal - Ash	Mass %
6	2.0829	4.408E-01	4.144761E-01	1.500000E-01	Coal - H2O	Mass %
7	12775.5700	2.231E+02	2.217231E+02	2.500000E+01	Coal - HHV	BTU/lb
8	19.0400	2.271E+00	2.265760E+00	1.500000E-01	CD Drain - C	Mass %
9	.1300	4.215E-02	2.347800E-02	3.500000E-02	CD Drain - H	Mass %
10	.4300	7.433E-02	7.000400E-02	2.500000E-02	CD Drain - N	Mass %
11	9.9200	4.96	4.96		CD Drain - S	Mass %
12	93.4600	1.542E+01	1.542090E+01	2.500000E-01	CD Drain - Ash	Mass %
13	2804.0000	3.550E+02	3.541452E+02	2.500000E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.000E+00	.000000E+00	1.000000E-01	CD Drain - sfate S	Mass %
15	8.6500	8.65	8.65		CD Drain - sfide S	Mass %
16	4.2300	1.007E+00	9.953190E-01	1.500000E-01	CD Drain - crbate C	Mass %
17	11.8000	5.9	5.9		CD Drain - Ash S	Mass %
18	28.8000				CD Drain - Ash CaO	Mass %
19	23.8000				CD Drain - Ash MgO	Mass %
20	63.4633	5.847E-01	5.651574E-01	1.500000E-01	PD Drain - C	Mass %
21	.5633	3.646E-02	1.021091E-02	3.500000E-02	PD Drain - H	Mass %
22	1.6033	4.976E-02	4.302181E-02	2.500000E-02	PD Drain - N	Mass %
23	4.1600	2.08	2.08		PD Drain - S	Mass %
24	34.5567	7.482E-01	7.051708E-01	2.500000E-01	PD Drain - Ash	Mass %
25	10340.6700	9.411E+01	9.072800E+01	2.500000E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.000E+00	.000000E+00	1.000000E-01	PD Drain - sfate S	Mass %
27	1.7400	1.74	1.74		PD Drain - sfide S	Mass %
28	1.0733	1.752E-01	9.060723E-02	1.500000E-01	PD Drain - crbate C	Mass %
29	7.7833	3.89165	3.89165		PD Drain - Ash S	Mass %
30	24.2333				PD Drain - Ash CaO	Mass %
31	18.7000				PD Drain - Ash MgO	Mass %
32	58.5500	1.123E+00	1.112450E+00	1.500000E-01	CF/SD Drain - C	Mass %
33	.4900	4.667E-02	3.087000E-02	3.500000E-02	CF/SD Drain - H	Mass %
34	1.6900	9.789E-02	9.464000E-02	2.500000E-02	CF/SD Drain - N	Mass %
35	3.0400	1.52	1.52		CF/SD Drain - S	Mass %
36	35.3700	1.856E+00	1.839240E+00	2.500000E-01	CF/SD Drain - Ash	Mass %
37	9954.0000	2.006E+02	1.990800E+02	2.500000E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.000E+00	.000000E+00	1.000000E-01	CF/SD Drain - sfate S	Mass %
39	1.5400	1.54	1.54		CF/SD Drain - sfide S	Mass %
40	.8100	2.719E-01	2.268000E-01	1.500000E-01	CF/SD Drain - cabate C	Mass %
41	5.1700	2.585	2.585		CF/SD Drain - Ash S	Mass %
42	25.4000				CF/SD Drain - Ash CaO	Mass %
43	19.4000				CF/SD Drain - Ash MgO	Mass %
44	1.0000	1.520E-02	.000000E+00	1.520000E-02	Coeff.in Dulong's correlation	dimensionless
45	68.1600	1.304E+00	1.295040E+00	1.500000E-01	BD Drain - C	Mass %
46	.7700	5.982E-02	4.851000E-02	3.500000E-02	BD Drain - H	Mass %
47	2.2000	1.257E-01	1.232000E-01	2.500000E-02	BD Drain - N	Mass %
48	2.4700	1.235	1.235		BD Drain - S	Mass %
49	27.1100	1.432E+00	1.409720E+00	2.500000E-01	BD Drain - Ash	Mass %
50	10261.0000	2.067E+02	2.052200E+02	2.500000E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.000E+00	.000000E+00	1.000000E-01	BD Drain - sfate S	Mass %
52	.9400	.94	.94		BD Drain - sfide S	Mass %
53	.4000	1.872E-01	1.120000E-01	1.500000E-01	BD Drain - crbate C	Mass %
54	5.1500	2.575	2.575		BD Drain - Ash S	Mass %
55	30.4000				BD Drain - Ash CaO	Mass %
56	22.9000				BD Drain - Ash MgO	Mass %
57	75.9750	8.116E-01	2.827832E-01	7.607500E-01	Demister Gas - N2	mol,vol %
58	1.2450	1.246E-01	1.239004E-01	1.345000E-02	Demister Gas - O2	mol,vol %
59	4.3950	9.716E-02	8.613295E-02	4.494999E-02	Demister Gas - CO	mol,vol %
60	1.6950	9.626E-02	9.457140E-02	1.795000E-02	Demister Gas - CH4	mol,vol %
61	8.8075	1.756E-01	1.513704E-01	8.907500E-02	Demister Gas - CO2	mol,vol %
62	.0325	1.115E-02	1.107293E-02	1.325000E-03	Demister Gas - C2H4	mol,vol %
63	.0225	8.472E-03	8.382834E-03	1.225000E-03	Demister Gas - C2H6	mol,vol %
64	.0931	2.089E-02	2.086699E-02	9.307500E-04	Demister Gas - H2S	mol,vol %
65	5.4800	1.591E-01	1.490145E-01	5.579999E-02	Demister Gas - H2	mol,vol %
66	.3525	8.755E-02	8.575546E-02	1.762250E-02	Demister Gas - NH3	mol,vol %
67	.4500	7.588E-03	5.227928E-03	5.500000E-03	Demister Gas - Ar	mol,vol %
68					Freeboard Gas - N2	mol,vol %

69					Freeboard Gas - O2	mol,vol %
70					Freeboard Gas - CO	mol,vol %
71					Freeboard Gas - CH4	mol,vol %
72					Freeboard Gas - CO2	mol,vol %
73					Freeboard Gas - C2H4	mol,vol %
74					Freeboard Gas - C2H6	mol,vol %
75	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - H2S	mol,vol %
76					Freeboard Gas - H2	mol,vol %
77	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - NH3	mol,vol %
78					Freeboard Gas - Ar	mol,vol %
79	22.0500	1.5		1.500000E+00	Water Content in Freeboard Gas	mol,vol %
80	.0000	.000E+00	.000000E+00	.000000E+00	Demister Gas - SO2	mol,vol %
81	.0000	.000E+00	.000000E+00	.000000E+00	Freeboard Gas - SO2	mol,vol %
82	57.6000	1.345E+00	1.340281E+00	1.100000E-01	Sorbent - CaO	Mass %
83	41.4667	1.068E+00	1.055831E+00	1.600000E-01	Sorbent - MgO	Mass %
84	.8000	7.181E-02	6.324653E-02	3.400000E-02	Sorbent - SO3	Mass %
85	1.2333	1.586E-01	5.164160E-02	1.500000E-01	Sorbent - Ash	Mass %
86	.0000	.000E+00	.000000E+00	.000000E+00	Unused	
87	4.0000	.000E+00	.000000E+00	.000000E+00	Demister gas # of Analyses,	dimensionless
88	2.0000	.000E+00	.000000E+00	.000000E+00	Freeboard gas # of Analyses,	dimensionless
89	.0000	.000E+00	.000000E+00	.000000E+00	Unused	

SAMPLE OUTPUT FROM BALAID PROGRAM


```
**********************************************************
*                      BALAID1                           *
*                      -------                           *
*                                                        *
*  Statistical Data Analysis and Reconciliation Code     *
* Copyright 1993, Science Ventures Inc. (619) 292-7354   *
*   Licensed to Institute of Gas Technology, Chicago     *
*               through February 28, 1998                *
**********************************************************
```

BALAID1 calculation 03-01-94 at 13:02:42 with output written on A:BALAID1.42C
for the FW Carbonizer System

Echo Input Data Read from File "A:BALAID.IN"

Control Parameters

IPRINT	LEVEL	MAXCYC	ITIME	DEVICE					
1	3	40	0	A					
EPSMAX	CUTOF1	CUTOF2	ERRMIN	TOLERN	QALITY	EXPT	SENSTV	CORRCO	MAXPNT
2.00E-01	3.00	1.80	1.00	.25	1.00	.50	.04	.99	20

Run Title

TR4 - TEST POINT 2 <<CASE C>> 03/11/92 Pittsburgh Coal + Dolomite
SET POINT DATE: 3/11/92
SET POINT TIME: 04:30:00 - 08:30:00

Numeric Inputs

DP #	Means	Sigma	t Sigma	p Sigma	Plant Measurement		
1	155.9030	1.25600	1.008E+00	7.500E-01	Carbonizer Pressure	PSIG	PI-3007
2	152.6400	1.24400	9.930E-01	7.500E-01	Orifice Pressure	PSIG	PI-3106
3	217.4810	2.57600	2.464E+00	7.500E-01	Boiler Steam Pressure	PSIG	PI-7040
4	656.0290	10.06000	4.404E+00	9.045E+00	Total Air Feed	lb/hr	FIC-1055
5	.5330	.18290	1.620E-01	8.500E-02	Transport N2 Feed	SCFM	FIC-1053
6	48.5630	1.23000	7.160E-01	1.000E+00	Bed Drain N2 Feed	SCFM	FI-3028
7	39.0980	.92050	8.290E-01	4.000E-01	N2 to spray tower	SCFM	FI-4051
8	10.7080	1.80400	1.787E+00	2.500E-01	Feed lockhopper comp N2	SCFM	FI-7008
9	4.7700	.21740	1.290E-01	1.750E-01	Purge N2 to cyclones diplegs	SCFM	FI-7020
10	6.3520	.14920	1.450E-01	3.500E-02	Purge N2 to carbonizer	SCFM	FI-7021
11	2.8490	.04833	4.400E-02	2.000E-02	Purge N2 to cyclones	SCFM	FI-7022
12	600.8400	17.03000	8.066E+00	1.500E+01	Primary cyclone dip-leg stm	lb/hr	FIC-3072
13	600.6260	13.08000	2.609E+00	1.282E+01	Secondary cyclone dip-leg stm	lb/hr	FIC-3090
14	117.9620	1.63800	6.590E-01	1.500E+00	Steam flow to carbonizer	lb/hr	FIC-BSTM
15	297.0000	7.44180	7.425E+00	5.000E-01	Coal Feed rate	lb/hr	

16	90.0000	2.30490	2.250E+00	5.000E-01	Sorbent feed rate	lb/hr	
17	.0000	.00000	.000E+00	.000E+00	Run duration	hr	
18	.0000	.00000	.000E+00	.000E+00	Initial bed density	lb/cu ft	
19	.0000	.00000	.000E+00	.000E+00	Final bed density	lb/cu ft	
20	.0000	.00000	.000E+00	.000E+00	Initial Bed Level	ft	
21	.0000	.00000	.000E+00	.000E+00	Final Bed Level	ft	
22	78.9320	2.28900	1.113E+00	2.000E+00	Air Feed Temp	deg F	TI-1059
23	214.3610	40.04000	3.999E+01	2.000E+00	Bed Drain Temp	deg F	TIC-3027
24	163.1160	11.02000	1.084E+01	2.000E+00	Primary Cyclone Lockhopper Temp	F	TI-3070
25	185.4590	7.61900	7.352E+00	2.000E+00	Secondary Cyclone Lockhopper Temp	F	TI-3082
26	1530.5770	6.24400	2.458E+00	5.740E+00	FreedBoard Temp (at 27.5 ft)	F	TI-3003
27	.0000	.00000	.000E+00	5.500E-01	N2 to Opacity Meter	SCFM	FI-7029
28	.0000	.00000	.000E+00	.000E+00	unused		
29	.0000	.00000	.000E+00	.000E+00	unused		
30	.0000	.00000	.000E+00	.000E+00	unused		
31	.0000	.00000	.000E+00	.000E+00	unused		
32	.0000	.00000	.000E+00	.000E+00	unused		
33	.0000	.00000	.000E+00	.000E+00	unused		
34	.0000	.00000	.000E+00	.000E+00	unused		
35	100.0000	30.41000	3.000E+01	5.000E+00	Carbonizer wall heat loss	KBTU/hr	
36	200.0000	60.83000	6.000E+01	1.000E+01	Carbonizer + Cyclones heat loss	KBTU/hr	
37	1292.1770	5.91500	3.392E+00	4.846E+00	Orifice Temp (Upstream)	F	TI-3108
38	115.6260	5.13600	4.731E+00	2.000E+00	Purge N2 Temp	F	TI-7012
39	342.0250	10.03000	9.833E+00	2.000E+00	Primary Cyclone Dipleg Steam Temp	F	TI-3060
40	272.7190	5.24500	4.849E+00	2.000E+00	15 lb Steam Temperature	F	TI-3089
41	209.3490	2.00200	7.900E-02	2.000E+00	Secondary Cyclone Dipleg Steam Temp	F	TI-3096
42	394.3530	2.19500	9.050E-01	2.000E+00	Boiler Steam Temperature	F	TI-7041
43	.0000	.00000	.000E+00	.000E+00	unused		
44	82.1700	4.13900	4.109E+00	5.000E-01	CD Flow; carbonizer discharge	lb/hr	
45	81.3800	4.10000	4.069E+00	5.000E-01	PD Flow; primary cyclone	lb/hr	
46	4.0900	.54020	2.045E-01	5.000E-01	SD/CF Flow; secondary cyclone	lb/hr	
47	7.7300	.63200	3.865E-01	5.000E-01	BD Flow; bag house	lb/hr	
48	.0000	.00000	.000E+00	.000E+00	unused		
49	60.0000	15.13000	1.500E+01	2.000E+00	Ambient Temperature	F	
50	.9000	.04500	.000E+00	4.500E-02	Orifice Coefficient	dimensionless. G SI	

DL #	Means	Sigma	t Sigma	p Sigma	Lab measurement	
1	71.5414	1.20400	1.194E+00	1.500E-01	Coal - C	Mass %
2	4.6757	.13060	1.258E-01	3.500E-02	Coal - H	Mass %
3	1.9014	.09733	9.406E-02	2.500E-02	Coal - N	Mass %
4	3.3557	.16779	1.678E-01	.000E+00	Coal - S	Mass %
5	11.1786	1.63800	1.635E+00	1.000E-01	Coal - Ash	Mass %
6	2.0829	.44080	4.145E-01	1.500E-01	Coal - H2O	Mass %
7	12775.5700	223.10000	2.217E+02	2.500E+01	Coal - HHV	BTU/lb
8	19.0400	2.27100	2.266E+00	1.500E-01	CD Drain - C	Mass %
9	.1300	.04215	2.348E-02	3.500E-02	CD Drain - H	Mass %
10	.4300	.07433	7.000E-02	2.500E-02	CD Drain - N	Mass %
11	9.9200	4.96000	4.960E+00	.000E+00	CD Drain - S	Mass %
12	93.4600	15.42000	1.542E+01	2.500E-01	CD Drain - Ash	Mass %
13	2804.0000	355.00000	3.541E+02	2.500E+01	CD Drain - HHV (dry)	BTU/lb
14	.0000	.00000	.000E+00	1.000E-01	CD Drain - sfate S	Mass %
15	8.6500	8.65000	8.650E+00	.000E+00	CD Drain - sfide S	Mass %
16	4.2300	1.00700	9.953E-01	1.500E-01	CD Drain - crbate C	Mass %
17	11.8000	5.90000	5.900E+00	.000E+00	CD Drain - Ash S	Mass %
18	28.8000	.00000	.000E+00	.000E+00	CD Drain - Ash CaO	Mass %
19	23.8000	.00000	.000E+00	.000E+00	CD Drain - Ash MgO	Mass %
20	63.4633	.58470	5.652E-01	1.500E-01	PD Drain - C	Mass %
21	.5633	.03646	1.021E-02	3.500E-02	PD Drain - H	Mass %

