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Energy

FOSSIL

REVISED SRC-I PROJECT BASELINE

April 1984

Work Performed Under Contract No. AC05-78OR03054

International Coal Refining Company
Allentown, Pennsylvania

Technical Information Center
Office of Scientific and Technical Information
United States Department of Energy

DISCLAIMER

6,000 TPD SRC-1 PROJECT
NEWMAN, KENTUCKY

INTERNATIONAL COAL REFINING COMPANY
ALLENTOWN, PA.

TITLE
INDEX FLOW DIAGRAM FOR PRODUCT AREAS

FIGURE 4

DATE - MAY 1983
Rev. 1 - March 30, 1984

DWG. NO.

REV. 1


NRSR
DPU
RGC
GASIFICATION
WASH WATER TREAT.
SHIFT
AIR SEPARATION
DEA UNIT
SOUR WATER TREATMENT
SELEXOL
METHANATION
CONDENSATE TO BSRU
HYDROGEN PURIFICATION
LPG RECOVERY
SULFUR RECOVERY - CLAUS PLANT
SULFUR RECOVERY-BEAVON SULFUR REMOVAL
6,000 TPD SRC-1 PROJECT
NEWMAN, KENTUCKY
INTERNATIONAL COAL
REFINING COMPANY
ALLENTOWN, PA.
INDEX FLOW DIAGRAM
FOR
SUPPORTING PROCESSES
FIGURE 5
TITLE
DATE - MAY, 1983
Rev. 1 - March 30, 1984
DWG. NO.
REV.
1

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REVISED SRC-I PROJECT BASELINE

VOLUME 1

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International Coal Refining Company
Allentown, Pennsylvania

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EXECUTIVE SUMMARY

International Coal Refining Company (ICRC), in cooperation with the Commonwealth of Kentucky has contracted with the United States Department of Energy (DOE) to design, build and operate a first-of-its-kind plant demonstrating the economic, environmental, socioeconomic and technical feasibility of the direct coal liquefaction process known as SRC-I. ICRC has made a massive commitment of time and expertise to design processes, plan and formulate policy, schedules, costs and technical drawings for all plant systems. These fully integrated plans comprise the Project Baseline and are the basis for all future detailed engineering, plant construction, operation, and other work set forth in the contract between ICRC and the DOE.

Volumes I and II of the accompanying documents constitute the updated Project Baseline for the SRC-I two-stage liquefaction plant. The original Project Baseline was released to the DOE in March 1982. International Coal Refining Company believes this versatile plant design incorporates the most advanced coal liquefaction system available in the synthetic fuels field. SRC-I two-stage liquefaction, as developed by ICRC, is the way of the future in coal liquefaction because of its product slate flexibility, high process thermal efficiency, and low consumption of hydrogen. The SRC-I Project Baseline design also has made important state-of-the-art advances in areas such as environmental control systems.

The Baseline reflects ICRC's commitment to assure the SRC-I plant meets all applicable environmental standards. In completing the Project Baseline, International Coal Refining Company has succeeded in translating the project goal of protecting human health and the environment into a series of specific design and operating innovations. Taken together, these provisions represent a major commitment to environmental quality.

Because of a lack of funding, the DOE has curtailed the total project effort without specifying a definite renewal data. This precludes the development of revised accurate and meaningful schedules and, hence, escalated project costs. ICRC has revised and updated the original Design Baseline to include in the technical documentation all of the approved but previously non-incorporated Category B and C and new Post-Baseline Engineering Change Proposals.

COSTS

The Original and Revised Baseline cost estimates, in first-quarter FY 1982 dollars, before contingency and rounded to the nearest million, are summarized and compared below. Without a definitive schedule for the resumption of the project, proper allowances for escalations cannot be made. Furthermore, the capital cost estimate and cash flow will be subject to revision to take into consideration the attendant engineering start-up costs and the state of business activity at the time of resumption. Nevertheless, the decrease in the updated cost estimate, the amount of an allowance for engineering start-up costs and, any changes in the escalation factors from those assumed in the original Baseline will have a minor impact on the total cost of the project.

	Original (000)	Revised (000)
Engineering (Phase I)*	$ 376,000	$ 376,000
Construction and Initial Operations (Phase II)	1,501,000	1,490,000
	$1,877,000	$1,866,000

*Includes $10,285,000 Phase 0 cost in "as spent" dollars.

SCHEDULE

In the absence of a definite restart date, a specific project schedule cannot be developed. The schedule presented herein is the schedule for the Original Project Baseline. It is maintained for reference only to indicate relative time spans. Any new schedule must make allowances for the times necessary to bring aboard and to mobilize the engineering and construction subcontractors, and for them to review the Design Baseline and to consider any possible new technological developments. These time allowances could span one year and must be inserted at the front-end of the existing schedule.

The schedule called for construction of the original Baseline plant to begin in October 1982 and be completed in December 1987. Inflation was to add to the cost of the project. Using the rates as directed by DOE, inflation would be $565 million. Using Office of Management and Budget (OMB) rates, inflation would add $365 million. If current inflation trends were to continue, the escalation would be even less.

During the first two and one half years (test period) of operation, the revenues from plant production would have exceeded expenses by approximately $200 million (based on: 1) the 1981 Energy Information Agency's price projection; 2) DOE recommended escalation rates; and 3) ICRC's baseline cost projections). The industrial partners have the option to purchase the plant at the conclusion of the demonstration period for its economic value which was estimated at $1.558 billion. Therefore, the total estimated net cost to the government for the Baseline plant would have been approximately $1.3 billion--when construction cost, net operation revenues, buyout, and the industrial partners' cost sharing were all considered.

BACKGROUND

This demonstration program traces its roots to 1976 when Rust Engineering Company received a contract from the Commonwealth of Kentucky to design a 2,000 ton-per-day Solid SRC facility near Owensboro, Kentucky. At the time, the Rust-designed direct liquefaction plant was considered the most ambitious project of its kind. Rust Engineering is a subsidiary of Wheelabrator-Frye Inc. who, in partnership with Air Products and Chemicals, Inc., formed the International Coal Refining Company.

Additional tests, review of the technical information provided by the 2,000 ton-per-day plant design data and consideration of the economics of various sizes of plants led the U.S. Government, Wheelabrator-Frye and Air Products and Chemicals to support the design and construction of a 6,000 ton-per-day plant. In 1980, at the suggestion of International Coal Refining Company and based on the engineering and development tests performed on proposed SRC-I integrated systems, the plant design was further modified to include an array of liquid energy products in addition to the solid fuels. International Coal Refining Company was then contracted by the Department of Energy to complete a baseline for the SRC-I Refinery based on this highly flexible process which allows a wide range of liquid and solid energy products.

While ICRC began detailed design of the more flexibile SRC process, tests continued on the marketability of the solid product. The importance to national security of SRC liquid products such as naphtha was, and still is, self-evident.

However, the solid product was not certain to be of interest to as large a range of customers as SRC liquids. Then, in 1980, a major breakthrough strengthened the economics of the solid product. The Pittsburgh Energy Technology Center completed tests proving SRC can be burned as a powder, melt, solid-oil, or solid-water mixtures in utility boilers designed for "oil only". In addition, SRC's combustion characteristics have proved to be almost identical to oil. This breakthrough opened a wide range of new potential markets for the clean-burning SRC-I product. These and other subsequent tests indicate that this new fuel could directly displace No. 6 fuel oil and could command a comparable price on the open market.

SYNTHETIC FUELS CORPORATION

As the SRC demonstration project continued its testing to certify design technology and the viability of the synthetic fuels program, outside domestic and world forces brought other variables into play.

During the past several years, changes in the world energy market and the domestic political climate have combined to produce a new U.S. energy policy. Industry has been asked to take a larger role in synthetic fuels development. The Federal Government role has turned to an emphasis on construction of major synthetic fuels plants through the Synthetic Fuels Corporation and sponsorship of limited long-range synthetic fuels research through the Department of Energy.

Understandably, ICRC is considering the Synthetic Fuels Corporation as a source of project funding. International Coal Refining has submitted a proposal to the SFC. At present, however, ICRC cannot discuss either the financial or technical details of potential funding by the SFC.

DEPARTMENT OF ENERGY

ICRC has completed and now submits its revised Project Baseline to the United States Department of Energy for its review of the environmental, technical and economic strengths of the project. As reflected by the work completed thus far, ICRC remains committed to proving the technical feasibility, economic viability and environmental acceptability of direct coal liquefaction.

Department of Energy Contract No. DE-AC05-78-ORO-3054 calls for International Coal Refining Company (ICRC), in cooperation with the Commonwealth of Kentucky, to perform the work necessary to design, build, and operate the SRC-I Demonstration Plant. In partial fulfillment of this contract, ICRC has prepared and is submitting for Department of Energy (DOE) review the revised SRC-I Project Baseline.

The Project Baseline is a set of documented decisions that constitute an established reference position for controlling work and costs. Included are a documented design configuration for the Demonstration Plant, a documented estimate of the costs to perform the work specified by the DOE Contract, and a detailed schedule of the original time needed to perform this work. The Baseline data and decisions encompass all work specified to be performed in the three phases of the DOE Contract: Phase I, Engineering Design; Phase II, Procurement and Construction; Phase III, Operations.

SRC-I PROJECT DEVELOPMENT PHILOSOPHY

The SRC-I Project has been undertaken to demonstrate the technical feasibility, environmental acceptability and economic viability of the SRC-I direct coal-liquefaction process. This demonstration is intended to promote energy independence by generating products that can substitute for products derived from oil, and to promote the establishment of a commercial, private-sector SRC-I industry without additional demonstrations or experimental work. The plant is sized to process 6,000 tons of coal per day and to produce the oil equivalent of 20,000 barrels per day of fuels and energy products. The plant can be expanded to a commercial facility, following a successful demonstration period, by adding four additional modules.

The DOE Contract provides ICRC with the option of buying out the government's interest in the plant following the demonstration period, as a prelude to enlarging the facility to commercial size.

The general approach used for the design and construction of the plant has been outlined in the ICRC Project Management Plan, which has been submitted to the DOE, and in Appendix A of the DOE/ICRC Contract. The following concept is set forth in Appendix A:

> Since this is a demonstration plant and will contain some prototype equipment and/or processes, some areas of it will be equipped with more than the normal commercial plant instrumentation and controls to allow analysis of the test operation required of a demonstration facility.
>
> Since the plant is also planned as the first module of a commercial plant, and since it must demonstrate its economic viability in the demonstration phase, it will be designed in accordance with good industrial practice for a commercial plant, with the potential for operating for 20 years at a cost-effective production rate. The plant will be designed to attain design capacity with commercially available coal feedstock, with a target of 90 percent onstream and utilization factors, after the initial period of commissioning, startup, shakedown and test operation, and after the accomplishment of the modifications found during this period to be required. The plant will be designed with the equipment redundancy, installed spares, operating flexibility and product line flexibility required by good industrial practice for commercial operation. It will be provided adequately with the other facilities required for long-term commercial operation, such as buildings, roads, maintenance facilities, spare parts stock, etc.

This concept has guided the work of ICRC and its subcontractors and is the foundation of their work in the SRC-I Project.

With the concurrence of the DOE, all cost estimates in the original Project Baseline were expressed in two ways: in constant Fiscal Year 1982 dollars, and also in dollars for the fiscal year in which costs will be incurred. The second set of cost estimates includes escalation factors calculated as follows: 10 percent added to all costs incurred in Fiscal Years 1982 and 1983; 9 percent added to all costs incurred in Fiscal Years 1984 and 1985; 8 percent added to all costs incurred in Fiscal Year 1986 and thereafter.

Appendices to the Baseline contain a listing and description of Category B and Category C Engineering Change Proposals, which were defined by ICRC and reviewed by the Department of Energy as the original Baseline was being finalized. A similar, supplementary list of Post-Baseline Engineering Change Proposals has been added to Appendix B. These Category B and Category C and Post-Baseline Engineering Change Proposals were incorporated into the technical documentation of the Revised Baseline. They altered the technological configuration of the plant but did not change the overall scope, aims or intent of the SRC-I Project. Category B, C, and Post-Baseline Engineering Change Proposals resulted in a net savings in the overall project cost estimate.

Costs for Phases 0, I, and II of the SRC-I Project, as calculated in the original Baseline were as follows:

	1st Qtr. FY82 Dollars (000)	Escalated Dollars (000)
Phase 0 - Feasibility Evaluation	$ 10,285	$ 10,285
Phase I - Design Engineering	365,187	399,537
Phase II - Construction & Commissioning	1,501,230	2,032,416
Total Before Contingency	$1,876,702	$2,442,238
Contingency -		
Phase I		32,647
Phase II		419,217
Total		451,864
Total Cost		$2,894,102

Updated costs, in first quarter Fiscal Year 1982 dollars only, for Phases 0, I, and II as calculated for this Revised Cost Baseline, are as follows:

	1st Qtr. FY82 Dollars (000)
Phase 0 - Feasibility Evaluation	$ 10,285
Phase I - Design Engineering	365,720
Phase II - Construction & Commissioning	1,489,539
Total Before Contingency	$1,865,544
Contingency -	
Phase I	36,572
Phase II	289,285
Total	$ 325,857
Total Unescalated cost	$2,191,401

Because of the lack of a specific project restart date, and hence, a definitive schedule and, because meaningful escalation rates have not been given nor agreed by DOE, no attempt has been made here to escalate the revised costs. In this Revised Project Baseline, all capital costs are expressed in first-quarter FY 82 dollars only.

The original schedule called for construction of the Demonstration Plant to be completed in December, 1987. Inflation would add to the cost of the project. Using rates as directed by the DOE, $565 million in inflation has been included in the "Escalated Dollars" column. If current inflation trends were to continue, the escalation would be less.

During the first two and one-half years (test period) of operation, the revenues from plant production would have exceeded expenses by approximately $200 million based on: (1) the 1981 Energy Information Agency's price projection; (2) DOE's recommended escalation rates; and (3) ICRC's Baseline cost projections. The industrial partners have the option to purchase the plant at the conclusion of the demonstration period for its economic value which was estimated at $1.558 billion. Therefore, the total estimated net cost to the government for the Baseline plant would have been approximately $1.3 billion--when construction cost, net operation revenues, buyout, and the industrial partners' cost-sharing were all considered.

THE SRC-I DEMONSTRATION PLANT--AN OVERVIEW

As documented in the Project Baseline, the SRC-I Demonstration Plant will demonstrate all of the major technological systems and processes associated with the production of synthetic fuels from coal. Generally, these systems and processes must be demonstrated at or near commercial scale before a coal-based U.S. synthetic fuels industry can proceed to commercialization. The Demonstration Plant will accomplish this demonstration in a single, integrated facility.

Process steps in the plant will include the following: coal drying and pulverization; coal gasification; coal liquefaction; production of coal-based liquid process solvent; removal of ash and sulfur from coal; solidification of low ash, low sulfur products; upgrading of coal liquids via expanded bed hydrocracking; naphtha hydrotreating; production of high carbon anode coke; the production of elemental sulfur; and generation of enough process gases including oxygen, nitrogen and hydrogen to sustain the plant at design level.

The Baseline reference data include documentation of the various analyses, studies, and research programs leading to the design and selection of major technologies, as well as the choice of major components for the plant.

As specified in the Baseline, the design coal-feed rate to the plant is 6,000 tons per stream day (TPSD) of washed coal. Of this amount, approximately 5,600 TPSD will be processed in the SRC coal liquefaction unit; the remainder will be fed to the gasification system to produce hydrogen for the process.

In the SRC liquefaction area, coal will be mixed with a process solvent. The mixture will be hydrogenated at high temperature and pressure, and converted into solvent-refined coal (SRC) plus liquid and gaseous fuels.

Further processing will remove ash, sulfur, and other impurities from the molten SRC. Residue from the deashing step will be sent to the gasification system for hydrogen production. Gasifying the SRC ash residue will also render it into an environmentally acceptable solid waste.

One-third of the molten SRC will be solidified as product, another third will be fed to the Delayed Coker/Calciner to produce anode coke, and the final third will be fed to the Expanded Bed Hydrocracker for additional hydrogenation to convert the molten SRC to intermediate liquid feedstocks for the Product Oil Fractionator.

Although the Baseline calls for one-third of the first-stage SRC product to be hydrocracked, design provisions will allow up to two-thirds of this product to be routed through the Expanded Bed Hydrocracker. This design flexibility will enable ICRC to adapt to market demands when products are offered for sale. The product slate produced when the plant is operated, as specified in the Revised Baseline, is as follows:

Naphtha	3,809 barrels per stream day
Middle Distillate	4,846 barrels per stream day
Heavy Oil	827 barrels per stream day
Calcined Coke	573 tons per stream day
SRC Solid	884 tons per stream day
TSL Solid	169 tons per stream day
LPG	45 tons per stream day
Sulfur	193 tons per stream day

The Demonstration Plant will be a self-sufficient facility except for the supply items of coal, water, air, chemicals, catalysts, and electricity. All other utilities and process raw materials will be generated within the plant.

The proposed SRC-I plant site at Newman, Kentucky contains 28 separate land parcels representing approximately 1,484 acres. The plant will require an area of approximately 750 acres to be graded to meet requirements for flood protection elevation, erosion and the plot plan. Approximately 4,300,000 cubic yards of grading will be required for the area. Additional site acreage will be reserved for expanding the plant to commercial size.

Although the Final Environmental Impact Statement (FEIS) has been published, the National Environmental Policy Act (NEPA) process for the SRC-I Project has not been completed. Options are held on most of the property until 25 August 1984 unless subsequently extended; however, ICRC will not acquire any of the 28 parcels until completion of the NEPA process and the issuance of a DOE Record of Decision has committed the proposed site to the project. Rezoning will not commence until ICRC, the Commonwealth of Kentucky, or the United States Government controls the entire site.

The design coal feed to the plant will be washed, Kentucky No. 9 high-volatile bituminous coal. ICRC has selected a two-stage coal-procurement strategy to attain the goals of the demonstration program. This strategy incorporates the following objectives:

- assuring a feed coal supply compatible with schedule, plant operation, and overall operability requirements;
- maintaining flexibility to adapt to changing project feed requirements and market conditions;
- obtaining maximum value through overall yield efficiency;
- obtaining reasonable prices for coal delivered;
- developing competition and encouraging small-business participation; and
- facilitating transition to commercial operations.

MAJOR AREAS OF THE SRC-I DEMONSTRATION PLANT

THE SRC PROCESS AREA

ICRC has engaged Catalytic, Inc., of Philadelphia, Pennsylvania to design the SRC Process Area. This area produces Solvent-Refined Coal (SRC), a low-sulfur, low-ash solid fuel that can substitute for coal as well as liquid fuels and energy products that can replace oil-derived products for industry, utilities, and transportation.

In the SRC Process Area, pulverized coal is mixed with a process-derived solvent, heated to approximately 840°F at about 2,000 psig, and reacted with hydrogen to remove sulfur and other impurities. The Kerr-McGee proprietary

Critical Solvent Deashing process is then used to remove ash and other solids from the SRC product.

The SRC Process Area will contain two carbon-steel SRC-I reactor vessels, each of which will be approximately 76 feet high and 11 feet in diameter. Vessel walls will approach 11 inches in thickness. These will be the largest pressure vessels ever designed and fabricated for a coal-liquefaction facility.

The SRC Process Area consists of ten subareas, each of which is described in detail in the Baseline: Integrated Facilities; Slurry Preparation and Pumping; Slurry Heater; Hydrogen Recovery and Dissolver; Process-Solvent Recovery and Compressors; Vacuum Column; Critical Solvent Deashing; Solidification; Engineering Technical Support; and Area Management.

GAS SYSTEMS AREA

ICRC has engaged the Ralph M. Parsons Company of Pasadena, California to design the Gas Systems Area of the Demonstration Plant. This area includes Gasification, Gas Treating, and Sulfur Recovery Subareas.

In the Gasification Subarea, coal and process residue from the deashing unit are gasified to produce gas streams that yield hydrogen used in the SRC Process and for Expanded Bed Hydrocracking and Hydrotreating. The Gesellschaft für Kohle-Technologie (GKT) proprietary coal-gasification technology will be used.

In the Gas Treating Subarea, hydrogen-rich gas streams produced by coal gasification are cleaned, treated, and compressed before being conveyed to the other process areas. The Gas Treating Subarea performs the same operations on recycle gas streams that are produced in other areas of the refinery as by-products of the process steps. One of the streams produced in the Gas Treating Subarea will be liquefied petroleum gas (LPG), which will be stored and used as fuel in the plant.

In the Sulfur Recovery Subarea, sulfur removed from the plant's products in the process steps is recovered and stored for sale as a commercial by-product.

The Gas Systems Area will include three operating GKT gasifier trains. Other systems in this area include, but are not limited to: Selexol Unit, Shift Unit, Diethanolamine Unit, Methanation Unit, Beavon-Stretford Unit, and Claus Unit.

The Gas Systems Area will generate 77.5 million cubic feet of hydrogen per day for use in the process areas of the SRC-I Refinery.

CRYOGENIC SYSTEMS AREA

ICRC has engaged Air Products and Chemicals, Inc. of Allentown, PA to design the Cryogenic Systems Area of the Demonstration Plant. In this area, atmospheric air is separated cryogenically to provide oxygen for use in the gasification process and nitrogen for use as a blanketing inert gas, a stripping gas, and a conveying medium for ash residue. Also, in a separate system, the purity of the recycle-hydrogen stream is upgraded by the rejection of hydrocarbon contaminants.

THE EXPANDED-BED HYDROCRACKING AREA

ICRC has engaged the C-E Lummus Company of Bloomfield, New Jersey to design the Expanded Bed Hydrocracking Area of the Demonstration Plant. In this Area, SRC product from the SRC Process Area is upgraded via expanded-bed hydrocracking and converted to intermediate liquid feedstocks which are further processed by the Product Oil Fractionator in the SRC Process Area. The conversion of SRC also coproduces an off-gas which is a significant contribution to the plant fuel gas system. The Expanded Bed Hydrocracking Area will use the proprietary LC-Fining technology developed by C-E Lummus and Cities Service Company.

THE COKER/CALCINER AREA

ICRC also has engaged the C-E Lummus Company to design the Coker/Calciner Area. In this Area, SRC product from the SRC Process Area is converted into high-purity, low-sulfur anode coke, which is an essential material for smelting aluminum. Anode coke is currently produced from petroleum, but the low-sulfur coke produced in this area can directly replace petroleum-based coke.

The Coker/Calciner Area will employ partially proprietary technology developed by C-E Lummus.

UTILITIES AND OFF-SITES AREAS

ICRC has engaged Rust Engineering Company of Birmingham, Alabama to design the Utilities and Off-Sites Areas of the plant. Services and facilities provided in these Areas include, but are not limited to, those described in the following section.

Power

The Green River Electric Company will supply electrical power at 161 kilovolts which will be transformed on site to 13.8 kilovolts and distributed to a series of substations throughout the plant. The normal power load will be approximately 120 megawatts. Baseline design includes adequate on-site facilities to generate emergency electrical power for critical services if partial or full power outages occur.

Water

Water will be withdrawn from the Green River at a nominal rate of 4.2 million gallons per day (8.6 million gallons maximum), and will undergo treatment in an on-site treatment plant to provide process water for the Demonstration Plant. Cooling water will be supplied to the process areas by using conventional mechanical draft cooling towers and support systems. The total facility recirculation rate will exceed 110,000 gallons per minute.

Potable water will be supplied from wells on the site at a nominal rate of 35 gallons per minute (898 gallons per minute maximum). The potable water will be treated on site and will meet applicable federal and state regulations for water quality.

Waste Disposal

The plant will generate approximately 1.5 million gallons per day (3.7 million gallons per day maximum) of wastewater, which will be treated on-site by two waste treatment systems. Included will be treatment for toxic metal and oil removal, two-stage biological treatment, wet air oxidation, filtration, reverse osmosis, and aerated stabilization. Treatment effluent from the two systems will be recycled for use in cooling the plant process areas.

The SRC-I Demonstration Plant will generate approximately 30,600 cubic yards of hazardous solid waste and approximately 14,000 cubic yards of nonhazardous solid wastes per year, which will be stored in landfills designed and constructed in accordance with the Resource Conservation and Recovery Act (RCRA) regulations and all other applicable federal, state, and local ordinances.

An integrated, environmentally acceptable emergency flare system will be provided to dispose of process waste materials and process upsets. The single derrick-type elevated flare will be designed to handle 1 million pounds per hour of hydrocarbon releases. A Liquid Thermal Oxidizer sized to handle 2,500 pounds per hour of oil wastes and a vent gas incinerator sized to burn 2,500 pounds per hour of waste gases will be provided.

Transportation and Site Access

Rail service to the plant will be provided via a connection to an existing L&N Railroad track which runs along the north boundary of the site. The on-site rail system will include a dual rail loop and marshalling yard. Total requirements will be 93,700 linear feet of railroad.

Highway access is via U.S. Highway 60, which also parallels the northern boundary of the site. Two existing roads connect the site with U.S. Highway 60.

Fire Protection

The fire protection system will follow Factory Mutual (FM) and National Fire Protection Association (NFPA) guidelines for refineries and coal-handling facilities. Mobile fire-fighting equipment with foam capacity and portable equipment will be included. Each of two independent water sources and their associated pumps will be capable of supplying the 7,500 gallons per minute (gpm) maximum water demand needed for fire protection.

Coal Handling

The coal-handling and storage system will be capable of receiving by railroad 6,000 TPSD of dry coal, blending up to six different coals from the 30,000-ton storage piles, and storing a total of 180,000 tons of coal in long-term, emergency piles.

Coal Preparation

The coal-preparation system will be capable of: (1) drying the as-received coal to a maximum of two percent total moisture content; (2) pulverizing it to pass 90 percent through 170 mesh; and (3) feeding a nominal 5,600 TPSD, dry basis, to the SRC Process Area while feeding 400 TPSD to the Gasifiers. All coal-storage, -handling and -preparation systems will be designed to meet present and anticipated standards for the control of emissions and pollutants.

Product Storage

A system will be provided to receive and ship 2,200 TPSD of solid products. The storage capacity of the system will be 60,000 tons. For the storage of liquid products, the Baseline specifies a tank farm consisting of 14 cone-roof tanks with a total capacity of 450,000 barrels of liquids. Tank storage area design includes dikes, fire-fighting facilities and necessary associated piping.

CONSTRUCTION OF THE SRC-I REFINERY

ICRC has selected Stone & Webster Engineering Company of Boston, Massachusetts as Construction Manager/Constructor (CM/C) for the SRC-I Project. During Phase I and Phase II the CM/C will perform activities leading up to on-site construction and will assume primary responsibility for management of on-site construction work.

A peak force of 4,000 craftspeople will build the SRC-I Demonstration Plant during the 48 month on-site construction period. Approximately 18.9 million worker-hours will be required to complete on-site construction work.

Following on-site work, the CM/C will assist ICRC and its subcontractors with final Phase II activities which lead to Phase III (Operations) of the project.

Construction Strategy

The CM/C will have primary responsibility on the site for management of plant construction activities. The overall construction strategy to be employed is based on a least cost premise. This strategy involves the identification of construction packages and determining the method of execution for these packages on the basis of maximum flexibility and minimum cost within the schedule restraints and in relation to other construction packages. The method of carrying out the work may vary in approach depending upon prevailing conditions.

The organizational approach of the CM/C is to establish a central management staff for overall site construction and establish four area management offices for support of construction in the specific areas. All bulk purchases and warehousing will be handled by the CM/C.

At peak level, the CM/C staff on-site will total 483. In addition, there will be provisions at the site for approximately 140 ICRC personnel connected with the management of the Construction Phase and 25 personnel from the Department of Energy.

A comprehensive Procurement Plan will be developed for Phase II of the project. Intensive planning sessions will be conducted at the outset of Phase II by the CM/C, representatives of the area contractors and representatives of the ICRC project team to: identify first priority procurements; review previously established project schedules; identify various contractor interfaces and sequences; and initiate preparation of procurement plans, schedules, and procedures.

Utilizing the information developed in the intensive planning sessions, the CM/C will prepare an overall Procurement Plan. The Procurement Plan will consist of a Subcontract Plan addressing subcontractors for fixed price construction packages; a plan for using small business concerns and small business concerns owned by and controlled by socially and economically disadvantaged individuals, and a plan for addressing the purchasing of materials and equipment.

A purchasing team and sufficient Contract Administrators will be assigned to the field organization on the construction site by the CM/C. This team will be responsible for all site-related procurement activities and for administration of the subcontracts. This includes assuring that all data requirements are obtained from subcontractors, and approving progress payments, contract changes, disposition of claims, and final payment/contract closeout.

The CM/C will comply with the ICRC Procurement Manual and 41 CFR Chapter 1, Federal Procurement Regulations and 41 CFR, Chapter 9, Department of Energy Procurement Regulations.

The CM/C technical staff, construction supervisors and engineers will be assisted by specialists from equipment suppliers and the area contractors. The mission of the technical staff will be to insure that proper care is given to all construction details to prevent or minimize problems during commissioning. The technical staff will also assess and evaluate work progress.

FIELD SAFETY PROGRAM

Throughout the construction phase a corporate field safety program will be employed to provide an accident-prevention standard equal to, or more rigorous than, the requirements of federal, state, and local laws. These safety practices will also protect project facilities and equipment from misuse and damages, will seek out the causes of accidents, and will promote a self-protective, safety-minded working attitude among all employees.

Subcontractors will be required to submit their own safety programs to the CM/C for approval and coordination with the overall corporate programs.

Security requirements specific to the construction site for the SRC-I Demonstration Plant will be evaluated in detail once the site has been occupied, and a comprehensive security program for the site will be developed.

LABOR RELATIONS

To promote and maintain harmonious labor relations during construction, the CM/C's labor-management personnel will follow a carefully prepared plan. Basic to this plan is an in-depth survey of the labor situation in the location where construction will take place. The survey will assess: availability and productivity of labor based upon demands for manpower in the labor market; general terms and conditions of employment prevailing in the area; prevailing customs, practices, and understandings of the area which are not part of negotiated agreements; and the labor history of the area. The results of the survey and analysis will be summarized in a report for use by the construction-management team.

OPERATIONS

The current project schedule provides a period of approximately 16 months to commission the plant, as defined in the DOE Contract. The first half of this period will be devoted to commissioning the utilities, the coal-handling system, the Air Separation Unit and the Gas Systems Area. During the second half, the SRC Process Area will be commissioned, followed by the Coker/Calciner and Expanded-Bed Hydrocracker. When all of these units are commissioned, startup will begin.

START-UP

The Contract states that the plant will be ready for start-up when:

- all areas have been fully commissioned;
- necessary modifications, additions, debottlenecking, or upgrading has been accomplished, or can be scheduled without interfering with operating objectives, and
- the plant is ready for sustained operation to produce the full product slate, including solid SRC, anode coke, and hydrotreated oil products.

A period of two and one-half years is provided following completion of commissioning for start-up and the test operation period. ICRC recognizes that this is an ambitious time period in which to evaluate a plant of this size and complexity, which contains new technology and equipment prototypes. To minimize problems that might reduce on-stream time essential to Contract goals, the Baseline specifies more equipment or system redundancy for prototype or new-application units than normal commercial practice would dictate for an established process. In other cases, normal industrial practice is followed.

EMPLOYMENT AND TRAINING

A key factor in the success of the SRC-I Project will be the employment of skilled personnel at the plant. To this end, ICRC will coordinate training programs for operating and maintenance personnel. An equal opportunity employment program for ICRC and an affirmative action plan will be developed to meet the objectives for employment and promotion of minority employees.

The projected staff for the SRC-I Demonstration Plant can be summarized as follows:

	Exempt	Nonexempt	Total
Management and Administrative	25	12	37
Technical Support	19	32	51
Occupational Health	5	3	8
Production	33	195	228
Maintenance	24	199	223
Total ICRC Employees	106	441	547
Average Number of Contractors'			
Supervisory and Hourly			210
Plant Total			757

Although some of the technical and supervisory personnel who have been working on Phase I will transfer to the plant staff, many of the new employees probably will be recruited locally or elsewhere.

The ICRC Manufacturing Department will be responsible for checkout and commissioning and recruiting/training during Phase II. Preparation for checkout and commissioning, or precommissioning, will begin when the commitment to build the plant is made. Precommissioning activities will be directed toward the planning and preparation for plant acceptance and commissioning.

Checkout and commissioning activities have been divided into four phases for each area indicated on the Project Schedule. These phases are as follows:

- Phase IIA--Preoperational Checkout: After completion of testing and written acceptance of the area from Construction, Manufacturing representatives will continue to operate the equipment or systems with simulants or process materials.
- Phase IIB--Commissioning: Equipment or systems will be run in with simulants or process materials, as appropriate, in preparation for the operation of the entire area to produce products.
- Phase IIC--Commissioning/Downstream Support: The area will be commissioned by operating it with simulants, followed by process materials, until specification products are produced consistently.

Then the area will be operated to supply specification products to storage, or to supply downstream systems or areas with feed materials.

- Phase IID--Commissioning/Optimization: The system or area will be operated to continue supplying products to storage or feed materials to downstream systems or areas. Concurrently, operating conditions will be optimized, and rates will be increased as practical, until design conditions are attained or problems and limitations are identified and corrected.

Detailed plans for these commissioning activities will be prepared during Phase II, after the plant supervisory and technical staff is recruited and trained.

A general plan for sequential commissioning of the plant by area is presented in Chapter VII of the Baseline. ICRC Manufacturing Department representatives will direct activities during all four phases in each area to accomplish the tasks set forth.

PROJECT MANAGEMENT

ICRC is a partnership of Air Products and Chemicals, Inc., and Wheelabrator-Frye Inc., two companies with extensive experience in energy systems, in synthetic fuels research and development, and in the design and construction of process plants for private industry. The partner companies have assigned key personnel to ICRC and have recruited and hired the additional staff necessary to perform work related to the SRC-I Project. Although ultimate responsibility for the project rests with the Department of Energy, management has been assigned to ICRC as the prime contractor.

As detailed in the Baseline, ICRC's management efforts are directed toward the successful completion of each phase of work and also toward activities necessary for evaluating the commercialization of the SRC-I process.

As prime contractor, ICRC ensures compliance with all provisions of the DOE/ICRC Contract and is responsible for the preparation and delivery of all Contract deliverables.

ICRC's primary management mission is carried out in the Operations Division, which has responsibility for technology development and design, procurement, construction, and operation of the SRC-I Demonstration Plant. The Division manages each of the area construction subcontractors, as well as the R&D and environmental programs. Operations establishes design priorities, identifies research needs, evaluates design and research results, and makes adjustments to improve design quality and costs.