22	1.6033	.04976	4.302E-02	2.500E-02	PD Drain - N	Mass %
23	4.1600	2.08000	2.080E+00	.000E+00	PD Drain - S	Mass %
24	34.5567	.74820	7.052E-01	2.500E-01	PD Drain - Ash	Mass %
25	10340.6700	94.11000	9.073E+01	2.500E+01	PD Drain - HHV (dry)	BTU/lb
26	.0000	.00000	.000E+00	1.000E-01	PD Drain - sfate S	Mass %
27	1.7400	1.74000	1.740E+00	.000E+00	PD Drain - sfide S	Mass %
28	1.0733	.17520	9.061E-02	1.500E-01	PD Drain - crbate C	Mass %
29	7.7833	3.89165	3.892E+00	.000E+00	PD Drain - Ash S	Mass %
30	24.2333	.00000	.000E+00	.000E+00	PD Drain - Ash CaO	Mass %
31	18.7000	.00000	.000E+00	.000E+00	PD Drain - Ash MgO	Mass %
32	58.5500	1.12300	1.112E+00	1.500E-01	CF/SD Drain - C	Mass %
33	.4900	.04667	3.087E-02	3.500E-02	CF/SD Drain - H	Mass %
34	1.6900	.09789	9.464E-02	2.500E-02	CF/SD Drain - N	Mass %
35	3.0400	1.52000	1.520E+00	.000E+00	CF/SD Drain - S	Mass %
36	35.3700	1.85600	1.839E+00	2.500E-01	CF/SD Drain - Ash	Mass %
37	9954.0000	200.60000	1.991E+02	2.500E+01	CF/SD Drain - HHV (dry)	BTU/lb
38	.0000	.00000	.000E+00	1.000E-01	CF/SD Drain - sfate S	Mass %
39	1.5400	1.54000	1.540E+00	.000E+00	CF/SD Drain - sfide S	Mass %
40	.8100	.27190	2.268E-01	1.500E-01	CF/SD Drain - cabate C	Mass %
41	5.1700	2.58500	2.585E+00	.000E+00	CF/SD Drain - Ash S	Mass %
42	25.4000	.00000	.000E+00	.000E+00	CF/SD Drain - Ash CaO	Mass %
43	19.4000	.00000	.000E+00	.000E+00	CF/SD Drain - Ash MgO	Mass %
44	1.0000	.01520	.000E+00	1.520E-02	Coeff.in Dulong's correlation	dimensionless
45	68.1600	1.30400	1.295E+00	1.500E-01	BD Drain - C	Mass %
46	.7700	.05982	4.851E-02	3.500E-02	BD Drain - H	Mass %
47	2.2000	.12570	1.232E-01	2.500E-02	BD Drain - N	Mass %
48	2.4700	1.23500	1.235E+00	.000E+00	BD Drain - S	Mass %
49	27.1100	1.43200	1.410E+00	2.500E-01	BD Drain - Ash	Mass %
50	10261.0000	206.70000	2.052E+02	2.500E+01	BD Drain - HHV (dry)	BTU/lb
51	.0000	.00000	.000E+00	1.000E-01	BD Drain - sfate S	Mass %
52	.9400	.94000	9.400E-01	.000E+00	BD Drain - sfide S	Mass %
53	.4000	.18720	1.120E-01	1.500E-01	BD Drain - crbate C	Mass %
54	5.1500	2.57500	2.575E+00	.000E+00	BD Drain - Ash S	Mass %
55	30.4000	.00000	.000E+00	.000E+00	BD Drain - Ash CaO	Mass %
56	22.9000	.00000	.000E+00	.000E+00	BD Drain - Ash MgO	Mass %
57	75.9750	.81160	2.828E-01	7.607E-01	Demister Gas - N2	mol,vol %
58	1.2450	.12460	1.239E-01	1.345E-02	Demister Gas - O2	mol,vol %
59	4.3950	.09716	8.613E-02	4.495E-02	Demister Gas - CO	mol,vol %
60	1.6950	.09626	457E-02	1.795E-02	Demister Gas - CH4	mol,vol %
61	8.8075	.17560	..514E-01	8.907E-02	Demister Gas - CO2	mol,vol %
62	.0325	.01115	1.107E-02	1.325E-03	Demister Gas - C2H4	mol,vol %
63	.0225	.00847	8.383E-03	1.225E-03	Demister Gas - C2H6	mol,vol %
64	.0931	.02089	2.087E-02	9.307E-04	Demister Gas - H2S	mol,vol %
65	5.4800	.15910	1.490E-01	5.580E-02	Demister Gas - H2	mol,vol %
66	.3525	.08755	8.576E-02	1.762E-02	Demister Gas - NH3	mol,vol %
67	.4500	.00759	5.228E-03	5.500E-03	Demister Gas - Ar	mol,vol %
68	.0000	.00000	.000E+00	.000E+00	Freeboard Gas - N2	mol,vol %
69	.0000	.00000	.000E+00	.000E+00	Freeboard Gas - O2	mol,vol %
70	.0000	.00000	.000E+00	.000E+00	Freeboard Gas - CO	mol,vol %
71	.0000	.00000	.000E+00	.000E+00	Freeboard Gas - CH4	mol,vol %
72	.0000	.00000	.000E+00	.000E+00	Freeboard Gas - CO2	mol,vol %
73	.0000	.00000	.000E+00	.000E+00	Freeboard Gas - C2H4	mol,vol %
74	.0000	.00000	.000E+00	.000E+00	Freeboard Gas - C2H6	mol,vol %
75	.0000	.00000	.000E+00	.000E+00	Freeboard Gas - H2S	mol,vol %
76	.0000	.00000	.000E+00	.000E+00	Freeboard Gas - H2	mol,vol %
77	.0000	.00000	.000E+00	.000E+00	Freeboard Gas - NH3	mol,vol %
78	.0000	.00000	.000E+00	.000E+00	Freeboard Gas - Ar	mol,vol %
79	22.0500	1.50000	.000E+00	1.500E+00	Water Content in Freeboard Gas	mol,vol %

```
80      .0000    .00000  .000E+00  .000E+00 Demister Gas - SO2              mol,vol %
81      .0000    .00000  .000E+00  .000E+00 Freeboard Gas - SO2             mol,vol %
82    57.6000   1.34500 1.340E+00 1.100E-01 Sorbent - CaO                   Mass %
83    41.4667   1.06800 1.056E+00 1.600E-01 Sorbent - MgO                   Mass %
84      .8000    .07181 6.325E-02 3.400E-02 Sorbent - SO3                   Mass %
85     1.2333    .15860 5.164E-02 1.500E-01 Sorbent - Ash                   Mass %
86      .0000    .00000  .000E+00  .000E+00 Unused
87     4.0000    .00000  .000E+00  .000E+00 Demister gas # of Analyses,  dimensionless
88     2.0000    .00000  .000E+00  .000E+00 Freeboard gas # of Analyses, dimensionless
89      .0000    .00000  .000E+00  .000E+00 Unused
--- CONVERT MESSAGE. Plant measurement  7 N2 to spray tower               SCFM
        =    39.0980 outside 2-sigma range of     21.4400±    17.3120
+++ CONVERT WARNING. Plant measurement 10 Purge N2 to carbonizer          SCFM
        =     6.3520 outside 3-sigma range of      1.8540±     .5304
+++ CONVERT WARNING.   Lab measurement  6 Coal - H2O                     Mass %
        =     2.0829 outside 3-sigma range of     16.6900±    4.0884
--- CONVERT MESSAGE.   Lab measurement 32 CF/SD Drain - C                Mass %
        =    58.5500 outside 2-sigma range of     67.3600±    8.6303
--- CONVERT MESSAGE.   Lab measurement 65 Demister Gas - H2              mol,vo
        =     5.4800 outside 2-sigma range of      7.1120±    1.3262
--- CONVERT MESSAGE.   Lab measurement 82 Sorbent - CaO                  Mass %
        =    57.6000 outside 2-sigma range of     87.4800±   21.1046

(Original freeboard gas analysis is as follows:)
68    72.2500 7.347E-01 1.280314E-01 7.235000E-01 Freeboard Gas - N2
69      .9700 1.073E-01 1.068057E-01 1.070000E-02 Freeboard Gas - O2
70     5.4350 9.897E-02 8.204345E-02 5.535000E-02 Freeboard Gas - CO
71     2.0950 1.491E-01 1.474742E-01 2.195000E-02 Freeboard Gas - CH4
72    11.0500 3.595E-01 3.418062E-01 1.115000E-01 Freeboard Gas - CO2
73      .0550 7.073E-03 6.901303E-03 1.550000E-03 Freeboard Gas - C2H4
74      .0400 6.292E-03 6.134492E-03 1.400000E-03 Freeboard Gas - C2H6
75      .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - H2S
76     6.8850 8.292E-02 4.468291E-02 6.985000E-02 Freeboard Gas - H2
77      .0000  .000E+00  .000000E+00  .000000E+00 Freeboard Gas - NH3
78      .5400 7.175E-03 3.242519E-03 6.399999E-03 Freeboard Gas - Ar


--- CHAR MESSAGE.  Sulfur remaining in fired char =11.028 percent dry basis
    exceeds raw char sulfur = 9.920 at node  4

--- CHAR MESSAGE at node  4.  composition components total 102.39%

--- CHAR MESSAGE at node  9.  composition components total  95.96%

--- CHAR MESSAGE at node 10.  composition components total  97.82%
```

	Char Properties			
	CD	PD	SD	BD
Wt percent organic matter	16.25	67.23	64.00	73.87
Organic HOF, Dulong, BTU/lb	229.	239.	240.	241.
1 Organic HHV, Dulong, BTU/lb	13738.	14216.	14266.	14385.
2 Organic HHV, measured, IGT corrections	11969.	15149.	15314.	13759.
3 Organic HHV, measured, equil. correction	9743.	14801.	14939.	13413.
HHV input selection is	IGT	IGT	IGT	IGT

```
+++ FLOWS Warning.  Heat of formation of CD char organic
                    is outside normal range at    -753.8 cal/g.
```

```
+++ FLOWS Warning.  Heat of formation of PD char organic
                   is outside normal range at     756.7 cal/g.
+++ FLOWS Warning.  Heat of formation of SD char organic
                   is outside normal range at     821.9 cal/g.
+++ FLOWS Warning.  Heat of formation of BD char organic
                   is outside normal range at    -107.3 cal/g.
```

********** Unreconciled LEVEL1 Summary Printout **********

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	78.9
2	Steam to Carbonizer	394.4
3	Coal & Sorbent Feeds	60.0
4	Carbonizer Drain	214.4
5	N2 Purges to carbonizer	115.6
6	Freeboard gas	1530.6
7	N2 Purges to cyclones	115.6
8	Primary cyclone Drain	163.1
9	Secondary cyclone Drain	185.5
10	Dusty gas to orifice	1292.2

Unreconciled Compositions of Variable Species

Index I	Species Name	Element percent by weight of species H	C	N	O	S
24	Coal organic matter	5.391	82.479	2.192	6.069	3.869
25	CD char organic	.781	89.002	2.584	.000	7.632
26	PD char organic	.841	93.152	2.394	.000	3.613
27	SD char organic	.798	94.008	2.752	.000	2.442
28	BD char organic	1.066	93.772	3.045	.000	2.117

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.676	.000	.127	.565	.511	.787
C	71.542	.000	14.464	62.627	60.169	69.270
N	1.901	.000	.420	1.609	1.761	2.249
O	5.264	.000	.000	.000	.000	.000
S	3.356	.000	1.240	2.429	1.563	1.564
Water Moisture	2.082	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	16.134	6.487	7.150	6.347
Magnesium Carbonate	.000	45.535	11.693	.000	.000	.000
Calcium Oxide	.000	.000	.000	.321	2.614	4.835
Calcium Sulfide	.000	.378	19.009	3.930	3.611	2.162
Calcium Carbonate	.000	53.439	20.544	8.978	7.034	3.407
Sorbent Inerts	.000	.647	.563	.180	.200	.180
Coal Ash	11.179	.000	15.807	12.873	15.387	9.198

COMPOSITION OF DRY AIR

	Mass %	Mole %
Nitrogen	75.518	78.073
Oxygen	23.193	20.992
Argon	1.290	.935

Unreconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	5.08	.00	.00	.00	5.08
2	Methane		.00	.00	.00	.00	.00	12.51	.00	.00	.00	12.51
3	Ammonia		.00	.00	.00	.00	.00	2.76	.00	.00	.00	2.76
4	Water Vapor		.00	117.93	.00	.00	.00	179.48	.00	.00	.00	179.48
5	Carbon Monoxide		.00	.00	.00	.00	.00	56.63	.00	.00	.00	56.63
6	Nitrogen		.00	.00	.00	.00	293.00	712.52	33.74	.00	.00	746.27
7	Air, dry		656.04	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.42	.00	.00	.00	.42
9	Ethane		.00	.00	.00	.00	.00	.31	.00	.00	.00	.31
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	1.46	.00	.00	.00	1.46
11	Argon		.00	.00	.00	.00	.00	7.25	.00	.00	.00	7.25
12	Carbon Dioxide		.00	.00	.00	.00	.00	178.31	.00	.00	.00	178.31
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	6.18	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	13.26	.00	6.06	.00	5.28	.29	.49
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	40.98	9.61	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	.74	.00	.26	.11	.37
19	Calcium Sulfide		.00	.00	.34	15.62	.00	3.51	.00	3.20	.15	.17
20	Calcium Carbonate		.00	.00	48.10	16.88	.00	7.86	.00	7.31	.29	.26
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.58	.46	.00	.17	.00	.15	.01	.01
23	Coal Ash		.00	.00	33.20	12.99	.00	11.82	.00	10.48	.63	.71
24	Coal organic matter		.00	.00	257.62	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	13.35	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	54.71	.00	54.71	.00	.00
27	SD char organic		.00	.00	.00	.00	.00	2.62	.00	.00	2.62	.00
28	BD char organic		.00	.00	.00	.00	.00	5.71	.00	.00	.00	5.71
	TOTAL GAS FLOW		656.0	117.9	.0	.0	293.0	1156.7	33.7	.0	.0	1190.5
	TOTAL MASS FLOW		656.0	117.9	387.0	82.2	293.0	1249.9	33.7	81.4	4.1	1198.2
	Gas mean molecular weights		28.962	18.015	.000	.000	28.014	25.601	28.014	.000	.000	25.664

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the Carbonizer only

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.3	656.0	.00	.0	495.4	152.2	.00	.00	8.461	.00	.00
Steam to Carbonizer	141.0	117.9	13.20	.0	.0	104.7	.00	.00	.000	.00	.00
Coal & Sorbent Feeds	3732.0	387.0	14.58	224.1	5.6	67.5	11.81	10.12	.000	19.45	33.78
N2 Purges to carbonizer	2.8	293.0	.00	.0	293.0	.0	.00	.00	.000	.00	.00
Total Inflow	3876.0	1454.0	27.78	224.1	794.1	324.4	11.81	10.12	8.461	19.45	33.78

OUTFLOWS

Carbonizer Drain	186.0	82.2	.10	15.3	.3	18.8	10.76	7.96	.000	15.44	13.45
Freeboard gas	2633.7	1249.9	29.55	142.6	716.3	327.8	3.66	5.10	7.250	5.63	11.99
Heat Loss	100.0										
Total Outflow	2919.6	1332.1	29.66	157.9	716.7	346.6	14.42	13.06	7.250	21.07	25.44
Loss	956.4	121.9	-1.88	66.2	77.4	-22.2	-2.61	-2.94	1.210	-1.62	8.35
Percent Loss	24.7	8.4	-6.8	29.5	9.7	-6.8	-22.1	-29.0	14.3	-8.3	24.7
Closure (out/in) %	75.3	91.6	106.8	70.5	90.3	106.8	122.1	129.0	85.7	108.3	75.3

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

********** Unreconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.3	656.0	.00	.0	495.4	152.2	.00	.00	8.461	.00	.00
Steam to Carbonizer	141.0	117.9	13.20	.0	.0	104.7	.00	.00	.300	.00	.00
Coal & Sorbent Feeds	3732.0	387.0	14.58	224.1	5.6	67.5	11.81	10.12	.300	19.45	33.78
N2 Purges to carbonizer	2.8	293.0	.00	.0	293.0	.0	.00	.00	.000	.00	.00
N2 Purges to cyclones	.3	33.7	.00	.0	33.7	.0	.00	.00	.300	.00	.00
Total Inflow	3876.4	1487.7	27.78	224.1	827.8	324.4	11.81	10.12	8.461	19.45	33.78

OUTFLOWS

Carbonizer Drain	186.0	82.2	.10	15.3	.3	18.8	10.76	7.96	.300	15.44	13.45
Primary cyclone Drain	833.4	81.4	.46	51.8	1.3	5.7	3.18	3.40	.300	4.89	10.62
Secondary cyclone Drain	40.4	4.1	.02	2.5	.1	.3	.18	.13	.300	.27	.64
Dusty gas to orifice	1634.5	1198.2	29.07	88.3	748.7	321.8	.30	1.57	7.250	.47	.72
Heat Loss	200.0										
Total Outflow	2894.2	1365.9	29.66	157.9	750.4	346.6	14.42	13.06	7.250	21.07	25.44
Loss	982.1	121.9	-1.88	66.2	77.4	-22.2	-2.61	-2.94	1.210	-1.62	8.35
Percent Loss	25.3	8.2	-6.8	29.5	9.3	-6.8	-22.1	-29.0	14.3	-8.3	24.7
Closure (out/in) %	74.7	91.8	106.8	70.5	90.7	106.8	122.1	129.0	85.7	108.3	75.3

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

********** Unreconciled LEVEL2 Detailed Mass and Energy Balances **********

Mass and Element Balances by Species and Node for the Carbonizer only

INFLOWS	Total	Element Distribution								
	Mass	H	C	N	O	Mg	S	Ar	Ca	Ash
Node	----	---	---	---	---	---	---	---	---	---
1 Feed Air										
Air, dry	656.0	.00	.0	495.4	152.2	.00	.00	8.461	.00	.00
2 Steam to Carbonizer										
Water Vapor	117.9	13.20	.0	.0	104.7	.00	.00	.000	.00	.00
3 Coal & Sorbent Feeds										
Water Moisture	6.2	.69	.0	.0	5.5	.00	.00	.000	.00	.00
Magnesium Carbonate	41.0	.00	5.8	.0	23.3	11.81	.00	.000	.00	.00
Calcium Sulfide	.3	.00	.0	.0	.0	.00	.15	.000	.19	.00
Calcium Carbonate	48.1	.00	5.8	.0	23.1	.00	.00	.000	19.26	.00
Sorbent Inerts	.6	.00	.0	.0	.0	.00	.00	.000	.00	.58
Coal Ash	33.2	.00	.0	.0	.0	.00	.00	.000	.00	33.20
Coal organic matter	257.6	13.89	212.5	5.6	15.6	.00	9.97	.000	.00	.00
5 N2 Purges to carbonizer										
Nitrogen	293.0	.00	.0	293.0	.0	.00	.00	.000	.00	.00
Total Inflow	1454.0	27.78	224.1	794.1	324.4	11.81	10.12	8.461	19.45	33.78
OUTFLOWS										
4 Carbonizer Drain										
Magnesium Oxide	13.3	.00	.0	.0	5.3	7.99	.00	.000	.00	.00
Magnesium Carbonate	9.6	.00	1.4	.0	5.5	2.77	.00	.000	.00	.00
Calcium Sulfide	15.6	.00	.0	.0	.0	.00	6.94	.000	8.68	.00
Calcium Carbonate	16.9	.00	2.0	.0	8.1	.00	.00	.000	6.76	.00
Sorbent Inerts	.5	.00	.0	.0	.0	.00	.00	.000	.00	.46
Coal Ash	13.0	.00	.0	.0	.0	.00	.00	.000	.00	12.99
CD char organic	13.4	.10	11.9	.3	.0	.00	1.02	.000	.00	.00
6 Freeboard gas										
Hydrogen	5.1	5.08	.0	.0	.0	.00	.00	.000	.00	.00
Methane	12.5	3.14	9.4	.0	.0	.00	.00	.000	.00	.00
Ammonia	2.8	.49	.0	2.3	.0	.00	.00	.000	.00	.00
Water Vapor	179.5	20.09	.0	.0	159.4	.00	.00	.000	.00	.00
Carbon Monoxide	56.6	.00	24.3	.0	32.3	.00	.00	.000	.00	.00
Nitrogen	712.5	.00	.0	712.5	.0	.00	.00	.000	.00	.00
Ethlyene	.4	.06	.4	.0	.0	.00	.00	.000	.00	.00
Ethane	.3	.06	.2	.0	.0	.00	.00	.000	.00	.00
Hydrogen Sulfide	1.5	.09	.0	.0	.0	.00	1.37	.000	.00	.00
Argon	7.3	.00	.0	.0	.0	.00	.00	7.250	.00	.00
Carbon Dioxide	178.3	.00	48.7	.0	129.6	.00	.00	.000	.00	.00
Magnesium Oxide	6.1	.00	.0	.0	2.4	3.66	.00	.000	.00	.00
Calcium Oxide	.7	.00	.0	.0	.2	.00	.00	.000	.53	.00
Calcium Sulfide	3.5	.00	.0	.0	.0	.00	1.56	.000	1.95	.00
Calcium Carbonate	7.9	.00	.9	.0	3.8	.00	.00	.000	3.15	.00
Sorbent Inerts	.2	.00	.0	.0	.0	.00	.00	.000	.00	.17
Coal Ash	11.8	.00	.0	.0	.0	.00	.00	.000	.00	11.82
PD char organic	54.7	.46	51.0	1.3	.0	.00	1.98	.000	.00	.00
SD char organic	2.6	.02	2.5	.1	.0	.00	.06	.000	.00	.00
BD char organic	5.7	.06	5.4	.2	.0	.00	.12	.000	.00	.00
Total Outflow	1332.1	29.66	157.9	716.7	346.6	14.42	13.06	7.250	21.07	25.44

Loss	121.9	-1.88	66.2	77.4	-22.2	-2.61	-2.94	1.210	-1.62	8.35
Percent Loss	8.4	-6.8	29.5	9.7	-6.8	-22.1	-29.0	14.3	-8.3	24.7

Mass units are Pounds per hour

********** Unreconciled LEVEL2 Detailed Mass and Energy Balances **********

Detailed Energy Balance by Species and Node for the Carbonizer only

INFLOWS	Percent Heat	Total Heat	Sensible Heat	Heat of Combustion	Latent Heat
Node	----	----	----	----------	----
1 Feed Air					
Air, dry	.01	.3	.3	.0	.0
2 Steam to Carbonizer					
Water Vapor	3.64	141.0	17.0	.0	124.0
3 Coal & Sorbent Feeds					
Water Moisture	.00	-.1	-.1	.0	.0
Magnesium Carbonate	-.64	-24.9	-.1	-24.7	.0
Calcium Sulfide	.02	.9	.0	.9	.0
Calcium Carbonate	-.96	-37.1	-.2	-37.0	.0
Sorbent Inerts	.00	.0	.0	.0	.0
Coal Ash	.00	-.1	-.1	.0	.0
Coal organic matter	97.86	3793.3	-1.2	3794.4	.0
5 N2 Purges to carbonizer					
Nitrogen	.07	2.8	2.8	.0	.0
Total Inflow	100.00	3876.0	18.4	3733.6	124.0
OUTFLOWS					
4 Carbonizer Drain					
Magnesium Oxide	.01	.4	.4	.0	.0
Magnesium Carbonate	-.14	-5.5	.3	-5.8	.0
Calcium Sulfide	1.11	42.9	.3	42.6	.0
Calcium Carbonate	-.32	-12.5	.5	-13.0	.0
Sorbent Inerts	.00	.0	.0	.0	.0
Coal Ash	.01	.4	.4	.0	.0
CD char organic	4.13	160.2	.4	159.8	.0
6 Freeboard gas					
Hydrogen	8.67	335.9	25.9	310.0	.0
Methane	8.11	314.2	15.6	298.7	.0
Ammonia	.76	29.4	2.7	26.7	.0
Water Vapor	8.24	319.4	130.8	.0	188.7
Carbon Monoxide	6.92	268.1	21.9	246.2	.0
Nitrogen	7.04	273.0	273.0	.0	.0
Ethlyene	.24	9.5	.4	9.1	.0
Ethane	.19	7.3	.3	6.9	.0
Hydrogen Sulfide	.28	11.0	.6	10.4	.0
Argon	.07	2.8	2.8	.0	.0
Carbon Dioxide	1.76	68.3	68.3	.0	.0
Magnesium Oxide	.06	2.5	2.5	.0	.0
Calcium Oxide	.01	.2	.2	.0	.0
Calcium Sulfide	.27	10.5	.9	9.6	.0
Calcium Carbonate	-.08	-3.0	3.1	-6.0	.0
Sorbent Inerts	.00	.1	.1	.0	.0
Coal Ash	.11	4.3	4.3	.0	.0
PD char organic	22.12	857.3	28.4	828.9	.0
SD char organic	1.07	41.4	1.4	40.1	.0
BD char organic	2.10	81.5	3.0	78.6	.0

Heat Transfer	2.58	100.0	100.0		
Total Outflow	75.33	2919.6	688.4	2042.6	188.7
Loss	24.67	956.4	-670.0	1691.0	-64.7

Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins.

********** Unreconciled LEVEL2 Detailed Mass and Energy Balances **********

Mass and Element Balances by Species and Node for the FW Carbonizer System

INFLOWS	Total	Element Distribution								
	Mass	H	C	N	O	Mg	S	Ar	Ca	Ash
Node	----	---	---	---	---	---	---	---	---	---
1 Feed Air										
Air, dry	656.0	.00	.0	495.4	152.2	.00	.00	8.461	.00	.00
2 Steam to Carbonizer										
Water Vapor	117.9	13.20	.0	.0	104.7	.00	.00	.000	.00	.00
3 Coal & Sorbent Feeds										
Water Moisture	6.2	.69	.0	.0	5.5	.00	.00	.000	.00	.00
Magnesium Carbonate	41.0	.00	5.8	.0	23.3	11.81	.00	.000	.00	.00
Calcium Sulfide	.3	.00	.0	.0	.0	.00	.15	.000	.19	.00
Calcium Carbonate	48.1	.00	5.8	.0	23.1	.00	.00	.000	19.26	.00
Sorbent Inerts	.6	.00	.0	.0	.0	.00	.00	.000	.00	.58
Coal Ash	33.2	.00	.0	.0	.0	.00	.00	.000	.00	33.20
Coal organic matter	257.6	13.89	212.5	5.6	15.6	.00	9.97	.000	.00	.00
5 N2 Purges to carbonizer										
Nitrogen	293.0	.00	.0	293.0	.0	.00	.00	.000	.00	.00
7 N2 Purges to cyclones										
Nitrogen	33.7	.00	.0	33.7	.0	.00	.00	.000	.00	.00
Total Inflow	1487.7	27.78	224.1	827.8	324.4	11.81	10.12	8.461	19.45	33.78
OUTFLOWS										
4 Carbonizer Drain										
Magnesium Oxide	13.3	.00	.0	.0	5.3	7.99	.00	.000	.00	.00
Magnesium Carbonate	9.6	.00	1.4	.0	5.5	2.77	.00	.000	.00	.00
Calcium Sulfide	15.6	.00	.0	.0	.0	.00	6.94	.000	8.68	.00
Calcium Carbonate	16.9	.00	2.0	.0	8.1	.00	.00	.000	6.76	.00
Sorbent Inerts	.5	.00	.0	.0	.0	.00	.00	.000	.00	.46
Coal Ash	13.0	.00	.0	.0	.0	.00	.00	.000	.00	12.99
CD char organic	13.4	.10	11.9	.3	.0	.00	1.02	.000	.00	.00
8 Primary cyclone Drain										
Magnesium Oxide	5.3	.00	.0	.0	2.1	3.18	.00	.000	.00	.00
Calcium Oxide	.3	.00	.0	.0	.1	.00	.00	.000	.19	.00
Calcium Sulfide	3.2	.00	.0	.0	.0	.00	1.42	.000	1.78	.00
Calcium Carbonate	7.3	.00	.9	.0	3.5	.00	.00	.000	2.93	.00
Sorbent Inerts	.1	.00	.0	.0	.0	.00	.00	.000	.00	.15
Coal Ash	10.5	.00	.0	.0	.0	.00	.00	.000	.00	10.48
PD char organic	54.7	.46	51.0	1.3	.0	.00	1.98	.000	.00	.00
9 Secondary cyclone Drain										
Magnesium Oxide	.3	.00	.0	.0	.1	.18	.00	.000	00	.00
Calcium Oxide	.1	.00	.0	.0	.0	.00	.00	.000	.08	.00
Calcium Sulfide	.1	.00	.0	.0	.0	.00	.07	.000	.08	.00
Calcium Carbonate	.3	.00	.0	.0	.1	.00	.00	.000	.12	.00
Sorbent Inerts	.0	.00	.0	.0	.0	.00	.00	.000	.00	.01
Coal Ash	.6	.00	.0	.0	.0	.00	.00	.000	.00	.63
SD char organic	2.6	.02	2.5	.1	.0	.00	.06	.000	.00	.00
10 Dusty gas to orifice										
Hydrogen	5.1	5.08	.0	.0	.0	.00	.00	.000	.00	.00
Methane	12.5	3.14	9.4	.0	.0	.00	.00	.000	.00	.00
Ammonia	2.8	.49	.0	2.3	.0	.00	.00	.000	.00	.00

Water Vapor	179.5	20.09	.0	.0	159.4	.00	.00	.000	.00	.00
Carbon Monoxide	56.6	.00	24.3	.0	32.3	.00	.00	.000	.00	.00
Nitrogen	746.3	.00	.0	746.3	.0	.00	.00	.000	.00	.00
Ethlyene	.4	.06	.4	.0	.0	.00	.00	.000	.00	.00
Ethane	.3	.06	.2	.0	.0	.00	.00	.000	.00	.00
Hydrogen Sulfide	1.5	.09	.0	.0	.0	.00	1.37	.000	.00	.00
Argon	7.3	.00	.0	.0	.0	.00	.00	7.250	.00	.00
Carbon Dioxide	178.3	.00	48.7	.0	129.6	.00	.00	.000	.00	.00
Magnesium Oxide	.5	.00	.0	.0	.2	.30	.00	.000	.00	.00
Calcium Oxide	.4	.00	.0	.0	.1	.00	.00	.000	.27	.00
Calcium Sulfide	.2	.00	.0	.0	.0	.00	.07	.000	.09	.00
Calcium Carbonate	.3	.00	.0	.0	.1	.00	.00	.000	.11	.00
Sorbent Inerts	.0	.00	.0	.0	.0	.00	.00	.000	.00	.01
Coal Ash	.7	.00	.0	.0	.0	.00	.00	.000	.00	.71
BD char organic	5.7	.06	5.4	.2	.0	.00	.12	.000	.00	.00
Total Outflow	1365.9	29.66	157.9	750.4	346.6	14.42	13.06	7.250	21.07	25.44
Loss	121.9	-1.88	66.2	77.4	-22.2	-2.61	-2.94	1.210	-1.62	8.35
Percent Loss	8.2	-6.8	29.5	9.3	-6.8	-22.1	-29.0	14.3	-8.3	24.7

Mass units are Pounds per hour

********** Unreconciled LEVEL2 Detailed Mass and Energy Balances **********

Detailed Energy Balance by Species and Node for the FW Carbonizer System

INFLOWS Node	Percent Heat	Total Heat	Sensible Heat	Heat of Combustion	Latent Heat
1 Feed Air					
Air, dry	.01	.3	.3	.0	.0
2 Steam to Carbonizer					
Water Vapor	3.64	141.0	17.0	.0	124.0
3 Coal & Sorbent Feeds					
Water Moisture	.00	-.1	-.1	.0	.0
Magnesium Carbonate	-.64	-24.9	-.1	-24.7	.0
Calcium Sulfide	.02	.9	.0	.9	.0
Calcium Carbonate	-.96	-37.1	-.2	-37.0	.0
Sorbent Inerts	.00	.0	.0	.0	.0
Coal Ash	.00	-.1	-.1	.0	.0
Coal organic matter	97.86	3793.3	-1.2	3794.4	.0
5 N2 Purges to carbonizer					
Nitrogen	.07	2.8	2.8	.0	.0
7 N2 Purges to cyclones					
Nitrogen	.01	.3	.3	.0	.0
Total Inflow	100.00	3876.4	18.8	3733.6	124.0
OUTFLOWS					
4 Carbonizer Drain					
Magnesium Oxide	.01	.4	.4	.0	.0
Magnesium Carbonate	-.14	-5.5	.3	-5.8	.0
Calcium Sulfide	1.11	42.9	.3	42.6	.0
Calcium Carbonate	-.32	-12.5	.5	-13.0	.0
Sorbent Inerts	.00	.0	.0	.0	.0
Coal Ash	.01	.4	.4	.0	.0
CD char organic	4.13	160.2	.4	159.8	.0
8 Primary cyclone Drain					
Magnesium Oxide	.00	.1	.1	.0	.0
Calcium Oxide	.00	.0	.0	.0	.0
Calcium Sulfide	.23	8.8	.0	8.7	.0
Calcium Carbonate	-.14	-5.5	.1	-5.6	.0
Sorbent Inerts	.00	.0	.0	.0	.0
Coal Ash	.00	.2	.2	.0	.0
PD char organic	21.41	829.8	1.0	828.9	.0
9 Secondary cyclone Drain					
Magnesium Oxide	.00	.0	.0	.0	.0
Calcium Oxide	.00	.0	.0	.0	.0
Calcium Sulfide	.01	.4	.0	.4	.0
Calcium Carbonate	-.01	-.2	.0	-.2	.0
Sorbent Inerts	.00	.0	.0	.0	.0
Coal Ash	.00	.0	.0	.0	.0
SD char organic	1.04	40.1	.1	40.1	.0
10 Dusty gas to orifice					
Hydrogen	8.55	331.5	21.5	310.0	.0
Methane	8.02	310.9	12.3	298.7	.0

Ammonia	.75	28.9	2.2	26.7	.0
Water Vapor	7.63	295.8	107.1	.0	188.7
Carbon Monoxide	6.82	264.2	18.1	246.2	.0
Nitrogen	6.09	235.9	235.9	.0	.0
Ethlyene	.24	9.4	.3	9.1	.0
Ethane	.19	7.2	.3	6.9	.0
Hydrogen Sulfide	.28	10.9	.5	10.4	.0
Argon	.06	2.3	2.3	.0	.0
Carbon Dioxide	1.44	55.7	55.7	.0	.0
Magnesium Oxide	.00	.2	.2	.0	.0
Calcium Oxide	.00	.1	.1	.0	.0
Calcium Sulfide	.01	.5	.0	.5	.0
Calcium Carbonate	.00	-.1	.1	-.2	.0
Sorbent Inerts	.00	.0	.0	.0	.0
Coal Ash	.01	.2	.2	.0	.0
BD char organic	2.09	80.9	2.4	78.6	.0
Heat Transfer	5.16	200.0	200.0		
Total Outflow	74.66	2894.2	663.0	2042.6	188.7
Loss	25.34	982.1	-644.2	1691.0	-64.7

Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins.