Within the Operations Division, Engineering Technology provides technical information required for detailed design, construction, and operation. Engineering Technology is also responsible for the technical integrity of the designs supplied by the subcontractors.

Project Engineering is responsible for the detailed design, procurement, and construction of the plant by the engineering/construction subcontractors.

Manufacturing is responsible for providing operations information required for engineering, design, construction, start-up, and operation.

A Management Systems Group has been established within the Operations Division. This group coordinates planning and scheduling, prepares independent cost estimates to check the estimates used in the budgets, and monitors the progress of work completion in relation to cost expenditures and project schedule. The Management Plan and the Cost and Schedule Control System (CSC/S) are two of the principal management tools used by the Management Systems Group.

To optimize the economics of coal refining, the Business Management Division identifies potential coal supplies plus markets for the SRC-I product slate. This requires laboratory and pilot plant testing of potential coal supplies in the laboratory and testing of products in existing applications. Within the Business Management Division, individual groups are responsible for coal supply and distribution, planning, product development and application engineering programs, and market development activities.

The Government and Public Affairs Division serves as liaison for ICRC with government, media, and the public. It maintains staffs in Washington, D.C., in Allentown, Pennsylvania, and in Owensboro, Kentucky, near the selected site for the plant.

The Finance/Administration Division provides ICRC with contract administration, purchasing, legal, accounting, financial and office service functions.

ICRC has prepared a comprehensive Project Management Plan (PMP) for the accomplishment of the project. Revision 2 of the plan has been forwarded to DOE. The PMP will be updated and revised as detailed information is developed and becomes available. ICRC will implement the procedures and systems defined in the PMP.

Also, ICRC has developed and will implement the following plans which supplement the PMP: Configuration Management Plan; Project Baselining Plan; Cost Schedule/Control Systems Criteria Plan; Safety Program Plan; Environmental Plan/Construction; Interface Management Implementation Plan; Technology Transfer Plan; Quality Assurance Plan; By-Product Disposition Plan; Document Control Plan; Procurement Manual; General Engineering Specifications; Socioeconomic Impact Assessment; ICRC Position Descriptions Volume; Research and Development Plan; Manpower Plans; Critical Technology Plans; Product Demonstration Plan, and; Master Project Procedures.

Except for sections of the Manpower Plans, the documents listed above have been previously forwarded to the DOE or are included in this Baseline.

TECHNICAL SUPPORT ACTIVITIES

Design confirmation has been established as a project-management activity to provide expertise in the areas of data-analysis instrumentation, materials selection, corrosion control, process-equipment design, mechanical equipment review, process development, and critical technology analysis. Such knowledge will help to maximize the probability of successfully operating the plant and will help to assure that the highest standards of operability and integrity are incorporated into critical technology equipment and systems.

As part of design confirmation activities, work performed by area contractors and vendors will be reviewed to ensure that it is consistent with the best available data and is compatible with acceptable standards for operability, safety, reliability, maintainability, quality, environmental requirements, and costs.

Construction materials and instrumentation will be inspected in the shop and in the field. Data from ICRC and other ongoing DOE and non-DOE development programs will be evaluated and used to assist in the final detailed design and the installation of process equipment. Aid will be provided, as necessary, in the execution of design changes that result from significant new technical information.

ICRC will initiate and monitor subcontracted testing to resolve problems in equipment design. Commissioning, start-up, and maintenance procedures will be reviewed as they become available. Field support will be provided during commissioning and start-up.

To ensure the technical viability of the SRC-I Demonstration Plant, the data base for its design, construction, and operation must be supported during Phases I and II. Activities in this work element include process R&D, technical support of the Wilsonville Pilot Plant, and data analysis. The Process R&D Plan, which ICRC submitted to DOE as a deliverable in Phase I, is described in Baseline Appendix B, Section 5.0. The R&D Plan identifies gaps in technology and proposes specific experimental programs to address them.

The scope of work for the data base includes identifying, coordinating, evaluating, and managing partner-affiliated and subcontracted R&D, as well as managing of the R&D Plan itself. Also included is the monitoring of the R&D work of other DOE contracts (e.g., Oak Ridge National Laboratory and the Pittsburgh Energy Technology Center).

An important part of the technical support required to ensure success of the SRC-I Project must come from the Wilsonville Pilot Plant. A Wilsonville Technical Support Plan covering a one-year period was developed and will be managed as part of this work element.

In accordance with the contract between DOE and ICRC, steady-state and dynamic models of the facility and its components will be developed. The models will be adequate for use as operating training tools.

The "ASPEN" steady-state simulation model developed by the Massachusetts Institute of Technology with DOE funding was assessed and deemed to be applicable for design and operation, was upgraded and will be utilized.

PRODUCT DEVELOPMENT AND COMMERCIAL DEVELOPMENT ACTIVITIES

The overall strategy for Product Development and Commercial Development activities is to demonstrate the commercial viability of the SRC-I technology. Both short-term demonstration product markets and long-term commercial product markets will be addressed with emphasis on large premium value market applications for SRC-I demonstration product utilization.

ICRC's Planning Group has continued its market analysis activities, which provide the necessary research basis to define the markets for the demonstration- and commercial-plant products. The technical feasibility, economic viability, and environmental acceptability of SRC-I products in various energy markets has been evaluated to the level that product characterization has been completed and product demonstration agreements are in place.

Commercial development activities have been directed toward identifying various energy market opportunities now served by imported oil and comparative product advantages and disadvantages. New SRC-I products will be identified and developed, as appropriate, if and when the project is reinstated.

Business analysis activities have focused on analysis and evaluation of the SRC-I products from the demonstration and commercial plants in terms of size, economics, alternative product mix, and product costs.

Product utilization activities will demonstrate the successful commercial viability of the SRC-I technology. The short-term demonstration product markets and the long-term commercial product markets will be addressed. Priority will be given to the placement of SRC-I products as substitutes for petroleum-derived products.

The overall product utilization activities will continue to be based on the integrated operation of three action programs: market analysis, product demonstration and application engineering (PD&AE), and sales.

Market analyses has identified and determined the size of target markets for SRC-I products, and addressed both existing and future markets for SRC-I product applications. These activities will require updating as the domestic and internatonal environments change.

Product demonstration and application engineering activities have been identified, and a plan for implementation and supervision of the applications and development tests and the future evaluation of SRC-I products in the target markets has been developed. The objective of the PD&AE programs will be to evaluate and address any challenges related to product utilization.

Future sales activities will be directed toward the execution of the product demonstration use contracts for the purchase of SRC-I demonstration products in priority target markets. Priority market applications are those in which the SRC-I product is demonstrated to be technically feasible, economically viable, environmentally acceptable, commercially profitable, and applicable to many markets.

ENVIRONMENTAL, PERMITTING, AND LAND-ACQUISITION SUPPORT ACTIVITIES (EPLA)

Environmental support consists of six related, but separate, project support activities: pollution-control engineering, toxicity testing, environmental monitoring, permitting, worker health protection, and environmental assessment.

Pollution-control engineering services are needed to develop design criteria for all elements of the Demonstration Plant that may cause, contribute to, or otherwise be associated with the release or discharge of pollutants to the environment. ICRC pollution-control specialists systematically review the area contractor design deliverables to confirm that design criteria are being incorporated faithfully into the Demonstration Plant design.

A toxicity testing program for the products and process intermediates of the Demonstration Plant will be completed to assess in a responsible manner the potential toxic hazards. Program activities include planning, management of subcontract laboratory testing, quality assurance, and data review and interpretation. The program scope includes physical/chemical characterization, environmental fate studies, and human and ecosystem toxicity testing. Program results will be used for: the Premanufacturing Notification required by the Environmental Protection Agency pursuant to the provisions of the Toxic Substance Control Act; the development of Material Safety Data Sheets to be used by product transporters and consumers; and continued development of a comprehensive worker health protection program. Program results are also expected to enhance government and public acceptance of SRC-I products and the plans for their distribution and use.

A comprehensive environmental monitoring program will provide the data needed to identify and characterize, in a quantitive and scientifically rigorous fashion, any environmental effects that may be caused by constructing and operating the Demonstration Plant.

The program scope includes aquatic, atmospheric, and terrestrial system studies to be conducted in four phases paralleling the Baseline, construction, start-up, and operation phases of the Demonstration Plant. A detailed scope of work for the Baseline phase of the program was approved by the DOE and published on 10 August 1981, as the Preconstruction Environmental Monitoring Program Plan for the SRC-I Demonstration Project. The Phase II scope will provide for the continuation of monitoring at a reduced level, and will include additional studies designed to examine the expected effects of plant construction activities on the local environment.

The ICRC permitting staffs will conduct those activities necessary to secure the permits associated with construction and operation of the Demonstration Plant. More than a dozen major permits, primarily environmental permits, are needed from federal and state regulatory authorities in connection with air contaminant sources, hazardous waste and solid waste management facilities, the wastewater treatment system, and a number of other plant facilities and systems.

The worker health protection program has four primary functions. The first function is to provide industrial hygiene to the design process. The second is to safeguard the health of ICRC employees and subcontractors who are engaged in research and development studies with SRC-I materials. The third function is to assist in protecting the health of construction workers on the Demonstration Plant. The fourth, and perhaps the most important program function, is to prepare a detailed plan for protecting of the health of the Demonstration Plant work force. This plan will include provisions for worker education, safe work practices, monitoring of the work, and monitoring of the maintenance of records. An outline of this Worker Health Protection Plan is contained in the Project Baseline, Phases IIIA and IIIB, Chapter V.

SRC-I PROJECT SCHEDULE

More than 65,000 individual activities will be performed by ICRC and its subcontractors during the life of the SRC-I Project. The Project Schedule is a time-phased depiction of this network of tasks that defines the ways in which the tasks interrelate during the eight years required to complete the project. The Project Baseline Schedule provides both early and late start/complete dates for each activity. This permits progress monitoring for all activities and enables ICRC to exercise particular control, where necessary, for activities critical to timely completion of the project.

As indicated in the Schedule, key dates for the SRC-I Project are as follows. If and when the project is reinstated, a new schedule must be developed which would incorporate about a one-year time span at the outset to bring aboard and mobilize the engineering and construction subcontractors, after which the utilization of the listed time spans could be considered:

15 June 1982	Begin procurement selection process (bid request)
15 October 1982	FEIS record of decision
1 November 1982	Begin Phase II (equipment fabrication)
15 April 1983	Move on site
15 February 1985	Complete Phase I
15 December 1985	Begin commissioning - electrical power distribution system
22 August 1986	Begin commissioning - boiler
December 1987	Complete Phase II, begin Phase IIIA
June 1988	Begin Phase IIIB
June 1990	Complete Phase IIIB

The Executive Schedule follows. It provides an overview of the entire project and is presented in Gantt bar chart format. The Executive Schedule indicates approximately 100 Project Milestones and is supported by appropriate Milestone logs.

DOE Form CR435
(1-78)

U.S. DEPARTMENT OF ENERGY

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification: PRODUCT - EXECUTIVE SCHEDULE

2. Reporting Period: through

3. Contract Number:

4. Contractor (name, address): SRC and COKE AND LIQUID PRODUCTS

5. Contract Start Date:

6. Contract Completion Date:

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1981 (OND), 1982 (JFM AMJ JAS), 1983 (OND JFM AMJ JAS), 1984 (OND JFM AMJ JAS), 1985 (OND JFM AMJ JAS), 1986 (OND JFM AMJ JAS), 1987 (OND JFM AMJ)	10. Percent Complete a) Planned	b) Actual
1.2	DESIGN	A1 B C F E2 D G I B1 D1		
1.2	PROCUREMENT	T V S U X W Y		
1.2	CONSTRUCTION	J K L H P N O,Q		

11. Remarks: Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date

13. Signature of Government Technical Representative and Date

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 20 PAGE 1

CONTRACT 00100 RUN 29MAR82 00-1-4821 ICRC EXECUTIVE SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: PRODUCT WBS ELEMENT NUMBER: 1.2

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
1.2A	BGN PROC DSGN	02JAN80	02JAN80	2JAN80		
1.2A1	BGN DSGN SUPPORT PROGRAMS	01OCT81		1OCT81	06JUN85	
1.2B	BGN DETAILED DSGN	03NOV80	03NOV80	3NOV80		
1.2B1	BGN OPER SUPPORT PROGRAMS	12AUG86		12AUG86	12DEC86	
1.2B2	COMPL DSGN SUPPORT PROGRAMS	29APR83		29APR83	20MAR87	
1.2C	1ST M/SR COMPL	09JUN82		9JUN82	16JAN84	
1.2D	2ND M/SR COMPL	03NOV83		3NOV83	24MAY84	
1.2D1	COMPL OPER SUPPORT PROGRAMS	10AUG87		10AUG87	10DEC87	
1.2F	BGN PSAR	20JUL82		20JUL82	12JAN84	
1.2G	COMPL PSAR	25JUL84		25JUL84	12FEB86	
1.2H	1ST SIGNIFICANT CONSTR PKG	26JAN82		26JAN82	31DEC84	
1.2I	END PH 1	04FEB85		4FEB85	12JUN86	
1.2J	1ST CONSTR PKG AWARD (S/C)	27OCT83		27OCT83	17MAY85	
1.2K	BGN STEEL ERECTION	14MAR84		14MAR84	09OCT85	
1.2L	BGN PIPE	04SEP84		4SEP84	04FEB86	
1.2M	BGN ELEC	16OCT84		16OCT84	25AUG86	
1.2N	COMPL STEEL ERECTION	10NOV86		10NOV86	08MAY87	
1.2O	COMPL PIPE	24DEC86		24DEC86	22JUN87	
1.2P	COMPL ELEC	13OCT86		13OCT86	2JUN87	
1.2Q	MECH COMPL	24DEC86		24DEC86	22JUN87	
1.2R	BGN ISS MAJOR EQUIP SPECS	01DEC80	01DEC80	1DEC80		
1.2S	COMPL ISS MAJOR EQUIP SPECS	03DEC82		3DEC82	21AUG83	
1.2T	BGN ISS P.O/BGN VNDR ENG-MAJ EQUIP	09SEP82		9SEP82	28DEC85	
1.2U	COMPL ISS P.O/BGN VNDR ENG-MAJ EQ	28APR83		28APR83	13DEC83	
1.2V	1ST COMPL VNDR ENG/BGN FAB	18NOV82		18NOV82	11MAR85	
1.2W	LAST COMPL VNDR ENG/BGN FAB	26SEP83		26SEP83	04SEP84	
1.2X	START DEL TO SITE-MAJOR EQUIP	13JUN83		13JUN83	30SEP85	
1.2Y	COMPL DEL TO SITE-MAJOR EQUIP	28MAR85		28MAR85	07MAR86	

0 28 RECORDS, TOTAL ACTIVITY WEIGHT = 0

DOE Form CR-635
(1-78)

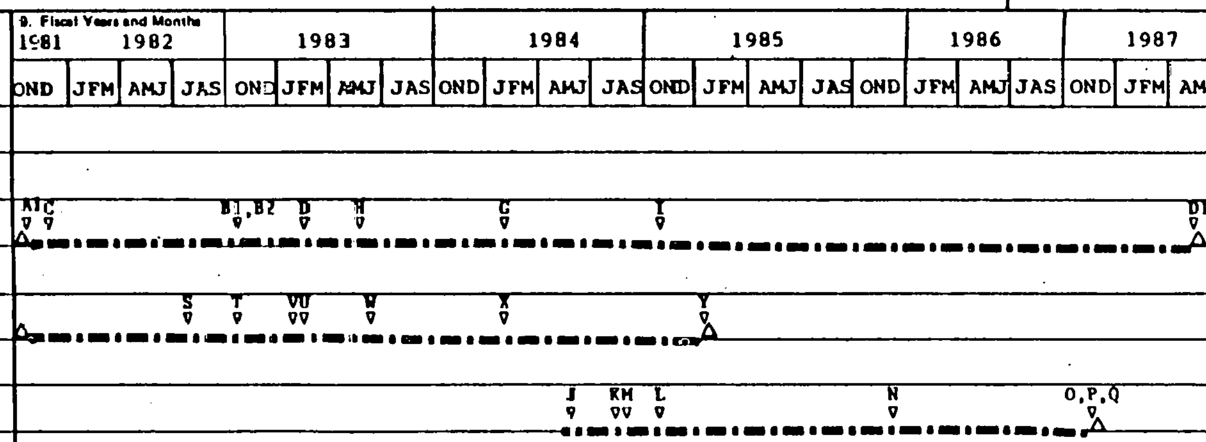
U.S. DEPARTMENT OF ENERGY

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification	2. Reporting Period	3. Contract Number
SUPPORT PROCESSES - EXECUTIVE SCHEDULE	through	

4. Contractor (name, address)	5. Contract Start Date / 6. Contract Completion Date
CRYOGENIC SYSTEMS and GAS SYSTEMS	

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1981 OND; 1982 JFM AMJ JAS; 1983 OND JFM AMJ JAS; 1984 OND JFM AMJ JAS; 1985 OND JFM AMJ JAS; 1986 OND JFM AMJ JAS; 1987 OND JFM AMJ	10. Percent Complete a) Planned	b) Actual
1.3	DESIGN			
1.3	PROCUREMENT			
1.3	CONSTRUCTION			



XXX

11. Remarks

Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 21 PAGE 1

CONTRACT 00100 RUN 29MAR82 00-1-4821 ICRC EXECUTIVE SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SUPPORT PROCESSES WBS ELEMENT NUMBER: 1.3

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
1.3A	BGN PROC DSGN	23JUN80	23JUN80	23JUN80		
1.3A1	BGN DSGN SUPPORT PROGRAMS	01OCT81		1OCT81		
1.3B	BGN DETAILED DSGN	11JUL80	11JUN80	11JUL80		
1.3B1	BGN OPER SUPPORT PROGRAMS	19OCT82		19OCT82	01AUG83	
1.3B2	COMPL DSGN SUPPORT PROGRAMS	19OCT82		19OCT82	05JUN85	
1.3C	1ST M/SR COMPL	22DEC81		22DEC81		
1.3D	2ND M/SR COMPL	28FEB83		28FEB83	21 JUN 84	
1.3D1	COMPL OPER SUPPORT PROGRAMS	29MAY87		29MAY87	10DEC87	
1.3F	BGN PSAR	23JAN81	23JAN81	23JAN81		
1.3G	COMPL PSAR	18JAN84		18JAN84	23JUL84	
1.3H	1ST SIGNIFICANT CONSTR PKG	27MAY83		27MAY83	23OCT84	
1.3I	END PH 1	02OCT84		2OCT84	17JAN86	
1.3J	1ST CONSTR PKG AWARD (S/C)	04MAY84		4MAY84	25JUN84	
1.3K	BGN STEEL ERECTION	21AUG84		21AUG84	15JAN85	
1.3L	BGN PIPE	25OCT84		25OCT84	22JUL85	
1.3M	BGN ELEC	12SEP84		12SEP84	12AUG85	
1.3N	COMPL STEEL ERECTION	12DEC85		12DEC85	23SEP86	
1.3O	COMPL PIPE	24NOV86		24NOV86	06APR87	
1.3P	COMPL ELEC	03NOV86		3NOV86	24NOV86	
1.3Q	MECH COMPL	24NOV86		24NOV86	06APR87	
1.3R	BGN ISS MAJOR EQUIP SPECS	27JAN81	27JAN81	27JAN81		
1.3S	COMPL ISS MAJOR EQUIP SPECS	28JUL82		28JUL82	23FEB83	
1.3T	BGN ISS P.O/BGN VNDR ENG-MAJ EQUIP	21OCT82		21OCT82	12OCT83	
1.3U	COMPL ISS P.O/BGN VNDR ENG-MAJ EQ	09FEB83		9FEB83	02AUG83	
1.3V	1ST COMPL VNDR ENG/BGN FAB	19JAN83		19JAN83	03MAR83	
1.3W	LAST COMPL VNDR ENG/BGN FAB	20JUN83		20JUN83	19JUN85	
1.3X	START DEL TO SITE-MAJOR EQUIP	28FEB84		28FEB84	04DEC85	
1.3Y	COMPL DEL TO SITE-MAJOR EQUIP	21JAN85		21JAN85	19JUN85	

0 28 RECORDS. TOTAL ACTIVITY WEIGHT = 0

U.S. DEPARTMENT OF ENERGY

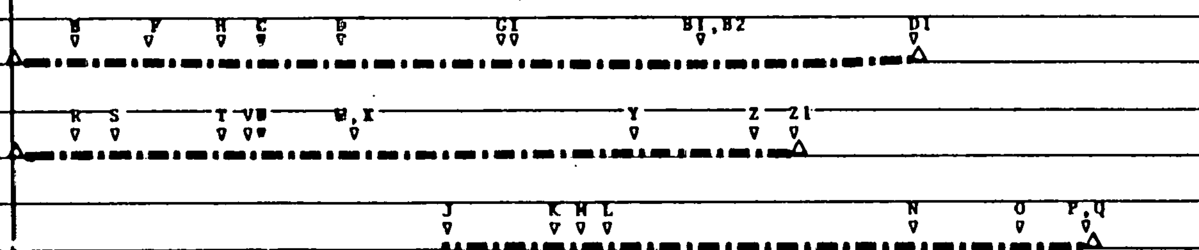
DOE Form CR436 (1-78)

MILESTONE SCHEDULE AND STATUS REPORT

PAGE 1 OF 1

1. Contract Identification OUTSIDE BATTERY LIMITS FACILITIES & CENTRAL CONTROL SYSTEM - EXECUTIVE SCHEDULE	2. Reporting Period through	3. Contract Number
4. Contractor (name, address) UTILITIES AND OFFSITES and CENTRAL CONTROL SYSTEM		5. Contract Start Date
		6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1981 OND; 1982 JFM AMJ JAS; 1983 OND JFM AMJ JAS; 1984 OND JFM AMJ JAS; 1985 OND JFM AMJ JAS; 1986 OND JFM AMJ JAS; 1987 OND JFM AMJ	10. Percent Complete a) Planned	b) Actual
1.4	DESIGN			
1.4	PROCUREMENT			
1.4	CONSTRUCTION			



11. Remarks

Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

XXXII

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 22 PAGE 1

CONTRACT 00100 RUN 29MAR82 00-1-4821 ICRC EXECUTIVE SCHEDULE - REV #01-U IT=DAY

REPORTING ELEMENT: OBLF & CCS WBS ELEMENT NUMBER: 1.4

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
1.4A	BGN PROC DSGN	01OCT81		1OCT81	09SEP82	
1.4A1	BGN DSGN SUPPORT PROGRAMS	01OCT81		1OCT81		
1.4B	BGN DETAILED DSGN	08JAN82		8JAN82	08APR82	
1.4B1	BGN OPER SUPPORT PROGRAMS	16JAN85		16JAN85	12DEC86	
1.4B2	COMPL DSGN SUPPORT PROGRAMS	16JAN85		16JAN85	12DEC86	
1.4C	1ST M/SR COMPL	10DEC82		10DEC82	11MAY83	
1.4D	2ND M/SR COMPL	22APR83		22APR83	08DEC83	
1.4D1	COMPL OPER SUPPORT PROGRAMS	14JAN86		14JAN86	10DEC87	
1.4F	BGN PSAR	11MAY82		11MAY82	20MAY83	
1.4G	COMPL PSAR	11JAN84		11JAN84	05JUL85	
1.4H	1ST SIGNIFICANT CONSTR PKG	23SEP82		23SEP82	10JAN84	
1.4I	END PH 1	27FEB84		27FEB84	20AUG85	
1.4J	1ST CONSTR PKG AWARD (S/C)	20OCT83		20OCT83	06APR84	
1.4K	BGN STEEL ERECTION	11APR84		11APR84	20JUN84	
1.4L	BGN PIPE	03JUL84		3JUL84	16AUG84	
1.4M	BGN ELEC	14JUN84		14JUN84	05SEP85	
1.4N	COMPL STEEL ERECTION	31JAN86		31JAN86	14JUL87	
1.4O	COMPL PIPE	07JUL86		7JUL86	17SEP86	
1.4P	COMPL ELEC	14NOV86		14NOV86	09DEC87	
1.4Q	MECH COMPL	14NOV86		14NOV86	09DEC87	
1.4R	BGN ISS MAJOR EQUIP SPECS	20JAN82		20JAN82	20DEC82	
1.4S	COMPL ISS MAJOR EQUIP SPECS	25MAR82		25MAR82	04NOV83	
1.4T	BGN ISS P.O/BGN VNDR ENG-MAJ EQUIP	23SEP82		23SEP82	01AUG84	
1.4U	COMPL ISS P.O/BGN VNDR ENG-MAJ EQ	06DEC82		6DEC82	29APR83	
1.4V	1ST COMPL VNDR ENG/BGN FAB	18NOV82		18NOV82	09MAR83	
1.4W	LAST COMPL VNDR ENG/BGN FAB	09MAR83		9MAR83	15AUG84	
1.4X	START DEL TO SITE-MAJOR EQUIP	16MAR83		16MAR83	19MAR85	
1.4Y	COMPL DEL TO SITE-MAJOR EQUIP	18SEP84		18SEP84	12NOV84	
1.4Z	BGN CONTROL SYS DEL	09APR85		9APR85	03OCT86	
1.4Z1	COMPL CONTROL SYS DEL	21JUN85		21JUN85	10DEC86	

0 30 RECORDS, TOTAL ACTIVITY WEIGHT = 0

U.S DEPARTMENT OF ENERGY

MILESTONE SCHEDULE AND STATUS REPORT

DOE Form CR436 (1-76)

1. Contract Identification: PROJECT MANAGEMENT & SUPPORT - EXECUTIVE SCHEDULE	2. Reporting Period through	3. Contract Number
4. Contractor (name, address)		5. Contract Start Date
		6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months 1983 AMJJASOND	1984 JFMAMJJASOND	1985 JFMAMJJASOND	1986 JFMAMJJASOND	1987 JFMAMJJASOND	1988 JFMAMJJASOND	1989 JFMAMJJASOND	10. Percent Complete a) Planned	b) Actual
1.5	PROJECT MANAGEMENT & SUPPORT	A			B	C		D		

11. Remarks
Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 23 PAGE 1

CONTRACT 00100 RUN 29MAR82 00-1-4821 ICRC EXECUTIVE SCHEDULE - REV #01-U IT=DAY

REPORTING ELEMENT: PROJECT MANAGEMENT & SUPPORT WBS ELEMENT NUMBER: 1.5

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
1.5A	COMPL LAND ACQ & REZONE	05APR83		5APR83	20JUN83	
1.5B	BGN COAL DEL	18APR86		18APR86	17SEP86	
1.5C	BGN 1ST PRODUCT DEL	29DEC87		29DEC87	20JUN90	
1.5D	BGN LAST PRODUCT DEL	26SEP89		26SEP89	20JUN90	

0 4 RECORDS. TOTAL ACTIVITY WEIGHT = 0

DOE Form CR436
(1-78)

U.S. DEPARTMENT OF ENERGY

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification OPERATIONS & PHASE III - EXECUTIVE SCHEDULE	2. Reporting Period through	3. Contract Number
4. Contractor (name, address)		5. Contract Start Date
		6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months 1984 JASOND	1985 JFMAMJJASOND	1986 JFMAMJJASOND	1987 JFMAMJJASOND	1988 JFMAMJJASOND	1989 JFMAMJJASOND	1990 JFMAMJJASO	10. Percent Complete a) Planned	b) Actual
1.6	OPERATIONS & PHASE III	A				B C		D		

11. Remarks
Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 24 PAGE 1

CONTRACT 00100 RUN 29MAR82 00-1-4821 ICRC EXECUTIVE SCHEDULE - REV #01-U IT=DAY

REPORTING ELEMENT: OPERATIONS WBS ELEMENT NUMBER: 1.6

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
1.6A	BGN START UP	15AUG84		15AUG84	04JUN86	
1.6B	COMPL START UP	11DEC87		11DEC87	11DEC87	
1.6C	COMPL OPER PH IIIA	24JUN88		24JUN88	24JUN88	
1.6D	COMPL OPER PH IIIB	22JUN90		22JUN90	22JUN90	

0 4 RECORDS. TOTAL ACTIVITY WEIGHT = 0

CHAPTER I. SRC-I PROJECT (WBS 1.0)

A. TECHNICAL SCOPE

1. PROCESS DESCRIPTION

The SRC-I (Solvent Refined Coal) Demonstration Plant will be designed and built to process a nominal 6,000 tons-per-stream-day (TPSD) of coal, on a moisture-free basis, to demonstrate the technical feasibility, environmental acceptability, and economic viability of the SRC-I process (see Figure 1). This demonstration is intended to allow the establishment of an SRC-I industry in the private sector without additional demonstrations or experimental work. The Plant will be constructed so as not to preclude its ultimate expansion to a commercial-size facility with the ability to process approximately 30,000 TPSD of coal.

Since the plant is also planned as the first module of a commercial plant, and since it must demonstrate its economic viability in the demonstration phase, it will be designed in accordance with good industrial practice for a commercial plant, with the potential to operate for 20 years at a cost-effective production rate. The plant will be designed to attain design capacity with commercially available coal feedstock, with a target of 90% on-stream and utilization factors, after the initial period of commissioning, start-up, shakedown, and test operation, and after completion of the modifications found to be required during this period. The plant will be designed with the equipment redundancy, installed spares, operating flexibility, and product-line flexibility required by good industrial practice for commercial operation. It will be provided adequately with other facilities required for long-term commercial operation, including buildings, roads, maintenance facilities, and spare parts stock.

The Demonstration Plant will be a grass-roots facility. Supply items include coal, water, air, chemicals, catalysts, and electricity. All other utilities will be self-generated.

The design coal feed to the plant will be a washed western Kentucky high-volatile bituminous coal. Process water will be taken from the Green River, and potable water will be pumped from wells. Electricity will be supplied by the Green River Electric Corporation (GREC).

During Phase 0, ICRC anticipated that the liquid hydrocarbon products from the Demonstration Plant would be made as two cuts--a mixed fuel oil substitute for No. 2 fuel oil and raw naphtha for reformer feedstocks. However, product utilization activities during Phase I revealed that additional equipment and processing would be required to upgrade the cuts to marketable products. The additional equipment includes a common Product Oil Fractionation Unit to fractionate the liquid hydrocarbons produced in the SRC Process, Delayed Coker and Expanded Bed Hydrocracker (EBH) Areas into naphtha, middle and heavy distillate fractions, and a Naphtha Hydrotreater to upgrade raw naphtha into reformer feedstock by reducing its sulfur, oxygen and nitrogen contents to acceptable limits.

In Phase 0, the makeup-hydrogen supply for the Expanded Bed Hydrocracker was obtained by the steam reforming of the light hydrocarbon gases produced in the SRC Process and/or EBH Areas. The steam reformer plant was designed by Lummus and included a Methanator as the final treatment step for the purification of this hydrogen stream.

During Phase I, the source of hydrogen for the EBH was modified. The reformer was deleted. The hydrogen will be obtained from an expansion of the facilities in the Gas Systems Area which produce makeup-hydrogen for the SRC Process Area. In order to achieve the same required purity with respect to carbon oxides for the makeup-hydrogen to the EBH in Phase I, as was provided in Phase 0, it became necessary to add a Methanator to treat that stream. The Methanator will treat the makeup-hydrogen for the Naphtha Hydrotreater also.

While the Product Oil Fractionation Unit in the SRC Process Area, the Naphtha Hydrotreater, and the Methanation Unit were not included in the Original Design Baseline, or as Category A Engineering Change Proposals (ECPs), the absolute necessity to include them to generate higher value, marketable products was recognized. After the Project Baseline was accepted by the Department of Energy (DOE), ICRC processed the necessary Category B Engineering Change Proposals through the Project Configuration Control Board to include the Product Oil Fractionation Unit and Naphtha Hydrotreater in the Revised Project Baseline. The costs for these and other Category B and C ECPs are included in the Cost Baseline herein.

The following process description, process flow diagrams, and discussions on material balance, utility summary, feedstocks and product slate are based upon incorporation of the Product Oil Fractionation Unit, Naphtha Hydrotreater and Methanation Unit into the Demonstration Plant.

The design coal feed rate to the plant is a nominal 6,000 TPSD of washed coal on a moisture-free (MF) basis. About 5,600 TPSD of this amount will be processed in the SRC liquefaction unit, and the remainder will be fed to the gasification system to produce supplemental hydrogen for the process needs. The major portion of the hydrogen requirements will be met by gasifying unconverted carbon in the ash-containing residue produced in the liquefaction unit. This step will render the residue into an environmentally acceptable solid waste.

Pulverized and dried coal will be processed in the liquefaction unit using the SRC hydroliquefaction process. The coal will be dissolved in a process solvent, hydrogenated at high temperature and pressure and then converted into low-sulfur SRC and liquid and gaseous fuels.

The Kerr-McGee Critical Solvent Deashing process will be used to remove the unconverted carbon and ash from the molten SRC product stream. The ash-containing residue (Kerr-McGee Ash Concentrate or KMAC) will be sent to the gasification system for hydrogen production. Normally, one third of the deashed molten SRC, or 886 TPSD will be solidified as product, while another third will be fed to the Delayed Coker/Calciner, and a final third to the EBH.

The Delayed Coker will use conventional delayed coking technology to convert SRC into green coke and by-product hydrocarbon gases and liquids. Then the green coke will be calcined at high temperature to produce anode-grade coke.

Deashed molten SRC will be further upgraded in the EBH into lighter liquid feedstock fractions which will be processed in the Product Oil Fractionator in the SRC Process Area and a gas fraction which is upgraded in the Gas Systems Area before being utilized in the fuel gas system. Conversion to lighter material will be achieved by catalytic hydrocracking of the SRC; desulfurization, deoxygenation, and denitrogenation of the SRC will take place also. The hydrocracker will be capable of processing one-third of the SRC produced in the SRC Process Area to lighter material at about 80% conversion in the base design or high conversion mode, or two-thirds of the SRC produced at about 50% conversion in the alternate or low conversion mode.

The hydrogen consumed in the SRC liquefaction, SRC hydrocracking and naphtha hydrotreating processes will be generated by the gasification of KMAC and coal. After compression, the gas generated will undergo shift conversion to produce a hydrogen-rich synthesis gas. The syngas will then be treated, using the Selexol process to remove H_2S and CO_2, and, about one-third of the gas will be methanated to convert carbon oxides to methane.