Unreconciled Compositions of Variable Species

Index I	Species Name	Element moles per unit mass of species H	C	N	O	S
24	Coal organic matter	.05348	.06867	.00157	.00379	.00121
25	CD char organic	.00775	.07410	.00184	.00000	.00238
26	PD char organic	.00834	.07756	.00171	.00000	.00113
27	SD char organic	.00791	.07827	.00196	.00000	.00076
28	BD char organic	.01057	.07807	.00217	.00000	.00066

Species Thermodynamic Properties

Index I	Species Name	Heat of Formation Kcal/m	KBTU/lb	Heat of Combustion Kcal/m	KBTU/lb	Latent Heat Kcal/m	KBTU/lb
1	Hydrogen	.00	.00	68.32	61.00	.000	.000
2	Methane	-17.89	-2.01	212.80	23.88	.000	.000
3	Ammonia	-10.96	-1.16	91.52	9.67	.000	.000
4	Water Vapor	-57.80	-5.77	.00	.00	10.520	1.051
5	Carbon Monoxide	-26.42	-1.70	67.64	4.35	.000	.000
6	Nitrogen	.00	.00	.00	.00	.000	.000
7	Air, dry	.00	.00	.00	.00	.000	.000
8	Ethlyene	12.49	.80	337.23	21.64	.000	.000
9	Ethane	-20.24	-1.21	372.82	22.32	.000	.000
10	Hydrogen Sulfide	-4.78	-.25	134.49	7.10	.000	.000
11	Argon	.00	.00	.00	.00	.000	.000
12	Carbon Dioxide	-94.05	-3.85	.00	.00	.000	.000
13	Sulfur Dioxide	-70.95	-1.99	.00	.00	.000	.000
14	Water Moisture	-68.32	-6.83	.00	.00	.000	.000
15	Magnesium Oxide	-143.70	-6.42	.00	.00	.000	.000
16	Magnesium Sulfide	-82.59	-2.64	132.05	4.22	.000	.000
17	Magnesium Carbonate	-266.02	-5.68	-28.27	-.60	.000	.000
18	Calcium Oxide	-151.79	-4.87	.00	.00	.000	.000
19	Calcium Sulfide	-113.51	-2.83	109.23	2.73	.000	.000
20	Calcium Carbonate	-288.57	-5.19	-42.73	-.77	.000	.000
21	Calcium Sulfate	-342.77	-4.53	-120.03	-1.59	.000	.000
22	Sorbent Inerts	.00	.00	.00	.00	.000	.000
23	Coal Ash	.00	.00	.00	.00	.000	.000
24	Coal organic matter	-.19	-.34	8.18	14.73	.000	.000
25	CD char organic	-.75	-1.36	6.65	11.97	.000	.000
26	PD char organic	.76	1.36	8.42	15.15	.000	.000
27	SD char organic	.82	1.48	8.51	15.31	.000	.000
28	BD char organic	-.11	-.19	7.64	13.76	.000	.000

********** Unreconciled LEVEL3 Miscellaneous Outputs **********

Species Flows, Sensible Heats and Heat Capacities

Node	Formula Weight	Flow	Sensible Heat Cal/m	Sensible Heat BTU/lb	Heat Capacity Cal/m/K
1 Feed Air					
Air, dry	28.962	656.0	7.	.5	6.940
2 Steam to Carbonizer					
Water Vapor	18.015	117.9	1442.	144.1	8.374
3 Coal & Sorbent Feeds					
Water Moisture	18.015	6.2	-170.	-17.0	17.997
Magnesium Carbonate	84.313	41.0	-168.	-3.6	17.613
Calcium Sulfide	72.140	.3	-107.	-2.7	11.297
Calcium Carbonate	100.088	48.1	-182.	-3.3	19.054
Sorbent Inerts	1.000	.6	-2.	-3.0	.175
Coal Ash	1.000	33.2	-2.	-3.2	.189
Coal organic matter	1.000	257.6	-2.	-4.5	.259
4 Carbonizer Drain					
Magnesium Oxide	40.304	13.3	726.	32.4	10.038
Magnesium Carbonate	84.313	9.6	1491.	31.8	20.821
Calcium Sulfide	72.140	15.6	876.	21.9	11.623
Calcium Carbonate	100.088	16.9	1617.	29.1	22.521
Sorbent Inerts	1.000	.5	15.	26.5	.205
Coal Ash	1.000	13.0	15.	27.6	.209
CD char organic	1.000	13.4	16.	29.5	.238
5 N2 Purges to carbonizer					
Nitrogen	28.014	293.0	149.	9.6	6.951
6 Freeboard gas					
Hydrogen	2.016	5.1	5705.	5094.1	7.307
Methane	16.043	12.5	11090.	1244.3	18.294
Ammonia	17.031	2.8	9263.	979.0	14.034
Water Vapor	18.015	179.5	7291.	728.5	10.124
Carbon Monoxide	28.010	56.6	6026.	387.2	8.074
Nitrogen	28.014	712.5	5962.	383.1	7.959
Ethlyene	28.054	.4	14538.	932.8	23.397
Ethane	30.070	.3	18603.	1113.6	30.465
Hydrogen Sulfide	34.076	1.5	7884.	416.4	11.331
Argon	39.948	7.3	8510.	383.5	11.361
Carbon Dioxide	44.009	178.3	9367.	383.1	13.260
Magnesium Oxide	40.304	6.1	9210.	411.3	12.314
Calcium Oxide	56.079	.7	9783.	314.0	12.918
Calcium Sulfide	72.140	3.5	10391.	259.3	14.402
Calcium Carbonate	100.088	7.9	21624.	388.9	30.267
Sorbent Inerts	1.000	.2	202.	363.2	.281
Coal Ash	1.000	11.8	201.	362.3	.274
PD char organic	1.000	54.7	289.	519.7	.449
SD char organic	1.000	2.6	289.	519.7	.449
BD char organic	1.000	5.7	289.	519.7	.449

7 N2 Purges to cyclones					
Nitrogen	28.014	33.7	149.	9.6	6.951
8 Primary cyclone Drain					
Magnesium Oxide	40.304	5.3	445.	19.9	9.683
Calcium Oxide	56.079	.3	507.	16.3	10.847
Calcium Sulfide	72.140	3.2	547.	13.6	11.515
Calcium Carbonate	100.088	7.3	988.	17.8	21.614
Sorbent Inerts	1.000	.1	9.	16.2	.196
Coal Ash	1.000	10.5	9.	17.0	.203
PD char organic	1.000	54.7	10.	17.7	.221
9 Secondary cyclone Drain					
Magnesium Oxide	40.304	.3	566.	25.3	9.848
Calcium Oxide	56.079	.1	642.	20.6	10.955
Calcium Sulfide	72.140	.1	690.	17.2	11.562
Calcium Carbonate	100.088	.3	1259.	22.6	22.031
Sorbent Inerts	1.000	.0	11.	20.6	.200
Coal Ash	1.000	.6	12.	21.6	.206
SD char organic	1.000	2.6	13.	22.8	.229
10 Dusty gas to orifice					
Hydrogen	2.016	5.1	4746.	4237.3	7.186
Methane	16.043	12.5	8741.	980.7	17.154
Ammonia	17.031	2.8	7448.	787.2	13.364
Water Vapor	18.015	179.5	5972.	596.7	9.789
Carbon Monoxide	28.010	56.6	4968.	319.3	7.891
Nitrogen	28.014	746.3	4920.	316.2	7.771
Ethlyene	28.054	.4	11516.	738.9	22.195
Ethane	30.070	.3	14668.	878.0	28.899
Hydrogen Sulfide	34.076	1.5	6412.	338.7	10.883
Argon	39.948	7.3	7023.	316.5	11.092
Carbon Dioxide	44.009	178.3	7633.	312.2	12.908
Magnesium Oxide	40.304	.5	7590.	339.0	12.149
Calcium Oxide	56.079	.4	8084.	259.5	12.736
Calcium Sulfide	72.140	.2	8517.	212.5	13.898
Calcium Carbonate	100.088	.3	17670.	317.8	29.425
Sorbent Inerts	1.000	.0	165.	296.8	.276
Coal Ash	1.000	.7	165.	297.1	.272
BD char organic	1.000	5.7	230.	414.3	.434

Heat capacity units of cal/gram-mole/deg C are the same as BTU/lb-mole/deg F.
Mass units are Pounds per hour

Confidence Levels for the Balances

A mass, element or energy balance is considered significant for purposes of measurement error diagnosis and printing if its normalized variance does not exceed tolerance TOLERN = .25 The variances are tabulated for each reactor index, L

Index M	Balance	L= 1	2
1	Hydrogen	.534	.004
2	Carbon	.161	.006
3	Nitrogen	.890	.003
4	Oxygen	.386	.004

5	Magnes.	.495	.477
6	Sulfur	.463	.417
7	Argon	.852	.002
8	Calcium	.330	.304
9	Ash	.380	.316
10	Heat	.109	.005

General Variables for Reconciliation

(All nonzero values are tabulated of species flows, node temperatures and variable species compositions, showing indices, least square weights and the ratio of each standard deviation to its mean.)

F(I,J) represents molar flow of species I at node J in gram moles/sec.
T(J) represents temperature at node J in Kelvins.
S(I,M) moles of element M in unit weight of variable species I.
S(I,NM) is species energy content at the reference temp.
WF, WT & WS are least square weights applied to F, T and S respectively.
RATIO represents standard error relative to the mean value. RATIO = 1.0000 indicates an unmeasured variable with tentative value.
IG is the variable index used internally in BALAID3.

Flow of species I at node J (gram moles per second)

IG	I	J		F(I,J)	WF(I,J)	RATIO
		1	Feed Air			
7	7	1	Air, dry	2.85408E+00	5.22056E+02	.0153
		2	Steam to Carbonizer			
33	4	2	Water Vapor	8.24818E-01	7.62326E+03	.0139
		3	Coal & Sorbent Feeds			
72	14	3	Water Moisture	4.32554E-02	1.17399E+04	.2134
75	17	3	Magnesium Carbonate	6.12442E-02	2.22990E+05	.0346
77	19	3	Calcium Sulfide	5.94846E-04	3.09507E+08	.0956
78	20	3	Calcium Carbonate	6.05466E-02	2.63324E+05	.0322
80	22	3	Sorbent Inerts	7.34146E-02	1.05353E+04	.1327
81	23	3	Coal Ash	4.18326E+00	2.57287E+00	.1490
82	24	3	Coal organic matter	3.24593E+01	8.46193E-01	.0335
		4	Carbonizer Drain			
102	15	4	Magnesium Oxide	4.14449E-02	5.82181E+02	1.0000
104	17	4	Magnesium Carbonate	1.43591E-02	4.85002E+03	1.0000
106	19	4	Calcium Sulfide	2.72812E-02	1.34361E+03	1.0000
107	20	4	Calcium Carbonate	2.12509E-02	2.21435E+03	1.0000
109	22	4	Sorbent Inerts	5.82741E-02	2.94475E+02	1.0000
110	23	4	Coal Ash	1.63653E+00	3.73381E-01	1.0000
112	25	4	CD char organic	1.68254E+00	1.02987E+00	.5857
		5	N2 Purges to carbonizer			
122	6	5	Nitrogen	1.31783E+00	5.22518E+02	.0332
		6	Freeboard gas			
146	1	6	Hydrogen	3.17640E-01	9.91127E+00	1.0000
147	2	6	Methane	9.82482E-02	1.03598E+02	1.0000
148	3	6	Ammonia	2.04321E-02	2.39537E+03	1.0000
149	4	6	Water Vapor	1.25531E+00	6.34592E-01	1.0000
150	5	6	Carbon Monoxide	2.54750E-01	1.54089E+01	1.0000
151	6	6	Nitrogen	3.20469E+00	9.73708E-02	1.0000
153	8	6	Ethlyene	1.88381E-03	2.81789E+05	1.0000
154	9	6	Ethane	1.30418E-03	5.87930E+05	1.0000
155	10	6	Hydrogen Sulfide	5.39640E-03	3.43393E+04	1.0000
156	11	6	Argon	2.28679E-02	1.91226E+03	1.0000

157	12	6	Carbon Dioxide	5.10514E-01	3.83694E+00	1.0000
160	15	6	Magnesium Oxide	1.89509E-02	2.78445E+03	1.0000
163	18	6	Calcium Oxide	1.66624E-03	3.60183E+05	1.0000
164	19	6	Calcium Sulfide	6.13616E-03	2.65587E+04	1.0000
165	20	6	Calcium Carbonate	9.89142E-03	1.02207E+04	1.0000
167	22	6	Sorbent Inerts	2.12456E-02	2.21546E+03	1.0000
168	23	6	Coal Ash	1.48891E+00	4.51088E-01	1.0000
171	26	6	PD char organic	6.89381E+00	2.10417E-02	1.0000
172	27	6	SD char organic	3.29837E-01	9.19181E+00	1.0000
173	28	6	BD char organic	7.19481E-01	1.93179E+00	1.0000
174	29	6	Heat Loss via Conduction	6.99988E+03	2.20692E-07	.3041
		7	N2 Purges to cyclones			
180	6	7	Nitrogen	1.51770E-01	5.08104E+04	.0292
		8	Primary cyclone Drain			
218	15	8	Magnesium Oxide	1.65030E-02	3.67178E+03	1.0000
221	18	8	Calcium Oxide	5.86296E-04	2.90915E+06	1.0000
222	19	8	Calcium Sulfide	5.58627E-03	3.20447E+04	1.0000
223	20	8	Calcium Carbonate	9.19767E-03	4.02121E+05	.1715
225	22	8	Sorbent Inerts	1.84556E-02	2.93593E+03	1.0000
226	23	8	Coal Ash	1.32003E+00	7.61004E-01	.8684
229	26	8	PD char organic	6.89381E+00	5.04076E+00	.0646
		9	Secondary cyclone Drain			
247	15	9	Magnesium Oxide	9.14278E-04	1.19631E+06	1.0000
250	18	9	Calcium Oxide	2.40204E-04	1.73317E+07	1.0000
251	19	9	Calcium Sulfide	2.57957E-04	1.50282E+07	1.0000
252	20	9	Calcium Carbonate	3.62156E-04	6.03118E+07	.3556
254	22	9	Sorbent Inerts	1.03301E-03	9.37111E+05	1.0000
255	23	9	Coal Ash	7.92941E-02	2.49081E+02	.7991
259	27	9	SD char organic	3.29837E-01	4.87575E+02	.1373
		10	Dusty gas to orifice			
262	1	10	Hydrogen	3.17640E-01	3.31339E+03	.0547
263	2	10	Methane	9.82482E-02	1.92793E+04	.0733
264	3	10	Ammonia	2.04321E-02	3.75241E+04	.2527
265	4	10	Water Vapor	1.25531E+00	8.66381E+01	.0856
266	5	10	Carbon Monoxide	2.54750E-01	5.84317E+03	.0514
267	6	10	Nitrogen	3.35646E+00	2.62694E+01	.0581
269	8	10	Ethlyene	1.88381E-03	2.35118E+06	.3462
270	9	10	Ethane	1.30418E-03	4.08495E+06	.3794
271	10	10	Hydrogen Sulfide	5.39640E-03	6.54133E+05	.2291
272	11	10	Argon	2.28679E-02	7.54072E+05	.0504
273	12	10	Carbon Dioxide	5.10514E-01	1.50712E+03	.0505
276	15	10	Magnesium Oxide	1.53369E-03	4.25131E+05	1.0000
279	18	10	Calcium Oxide	8.39744E-04	1.41810E+06	1.0000
280	19	10	Calcium Sulfide	2.91935E-04	1.17335E+07	1.0000
281	20	10	Calcium Carbonate	3.31591E-04	4.10038E+07	.4710
283	22	10	Sorbent Inerts	1.75700E-03	3.23935E+05	1.0000
284	23	10	Coal Ash	8.95872E-02	1.24597E+02	1.0000
289	28	10	BD char organic	7.19481E-01	2.63406E+02	.0856
290	29	10	Heat Loss via Conduction	1.39998E+04	5.51547E-08	.3042

Temperature at node J (Kelvins)

IG	J		T(J)	WT(J)	RATIO
291	1	Feed Air	2.99223E+02	6.18377E-01	.0042
292	2	Steam to Carbonizer	4.74457E+02	6.72475E-01	.0026
293	3	Coal & Sorbent Feeds	2.88706E+02	1.41536E-02	.0291
294	4	Carbonizer Drain	3.74462E+02	2.02096E-03	.0594
295	5	N2 Purges to carbonizer	3.19609E+02	1.22827E-01	.0089
296	6	Freeboard gas	1.10569E+03	8.31035E-02	.0031
297	7	N2 Purges to cyclones	3.19609E+02	1.22827E-01	.0089
298	8	Primary cyclone Drain	3.45992E+02	2.66798E-02	.0177
299	9	Secondary cyclone Drain	3.58405E+02	5.58148E-02	.0118
300	10	Dusty gas to orifice	9.73248E+02	9.26052E-02	.0034

Compositions of species with variable compositions
Moles of element M in a gram of species I

IG	I	M		S(I,M)	WS(I,M)	RATIO
301	1	1	Hydrogen in Coal organic matter	5.3478E-02	3.00755E+05	.0341
306	1	2	Carbon in Coal organic matter	6.8670E-02	3.18571E+05	.0258
311	1	3	Nitrogen in Coal organic matter	1.5650E-03	1.35973E+08	.0548
316	1	4	Oxygen in Coal organic matter	3.7935E-03	4.76329E+05	.3820
326	1	6	Sulfur in Coal organic matter	1.2067E-03	2.38233E+08	.0537
346	1	10	Heat in Coal organic matter	8.1827E+03	2.17269E-05	.0262
302	2	1	Hydrogen in CD char organic	7.7505E-03	3.43331E+04	.6963
307	2	2	Carbon in CD char organic	7.4101E-02	5.06672E+02	.5995
312	2	3	Nitrogen in CD char organic	1.8449E-03	7.17078E+05	.6401
327	2	6	Sulfur in CD char organic	2.3806E-03	1.76452E+05	1.0000
347	2	10	Heat in CD char organic	6.6493E+03	1.14689E-07	.4441
303	3	1	Hydrogen in PD char organic	8.3437E-03	2.45872E+06	.0764
308	3	2	Carbon in PD char organic	7.7556E-02	1.01334E+05	.0405
313	3	3	Nitrogen in PD char organic	1.7090E-03	1.29670E+08	.0514
328	3	6	Sulfur in PD char organic	1.1270E-03	7.87304E+05	1.0000
348	3	10	Heat in PD char organic	8.4161E+03	9.43895E-06	.0387
304	4	1	Hydrogen in SD char organic	7.9145E-03	1.51680E+06	.1026
309	4	2	Carbon in SD char organic	7.8269E-02	1.31045E+05	.0353
314	4	3	Nitrogen in SD char organic	1.9644E-03	5.43435E+07	.0691
329	4	6	Sulfur in SD char organic	7.6176E-04	1.72331E+06	1.0000
349	4	10	Heat in SD char organic	8.5077E+03	8.51155E-06	.0403
305	5	1	Hydrogen in BD char organic	1.0571E-02	1.33470E+06	.0819
310	5	2	Carbon in BD char organic	7.8072E-02	3.51683E+05	.0216
315	5	3	Nitrogen in BD char organic	2.1736E-03	5.47892E+07	.0622
330	5	6	Sulfur in BD char organic	6.6043E-04	2.32465E+06	.9931
350	5	10	Heat in BD char organic	7.6437E+03	1.64680E-05	.0322

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**********************************************************
*                       BALAID2                          *
*                       -------                          *
*                                                        *
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BALAID2 Calculation 03-01-94 at 13:03:33 with output written on A:BALAID2.42C
for the FW Carbonizer System Cutoff % probabilities are 3.00 1.80

DATA SET DESIGNATION

TR4 - TEST POINT 2 <<CASE C>> 03/11/92 Pittsburgh Coal + Dolomite
SET POINT DATE: 3/11/92
SET POINT TIME: 04:30:00 - 08:30:00

REACTOR OR PLANT UNIT CONSIDERED

Unit 2, the FW Carbonizer System

PROCESS STREAMS ENTERING AND LEAVING THIS UNIT

J Index	Stream	Direction
1	Feed Air	Inflow
2	Steam to Carbonizer	Inflow
3	Coal & Sorbent Feeds	Inflow
5	N2 Purges to carbonizer	Inflow
7	N2 Purges to cyclones	Inflow
4	Carbonizer Drain	Outflow
8	Primary cyclone Drain	Outflow
9	Secondary cyclone Drain	Outflow
10	Dusty gas to orifice	Outflow

BALANCES TO BE UTILIZED

M Index	Balance	Percent Loss	Variance
1	Hydrogen	-6.77	.004
2	Carbon	29.52	.006
3	Nitrogen	9.35	.003
4	Oxygen	-6.84	.004
7	Argon	14.31	.002
10	Heat	25.34	.005

PLANT AND LABORATORY MEASUREMENTS TO BE TESTED FOR ERROR

KK Index	Plant Measurement			Mean
2	Orifice Pressure	PSIG	PI-3106	1.526E+02
4	Total Air Feed	lb/hr	FIC-1055	6.560E+02
5	Transport N2 Feed	SCFM	FIC-1053	5.330E-01
6	Bed Drain N2 Feed	SCFM	FI-3028	4.856E+01
7	N2 to spray tower	SCFM	FI-4051	3.910E+01
8	Feed lockhopper comp N2	SCFM	FI-7008	1.071E+01
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	4.770E+00
10	Purge N2 to carbonizer	SCFM	FI-7021	6.352E+00
11	Purge N2 to cyclones	SCFM	FI-7022	2.849E+00
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	1.180E+02
15	Coal Feed rate	lb/hr		2.970E+02
16	Sorbent feed rate	lb/hr		9.000E+01
22	Air Feed Temp	deg F	TI-1059	7.893E+01
23	Bed Drain Temp	deg F	TIC-3027	2.144E+02
24	Primary Cyclone Lockhopper Temp	F	TI-3070	1.631E+02
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	1.855E+02
36	Carbonizer + Cyclones heat loss	KBTU/hr		2.000E+02
37	Orifice Temp (Upstream)	F	TI-3108	1.292E+03
38	Purge N2 Temp	F	TI-7012	1.156E+02
42	Boiler Steam Temperature	F	TI-7041	3.944E+02
44	CD Flow; carbonizer discharge	lb/hr		8.217E+01
45	PD Flow; primary cyclone	lb/hr		8.138E+01
46	SD/CF Flow; secondary cyclone	lb/hr		4.090E+00
47	BD Flow; bag house	lb/hr		7.730E+00
49	Ambient Temperature	F		6.000E+01
	Lab Measurement			
51	Coal - C	Mass %		7.154E+01
52	Coal - H	Mass %		4.676E+00
53	Coal - N	Mass %		1.901E+00
54	Coal - S	Mass %		3.356E+00
55	Coal - Ash	Mass %		1.118E+01
56	Coal - H2O	Mass %		2.083E+00
57	Coal - HHV	BTU/lb		1.278E+04
58	CD Drain - C	Mass %		1.904E+01
59	CD Drain - H	Mass %		1.300E-01
60	CD Drain - N	Mass %		4.300E-01
61	CD Drain - S	Mass %		9.920E+00
62	CD Drain - Ash	Mass %		9.346E+01
63	CD Drain - HHV (dry)	BTU/lb		2.804E+03
65	CD Drain - sfide S	Mass %		8.650E+00
66	CD Drain - crbate C	Mass %		4.230E+00
67	CD Drain - Ash S	Mass %		1.180E+01
68	CD Drain - Ash CaO	Mass %		2.880E+01
69	CD Drain - Ash MgO	Mass %		2.380E+01
70	PD Drain - C	Mass %		6.346E+01
71	PD Drain - H	Mass %		5.633E-01
72	PD Drain - N	Mass %		1.603E+00
73	PD Drain - S	Mass %		4.160E+00
74	PD Drain - Ash	Mass %		3.456E+01

75	PD Drain - HHV (dry)	BTU/lb	1.034E+04
77	PD Drain - sfide S	Mass %	1.740E+00
78	PD Drain - crbate C	Mass %	1.073E+00
79	PD Drain - Ash S	Mass %	7.783E+00
80	PD Drain - Ash CaO	Mass %	2.423E+01
81	PD Drain - Ash MgO	Mass %	1.870E+01
82	CF/SD Drain - C	Mass %	5.855E+01
83	CF/SD Drain - H	Mass %	4.900E-01
84	CF/SD Drain - N	Mass %	1.690E+00
85	CF/SD Drain - S	Mass %	3.040E+00
86	CF/SD Drain - Ash	Mass %	3.537E+01
87	CF/SD Drain - HHV (dry)	BTU/lb	9.954E+03
89	CF/SD Drain - sfide S	Mass %	1.540E+00
90	CF/SD Drain - cabate C	Mass %	8.100E-01
91	CF/SD Drain - Ash S	Mass %	5.170E+00
92	CF/SD Drain - Ash CaO	Mass %	2.540E+01
93	CF/SD Drain - Ash MgO	Mass %	1.940E+01
95	BD Drain - C	Mass %	6.816E+01
96	BD Drain - H	Mass %	7.700E-01
97	BD Drain - N	Mass %	2.200E+00
98	BD Drain - S	Mass %	2.470E+00
99	BD Drain - Ash	Mass %	2.711E+01
100	BD Drain - HHV (dry)	BTU/lb	1.026E+04
102	BD Drain - sfide S	Mass %	9.400E-01
103	BD Drain - crbate C	Mass %	4.000E-01
104	BD Drain - Ash S	Mass %	5.150E+00
105	BD Drain - Ash CaO	Mass %	3.040E+01
106	BD Drain - Ash MgO	Mass %	2.290E+01
107	Demister Gas - N2	mol,vol %	7.597E+01
108	Demister Gas - O2	mol,vol %	1.245E+00
109	Demister Gas - CO	mol,vol %	4.395E+00
110	Demister Gas - CH4	mol,vol %	1.695E+00
111	Demister Gas - CO2	mol,vol %	8.807E+00
112	Demister Gas - C2H4	mol,vol %	3.250E-02
113	Demister Gas - C2H6	mol,vol %	2.250E-02
114	Demister Gas - H2S	mol,vol %	9.310E-02
115	Demister Gas - H2	mol,vol %	5.480E+00
116	Demister Gas - NH3	mol,vol %	3.525E-01
117	Demister Gas - Ar	mol,vol %	4.500E-01
129	Water Content in Freeboard Gas	mol,vol %	2.205E+01
132	Sorbent - CaO	Mass %	5.760E+01
133	Sorbent - MgO	Mass %	4.147E+01
134	Sorbent - SO3	Mass %	8.000E-01
135	Sorbent - Ash	Mass %	1.233E+00

COLINEAR VARIABLES ELIMINATED

The following table lists pairs of variables with very high covariance. They are interchangable or nearly interchangable for purposes of measurement error diagnosis, so one of the pair is eliminated. Any correction factors estimated for the retained variable can be applied to the deleted variable as well, on division by the tabulated "RATIO". Indices can be related to names of the corresponding measurements according to the preceding table.

VARIABLE DELETED	VARIABLE RETAINED	CORRELATION COEFFICIENT	RATIO
8	107	1.000	-.0452
6	107	-.997	-.2050
36	57	-1.000	-.0527
44	109	.995	.6469
63	57	-1.000	-.0607
75	57	-1.000	-.2218
58	70	.994	.7218

Skip the following 62 measurements because of negligible effect on balances.

5	9	10	11	22	23	24	25	38	42	46	47	49	53	54	56
59	60	61	65	66	67	68	69	71	72	73	77	78	79	80	81
82	83	84	85	86	87	89	90	91	92	93	95	96	97	98	99
100	102	103	104	105	106	112	113	114	115	132	133	134	135		

Of the 92 original measurements affecting this unit, the 23 linearly independent measurements remaining to be tested are: 2 4 7 14 15 16 37 45 51 52 55 57 62 70 74 107 108 109 110 111 115 117 129

No measurements correlated with balance discrepancies in 529 regressions.

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**********************************************************
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*                       -------                          *
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BALAID3 Calculation 03-01-94 at 13:03:40 with output written on A:BALAID3.42C
for the FW Carbonizer System

DATA SET DESIGNATION

TR4 - TEST POINT 2 <<CASE C>> 03/11/92 Pittsburgh Coal + Dolomite
SET POINT DATE: 3/11/92
SET POINT TIME: 04:30:00 - 08:30:00

------> BALAID3 Iteration 1 <------
Q is 5.51465097D+04. Mean & max error are 5.13176E+03 1.26756E+05 for GP 326

------> BALAID3 Iteration 2 <------
Q is 1.42501477D+03. Mean & max error are 5.63807E+02 1.16940E+04 for GP 326

------> BALAID3 Iteration 3 <------
Q is 8.49816830D+01. Mean & max error are 1.11138E+02 2.18235E+03 for GP 326

------> BALAID3 Iteration 4 <------
Q is 4.75678248D+01. Mean & max error are 8.52687E-01 1.65504E+01 for GP 326

------> BALAID3 Iteration 5 <------
Q is 4.75643131D+01. Mean & max error are 1.29986E-02 2.46354E-01 for GP 326

--- ECONS MESSAGE. Zero lower bound set for variable 327

------> BALAID3 Iteration 6 <------
Q is 8.20428907D+02. Mean & max error are 5.20093E+02 1.09023E+04 for GP 326

------> BALAID3 Iteration 7 <------
Q is 4.76729794D+01. Mean & max error are 2.01927E+00 4.21780E+01 for GP 326

------> BALAID3 Iteration 8 <------
Q is 4.76437691D+01. Mean & max error are 1.77784E-02 2.20100E-01 for GP 326

------> BALAID3 Iteration 9 <------
Q is 4.76437045D+01. Mean & max error are 1.71105E-03 9.30377E-02 for GP 297

Checking inequality constraints in effect for the following 1 variables.
IG, LIMITG(IG), DQDG(IG) 327 -1 1.548527882837579D+02

------> BALAID3 Iteration 10 <------
Q is 4.76437041D+01. Mean & max error are 1.48991E-03 9.31009E-02 for GP 297

--- LSQCHK IS VERIFYING TRUE LSQ CONVERGENCE BY BRUTE FORCE.

--- LSQCHK TEST COMPLETE.

Constant Inequality Constraints in effect.

BOUND	VARIABLE INDEX	LIMITING GP VALUE
Lower	327	.0000D+00

BALAID3 calculation complete.

```
**********************************************************
*                       BALAID4                          *
*                       -------                          *
*                                                        *
*  Statistical Data Analysis and Reconciliation Code     *
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*   Licensed to Institute of Gas Technology, Chicago     *
*               through February 28, 1998                *
**********************************************************
```

BALAID4 Calculation 03-01-94 at 13:04:48 with output written on A:BALAID4.42C
for the FW Carbonizer System

DATA SET DESIGNATION

TR4 - TEST POINT 2 <<CASE C>> 03/11/92 Pittsburgh Coal + Dolomite
SET POINT DATE: 3/11/92
SET POINT TIME: 04:30:00 - 08:30:00

********** Reconciled LEVEL1 Summary Printout **********

Node assignments

Index J	Node Name	Temperature (Degrees F)
1	Feed Air	78.9
2	Steam to Carbonizer	394.4
3	Coal & Sorbent Feeds	59.9
4	Carbonizer Drain	214.5
5	N2 Purges to carbonizer	115.6
6	Freeboard gas	1530.5
7	N2 Purges to cyclones	115.6
8	Primary cyclone Drain	163.1
9	Secondary cyclone Drain	185.5
10	Dusty gas to orifice	1292.3

Reconciled Compositions of Variable Species

Index I	Species Name	Element percent by weight of species H	C	N	O	S
24	Coal organic matter	5.463	79.684	2.197	8.771	3.886
25	CD char organic	.635	97.230	2.134	.000	.000
26	PD char organic	.839	94.943	2.392	.000	1.826
27	SD char organic	.798	94.054	2.751	.000	2.397
28	BD char organic	1.065	93.827	3.044	.000	2.064

SOLID STREAM COMPOSITIONS, WEIGHT PERCENTS

	Coal	Sorbent	CD Char	PD Char	SD Char	BD Char
H	4.680	.000	.238	.574	.515	.791
C	68.271	.000	36.423	64.968	60.774	69.714
N	1.882	.000	.800	1.637	1.778	2.262
O	7.515	.000	.000	.000	.000	.000
S	3.329	.000	.000	1.249	1.549	1.533
Water Moisture	2.368	.000	.000	.000	.000	.000
Magnesium Oxide	.000	.000	7.318	5.504	6.689	5.995
Magnesium Carbonate	.000	45.514	10.862	.000	.000	.000
Calcium Oxide	.000	.000	.000	.292	2.597	4.778
Calcium Sulfide	.000	.379	10.073	3.489	3.602	2.145
Calcium Carbonate	.000	53.459	17.066	8.295	6.965	3.372
Sorbent Inerts	.000	.649	.373	.164	.200	.179
Coal Ash	11.955	.000	16.848	13.828	15.331	9.231

COMPOSITION OF DRY AIR

	Mass %	Mole %
Nitrogen	75.518	78.073
Oxygen	23.193	20.992
Argon	1.290	.935

Reconciled Species Flows at Each Node

Index I	Species Name	J=	Mass Flows, Pounds per hour 1	2	3	4	5	6	7	8	9	10
1	Hydrogen		.00	.00	.00	.00	.00	5.04	.00	.00	.00	5.04
2	Methane		.00	.00	.00	.00	.00	12.69	.00	.00	.00	12.69
3	Ammonia		.00	.00	.00	.00	.00	2.73	.00	.00	.00	2.73
4	Water Vapor		.00	118.27	.00	.00	.00	150.50	.00	.00	.00	150.50
5	Carbon Monoxide		.00	.00	.00	.00	.00	58.08	.00	.00	.00	58.08
6	Nitrogen		.00	.00	.00	.00	289.83	776.62	33.71	.00	.00	810.34
7	Air, dry		644.25	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	Ethlyene		.00	.00	.00	.00	.00	.43	.00	00	.00	.43
9	Ethane		.00	.00	.00	.00	.00	.31	.00	.00	.00	.31
10	Hydrogen Sulfide		.00	.00	.00	.00	.00	1.46	.00	.00	.00	1.46
11	Argon		.00	.00	.00	.00	.00	8.31	.00	.00	.00	8.31
12	Carbon Dioxide		.00	.00	.00	.00	.00	185.01	.00	.00	.00	185.01
13	Sulfur Dioxide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	Water Moisture		.00	.00	6.41	.00	.00	.00	.00	.00	.00	.00
15	Magnesium Oxide		.00	.00	.00	8.17	.00	5.60	.00	4.85	.28	.47
16	Magnesium Sulfide		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	Magnesium Carbonate		.00	.00	40.93	12.13	.00	.00	.00	.00	.00	.00
18	Calcium Oxide		.00	.00	.00	.00	.00	.74	.00	.26	.11	.37
19	Calcium Sulfide		.00	.00	.34	11.25	.00	3.39	.00	3.08	.15	.17
20	Calcium Carbonate		.00	.00	48.08	19.05	.00	7.86	.00	7.31	.29	.26
21	Calcium Sulfate		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	Sorbent Inerts		.00	.00	.58	.42	.00	.17	.00	.14	.01	.01
23	Coal Ash		.00	.00	32.36	18.81	.00	13.55	.00	12.19	.63	.72
24	Coal organic matter		.00	.00	231.89	.00	.00	.00	.00	.00	.00	.00
25	CD char organic		.00	.00	.00	41.83	.00	.00	.00	.00	.00	.00
26	PD char organic		.00	.00	.00	.00	.00	60.32	.00	60.32	.00	00
27	SD char organic		.00	.00	.00	.00	.00	2.67	.00	.00	2.67	.00
28	BD char organic		.00	.00	.00	.00	.00	5.82	.00	.00	.00	5.82
	TOTAL GAS FLOW		644.3	118.3	.0	.0	289.8	1201.2	33.7	.0	.0	1234.9
	TOTAL MASS FLOW		644.3	118.3	360.6	111.7	289.8	1301.3	33.7	68.2	4.1	1242.7
	Gas mean molecular weights		28.962	18.015	.000	.000	28.014	26.066	28.014	.000	.000	26.116

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the Carbonizer only

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.3	644.3	.00	.0	486.5	149.4	.00	.000	8.309	.00	.00
Steam to Carbonizer	141.4	118.3	13.23	.0	.0	105.0	.00	.000	.000	.00	.00
Coal & Sorbent Feeds	3328.6	360.6	13.38	196.4	5.1	72.4	11.80	9.162	.000	19.44	32.94
N2 Purges to carbonizer	2.8	289.8	.00	.0	289.8	.0	.00	.000	.000	.00	.00
Total Inflow	3473.0	1412.9	26.62	196.4	781.5	326.8	11.80	9.162	8.309	19.44	32.94

OUTFLOWS

Carbonizer Drain	664.6	111.7	.27	44.7	.9	19.3	8.42	4.998	.000	13.88	19.23
Freeboard gas	2712.1	1301.3	26.35	151.7	780.6	307.6	3.38	4.164	8.309	5.56	13.71
Heat Loss	96.3										
Total Outflow	3473.0	1412.9	26.62	196.4	781.5	326.8	11.80	9.162	8.309	19.44	32.94
Loss	.0	.0	.00	.0	.0	.0	.00	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

********** Reconciled LEVEL1 Summary Printout **********

Summary Material, Energy and Element Balances for the FW Carbonizer System

INFLOWS

Node	Total Energy	Total Mass	Element Distribution H	C	N	O	Mg	S	Ar	Ca	Ash
Feed Air	.3	644.3	.00	.0	486.5	149.4	.00	.000	8.309	.00	.00
Steam to Carbonizer	141.4	118.3	13.23	.0	.0	105.0	.00	.000	.000	.00	.00
Coal & Sorbent Feeds	3328.6	360.6	13.38	196.4	5.1	72.4	11.80	9.162	.000	19.44	32.94
N2 Purges to carbonizer	2.8	289.8	.00	.0	289.8	.0	.00	.000	.000	.00	.00
N2 Purges to cyclones	.3	33.7	.00	.0	33.7	.0	.00	.000	.000	.00	.00
Total Inflow	3473.3	1446.7	26.62	196.4	815.2	326.8	11.80	9.162	8.309	19.44	32.94