The plant will also contain several supporting process units to remove acid gases from the off-gas and sour water streams produced throughout the plant and to convert hydrogen sulfide into elemental sulfur and environmentally acceptable tail gases. Process units will also be included to separate high pressure off-gases into fuel gas, liquefied petroleum gas (LPG), and a hydrogen-rich recycle gas. The oxygen consumed in the gasification process will be produced in an Air Separation Unit (ASU). The Product Oil Fractionator within the SRC Process Area will fractionate the hydrocarbon liquids produced in the plant into medium oil and heavy oil for sale in the marketplace and naphtha which will be further treated in the Naphtha Hydrotreater to reduce its content of sulfur, oxygen and nitrogen before it is sold as product.

The Central Control System for the plant will be a modular, microprocessor-based, distributed system interfaced with a process management host computer located in a Central Control Room. The overall facility will be operated principally from this room, which will contain the operating interface for all operating areas. The system will use multiple CRT displays and printers.

The microprocessor equipment will be distributed throughout the plant, mounted in instrument racks located in individual operating area Instrument and Control Systems (I&CS) equipment rooms. These equipment rooms will be connected to the Central Control Room via redundant communications lines. Control operators will not be stationed in the I&CS equipment rooms.

The process management host computer will be interfaced to each data communications line primarily to gather information and to generate reports. Capability for direct digital control (DDC)/supervisory control will be available.

The utilities and off-sites to support the process plant will comprise the Utility Systems, Off-Site Facilities, and Raw Material and Product Storage and Handling.

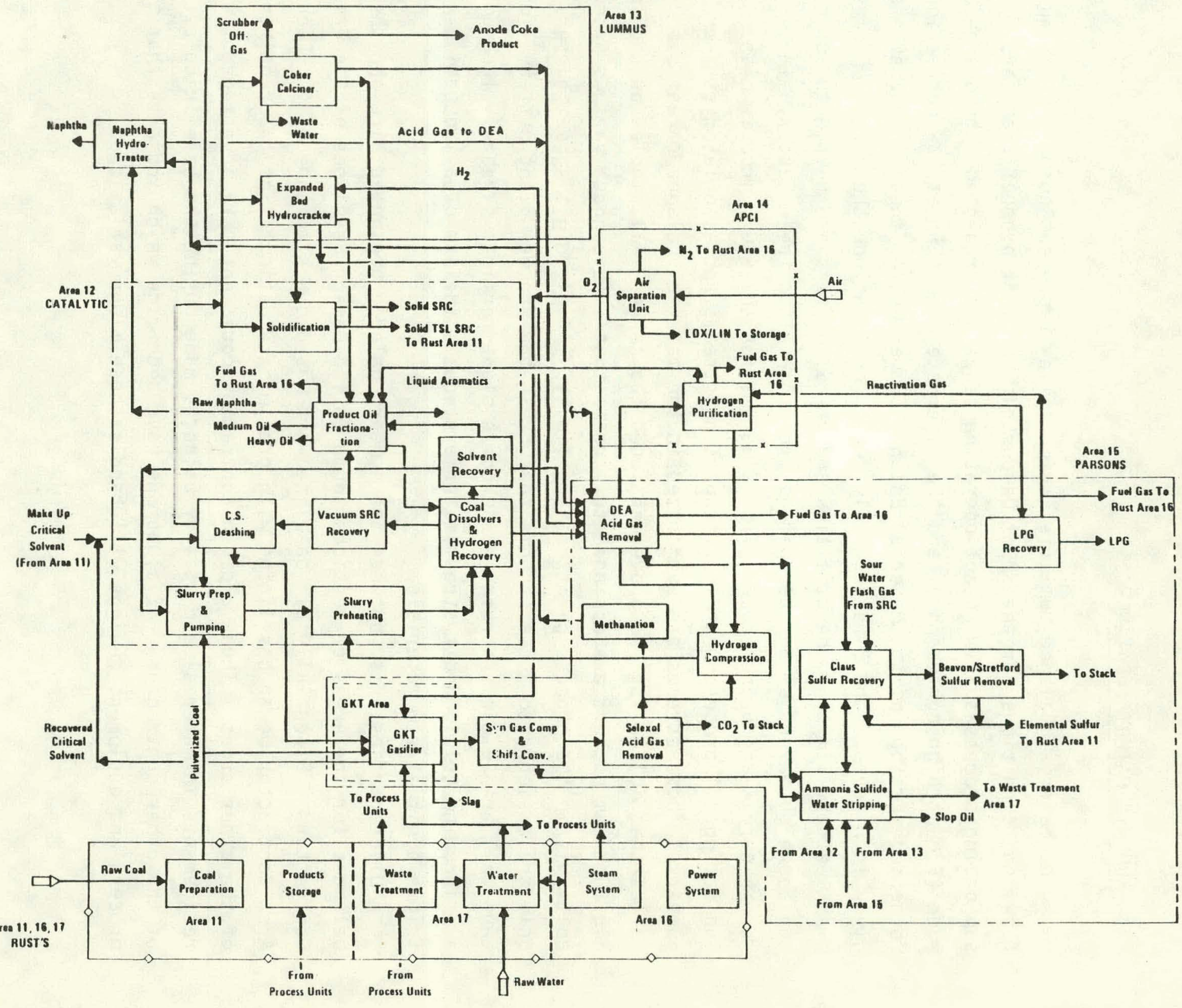
The Utilities Systems will include electrical power; boiler feedwater, steam and condensate return; cooling tower and cooling water; fuel distribution; plant/instrument air; nitrogen; fire protection; flare system and facility interconnecting systems. The Off-Site Systems will include water treatment, wastewater treatment, waste disposal, non-process buildings, site development, plant roads, railroads, river structures, and fencing. The Raw Material and Product Handling and Storage Systems will comprise coal storage and transfer, coal preparation and distribution, SRC handling and storage, and liquid storage.

During the Post-Baseline period, a number of engineering studies will be conducted, each having one or more of the following objectives: resolving areas of technical uncertainty; ensuring integration and compatibility of process units, and; identifying and evaluating potential design improvements for improved operability, reliability, or economics. Engineering Change Proposals will be prepared for these studies which are:

- Alternate KMAC Transport System
- Phenol Recovery
- Zero Discharge (to Discharge mode)
- Wastewater Treating
- Naphtha Hydrotreater (existing Class C ECP to be upgraded)
- Waterbath Solidification
- Site Plan Change
- U&O Design Update
- SRC Area Equipment Materials Revisions

The costs for these ECPs will be added subsequently to this Revised Project Baseline at the end of Appendix B in Volume II.

FIGURE 1
MAJOR PROCESS FLOW SCHEME
OVERALL SRC-I PLANT



2. SUMMARY MATERIAL BALANCES

The Material Balance Summaries which follow represent normal operating flows and conditions for the SRC-I Demonstration Plant product areas and supporting processes. Two plant operating cases are presented; the design mode (EBH at high-conversion), and the alternate mode (EBH at low-conversion). Condensed versions of the Material Balance Summaries for these two cases are given in Figures 2 and 3 respectively, which only include the overall process plant battery limits. The Utilities and Off-Site Areas are not included in the above summaries since these areas are external to these battery limits.

Figure 4 and 5 are process flow diagrams for the SRC-I process plant indicating all process-unit interconnecting streams and associated stream numbers. These streams are summarized in the material balance stream summaries that follow for the above-mentioned two cases. All single and double digit stream numbers are assigned to streams that interconnect various process units within the process plant battery limits. Triple-digit stream numbers only are assigned to those streams that cross the process plant battery limits; thus, all triple digit streams are process plant terminal streams. The sum of all incoming triple digit stream materials equals the sum of all outgoing triple digit stream materials.

Discrepancies exist between the summary balance presented here and the balances for the Areas or sections found in the Design Baselines of the Area Contractors. Essentially all baseline work was begun simultaneously. Each Area Contractor began baselining with preliminary estimates of the requirements of the other areas. Thus, a given contractor could not take advantage of refinements in material and utility balances made during the baselining efforts of the other contractors. Evaluations have been made which indicate that the process and equipment designs will handle these minor variations.

FIGURE-2
OVERALL SRC-I PROCESS PLANT MATERIAL BALANCE-EBH @ HIGH CONV.

SRC-I PROCESS PLANT. DOES NOT INCLUDE U&O AREA

INPUT

DRY, LBS/HR	MOISTURE, LBS/HR	Stream
1,176	-	FUEL GAS*
635	-	LPG*
450,203	65,364	COAL (ASH FREE)
52,818	-	ASH IN COAL
-	209,646	STEAM
-	309,034	PROC. WATER BFW. COND.
36,446	-	GAN/LIN
635,815**	11,778**	AIR
3,714	5,330	CHEMICALS, CAT.
1,180,807	601,152	TOTAL, LB/HR
1,781,959		TOTAL (DRY & MOISTURE), LB/HR

OUTPUT

Stream	DRY, LBS/HR	MOISTURE, LBS/HR
VENT GASES, CO_2, N_2	702,605***	159,058***
FUEL GAS	44,505	149
LPG	4,991	-
NAPHTHA	44,466	-
MEDIUM OIL	66,748	-
HEAVY OIL	13,278	-
COKE	47,755	-
SOLID SRC	73,663	-
SOLID SRC/TSL	14,116	-
SULFUR	16,082	-
LIN/GAN	115,433	-
LOX	2,917	-
WASTEWATER	3,280	365,289
LIQ. WASTE, SLOP OIL	470	36
SOLID WASTE, ASH, CARBON, CATALYST	61,376	45,742
TOTAL, LB/HR	1,211,685	570,274
TOTAL (DRY & MOISTURE), LB/HR	1,781,959	

* FOR REACTION ONLY. EXCLUDES FUEL REQUIREMENTS FOR EXTERNAL VESSEL FIRING.

**Including ASU air inlet which only net air (TOTAL AIR IN - WASTE - PURGE) is shown to preserve APCI proprietary information.

***Waste and purge nitrogen streams information are deleted to preserve APCI proprietary information

FIGURE-3

OVERALL SRC-I PROCESS PLANT MATERIAL BALANCE-EBH @ LOW CONV.

SRC-I PROCESS PLANT. DOES NOT INCLUDE U&O AREA

INPUT

DRY, LBS/HR	MOISTURE, LBS/HR	STREAM
1,176	-	FUEL GAS*
635	-	LPG*
450,203	65,364	COAL (ASH FREE)
52,010	-	ASH IN COAL
-	210,396	STEAM
-	302,786	PROC. WATER BFW, COND.
36,166	-	GAN/LIN
636,078**	11,782**	AIR
3,718	5,330	CHEMICALS, CAT.
1,180,794	595,658	TOTAL, LB/HR

OUTPUT

STREAM	DRY, LBS/HR	MOISTURE, LBS/HR
VENT GASES, CO_2, N_2	702,708***	159,070***
FUEL GAS	46,434	149
LPG	5,433	-
NAPHTHA	45,666	-
MEDIUM OIL	66,580	-
HEAVY OIL	12,843	-
COKE	47,755	-
SOLID SRC	-	-
SOLID SRC/TSL	81,904	-
SULFUR	16,566	-
LIN/GAN	115,433	-
LOX	2,917	-
WASTEWATER	3,251	362,112
LIQ. WASTE, SLOP OIL	470	36
SOLID WASTE, ASH, CARBON, CATALYST	61,303	45,742
TOTAL, LB/HR	1,209,343	567,109

TOTAL (DRY & MOISTURE), LB/HR: Input 1,776,452; Output 1,776,452

* FOR REACTION ONLY. EXCLUDES FUEL REQUIREMENTS FOR EXTERNAL VESSEL FIRING.
**Including ASU air inlet which only net air (TOTAL AIR IN - WASTE - PURGE) is shown to preserve APCI proprietary information.
***Waste and purge nitrogen streams information are deleted to preserve APCI proprietary information

Material Balance Summary

6,000-tpd SRC-I Demonstration Plant

EBH at High Conversion

STREAM NUMBER		1		2		3		4		5	
DESCRIPTION		FINISHED DUST FROM DPU TO GKT		COAL FROM PULVERIZER TO DPU		COAL FROM PULVERIZER TO SRC		CONDENSATE FROM SHIFT TO GKT		H.P. OFF GAS FROM SRC TO DEA	
PHASE		S		S		S		L		V	
TEMPERATURE, DEG F		206.0		121.0		180.0		100.0		110.0	
PRESSURE, PSIA		14.55		14.60		14.70		255.00		1860.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	19401.	17.04
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	16809.	14.77
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	2203.	1.94
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	20263.	17.80
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	23.	0.02	3459.	3.04
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	7.	0.01	6673.	5.86
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	14.	0.01	29.	0.03
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	18261.	16.04
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	9358.	8.22
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	6245.	5.49
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	3938.	3.46
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	6936.	6.09
400 - 650 DEG F	166.00	267.	0.16	0.	0.0	0.	0.0	0.	0.0	6.	0.01
650 - 850 DEG F	240.00	1764.	1.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	46585.	28.05	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	76509.	46.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	37188.	22.40	37188.	98.50	465833.	98.04	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		162313.	97.75	37188.	98.50	465833.	98.04	44.	0.04	113581.	99.77
WATER	18.02	3736.	2.25	566.	1.50	9317.	1.96	115919.	99.96	262.	0.23
TOTAL(WET)		166049.	100.00	37754.	100.00	475150.	100.00	115963.	100.00	113843.	100.00
LB MOL/HR(WET)	*	**********		**********		**********		5434.35		13017.03	
MMSCFD	*	0.0		0.0		0.0		0.0		118.50	
GPM	*	0.0		0.0		0.0		236.00		0.0	
ACFM	*	0.0		0.0		0.0		0.0		751.90	
MOLECULAR WT	*	**********		**********		**********		18.02		8.75	
DENSITY,LB/CU.FT	*	17.48		0.0		0.0		61.22		2.52	
VISCOSITY,LB/FT-HR	*	0.0		0.0		0.0		1.43		0.03	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		6		7		8		9		10	
DESCRIPTION		LP OFF GAS FROM SRC TO DEA		M.O. FROM SRC TO NC-POF		H.O. FROM SRC TO HOF-POF		SLURRY FROM SRC TO CSD		KMAC FROM CSD TO DPU	
PHASE		V		L		L		SL		S	
TEMPERATURE, DEG F		110.0		110.0		571.0		597.0		400.0	
PRESSURE, PSIA		125.00		16.00		70.00		1075.00		15.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	30.	2.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	251.	17.39	1.	0.00	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	25.	1.73	1.	0.00	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	226.	15.66	1.	0.00	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	45.	3.12	2.	0.00	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	87.	6.03	13.	0.03	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	3.	0.01	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	68.	4.71	1.	0.00	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	121.	8.39	10.	0.02	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	129.	8.94	28.	0.07	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	161.	11.16	200.	0.50	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	290.	20.10	31462.	78.21	38.	0.14	1.	0.00	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	8487.	21.10	20838.	77.74	2767.	0.75	267.	0.21
650 - 850 DEG F	240.00	0.	0.0	1.	0.00	5197.	19.39	17539.	4.78	1764.	1.40
850+ DEG F	425.00	0.	0.0	0.	0.0	731.	2.73	269702.	73.51	46585.	36.86
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	76858.	20.95	76509.	60.53
DEASHING SOLVENT	******	0.	0.0	10.	0.02	0.	0.0	0.	0.0	1264.	1.00
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		1433.	99.31	40220.	99.98	26804.	100.00	366867.	100.00	126389.	100.00
WATER	18.02	10.	0.69	10.	0.02	0.	0.0	0.	0.0	0.	0.0
TOTAL(WET)		1443.	100.00	40230.	100.00	26804.	100.00	366867.	100.00	126389.	100.00
LB MOL/HR(WET)	*	53.36		**********		149.26		**********		**********	
MMSCFD	*	0.49		0.0		0.0		0.0		0.0	
GPM	*	0.0		97.50		68.20		632.00		0.0	
ACFM	*	42.70		0.0		0.0		0.0		0.0	
MOLECULAR WT	*	27.04		**********		179.58		**********		**********	
DENSITY,LB/CU.FT	*	0.56		51.44		49.00		72.38		90.00	
VISCOSITY,LB/FT-HR	*	0.03		0.89		0.52		387.00		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		11		12		13		14		15	
DESCRIPTION		TOTAL MOLTEN SRC FROM CSD		MOLTEN SRC FROM CSD TO SOLIDIFICATION		SOUR WATER FROM CLAUS TO ASWS		MOLTEN SRC FROM CSD TO COKER		MOLTEN SRC FROM CSD TO EBH	
PHASE		L		L		L		L		L	
TEMPERATURE, DEG F		488.0		488.0		324.0		488.0		488.0	
PRESSURE, PSIA		25.00		25.00		94.50		115.00		115.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	324.	0.15	107.	0.14	0.	0.0	108.	0.15	109.	0.15
650 - 850 DEG F	240.00	11131.	5.02	3710.	5.02	0.	0.0	3710.	5.02	3711.	5.02
850+ DEG F	425.00	209633.	94.57	69878.	94.58	0.	0.0	69878.	94.58	69877.	94.57
ASH/UNCONV CARBON	******	349.	0.16	117.	0.16	0.	0.0	116.	0.16	116.	0.16
DEASHING SOLVENT	******	222.	0.10	74.	0.10	0.	0.0	74.	0.10	74.	0.10
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		221659.	100.00	73886.	100.00	0.	0.0	73886.	100.00	73887.	100.00
WATER	18.02	0.	0.0	0.	0.0	586.	100.00	0.	0.0	0.	0.0
TOTAL(WET)		221659.	100.00	73886.	100.00	586.	100.00	73886.	100.00	73887.	100.00
LB MOL/HR(WET)	*	**********		**********		32.52		**********		**********	
MMSCFD	*	0.0		0.0		0.0		0.0		0.0	
GPM	*	402.00		134.00		0.70		134.00		134.00	
ACFM	*	0.0		0.0		0.0		0.0		0.0	
MOLECULAR WT	*	**********		**********		18.02		**********		**********	
DENSITY, LB/CU.FT	*	68.64		68.64		52.60		68.64		68.64	
VISCOSITY, LB/FT-HR	*	484.00		484.00		0.81		484.00		484.00	

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'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		16		17		18		19		20	
DESCRIPTION		S-PIT VAPORS FROM CLAUS TO BSRU		IMPURE N2 FROM GKT TO DPU		CONVEYING N2 FROM GKT TO DPU		RETURN N2 FROM DPU TO NRSR		CRUDE NAPHTHA FEED TO NC-POF	
PHASE		V		V		V		V		L	
TEMPERATURE, DEG F		280.0		87.0		158.0		248.0		111.0	
PRESSURE, PSIA		14.50		14.70		14.90		14.60		175.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	822.	74.32	414.	100.00	31792.	96.14	34906.	77.06	1.	0.00
ARGON	40.00	14.	1.27	0.	0.0	0.	0.0	0.	0.0	1.	0.00
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1.	0.00
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	2.	0.00
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	15.	0.03
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	4.	0.01
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	5.	0.01
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	35.	0.06
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	226.	0.39
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1162.	2.01
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	46980.	81.08
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	9489.	16.38
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1.	0.00
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	1264.	2.79	10.	0.02
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	252.	22.78	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		1088.	98.37	414.	100.00	31792.	96.14	36170.	79.85	57932.	99.98
WATER	18.02	18.	1.63	0.	0.0	1276.	3.86	9129.	20.15	10.	0.02
TOTAL(WET)		1106.	100.00	414.	100.00	33068.	100.00	45299.	100.00	57942.	100.00
LB MOL/HR(WET)	*	38.56		14.78		1205.43		**********		**********	
MMSCFD	*	0.35		0.14		11.00		0.0		0.0	
GPM	*	0.0		0.0		0.0		0.0		142.20	
ACFM	*	35.23		98.14		8937.00		0.0		0.0	
MOLECULAR WT	*	28.63		28.02		27.43		**********		**********	
DENSITY,LB/CU.FT	*	0.05		0.07		0.06		0.05		50.81	
VISCOSITY,LB/FT-HR	*	0.05		0.04		0.05		0.05		0.85	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		21		22		23		24		25	
DESCRIPTION		CRUDE M.O. FEED TO NC-POF		LP OFF GAS FROM NC-POF TO DEA		NAPHTHA FROM NC-POF TO NHT		COND FROM METH TO SSRU		CRUDE H.O. FEED TO HOF-POF	
PHASE		L		V		L		L		L	
TEMPERATURE, DEG F		454.0		135.0		110.0		100.0		477.0	
PRESSURE, PSIA		160.00		115.00		115.00		615.00		40.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	1.	0.09	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	2.	0.18	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	2.	0.18	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	1.	0.09	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	2.	0.18	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	15.	1.37	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	4.	0.37	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	23.	2.11	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	65.	5.96	1.	0.00	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	276.	25.30	20.	0.04	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	565.	51.79	717.	1.56	0.	0.0	0.	0.0
C5-400 DEG F	106.00	1342.	4.65	125.	11.46	44636.	97.30	0.	0.0	39.	0.10
400 - 650 DEG F	166.00	26639.	92.26	0.	0.0	499.	1.09	0.	0.0	22508.	56.61
650 - 850 DEG F	240.00	885.	3.07	0.	0.0	0.	0.0	0.	0.0	14867.	37.39
850+ DEG F	425.00	7.	0.02	0.	0.0	0.	0.0	0.	0.0	2349.	5.91
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		28873.	100.00	1081.	99.08	45873.	100.00	0.	0.0	39763.	100.00
WATER	18.02	0.	0.0	10.	0.92	0.	0.0	1626.	100.00	0.	0.0
TOTAL(WET)		28873	100.00	1091.	100.00	45873.	100.00	1626.	100.00	39763.	100.00
LB MOL/HR(WET)	*	176.84		22.68		436.92		90.23		203.43	
MMSCFD	*	0.0		0.21		0.0		0.0		0.0	
GPM	*	71.90		0.0		114.00		3.27		91.35	
ACFM	*	0.0		18.70		0.0		0.0		0.0	
MOLECULAR WT	*	163.27		48.10		104.99		18.02		195.46	
DENSITY,LB/CU.FT	*	50.10		0.97		50.31		62.00		54.28	
VISCOSITY,LB/FT-HR	*	0.61		0.02		0.82		1.64		0.75	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		26		27		28		29		30	
DESCRIPTION		SOUR WATER FROM NHT TO ASWS		HP RECYCLE N2 FROM NRSR TO GKT		RAW GAS FROM GKT TO RGC		A/G FROM NHT TO DEA		H.P. OFF GAS FROM EBH TO DEA	
PHASE		L		V		V		V		V	
TEMPERATURE, DEG F		125.0		104.0		105.8		132.0		110.0	
PRESSURE, PSIA		85.00		60.00		15.00		115.00		1840.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	5348.	2.38	0.	0.0	1079.	8.97
NITROGEN	28.02	0.	0.0	31693.	99.09	2516.	1.12	0.	0.0	706.	5.87
ARGON	40.00	0.	0.0	0.	0.0	707.	0.31	0.	0.0	223.	1.85
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	163661.	72.77	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	30780.	13.69	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	1202.	0.53	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	6014.	2.67	268.	100.00	4.	0.03
AMMONIA	17.03	147.	2.84	0.	0.0	3.	0.00	0.	0.0	5.	0.04
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	2.	0.00	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	153.	0.07	0.	0.0	3674.	30.54
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	2016.	16.76
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	2045.	17.00
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1705.	14.17
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	551.	4.58
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	11.	0.00	0.	0.0	0.	0.0
WASHING SOLVENT	******	0.	0.0	252.	0.79	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	2.	0.00	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HCN	27.03	0.	0.0	0.	0.0	19.	0.01	0.	0.0	0.	0.0
NO	30.01	0.	0.0	0.	0.0	5.	0.00	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		147.	2.84	31945.	99.87	210423.	93.56	268.	100.00	12008.	99.83
WATER	18.02	5022.	97.16	40.	0.13	14478.	6.44	0.	0.0	21.	0.17
TOTAL(WET)		5169.	100.00	31985.	100.00	224901.	100.00	268.	100.00	12029.	100.00
LB MOL/HR(WET)	*	287.32		**********		**********		7.86		944.57	
MMSCFD	*	0.0		0.0		93.93		0.07		8.60	
GPM	*	10.40		0.0		0.0		7.24		0.0	
ACFM	*	0.0		0.0		69556.00		0.0		51.92	
MOLECULAR WT	*	17.99		**********		**********		34.08		12.73	
DENSITY,LB/CU.FT	*	61.80		0.28		0.05		0.0		3.86	
VISCOSITY,LB/FT-HR	*	1.50		0.04		0.04		0.0		0.03	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