OUTFLOWS

Carbonizer Drain	664.6	111.7	.27	44.7	.9	19.3	8.42	4.998	.000	13.88	19.23
Primary cyclone Drain	922.0	88.2	.51	58.2	1.4	5.5	2.93	2.468	.000	4.82	12.33
Secondary cyclone Drain	41.2	4.1	.02	2.6	.1	.3	.17	.130	.000	.28	.64
Dusty gas to orifice	1619.2	1242.7	25.83	91.0	812.8	301.8	.28	1.565	8.309	.47	.74
Heat Loss	226.3										
Total Outflow	3473.3	1446.7	26.62	196.4	815.2	326.8	11.80	9.162	8.309	19.44	32.94
Loss	.0	.0	.00	.0	.0	.0	.00	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Closure (out/in) %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Mass units are Pounds per hour
Energy units are Thousands of BTU per hour
computed relative to combustion products at 77. degrees F

********** Reconciled LEVEL2 Detailed Mass and Energy Balances **********

Mass and Element Balances by Species and Node for the Carbonizer only

INFLOWS	Total	Element Distribution								
	Mass	H	C	N	O	Mg	S	Ar	Ca	Ash
Node	----	---	---	---	---	---	---	---	---	---
1 Feed Air										
Air, dry	644.3	.00	.0	486.5	149.4	.00	.000	8.309	.00	.00
2 Steam to Carbonizer										
Water Vapor	118.3	13.23	.0	.0	105.0	.00	.000	.000	.00	.00
3 Coal & Sorbent Feeds										
Water Moisture	6.4	.72	.0	.0	5.7	.00	.000	.000	.00	.00
Magnesium Carbonate	40.9	.00	5.8	.0	23.3	11.80	.000	.000	.00	.00
Calcium Sulfide	.3	.00	.0	.0	.0	.00	.151	.000	.19	.00
Calcium Carbonate	48.1	.00	5.8	.0	23.1	.00	.000	.000	19.25	.00
Sorbent Inerts	.6	.00	.0	.0	.0	.00	.000	.000	.00	.58
Coal Ash	32.4	.00	.0	.0	.0	.00	.000	.000	.00	32.36
Coal organic matter	231.9	12.67	184.8	5.1	20.3	.00	9.011	.000	.00	.00
5 N2 Purges to carbonizer										
Nitrogen	289.8	.00	.0	289.8	.0	.00	.000	.000	.00	.00
Total Inflow	1412.9	26.62	196.4	781.5	326.8	11.80	9.162	8.309	19.44	32.94
OUTFLOWS										
4 Carbonizer Drain										
Magnesium Oxide	8.2	.00	.0	.0	3.2	4.93	.000	.000	.00	.00
Magnesium Carbonate	12.1	.00	1.7	.0	6.9	3.50	.000	.000	.00	.00
Calcium Sulfide	11.2	.00	.0	.0	.0	.00	4.998	.000	6.25	.00
Calcium Carbonate	19.1	.00	2.3	.0	9.1	.00	.000	.000	7.63	.00
Sorbent Inerts	.4	.00	.0	.0	.0	.00	.000	.000	.00	.42
Coal Ash	18.8	.00	.0	.0	.0	.00	.000	.000	.00	18.81
CD char organic	41.8	.27	40.7	.9	.0	.00	.000	.000	.00	.00
6 Freeboard gas										
Hydrogen	5.0	5.04	.0	.0	.0	.00	.000	.000	.00	.00
Methane	12.7	3.19	9.5	.0	.0	.00	.000	.000	.00	.00
Ammonia	2.7	.48	.0	2.2	.0	.00	.000	.000	.00	.00
Water Vapor	150.5	16.84	.0	.0	133.7	.00	.000	.000	.00	.00
Carbon Monoxide	58.1	.00	24.9	.0	33.2	.00	.000	.000	.00	.00
Nitrogen	776.6	.00	.0	776.6	.0	.00	.000	.000	.00	.00
Ethlyene	.4	.06	.4	.0	.0	.00	.000	.000	.00	.00
Ethane	.3	.06	.3	.0	.0	.00	.000	.000	.00	.00
Hydrogen Sulfide	1.5	.09	.0	.0	.0	.00	1.371	.000	.00	.00
Argon	8.3	.00	.0	.0	.0	.00	.000	8.309	.00	.00
Carbon Dioxide	185.0	.00	50.5	.0	134.5	.00	.000	.000	.00	.00
Magnesium Oxide	5.6	.00	.0	.0	2.2	3.38	.000	.000	.00	.00
Calcium Oxide	.7	.00	.0	.0	.2	.00	.000	.000	.53	.00
Calcium Sulfide	3.4	.00	.0	.0	.0	.00	1.508	.000	1.89	.00
Calcium Carbonate	7.9	.00	.9	.0	3.8	.00	.000	.000	3.15	.00
Sorbent Inerts	.2	.00	.0	.0	.0	.00	.000	000	.00	.17
Coal Ash	13.5	.00	.0	.0	.0	.00	.000	.000	.00	13.55
PD char organic	60.3	.51	57.3	1.4	.0	.00	1.101	.000	.00	.00
SD char organic	2.7	.02	2.5	.1	.0	.00	064	.000	.00	.00
BD char organic	5.8	.06	5.5	.2	.0	.00	120	000	.00	.00
Total Outflow	1412.9	26.62	196.4	781.5	326.8	11.80	9.162	8.309	19.44	32.94

Loss	.0	.00	.0	.0	.0	.00	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour

********** Reconciled LEVEL2 Detailed Mass and Energy Balances **********

Detailed Energy Balance by Species and Node for the Carbonizer only

INFLOWS	Percent Heat	Total Heat	Sensible Heat	Heat of Combustion	Latent Heat
Node	----	----	----	----------	----
1 Feed Air					
Air, dry	.01	.3	.3	.0	.0
2 Steam to Carbonizer					
Water Vapor	4.07	141.4	17.0	.0	124.3
3 Coal & Sorbent Feeds					
Water Moisture	.00	-.1	-.1	.0	.0
Magnesium Carbonate	-.72	-24.8	-.1	-24.7	.0
Calcium Sulfide	.03	.9	.0	.9	.0
Calcium Carbonate	-1.07	-37.1	-.2	-36.9	.0
Sorbent Inerts	.00	.0	.0	.0	.0
Coal Ash	.00	-.1	-.1	.0	.0
Coal organic matter	97.60	3389.8	-1.0	3390.9	.0
5 N2 Purges to carbonizer					
Nitrogen	.08	2.8	2.8	.0	.0
Total Inflow	100.00	3473.0	18.6	3330.1	124.3
OUTFLOWS					
4 Carbonizer Drain					
Magnesium Oxide	.01	.3	.3	.0	.0
Magnesium Carbonate	-.20	-6.9	.4	-7.3	.0
Calcium Sulfide	.89	30.9	.2	30.7	.0
Calcium Carbonate	-.41	-14.1	.6	-14.6	.0
Sorbent Inerts	.00	.0	.0	.0	.0
Coal Ash	.01	.5	.5	.0	.0
CD char organic	18.83	653.9	1.2	652.7	.0
6 Freeboard gas					
Hydrogen	9.59	333.1	25.7	307.4	.0
Methane	9.18	318.7	15.8	302.9	.0
Ammonia	.84	29.1	2.7	26.4	.0
Water Vapor	7.71	267.8	109.6	.0	158.2
Carbon Monoxide	7.92	274.9	22.5	252.4	.0
Nitrogen	8.57	297.5	297.5	.0	.0
Ethlyene	.28	9.6	.4	9.2	.0
Ethane	.21	7.4	.4	7.0	.0
Hydrogen Sulfide	.32	11.0	.6	10.3	.0
Argon	.09	3.2	3.2	.0	.0
Carbon Dioxide	2.04	70.9	70.9	.0	.0
Magnesium Oxide	.07	2.3	2.3	.0	.0
Calcium Oxide	.01	.2	.2	.0	.0
Calcium Sulfide	.29	10.1	.9	9.2	.0
Calcium Carbonate	-.09	-3.0	3.1	-6.0	.0
Sorbent Inerts	.00	.1	.1	.0	.0
Coal Ash	.14	4.9	4.9	.0	.0
PD char organic	27.33	949.0	31.3	917.7	.0
SD char organic	1.22	42.4	1.4	41.0	.0
BD char organic	2.39	83.1	3.0	80.0	.0

Heat Transfer	2.77	96.3	96.3		
Total Outflow	100.00	3473.0	695.9	2618.9	158.2
Loss	.00	.0	-677.3	711.2	-33.9

Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins.

********** Reconciled LEVEL2 Detailed Mass and Energy Balances **********

Mass and Element Balances by Species and Node for the FW Carbonizer System

INFLOWS	Total	Element Distribution								
	Mass	H	C	N	O	Mg	S	Ar	Ca	Ash
Node	----	---	---	---	---	---	---	---	---	---
1 Feed Air										
Air, dry	644.3	.00	.0	486.5	149.4	.00	.000	8.309	.00	.00
2 Steam to Carbonizer										
Water Vapor	118.3	13.23	.0	.0	105.0	.00	.000	.000	.00	.00
3 Coal & Sorbent Feeds										
Water Moisture	6.4	.72	.0	.0	5.7	.00	.000	.000	.00	.00
Magnesium Carbonate	40.9	.00	5.8	.0	23.3	11.80	.000	.000	.00	.00
Calcium Sulfide	.3	.00	.0	.0	.0	.00	.151	.000	.19	.00
Calcium Carbonate	48.1	.00	5.8	.0	23.1	.00	.000	.000	19.25	.00
Sorbent Inerts	.6	.00	.0	.0	.0	.00	.000	.000	.00	.58
Coal Ash	32.4	.00	.0	.0	.0	.00	.000	.000	.00	32.36
Coal organic matter	231.9	12.67	184.8	5.1	20.3	.00	9.011	.000	.00	.00
5 N2 Purges to carbonizer										
Nitrogen	289.8	.00	.0	289.8	.0	.00	.000	.000	.00	.00
7 N2 Purges to cyclones										
Nitrogen	33.7	.00	.0	33.7	.0	.00	.000	.000	.00	.00
Total Inflow	1446.7	26.62	196.4	815.2	326.8	11.80	9.162	8.309	19.44	32.94
OUTFLOWS										
4 Carbonizer Drain										
Magnesium Oxide	8.2	.00	.0	.0	3.2	4.93	.000	.000	.00	.00
Magnesium Carbonate	12.1	.00	1.7	.0	6.9	3.50	.000	.000	.00	.00
Calcium Sulfide	11.2	.00	.0	.0	.0	.00	4.998	.000	6.25	.00
Calcium Carbonate	19.1	.00	2.3	.0	9.1	.00	.000	.000	7.63	.00
Sorbent Inerts	.4	.00	.0	.0	.0	.00	.000	.000	.00	.42
Coal Ash	18.8	.00	.0	.0	.0	.00	.000	.000	.00	18.81
CD char organic	41.8	.27	40.7	.9	.0	.00	.000	.000	.00	.00
8 Primary cyclone Drain										
Magnesium Oxide	4.9	.00	.0	.0	1.9	2.93	.000	.000	.00	.00
Calcium Oxide	.3	.00	.0	.0	.1	.00	.000	.000	.18	.00
Calcium Sulfide	3.1	.00	.0	.0	.0	.00	1.367	.000	1.71	.00
Calcium Carbonate	7.3	.00	.9	.0	3.5	.00	.000	.000	2.93	.00
Sorbent Inerts	.1	.00	.0	.0	.0	.00	.000	.000	.00	.14
Coal Ash	12.2	.00	.0	.0	.0	.00	.000	.000	.00	12.19
PD char organic	80.3	.51	57.3	1.4	.0	.00	1.101	.000	.00	.00
9 Secondary cyclone Drain										
Magnesium Oxide	.3	.00	.0	.0	.1	.17	.000	.000	.00	.00
Calcium Oxide	.1	.00	.0	.0	.0	.00	.000	.000	.08	.00
Calcium Sulfide	.1	.00	.0	.0	.0	.00	.066	.000	.08	.00
Calcium Carbonate	.3	.00	.0	.0	.1	.00	.000	.000	.12	.00
Sorbent Inerts	.0	.00	.0	.0	.0	.00	.000	.000	.00	.01
Coal Ash	.6	.00	.0	.0	.0	.00	.000	.000	.00	.63
SD char organic	2.7	.02	2.5	.1	.0	.00	.064	.000	.00	.00
10 Dusty gas to orifice										
Hydrogen	5.0	5.04	.0	.0	.0	.00	.000	.000	.00	.00
Methane	12.7	3.19	9.5	.0	.0	.00	.000	.000	.00	.00
Ammonia	2.7	.48	.0	2.2	.0	.00	.000	.000	.00	.00

Water Vapor	150.5	16.84	.0	.0	133.7	.00	.000	.000	.00	.00
Carbon Monoxide	58.1	.00	24.9	.0	33.2	.00	.000	.000	.00	.00
Nitrogen	810.3	.00	.0	810.3	.0	.00	.000	.000	.00	.00
Ethlyene	.4	.06	.4	.0	.0	.00	.000	.000	.00	.00
Ethane	.3	.06	.3	.0	.0	.00	.000	.000	.00	.00
Hydrogen Sulfide	1.5	.09	.0	.0	.0	.00	1.371	.000	.00	.00
Argon	8.3	.00	.0	.0	.0	.00	.000	8.309	.00	.00
Carbon Dioxide	185.0	.00	50.5	.0	134.5	.00	.000	.000	.00	.00
Magnesium Oxide	.5	.00	.0	.0	.2	.28	.000	.000	.00	.00
Calcium Oxide	.4	.00	.0	.0	.1	.00	.000	.000	.27	.00
Calcium Sulfide	.2	.00	.0	.0	.0	.00	.075	.000	.09	.00
Calcium Carbonate	.3	.00	.0	.0	.1	.00	.000	.000	.11	.00
Sorbent Inerts	.0	.00	.0	.0	.0	.00	.000	.000	.00	.01
Coal Ash	.7	.00	.0	.0	.0	.00	.000	.000	.00	.72
BD char organic	5.8	.06	5.5	.2	.0	.00	.120	.000	.00	.00
Total Outflow	1446.7	26.62	196.4	815.2	326.8	11.80	9.162	8.309	19.44	32.94
Loss	.0	.00	.0	.0	.0	.00	.000	.000	.00	.00
Percent Loss	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Mass units are Pounds per hour

********** Reconciled LEVEL2 Detailed Mass and Energy Balances **********

Detailed Energy Balance by Species and Node for the FW Carbonizer System

INFLOWS	Percent Heat	Total Heat	Sensible Heat	Heat of Combustion	Latent Heat
Node	----	----	----	----------	----
1 Feed Air					
Air, dry	.01	.3	.3	.0	.0
2 Steam to Carbonizer					
Water Vapor	4.07	141.4	17.0	.0	124.3
3 Coal & Sorbent Feeds					
Water Moisture	.00	-.1	-.1	.0	.0
Magnesium Carbonate	-.72	-24.8	-.1	-24.7	.0
Calcium Sulfide	.03	.9	.0	.9	.0
Calcium Carbonate	-1.07	-37.1	-.2	-36.9	.0
Sorbent Inerts	.00	.0	.0	.0	.0
Coal Ash	.00	-.1	-.1	.0	.0
Coal organic matter	97.60	3389.8	-1.0	3390.9	.0
5 N2 Purges to carbonizer					
Nitrogen	.08	2.8	2.8	.0	.0
7 N2 Purges to cyclones					
Nitrogen	.01	.3	.3	.0	.0
Total Inflow	100.00	3473.3	18.9	3330.1	124.3
OUTFLOWS					
4 Carbonizer Drain					
Magnesium Oxide	.01	.3	.3	.0	.0
Magnesium Carbonate	-.20	-6.9	.4	-7.3	.0
Calcium Sulfide	.89	30.9	.2	30.7	.0
Calcium Carbonate	-.41	-14.1	.6	-14.6	.0
Sorbent Inerts	.00	.0	.0	.0	.0
Coal Ash	.01	.5	.5	.0	.0
CD char organic	18.83	653.9	1.2	652.7	.0
8 Primary cyclone Drain					
Magnesium Oxide	.00	.1	.1	.0	.0
Calcium Oxide	.00	.0	.0	.0	.0
Calcium Sulfide	.24	8.4	.0	8.4	.0
Calcium Carbonate	-.16	-5.5	.1	-5.6	.0
Sorbent Inerts	.00	.0	.0	.0	.0
Coal Ash	.01	.2	.2	.0	.0
PD char organic	26.45	918.8	1.1	917.7	.0
9 Secondary cyclone Drain					
Magnesium Oxide	.00	.0	.0	.0	.0
Calcium Oxide	.00	.0	.0	.0	.0
Calcium Sulfide	.01	.4	.0	.4	.0
Calcium Carbonate	-.01	-.2	.0	-.2	.0
Sorbent Inerts	.00	.0	.0	.0	.0
Coal Ash	.00	.0	.0	.0	.0
SD char organic	1.18	41.0	.1	41.0	.0
10 Dusty gas to crifice					
Hydrogen	9.47	328.8	21.4	307.4	.0
Methane	9.08	315.3	12.4	302.9	.0

Ammonia	.82	28.5	2.1	26.4	.0
Water Vapor	7.14	248.0	89.8	.0	158.2
Carbon Monoxide	7.80	271.0	18.5	252.4	.0
Nitrogen	7.38	256.2	256.2	.0	.0
Ethlyene	.27	9.5	.3	9.2	.0
Ethane	.21	7.3	.3	7.0	.0
Hydrogen Sulfide	.31	10.8	.5	10.3	.0
Argon	.08	2.6	2.6	.0	.0
Carbon Dioxide	1.66	57.8	57.8	.0	.0
Magnesium Oxide	.00	.2	.2	.0	.0
Calcium Oxide	.00	.1	.1	.0	.0
Calcium Sulfide	.01	.5	.0	.5	.0
Calcium Carbonate	.00	-.1	.1	-.2	.0
Sorbent Inerts	.00	.0	.0	.0	.0
Coal Ash	.01	.2	.2	.0	.0
BD char organic	2.37	82.4	2.4	80.0	.0
Heat Transfer	6.52	226.3	226.3		
Total Outflow	100.00	3473.3	696.2	2618.9	158.2
Loss	.00	.0	-677.3	711.2	-33.9

Energy units are Thousands of BTU per hour
computed relative to combustion products at 298.1 Kelvins.