T. D. VAKIL,6/83

6000 T/D SRC-I DEMO PLANT SUMMARY MATERIAL BALANCE — CASE - EBH AT HIGH CONVERSION — REV. BY TCL,3/84 — PAGE 7 OF 40

STREAM NUMBER		31		32		33		34		35	
DESCRIPTION		HP NAPHTHA FROM EBH TO NC-POF		LP OFF GAS FROM EBH TO DEA		LP NAPHTHA FROM EBH TO NC-POF		M.D. FROM EBH TO NC-POF		HO FROM EBH TO HOF-POF INCL STREAM 36	
PHASE		V+L		V		L		L		L	
TEMPERATURE, DEG F		111.0		110.0		115.0		452.0		446.0	
PRESSURE, PSIA		500.00		115.00		65.00		65.00		65.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	1.	0.22	25.	2.03	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	1.	0.22	41.	3.32	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	1.	0.22	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	1.	0.01	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	18.	4.04	107.	8.67	2.	0.02	0.	0.0	0.	0.0
ETHANE	30.07	31.	6.95	174.	14.10	17.	0.14	0.	0.0	0.	0.0
PROPANE	44.10	70.	15.70	370.	29.98	160.	1.28	0.	0.0	0.	0.0
BUTANE	58.12	120.	26.91	404.	32.74	749.	6.00	0.	0.0	0.	0.0
C5-400 DEG F	106.00	200.	44.84	105.	8.51	10599.	84.91	891.	4.02	1.	0.01
400 - 650 DEG F	166.00	4.	0.90	0.	0.0	955.	7.65	20441.	92.27	1670.	12.89
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	815.	3.68	9670.	74.62
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	7.	0.03	1618.	12.49
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		445.	100.00	1226.	99.35	12483.	100.00	22154.	100.00	12959.	100.00
WATER	18.02	0.	0.0	8.	0.65	0.	0.0	0.	0.0	0.	0.0
TOTAL(WET)		445.	100.00	1234.	100.00	12483.	100.00	22154.	100.00	12959.	100.00
LB MOL/HR(WET)	*	8.27		43.10		123.01		134.96		54.17	
MMSCFD	*	0.02		0.39		0.0		0.0		0.0	
GPM	*	1.34		0.0		31.55		54.88		26.60	
ACFM	*	0.36		36.80		0.0		0.0		0.0	
MOLECULAR WT	*	53.91		28.63		101.48		164.16		239.24	
DENSITY,LB/CU.FT	*	0.0		0.56		49.33		50.34		60.80	
VISCOSITY,LB/FT-HR	*	0.0		0.02		0.31		0.62		3.75	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		36		37		38		39		40	
DESCRIPTION		SEE STREAM 35		MOLTEN TSL FROM EBH TO SOLIDIFICATION		WASH WATER FROM RGC-ESP TO GKT		SOUR GAS FROM SHIFT TO ASWS		LP OFF GAS FROM COKER TO DEA	
PHASE				L		L		V		V	
TEMPERATURE, DEG F		0.0		654.0		104.0		262.5		100.0	
PRESSURE, PSIA		0.0		115.00		85.00		37.00		114.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	7.	0.08	133.	1.81
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	1.	0.01	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	2.	0.02	148.	2.02
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	1294.	15.38	191.	2.60
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	90.	1.07	337.	4.59
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	4.	0.05	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	3049.	41.55
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1481.	20.18
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	845.	11.51
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	393.	5.35
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	711.	9.69
400 - 650 DEG F	166.00	0.	0.0	4.	0.03	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	795.	5.62	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	13359.	94.36	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	11.	0.05	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	14158.	100.00	11.	0.05	1398.	16.61	7288.	99.31
WATER	18.02	0.	0.0	0.	0.0	22046.	99.95	7017.	83.39	51.	0.69
TOTAL(WET)		0.	0.0	14158.	100.00	22057.	100.00	8415.	100.00	7339.	100.00
LB MOL/HR(WET)	*	0.0		34.77		**********		425.26		360.28	
MMSCFD	*	0.0		0.0		0.0		3.88		3.28	
GPM	*	0.0		28.26		47.60		0.0		0.0	
ACFM	*	0.0		0.0		0.0		1464.00		311.00	
MOLECULAR WT	*	0.0		407.20		**********		19.79		20.37	
DENSITY,LB/CU.FT	*	0.0		62.48		1.58		0.10		0.39	
VISCOSITY,LB/FT-HR	*	0.0		1.20		0.0		0.03		0.03	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		41		42		43		44		45	
DESCRIPTION		NAPHTHA FROM COKER TO NC-POF		M.O. FROM COKER TO NC-POF		GREEN COKE FROM COKER TO CALCINER		COKE FROM CALC. KILN TO CALC. COOLER		L.O. FROM HOF-POF TO SEC	
PHASE		L		L		S		S		L	
TEMPERATURE, DEG F		115.0		458.0		0.0		2450.0		110.0	
PRESSURE, PSIA		137.00		115.00		0.0		14.50		32.00	
COMPONENTS	MOL.WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	2.	0.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	1.	0.05	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	2.	0.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	4.	0.20	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	6.	0.30	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	1912.	97.06	451.	6.71	0.	0.0	0.	0.0	3.	0.47
400 - 650 DEG F	166.00	43.	2.18	6198.	92.25	0.	0.0	0.	0.0	31.	4.89
650 - 850 DEG F	240.00	0.	0.0	70.	1.04	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.45	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	57890.	88.73	47580.	100.00	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		1970.	100.00	6719.	100.00	57890.	88.73	47580.	100.00	34.	5.36
WATER	18.02	0.	0.0	0.	0.0	7353.	11.27	0.	0.0	600.	94.64
TOTAL(WET)		1970.	100.00	6719.	100.00	65243.	100.00	47580.	100.00	634.	100.00
LB MOL/HR(WET)	*	18.68		41.88		**********		**********		33.51	
MMSCFD	*	0.0		0.0		0.0		0.0		0.0	
GPM	*	4.88		16.96		0.0		0.0		1.30	
ACFM	*	0.0		0.0		0.0		0.0		0.0	
MOLECULAR WT	*	105.47		160.42		**********		**********		18.92	
DENSITY,LB/CU.FT	*	50.34		49.40		0.0		126.61		60.65	
VISCOSITY,LB/FT-HR	*	0.82		0.59		0.0		0.0		1.39	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		46		47		48		49		50	
DESCRIPTION		WASH W. RECYCLE FROM WASH WT TO GKT		OIL SCRUB F.G. FROM HPU TO F.G. HEADER		WASH W. FROM GKT TO WASH WT		RETURN WATER FROM POND TO WASH WT		SLUDGE EFFLUENT FROM WASH WT TO POND	
PHASE		L		V		L		L		SL	
TEMPERATURE, DEG F		96.8		233.0		149.0		97.0		149.0	
PRESSURE, PSIA		92.80		107.00		14.71		14.70		150.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	48.	0.85	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	78.	1.38	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	7.	0.12	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	119.	2.11	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	3.	0.05	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	276.	4.89	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	605.	10.72	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	989.	17.53	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	1561.	27.67	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	1956.	34.67	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	44969.	1.90	0.	0.0	44969.	14.56
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CHLORIDE IONS	35.45	10945.	0.50	0.	0.0	11672.	0.49	1096.	0.50	1353.	0.44
SODIUM IONS	22.99	7098.	0.33	0.	0.0	7098.	0.30	711.	0.33	878.	0.28
HYDROGEN IONS	1.01	0.	0.0	0.	0.0	21.	0.00	0.	0.0	0.	0.0
TOTAL(DRY)		18043.	0.83	5642.	100.00	63760.	2.69	1807.	0.83	47200.	15.28
WATER	18.02	2162733.	99.17	0.	0.0	2302223.	97.31	216935.	99.17	261666.	84.72
TOTAL(WET)		2180776.	100.00	5642.	100.00	2365983.	100.00	218742.	100.00	308866.	100.00
LB MOL/HR(WET)	*	120635.94		136.15		**********		12100.41		**********	
MMSCFD	*	0.0		1.22		0.0		0.0		0.0	
GPM	*	4379.00		0.0		4706.00		439.00		533.00	
ACFM	*	0.0		149.60		0.0		0.0		0.0	
MOLECULAR WT	*	18.08		41.44		**********		18.08		**********	
DENSITY,LB/CU.FT	*	62.10		0.62		0.96		62.10		0.0	
VISCOSITY,LB/FT-HR	*	1.71		0.03		0.0		1.71		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		51		52		53		54		55	
DESCRIPTION		RSG FROM RGC TO SHIFT		COND FROM RGC TO ASWS		COND FROM SHIFT TO ASWS		SOUR WATER FROM EBH TO ASWS		GAS FROM CALCINER COOLER TO CALCINER KILN	
PHASE		V		L		L		L		V	
TEMPERATURE, DEG F		284.0		100.0		100.0		125.0		300.0	
PRESSURE, PSIA		852.00		34.50		215.00		85.00		14.50	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	5346.	2.54	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	2516.	1.19	0.	0.0	0.	0.0	0.	0.0	63602.	55.00
ARGON	40.00	707.	0.34	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	163661.	77.61	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	30780.	14.60	0.	0.0	1.	0.02	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	1202.	0.57	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	6015.	2.85	0.	0.0	0.	0.0	639.	0.91	0.	0.0
AMMONIA	17.03	6.	0.00	0.	0.0	1.	0.02	1265.	1.79	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	153.	0.07	0.	0.0	0.	0.0	1.	0.00	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	1.	0.00	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0	0.0	0.	0.0	0.	0.0	18998.	16.43
SULFUR	32.06	0.	0.0	0	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0	0.0	0.	0.0	0.	0.0	0.	0.0
HCN	27.03	19.	0.01	0	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		210405.	99.78	0.	0.0	2.	0.03	1906.	2.70	82600.	71.43
WATER	18.02	462.	0.22	13632.	100.00	6155.	99.97	68599.	97.30	33044.	28.57
TOTAL(WET)		210867.	100.00	13632.	100.00	6157.	100.00	70505.	100.00	115644.	100.00
LB MOL/HR(WET)	*	9534.31		756.49		341.65		3899.95		4697.30	
MMSCFD	*	87.14		0.0		0.0		0.0		42.80	
GPM	*	0.0		27.42		12.54		147.00		0.0	
ACFM	*	1503.00		0.0		0.0		0.0		43968.00	
MOLECULAR WT	*	22.12		18.02		18.02		18.08		24.62	
DENSITY,LB/CU.FT	*	2.32		52.00		61.21		59.79		0.04	
VISCOSITY,LB/FT-HR	*	0.05		1.64		1.43		1.32		0.05	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		56		57		58		59		60	
DESCRIPTION		FLASH GAS FROM CALC SCRUB FL DRUM - CALC KILN		SHIFTED SYNGAS FROM SHIFT TO SELEXOL		SOUR WATER FROM COKER TO ASWS		SOUR WATER FROM COKER TO ASWS		TOTAL MAKEUP H2 FROM SELEXOL TO H2 COMP & METH	
PHASE		V		V		L		L		V	
TEMPERATURE, DEG F		115.0		100.0		115.0		150.0		60.0	
PRESSURE, PSIA		95.00		720.00		85.00		85.00		675.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	2.	16.67	16661.	5.36	0.	0.0	0.	0.0	16624.	62.64
NITROGEN	28.02	1.	8.33	2515.	0.81	0.	0.0	0.	0.0	2368.	8.92
ARGON	40.00	1.	8.33	707.	0.23	0.	0.0	0.	0.0	705.	2.66
CARBON MONOXIDE	28.01	2.	16.67	6382.	2.05	0.	0.0	0.	0.0	6307.	23.76
CARBON DIOXIDE	44.01	0.	0.0	277475.	89.26	1.	0.07	0.	0.0	384.	1.45
CARBONYL SULFIDE	60.07	0.	0.0	22.	0.01	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	6587.	2.12	1.	0.07	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	3.	25.00	153.	0.05	0.	0.0	1.	0.01	146.	0.55
ETHANE	30.07	2.	16.67	0.	0.0	0.	0.0	2.	0.01	0.	0.0
PROPANE	44.10	1.	8.33	0.	0.0	0.	0.0	1.	0.01	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	2.	0.01	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		12.	100.00	310502.	99.88	2.	0.13	6.	0.04	26534.	99.98
WATER	18.02	0.	0.0	360.	0.12	1535.	99.87	13589.	99.96	6.	0.02
TOTAL(WET)		12.	100.00	310862.	100.00	1537.	100.00	13595.	100.00	26540.	100.00
LB MOL/HR(WET)	*	1.40		15127.62		85.24		**********		8591.49	
MMSCFD	*	0.01		137.80		0.0		0.0		78.23	
GPM	*	0.0		0.0		3.10		27.50		0.0	
ACFM	*	1.52		2050.00		0.0		0.0		1217.00	
MOLECULAR WT	*	8.57		20.55		18.03		**********		3.09	
DENSITY,LB/CU.FT	*	0.13		2.53		61.82		61.70		0.36	
VISCOSITY,LB/FT-HR	*	0.03		0.04		1.50		1.21		0.02	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		61		62		63		64		65	
DESCRIPTION		ACID GAS FROM SELEXOL TO CLAUS		CO2 VENT GAS FROM SELEXOL TO SHIFT EXCH		CALC KILN OFF GAS TO CALCINER SCRUBBER		PROCESS COND FROM CSD TO SRC		TOTAL S.W. TO ASWS	
PHASE		V		V		V+A		L		L	
TEMPERATURE, DEG F		105.0		92.0		1650.0		110.0		0.0	
PRESSURE, PSIA		24.50		20.00		14.40		15.00		0.0	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	37.	0.01	0.	0.0	0.	0.0	2.	0.00
NITROGEN	28.02	0.	0.0	38421.	10.58	229642.	65.00	0.	0.0	1.	0.00
ARGON	40.00	0.	0.0	2.	0.00	0.	0.0	0.	0.0	1.	0.00
CARBON MONOXIDE	28.01	0.	0.0	75.	0.03	0.	0.0	0.	0.0	2.	0.00
CARBON DIOXIDE	44.01	20320.	73.99	256771.	89.34	33061.	9.36	0.	0.0	1643.	0.70
CARBONYL SULFIDE	60.07	4.	0.01	18.	0.01	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	6586.	23.98	1.	0.00	0.	0.0	0.	0.0	3200.	1.37
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	3330.	1.43
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	288.	0.12
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	370.	0.10	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	7.	0.00	0.	0.0	0.	0.0	5.	0.00
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	7.	0.00
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	8.	0.00
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	25.	0.01
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	210.	0.09
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	9.	0.07	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	24877.	7.04	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	12.	0.00	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		26910.	97.99	287332.	99.97	287962.	81.50	9.	0.07	8722.	3.74
WATER	18.02	552.	2.01	91.	0.03	65352.	18.50	12098.	99.93	224398.	96.26
TOTAL(WET)		27462.	100.00	287423.	100.00	353314.	100.00	12107.	100.00	233120.	100.00
LB MOL/HR(WET)	*	685.66		6946.95		**********		**********		12789.14	
MMSCFD	*	5.25		63.28		121.00		0.0		0.0	
GPM	*	0.0		0.0		0.0		24.80		0.0	
ACFM	*	2802.00		34100.00		347594.00		0.0		0.0	
MOLECULAR WT	*	40.05		41.37		**********		**********		18.23	
DENSITY,LB/CU.FT	*	0.16		0.14		0.02		60.87		61.23	
VISCOSITY,LB/FT-HR	*	0.04		0.04		0.0		1.40		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		66		67		68		69		70	
DESCRIPTION		O2 FROM ASU TO GKT		OFF GAS FROM ASWS TO CLAUS		LIGHT SRC FROM CSD TO SRC		SOUR WATER FROM SRC TO ASWS		TOTAL HP GAS FEED TO HP DEA	
PHASE		V		V		L		L		V	
TEMPERATURE, DEG F		241.0		180.0		418.0		125.0		110.0	
PRESSURE, PSIA		60.00		24.70		145.00		25.00		1840.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	9.	0.08	0.	0.0	0.	0.0	20480.	16.27
NITROGEN	28.02	50.	0.04	2.	0.02	0.	0.0	0.	0.0	17515.	13.91
ARGON	40.00	707.	0.62	1.	0.01	0.	0.0	0.	0.0	2426.	1.93
CARBON MONOXIDE	28.01	0.	0.0	4.	0.04	0.	0.0	0.	0.0	20263.	16.10
CARBON DIOXIDE	44.01	0.	0.0	2937.	25.92	0.	0.0	1550.	1.66	3459.	2.75
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	3285.	28.99	0.	0.0	2372.	2.54	6677.	5.30
AMMONIA	17.03	0.	0.0	3414.	30.13	0.	0.0	1971.	2.11	34.	0.03
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	5.	0.04	0.	0.0	0.	0.0	21935.	17.43
ETHANE	30.07	0.	0.0	7.	0.06	0.	0.0	0.	0.0	11374.	9.04
PROPANE	44.10	0.	0.0	8.	0.07	0.	0.0	0.	0.0	8290.	6.59
BUTANE	58.12	0.	0.0	24.	0.21	0.	0.0	0.	0.0	5643.	4.48
C5-400 DEG F	106.00	0.	0.0	0.	0.0	1.	0.00	0.	0.0	7487.	5.95
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	2176.	10.72	0.	0.0	6.	0.00
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	4644.	22.87	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	13484.	66.40	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	1.	0.00	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	196.	0.21	0.	0.0
OXYGEN	32.00	112735.	99.33	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		113492.	100.00	9696.	85.58	20306.	100.00	6089.	6.51	125589.	99.78
WATER	18.02	0.	0.0	1634.	14.42	0.	0.0	87404.	93.49	283.	0.22
TOTAL(WET)		113492.	100.00	11330.	100.00	20306.	100.00	93493.	100.00	125872.	100.00
LB MOL/HR(WET)	*	3542.43		460.11		**********		5076.32		13961.59	
MMSCFD	*	32.27		4.03		0.0		0.0		127.20	
GPM	*	0.0		0.0		39.33		194.90		0.0	
ACFM	*	7395.00		2030.00		0.0		0.0		812.50	
MOLECULAR WT	*	32.04		24.62		**********		18.42		9.02	
DENSITY,LB/CU.FT	*	0.26		0.09		64.38		59.83		2.58	
VISCOSITY,LB/FT-HR	*	0.06		0.03		135.00		1.30		0.03	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		71		72		73		74		75	
DESCRIPTION		TOTAL LP GAS FEED TO DEA		TOTAL H.P. DEA OFF GAS		H.P. OFF GAS FROM DEA TO H2 COMPR		H.P. OFF GAS FROM DEA TO HPU		ACID GAS FROM DEA/NHT TO CLAUS	
PHASE		V		V		V		V		V	
TEMPERATURE, DEG F		110.0		110.0		110.0		110.0		115.0	
PRESSURE, PSIA		100.00		1785.00		1785.00		1785.00		25.70	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	189.	1.70	20458.	17.71	6454.	17.71	14004.	17.71	1.	0.01
NITROGEN	28.02	294.	2.65	17503.	15.16	5522.	15.16	11981.	15.16	1.	0.01
ARGON	40.00	27.	0.24	2424.	2.10	765.	2.10	1659.	2.10	0.	0.0
CARBON MONOXIDE	28.01	375.	3.38	20243.	17.53	6386.	17.53	13857.	17.53	1.	0.01
CARBON DIOXIDE	44.01	238.	2.14	5.	0.00	2.	0.01	3.	0.00	3206.	29.95
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	439.	3.95	0.	0.0	0.	0.0	0.	0.0	7193.	67.19
AMMONIA	17.03	4.	0.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.05	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	3247.	29.23	21907.	18.97	6911.	18.97	14996.	18.97	1.	0.01
ETHANE	30.07	1841.	16.58	11356.	9.83	3582.	9.83	7774.	9.83	1.	0.01
PROPANE	44.10	1620.	14.59	8294.	7.18	2616.	7.18	5678.	7.18	0.	0.0
BUTANE	58.12	1523.	13.71	5627.	4.87	1775.	4.87	3852.	4.87	0.	0.0
C5-400 DEG F	106.00	1231.	11.08	7487.	6.48	2362.	6.48	5125.	6.48	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	6.	0.01	2.	0.01	4.	0.01	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		11028.	99.29	115310.	99.85	36377.	99.85	78933.	99.85	10404.	97.19
WATER	18.02	79.	0.71	177.	0.15	56.	0.15	121.	0.15	301.	2.81
TOTAL(WET)		11107.	100.00	115487.	100.00	36433.	100.00	79054.	100.00	10705.	100.00
LB MOL/HR(WET)	*	479.42		13664.68		4310.86		9353.81		301.28	
MMSCFD	*	4.36		124.45		39.26		85.19		2.74	
GPM	*	0.0		0.0		0.0		0.0		0.0	
ACFM	*	479.20		821.94		259.30		562.70		1193.00	
MOLECULAR WT	*	23.17		8.45		8.45		8.45		35.53	
DENSITY,LB/CU.FT	*	0.39		2.34		2.34		2.34		0.15	
VISCOSITY,LB/FT-HR	*	0.03		0.03		0.03		0.03		0.03	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		76		77		78		79		80	
DESCRIPTION		RESIDUAL FUEL GAS FROM LPG TO HPU FUEL GAS HDR		SOUR H2O FLASH GAS FROM SRC TO CLAUS		WATER BLEED FROM DEA TO ASWS		WATER BLEED FROM DEA TO ASWS		RECYCLE H2 FROM HPU TO H2 COMPR	
PHASE		V		V		L		L		V	
TEMPERATURE, DEG F		89.0		125.0		115.0		115.0		57.2	
PRESSURE, PSIA		120.00		25.00		1806.00		97.00		1700.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	179.	1.74	0.	0.0	2.	0.01	0.	0.0	13482.	34.05
NITROGEN	28.02	1368.	13.30	0.	0.0	1.	0.01	0.	0.0	10109.	25.53
ARGON	40.00	229.	2.23	0.	0.0	1.	0.01	0.	0.0	1044.	2.64
CARBON MONOXIDE	28.01	1295.	12.59	0.	0.0	2.	0.01	0.	0.0	10302.	26.02
CARBON DIOXIDE	44.01	0.	0.0	10.	27.78	89.	0.59	2.	0.05	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	24.	66.67	182.	1.20	6.	0.16	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	34.	0.22	4.	0.11	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	3807.	37.01	0.	0.0	3.	0.02	0.	0.0	4619.	11.67
ETHANE	30.07	2686.	26.11	0.	0.0	2.	0.01	0.	0.0	32.	0.08
PROPANE	44.10	693.	6.74	0.	0.0	1.	0.01	0.	0.0	2.	0.01
BUTANE	58.12	29.	0.28	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		10286.	100.00	34.	94.44	317.	2.10	12.	0.33	39590.	100.00
WATER	18.02	0.	0.0	2.	5.56	14800.	97.90	3654.	99.67	0.	0.0
TOTAL(WET)		10286.	100.00	36.	100.00	15117.	100.00	3666.	100.00	39590.	100.00
LB MOL/HR(WET)	*	532.45		1.04		832.07		203.23		7731.24	
MMSCFD	*	4.85		0.01		0.0		0.0		70.42	
GPM	*	0.0		0.0		31.15		7.53		0.0	
ACFM	*	435.55		4.32		0.0		0.0		450.30	
MOLECULAR WT	*	19.32		34.53		18.17		18.04		5.12	
DENSITY,LB/CU.FT	*	0.10		0.14		60.51		60.68		1.46	
VISCOSITY,LB/FT-HR	*	0.03		0.03		1.36		1.38		0.03	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		81		82		83		84		85	
DESCRIPTION		REJECT GAS FROM HPU TO LPG		REACTIVATION GAS FROM LPG TO HPU		K/O COND FROM BSRU TO ASWS		LIQUID AROMATICS FROM HPU TO NC-POF		MAKE UP H2 FROM SELEXOL TO H2 COMPR	
PHASE		V		V		L		L		V	
TEMPERATURE, DEG F		57.2		89.0		0.0		102.0		60.0	
PRESSURE, PSIA		20.00		120.00		0.0		80.00		675.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	474.	1.47	295.	1.74	0.	0.0	0.	0.0	10124.	62.64
NITROGEN	28.02	3629.	11.24	2261.	13.30	0.	0.0	0.	0.0	1442.	8.92
ARGON	40.00	608.	1.88	379.	2.23	0.	0.0	0.	0.0	429.	2.65
CARBON MONOXIDE	28.01	3435.	10.65	2141.	12.59	0.	0.0	0.	0.0	3841.	23.76
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	234.	1.45
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	10100.	31.29	6293.	37.02	0.	0.0	1.	0.03	89.	0.55
ETHANE	30.07	7131.	22.09	4439.	26.11	2.	0.68	6.	0.18	0.	0.0
PROPANE	44.10	4653.	14.42	1145.	6.74	6.	2.05	34.	1.04	0.	0.0
BUTANE	58.12	2084.	6.46	47.	0.28	25.	8.56	207.	6.35	0.	0.0
C5-400 DEG F	106.00	162.	0.50	0.	0.0	210.	71.92	3007.	92.27	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	4.	0.12	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		32277.	100.00	17000.	100.00	243.	83.22	3259.	100.00	16159.	99.98
WATER	18.02	0.	0.0	0.	0.0	49.	16.78	0.	0.0	4.	0.02
TOTAL(WET)		32277.	100.00	17000.	100.00	292.	100.00	3259.	100.00	16163.	100.00
LB MOL/HR(WET)	*	1512.22		879.66		5.33		32.99		5232.22	
MMSCFD	*	13.77		8.01		0.0		0.0		47.64	
GPM	*	0.0		0.0		0.0		8.23		0.0	
ACFM	*	6965.00		710.20		0.0		0.0		741.00	
MOLECULAR WT	*	21.34		19.33		54.75		98.80		3.09	
DENSITY,LB/CU.FT	*	0.08		0.40		0.0		49.38		0.36	
VISCOSITY,LB/FT-HR	*	0.03		0.03		0.0		0.77		0.02	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		86		87		88		89		90	
DESCRIPTION		RECYCLE + MAKEUP H2 FROM H2 COMPR TO SRC		MAKEUP H2 FROM SELEXOL TO METH		SOUR WATER FROM BSRU TO ASWS		METHANATED H2 FROM METH TO EBH		METHANATED H2 FROM METH TO NWT	
PHASE		V		V		L		V		V	
TEMPERATURE, DEG F		224.0		60.0		147.0		100.0		100.0	
PRESSURE, PSIA		2965.00		675.00		0.0		615.00		615.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	29856.	32.53	6500.	62.64	0.	0.0	4799.	67.87	1141.	67.92
NITROGEN	28.02	17044.	18.57	926.	8.92	0.	0.0	748.	10.58	178.	10.60
ARGON	40.00	2230.	2.43	276.	2.66	0.	0.0	224.	3.17	52.	3.10
CARBON MONOXIDE	28.01	20496.	22.33	2466.	23.76	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	231.	0.25	150.	1.45	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	11617.	12.66	57.	0.55	0.	0.0	1231.	17.41	293.	17.44
ETHANE	30.07	3614.	3.94	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	2618.	2.85	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	1775.	1.93	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	2304.	2.51	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		91785.	100.00	10375.	99.98	0.	0.0	7002.	99.02	1664.	99.05
WATER	18.02	0.	0.0	2.	0.02	9313.	100.00	69.	0.98	16.	0.95
TOTAL(WET)		91785.	100.00	10377.	100.00	9313.	100.00	7071.	100.00	1680.	100.00
LB MOL/HR(WET)	*	17166.61		3359.27		516.81		2493.33		592.78	
MMSCFD	*	156.36		30.59		0.0		22.71		5.40	
GPM	*	0.0		0.0		19.49		0.0		0.0	
ACFM	*	783.50		476.00		0.0		415.80		98.86	
MOLECULAR WT	*	5.35		3.09		18.02		2.84		2.83	
DENSITY,LB/CU.FT	*	1.95		0.36		59.60		0.28		0.28	
VISCOSITY,LB/FT-HR	*	0.03		0.02		1.28		0.02		0.02	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

1-28

STREAM NUMBER		91		92		93		94		95	
DESCRIPTION		WASTE CAUSTIC FROM DEA TO CALCINER		S-PRODUCT FROM BSRU TO CLAUS		TAIL GAS FROM CLAUS TO BSRU		M.O. PROD FROM NC-POF		M.O. PRODUCT FROM HOF-POF	
PHASE		L		L		V		L		L	
TEMPERATURE, DEG F		115.0		0.0		280.0		315.0		340.0	
PRESSURE, PSIA		1327.00		0.0		17.50		140.00		125.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	2	0.01	0.	0.0	97.	0.12	0.	0.0	0.	0.0
NITROGEN	28.02	1.	0.01	0.	0.0	38778.	47.20	0.	0.0	0.	0.0
ARGON	40.00	1.	0.01	0.	0.0	621.	0.76	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	2.	0.01	0.	0.0	1372.	1.67	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	24431.	29.74	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	24.	0.03	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	587.	0.71	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	482.	0.59	0.	0.0	0.	0.0
METHANE	16.04	3.	0.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	2.	0.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	1.	0.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	3761.	9.33	36.	0.14
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	35633.	88.43	21812.	82.46
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	886.	2.20	4597.	17.38
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	7.	0.02	6.	0.02
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	10.	0.02	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	1.	0.00	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	881.	100.00	78.	0.09	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CAUSTIC	40.00	675.	4.14	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		687.	4.22	881	100.00	66471.	80.92	40297.	100.00	26451.	100.00
WATER	18.02	15607.	95.78	0.	0.0	15678.	19.08	0.	0.0	0.	0.0
TOTAL(WET)		16294.	100.00	881.	100.00	82149.	100.00	40297.	100.00	26451.	100.00
LB MOL/HR(WET)	*	884.37		27.48		2949.33		**********		150.91	
MMSCFD	*	0.0		0.0		27.00		0.0		0.0	
GPM	*	32.80		0.0		0.0		94.16		59.23	
ACFM	*	0.0		0.0		22445.00		0.0		0.0	
MOLECULAR WT	*	18.42		32.06		27.85		**********		175.28	
DENSITY, LB/CU.FT	*	61.90		0.0		0.06		53.37		55.69	
VISCOSITY, LB/FT-HR	*	1.36		0.0		0.0		1.50		1.98	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		96		97		98		99		100	
DESCRIPTION		REACT F.G. FROM HPU K/O POT TO F.G. HEADER		TOTAL FUEL GAS FROM HPU TO F.G. HEADER		RECOVERED C.S. FROM NRSR TO CSD				COAL TO PULVERIZER	
PHASE		V		V		L				S	
TEMPERATURE, DEG F		100.0		100.0		40.0		0.0		0.0	
PRESSURE, PSIA		105.00		105.00		62.00		0.0		0.0	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	295.	1.74	343.	1.51	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	2261.	13.30	2339.	10.33	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	379.	2.23	386.	1.70	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	2141.	12.59	2260.	9.98	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	3.	0.01	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	6293.	37.02	6569.	29.01	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	4439.	26.11	5044.	22.28	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	1145.	6.74	2134.	9.42	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	47.	0.28	1608.	7.10	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	1956.	8.64	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	892.	100.00	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	503021.	88.50
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		17000.	100.00	22642.	100.00	892.	100.00	0.	0.0	503021.	88.50
WATER	18.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	65364.	11.50
TOTAL(WET)		17000.	100.00	22642.	100.00	892.	100.00	0.	0.0	568385.	100.00
LB MOL/HR(WET)	*	879.66		1015.81		**********		0.0		**********	
MMSCFD	*	8.01		9.25		0.0		0.0		0.0	
GPM	*	0.0		0.0		2.02		0.0		0.0	
ACFM	*	829.90		953.50		0.0		0.0		0.0	
MOLECULAR WT	*	19.33		22.29		**********		0.0		**********	
DENSITY,LB/CU.FT	*	0.34		0.40		54.99		0.0		0.0	
VISCOSITY,LB/FT-HR	*	0.03		0.03		0.99		0.0		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		101		102		103		104		105	
DESCRIPTION		TREATED H2O TO SRC		STEAM TO DEA		STEAM TO SRC		LPG PRODUCT		PURE N2 TO SRC	
PHASE		L		V		V		L		V	
TEMPERATURE, DEG F		88.0		307.6		356.0		98.0		100.0	
PRESSURE, PSIA		30.00		75.00		150.00		250.00		14.70	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	401.	100.00
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	6.	0.12	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	2815.	56.40	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	2008.	40.23	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	162.	3.25	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	0.	0.0	0.	0.0	4991.	100.00	401.	100.00
WATER	18.02	39723.	100.00	28759.	100.00	3168.	100.00	0.	0.0	0.	0.0
TOTAL(WET)		39723.	100.00	28759.	100.00	3168.	100.00	4991.	100.00	401.	100.00
LB MOL/HR(WET)	*	2204.39		1595.45		175.80		100.11		14.31	
MMSCFD	*	0.0		0.0		1.60		0.0		0.13	
GPM	*	80.00		0.0		0.0		19.74		0.0	
ACFM	*	0.0		2785.80		163.40		0.0		96.90	
MOLECULAR WT	*	18.02		18.02		18.02		49.86		28.02	
DENSITY,LB/CU.FT	*	62.13		0.17		0.32		31.52		0.07	
VISCOSITY,LB/FT-HR	*	2.42		0.04		0.04		0.26		0.04	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		106		107		108		109		110	
DESCRIPTION		TOTAL M.O. PROD FROM HOF/NC-POF		TOTAL H.O. PROD FROM HOF-POF		STEAM TO METHANATION FROM U&O		VENT FROM SRC		NAPHTHA PRODUCT	
PHASE		L		L		V		V		L	
TEMPERATURE, DEG F		180.0		180.0		0.0		135.0		115.0	
PRESSURE, PSIA		115.00		115.00		0.0		14.70		65.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	384.	68.82	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	1.	0.18	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	6.	1.08	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	3.	0.54	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	4.	0.72	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	8.	1.43	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	19.	3.41	0.	0.0
C5-400 DEG F	106.00	3797.	5.69	0.	0.0	0.	0.0	60.	10.75	44466.	100.00
400 - 650 DEG F	166.00	57445.	86.06	665.	5.01	0.	0.0	6.	1.08	0.	0.0
650 - 850 DEG F	240.00	5483.	8.21	10270.	77.35	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	13.	0.02	2343.	17.65	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	10.	0.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		66748.	100.00	13278.	100.00	0.	0.0	491.	87.99	44466.	100.00
WATER	18.02	0.	0.0	0.	0.0	0.	0.0	67.	12.01	0.	0.0
TOTAL(WET)		66748.	100.00	13278.	100.00	0.	0.0	558.	100.00	44466.	100.00
LB MOL/HR(WET)	*	**********		52.31		0.0		18.99		419.49	
MMSCFD	*	0.0		0.0		0.0		0.17		0.0	
GPM	*	141.35		24.13		0.0		0.0		111.10	
ACFM	*	0.0		0.0		0.0		158.80		0.0	
MOLECULAR WT	*	**********		253.83		0.0		29.38		106.00	
DENSITY, LB/CU.FT	*	58.87		68.59		0.0		0.06		49.90	
VISCOSITY, LB/FT-HR	*	3.78		40.10		0.0		0.04		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		111		112		113		114		115	
DESCRIPTION		STEAM TO HOF-POF		F.C. FROM NHT		M/U CS TO CSD		STEAM TO CSD		FUMES FROM SOLIDIF	
PHASE		V		V		L		V		V	
TEMPERATURE, DEG F		356.0		115.0		70.0		308.0		497.0	
PRESSURE, PSIA		145.00		88.00		115.00		75.00		14.70	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	292.	27.81	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	178.	16.95	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	52.	4.95	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	7.	0.67	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	317.	30.19	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	57.	5.43	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	79.	7.52	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	55.	5.24	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	111.	41.89
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	80.	30.19
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	604.	100.00	0.	0.0	74.	27.92
HYDROGEN CHLORIDE	36.45	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.05	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	1037.	98.76	604.	100.00	0.	0.0	265.	100.00
WATER	18.02	600.	100.00	13.	1.24	0.	0.0	12098.	100.00	0.	0.0
TOTAL(WET)		600.	100.00	1050.	100.00	604.	100.00	12098.	100.00	265.	100.00
LB MOL/HR(WET)	*	33.30		177.82		**********		671.37		**********	
MMSCFD	*	0.30		1.63		0.0		6.12		0.0	
GPM	*	0.0		0.0		1.40		0.0		0.0	
ACFM	*	31.20		210.00		0.0		1197.00		0.0	
MOLECULAR WT	*	18.02		5.90		**********		18.02		**********	
DENSITY,LB/CU.FT	*	0.32		0.08		53.60		0.17		0.47	
VISCOSITY,LB/FT-HR	*	1.02		0.0		1.45		0.03		0.01	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		116		117		118		119		120	
DESCRIPTION		PURE N2 TO DPU		PROC WATER TO DPU		VENT FROM PULVERIZER		ASWS SLUDGE TO U&O		PURGE N2 FROM NRSR TO ATM	
PHASE		V		L		V		SL		V	
TEMPERATURE, DEG F		77.0		68.0		0.0		250.0		396.0	
PRESSURE, PSIA		94.50		29.00		0.0		40.00		23.30	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	2700.	100.00	0.	0.0	0.	0.0	0.	0.0	3213.	77.07
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	14.	0.16	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
LEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	116.	2.78
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CA(OH)2	74.10	0.	0.0	0.	0.0	0.	0.0	216.	2.44	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		2700.	100.00	0.	0.0	0.	0.0	230.	2.60	3329.	79.85
WATER	18.02	0.	0.0	11023.	100.00	55481.	100.00	8625.	97.40	840.	20.15
TOTAL(WET)		2700.	100.00	11023.	100.00	55481.	100.00	8855.	100.00	4169.	100.00
LB MOL/HR(WET)	*	96.36		611.71		3078.86		481.68		**********	
MMSCFD	*	0.83		0.0		28.04		0.0		0.0	
GPM.	*	0.0		11.00		0.0		19.00		0.0	
ACFM	*	98.00		0.0		0.0		0.0		0.0	
MOLECULAR WT	*	28.02		18.02		18.02		18.38		**********	
DENSITY,LB/CU.FT	*	0.46		62.31		0.0		59.89		0.07	
VISCOSITY,LB/FT-HR	*	0.04		2.42		0.0		0.58		0.05	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

6000 T/D SRC-I DEMO PLANT SUMMARY MATERIAL BALANCE   CASE - EBH AT HIGH CONVERSION   T. D. VAKIL, 6/83 REV. BY TCL, 3/84

STREAM NUMBER		121		122		123		124		125	
DESCRIPTION		COND FROM NRSR TO WWT		STEAM TO GKT		PURE N2 TO GKT		PROC H20 TO RGC		AIR TO CALCINER	
PHASE		L		V		V		L		V	
TEMPERATURE, DEG F		92.4		267.0		77.0		62.0		60.0	
PRESSURE, PSIA		62.00		40.00		94.25		95.00		14.50	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	1236.	100.00	0.	0.0	63602.	75.78
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	4.	0.05	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.45	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	18998.	22.63
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		4.	0.05	0.	0.0	1236.	100.00	0.	0.0	82600.	98.41
WATER	18.02	8249.	99.95	9653.	100.00	0.	0.0	21655.	100.00	1332.	1.59
TOTAL(WET)		8253.	100.00	9653.	100.00	1236.	100.00	21655.	100.00	83932.	100.00
LB MOL/HR(WET)	*	**********		535.68		44.11		1201.72		2937.48	
MMSCFD	*	0.0		4.88		0.40		0.0		26.77	
GPM	*	15.75		0.0		0.0		43.30		0.0	
ACFM	*	0.0		0.0		44.84		0.0		18589.00	
MOLECULAR WT	*	**********		18.02		28.02		18.02		28.57	
DENSITY, LB/CU.FT	*	61.47		0.0		0.46		62.36		0.07	
VISCOSITY, LB/FT-HR	*	1.45		0.0		0.04		2.62		0.05	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		126		127		128		129		130	
DESCRIPTION		SLAG FROM GKT TO U&O		CO2 VENT EXCH GAS FROM SHIFT		BFW TO SHIFT		PROC WATER TO WASH WT FROM U&O		AIR TO CALCINER	
PHASE		L+S		V		L		L		V	
TEMPERATURE, DEG F		156.5		280.0		220.0		62.1		60.0	
PRESSURE, PSIA		15.20		19.00		1115.00		14.70		14.70	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	37.	0.01	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	30421.	10.58	0.	0.0	0.	0.0	165817.	75.78
ARGON	40.00	0.	0.0	2.	0.00	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	75.	0.03	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	256771.	89.34	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	18.	0.01	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	1.	0.00	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	7.	0.00	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	15834.	94.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	49530.	22.64
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		15834.	94.00	287332.	99.97	0.	0.0	0.	0.0	215347.	98.41
WATER	18.02	1011.	6.00	91.	0.03	109030.	100.00	221.	100.00	3472.	1.59
TOTAL(WET)		16845.	100.00	287423.	100.00	109030.	100.00	221.	100.00	218819.	100.00
LB MOL/HR(WET)	*	**********		6946.95		6050.50		12.26		7658.29	
MMSCFD	*	0.0		63.27		0.0		0.0		69.79	
GPM	*	0.0		0.0		0.0		0.44		0.0	
ACFM	*	0.0		48283.00		0.0		0.0		48463.00	
MOLECULAR WT	*	**********		41.37		18.02		18.02		28.57	
DENSITY,LB/CU.FT	*	0.0		0.10		0.0		62.36		0.07	
VISCOSITY,LB/FT-HR	*	0.0		0.05		0.0		2.66		0.05	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		131		132		133		134		135	
DESCRIPTION		F.G. TO CALCINER		FLY DUST FROM POND TO U&O		WASH W B/D FROM WASH WT		CALCINED COKE PROD		H.P. SATD STEAM FROM U&O TO SHIFT	
PHASE		V		SL		L		S		V	
TEMPERATURE, DEG F		105.0		0.0		97.0		300.0		533.9	
PRESSURE, PSIA		75.00		0.0		93.00		15.00		914.70	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	400.	34.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	82.	6.97	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	12.	1.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	44969.	49.90	0.	0.0	0.	0.0	0.	0.0
WASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	47.	4.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	47580.	99.63	0.	0.0
OTHER	******	635.	54.00	424.	0.47	0.	0.0	0.	0.0	0.	0.0
OIL	******	0.	0.0	0.	0.0	0.	0.0	175.	0.37	0.	0.0
NACL IONS	58.44	0.	0.0	0.	0.0	775.	0.83	0.	0.0	0.	0.0
TOTAL(DRY)		1176.	100.00	45393.	50.37	775.	0.83	47755.	100.00	0.	0.0
WATER	18.02	0.	0.0	44731.	49.63	92815.	99.17	0.	0.0	8069.	100.00
TOTAL(WET)		1176.	100.00	90124.	100.00	93590.	100.00	47755.	100.00	8069.	100.00
LB MOL/HR(WET)	*	**********		**********		5163.93		**********		447.78	
MMSCFD	*	0.0		0.0		0.0		0.0		4.08	
GPM	*	0.0		0.0		186.60		0.0		0.0	
ACFM	*	0.0		0.0		0.0		0.0		66.00	
MOLECULAR WT	*	**********		**********		18.12		**********		18.02	
DENSITY,LB/CU.FT	*	0.26		0.0		62.03		126.61		2.03	
VISCOSITY,LB/FT-HR	*	0.02		0.0		1.71		0.0		0.07	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		136		137		138		139		140	
DESCRIPTION		H.P. STEAM (SUP. HT.) TO SHIFT		FLOCCULATING AGENT TO WASH WT		B/D FROM SHIFT		B/D FROM SHIFT		PROC H2O TO CALCINER	
PHASE		V		L		L		L		L	
TEMPERATURE, DEG F		800.0		0.0		0.0		0.0		62.0	
PRESSURE, PSIA		864.70		0.0		0.0		0.0		95.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
WATER	18.02	123341.	100.00	1.	100.00	1493.	100.00	8417.	100.00	31712.	100.00
TOTAL(WET)		123341.	100.00	1.	100.00	1493.	100.00	8417.	100.00	31712.	100.00
LB MOL/HR(WET)	*	6844.68		0.06		82.85		467.09		1759.82	
MMSCFD	*	62.35		0.0		0.0		0.0		0.0	
GPM	*	0.0		0.0		3.00		16.80		63.42	
ACFM	*	1657.00		0.0		0.0		0.0		0.0	
MOLECULAR WT	*	18.02		18.02		18.02		18.02		18.02	
DENSITY,LB/CU.FT	*	1.25		0.0		0.0		0.0		62.37	
VISCOSITY,LB/FT-HR	*	0.06		0.0		0.0		0.0		2.42	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		141		142		143		144		145	
DESCRIPTION		SLOP OIL FROM ASWS		SLOP OIL FROM ASWS		PURE H2 TO SELEXOL		COND. TO SELEXOL		H2 COMPR LEAKAGE	
PHASE		L		L		V		V		V	
TEMPERATURE, DEG F		124.0		124.0		77.0		366.0		0.0	
PRESSURE, PSIA		64.00		64.00		95.00		164.50		0.0	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	204.	72.60
NITROGEN	28.02	0.	0.0	0.	0.0	30274.	100.00	0.	0.0	29.	10.32
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	8.	2.85
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	33.	11.74
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	5.	1.78
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	2.	0.71
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.11	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	98.	95.15	98.	95.15	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CA(OH)2	74.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		98.	95.15	98.	95.15	30274.	100.00	0.	0.0	281.	100.00
WATER	18.02	5.	4.85	5.	4.85	0.	0.0	289.	100.00	0.	0.0
TOTAL(WET)		103	100.00	103.	100.00	30274.	100.00	289.	100.00	281.	100.00
LB MOL/HR(WET)	*	1.20		1.20		1080.44		16.04		103.84	
MMSCFD	*	0.0		0.0		9.84		0.15		0.93	
GPM	*	0.0		0.0		0.0		0.0		0.0	
ACFM	*	0.0		0.0		1090.00		13.72		0.0	
MOLECULAR WT	*	85.69		85.69		28.02		18.02		2.71	
DENSITY,LB/CU.FT	*	0.0		0.0		0.46		0.35		0.0	
VISCOSITY,LB/FT-HR	*	0.0		0.0		0.04		0.03		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		146		147		148		149		150	
DESCRIPTION		COND FROM H2 COMPR		COND TO DEA		20% CAUSTIC TO DEA		NET AIR TO ASU ** (AIR IN - WASTE - PURGE)		GAN FROM ASU	
PHASE		L		L		L		V		V	
TEMPERATURE, DEG F		0.0		280.0		100.0		70.0		100.0	
PRESSURE, PSIA		0.0		75.00		65.00		14.70		95.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	125735.	50.84	112718.	100.00
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	722.	0.29	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	58.	48.33	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	2.	1.67	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	115637.	46.76	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CAUSTIC	40.00	0.	0.0	0.	0.0	482.	20.02	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		60.	50.00	0.	0.0	482.	20.02	241894.	97.81	112718.	100.00
WATER	18.02	60.	50.00	3540.	100.00	1926.	79.98	5428.	2.19	0.	0.0
TOTAL(WET)		120.	100.00	3540.	100.00	2408.	100.00	247322.	100.00	112718.	100.00
LB MOL/HR(WET)	*	3.89		196.45		118.93		8420.32		4022.77	
MMSCFD	*	0.0		0.0		0.0		76.71		36.65	
GPM	*	0.0		7.62		4.00		0.0		0.0	
ACFM	*	0.0		0.0		0.0		54281.45		4242.46	
MOLECULAR WT	*	30.86		18.02		20.25		29.37		28.02	
DENSITY,LB/CU.FT	*	0.0		57.94		75.38		0.07		0.43	
VISCOSITY,LB/FT-HR	*	0.0		0.48		6.30		0.04		0.04	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

**NET AIR (TOTAL AIR IN - WASTE - PURGE) IS SHOWN TO PRESERVE APCI PROPRIETARY INFORMATION

STREAM NUMBER		151		152		153		154		155	
DESCRIPTION		SOLID SRC PRODUCT FROM SOLIDIFICATION		NEUTRALIZING AGENT TO WASH WT		SOLID SRC/TSL FROM SOLIDIFICATION		STEAM TO HPU		LIN TO HPU	
PHASE		S		L		S		V		L	
TEMPERATURE, DEG F		200.0		97.0		200.0		356.0		-282.8	
PRESSURE, PSIA		14.70		14.70		14.70		145.00		100.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1835.	100.00
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	3658.	4.98	0.	0.0	757.	5.36	0.	0.0	0.	0.0
850+ DEG F	425.00	69878.	94.86	0.	0.0	13359.	94.64	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	117.	0.16	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SODIUM IONS	22.99	0.	0.0	472.	11.50	0.	0.0	0.	0.0	0.	0.0
HYDROXYL IONS	17.01	0.	0.0	349.	8.50	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		73663.	100.00	821.	20.00	14116.	100.00	0.	0.0	1835.	100.00
WATER	18.02	0.	0.0	3283.	80.00	0.	0.0	9000.	100.00	0.	0.0
TOTAL(WET)		73663.	100.00	4104.	100.00	14116.	100.00	9000.	100.00	1835.	100.00
LB MOL/HR(WET)	*	**********		223.23		34.59		499.45		65.49	
MMSCFD	*	0.0		0.0		0.0		4.55		0.0	
GPM	*	0.0		7.34		0.0		0.0		5.23	
ACFM	*	0.0		0.0		0.0		468.90		0.0	
MOLECULAR WT	*	**********		18.38		408.13		18.02		28.02	
DENSITY,LB/CU.FT	*	0.0		69.70		73.60		0.32		43.72	
VISCOSITY,LB/FT-HR	*	0.0		1.71		0.0		0.04		0.20	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		156		157		158		159		160	
DESCRIPTION		OILY WATER FROM HPU TO WWT		OILY WATER FROM HPU TO WWT		OILY WATER FROM HPU TO WWT		TOTAL HPU/LPG F.G. TO F.G. HEADER		ANTIFOAM TO COKER	
PHASE		L		L		L		V		L	
TEMPERATURE, DEG F		100.0		65.0		99.0		89.0		0.0	
PRESSURE, PSIA		55.00		55.00		55.00		120.00		0.0	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	522.	1.59	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	3707.	11.26	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	615.	1.87	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	3555.	10.80	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	3.	0.01	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	10376.	31.51	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	7730.	23.48	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	2827.	8.59	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	1637.	4.97	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	1956.	5.94	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CATALYST	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	15.	100.00
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	0.	0.0	0.	0.0	32928.	100.00	15.	100.00
WATER	18.02	0.	0.0	142.	100.00	8979.	100.00	0.	0.0	0.	0.0
TOTAL(WET)		0.	0.0	142.	100.00	8979.	100.00	32928.	100.00	15.	100.00
LB MOL/HR(WET)	*	0.0		7.88		498.28		1548.26		**********	
MMSCFD	*	0.0		0.0		0.0		14.14		0.0	
GPM	*	0.0		0.28		18.16		0.0		0.0	
ACFM	*	0.0		0.0		0.0		1270.00		0.0	
MOLECULAR WT	*	0.0		18.02		18.02		21.27		**********	
DENSITY,LB/CU.FT	*	0.0		62.85		61.66		0.43		0.0	
VISCOSITY,LB/FT-HR	*	0.0		2.52		1.66		0.0		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		161		162		163		164		165	
DESCRIPTION		SLOP OIL FROM COKER		SULFUR PRODUCT FROM CLAUS		H2O FROM ASWS TO WWT		BFW TO NHT		STEAM TO NHT	
PHASE		L		L		L		L		V	
TEMPERATURE, DEG F		150.0		0.0		120.0		220.0		800.0	
PRESSURE, PSIA		65.00		0.0		85.00		235.00		865.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	5.	0.00	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	12.	0.01	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	1.	0.00	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	2.	3.85	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	4.	7.69	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	16082.	100.00	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	5.	9.62	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CATALYST	******	15.	28.85	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CACL2	110.99	0.	0.0	0.	0.0	300.	0.13	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		26.	50.00	16082.	100.00	318.	0.14	0.	0.0	0.	0.0
WATER	18.02	26.	50.00	0.	0.0	223600.	99.86	2200.	100.00	1200.	100.00
TOTAL(WET)		52.	100.00	16082.	100.00	223918.	100.00	2200.	100.00	1200.	100.00
LB MOL/HR(WET)	*	**********		501.62		12412.01		122.09		66.59	
MMSCFD	*	0.0		0.0		0.0		0.0		0.61	
GPM	*	0.0		0.0		449.80		4.40		0.0	
ACFM	*	0.0		0.0		0.0		0.0		0.0	
MOLECULAR WT	*	**********		32.06		18.04		18.02		18.02	
DENSITY,LB/CU.FT	*	0.0		0.0		62.10		0.0		0.0	
VISCOSITY,LB/FT-HR	*	0.0		0.0		1.30		0.0		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		166		167		168		169		170	
DESCRIPTION		DEDUST OIL TO CALC		AIR TO CLAUS		LIME SLURRY TO ASWS		AIR TO S-PIT, CLAUS		PROC H2O TO CALC	
PHASE		L		V		SL		V		L	
TEMPERATURE, DEG F		0.0		60.0		0.0		60.0		62.0	
PRESSURE, PSIA		0.0		14.70		0.0		14.70		95.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	36221.	74.35	0.	0.0	822.	74.32	0.	0.0
ARGON	40.00	0.	0.0	620.	1.27	0.	0.0	14.	1.27	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	11101.	22.79	0.	0.0	252.	22.78	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CA(OH)2	74.10	0.	0.0	0.	0.0	416.	15.00	0.	0.0	0.	0.0
OIL	******	175.	100.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		175.	100.00	47942.	98.41	416.	15.00	1088.	98.37	0.	0.0
WATER	18.02	0.	0.0	773.	1.59	2357.	85.00	18.	1.63	14248.	100.00
TOTAL(WET)		175.	100.00	48715.	100.00	2773.	100.00	1106.	100.00	14248.	100.00
LB MOL/HR(WET)	*	**********		1697.99		136.41		38.56		790.68	
MMSCFD	*	0.0		15.48		0.0		0.35		0.0	
GPM	*	0.0		0.0		0.0		0.0		28.49	
ACFM	*	0.0		10744.00		0.0		244.00		0.0	
MOLECULAR WT	*	**********		28.69		20.33		28.68		18.02	
DENSITY,LB/CU.FT	*	0.0		0.08		0.0		0.08		62.37	
VISCOSITY,LB/FT-HR	*	0.0		0.0		0.0		0.0		2.42	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		171		172		173		174		175	
DESCRIPTION		STEAM TO BSRU		LPG TO BSRU		AIR TO BSRU		COND TO BSRU		STRETFORD M/U TO BSRU	
PHASE		V		V		V		L		L	
TEMPERATURE, DEG F		320.0		80.0		200.0		0.0		0.0	
PRESSURE, PSIA		89.70		45.00		24.70		0.0		0.0	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	15560.	74.35	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	266.	1.27	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	1.	0.16	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	358.	56.38	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	255.	40.16	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	21.	3.31	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	4769.	22.79	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
STRETFORD SOLUTION	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	395.	100.00
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	635.	100.00	20595.	98.41	0.	0.0	395.	100.00
WATER	18.02	592.	100.00	0.	0.0	332.	1.59	994.	100.00	0.	0.0
TOTAL(WET)		592.	100.00	635.	100.00	20927.	100.00	994.	100.00	395.	100.00
LB MOL/HR(WET)	*	32.85		12.74		729.42		55.16		**********	
MMSCFD	*	0.30		0.12		6.65		0.0		0.0	
GPM	*	0.0		0.0		0.0		2.00		0.0	
ACFM	*	51.08		25.73		3484.00		0.0		0.0	
MOLECULAR WT	*	18.02		49.86		28.69		18.02		**********	
DENSITY,LB/CU.FT	*	0.20		0.41		0.10		0.0		0.0	
VISCOSITY,LB/FT-HR	*	0.0		0.02		0.05		0.0		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		176		177		178		179		180	
DESCRIPTION		TAIL GAS VENT FROM BSRU		OXIDIZER VENT FROM BSRU		STRETFORD PURGE FROM BSRU		CALCINER OFF GAS		CALCINER WW TO WWT	
PHASE		V		V		L		V		L	
TEMPERATURE, DEG F		124.0		97.0		270.0		161.0		161.0	
PRESSURE, PSIA		14.50		14.50		64.70		14.50		87.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	119.	0.15	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	46318.	56.77	8842.	71.64	0.	0.0	229642.	61.00	0.	0.0
ARGON	40.00	750.	0.92	151.	1.22	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	69.	0.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	27666.	33.91	0.	0.0	0.	0.0	33061.	8.78	0.	0.0
CARBONYL SULFIDE	60.07	5.	0.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	32.	0.01	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
WASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	252.	0.31	2710.	21.96	0.	0.0	24877.	6.61	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	12.	0.00	0.	0.0
STRETFORD SOLUTION	******	0.	0.0	0.	0.0	395.	16.60	0.	0.0	0.	0.0
CAUSTIC	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	669.	9.06
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		75179.	92.14	11703.	94.82	395.	16.60	287624.	76.40	669.	9.06
WATER	18.02	6412.	7.86	639.	5.18	1984.	83.40	88834.	23.60	6717.	90.94
TOTAL(WET)		81591.	100.00	12342.	100.00	2379.	100.00	376458.	100.00	7386.	100.00
LB MOL/HR(WET)	*	2725.59		439.48		**********		**********		389.48	
MMSCFD	*	24.83		4.00		0.0		133.50		0.0	
GPM	*	0.0		0.0		4.74		0.0		13.50	
ACFM	*	19595.00		3020.00		0.0		111967.00		0.0	
MOLECULAR WT	*	29.93		28.08		**********		**********		18.96	
DENSITY,LB/CU.FT	*	0.07		0.07		0.0		0.06		62.00	
VISCOSITY,LB/FT-HR	*	0.04		0.0		0.0		0.04		1.40	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		181		182		183		184		185	
DESCRIPTION		CONDENSATE FROM ASU		PURGE TO ATM. FROM ASU		WASTE VENT FROM ASU		LOX FROM ASU		LIN FROM ASU	
PHASE		L		V		V		L		L	
TEMPERATURE, DEG F		60.0		92.0		92.2		-300.0		-317.0	
PRESSURE, PSIA		15.00		85.00		14.70		40.00		16.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0					0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0					0.	0.0	2715.	100.00
ARGON	40.00	0.	0.0					15.	1.55	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0					0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0					0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0					0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0					0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0					0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0					0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0					0.	0.0	0.	0.0
METHANE	16.04	0.	0.0					0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0					0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0					0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0					0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0					0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0					0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0					0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0					0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0					0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0					0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0					0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0					2902.	98.45	0.	0.0
SULFUR	32.06	0.	0.0					0.	0.0	0.	0.0
COAL	******	0.	0.0					0.	0.0	0.	0.0
COKE	******	0.	0.0					0.	0.0	0.	0.0
	******	0.	0.0					0.	0.0	0.	0.0
	******	0.	0.0					0.	0.0	0.	0.0
	******	0.	0.0					0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0					2917.	100.00	2715.	100.00
WATER	18.02	5428.	100.00					0.	0.0	0.	0.0
TOTAL(WET)		5428.	100.00					2917.	100.00	2715.	100.00
LB MOL/HR(WET)	*	301.22						91.06		96.90	
MMSCFD	*	0.0						0.0		0.0	
GPM	*	10.82						0.0		6.89	
ACFM	*	0.0						0.0		0.0	
MOLECULAR WT	*	18.02						32.10		28.02	
DENSITY,LB/CU.FT	*	52.56						71.70		49.40	
VISCOSITY,LB/FT-HR	*	1.56						0.47		0.37	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		186		187		188		189		190	
DESCRIPTION		ASU BY-PASS TO ATM.		AIR TO WASH WT		VENT FROM WASH WT		STEAM TO EBH		STEAM TO EBH	
PHASE		V		V		V		V		V	
TEMPERATURE, DEG F		0.0		60.0		153.0		308.0		356.0	
PRESSURE, PSIA		0.0		14.70		15.00		75.00		145.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	10146.	100.00	20216.	75.78	20216.	62.21	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	6039.	22.64	6039.	18.58	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		10146.	100.00	26255.	98.41	26255.	80.79	0.	0.0	0.	0.0
WATER	18.02	0.	0.0	423.	1.59	6242.	19.21	3300.	100.00	1200.	100.00
TOTAL(WET)		10146.	100.00	26678.	100.00	32497.	100.00	3300.	100.00	1200.	100.00
LB MOL/HR (WET)	*	362.10		933.68		1256.60		183.13		66.59	
MMSCFD	*	3.29		8.51		11.45		1.67		0.61	
GPM	*	0.0		0.0		0.0		0.0		0.0	
ACFM	*	0.0		5909.00		9166.00		326.70		61.78	
MOLECULAR WT	*	28.02		28.57		25.86		18.02		18.02	
DENSITY,LB/CU.FT	*	0.0		0.07		0.06		0.17		0.0	
VISCOSITY,LB/FT-HR	*	0.0		0.0		0.04		0.03		0.04	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		191		192		193		194		195	
DESCRIPTION		BFW TO EBH		FOAMING INHIB. TO EBH		NEUT. INHIB. TO EBH		FRESH CAT TO EBH		SPENT CAT FROM EBH	
PHASE		L		L		L		S		S	
TEMPERATURE, DEG F		220.0		0.0		0.0		0.0		0.0	
PRESSURE, PSIA		235.00		0.0		0.0		0.0		0.0	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	3.	2.01
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	7.	4.70
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
WASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
INHIBITOR	******	0.	0.0	28.	100.00	4.	100.00	0.	0.0	32.	21.48
CATALYST	******	0.	0.0	0.	0.0	0.	0.0	107.	100.00	107.	71.81
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	28.	100.00	4.	100.00	107.	100.00	149.	100.00
WATER	18.02	60520.	100.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(WET)		60520.	100.00	28.	100.00	4.	100.00	107.	100.00	149.	100.00
LB MOL/HR(WET)	*	3358.49		**********		**********		**********		**********	
MMSCFD	*	0.0		0.0		0.0		0.0		0.0	
GPM	*	128.09		0.0		0.0		0.0		0.0	
ACFM	*	0.0		0.0		0.0		0.0		0.0	
MOLECULAR WT	*	18.02		**********		**********		**********		**********	
DENSITY,LB/CU.FT	*	58.91		0.0		0.0		0.0		0.0	
VISCOSITY,LB/FT-HR	*	0.64		0.0		0.0		0.0		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		196		197		198		199		200	
DESCRIPTION		STEAM TO COKER		STEAM TO COKER		STEAM TO COKER		PROCESS H2O TO COKER		L.P. DEA F.G.	
PHASE		V		V		V		L		V	
TEMPERATURE, DEG F		460.0		363.0		320.0		62.0		120.0	
PRESSURE, PSIA		465.00		165.00		90.00		95.00		88.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	206.	1.93
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	303.	2.84
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	27.	0.25
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	390.	3.65
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	105.	0.98
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	3.	0.03
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	3268.	30.61
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1854.	17.37
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1614.	15.12
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1539.	14.42
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1231.	11.53
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	0.	0.0	0.	0.0	0.	0.0	10540.	98.73
WATER	18.02	1200.	100.00	6800.	100.00	386.	100.00	14168.	100.00	136.	1.27
TOTAL(WET)		1200.	100.00	6800.	100.00	386.	100.00	14168.	100.00	10676.	100.00
LB MOL/HR(WET)	*	66.59		377.36		21.42		786.24		477.70	
MMSCFD	*	0.61		3.44		0.20		0.0		4.35	
GPM	*	0.0		0.0		0.0		28.27		0.0	
ACFM	*	20.00		320.40		32.00		0.0		554.50	
MOLECULAR WT	*	18.02		18.02		18.02		18.02		22.35	
DENSITY,LB/CU.FT	*	1.00		0.35		0.20		62.49		0.32	
VISCOSITY,LB/FT-HR	*	0.04		0.04		0.04		1.55		0.03	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