Reconciled Compositions of Variable Species

Index I	Species Name	Element moles per unit mass of species H	C	N	O	S
24	Coal organic matter	.05419	.06634	.00157	.00548	.00121
25	CD char organic	.00630	.08095	.00152	.00000	.00000
26	PD char organic	.00832	.07905	.00171	.00000	.00057
27	SD char organic	.00791	.07831	.00196	.00000	.00075
28	BD char organic	.01057	.07812	.00217	.00000	.00064

Species Thermodynamic Properties

Index I	Species Name	Heat of Formation Kcal/m	KBTU/lb	Heat of Combustion Kcal/m	KBTU/lb	Latent Heat Kcal/m	KBTU/lb
1	Hydrogen	.00	.00	68.32	61.00	.000	.000
2	Methane	-17.89	-2.01	212.80	23.88	.000	.000
3	Ammonia	-10.96	-1.16	91.52	9.67	.000	.000
4	Water Vapor	-57.80	-5.77	.00	.00	10.520	1.051
5	Carbon Monoxide	-26.42	-1.70	67.64	4.35	.000	.000
6	Nitrogen	.00	.00	.00	.00	.000	.000
7	Air, dry	.00	.00	.00	.00	.000	.000
8	Ethlyene	12.49	.80	337.23	21.64	.000	.000
9	Ethane	-20.24	-1.21	372.82	22.32	.000	.000
10	Hydrogen Sulfide	-4.78	-.25	134.49	7.10	.000	.000
11	Argon	.00	.00	.00	.00	.000	.000
12	Carbon Dioxide	-94.05	-3.85	.00	.00	.000	.000
13	Sulfur Dioxide	-70.95	-1.99	.00	.00	.000	.000
14	Water Moisture	-68.32	-3.83	.00	.00	.000	.000
15	Magnesium Oxide	-143.70	-3.42	.00	.00	.000	.000
16	Magnesium Sulfide	-82.59	-2.64	132.05	4.22	.000	.000
17	Magnesium Carbonate	-266.02	-5.68	-28.27	-.60	.000	.000
18	Calcium Oxide	-151.79	-4.87	.00	.00	.000	.000
19	Calcium Sulfide	-113.51	-2.83	109.23	2.73	.000	.000
20	Calcium Carbonate	-288.57	-5.19	-42.73	-.77	.000	.000
21	Calcium Sulfate	-342.77	-4.53	-120.03	-1.59	.000	.000
22	Sorbent Inerts	.00	.00	.00	.00	.000	.000
23	Coal Ash	.00	.00	.00	.00	.000	.000
24	Coal organic matter	-.25	-.45	8.12	14.62	.000	.000
25	CD char organic	1.27	2.28	8.67	15.61	.000	.000
26	PD char organic	.79	1.43	8.45	15.21	.000	.000
27	SD char organic	.82	1.48	8.51	15.32	.000	.000
28	BD char organic	-.11	-.19	7.65	13.76	.000	.000

********** Reconciled LEVEL3 Miscellaneous Outputs **********

Species Flows, Sensible Heats and Heat Capacities

Node	Formula Weight	Flow	Sensible Heat Cal/m	Sensible Heat BTU/lb	Heat Capacity Cal/m/K
1 Feed Air					
Air, dry	28.962	644.3	7.	.5	6.940
2 Steam to Carbonizer					
Water Vapor	18.015	118.3	1442.	144.1	8.374
3 Coal & Sorbent Feeds					
Water Moisture	18.015	6.4	-171.	-17.1	17.997
Magnesium Carbonate	84.313	40.9	-169.	-3.6	17.613
Calcium Sulfide	72.140	.3	-107.	-2.7	11.297
Calcium Carbonate	100.088	48.1	-183.	-3.3	19.054
Sorbent Inerts	1.000	.6	-2.	-3.0	.175
Coal Ash	1.000	32.4	-2.	-3.2	.189
Coal organic matter	1.000	231.9	-2.	-4.5	.259
4 Carbonizer Drain					
Magnesium Oxide	40.304	8.2	726.	32.4	10.038
Magnesium Carbonate	84.313	12.1	1492.	31.9	20.821
Calcium Sulfide	72.140	11.2	877.	21.9	11.623
Calcium Carbonate	100.088	19.1	1618.	29.1	22.521
Sorbent Inerts	1.000	.4	15.	26.5	.205
Coal Ash	1.000	18.8	15.	27.6	.209
CD char organic	1.000	41.8	16.	29.5	.238
5 N2 Purges to carbonizer					
Nitrogen	28.014	289.8	149.	9.6	6.951
6 Freeboard gas					
Hydrogen	2.016	5.0	5705.	5093.8	7.307
Methane	16.043	12.7	11090.	1244.2	18.294
Ammonia	17.031	2.7	9263.	979.0	14.034
Water Vapor	18.015	150.5	7291.	728.5	10.124
Carbon Monoxide	28.010	58.1	6026.	387.2	8.074
Nitrogen	28.014	776.6	5962.	383.1	7.959
Ethlyene	28.054	.4	14537.	932.7	23.397
Ethane	30.070	.3	18602.	1113.5	30.465
Hydrogen Sulfide	34.076	1.5	7883.	416.4	11.331
Argon	39.948	8.3	8510.	383.4	11.361
Carbon Dioxide	44.009	185.0	9366.	383.1	13.260
Magnesium Oxide	40.304	5.6	9209.	411.3	12.314
Calcium Oxide	56.079	.7	9782.	314.0	12.918
Calcium Sulfide	72.140	3.4	10390.	259.3	14.402
Calcium Carbonate	100.088	7.9	21623.	388.9	30.267
Sorbent Inerts	1.000	.2	202.	363.1	.281
Coal Ash	1.000	13.5	201.	362.3	.274
PD char organic	1.000	60.3	289.	519.6	.449
SD char organic	1.000	2.7	289.	519.6	.449
BD char organic	1.000	5.8	289.	519.6	.449

7 N2 Purges to cyclones					
Nitrogen	28.014	33.7	149.	9.6	6.951
8 Primary cyclone Drain					
Magnesium Oxide	40.304	4.9	445.	19.9	9.683
Calcium Oxide	56.079	.3	507.	16.3	10.847
Calcium Sulfide	72.140	3.1	547.	13.6	11.515
Calcium Carbonate	100.088	7.3	988.	17.8	21.614
Sorbent Inerts	1.000	.1	9.	16.2	.196
Coal Ash	1.000	12.2	9.	17.0	.203
PD char organic	1.000	60.3	10.	17.7	.221
9 Secondary cyclone Drain					
Magnesium Oxide	40.304	.3	566.	25.3	9.848
Calcium Oxide	56.079	.1	642.	20.6	10.955
Calcium Sulfide	72.140	.1	690.	17.2	11.562
Calcium Carbonate	100.088	.3	1259.	22.6	22.031
Sorbent Inerts	1.000	.0	11.	20.6	.200
Coal Ash	1.000	.6	12.	21.6	.206
SD char organic	1.000	2.7	13.	22.8	.229
10 Dusty gas to orifice					
Hydrogen	2.016	5.0	4746.	4237.7	7.186
Methane	16.043	12.7	8742.	980.8	17.154
Ammonia	17.031	2.7	7449.	787.3	13.364
Water Vapor	18.015	150.5	5973.	596.8	9.789
Carbon Monoxide	28.010	58.1	4969.	319.3	7.891
Nitrogen	28.014	810.3	4921.	316.2	7.771
Ethlyene	28.054	.4	11517.	739.0	22.195
Ethane	30.070	.3	14670.	878.1	28.899
Hydrogen Sulfide	34.076	1.5	6413.	338.7	10.883
Argon	39.948	8.3	7024.	316.5	11.092
Carbon Dioxide	44.009	185.0	7634.	312.2	12.908
Magnesium Oxide	40.304	.5	7590.	339.0	12.149
Calcium Oxide	56.079	.4	8085.	259.5	12.736
Calcium Sulfide	72.140	.2	8518.	212.5	13.898
Calcium Carbonate	100.088	.3	17672.	317.8	29.425
Sorbent Inerts	1.000	.0	165.	296.8	.276
Coal Ash	1.000	.7	165.	297.1	.272
BD char organic	1.000	5.8	230.	414.3	.434

Heat capacity units of cal/gram-mole/deg C are the same as BTU/lb-mole/deg F.
Mass units are Pounds per hour

Comparison of unreconciled (Old) with reconciled (New) values of species flows, temperatures and compositions

F(I,J) represents molar flow of species I at node J in lb moles/hr.
F(NI,J) is conductive heat loss in BTU/hr.
T(J) represents temperature at node J in Fahrenheit.
S(I,M) moles of element M in unit weight of variable species I.
S(I,NM) is species energy content at the reference temp in BTU/lb.
Z is number of standard deviations reconciliation adjustment.
Normalized Sigma is unreconciled std. deviation divided by unreconciled measurement

@ at end of line signifies the variable is subject to inequality constraint.

Flow of species I at node J; F(I,J)

Index I				Old Value	New Value	Change	% Change	Z	Norm. Sigma
	Node	1	Feed Air						
7			Air, dry	22.652	22.245	-.407	-1.80	-1.17	.0153
	Node	2	Steam to Carbonizer						
4			Water Vapor	6.5463	6.5648	.0185	.28	.20	.0139
	Node	3	Coal & Sorbent Feeds						
14			Water Moisture	.34330	.35571	.01240	3.61	.17	.2134
17			Magnesium Carbonate	.48607	.48546	-.00061	-.13	-.04	.0346
19			Calcium Sulfide	.004721	.004721	.000000	.01	.00	.0956
20			Calcium Carbonate	.48054	.48034	-.00020	-.04	-.01	.0322
22			Sorbent Inerts	.58267	.58368	.00101	.17	.01	.1327
23			Coal Ash	33.201	32.358	-.843	-2.54	-.17	.1490
24			Coal organic matter	257.62	231.89	-25.72	-9.99	-2.98	.0335
	Node	4	Carbonizer Drain						
15			Magnesium Oxide	.32893	.20271	-.12622	-38.37	-.38	1.0000
17			Magnesium Carbonate	.11396	.14385	.02988	26.22	.26	1.0000
19			Calcium Sulfide	.21652	.15589	-.06063	-28.00	-.28	1.0000
20			Calcium Carbonate	.16866	.19037	.02171	12.87	.13	1.0000
22			Sorbent Inerts	.46250	.41667	-.04583	-9.91	-.10	1.0000
23			Coal Ash	12.989	18.811	5.823	44.83	.45	1.0000
25			CD char organic	13.354	41.825	28.472	213.21	3.64	.5857
	Node	5	N2 Purges to carbonizer						
6			Nitrogen	10.459	10.346	-.113	-1.08	-.33	.0332
	Node	6	Freeboard gas						
1			Hydrogen	2.5210	2.4998	-.0212	-.84	-.01	1.0000
2			Methane	.77976	.79075	.01099	1.41	.01	1.0000
3			Ammonia	.16216	.16015	-.00201	-1.24	-.01	1.0000
4			Water Vapor	9.9630	8.3540	-1.6089	-16.15	-.16	1.0000
5			Carbon Monoxide	2.0219	2.0735	.0517	2.56	.03	1.0000
6			Nitrogen	25.434	27.723	2.288	9.00	.09	1.0000
8			Ethlyene	.014951	.015173	.000222	1.49	.01	1.0000
9			Ethane	.010351	.010458	.000108	1.04	.01	1.0000
10			Hydrogen Sulfide	.042829	.042755	-.000075	-.17	.00	1.0000
11			Argon	.18149	.20799	.02650	14.60	.15	1.0000
12			Carbon Dioxide	4.0518	4.2039	.1521	3.75	.04	1.0000
15			Magnesium Oxide	.15041	.13891	-.01150	-7.65	-.08	1.0000
18			Calcium Oxide	.013224	.013181	-.000043	-.33	.00	1.0000
19			Calcium Sulfide	.048700	.047031	-.001669	-3.43	-.03	1.0000

20			Calcium Carbonate	.078505	.078578	.000073	.09	.00	1.0000
22			Sorbent Inerts	.16862	.16701	-.00161	-.95	-.01	1.0000
23			Coal Ash	11.817	13.547	1.730	14.64	.15	1.0000
26			PD char organic	54.714	60.324	5.610	10.25	.10	1.0000
27			SD char organic	2.6178	2.6746	.0568	2.17	.02	1.0000
28			BD char organic	5.7103	5.8154	.1051	1.84	.02	1.0000
29			Heat Loss via Conduction	100000.	96268.	-3732.	-3.73	-.12	.3041
	Node	7	N2 Purges to cyclones						
6			Nitrogen	1.2045	1.2034	-.0011	-.09	-.03	.0292
	Node	8	Primary cyclone Drain						
15			Magnesium Oxide	.13098	.12040	-.01058	-8.08	-.08	1.0000
18			Calcium Oxide	.004653	.004596	-.000057	-1.23	-.01	1.0000
19			Calcium Sulfide	.044336	.042637	-.001699	-3.83	-.04	1.0000
20			Calcium Carbonate	.072999	.073061	.000062	.09	.00	.1715
22			Sorbent Inerts	.14648	.14475	-.00172	-1.18	-.01	1.0000
23			Coal Ash	10.477	12.190	1.713	16.35	.19	.8684
26			PD char organic	54.714	60.324	5.610	10.25	1.59	.0646
	Node	9	Secondary cyclone Drain						
15			Magnesium Oxide	.007256	.006870	-.000386	-5.32	-.05	1.0000
18			Calcium Oxide	.001906	.001917	.000010	.55	.01	1.0000
19			Calcium Sulfide	.002047	.002067	.000020	.96	.01	1.0000
20			Calcium Carbonate	.002874	.002880	.000006	.22	.01	.3556
22			Sorbent Inerts	.008199	.008260	.000061	.75	.01	1.0000
23			Coal Ash	.62933	.63457	.00524	.83	.01	.7991
27			SD char organic	2.6178	2.6746	.0568	2.17	.16	.1373
	Node	10	Dusty gas to orifice						
1			Hydrogen	2.5210	2.4998	-.0212	-.84	-.15	.0547
2			Methane	.77976	.79075	.01099	1.41	.19	.0733
3			Ammonia	.16216	.16015	-.00201	-1.24	-.05	.2527
4			Water Vapor	9.9630	8.3540	-1.6089	-16.15	-1.89	.0856
5			Carbon Monoxide	2.0219	2.0735	.0517	2.56	.50	.0514
6			Nitrogen	26.639	28.926	2.287	8.59	1.48	.0581
8			Ethlyene	.014951	.015173	.000222	1.48	.04	.3462
9			Ethane	.010351	.010458	.000108	1.04	.03	.3794
10			Hydrogen Sulfide	.042829	.042755	-.000075	-.17	-.01	.2291
11			Argon	.18149	.20799	.02650	14.60	2.90	.0504
12			Carbon Dioxide	4.0518	4.2039	.1521	3.75	.74	.0505
15			Magnesium Oxide	.012172	.011642	-.000530	-4.36	-.04	1.0000
18			Calcium Oxide	.006665	.006669	.000004	.06	.00	1.0000
19			Calcium Sulfide	.002317	.002327	.000010	.43	.00	1.0000
20			Calcium Carbonate	.002632	.002637	.000005	.19	.00	.4710
22			Sorbent Inerts	.013945	.013997	.000053	.38	.00	1.0000
23			Coal Ash	.71102	.72249	.01147	1.61	.02	1.0000
28			BD char organic	5.7103	5.8154	.1051	1.84	.21	.0856
29			Heat Loss via Conduction	200000.	226319.	26319.	13.16	.43	.3042

Temperature at node J (Fahrenheit); T(J)

Index J		Old Value	New Value	Change	Z Change	Z	Norm. Sigma
1	Feed Air	78.932	78.930	-.002	.00	.00	.0290
2	Steam to Carbonizer	394.35	394.35	.00	.00	.00	.0056
3	Coal & Sorbent Feeds	60.000	59.936	-.064	-.11	.00	.2522
4	Carbonizer Drain	214.36	214.48	.12	.06	.00	.1868
5	N2 Purges to carbonizer	115.63	115.62	-.01	-.01	.00	.0444
6	Freeboard gas	1530.6	1530.5	-.1	.00	-.01	.0041
7	N2 Purges to cyclones	115.63	115.62	.00	.00	.00	.0444
8	Primary cyclone Drain	163.12	163.13	.02	.01	.00	.0676
9	Secondary cyclone Drain	185.46	185.46	.00	.00	.00	.0411
10	Dusty gas to orifice	1292.2	1292.3	.1	.01	.02	.0046

Formula subscripts for species with variable compositions; S(I,M)
(Moles of element M in unit weight of species I)

Index M			Old Value	New Value	Change	Z Change	Z	Norm. Sigma
	Species 24 Coal organic matter							
1		Hydrogen	.053478	.054193	.000715	1.34	.39	.0341
2		Carbon	.068670	.066342	-.002327	-3.39	-1.31	.0258
3		Nitrogen	.001565	.001568	.000003	.20	.04	.0548
4		Oxygen	.003793	.005482	.001689	44.52	1.17	.3820
6		Sulfur	.001207	.001212	.000005	.44	.08	.0537
10		Heat	14729.	14622.	-106.	-.72	-.28	.0262
	Species 25 CD char organic							
1		Hydrogen	.007750	.006302	-.001448	-18.69	-.27	.6963
2		Carbon	.074101	.080951	.006850	9.24	.15	.5995
3		Nitrogen	.001845	.001524	-.000321	-17.41	-.27	.6401
6		Sulfur	.002381	.000000	-.002381	-100.00	-1.00	1.0000@
10		Heat	11969.	15605.	3636.	30.38	.68	.4441
	Species 26 PD char organic							
1		Hydrogen	.008344	.008319	-.000024	-.29	-.04	.0764
2		Carbon	.077556	.079047	.001492	1.92	.47	.0405
3		Nitrogen	.001709	.001708	-.000001	-.07	-.01	.0514
6		Sulfur	.001127	.000570	-.000558	-49.47	-.49	1.0000
10		Heat	15149.	15213.	64.	.42	.11	.0387
	Species 27 SD char organic							
1		Hydrogen	.007915	.007913	-.000002	- 02	.00	1026
2		Carbon	.078269	.078306	.000038	.05	.01	.0353
3		Nitrogen	.001964	.001964	.000000	-.01	.00	.0691
6		Sulfur	.000762	.000748	-.000014	-1.84	-.02	1.0000
10		Heat	15314.	15317.	3.	.02	.01	.0403

Species 28 BD char organic

1	Hydrogen	.010571	.010567	-.000004	-.04	.00	.0819
2	Carbon	.078072	.078117	.000045	.06	.03	.0216
3	Nitrogen	.002174	.002173	.000000	-.01	.00	.0622
6	Sulfur	.000660	.000644	-.000017	-2.53	-.03	.9931
10	Heat	13759.	13762.	4.	.03	.01	.0322

Comparison of unreconciled (Old) with reconciled (New) values
of plant and lab data measurements

("Norm. Sigma" is the raw standard deviation as a fraction of the raw measurement.
Z is the adjustment as a fraction of raw sigma.)