Material Balance Summary

6,000-tpd SRC-I Demonstration Plant

EBH at Low Conversion

STREAM NUMBER		1		2		3		4		5	
DESCRIPTION		FINISHED DUST FROM DPU TO GKT		COAL FROM PULVERIZER TO DPU		COAL FROM PULVERIZER TO SRC		CONDENSATE FROM SHIFT TO GKT		H.P. OFF GAS FROM SRC TO DEA	
PHASE		S		S		S		L		V	
TEMPERATURE, DEG F		206.0		121.0		180.0		100.0		110.0	
PRESSURE, PSIA		14.55		14.60		14.70		255.00		1860.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	19336.	16.92
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	16481.	14.42
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	2155.	1.89
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	19803.	17.33
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	23.	0.02	3459.	3.03
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	7.	0.01	6673.	5.84
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	14.	0.01	29.	0.03
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	19014.	16.64
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	9592.	8.39
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	6445.	5.64
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	4086.	3.58
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	6938.	6.07
400 - 650 DEG F	166.00	267.	0.16	0.	0.0	0.	0.0	0.	0.0	6.	0.01
650 - 850 DEG F	240.00	1764.	1.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	46585.	28.05	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	76509.	46.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	37188.	22.40	37188.	98.50	465833.	98.04	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		162313.	97.75	37188.	98.50	465833.	98.04	44.	0.04	114017.	99.77
WATER	18.02	3736.	2.25	566.	1.50	9317.	1.96	115919.	99.96	263.	0.23
TOTAL(WET)		166049.	100.00	37754.	100.00	475150.	100.00	115963.	100.00	114280.	100.00
LB MOL/HR(WET)	*	**********		**********		**********		6434.35		13017.34	
MMSCFD	*	0.0		0.0		0.0		0.0		118.60	
GPM	*	0.0		0.0		0.0		236.00		0.0	
ACFM	*	0.0		0.0		0.0		0.0		751.50	
MOLECULAR WT	*	**********		**********		**********		18.02		8.78	
DENSITY,LB/CU.FT	*	17.48		0.0		0.0		61.22		2.53	
VISCOSITY,LB/FT-HR	*	0.0		0.0		0.0		1.43		0.03	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		6		7		8		9		10	
DESCRIPTION		LP OFF GAS FROM SRC TO DEA		M.O. FROM SRC TO MO-POF		H.O. FROM SRC TO HOF-POF		SLURRY FROM SRC TO CSD		KMAC FROM CSD TO DPU	
PHASE		V		L		L		SL		S	
TEMPERATURE, DEG F		110.0		110.0		571.0		597.0		400.0	
PRESSURE, PSIA		125.00		16.00		70.00		1075.00		15.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	31.	2.22	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	249.	17.80	1.	0.00	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	25.	1.79	1.	0.00	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	177.	12.65	1.	0.00	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	45.	3.22	2.	0.00	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	87.	6.22	13.	0.03	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	3.	0.01	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	72.	5.15	1.	0.00	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	124.	8.86	10.	0.02	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	122.	8.72	27.	0.07	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	167.	11.94	207.	0.51	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	290.	20.73	31471.	78.19	38.	0.14	1.	0.00	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	8489.	21.09	20843.	77.75	2767.	0.75	267.	0.21
650 - 850 DEG F	240.00	0.	0.0	1.	0.00	5197.	19.39	17539.	4.78	1764.	1.40
850+ DEG F	425.00	0.	0.0	0.	0.0	731.	2.73	269702.	73.51	46585.	36.86
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	76858.	20.95	76509.	60.53
DEASHING SOLVENT	******	0.	0.0	10.	0.02	0.	0.0	0.	0.0	1264.	1.00
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		1589.	99.29	40237.	99.98	26809.	100.00	366867.	100.00	126389.	100.00
WATER	18.02	10.	0.71	10.	0.02	0.	0.0	0.	0.0	0.	0.0
TOTAL(WET)		1599.	100.00	40247.	100.00	26809.	100.00	366867.	100.00	126389.	100.00
LB MOL/HR(WET)	*	52.33		********.**		149.29		**********		**********	
MMSCFD	*	0.48		0.0		0.0		0.0		0.0	
GPM	*	0.0		97.57		68.22		632.00		0.0	
ACFM	*	41.90		0.0		0.0		0.0		0.0	
MOLECULAR WT	*	26.74		********.**		179.57		**********		**********	
DENSITY,LB/CU.FT	*	0.56		51.44		49.00		72.38		90.00	
VISCOSITY,LB/FT-HR	*	0.03		0.89		0.52		387.00		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		11		12		13		14		15	
DESCRIPTION		TOTAL MOLTEN SRC FROM CSD		MOLTEN SRC FROM CSD TO SOLIDIFICATION		SOUR WATER FROM CLAUS TO ASWS		MOLTEN SRC FROM CSD TO COKER		MOLTEN SRC FROM CSD TO EBH	
PHASE		L		L		L		L		L	
TEMPERATURE, DEG F		488.0		488.0		324.0		488.0		488.0	
PRESSURE, PSIA		25.00		25.00		94.50		115.00		115.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	324.	0.15	0.	0.0	0.	0.0	108.	0.15	216.	0.15
650 - 850 DEG F	240.00	11131.	5.02	0.	0.0	0.	0.0	3710.	5.02	7421.	5.02
850+ DEG F	425.00	209633.	94.57	0.	0.0	0.	0.0	69878.	94.58	139755.	94.57
ASH/UNCONV. CARBON	******	349.	0.16	0.	0.0	0.	0.0	116.	0.16	233.	0.16
DEASHING SOLVENT	******	222.	0.10	0.	0.0	0.	0.0	74.	0.10	148.	0.10
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		221659.	100.00	0.	0.0	0.	0.0	73886.	100.00	147773.	100.00
WATER	18.02	0.	0.0	0.	0.0	685.	100.00	0.	0.0	0.	0.0
TOTAL(WET)		221659.	100.00	0.	0.0	685.	100.00	73886.	100.00	147773.	100.00
LB MOL/HR(WET)	*	**********		0.0		38.01		**********		**********	
MMSCFD	*	0.0		0.0		0.0		0.0		0.0	
GPM	*	402.00		0.0		1.61		134.00		268.00	
ACFM	*	0.0		0.0		0.0		0.0		0.0	
MOLECULAR WT	*	**********		0.0		18.02		**********		**********	
DENSITY, LB/CU.FT	*	68.64		0.0		52.60		68.64		68.64	
VISCOSITY, LB/FT-HR	*	484.00		0.0		0.81		484.00		484.00	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		16		17		18		19		20	
DESCRIPTION		S-PIT VAPORS FROM CLAUS TO BSRU		IMPURE N2 FROM GKT TO DPU		CONVEYING N2 FROM GKT TO DPU		RETURN N2 FROM DPU TO NRSR		CRUDE NAPHTHA FEED TO NC-POF	
PHASE		V		V		V		V		L	
TEMPERATURE, DEG F		280.0		87.0		158.0		248.0		111.0	
PRESSURE, PSIA		14.50		14.70		14.90		14.60		175.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	822.	74.32	414.	100.00	31792.	96.14	34906.	77.06	1.	0.00
ARGON	40.00	14.	1.27	0.	0.0	0.	0.0	0.	0.0	1.	0.00
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1.	0.00
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	2.	0.00
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	16.	0.03
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	4.	0.01
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	5.	0.01
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	40.	0.07
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	261.	0.44
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1316.	2.23
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	48047.	81.52
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	9222.	15.65
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1.	0.00
850+ DEG F	425.00	0	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0	0.0	0.	0.0	0.	0.0	1264.	2.79	10.	0.02
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	252.	22.78	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		1088.	98.37	414.	100.00	31792.	96.14	36170.	79.85	58927.	99.98
WATER	18.02	18.	1.63	0.	0.0	1276.	3.86	9129.	20.15	10.	0.02
TOTAL(WET)		1106.	100.00	414.	100.00	33068.	100.00	45299.	100.00	58937.	100.00
LB MOL/HR(WET)	*	38.56		14.78		1205.43		**********		**********	
MMSCFD	*	0.35		0.14		11.00		0.0		0.0	
GPM	*	0.0		0.0		0.0		0.0		114.64	
ACFM	*	35.23		98.14		8937.00		0.0		0.0	
MOLECULAR WT	*	28.68		28.02		27.43		**********		**********	
DENSITY, LB/CU.FT	*	0.05		0.07		0.06		0.05		50.81	
VISCOSITY, LB/FT-HR	*	0.05		0.04		0.05		0.05		0.85	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		21		22		23		24		25	
DESCRIPTION		CRUDE M.O. FEED TO NC-POF		LP OFF GAS FROM NC-POF TO DEA		NAPHTHA FROM NC-POF TO NHT		COND FROM METH TO ASWS		CRUDE H.O. FEED TO HOF-POF	
PHASE		L		V		L		L		L	
TEMPERATURE, DEG F		454.0		135.0		110.0		100.0		477.0	
PRESSURE, PSIA		160.00		115.00		115.00		615.00		40.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	1.	0.08	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	2.	0.16	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	2.	0.16	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	1.	0.08	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	2.	0.16	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	16.	1.32	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	4.	0.33	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	27.	2.22	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	76.	6.26	1.	0.00	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	314.	25.84	23.	0.05	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	632.	52.02	802.	1.70	0.	0.0	0.	0.0
C5-400 DEG F	136.00	1642.	6.81	128.	10.53	45860.	97.34	0.	0.0	43.	0.10
400 - 650 DEG F	166.00	21712.	90.02	0.	0.0	427.	0.91	0.	0.0	27548.	62.16
650 - 850 DEG F	240.00	761.	3.16	0.	0.0	0.	0.0	0.	0.0	15170.	34.23
850+ DEG F	425.00	3.	0.01	0.	0.0	0.	0.0	0.	0.0	1554.	3.51
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PREASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		24118.	100.00	1205.	99.18	47113.	100.00	0.	0.0	44315.	100.00
WATER	18.02	0.	0.0	10.	0.82	0.	0.0	1627.	100.00	0.	0.0
TOTAL(WET)		24118.	100.00	1215.	100.00	47113.	100.00	1627.	100.00	44315.	100.00
LB MOL/HR(WET)	*	149.46		25.37		449.57		90.29		233.22	
MMSCFD	*	0.0		0.23		0.0		0.0		0.0	
GPM	*	60.10		0.0		116.84		3.31		103.04	
ACFM	*	0.0		20.97		0.0		0.0		0.0	
MOLECULAR WT	*	161.36		47.89		104.80		18.02		190.01	
DENSITY, LB/CU.FT	*	50.10		0.97		50.28		61.22		53.63	
VISCOSITY, LB/FT-HR	*	0.61		0.02		0.81		0.54		0.72	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		26		27		28		29		30	
DESCRIPTION		SOUR WATER FROM NHT TO ASWS		HP RECYCLE N2 FROM NRSR TO GKT		RAW GAS FROM GKT TO RGC		A/G FROM NHT TO DEA		H.P. OFF GAS FROM EBH TO DEA	
PHASE		L		V		V		V		V	
TEMPERATURE, DEG F		125.0		104.0		105.8		0.0		110.0	
PRESSURE, PSIA		85.00		60.00		15.00		0.0		1840.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	5348.	2.38	0.	0.0	1084.	7.46
NITROGEN	28.02	0.	0.0	31693.	99.09	2516.	1.12	0.	0.0	712.	4.90
ARGON	40.00	0.	0.0	0.	0.0	707.	0.31	0.	0.0	223.	1.54
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	163661.	72.77	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	30780.	13.69	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	1202.	0.53	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	6014.	2.67	275.	100.00	13.	0.09
AMMONIA	17.03	151.	2.89	0.	0.0	3.	0.00	0.	0.0	2.	0.01
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	2.	0.00	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	153.	0.07	0.	0.0	4584.	31.57
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	2616.	18.01
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	2532.	17.44
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	2117.	14.58
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	614.	4.23
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	11.	0.00	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	252.	0.79	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	2.	0.00	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HCN	27.03	0.	0.0	0.	0.0	19.	0.01	0.	0.0	0.	0.0
NO	30.01	0.	0.0	0.	0.0	5.	0.00	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		151.	2.89	31945.	99.87	210423.	93.56	275.	100.00	14497.	99.83
WATER	18.02	5066.	97.11	40.	0.13	14478.	6.44	0.	0.0	25.	0.17
TOTAL(WET)		5217.	100.00	31985.	100.00	224901.	100.00	275.	100.00	14522.	100.00
LB MOL/HR(WET)	*	290.00		**********		**********		8.07		1042.98	
MMSCFD	*	0.0		0.0		29.29		0.0		9.50	
GPM	*	10.50		0.0		0.0		0.0		0.0	
ACFM	*	0.0		0.0		21688.00		0.0		56.20	
MOLECULAR WT	*	17.99		**********		**********		34.08		13.92	
DENSITY,LB/CU.FT	*	61.30		0.28		0.05		0.0		4.31	
VISCOSITY,LB/FT-HR	*	1.50		0.04		0.04		0.0		0.03	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		31		32		33		34		35	
DESCRIPTION		HP NAPHTHA FROM EBH TO NC-POF		LP OFF GAS FROM EBH TO DEA		LP NAPHTHA FROM EBH TO NC-POF		M.O. FROM EBH TO NC-POF		HO FROM EBH TO HOF-POF INCL STREAM 36	
PHASE		V+L		V		L		L		L	
TEMPERATURE, DEG F		111.0		110.0		115.0		447.0		477.0	
PRESSURE, PSIA		500.00		115.00		65.00		65.00		65.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	1.	0.24	20.	1.46	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	1.	0.24	35.	2.55	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	1.	0.24	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	4.	0.29	1.	0.01	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	1.	0.01	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	22.	5.21	124.	9.04	2.	0.01	0.	0.0	0.	0.0
ETHANE	30.07	37.	8.77	207.	15.09	22.	0.16	0.	0.0	0.	0.0
PROPANE	44.10	76.	18.01	423.	30.83	190.	1.42	0.	0.0	0.	0.0
BUTANE	58.12	118.	27.96	451.	32.87	875.	6.52	0.	0.0	0.	0.0
C5-400 DEG F	106.00	163.	38.63	100.	7.29	11640.	86.76	1191.	6.85	5.	0.03
400 - 650 DEG F	166.00	3.	0.71	0.	0.0	686.	5.11	15514.	89.17	6705.	38.30
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	691.	3.97	9973.	56.97
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	3.	0.02	823.	4.70
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		422.	100.00	1364.	99.42	13417.	100.00	17399.	100.00	17506.	100.00
WATER	18.02	0.	0.0	8.	0.58	0.	0.0	0.	0.0	0.	0.0
TOTAL(WET)		422.	100.00	1372.	100.00	13417.	100.00	17399.	100.00	17506.	100.00
LB MOL/HR(WET)	*	8.47		44.64		134.25		107.58		83.93	
MMSCFD	*	0.02		0.41		0.0		0.0		0.0	
GPM	*	1.27		0.0		34.08		43.42		38.79	
ACFM	*	0.43		37.80		0.0		0.0		0.0	
MOLECULAR WT	*	49.83		30.73		99.94		161.73		208.58	
DENSITY,LB/CU.FT	*	0.0		0.60		49.09		49.96		56.28	
VISCOSITY,LB/FT-HR	*	0.0		0.02		0.75		0.61		2.05	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		36		37		38		39		40	
DESCRIPTION		SEE STREAM 35		MOLTEN TSL FROM EBH TO SOLIDIFICATION		WASH WATER FROM RGC-ESP TO GKT		SOUR GAS FROM SHIFT TO ASWS		LP OFF GAS FROM COKER TO DEA	
PHASE				L		L		V		V	
TEMPERATURE, DEG F		0.0		686.0		104.0		262.5		100.0	
PRESSURE, PSIA		0.0		115.00		85.00		37.00		114.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	7.	0.08	133.	1.81
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	1.	0.01	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	2.	0.02	148.	2.02
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	1294.	15.38	191.	2.60
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	90.	1.07	337.	4.59
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	4.	0.05	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	3049.	41.55
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1481.	20.18
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	845.	11.51
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	393.	5.35
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	711.	9.69
400 - 650 DEG F	166.00	0.	0.0	41.	0.05	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	3125.	3.81	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	78928.	96.14	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	11.	0.05	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	82094.	100.00	11.	0.05	1398.	16.61	7288.	99.31
WATER	18.02	0.	0.0	0.	0.0	22046.	99.95	7017.	83.39	51.	0.69
TOTAL(WET)		0.	0.0	82094.	100.00	22057.	100.00	8415.	100.00	7339.	100.00
LB MOL/HR(WET)	*	0.0		198.98		**********		425.26		360.28	
MMSCFD	*	0.0		0.0		0.0		3.88		3.28	
GPM	*	0.0		165.70		47.60		0.0		0.0	
ACFM	*	0.0		0.0		0.0		1464.00		311.00	
MOLECULAR WT	*	0.0		412.57		**********		19.79		20.37	
DENSITY,LB/CU.FT	*	0.0		61.78		1.58		0.10		0.39	
VISCOSITY,LB/FT-HR	*	0.0		1.15		0.0		0.03		0.03	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		41		42		43		44		45	
DESCRIPTION		NAPHTHA FROM COKER TO NC-POF		M.O. FROM COKER TO NC-POF		GREEN COKE FROM COKER TO CALCINER		COKE FROM CALC. KILN TO CALC. COOLER		L.O. FROM HOF-POF TO SRC	
PHASE		L		L		S		S		L	
TEMPERATURE, DEG F		115.0		458.0		0.0		2450.0		110.0	
PRESSURE, PSIA		137.00		115.00		0.0		14.50		32.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	2.	0.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	1.	0.05	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	2.	0.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	4.	0.20	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	6.	0.30	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	1912.	97.06	451.	6.71	0.	0.0	0.	0.0	3.	0.47
400 - 650 DEG F	166.00	43.	2.18	6198.	92.25	0.	0.0	0.	0.0	38.	5.93
650 - 850 DEG F	240.00	0.	0.0	70.	1.04	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	57890.	88.73	47580.	100.00	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		1970.	100.00	6719.	100.00	57890.	88.73	47580.	100.00	41.	6.40
WATER	18.02	0.	0.0	0.	0.0	7353.	11.27	0.	0.0	600.	93.60
TOTAL(WET)		1970.	100.00	6719.	100.00	65243.	100.00	47580.	100.00	641.	100.00
LB MOL/HR(WET)	*	18.68		41.88		**********		**********		33.55	
MMSCFD	*	0.0		0.0		0.0		0.0		0.0	
GPM	*	4.88		16.96		0.0		0.0		1.32	
ACFM	*	0.0		0.0		0.0		0.0		0.0	
MOLECULAR WT	*	105.47		160.42		**********		**********		19.10	
DENSITY,LB/CU.FT	*	50.34		49.40		0.0		126.61		60.60	
VISCOSITY,LB/FT-HR	*	0.82		0.59		0.0		0.0		1.39	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		46		47		48		49		50	
DESCRIPTION		WASH W. RECYCLE FROM WASH WT TO GKT		OIL SCRUB F.G. FROM HPU TO F.G. HEADER		WASH W. FROM GKT TO WASH WT		RETURN WATER FROM FOND TO WASH WT		SLUDGE EFFLUENT FROM WASH WT TO POND	
PHASE		L		V		L		L		SL	
TEMPERATURE, DEG F		96.8		233.0		149.0		97.0		149.0	
PRESSURE, PSIA		92.80		107.00		14.70		14.70		150.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	48.	0.81	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	77.	1.29	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	7.	0.12	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	117.	1.96	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	3.	0.05	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	298.	5.00	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	652.	10.94	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	1070.	17.95	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	1722.	28.89	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	1967.	33.00	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	44969.	1.90	0.	0.0	44969.	14.56
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CHLORIDE IONS	35.45	10945.	0.50	0.	0.0	11672.	0.49	1096.	0.50	1353.	0.44
SODIUM IONS	22.99	7098.	0.33	0.	0.0	7098.	0.30	731.	0.33	878.	0.28
HYDROGEN IONS	1.01	0.	0.0	0.	0.0	21.	0.00	0.	0.0	0.	0.0
TOTAL(DRY)		18043.	0.83	5961.	100.00	63760.	2.69	1807.	0.83	47200.	15.28
WATER	18.02	2162733.	99.17	0.	0.0	2302223.	97.31	216935.	99.17	261666.	84.72
TOTAL(WET)		2180776.	100.00	5961.	100.00	2365983.	100.00	218742.	100.00	308866.	100.00
LB MOL/HR(WET)	*	120635.94		143.69		**********		12100.41		**********	
MMSCFD	*	0.0		1.32		0.0		0.0		0.0	
GPM	*	4379.00		0.0		4706.00		439.00		533.00	
ACFM	*	0.0		160.28		0.0		0.0		0.0	
MOLECULAR WT	*	18.08		41.49		**********		18.08		**********	
DENSITY,LB/CU.FT	*	62.10		0.62		0.96		62.10		0.0	
VISCOSITY,LB/FT-HR	*	1.71		0.05		0.0		1.71		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		51		52		53		54		55	
DESCRIPTION		RSG FROM RGC TO SHIFT		COND FROM SRC TO ASWS		COND FROM SHIFT TO ASWS		SOUR WATER FROM EBH TO ASWS		GAS FROM CALCINER COOLER TO CALCINER KILN	
PHASE		V		L		L		L		V	
TEMPERATURE, DEG F		284.0		100.0		100.0		125.0		300.0	
PRESSURE, PSIA		852.00		34.50		215.00		85.00		14.50	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	5346.	2.54	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	2516.	1.19	0.	0.0	0.	0.0	0.	0.0	63602.	55.00
ARGON	40.00	707.	0.34	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	163661.	77.61	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	30780.	14.60	0.	0.0	1.	0.02	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	1202.	0.57	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	6015.	2.85	0.	0.0	0.	0.0	1135.	1.68	0.	0.0
AMMONIA	17.03	6.	0.00	0.	0.0	1.	0.02	1164.	1.72	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	153.	0.07	0.	0.0	0.	0.0	1.	0.00	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	105.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	165.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	18998.	16.43
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HCN	27.03	19.	0.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		210405.	99.78	0.	0.0	2.	0.03	2300.	3.40	82600.	71.43
WATER	18.02	462.	0.22	13632.	100.00	6155.	99.97	65321.	96.60	33044.	28.57
TOTAL(WET)		210867.	100.00	13632.	100.00	6157.	100.00	67621.	100.00	115644.	100.00
LB MOL/HR(WET)	*	9534.31		756.49		341.65		3726.64		4697.30	
MMSCFD	*	87.14		0.0		0.0		0.0		42.80	
GPM	*	0.0		27.42		12.54		141.01		0.0	
ACFM	*	1503.00		0.0		0.0		0.0		43968.00	
MOLECULAR WT	*	22.12		18.02		18.02		18.15		24.62	
DENSITY,LB/CU.FT	*	2.32		62.00		61.20		59.80		0.04	
VISCOSITY,LB/FT-HR	*	0.05		1.64		1.43		1.31		0.05	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		56		57		58		59		60	
DESCRIPTION		FLASH GAS FROM CALC SCRUB FL DRUM - CALC KILN		SHIFTED SYNGAS FROM SHIFT TO SELEXOL		SOUR WATER FROM COKER TO ASWS		SOUR WATER FROM COKER TO ASWS		TOTAL MAKEUP H2 FROM SELEXOL TO H2 COMP & METH	
PHASE		V		V		L		L		V	
TEMPERATURE, DEG F		115.0		100.0		115.0		150.0		60.0	
PRESSURE, PSIA		95.00		720.00		85.00		85.00		675.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	2.	16.67	16661.	5.36	0.	0.0	0.	0.0	16624.	62.64
NITROGEN	28.02	1.	8.33	2515.	0.81	0.	0.0	0.	0.0	2368.	8.92
ARGON	40.00	1.	8.33	707.	0.23	0.	0.0	0.	0.0	705.	2.66
CARBON MONOXIDE	28.01	2.	16.67	6382.	2.05	0.	0.0	0.	0.0	6307.	23.76
CARBON DIOXIDE	44.01	0.	0.0	277475.	89.26	1.	0.07	0.	0.0	384.	1.45
CARBONYL SULFIDE	60.07	0.	0.0	22.	0.01	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	6587.	2.12	1.	0.07	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	3.	25.00	153.	0.05	0.	0.0	1.	0.01	146.	0.55
ETHANE	30.07	2.	16.67	0.	0.0	0.	0.0	2.	0.01	0.	0.0
PROPANE	44.10	1.	8.33	0.	0.0	0.	0.0	1.	0.01	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	2.	0.01	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		12.	100.00	310502.	99.88	2.	0.13	6.	0.04	26534.	99.98
WATER	18.02	0.	0.0	360.	0.12	1535.	99.87	13589.	99.96	6.	0.02
TOTAL(WET)		12.	100.00	310862.	100.00	1537.	100.00	13595.	100.00	26540.	100.00
LB MOL/HR(WET)	*	1.40		15127.62		85.24		**********		8591.49	
MMSCFD	*	0.01		137.80		0.0		0.0		78.23	
GPM	*	0.0		0.0		3.10		27.50		0.0	
ACFM	*	1.52		2050.00		0.0		0.0		1217.00	
MOLECULAR WT	*	8.57		20.55		18.03		**********		3.09	
DENSITY,LB/CU.FT	*	0.13		2.55		61.82		61.70		0.36	
VISCOSITY,LB/FT-HR	*	0.03		0.04		1.50		1.21		0.02	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		61		62		63		64		65	
DESCRIPTION		ACID GAS FROM SELEXOL TO CLAUS		CO2 VENT GAS FROM SELEXOL TO SHIFT EXCH		CALC KILN OFF GAS TO CALCINER SCRUBBER		PROCESS COND FROM CSD TO SRC		TOTAL S.W. TO ASWS	
PHASE		V		V		V+A		L		L	
TEMPERATURE, DEG F		105.0		92.0		1650.0		110.0		0.0	
PRESSURE, PSIA		24.50		20.00		14.40		15.00		0.0	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	37.	0.01	0.	0.0	0.	0.0	2.	0.00
NITROGEN	28.02	0.	0.0	30421.	10.58	229642.	65.00	0.	0.0	1.	0.00
ARGON	40.00	0.	0.0	2.	0.00	0.	0.0	0.	0.0	1.	0.00
CARBON MONOXIDE	28.01	0.	0.0	75.	0.03	0.	0.0	0.	0.0	2.	0.00
CARBON DIOXIDE	44.01	20320.	73.99	256771.	89.34	33061.	9.36	0.	0.0	1643.	0.71
CARBONYL SULFIDE	60.07	4.	0.01	18.	0.01	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	6586.	23.98	1.	0.00	0.	0.0	0.	0.0	3697.	1.60
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	3230.	1.40
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	288.	0.13
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	370.	0.10	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	7.	0.00	0.	0.0	0.	0.0	4.	0.00
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	6.	0.00
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	8.	0.00
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	25.	0.01
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	210.	0.09
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	9.	0.07	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	24877.	7.04	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	12.	0.00	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		26910.	97.99	287332.	99.97	287962.	81.50	9.	0.07	9117.	3.96
WATER	18.02	552.	2.01	91.	0.03	65352.	18.50	12098.	99.93	221282.	96.04
TOTAL(WET)		27462.	100.00	287423.	100.00	353314.	100.00	12107.	100.00	230399.	100.00
LB MOL/HR(WET)	*	685.66		6946.95		**********		**********		12624.83	
MMSCFD	*	6.25		63.28		121.00		0.0		0.0	
GPM	*	0.0		0.0		0.0		24.80		0.0	
ACFM	*	2802.00		34100.00		347594.00		0.0		0.0	
MOLECULAR WT	*	40.05		41.37		**********		**********		18.25	
DENSITY, LB/CU.FT	*	0.16		0.14		0.02		60.87		0.0	
VISCOSITY, LB/FT-HR	*	0.04		0.04		0.0		1.40		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		66		67		68		69		70	
DESCRIPTION		O2 FROM ASU TO G<T		OFF GAS FROM ASWS TO CLAUS		LIGHT SRC FROM CSD TO SRC		SOUR WATER FROM SRC TO ASWS		TOTAL HP GAS FEED TO HP DEA	
PHASE		V		V		L		L		V	
TEMPERATURE, DEG F		241.0		180.0		418.0		125.0		110.0	
PRESSURE, PSIA		60.00		24.70		145.00		25.00		1840.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0	0.0	9.	0.08	0.	0.0	0.	0.0	20420.	15.85
NITROGEN	28.02	50.	0.04	2.	0.02	0.	0.0	0.	0.0	17193.	13.35
ARGON	40.00	707.	0.62	1.	0.01	0.	0.0	0.	0.0	2378.	1.85
CARBON MONOXIDE	28.01	0.	0.0	4.	0.03	0.	0.0	0.	0.0	19803.	15.37
CARBON DIOXIDE	44.01	0.	0.0	2937.	24.69	0.	0.0	1550.	1.66	3459.	2.69
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	3780.	31.78	0.	0.0	2372.	2.54	6686.	5.19
AMMONIA	17.03	0.	0.0	3414.	28.70	0.	0.0	1971.	2.11	31.	0.02
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	5.	0.04	0.	0.0	0.	0.0	23598.	18.32
ETHANE	30.07	0.	0.0	6.	0.05	0.	0.0	0.	0.0	12208.	9.48
PROPANE	44.10	0.	0.0	8.	0.07	0.	0.0	0.	0.0	8977.	6.97
BUTANE	58.12	0.	0.0	24.	0.20	0.	0.0	0.	0.0	6203.	4.82
C5-400 DEG F	106.00	0.	0.0	0.	0.0	1.	0.00	0.	0.0	7552.	5.86
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	2176.	10.72	0.	0.0	6.	0.00
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	4644.	22.87	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	13484.	66.40	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
WASHING SOLVENT	******	0.	0.0	0.	0.0	1.	0.00	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	195.	0.21	0.	0.0
OXYGEN	32.00	112735.	99.33	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		113492.	100.00	10190.	85.67	20306.	100.00	6089.	6.51	128514.	99.78
WATER	18.02	0.	0.0	1704.	14.33	0.	0.0	87403.	93.49	288.	0.22
TOTAL(WET)		113492.	100.00	11894.	100.00	20306.	100.00	93492.	100.00	128802.	100.00
LB MOL/HR(WET)	*	3542.43		478.49		**********		5076.26		14060.33	
MMSCFD	*	32.27		4.36		0.0		0.0		128.10	
GPM	*	0.0		0.0		39.33		194.91		0.0	
ACFM	*	7395.00		219.87		0.0		0.0		817.00	
MOLECULAR WT	*	32.04		24.86		**********		18.42		9.16	
DENSITY, LB/CU.FT	*	0.26		0.09		64.38		59.82		2.63	
VISCOSITY, LB/FT-HR	*	0.06		0.05		135.00		1.30		0.03	

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'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		71		72		73		74		75	
DESCRIPTION		TOTAL LP GAS FEED TO DEA		TOTAL H.P. DEA OFF GAS		H.P. OFF GAS FROM DEA TO H2 COMPR		H.P. OFF GAS FROM DEA TO HPU		ACID GAS FROM DEA/NHT TO CLAUS	
PHASE		V		V		V		V		V	
TEMPERATURE, DEG F		110.0		110.0		110.0		110.0		115.0	
PRESSURE, PSIA		100.00		1785.00		1785.00		1785.00		25.70	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	185.	1.63	20398.	17.24	6389.	17.24	14009.	17.24	1.	0.01
NITROGEN	28.02	286.	2.53	17181.	14.52	5381.	14.52	11800.	14.52	1.	0.01
ARGON	40.00	27.	0.24	2376.	2.01	744.	2.01	1632.	2.01	0.	0.0
CARBON MONOXIDE	28.01	326.	2.88	19783.	16.72	6196.	16.72	13587.	16.72	1.	0.01
CARBON DIOXIDE	44.01	238.	2.10	5.	0.00	2.	0.01	3.	0.00	3206.	29.89
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	444.	3.92	0.	0.0	0.	0.0	0.	0.0	7213.	67.25
AMMONIA	17.03	4.	0.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	3272.	28.89	23567.	19.92	7381.	19.91	16186.	19.92	1.	0.01
ETHANE	30.07	1888.	16.67	12188.	10.30	3817.	10.30	8371.	10.30	1.	0.01
PROPANE	44.10	1704.	15.05	8963.	7.57	2808.	7.58	6155.	7.57	0.	0.0
BUTANE	58.12	1643.	14.51	6184.	5.23	1937.	5.23	4247.	5.23	0.	0.0
C5-400 DEG F	106.00	1229.	10.85	7505.	6.34	2351.	6.34	5154.	6.34	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	6.	0.01	2.	0.01	4.	0.00	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		11246.	99.30	118156.	99.85	37008.	99.85	81148.	99.85	10424.	97.19
WATER	18.02	79.	0.70	181.	0.15	57.	0.15	124.	0.15	301.	2.81
TOTAL(WET)		11325.	100.00	118337.	100.00	37065.	100.00	81272.	100.00	10725.	100.00
LB MOL/HR(WET)	*	482.62		13762.12		4310.48		9451.61		301.86	
MMSCFD	*	4.41		125.35		39.26		86.09		2.75	
GPM	*	0.0		0.0		0.0		0.0		0.0	
ACFM	*	482.00		826.60		258.90		567.70		1195.00	
MOLECULAR WT	*	23.47		8.60		8.60		8.60		35.53	
DENSITY,LB/CU.FT	*	0.39		2.39		2.39		2.39		0.15	
VISCOSITY,LB/FT-HR	*	0.03		0.03		0.03		0.03		0.03	

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'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		76		77		78		79		80	
DESCRIPTION		RESIDUAL FUEL GAS FROM LPG TO HPU FUEL GAS HDR		SOUR H2O FLASH GAS FROM SRC TO CLAUS		WATER BLEED FROM DEA TO ASWS		WATER BLEED FROM DEA TO ASWS		RECYCLE H2 FROM HPU TO H2 COMPR	
PHASE		V		V		L		L		V	
TEMPERATURE, DEG F		89.0		125.0		115.0		115.0		57.2	
PRESSURE, PSIA		120.00		25.00		1806.00		97.00		1700.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	193.	1.66	0.	0.0	2.	0.01	0.	0.0	13486.	34.24
NITROGEN	28.02	1364.	11.74	0.	0.0	1.	0.01	0.	0.0	9918.	25.18
ARGON	40.00	247.	2.13	0.	0.0	1.	0.01	0.	0.0	1017.	2.58
CARBON MONOXIDE	28.01	1397.	12.03	0.	0.0	2.	0.01	0.	0.0	10028.	25.46
CARBON DIOXIDE	44.01	0.	0.0	10.	27.78	89.	0.59	2.	0.05	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	24.	66.67	183.	1.21	6.	0.16	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	31.	0.21	4.	0.11	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	4457.	38.37	0.	0.0	3.	0.02	0.	0.0	4906.	12.45
ETHANE	30.07	3114.	26.81	0.	0.0	2.	0.01	0.	0.0	34.	0.09
PROPANE	44.10	809.	6.97	0.	0.0	1.	0.01	0.	0.0	2.	0.01
BUTANE	58.12	34.	0.29	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		11615.	100.00	34.	94.44	325.	2.08	12.	0.33	39391.	100.00
WATER	18.02	0.	0.0	2.	5.56	14801.	97.92	3654.	99.67	0.	0.0
TOTAL(WET)		11615.	100.00	36.	100.00	15126.	100.00	3666.	100.00	39391.	100.00
LB MOL/HR(WET)	*	600.82		1.04		831.98		203.23		7733.91	
MMSCFD	*	5.47		0.01		0.0		0.0		70.44	
GPM	*	0.0		0.0		31.15		7.53		0.0	
ACFM	*	484.80		4.32		0.0		0.0		450.40	
MOLECULAR WT	*	19.33		34.53		18.17		18.04		5.09	
DENSITY,LB/CU.FT	*	0.40		0.14		60.52		60.68		1.46	
VISCOSITY,LB/FT-HR	*	0.03		0.03		1.36		1.38		0.03	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		81		82		83		84		85	
DESCRIPTION		REJECT GAS FROM HPU TO LPG		REACTIVATOR GAS FROM LPG TO HPU		K/O COND FROM BSRU TO ASWS		LIQUID AROMATICS FROM HPU TO NC-POF		MAKE UP H2 FROM SELEXOL TO H2 COMPR	
PHASE		V		V		L		L		V	
TEMPERATURE, DEG F		57.2		189.0		0.0		102.0		60.0	
PRESSURE, PSIA		20.00		120.00		0.0		80.00		675.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	475.	1.40	282.	1.66	0.	0.0	0.	0.0	10117.	62.64
NITROGEN	28.02	3360.	9.87	1996.	11.74	0.	0.0	0.	0.0	1441.	8.92
ARGON	40.00	608.	1.79	361.	2.12	0.	0.0	0.	0.0	429.	2.66
CARBON MONOXIDE	28.01	3442.	10.11	2045.	12.03	0.	0.0	0.	0.0	3838.	23.76
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	234.	1.45
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	10981.	32.25	6524.	38.38	0.	0.0	1.	0.03	89.	0.55
ETHANE	30.07	7679.	22.55	4559.	26.82	2.	0.68	6.	0.18	0.	0.0
PROPANE	44.10	5043.	14.81	1183.	6.96	6.	2.05	40.	1.21	0.	0.0
BUTANE	58.12	2297.	6.75	50.	0.29	25.	8.56	228.	6.90	0.	0.0
C5-400 DEG F	106.00	163.	0.48	0.	0.0	210.	71.92	3024.	91.55	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	4.	0.12	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		34048.	100.00	17000.	100.00	243.	83.22	3303.	100.00	16148.	99.98
WATER	18.02	0.	0.0	0.	0.0	49.	16.78	0.	0.0	4.	0.02
TOTAL(WET)		34048.	100.00	17000.	100.00	292.	100.00	3303.	100.00	16152.	100.00
LB MOL/HR(WET)	*	1589.00		879.18		5.33		33.64		5228.60	
MMSCFD	*	15.13		8.01		0.0		0.0		47.63	
GPM	*	0.0		0.0		0.0		8.36		0.0	
ACFM	*	7641.00		710.20		0.0		0.0		740.80	
MOLECULAR WT	*	21.43		19.34		54.75		98.17		3.09	
DENSITY,LB/CU.FT	*	0.07		0.40		0.0		49.24		0.36	
VISCOSITY,LB/FT-HR	*	0.03		0.03		0.0		0.76		0.02	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		86		87		88		89		90	
DESCRIPTION		RECYCLE + MAKEUP H2 FROM H2 COMPR TO SRC		MAKEUP H2 FROM SELEXOL TO METH		SOUR WATER FROM BSRU TO ASWS		METHANATED H2 FROM METH TO EBH		METHANATED H2 FROM METH TO NHT	
PHASE		V		V		L		V		V	
TEMPERATURE, DEG F		224.0		60.0		147.0		100.0		100.0	
PRESSURE, PSIA		2965.00		675.00		0.0		615.00		615.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	29792.	32.32	6507.	62.64	0.	0.0	4799.	67.87	1152.	68.17
NITROGEN	28.02	16712.	18.13	927.	8.92	0.	0.0	748.	10.58	179.	10.59
ARGON	40.00	2182.	2.37	276.	2.66	0.	0.0	224.	3.17	52.	3.08
CARBON MONOXIDE	28.01	19986.	21.68	2459.	23.77	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	231.	0.25	150.	1.44	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	12374.	13.42	57.	0.55	0.	0.0	1231.	17.41	291.	17.22
ETHANE	30.07	3851.	4.18	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	2810.	3.05	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	1937.	2.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	2315.	2.51	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		92190.	100.00	10386.	99.98	0.	0.0	7002.	99.02	1674.	99.05
WATER	18.02	0.	0.0	2.	0.02	9336.	100.00	69.	0.98	16.	0.95
TOTAL(WET)		92190.	100.00	10388.	100.00	9336.	100.00	7071.	100.00	1690.	100.00
LB MOL/HR(WET)	*	17155.92		3362.88		518.09		2493.33		598.15	
MMSCFD	*	156.35		30.63		0.0		22.71		5.45	
GPM	*	0.0		0.0		19.54		0.0		0.0	
ACFM	*	733.40		476.40		0.0		415.80		99.75	
MOLECULAR WT	*	5.37		3.09		18.02		2.84		2.83	
DENSITY,LB/CU.FT	*	1.96		0.36		59.60		0.28		0.28	
VISCOSITY,LB/FT-HR	*	0.03		0.02		1.28		0.02		0.02	

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'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		91		92		93		94		95	
DESCRIPTION		WASTE CAUSTIC FROM DEA TO CALCINER		S-PRODUCT FROM BSRU TO CLAUS		TAIL GAS FROM CLAUS TO BSRU		M.O. PROD FROM NC-POF		M.O. PRODUCT - FROM HOF-POF	
PHASE		L		L		V		L		L	
TEMPERATURE, DEG F		115.0		0.0		280.0		315.0		340.0	
PRESSURE, PSIA		1827.00		0.0		17.50		140.00		125.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	2.	0.01	0.	0.0	97.	0.12	0.	0.0	0.	0.0
NITROGEN	28.02	1.	0.01	0.	0.0	38955.	47.27	0.	0.0	0.	0.0
ARGON	40.00	1.	0.01	0.	0.0	625.	0.76	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	2.	0.01	0.	0.0	1384.	1.68	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	24426.	29.64	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	24.	0.03	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	600.	0.73	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	496.	0.60	0.	0.0	0.	0.0
METHANE	16.04	3.	0.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	2.	0.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	1.	0.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	3864.	10.99	40.	0.13
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	30510.	86.80	26696.	84.94
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	762.	2.17	4691.	14.92
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	3.	0.01	4.	0.01
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	10.	0.03	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	1.	0.00	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	902.	100.00	80.	0.10	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CAUSTIC	40.00	675.	4.14	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		687.	4.22	902.	100.00	66688.	80.92	35149.	100.00	31431.	100.00
WATER	18.02	15607.	95.78	0.	0.0	15729.	19.08	0.	0.0	0.	0.0
TOTAL(WET)		16294.	100.00	902.	100.00	82417.	100.00	35149.	100.00	31431.	100.00
LB MOL/HR(WET)	*	884.37		28.13		2959.56		**********		180.75	
MMSCFD	*	0.0		0.0		27.06		0.0		0.0	
GPM	*	32.80		0.0		0.0		82.60		70.63	
ACFM	*	0.0		0.0		22423.00		0.0		0.0	
MOLECULAR WT	*	18.42		32.06		27.85		**********		173.89	
DENSITY,LB/CU.FT	*	61.90		0.0		0.06		53.06		55.49	
VISCOSITY,LB/FT-HR	*	1.36		0.0		0.05		1.50		1.98	

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'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		96		97		98		99		100	
DESCRIPTION		REACT F.G. FROM HPU K/O POT TO F.G. HEADER		TOTAL FUEL GAS FROM HPU TO F.G. HEADER		RECOVERED C.S. FROM NRSR TO CSD				COAL TO PULVERIZER	
PHASE		V		V		L				S	
TEMPERATURE, DEG F		100.0		100.0		40.0		0.0		0.0	
PRESSURE, PSIA		105.00		105.00		62.00		0.0		0.0	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	282.	1.66	330.	1.44	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	1996.	11.74	2073.	9.03	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	361.	2.12	368.	1.60	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	2045.	12.03	2162.	9.42	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	3.	0.01	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	6524.	38.38	6822.	29.71	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	4559.	26.82	5211.	22.69	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	1183.	6.96	2253.	9.81	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	50.	0.29	1772.	7.72	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	1967.	8.57	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	892.	100.00	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.45	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.05	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	503021.	88.50
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		17000.	100.00	22961.	100.00	892.	100.00	0.	0.0	503021.	88.50
WATER	18.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	65364.	11.50
TOTAL(WET)		17000.	100.00	22961.	100.00	892.	100.00	0.	0.0	568385.	100.00
LB MOL/HR(WET)	*	879.18		1022.87		**********		0.0		**********	
MMSCFD	*	8.01		9.32		0.0		0.0		0.0	
GPM	*	0.0		0.0		2.02		0.0		0.0	
ACFM	*	829.90		959.30		0.0		0.0		0.0	
MOLECULAR WT	*	19.34		22.45		**********		0.0		**********	
DENSITY, LB/CU.FT	*	0.34		0.40		54.99		0.0		0.0	
VISCOSITY, LB/FT-HR	*	0.03		0.03		0.99		0.0		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		101		102		103		104		105	
DESCRIPTION		TREATED H2O TO SRC		STEAM TO DEA		STEAM TO SRC		LPG PRODUCT		PURE N2 TO SRC	
PHASE		L		V		V		L		V	
TEMPERATURE, DEG F		88.0		307.6		356.0		98.0		100.0	
PRESSURE, PSIA		30.00		75.00		150.00		250.00		14.70	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	401.	100.00
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	6.	0.11	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	3051.	56.16	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	2213.	40.73	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	163.	3.00	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	0.	0.0	0.	0.0	5433.	100.00	401.	100.00
WATER	18.02	39723.	100.00	28750.	100.00	3168.	100.00	0.	0.0	0.	0.0
TOTAL(WET)		39723.	100.00	28750.	100.00	3168.	100.00	5433.	100.00	401.	100.00
LB MOL/HR(WET)	*	2204.39		1595.45		175.80		109.00		14.31	
MMSCFD	*	0.0		0.0		1.60		0.0		0.13	
GPM	*	80.00		0.0		0.0		21.49		0.0	
ACFM	*	0.0		2786.80		163.40		0.0		96.90	
MOLECULAR WT	*	18.02		18.02		18.02		49.85		28.02	
DENSITY,LB/CU.FT	*	62.13		0.17		0.32		31.52		0.07	
VISCOSITY,LB/FT-HR	*	2.42		0.04		0.04		0.26		0.04	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		106		107		108		109		110	
DESCRIPTION		TOTAL M.O. PROD FROM HOF/NC-POF		TOTAL H.O. PROD FROM HOF-POF		STEAM TO METHANATION FROM U&O		VENT FROM SRC		NAPHTHA PRODUCT	
PHASE		L		L		V		V		L	
TEMPERATURE, DEG F		180.0		180.0		0.0		135.0		115.0	
PRESSURE, PSIA		115.00		115.00		0.0		14.70		65.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	382.	68.71	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	1.	0.18	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	5.	0.90	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	3.	0.54	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	4.	0.72	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	8.	1.44	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	20.	3.60	0.	0.0
C5-400 DEG F	106.00	3904.	5.86	0.	0.0	0.	0.0	60.	10.79	45666.	100.00
400 - 650 DEG F	166.00	57206.	85.92	814.	6.34	0	0.0	6.	1.08	0.	0.0
650 - 850 DEG F	240.00	5453.	8.19	10479.	81.59	0	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	7.	0.01	1550.	12.07	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	10.	0.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		66580.	100.00	12843.	100.00	0.	0.0	489.	87.95	45666.	100.00
WATER	18.02	0.	0.0	0.	0.0	0.	0.0	67.	12.05	0.	0.0
TOTAL(WET)		66580.	100.00	12843.	100.00	0.	0.0	556.	100.00	45666.	100.00
LB MOL/HR(WET)	*	**********		52.21		0.0		18.90		430.81	
MMSCFD	*	0.0		0.0		0.0		0.17		0.0	
GPM	*	141.00		23.34		0.0		0.0		114.10	
ACFM	*	0.0		0.0		0.0		158.10		0.0	
MOLECULAR WT	*	**********		245.97		0.0		29.41		106.00	
DENSITY,LB/CU.FT	*	58.57		68.59		0.0		0.06		49.90	
VISCOSITY,LB/FT-HR	*	3.70		40.10		0.0		0.04		0.0	

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'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		111		112		113		114		115	
DESCRIPTION		STEAM TO HOF-POF		F.G. FROM NHT		M/U CS TO CSD		STEAM TO CSD		FUMES FROM SOLIDIF	
PHASE		V		V		L		V		V	
TEMPERATURE, DEG F		356.0		115.0		70.0		308.0		497.0	
PRESSURE, PSIA		145.00		88.00		115.00		75.00		14.70	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	280.	26.79	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	179.	17.13	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	52.	4.98	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	8.	0.77	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	316.	30.24	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	59.	5.65	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	81.	7.75	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	57.	5.45	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	41.	21.58
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	149.	78.42
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	604.	100.00	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	1032.	98.76	604.	100.00	0.	0.0	190.	100.00
WATER	18.02	600.	100.00	13.	1.24	0.	0.0	12098.	100.00	0.	0.0
TOTAL(WET)		600.	100.00	1045.	100.00	604.	100.00	12098.	100.00	190.	100.00
LB MOL/HR(WET)	*	33.30		172.01		**********		671.37		0.87	
MMSCFD	*	0.30		1.63		0.0		6.12		0.01	
GPM	*	0.0		0.0		1.40		0.0		0.0	
ACFM	*	31.20		210.00		0.0		1197.00		1.99	
MOLECULAR WT	*	18.02		6.08		**********		18.02		218.94	
DENSITY,LB/CU.FT	*	0.32		0.08		53.60		0.17		1.59	
VISCOSITY,LB/FT-HR	*	1.02		0.0		1.45		0.03		0.01	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		116		117		118		119		120	
DESCRIPTION		PURE N2 TO DPU		PROC WATER TO DPU		VENT FROM PULVERIZER		ASWS SLUDGE TO U&O		PURGE N2 FROM NRSR TO ATM	
PHASE		V				V		SL		V	
TEMPERATURE, DEG F		77.0		63.0		0.0		250.0		396.0	
PRESSURE, PSIA		94.50		23.00		0.0		40.00		23.30	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	2700.	100.00	0.	0.0	0.	0.0	0.	0.0	3213.	77.07
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	14.	0.16	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	116.	2.78
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CA(OH)2	74.10	0.	0.0	0.	0.0	0.	0.0	216.	2.44	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		2700.	100.00	0.	0.0	0.	0.0	230.	2.60	3329.	79.85
WATER	18.02	0.	0.0	11023.	100.00	55481.	100.00	8625.	97.40	840.	20.15
TOTAL(WET)		2700.	100.00	11023.	100.00	55481.	100.00	8855.	100.00	4169.	100.00
LB MOL/HR(WET)	*	96.36		511.71		3078.86		481.68		**********	
MMSCFD	*	0.88		0.0		28.04		0.0		0.0	
GPM	*	0.0		11.00		0.0		19.00		0.0	
ACFM	*	98.00		0.0		0.0		0.0		0.0	
MOLECULAR WT	*	28.02		18.02		18.02		18.38		**********	
DENSITY,LB/CU.FT	*	0.46		62.31		0.0		59.89		0.07	
VISCOSITY,LB/FT-HR	*	0.04		2.42		0.0		0.58		0.05	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		121		122		123		124		125	
DESCRIPTION		COND FROM NRSR TO WWT		STEAM TO GKT		PURE N2 TO GKT		PROC H2O TO RGC		AIR TO CALCINER	
PHASE		L		V		V		L		V	
TEMPERATURE, DEG F		92.4		267.0		77.0		62.0		60.0	
PRESSURE, PSIA		62.00		40.00		94.25		95.00		14.50	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	1236.	100.00	0.	0.0	63602.	75.78
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	4.	0.05	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	18998.	22.63
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		4.	0.05	0.	0.0	1236.	100.00	0.	0.0	82600.	98.41
WATER	18.02	8249.	99.95	9653.	100.00	0.	0.0	21655.	100.00	1332.	1.59
TOTAL(WET)		8253.	100.00	9653.	100.00	1236.	100.00	21655.	100.00	83932.	100.00
LB MOL/HR(WET)	*	**********		535.68		44.11		1201.72		2937.48	
MMSCFD	*	0.0		4.88		0.40		0.0		26.77	
GPM	*	16.75		0.0		0.0		43.30		0.0	
ACFM	*	0.0		0.0		44.84		0.0		18589.00	
MOLECULAR WT	*	**********		18.02		28.02		18.02		28.57	
DENSITY,LB/CU.FT	*	61.47		0.0		0.46		62.36		0.07	
VISCOSITY,LB/FT-HR	*	1.45		0.0		0.04		2.62		0.05	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		126		127		128		129		130	
DESCRIPTION		SLAG FROM GKT TO U&O		CO2 VENT EXCH GAS FROM SHIFT		BFW TO SHIFT		PROC WATER TO WASH WT FROM U&O		AIR TO CALCINER	
PHASE		L+S		V		L		L		V	
TEMPERATURE, DEG F		156.5		280.0		220.0		62.1		60.0	
PRESSURE, PSIA		15.20		19.00		1115.00		14.70		14.70	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	37.	0.01	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	30421.	10.58	0.	0.0	0.	0.0	165817.	75.78
ARGON	40.00	0.	0.0	2.	0.00	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	75.	0.03	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	256771.	89.34	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	18.	0.01	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	1.	0.00	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	7.	0.00	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	15834.	94.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	49530.	22.64
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		15834.	94.00	287332.	99.97	0.	0.0	0.	0.0	215347.	98.41
WATER	18.02	1011.	6.00	91.	0.03	109030.	100.00	221.	100.00	3472.	1.59
TOTAL(WET)		16845.	100.00	287423.	100.00	109030.	100.00	221.	100.00	218819.	100.00
LB MOL/HR(WET)	*	**********		6946.95		6050.50		12.26		7658.29	
MMSCFD	*	0.0		63.27		0.0		0.0		69.79	
GPM	*	0.0		0.0		0.0		0.44		0.0	
ACFM	*	0.0		48283.00		0.0		0.0		48463.00	
MOLECULAR WT	*	**********		41.37		18.02		18.02		28.57	
DENSITY, LB/CU.FT	*	0.0		0.10		0.0		62.36		0.07	
VISCOSITY, LB/FT-HR	*	0.0		0.05		0.0		2.66		0.05	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		131		132		133		134		135	
DESCRIPTION		F.G. TO CALCINER		FLY DUST FROM POND TO U&O		WASH W B/D FROM WASH WT		CALCINED COKE PROD		H.P. SATD STEAM FROM U&O TO SHIFT	
PHASE		V		SL		L		S		V	
TEMPERATURE, DEG F		105.0		0.0		97.0		300.0		533.9	
PRESSURE, PSIA		75.00		0.0		93.00		15.00		914.70	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	400.	34.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	82.	6.97	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	12.	1.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	44969.	49.90	0.	0.0	0.	0.0	0.	0.0
WASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	47.	4.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	47580.	99.63	0.	0.0
OTHER	******	635.	54.00	424.	0.47	0.	0.0	0.	0.0	0.	0.0
OIL	******	0.	0.0	0.	0.0	0.	0.0	175.	0.37	0.	0.0
NACL IONS	58.44	0.	0.0	0.	0.0	775.	0.83	0.	0.0	0.	0.0
TOTAL(DRY)		1176.	100.00	45393.	50.37	775.	0.83	47755.	100.00	0.	0.0
WATER	18.02	0.	0.0	44731.	49.63	92815.	99.17	0.	0.0	8069.	100.00
TOTAL(WET)		1176.	100.00	90124.	100.00	93590.	100.00	47755.	100.00	8069.	100.00
LB MOL/HR(WET)	*	**********		**********		5163.93		**********		447.78	
MMSCFD	*	0.0		0.0		0.0		0.0		4.08	
GPM	*	0.0		0.0		186.60		0.0		0.0	
ACFM	*	0.0		0.0		0.0		0.0		66.00	
MOLECULAR WT	*	**********		**********		18.12		**********		18.02	
DENSITY,LB/CU.FT	*	0.26		0.0		62.03		126.61		2.03	
VISCOSITY,LB/FT-HR	*	0.02		0.0		1.71		0.0		0.07	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		136		137		138		139		140	
DESCRIPTION		H.P. STEAM (SUP. HT.) TO SHIFT		FLOCCULATING AGENT TO WASH WT		B/D FROM SHIFT		B/D FROM SHIFT		PROC H2O TO CALCINER	
PHASE		V		L		L		L		L	
TEMPERATURE, DEG F		800.0		0.0		0.0		0.0		62.0	
PRESSURE, PSIA		864.70		0.0		0.0		0.0		95.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
WATER	18.02	123341.	100.00	1.	100.00	1493.	100.00	8417.	100.00	31712.	100.00
TOTAL(WET)		123341.	100.00	1.	100.00	1493.	100.00	8417.	100.00	31712.	100.00
LB MOL/HR(WET)	*	6844.68		0.06		82.85		467.09		1759.82	
MMSCFD	*	62.35		0.0		0.0		0.0		0.0	
GPM	*	0.0		0.0		3.00		16.80		63.42	
ACFM	*	3657.00		0.0		0.0		0.0		0.0	
MOLECULAR WT	*	18.02		18.02		18.02		18.02		18.02	
DENSITY,LB/CU.FT	*	1.25		0.0		0.0		0.0		62.37	
VISCOSITY,LB/FT-HR	*	0.06		0.0		0.0		0.0		2.42	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		141		142		143		144		145	
DESCRIPTION		SLOP OIL FROM ASWS		SLOP OIL FROM ASWS		PURE N2 TO SELEXOL		COND. TO SELEXOL		H2 COMPR LEAKAGE	
PHASE		L		L		V		V		V	
TEMPERATURE, DEG F		124.0		124.0		77.0		366.0		0.0	
PRESSURE, PSIA		64.00		64.00		95.00		164.50		0.0	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	200.	62.70
NITROGEN	28.02	0.	0.0	0.	0.0	30274.	100.00	0.	0.0	28.	8.78
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	8.	2.51
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	76.	23.82
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	5.	1.57
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	2.	0.63
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	98.	95.15	98.	95.15	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CA(OH)2	74.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		98.	95.15	98.	95.15	30274.	100.00	0.	0.0	319.	100.00
WATER	18.02	5.	4.85	5.	4.85	0.	0.0	289.	100.00	0.	0.0
TOTAL(WET)		103.	100.00	103.	100.00	30274.	100.00	289.	100.00	319.	100.00
LB MOL/HR(WET)	*	1.20		1.20		1080.44		16.04		103.36	
MMSCFD	*	0.0		0.0		9.84		0.15		0.24	
GPM	*	0.0		0.0		0.0		0.0		0.0	
ACFM	*	0.0		0.0		1090.00		13.72		0.0	
MOLECULAR WT	*	85.69		85.69		28.02		18.02		3.09	
DENSITY,LB/CU.FT	*	0.0		0.0		0.46		0.35		0.0	
VISCOSITY,LB/FT-HR	*	0.0		0.0		0.04		0.03		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		146		147		148		149		150	
DESCRIPTION		COND FROM H2 COMPR		COND TO DEA		20% CAUSTIC TO DEA		NET AIR TO ASU ** (AIR IN - WASTE - PURGE)		GAN FROM ASU	
PHASE		L		L		L		V		V	
TEMPERATURE, DEG F		0.0		280.0		100.0		70.0		100.0	
PRESSURE, PSIA		0.0		75.00		65.00		14.70		95.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	125735.	50.84	112718.	100.00
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	722.	0.29	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	58.	48.33	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	2.	1.67	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0	0.0	0.	0.0	115637.	46.76	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CAUSTIC	40.00	0.	0.0	0.	0.0	482.	20.02	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		60.	50.00	0.	0.0	482.	20.02	241894.	97.81	112718.	100.00
WATER	18.02	60.	50.00	3540.	100.00	1926.	79.98	5428.	2.19	0.	0.0
TOTAL(WET)		120.	100.00	3540.	100.00	2408.	100.00	247322.	100.000	112718.	100.00
LB MOL/HR(WET)	*	3.89		196.45		118.93		8420.32		4022.77	
MMSCFD	*	0.0		0.0		0.0		76.71		36.65	
GPM	*	0.0		7.62		4.00		0.0		0.0	
ACFM	*	0.0		0.0		0.0		54281.45		4242.46	
MOLECULAR WT	*	30.86		18.02		20.25		29.37		28.02	
DENSITY,LB/CU.FT	*	0.0		57.94		75.38		0.07		0.43	
VISCOSITY,LB/FT-HR	*	0.0		0.48		6.30		0.04		0.04	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

**NET AIR (TOTAL AIR IN - WASTE - PURGE) IS SHOWN TO PRESERVE APCI PROPRIETARY INFORMATION

STREAM NUMBER		151		152		153		154		155	
DESCRIPTION		SOLID SRC PRODUCT FROM SOLIDIFICATION		NEUTRALIZING AGENT TO WASH WT		SOLID SRC/TSL FROM SOLIDIFICATION		STEAM TO HPU		LIN TO HPU	
PHASE		S		L		S		V		L	
TEMPERATURE, DEG F		200.0		97.0		200.0		356.0		-282.8	
PRESSURE, PSIA		14.70		14.70		14.70		145.00		100.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1555.	100.00
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	2976.	3.63	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	78928.	96.37	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SODIUM IONS	22.99	0.	0.0	472.	11.50	0.	0.0	0.	0.0	0.	0.0
HYDROXYL IONS	17.01	0.	0.0	349.	8.50	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	821.	20.00	81904.	100.00	0.	0.0	1555.	100.00
WATER	18.02	0.	0.0	3283.	80.00	0.	0.0	9000.	100.00	0.	0.0
TOTAL(WET)		0.	0.0	4104.	100.00	81904.	100.00	9000.	100.00	1555.	100.00
LB MOL/HR(WET)	*	0.0		223.23		198.11		499.45		55.50	
MMSCFD	*	0.0		0.0		0.0		4.55		0.0	
GPM	*	0.0		7.34		0.0		0.0		4.43	
ACFM	*	0.0		0.0		0.0		468.90		0.0	
MOLECULAR WT	*	0.0		18.38		413.42		18.02		28.02	
DENSITY,LB/CU.FT	*	0.0		69.70		73.60		0.32		43.72	
VISCOSITY,LB/FT-HR	*	0.0		1.71		0.0		0.04		0.20	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		156		157		158		159		160	
DESCRIPTION		OILY WATER FROM HPU TO WWT		OILY WATER FROM HPU TO WWT		OILY WATER FROM HPU TO WWT		TOTAL HPU/LPG F.G.		ANTIFOAM TO COKER	
PHASE		L		L		L		V		L	
TEMPERATURE, DEG F		100.0		45.0		99.0		89.0		0.0	
PRESSURE, PSIA		55.00		55.00		55.00		120.00		0.0	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	523.	1.51	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	3437.	9.94	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	615.	1.78	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	3559.	10.29	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	3.	0.01	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	11279.	32.62	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	8325.	24.08	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	3062.	8.86	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	1806.	5.22	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	1967.	5.69	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CATALYST	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	15.	100.00
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	0.	0.0	0.	0.0	34576.	100.00	15.	100.00
WATER	18.02	0.	0.0	142.	100.00	8982.	100.00	0.	0.0	0.	0.0
TOTAL(WET)		0.	0.0	142.	100.00	8982.	100.00	34576.	100.00	15.	100.00
LB MOL/HR(WET)	*	0.0		7.88		498.45		1623.69		**********	
MMSCFD	*	0.0		0.0		0.0		14.85		0.0	
GPM	*	0.0		0.28		18.17		0.0		0.0	
ACFM	*	0.0		0.0		0.0		1334.00		0.0	
MOLECULAR WT	*	0.0		18.02		18.02		21.29		**********	
DENSITY, LB/CU.FT.	*	0.0		62.85		61.66		0.43		0.0	
VISCOSITY, LB/FT-HR	*	0.0		2.52		1.66		0.0		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		161		162		163		164		165	
DESCRIPTION		SLOP OIL FROM COKER		SULFUR PRODUCT FROM CLAUS		H2O FROM ASWS TO WWT		BFW TO NHT		STEAM TO NHT	
PHASE		L		L		L		L		V	
TEMPERATURE, DEG F		150.0		0.0		120.0		220.0		800.0	
PRESSURE, PSIA		65.00		0.0		85.00		235.00		865.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	5.	0.00	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	12.	0.01	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	1.	0.00	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	2.	3.85	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	4.	7.69	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	16566.	100.00	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	5.	9.62	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CATALYST	******	15.	28.85	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CACL2	110.99	0.	0.0	0.	0.0	300.	0.13	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		26.	50.00	16566.	100.00	318.	0.14	0.	0.0	0.	0.0
WATER	18.02	26.	50.00	0.	0.0	223600.	99.86	2200.	100.00	1200.	100.00
TOTAL(WET)		52.	100.00	16566.	100.00	223918.	100.00	2200.	100.00	1200.	100.00
LB MOL/HR(WET)	*	**********		516.72		12412.01		122.09		66.59	
MMSCFD	*	0.0		0.0		0.0		0.0		0.61	
GPM	*	0.0		0.0		449.55		4.40		0.0	
ACFM	*	0.0		0.0		0.0		0.0		0.0	
MOLECULAR WT	*	**********		32.06		18.04		18.02		18.02	
DENSITY,LB/CU.FT	*	0.0		0.0		62.10		0.0		0.0	
VISCOSITY,LB/FT-HR	*	0.0		0.0		1.30		0.0		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		166		167		168		169		170	
DESCRIPTION		DEDUST OIL TO COKER		AIR TO CLAUS		LIME SLURRY TO ASWS		AIR TO S-PIT, CLAUS		PROC H2O TO CALC	
PHASE		L		V		SL		V		L	
TEMPERATURE, DEG F		0.0		60.0		0.0		60.0		62.0	
PRESSURE, PSIA		0.0		14.70		0.0		14.70		95.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	36472.	74.35	0.	0.0	822.	74.32	0.	0.0
ARGON	40.00	0.	0.0	624.	1.27	0.	0.0	14.	1.27	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.03	0.	0.0	0	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	11178.	22.79	0.	0.0	252.	22.78	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CA(OH)2	74.10	0.	0.0	0.	0.0	416.	15.00	0.	0.0	0.	0.0
OIL	******	175.	100.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		175.	100.00	48274.	98.41	416.	15.00	1088.	98.37	0.	0.0
WATER	18.02	0.	0.0	778.	1.59	2357.	85.00	18.	1.63	14248.	100.00
TOTAL(WET)		175.	100.00	49052.	100.00	2773.	100.00	1106.	100.00	14248.	100.00
LB MOL/HR(WET)	*	**********		1709.73		136.41		38.56		790.68	
MMSCFD	*	0.0		15.58		0.0		0.35		0.0	
GPM	*	0.0		0.0		0.0		0.0		28.49	
ACFM	*	0.0		10818.00		0.0		244.00		0.0	
MOLECULAR WT	*	**********		28.69		20.33		28.68		18.02	
DENSITY,LB/CU.FT	*	0.0		0.08		0.0		0.08		62.37	
VISCOSITY,LB/FT-HR	*	0.0		0.0		0.0		0.0		2.42	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		171		172		173		174		175	
DESCRIPTION		STEAM TO BSRU		LPG TO BSRU		AIR TO BSRU		COND. TO BSRU		STRETFORD M/U TO BSRU	
PHASE		V		V		V		L		L	
TEMPERATURE, DEG F		320.0		80.0		200.0		0.0		0.0	
PRESSURE, PSIA		89.70		45.00		24.70		0.0		0.0	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	15508.	74.35	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	265.	1.27	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	1.	0.16	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	358.	56.38	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	255.	40.16	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	21.	3.31	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	4753.	22.79	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
STRETFORD SOLUTION	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	395.	100.00
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	635.	100.00	20526.	98.41	0.	0.0	395.	100.00
WATER	18.02	592.	100.00	0.	0.0	331.	1.59	994.	100.00	0.	0.0
TOTAL(WET)		592.	100.00	635.	100.00	20857.	100.00	994.	100.00	395.	100.00
LB MOL/HR(WET)	*	32.85		12.74		726.99		55.16		**********	
MMSCFD	*	0.30		0.12		6.62		0.0		0.0	
GPM	*	0.0		0.0		0.0		2.00		0.0	
ACFM	*	51.08		25.73		3473.00		0.0		0.0	
MOLECULAR WT	*	18.02		49.86		28.69		18.02		**********	
DENSITY, LB/CU.FT	*	0.20		0.41		0.10		0.0		0.0	
VISCOSITY, LB/FT-HR	*	0.0		0.02		0.05		0.0		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		176		177		178		179		180	
DESCRIPTION		TAIL GAS VENT FROM BSRU		OXIDIZER VENT FROM BSRU		STRETFORD PURGE FROM BSRU		CALCINER OFF GAS		CALCINER WW TO WWT	
PHASE		V		V		L		V		L	
TEMPERATURE, DEG F		124.0		97.0		270.0		161.0		161.0	
PRESSURE, PSIA		14.50		14.50		64.70		14.50		87.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	119.	0.15	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	46443.	56.81	8842.	71.64	0.	0.0	229642.	61.00	0.	0.0
ARGON	40.00	753.	0.92	151.	1.22	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	70.	0.09	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	27677.	33.86	0.	0.0	0.	0.0	33061.	8.78	0.	0.0
CARBONYL SULFIDE	60.07	5.	0.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	1.	0.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	1.	0.00	0.	0.0	0.	0.0	32.	0.01	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	252.	0.31	2710.	21.96	0.	0.0	24877.	6.61	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	12.	0.00	0.	0.0
STRETFORD SOLUTION	******	0.	0.0	0.	0.0	395.	16.60	0.	0.0	0.	0.0
CAUSTIC	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	669.	9.06
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		75321.	92.14	11703.	94.82	395.	16.60	287624.	76.40	669.	9.06
WATER	18.02	6424.	7.86	639.	5.18	1984.	83.40	88834.	23.60	6717.	90.94
TOTAL(WET)		81745.	100.00	12342.	100.00	2379.	100.00	376458.	100.00	7386.	100.00
LB MOL/HR(WET)	*	2731.22		439.48		**********		**********		389.48	
MMSCFD	*	24.88		4.00		0.0		133.50		0.0	
GPM	*	0.0		0.0		4.74		0.0		13.50	
ACFM	*	19634.00		3020.00		0.0		111967.00		0.0	
MOLECULAR WT	*	29.93		28.08		**********		**********		18.96	
DENSITY, LB/CU.FT	*	0.07		0.07		0.0		0.06		62.00	
VISCOSITY, LB/FT-HR	*	0.04		0.0		0.0		0.04		1.40	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		181		182		183		184		185	
DESCRIPTION		CONDENSATE FROM ASU		PURGE TO ATM. FROM ASU		WASTE VENT FROM ASU		LOX FROM ASU		LIN FROM ASU	
PHASE		L		V		V		L		L	
TEMPERATURE, DEG F		60.0		92.0		92.2		-300.0		-317.0	
PRESSURE, PSIA		15.00		85.00		14.70		40.00		16.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0					0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0					0.	0.0	2715.	100.00
ARGON	40.00	0.	0.0					15.	1.55	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0					0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0					0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0					0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0					0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0					0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0					0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0					0.	0.0	0.	0.0
METHANE	16.04	0.	0.0					0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0					0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0					0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0					0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0					0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0					0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0					0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0					0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0					0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0					0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0					0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0					2902.	98.45	0.	0.0
SULFUR	32.06	0.	0.0					0.	0.0	0.	0.0
COAL	******	0.	0.0					0.	0.0	0.	0.0
COKE	******	0.	0.0					0.	0.0	0.	0.0
	******	0.	0.0					0.	0.0	0.	0.0
	******	0.	0.0					0.	0.0	0.	0.0
	******	0.	0.0					0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0					2917.	100.00	2715.	100.00
WATER	18.02	5428.	100.00					0.	0.0	0.	0.0
TOTAL(WET)		5428.	100.00					2917.	100.00	2715.	100.00
LB MOL/HR(WET)	*	301.22						91.06		96.90	
MMSCFD	*	0.0						0.0		0.0	
GPM	*	10.82						0.0		6.89	
ACFM	*	0.0						0.0		0.0	
MOLECULAR WT	*	18.02						32.10		28.02	
DENSITY, LB/CU.FT	*	62.56						71.70		49.40	
VISCOSITY, LB/FT-HR	*	1.56						0.47		0.37	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		186		187		188		189		190	
DESCRIPTION		ASU BY-PASS TO ATM.		AIR TO WASH WT		VENT FROM WASH WT		STEAM TO EBH		STEAM TO EBH	
PHASE		V		V		V		V		V	
TEMPERATURE, DEG F		0.0		60.0		153.0		308.0		356.0	
PRESSURE, PSIA		0.0		14.70		15.00		75.00		145.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	10146.	100.00	20216.	75.78	20216.	62.21	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	6039.	22.64	6039.	18.58	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		10146.	100.00	26255	98.41	26255.	80.79	0.	0.0	0.	0.0
WATER	18.02	0.	0.0	423	1.59	6242.	19.21	3300.	100.00	1200.	100.00
TOTAL(WET)		10146.	100.00	26678	100.00	32497.	100.00	3300.	100.00	1200.	100.00
LB MOL/HR(WET)	*	362.10		933.68		1256.60		183.13		66.59	
MMSCFD	*	3.29		8.51		11.45		1.67		0.61	
GPM	*	0.0		0.0		0.0		0.0		0.0	
ACFM	*	0.0		5909.00		9166.00		326.70		61.78	
MOLECULAR WT	*	28.02		28.57		25.86		18.02		18.02	
DENSITY,LB/CU.FT	*	0.0		0.07		0.06		0.17		0.0	
VISCOSITY,LB/FT-HR	*	0.0		0.0		0.04		0.03		0.04	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		191		192		193		194		195	
DESCRIPTION		BFW TO EBH		FOAMING INHIB. TO EBH		NEUT. INHIB. TO EBH		FRESH CAT TO EBH		SPENT CAT FROM EBH	
PHASE		L		L		L		S		S	
TEMPERATURE, DEG F		220.0		0.0		0.0		0.0		0.0	
PRESSURE, PSIA		235.00		0.0		0.0		0.0		0.0	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	13.	8.33
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
INHIBITOR	******	0.	0.0	31.	100.00	5.	100.00	0.	0.0	36.	23.08
CATALYST	******	0.	0.0	0.	0.0	0.	0.0	107.	100.00	107.	68.59
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	31.	100.00	5.	100.00	107.	100.00	156.	100.00
WATER	18.02	54272.	100.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(WET)		54272.	100.00	31.	100.00	5.	100.00	107.	100.00	156.	100.00
LB MOL/HR(WET)	*	3011.77		**********		**********		**********		**********	
MMSCFD	*	0.0		0.0		0.0		0.0		0.0	
GPM	*	114.88		0.0		0.0		0.0		0.0	
ACFM	*	0.0		0.0		0.0		0.0		0.0	
MOLECULAR WT	*	18.02		**********		**********		**********		**********	
DENSITY,LB/CU.FT	*	58.91		0.0		0.0		0.0		0.0	
VISCOSITY,LB/FT-HR	*	0.64		0.0		0.0		0.0		0.0	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

STREAM NUMBER		196		197		198		199		200	
DESCRIPTION		STEAM TO COKER		STEAM TO COKER		STEAM TO COKER		PROCESS H2O TO COKER		L.P. DEA F.G.	
PHASE		V		V		V		L		V	
TEMPERATURE, DEG F		460.0		363.0		320.0		62.0		120.0	
PRESSURE, PSIA		465.00		165.00		90.00		95.00		88.00	
COMPONENTS	MOL WT	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%	LB/HR	WT%
HYDROGEN	2.016	0.	0.0	0.	0.0	0.	0.0	0.	0.0	202.	1.84
NITROGEN	28.02	0.	0.0	0.	0.0	0.	0.0	0.	0.0	295.	2.69
ARGON	40.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	27.	0.25
CARBON MONOXIDE	28.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	341.	3.11
CARBON DIOXIDE	44.01	0.	0.0	0.	0.0	0.	0.0	0.	0.0	105.	0.96
CARBONYL SULFIDE	60.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN SULFIDE	34.08	0.	0.0	0.	0.0	0.	0.0	0.	0.0	3.	0.03
AMMONIA	17.03	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
AMMONIUM CHLORIDE	53.49	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR DIOXIDE	64.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
METHANE	16.04	0.	0.0	0.	0.0	0.	0.0	0.	0.0	3296.	30.07
ETHANE	30.07	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1903.	17.36
PROPANE	44.10	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1716.	15.65
BUTANE	58.12	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1662.	15.16
C5-400 DEG F	106.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	1276.	11.64
400 - 650 DEG F	166.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
650 - 850 DEG F	240.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
850+ DEG F	425.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
ASH/UNCONV CARBON	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
DEASHING SOLVENT	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
HYDROGEN CHLORIDE	36.46	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
OXYGEN	32.00	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
SULFUR	32.06	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COAL	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
COKE	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
	******	0.	0.0	0.	0.0	0.	0.0	0.	0.0	0.	0.0
TOTAL(DRY)		0.	0.0	0.	0.0	0.	0.0	0.	0.0	10826.	98.76
WATER	18.02	1200.	100.00	6800.	100.00	386.	100.00	14168.	100.00	136.	1.24
TOTAL(WET)		1200.	100.00	6800.	100.00	386.	100.00	14168.	100.00	10962.	100.00
LB MOL/HR(WET)	*	66.59		377.36		21.42		786.24		481.91	
MMSCFD	*	0.61		3.44		0.20		0.0		4.39	
GPM	*	0.0		0.0		0.0		28.27		0.0	
ACFM	*	20.00		320.40		32.00		0.0		559.00	
MOLECULAR WT	*	18.02		18.02		18.02		18.02		22.75	
DENSITY, LB/CU.FT	*	1.00		0.35		0.20		62.49		0.33	
VISCOSITY, LB/FT-HR	*	0.04		0.04		0.04		1.55		0.03	

* NOTE: PROPERTIES ON A SOLIDS-FREE BASIS.
'0.0' MEANS VALUE NOT DETERMINED.

3. UTILITY SUMMARY

The Utility Summary that follows represents the normal operating requirements for the Demonstration Plant Product Areas, Support Processes, and Utilities and Off Sites with the EBH operating in the high-conversion mode.

The area utility requirements are consistent with the revised Design Baselines for all Areas except the U&O Areas, i.e., Area 11, 16, and 17. All process area Design Baselines were revised in 1983 to reflect changes and Engineering Change Proposals (ECPs); however, the original U&O Design Baseline, issued in March 1982, has not been updated to reflect changes in other Design Baselines. Thus, the U&O utility requirements in the following table are based on the U&O Design Baseline of March 1982. One exception to this is the assumed change in the design of the evaporator in the Wastewater Treatment (U&O) Area. The steam-type evaporator has been assumed replaced by a vapor recompression-type evaporator; 106,000 lb/hr of steam requirements were replaced by 2,650 kW of power requirements. The power requirements listed are the required kilowatts at each Area Contractor's battery limits (each Area received power at 13.8 kv at its battery limit) assuming a power factor of 1.0.

TABLE 1

UTILITY SUMMARY[a] - NORMAL OPERATION, EBH AT HIGH CONVERSION

AREA NO. / Utility	11 Raw Materials Product Storage & Handling	12 SRC Process	13 Coke & Liquid Products	14 Air Separation Unit (ASU)	15 HPU & Gas Systems Area	16 Utilities Incl. Boiler	17 Off-Sites	Naphtha Hydrotreater	TOTAL
Process Water, GPM	220	108	406	85	155	1,682	200	120	2,976
Potable Water, GPM	20	25	-	25	50	25	-	25	170[f]
Instrument Air, SCFM	125	900	650	600	811	250	170	100	3,606
Plant Air, SCFM	125	1,400	2,160	-	-	225	200	100	4,210
Nitrogen, SCFM	200	100	355	-	8,414	-	-	100	9,169
Cooling Water, GPM	-	7,928	3,571	13,467	64,712	503	-	100	90,281
Fuel Oil, MM Btu/hr, LHV	-	-	-	-	-	-	-[g]	-	-
LPG Fuel, MM Btu/hr, LHV	0.5	4.2	1.1	-	13.1	5.9	-	0.3	25.1
Fuel Gas, MM Btu/hr, LHV	51.4	423.8	106.8	-	5.6	171.8	-	25.1	785.5
Electric Power, KW[e]	14,388	13,887	13,944	25,500	31,325	9,342	12,390	634	121,411
Boiler Feedwater, lb/hr	-	187,183	214,291	-	547,552	(951,226)[b]	-	2,200	0
900 psig, 850°F steam, lb/hr	-	(12,720)	(100,824)	-	208,513	(94,969)[c]	-	-	0
900 psig, sat'd steam, lb/hr	-	-	-	-	-	(1,200)	-	1,200	0
450 psig, sat'd steam, lb/hr	-	(89,723)	1,200	-	63,213	25,310	-	-	0
150 psig, sat'd steam, lb/hr	-	3,768	(13,157)	-	39,033	(23,650)	-	-	0
75 psig, sat'd steam, lb/hr	2,000	(48,896)	2,030	-	(14,052)	23,918	35,000	-	0
27 psig, sat/d steam, lb/hr	-	-	-	-	(108,733)	108,738	-	-	0
Steam Condensate, lb/hr	(2,000)	(21,126)	(21,232)	-	(411,965)	491,314	(35,000)	-	0
Consumption & Blowdown, lb/hr	-	(18,466)	(76,308)	-	(323,571)	421,765[d]	-	(3,400)	0

NOTES

[a] Numbers in parenthesis indicate export from the area. Numbers without parenthesis indicate import to the area.
[b] Total BFW out of the deaerator is 1,082,845 lb/hr.
[c] Boiler steam production rate is 103,121 lb/hr.
[d] Total make-up water to the deaerator is 430,660 lb/hr.
[e] Required power at each Area Contractor's battery limits. Assumes a power factor of 1.00.
[f] Average flow estimated to be 35 gpm. High rates occur at shift change.
[g] Burner maintenance program use estimated to be approximately 1 MM Btu/hr. Averaged start-up requirements for all areas estimated to be approximately 10 MM Btu/hr.

4. FEED MATERIALS

In addition to small quantities of catalysts and chemicals, the only raw materials required to operate the Demonstration Plant are coal and water. Required hydrogen will be produced by gasifying the residue from coal liquefaction plus some supplemental coal. Plant fuel will be provided by the gases produced in the plant in the various process areas. The Demonstration Plant generates its own utilities except electric power, which is purchased from a local utility.

The raw material feedstocks are presented in Table 2. Table 3 lists the feeds which are manufactured within the plant and directed to various areas.

Table 2

Raw Material Feedstocks

	Rate	HHV[a]	HHV 10^9 Btu/SD
Coal Feed (Total)	6,036.25 TPSD (MF)[b]	12,910 Btu/lb	155.86
To SRC Process	5,590.00 TPSD (MF)		
To Gasification	446.25 TPSD (MF)		
Electric Power (Purchased)	121.4 MW	9,500 Btu/KWH	27.68
River Water Intake			
Zero Dishcarge Mode	4.19 MMGPSD	--	--
Discharge Mode	5.63 MMGPSD	--	--
	Total		183.54

[a]Higher heating value
[b]Moisture free

Table 3

Plant Produced Feedstocks

SRC to Delayed Coker/Calciner	886.6 TPSD
SRC to Expanded-Bed Hydrocracker	
High Conversion Mode	886.6 TPSD
Low Conversion Mode	1,773.3 TPSD
Hydrogen	77.3 MM SCFD
Oxygen	33.2 MM SCFD
Nitrogen	37.9 MM SCFD
Fuel Gas	20.4 MM SCFD

5. PRODUCT SLATE

The expected net products from the SRC-I Demonstration Plant are presented in Tables 4 and 5 for operation of the EBH in both the high-conversion and low-conversion modes, respectively. All fuel gas will be consumed on site; no fuel gas will be exported from the plant. LPG in excess of plant fuel requirements will be exported.