Index KD	Plant Measurement			Old Value	New Value	Change	% Change	Z	Norm. Sigma
2	Orifice Pressure	PSIG	PI-3106	152.640	157.376	4.736	3.10	3.81	.0081
4	Total Air Feed	lb/hr	FIC-1055	656.029	644.246	-11.783	-1.80	-1.17	.0153
5	Transport N2 Feed	SCFM	FIC-1053	.533000	.494116	-.038884	-7.30	-.21	.3432
6	Bed Drain N2 Feed	SCFM	FI-3028	48.5630	48.3015	-.2615	-.54	-.21	.0253
7	N2 to spray tower	SCFM	FI-4051	39.0980	38.9676	-.1304	-.33	-.14	.0235
8	Feed lockhopper comp N2	SCFM	FI-7008	10.7080	10.3245	-.3835	-3.58	-.21	.1685
9	Purge N2 to cyclones diplegs	SCFM	FI-7020	4.77000	4.76427	-.00573	-.12	-.03	.0456
10	Purge N2 to carbonizer	SCFM	FI-7021	6.35200	6.32028	-.03172	-.50	-.21	.0235
11	Purge N2 to cyclones	SCFM	FI-7022	2.84900	2.84773	-.00127	-.04	-.03	.0170
14	Steam flow to carbonizer	lb/hr	FIC-BSTM	117.962	118.296	.334	.28	.20	.0139
15	Coal Feed rate	lb/hr		297.000	270.658	-26.342	-8.87	-3.54	.0251
16	Sorbent feed rate	lb/hr		90.0000	89.9297	-.0703	-.08	-.03	.0256
22	Air Feed Temp	deg F	TI-1059	78.9320	78.9295	-.0025	.00	.00	.0290
23	Bed Drain Temp	deg F	TIC-3027	214.361	214.485	.124	.06	.00	.1868
24	Primary Cyclone Lockhopper Temp	F	TI-3070	163.116	163.133	.017	.01	.00	.0676
25	Secondary Cyclone Lockhopper Temp	F	TI-3082	185.459	185.459	.000	.00	.00	.0411
26	FreedBoard Temp (at 27.5 ft)	F	TI-3003	1530.58	1530.51	-.07	.00	-.01	.0041
35	Carbonizer wall heat loss	KBTU/hr		100.000	96.268	-3.732	-3.73	-.12	.3041
36	Carbonizer + Cyclones heat loss	KBTU/hr		200.000	226.319	26.319	13.16	.43	.3042
37	Orifice Temp (Upstream)	F	TI-3108	1292.18	1292.28	.10	.01	.02	.0046
38	Purge N2 Temp	F	TI-7012	115.626	115.620	-.006	-.01	.00	.0444
42	Boiler Steam Temperature	F	TI-7041	394.353	394.352	-.001	.00	.00	.0056
44	CD Flow; carbonizer discharge	lb/hr		82.170	111.650	29.480	35.88	7.12	.0504
45	PD Flow; primary cyclone	lb/hr		81.3800	88.1557	6.7757	8.33	1.65	.0504
46	SD/CF Flow; secondary cyclone	lb/hr		4.09000	4.13913	.04913	1.20	.09	.1321
47	BD Flow; bag house	lb/hr		7.73000	7.82672	.09672	1.25	.15	.0818
49	Ambient Temperature	F		60.0000	59.9362	-.0638	-.11	.00	.2522

	Lab Measurement								
1	Coal - C	Mass %		71.5414	68.2704	-3.2710	-4.57	-2.72	.0168
2	Coal - H	Mass %		4.67570	4.68021	.00451	.10	.03	.0279
3	Coal - N	Mass %		1.90140	1.88196	-.01944	-1.02	-.20	.0512
4	Coal - S	Mass %		3.35570	3.32913	-.02657	-.79	-.16	.0500
5	Coal - Ash	Mass %		11.1786	11.9552	.7766	6.95	.47	.1465
6	Coal - H2O	Mass %		2.08290	2.36821	.28531	13.70	.65	.2116
7	Coal - HHV	BTU/lb		12775.6	12528.0	-247.6	-1.94	-1.11	.0175
8	CD Drain - C	Mass %		19.0400	40.9763	21.9363	115.21	9.66	.1193
9	CD Drain - H	Mass %		.130000	.243671	.113671	87.44	2.70	.3242
10	CD Drain - N	Mass %		.430000	.818661	.388661	90.39	5.23	.1729
11	CD Drain - S	Mass %		9.92000	4.58356	-5.33644	-53.79	-1.08	.5000
12	CD Drain - Ash	Mass %		93.4600	86.2980	-7.1620	-7.66	-.46	.1650
13	CD Drain - HHV (dry)	BTU/lb		2804.00	6225.23	3421.23	122.01	9.64	.1266
15	CD Drain - sfide S	Mass %		8.65000	4.58356	-4.06644	-47.01	-.47	1.0000

Index KD	Measurement		Old Value	New Value	Change	% Change	Z	Norm. Sigma
16	CD Drain - crbate C	Mass %	4.23000	3.68143	-.54857	-12.97	-.54	.2381
18	CD Drain - Ash CaO	Mass %	28.8000	20.6357	-8.1643	-28.35	-.28	1.0000
19	CD Drain - Ash MgO	Mass %	23.8000	14.8433	-8.9567	-37.63	-.38	1.0000
20	PD Drain - C	Mass %	63.4633	65.7133	2.2500	3.55	3.85	.0092
21	PD Drain - H	Mass %	.563300	.571664	.008364	1.48	.23	.0647
22	PD Drain - N	Mass %	1.60330	1.63064	.02734	1.71	.55	.0310
23	PD Drain - S	Mass %	4.16000	2.78936	-1.37064	-32.95	-.66	.5000
24	PD Drain - Ash	Mass %	34.5567	34.3290	-.2277	-.66	-.30	.0217
25	PD Drain - HHV (dry)	BTU/lb	10340.7	10545.6	204.9	1.98	2.18	.0091
27	PD Drain - sfide S	Mass %	1.74000	1.54472	-.19528	-11.22	-.11	1.0000
28	PD Drain - crbate C	Mass %	1.07330	.99165	-.08165	-7.61	-.47	.1632
30	PD Drain - Ash CaO	Mass %	24.2333	22.2064	-2.0269	-8.36	-.08	1.0000
31	PD Drain - Ash MgO	Mass %	18.7000	15.9731	-2.7269	-14.58	-.15	1.0000
32	CF/SD Drain - C	Mass %	58.5500	59.1223	.5723	.98	.51	.0192
33	CF/SD Drain - H	Mass %	.490000	.494570	.004570	.93	.10	.0952
34	CF/SD Drain - N	Mass %	1.69000	1.70601	.01601	.95	.16	.0579
35	CF/SD Drain - S	Mass %	3.04000	3.02276	-.01724	-.57	-.01	.5000
36	CF/SD Drain - Ash	Mass %	35.3700	35.0741	-.2959	-.84	- 16	.0525
37	CF/SD Drain - HHV (dry)	BTU/lb	9954.0	10049.8	95.8	.96	.48	.0202
39	CF/SD Drain - sfide S	Mass %	1.54000	1.53627	-.00373	-.24	.00	1.0000
40	CF/SD Drain - cabate C	Mass %	.810000	.802111	-.007889	-.97	-.03	.3357
42	CF/SD Drain - Ash CaO	Mass %	25.4000	25.4447	.0447	.18	.00	1.0000
43	CF/SD Drain - Ash MgO	Mass %	19.4000	18.3024	-1.0976	-5.66	-.06	1.0000
45	BD Drain - C	Mass %	68.1600	68.5900	.4300	.63	.33	.0191
46	BD Drain - H	Mass %	.770000	.774178	.004178	.54	.07	.0777
47	BD Drain - N	Mass %	2.20000	2.21256	.01256	.57	.10	.0571
48	BD Drain - S	Mass %	2.47000	2.43245	-.03755	-1.52	-.03	.5000
49	BD Drain - Ash	Mass %	27.1100	26.8576	-.2524	-.93	-.18	.0528
50	BD Drain - HHV (dry)	BTU/lb	10261.0	10322.1	61.1	.60	.30	.0201
52	BD Drain - sfide S	Mass %	.940000	.932416	-.007584	-.81	-.01	1.0000
53	BD Drain - crbate C	Mass %	.400000	.395806	-.004194	-1.05	-.02	.4680
55	BD Drain - Ash CaO	Mass %	30.4000	30.3556	-.0444	-.15	.00	1.0000
56	BD Drain - Ash MgO	Mass %	22.9000	21.8349	-1.0651	-4.65	-.05	1.0000
57	Demister Gas - N2	mol,vol %	75.9750	76.6969	.7219	.95	.89	.0107
58	Demister Gas - O2	mol,vol %	1.24500	1.09235	-.15265	-12.26	-1.23	.1001
59	Demister Gas - CO	mol,vol %	4.39500	4.29242	-.10258	-2.33	-1.06	.0221
60	Demister Gas - CH4	mol,vol %	1.69500	1.63692	-.05808	-3.43	-.60	.0568
61	Demister Gas - CO2	mol,vol %	8.80750	8.70244	-.10506	-1.19	-.60	.0199
62	Demister Gas - C2H4	mol,vol %	.032500	.031410	-.001090	-3.35	-.10	.3431
63	Demister Gas - C2H6	mol,vol %	.022500	.021650	-.000850	-3.78	-.10	.3765
64	Demister Gas - H2S	mol,vol %	.093100	.088506	-.004594	-4.93	-.22	.2244
65	Demister Gas - H2	mol,vol %	5.48000	5.17473	-.30527	-5.57	-1.92	.0290
66	Demister Gas - NH3	mol,vol %	.352500	.331533	-.020967	-5.95	-.24	.2484
67	Demister Gas - Ar	mol,vol %	.450000	.479233	.029233	6.50	3.85	.0169
79	Water Content in Freeboard Gas	mol,vol %	22.0500	18.1289	-3.9211	-17.78	-2.61	.0680
82	Sorbent - CaO	Mass %	57.6000	57.6181	.0181	.03	.01	.0234
83	Sorbent - MgO	Mass %	41.4667	41.4449	-.0218	-.05	-.02	.0258
84	Sorbent - SO3	Mass %	.800000	.800624	.000624	.08	.01	.0898
85	Sorbent - Ash	Mass %	1.23330	1.23634	.00304	.25	.02	.1286

PERFORMANCE SUMMARY

Raw and reconciled figures of merit with 95% (1.96 sigma) confidence intervals

Parameter	Raw value	Raw +/-	Reconciled value	Reconciled +/-
Air Oxygen / Carbon in Coal (mol/mol)	.269	.024	.304	.022
Air Oxygen/Carbon in Coal (lb/lb)	.716	.063	.809	.058
Feed Air / (Moisture Free) Feed Coal (lb/lb)	2.256	.166	2.438	.163
Feed Air / Feed Coal (lb/lb)	2.209	.161	2.380	.158
Total Char / MF Coal Feed (lb/lb)	.603	.246	.801	.134
Orifice Gas Produced / MF Coal Feed (lb/lb)	4.094	.419	4.673	.304
Orifice Gas Produced / Coal Feed (lb/lb)	4.008	.408	4.562	.294
Purge-Free Gas Produced / MF Coal Feed (lb/lb)	2.970	.380	3.449	.247
Purge-Free Gas Produced / Coal Feed (lb/lb)	2.908	.371	3.367	.239
Coal carbon % conversion to hydrocarbon -CH4	4.41	.73	5.14	.79
Coal carbon % conversion to hydrocarbon -C2H4	.169	.116	.197	.125
Coal carbon % conversion to hydrocarbon -C2H6	.117	.088	.136	.094
Coal carbon % conversion to hydrocarbon gas-Total	4.69	.76	5.47	.81
Coal carbon conversion to gas fm solid analysis	66.74	10.25	42.68	8.20
Coal carbon conversion to gas from gas analysis	35.60	4.64	42.68	3.99
Water-Gas Shift Constant = CO2*H2/(CO*H2O) =	.507	1.988	.607	.105
Water-Gas Shift Temperature (Degree F)	1897.	2901.	1771.	115.
Coal Nitrogen released from solids (%)	66.3	11.9	49.2	28.0
Released Nitrogen to Ammonia (%)	60.6	33.7	89.5	69.5
Coal Nitrogen going to Ammonia (%)	40.2	20.6	44.0	22.0
Feed Ca / Total Feed S Ratio (mol/mol)	1.54	.21	1.70	.22
Feed Ca / Total Feed S Ratio (lb/lb)	1.92	.26	2.12	.28
Sorbent Ca Conversion [Ca in discharge] (%)	54.7	89.7	41.8	25.7
Coal Sulfur Released (%)	68.1	59.9	85.7	76.2
Coal Sulfur captured by sorbent [gas analysis](%)	54.3	60.4	70.5	76.6
Product Solids Combined Rate, lb/hr	175.4	128.7	211.8	32.9
Coal HHV, moisture-free basis, BTU/lb	13047.3	805.2	12831.9	770.5
Freeboard gas mean molecular weight, wet	25.601	5.927	26.066	.210
Orifice gas mean molecular weight, wet	25.664	.380	26.116	.205
Demister gas mean molecular weight, wet	25.940	.336	26.335	.182
Solid Species as Percents of Composite Mixture				
% in product of Magnesium Oxide	11.02	15.96	6.50	4.08
% in product of Magnesium Carbonate	5.48	10.74	5.73	7.83
% in product of Calcium Oxide	.42	.52	.35	.36
% in product of Calcium Sulfide	10.91	17.82	6.91	4.22
% in product of Calcium Carbonate	14.11	18.92	12.71	4.95
% in product of Sorbent Inerts	.36	.54	.28	.07
% in product of Coal Ash	14.14	17.75	15.28	9.00
% in product of char organic matter	43.56	9.62	52.24	6.38
Organic Elements as Percents of Composite Solid Mixture				
% in product of Hydrogen	.37	.12	.40	.21
% in product of Carbon	40.30	11.97	50.01	6.34
% in product of Nitrogen	1.08	.36	1.22	.66
% in product of Sulfur	1.81	2.58	.61	3.24

FREEBOARD GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.521	5.579	7.158	2.500	5.425	6.626
Methane	.780	1.726	2.214	.791	1.716	2.096
Ammonia	.162	.359	.460	.160	.348	.425
Water Vapor	9.963	22.050	.000	8.354	18.129	.000
Carbon Monoxide	2.022	4.475	5.741	2.074	4.500	5.496
Nitrogen	25.434	56.291	72.215	27.722	60.161	73.482
Ethlyene	.015	.033	.042	.015	.033	.040
Ethane	.010	.023	.029	.010	.023	.028
Hydrogen Sulfide	.043	.095	.122	.043	.093	.113
Argon	.181	.402	.515	.208	.451	.551
Carbon Dioxide	4.052	8.967	11.504	4.204	9.123	11.143
TOTAL GAS	45.183	100.000	100.000	46.080	100.000	100.000

ORIFICE GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.521	5.435	6.921	2.500	5.287	6.421
Methane	.780	1.681	2.141	.791	1.672	2.031
Ammonia	.162	.350	.445	.160	.339	.411
Water Vapor	9.963	21.477	.000	8.354	17.668	.000
Carbon Monoxide	2.022	4.359	5.551	2.074	4.385	5.326
Nitrogen	26.639	57.426	73.133	28.926	61.174	74.302
Ethlyene	.015	.032	.041	.015	.032	.039
Ethane	.010	.022	.028	.010	.022	.027
Hydrogen Sulfide	.043	.092	.118	.043	.090	.110
Argon	.181	.391	.498	.208	.440	.534
Carbon Dioxide	4.052	8.734	11.124	4.204	8.891	10.798
TOTAL GAS	46.387	100.000	100.000	47.284	100.000	100.000

DEMISTER GAS COMPOSITION

Species	RAW Flow (mol/hr)	RAW mole % Wet	RAW mole % Dry	RECONCILED Flow (mol/hr)	RECONCILED mole % Wet	RECONCILED mole % Dry
Hydrogen	2.521	4.796	5.917	2.500	4.677	5.544
Methane	.780	1.483	1.830	.791	1.480	1.754
Ammonia	.162	.308	.381	.160	.300	.355
Water Vapor	9.963	18.952	.000	8.354	15.631	.000
Carbon Monoxide	2.022	3.846	4.745	2.074	3.880	4.599
Nitrogen	32.820	62.432	77.031	35.086	65.650	77.813
Ethlyene	.015	.028	.035	.015	.028	.034
Ethane	.010	.020	.024	.010	.020	.023
Hydrogen Sulfide	.043	.081	.101	.043	.080	.095
Argon	.181	.345	.426	.208	.389	.461
Carbon Dioxide	4.052	7.707	9.510	4.204	7.866	9.323
TOTAL GAS	52.569	100.000	100.000	53.445	100.000	100.000

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