Table 4

Product Slate

High Conversion EBH Operation

	Product Rates TPSD	Product Rates BPSD	HHV (Btu/lb)	Heat Content (MMM Btu/SD)
Main Products				
Naphtha (C_5-400°F)	533.59	3,809	19,420	20.72
Fuel Oil (400-650°F)	800.98	4,846	17,820	28.55
Fuel Oil (650-850°F)	159.34	827	17,670	5.63
SRC Solid	883.96		15,980	28.25
TSL-SRC Solid	169.39		16,710	5.66
Calcined Coke	573.06		14,210	16.29
LPG (3,724 lb/hr)	44.69	505	21,560	1.93
SUBTOTAL				107.03
By-Product				
Sulfur	192.98		4,050	1.56
TOTAL				108.59

Table 5

Product Slate

Low Conversion EBH Operation

	Product Rates TPSD	BPSD	HHV (Btu/lb)	Heat Content (MMM Btu/SD)
Main Products				
Naphtha (C_5-400°F)	547.99	3,912	19,420	21.28
Fuel Oil (400-650°F)	798.96	4,834	17,820	28.47
Fuel Oil (650-850°F)	154.12	800	17,670	5.45
SRC Solid	-	-	15,980	-
TSL-SRC Solid	982.85	-	16,710	32.85
Calcined Coke	573.06	-	14,210	16.29
LPG (4,185 lb/hr)	50.22	568	21,560	2.17
SUBTOTAL				106.51
By-Product				
Sulfur	198.79	-	4,050	1.61
TOTAL				100.12

6. PLANT THERMAL EFFICIENCY

The thermal efficiency of the Demonstration Plant is determined by calculating the ratio of the total heat content of the net plant products to the total heat content of the plant feedstocks, including coal and electric power. The heat contents (heats of combustion) of the products are listed in Tables 4 and 5. The heat content of the coal feed and the equivalent higher heating value (HHV) of the electric power, based on 1 KWH = 9,500 Btu, are provided in Table 2. Table 6 lists the plant efficiencies of both EBH operating modes.

Table 6

Plant Thermal Efficiency

	High-Conversion EBH Operation	Low-Conversion EBH Operation
Input (MMM Btu/SD)		
Coal and power	183.54	183.54
Output (MMM Btu/SD)		
Main Products	107.03	106.51
By-Product	1.56	1.61
Total	108.59	108.12
Thermal Efficiency[a] (%)		
Main Products only	58.31	58.03
Including By-Product	59.16	58.91
Coal Conversion Efficiency[b]	2.96	2.94

[a] Thermal Efficiency = $\frac{\text{HHV of Products}}{\text{HHV of Coal and Power}} \times 100$

[b] Coal Conversion Efficiency = $\frac{\text{HHV of Main Products (MM Btu/SD)}}{\text{6 (MM Btu/BBL) x Coal Feed (T/SD), (MF)}}$

B. COST PLANS AND SUMMARY

BACKGROUND

The cost estimate and cost plan data for the SRC-I Project, Work Breakdown Structure (WBS) element 1.0 have been coordinated and compiled by ICRC, based on engineering, vendor engineering and equipment estimates and material take-off quantities developed by Catalytic, Inc., The Lummus Company, Air Products and Chemicals, Inc., The Ralph M. Parsons Company, Rust Engineering Company and Johnson Controls, Inc.; a construction cost estimate developed by Stone and Webster Engineering Corporation; and, a Phase I and II support estimate developed by ICRC.

As indicated in the original Baseline cost plans, the estimate for Phases I and II, expressed in first quarter FY 1982 terms, was 1.8664 billion dollars. It was also estimated that 565 million dollars be included for escalation until the completion of Phase II in December of 1987. In addition, ICRC recommended including a project contingency of an additional 451.9 million dollars.

The following assumptions and clarifications were associated with the Cost Baseline:

- Costs were presented in 1st Quarter FY 82 dollars and escalated over the time frame of the Schedule Baseline
- The escalated costs had been developed using the following rates, compounded yearly: 10% for the last three quarters of fiscal year (FY) 82, 10% for FY 83, 9% for FY 84 and FY 85 and 8% thereafter.
- Phase I Engineering and Vendor Engineering costs were made up of contract negotiated costs plus the estimates associated with specific Category A Engineering Change Proposals included in the Design Baseline.
- In general, the equipment estimates of Area Contractors were based on vendor quotations or other historical in-house data.
- Construction craft productivity had been adjusted to a 1.38 multiplier over the Gulf Coast basis.
- Construction labor costs were based on a 40-hour week, 8-hour day, single shift with no premium time included for craft labor.
- Construction bulk material quantities were based on material take-offs estimated by Area Contractors or generated by computer programs.

- Construction cash flows assumed bulk materials were purchased on the basis of early-start and labor on the basis of scheduled-start.
- All costs associated with the Hydrogen Purification Unit had been included in the Gas Treating Area.
- A contingency allowance had been developed and included on the estimate summary sheet using the following guidelines: engineering at 10%, equipment at 10%, construction at 20%, manufacturing (operations) at 10% and Category C ECPs at 30%. In addition, monies had been included for post-mechanical-completion modifications.

Changes to the design, cost and schedule of the project since the submission of the Interim Project Baseline in January 1981 had been classified as Category A, B or C Engineering Change Proposals (ECPs). Category A ECPs were well-defined and were included in the technical documentation of the Design Baseline. Category B ECPs were those which were agreed upon and which were adequately defined but, because of time constraints, were not included within the technical documentation of the Design Baseline. Their costs had been estimated and time-phased and were included in the cost plans as a line item at the third level of the WBS. Category C ECPs appeared to be desirable but were not well-defined. The costs for them had been estimated and time-phased and were included in the cost plans as a line item at the first level of the WBS. For a more detailed listing and cost data, see the following: Category A ECPs--Appendix B, Section 21.0; Category B ECPs--Appendix A; and Category C ECPs--Appendix B, Section 26.0.

The following time-phased Cost Plans of the Original Baseline did not include any of the contingency allowance. They had been developed in first quarter FY82 dollars and in escalated dollars in the following formats:

<u>Phase I</u> - Level III WBS Summary - 1st Quarter FY 82 dollars
Level III WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

<u>Phase II</u> - Level III WBS Summary - 1st Quarter FY 82 dollars
Level III WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

More detailed cost breakdowns for specific areas of the plant at Levels IV and V of the WBS can be found in the cost plan sections of the applicable following chapters. The detailed cost baseline submittals from each of the Area Contractors and the CM/C are maintained in the control files of ICRC. The data is voluminous and much of it is proprietary. One copy of the cost estimates from the Area Contractors and the CM/C was forwarded to the DOE and to its support contractor, as they became available. This data is available for examination by authorized personnel from DOE and its support contractors.

REVISED BASELINE CAPITAL COSTS

The Original Cost Baseline of March 1982 projected a total cost for Phases I and II only of $1,866.4 million in first-quarter FY 1982 dollars, exclusive of contingency (Table 7). The corresponding estimate for the Revised Cost Baseline is $1,855.3 million dollars. The changes which occurred in the cost estimate during the Post-Baseline period are detailed below:

		1st Quarter FY 1982 Dollars (000)
Original Cost Baseline (less contingency)		1,866,400
Original Baseline B ECPs	(24,880)	
Revised Baseline B ECPs	(20,181)	
Net Change in B ECPs		4,699
Original Baseline C ECPs	25,501	
Revised Baseline C ECPs	10,606	
Net Change in C ECPs		(14,895)
Original Cost Baseline, adjusted for revised B&C ECPs and excluding contingency		1,856,204
Net of Post-Baseline ECPs		8,333
Revisions to Checkout and Commissioning Costs		(13,800)
Effect of Dust Preparation Unit Material Takeoffs		1,000
Effect of Gasification Unit Material Takeoffs		4,300
Revisions to Gas Systems Equipment Costs		(678)
Update of Naphtha Hydrotreater Estimate		(100)
Revised Baseline Estimate		1,855,259

Most of the cost changes are a direct result of further development and refinement of Engineering Change Proposals (ECPs). Table 8 shows the Category B ECP Summary of the Original and Revised Cost Baseline values. The only changes from the Original Baseline were the deletion, at the direction of DOE, of ECP-4-1002 (Sour Gas Compressor Revisions) and ECP 6-1008 (Deletion of Third 50% H_2 Compressor). The savings of $24.880 million projected in the Original Baseline have been reduced to $20.181 million, resulting in a net cost increase of $4.699 million.

The Category C ECP Summary is presented in Table 9. Considerable engineering and estimating developments have resulted in revisions to many of the original ECPs. The result of these changes is a net cost increase of $10.616 million only versus the increase of $25.501 million in the Original Baseline. The net savings are $14.885 million.

The Post-Baseline ECPs are summarized in Table 10. The net effect of these ECPs is a cost increase of $8.333 million.

Because of the expected large impact of the ECPs affecting the Dust Preparation and Gasification Units of the Gas Systems Area, it was decided that the material take-offs (MTOs) for these areas would be redone following the incorporation of engineering changes, so that factored estimating would not be required. The cost estimates resulting from the revised MTOs are higher for both areas than if the ECP values were used. An increase of $1 million is noted in the Dust Preparation area and an increase of $4.3 million is observed in the Gasification Area.

Also, separate from the further development of ECPs, equipment estimates in the entire Gas Systems Area were refined. A saving of about $0.7 million over and above that projected by ECPs has been realized. The most significant contributor to this overall saving, which involves both positive and negative items, is a $1 million decrease in the equipment cost for the three remaining Gasifiers.

Another relatively large decrease of $13.832 million is realized in checkout and commissioning costs. This is primarily due to both lower fuel consumption during the checkout and commissioning period as well as lower fuel price projections based on the Energy Information Administration's 1982 Annual Energy Outlook.

A slight savings of $.1 million results from the revision of the Naphtha Hydrotreater cost estimate. The estimate was revised without formal processing of the revised ECP. However, the value of ECP 5-1013 in Table 9 is shown as the original ECP number.

The reconciliation and discussion above is presented on a "before contingency basis" because the contingency in the Original Baseline was escalated and the contingency in the Revised Baseline is not. However, both sets of contingencies were calculated using the same guidelines (i.e., 10% on engineering, equipment and operations and 20% in construction). The resultant contingency for the Revised Baseline is $325.9 million, including $60 million for post mechanical modifications.

TABLE 7

COST SUMMARY

($000s)

	Original Baseline		Revised Baseline
	1st Qtr. FY 82 Dollars	Escalated Dollars	1st Qtr. FY 82 Dollars
Phase 0(1)	$ 10,285	$ 10,285	$ 10,285
Phase I(1)	365,187	399,537	365,720
Phase II	1,501,230	2,032,416	1,489,539
Total before Contingency	$1,876,702	$2,442,238	$1,865,544
Contingency -			
Phase I		$ 32,647	$ 36,572
Phase II		419,217	289,285
Total		451,864	325,857
Total Cost		$2,894,102	$2,191,401

(1) Includes expenditures prior to FY '82.

TABLE 8

CATEGORY B ENGINEERING CHANGE PROPOSAL SUMMARY

ECP No.	Title	1st QTR FY 1982 ($000) Baseline Value	Revised Baseline Value
	SRC Process Area		
4-1002	Sour Gas Compressor Revisions (Deleted)	$(1,657)	$ 0
4-1003	Quench Mode as Plant Design Basis	(4,267)	(4,267)
4-1005	Modify Coal Slurry Heating and Pumping Design	(21,841)	(21,841)
4-1006	Modifications to Solidification Section	(5,968)	(5,968)
4-1009	Storage Tank Design Modifications	(26)	(26)
4-1011	Boiler Blowdown Disposal	330	330
4-1012	Design Changes for Start-Up/Shut-Down	2,937	2,937
4-1014	Materials of Construction Modifications	2,763	2,763
4-1023	Modifications to KMAC Unloading Systems	86	86
4-1025	Light SRC Stripper Redesign	528	528
4-1027	Product Oil Fractionation	9,159	9,159
4-1028	Operator Shelter and Field Laboratory	62	62
4-1031	P-12724 Driver Modifications	1,093	1,093
	SRC Process Area Total	$(16,801)	$(15,144)
	Coke and Liquid Products Area		
5-1004	Change Hot Condensate Subcooler to Pump	$ 12	$ 12
5-1006	Eliminate Calciner Shift Bins	(333)	(333)
5-1007	J-Type Enclosures for Green Coker Conveyors	(1,206)	(1,026)
5-1008	Reduction in Wet Gas Compressor Size	(406)	(406)
5-1010	Operator Shelter and Field Laboratory	62	62
	Coke and Liquid Products Area Total	$(1,691)	$(1,691)
	Cryogenic Systems Area		
3-1003	Operator Shelter and Field Laboratory	$ 62	$ 62
	Cryogenic Systems Area Total	$ 62	$ 62
	Gas Systems Area		
6-1002	Mixed Feed Gasification Heat & Material Balance	$ 34	$ 34
6-1003	Selexol and DEA Spare Filters/Separators	(194)	(194)
6-1004	Gasifier Flare Operation	48	48
6-1005	Nitrogen Purge System Revision	(522)	(522)
6-1006	Sulfur Storage	1,586	1,586
6-1008	Deletion of Third 50% H_2 Compressor (Deleted)	(3,042)	(0)
6-1009	LPG System and Storage Addition	4,690	4,690
6-1012	Segregated Wash Water System	264	264
6-1013	Deletion of the Fourth Gasifier	(18,461)	(18,461)
6-1015	Two 67% Claus Plants	(2,436)	(2,436)
6-1016	Wash Water Treatment Pump Revision	(41)	(41)
6-1024	Methanation Unit	3,550	3,550
1-1011	Corrosion/Erosion Monitoring	76	76
	Gas Systems Area Total	$(14,448)	$(11,406)
	Outside Battery Limits Facilities Area		
7-1002	Addition of Fourth Pulverizer Train	$ 6,576	$ 6,576
7-1004	River Frontage Security Fence	52	52
7-1005	Flare System Spare Pumps	85	85
4-1031	P-12724 Driver Modifications	285	285
	Outside Battery Limits Facilities Area Total	$ 6,998	$ 6,998
	Product Utilization Area		
1-1002	Product User Retrofit (Conversion Costs)	$ 1,000	$ 1,000
	Product Utilization Area Total	$ 1,000	$ 1,000
	CATEGORY B ECP TOTAL	$(24,880)	$(20,181)
	NET CHANGE		$ 4,699

TABLE 9

CATEGORY C ENGINEERING CHANGE PROPOSAL SUMMARY

ECP No.	Title	1st QTR FY 1982 ($000) Baseline Value	Revised Baseline Value
	SRC Process Area		
4-1004	Elimination of Batch Solids Withdrawal System	$(1,400)	$(2,272)
4-1008	Portable Decoking Drums	(200)	(226)
4-1013	Limiting KMAC Size to 1 mm	2,200	4,951
4-1020	Flare System Modifications	400	445
4-1022	Design Improvements & Modifications	400	507
4-1029	Solidifier Fume Control Unit	1,700	1,692
4-1030	Vari-Speed Drive Modifications	(400)	(255)
4-1032	Increase Solidifier Flexibility	220	700
	SRC Process Area Total	$ 2,920	$ 5,542
	Coke and Liquid Products Area		
5-1013	Naphtha Hydrotreater	$ 14,200	$ 14,200
5-1014	Replace Soda Ash System for Calciner Scrubber	(100)	(121)
5-1015	Rotate Lummus Plot Plan	(722)	27
5-1016	Revise Spent Catalyst Handling System	100	115
5-1017	Seal Oil Storage for EBH Reactor Pumps	125	154
	Coke and Liquid Products Area Total	$ 13,603	$ 14,375
	Cryogenic Systems Area		
3-1004	Hot Water Bath LIN Vaporizer	$ 750	$ 104
	Cryogenic Systems Area Total	$ 750	$ 104
	Gas Systems Area		
5-1014	Replace Soda Ash System for Calciner Scrubber	$ 0	$ (33)
6-1007	Delete DPU Classification System	(8,237)	(11,435)
6-1014	Single 100% H_2S Recycle Compressor	(2,418)	(3,092)
6-1017	Min./Max. Changes	1,100	1,480
6-1018	N_2 Recycle/Solvent Recovery Unit	8,392	4,543
6-1019	Seal Nitrogen Booster Compressor	133	133
6-1020	Delete Centrifuges, Use Vacuum Belted Filters	(826)	(1,121)
6-1021	Reduction of Fixed-Ammonia in Stripped Water-Lime	2,850	1,912
6-1023	Kettle Type Steam Boilers	(496)	(396)
6-1025	Gasification Materials Revisions	2,810	3,799
6-1026	Shift Condensate to Gasification Unit	0	638
	Gas Systems Area Total	$ 3,308	$(3,562)
	Outside Battery Limits Facilities Area		
4-1032	Increase Solidifier Flexibility	$ 0	$ (59)
5-1014	Replace Soda Ash System for Calciner Scrubber	0	106
5-1015	Rotate Lummus Plot Plan	0	(3,590)
7-1003	Flare Stack Relocation	(1,500)	(1,500)
7-1006	Wastewater Treatment System Modification	6,420	(800)
	Outside Battery Limits Facilities Area Total	$ 4,920	$(5,843)
	CATEGORY C ECP TOTAL	$ 25,501	$ 10,616
	NET CHANGE		$(14,885)

TABLE 10

POST-BASELINE ENGINEERING CHANGE PROPOSAL SUMMARY

ECP No.	Title	1st QTR FY 1982 ($000) Revised Baseline Value
	SRC Process Area	
4-1101	Integrated Facilities Modifications	$ 1,648
4-1102	CSD Modifications	(3,283)
4-1103	Coal Slurry Heater Safety Factor Revision	950
4-1104	Plot Plan Revisions	3,615
4-1105	Product Oil Fractionation Revisions	216
4-1106	Vapor/Oil/Water Separator Modifications	598
4-1107	Sour Gas Compressor Modifications	(318)
4-1108	Column/Drum Residence Time	60
4-1109	Service Elevator Addition	988
	SRC Process Area Total	$ 4,474
	Coke and Liquid Products Area	
5-1101	Coker/Calciner Design Changes	$(253)
5-1102	EBH Design Review Changes	(259)
	Coke and Liquid Products Area Total	$(512)
	Gas Systems Area	
6-1101	Baseline Estimate Review and Sample Collection	$ 7
6-1102	Delete L.P. Fuel Gas Absorber in BSRU	(657)
6-1104	Delete Coal Receiving Cyclone/Filter	(98)
6-1105	Mixed Feed Gasification H&MB - Additional Scope	10
6-1106	Methanation Unit Revisions	(315)
6-1107	Revised Wash Water Treatment Pumps	377
6-1108	Caustic Storage and Distribution System	521
6-1109	Blowdown, Condensate and Relief System	998
6-1110	Add Separator and Heat Exchanger - Selexol Unit	411
6-1111	Steam Turbine Selection for Raw Syngas Compressor	3,645
6-1112	ASWS Capacity Reduction	(528)
	Gas Systems Area Total	$ 4,371
	POST-BASELINE ECP TOTAL	$ 8,333

International Coal Refining Company

REVISED
BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR ICRC

DATE 30 Sept. 1983

WBS LEVEL 1 , NUMBER

REVISION NO. I

WBS ELEMENT TITLE SRC-I

PAGE ____ OF ____

1ST QTR FY'82 (THOUSANDS)

ITEM			FINAL BASELINE					
			LABOR		MAT'L			TOTAL
			MH	$	$			$
EQUIP	A/C PURCHASE				263582.4			263582.4
	CM/C	PURCHASE			3814.6			3814.6
		ERECT	1522.5 (1)	13720.8	37226.6			50947.4
	ICRC	SPARE PARTS			30400.0			30400.0
TOTAL EQUIP			1522.5	13720.8	335023.6			348744.4
Site & Earthwork			1828.0	24141.8	21717.9			45849.7
Concrete			2318.5	29747.7	18567.3			48315.0
Structural Steel			861.7	13375.6	34806.0			48181.6
Piping			4058.7	64853.2	100343.5			165196.7
Electrical			1550.7	22713.1	34578.5			57291.6
Instrumentation			983.8	15030.5	33134.1			41864.6
Architectural, Painting, and Insulation			1666.9	23750.9	29576.1			53327.0
SUBTOTAL - BULKS			13268.3	193612.8	272723.4			466336.2
TOTAL DIRECTS			14790.8	207333.6	607747.0			815080.6
Distributables & Indirects			3826.7	132561.5	83713.8			216275.3
TOTAL DIRECTS & INDIRECTS			18617.5	339895.1	691460.8			1031355.9
A/C Engr	Phase I			144949.1				144949.1
	Vendor Engr'g				29097.5			29097.5
	Phase II			36913.8				36913.8
CM/C	Phase I			15716.0				15716.0
	Phase II		241.4	53326.5	52663.2			105989.7
TOTAL ENGINEERING + CM/C			241.4	250905.4	81760.7			332666.1
ICRC	Phase I			175957.0 (2)				175957.0
	Phase II			314280.0 (3)				314280.0
SUBTOTAL				490237.0				490237.0
CATEGORY B ECP's					1000.0			1000.0
CATEGORY C ECP's								
SUBTOTAL – OTHER			490237.0		1000.0			491237.0
ESCALATION	Phase I							
	Phase II							
CONTINGENCY	Phase I				36572.0			36572.0
	Phase II				229285.0			229285.0
	POST MECH MODS				60000.0			60000.0
SUBTOTAL – CONTINGENCY					325857.0			325857.0
GRAND TOTAL			18859	1081037	1100079			2181116

FORM 9637 (3/82)

(1) Incl. M-Hrs for field-erected equip. $ Values for these hours appear in mat'l. column
(2) Includes $12,218 land and $39,480 ICRC G&A
(3) Includes $32,183 ICRC G&A

International Coal Refining Company

ORIGINAL

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR ICRC

WBS LEVEL 1. , NUMBER

WBS ELEMENT TITLE SRC-I

DATE March 31, 1982

REVISION NO. 0

PAGE ____ OF ____

ITEM			FINAL BASELINE LABOR MH	LABOR $	MAT'L $	Subtotal $	Escalation $	TOTAL $
EQUIP	A/C PURCHASE				267021.0	267021.0		267021.0
EQUIP	CM/C	PURCHASE			3845.6	3845.6		3845.6
EQUIP	CM/C	ERECT	1507.0	13484.2	36629.9	50114.1		50114.1
	ICRC	SPARE PARTS			31013.0	31013.0		31013.0
TOTAL EQUIP			1507.0	13484.2	338509.5	351993.7		351993.7
Site & Earthwork			1843.9	24355.9	21686.8	46042.7		46042.7
Concrete			2275.1	29211.7	18387.9	47599.6		47599.6
Structural Steel			843.5	13098.3	34612.3	47710.6		47710.6
Piping			4206.1	67301.4	103319.1	170620.5		170620.5
Electrical			1570.7	22996.6	34116.9	57113.5		57113.5
Instrumentation			959.9	14675.1	32944.4	47619.5		47619.5
Architectural Painting, and Insulation			1648.6	23495.7	28694.6	52190.3		52190.3
SUBTOTAL - BULKS			13347.8	195134.7	273762.0	468896.7		468896.7
TOTAL DIRECTS			14854.8	208618.9	612271.5	820890.4		820890.4
Distributables & Indirects			3834.0	132786.6	83680.3	216466.9		216466.9
TOTAL DIRECTS & INDIRECTS			18688.8	341405.5	695951.8	1037357.3		1037357.3
A/C Engr	Phase I			138968.0		138968.0		138968.0
A/C Engr	Vendor Engr'g				28581.0	28581.0		28581.0
A/C Engr	Phase II			36135.9		36135.9		36135.9
CM/C	Phase I			15741.0		15741.0		15741.0
CM/C	Phase II		237.1	53956.1	52887.5	106843.6		106843.6
TOTAL ENGINEERING + CM/C			237.1	244801.0	81468.5	326269.5		326269.5
ICRC	Phase I			174757.0		174757.0		174757.0
ICRC	Phase II			327412.0		327412.0		327412.0
SUBTOTAL				502169.0		502169.0		502169.0
CATEGORY B ECP's					(24880.0)	(24880.0)		(24880.0)
CATEGORY C ECP's					25501.0	25501.0		25501.0
SUBTOTAL – OTHER				502169.0	621.0	502790.0		502790.0
ESCALATION	Phase I						34350.0	34350.0
ESCALATION	Phase II						531186.0	531186.0
CONTINGENCY	Phase I				32647.0	32647.0		32647.0
CONTINGENCY	Phase II				317982.0	317982.0		317982.0
	POST MECH MODS				60000.0	60000.0	41235.0	101235.0
SUBTOTAL – CONTINGENCY					410629.0	410629.0	41235.0	451864.0
GRAND TOTAL			18926	1088376	1188670	2277046	606771	2883817

FORM 9637 (3/82)

DOE Form CR-533P (1-78)

U. S. DEPARTMENT OF ENERGY   Level III WBS Summary
BASELINE

Phase I

PAGE   OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

6. Contract Completion Date:

8. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.1	Constr. Facil. & Equipment			-	-	-	-	-	-	-	3	3	5	5	5	21	355	79	-	455
1.2.1	SRC	3857	7106	496	540	584	608	692	643	956	1054	1097	1151	3511	1170	12502	19564	9415	1330	53774
1.2.2	Coke & Liquid Products	1285	4008	324	283	314	271	283	339	439	489	745	733	807	972	6059	10746	3334	189	25621
1.2	Product	5142	11114	820	823	898	879	975	982	1395	1543	1842	1944	4318	2142	18561	30310	12749	1519	79395
1.3.1	Cryogenic Systems	430	812	99	102	146	108	106	112	124	141	139	148	172	166	1563	5587	2004	3	10449
1.3.2	Gas Systems	1610	9268	1323	1369	1259	1507	1719	1890	1922	2043	1986	1935	2028	2021	21062	16982	4107	35	53094
1.3	Support Processes	2120	10080	1422	1471	1405	1615	1825	2002	2046	2184	2125	2143	2200	2187	22625	22569	6111	38	63543
1.4.1	Utilities & Offsites	2281	4463	750	1064	1292	1178	1238	1343	1748	2050	2020	1910	1868	1929	18390	26596	4667	-	56397
1.4.2	Central Control System	-	531	35	17	17	19	17	30	35	32	32	43	40	41	358	555	219	-	1663
1.4	Outside Battery Limits & Central Control System	2281	4994	785	1081	1309	1197	1255	1373	1783	2082	2052	1953	1908	1970	18748	27151	4886	-	58060
1.5.1	Project Management	4405	6492	871	891	873	681	744	676	574	675	703	1119	1083	1084	9974	19934	7405	-	48210
1.5.2	Administration & Planning	2256	5181	603	430	574	459	493	518	569	479	483	554	481	456	6099	4532	1901	43	20012
1.5.3	Technical Support	273	2968	442	425	431	424	441	430	550	570	641	720	744	792	6610	2823	1476	-	14150
1.5.4	Product Utilization	609	979	186	166	196	174	177	187	1320	430	469	455	519	501	4780	4894	3512	97	14871
1.5.5	E.P.L.A. Support	839	1574	173	205	217	318	296	347	409	415	410	436	387	397	4010	2446	929	-	9798
1.5	Project Management & Support	8332	17194	2275	2117	2291	2056	2151	2158	3422	2569	2706	3234	3214	3230	31473	34629	15223	140	107041
1.6	Operations																			
1.1	Total Before G & A	17925	43382	5302	5492	5903	5747	5206	6515	8646	8381	8728	9329	11645	9534	91428	115014	39048	1697	308494
	G & A	1883	9049	729	735	771	764	831	870	1158	1101	1153	1228	1549	1238	12127	11558	4727	136	39480
	Category C ECP's	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4995*
	Escalation	-	-	-	-	-	150	162	164	475	465	487	771	760	779	4213	17710	11026	701	34350*
	Total - Escalated	19808	52431	6031	6227	6674	6661	7199	7549	11279	9947	10368	11328	13954	11551	107768	144282	54801	2534	387319*
	Land	213	17	-	-	-	-	-	-	-	-	-	-	292	-	292	11696	-	-	12218
	Grand Total - Escalated	20021	52448	6031	6227	6674	6661	7199	7549	11279	9947	10368	11328	14246	11551	108060	155978	54801	2534	399537

15. Remarks: * Category C ECPs are represented in total only; $700 of escalation relates to Category C ECPs.

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level III WBS Summary

Phase I

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.1	Constr. Facil & Equipment										3	3	5	5	6	22	406	95		523
1.2.1	SRC	3857	7106	496	540	584	622	710	660	1004	1108	1153	1236	3595	1259	12967	22236	11735	1902	59803
1.2.2	Coke & Liquid Products	1285	4008	324	283	314	277	289	347	461	514	782	853	868	1044	6356	12195	4161	205	28210
1.2	Product	5142	11114	820	823	898	899	999	1007	1465	1622	1935	2089	4463	2303	19323	34431	15896	2107	88013
1.3.1	Cryogenic Systems	480	812	99	102	146	111	109	115	131	147	147	158	184	178	1627	6384	2504	3	11810
1.3.2	Gas Systems	1640	9268	1323	1369	1259	1543	1761	1932	2014	2143	2085	2145	2178	2168	21920	19351	5134	48	57361
1.3	Support Processes	2120	10080	1422	1471	1405	1654	1870	2047	2145	2290	2232	2303	2362	2346	23547	25735	7638	51	69171
1.4.1	Utilities & Offsites	2281	4463	750	1064	1292	1207	1269	1376	1835	2153	2120	2055	2007	2074	19202	30388	5962		62296
1.4.2	Central Control System	-	531	35	17	17	19	17	30	36	32	32	44	41	42	362	635	273		1801
1.4	Outside Battery Limits & Central Control System	2281	4994	785	1081	1309	1226	1286	1406	1871	2185	2152	2099	2048	2116	19564	31023	6235		64097
1.5.1	Project Management	4405	6492	871	891	873	694	757	688	600	710	740	1192	1154	1154	10324	22709	9265		53195
1.5.2	Administration & Planning	2256	5181	603	430	574	471	506	530	597	503	508	596	517	489	6324	5178	2375	59	21373
1.5.3	Technical Support	273	2968	442	425	431	435	452	441	578	598	673	774	800	851	6900	3225	1844		15210
1.5.4	Product Utilization	609	979	186	166	196	178	181	192	1386	452	492	489	558	539	5015	5591	4387	132	16713
1.5.5	E.P.L.A. Support	839	1574	173	205	217	326	303	356	429	436	431	469	416	427	4188	2795	1161		10557
1.5	Project Management & Support	8382	17194	2275	2117	2291	2104	2199	2207	3590	2699	2844	3520	3445	3460	32751	39498	19032	191	117048
1.6	Operations																			
1.1	Total Before G & A	17925	43382	5302	5492	5903	5883	6354	6667	9071	8799	9166	10016	12323	10231	95207	131093	48896	2349	338852
	G & A	1883	9049	729	735	771	778	845	882	1208	1148	1202	1312	1631	1320	12561	13189	5905	185	42772
	Category C ECP's			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5695
	Total	19808	52431	6031	6227	6674	6661	7199	7549	10279	9947	10368	11328	13954	11551	107768	144282	54801	2534	387319
	Land	213	17											292		292	11696			12218
	Grand Total	20021	52448	6031	6227	6674	6661	7199	7549	10279	9947	10368	11328	14246	11551	108060	155978	54801	2534	399537

15. Remarks:

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure

Phase I

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1. Contract Identification	2. Contract Number
Demonstration of the Solvent Refined Coal Process	DE-AC05-78OR03054
3. Contractor (name, address) International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date 10 July 1978 5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	Catalytic	2121	4148	263	332	363	406	436	457	529	551	574	625	664	720	5920	17217	8114	1282	38802
	Lummus	1176	3304	229	197	219	178	187	245	274	330	537	580	630	797	4403	9418	2824	189	21314
	APCI ASU/HPU	417	731	90	92	197	130	87	91	98	123	137	143	246	242	1646	6893	2184	3	11874
	Parsons	1311	4295	504	760	1049	1355	1529	1566	1618	1658	1608	1602	1602	1577	16428	13903	3339	33	39308
	Rust-Utilities & Offsites	1552	2801	507	855	1089	980	1047	1156	1347	1673	1578	1509	1513	1578	14832	25033	3983	-	48201
	-Engineering Services	1900	1584	57	51	50	41	39	38	41	35	36	39	35	34	496	1619	1047	-	6646
	Subtotal	3452	4385	564	906	1139	1021	1086	1194	1388	1708	1614	1548	1548	1612	15328	26652	5030	-	54847
	Johnson Controls	-	371	25	10	8	11	10	21	25	25	25	33	33	33	259	555	219	-	1404
	Stone & Webster	-	145	289	436	327	191	249	209	49	265	431	780	699	716	4637	10663	296	-	15741
	ICRC	9449	26003	3342	2759	2601	2485	2622	2732	4551	3607	3687	3892	5095	3703	42076	28791	16600	140	123059
	Category B ECPs	-	-	-	-	-	-	-	-	114	114	115	126	128	134	731	922	442	50	2145
	Subtotal	17925	43382	5302	5492	5903	5747	6206	6515	8646	8381	8728	9329	11645	9534	91428	115014	39048	1697	308494
	G & A	1883	9049	729	735	771	764	831	870	1158	1101	1153	1226	1549	1238	12127	11558	4727	136	39480
	Category C ECPs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4995
	Subtotal-1Q FY82 Dollars	19808	52431	6031	6227	6674	6511	7037	7385	9804	9482	9881	10557	13194	10772	103555	126572	43775	1833	352969

16. Remarks	Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars	17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure

Phase I

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)			10. Planned Current Fiscal Year FY82																
(cont.)		FY80	FY81	O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	Escalation	-	-	-	-	-	150	162	164	475	465	487	771	760	779	4213	17710	11026	701	34350
	Land	213	17	-	-	-	-	-	-	-	-	-	-	292	-	292	11696	-	-	12218
	Grand Total - Escalated	20021	52448	6031	6227	6674	6661	7199	7549	10279	9947	10368	11328	14246	11551	108060	155978	54801	2534	399537

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure

Phase I

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1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

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6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	Catalytic	2121	4148	263	332	363	415	447	469	556	579	604	671	714	774	6187	19554	10107	1837	43954
	Lummus	1176[illegible]	3304	229	197	219	182	191	251	288	347	564	624	678	856	4626	10760	3527	205	23598
	APCI ASU/HPU	4[illegible]7	731	9[illegible]	92	197	102	89	93	103	129	146	153	264	259	1717	7875	2730	3	13473
	Parsons	13[illegible]0	4295	504	760	1049	1389	1567	1604	1698	1741	1687	1723	1723	1694	17139	15884	4172	45	42845
	Rust-Utilities & Offsites	1552	2801	507	855	1089	1004	1074	1185	1414	1757	1658	1623	1626	1697	15489	28601	5106	-	53549
	-Engineering Services	1900	1584	57	51	50	42	40	39	43	38	39	42	38	38	517	1870	1337	-	7208
	Subtotal	3452	4385	564	906	1139	1046	1114	1224	1457	1795	1697	1665	1664	1735	16006	30471	6443	-	60757
	Johnson Controls	-	371	25	10	8	11	10	21	25	25	25	33	33	33	259	635	273	-	1538
	SWEC	-	145	285	436	327	191	249	210	50	278	450	828	740	758	4802	12099	354	-	17400
	ICRC	9449	26003	3342	2759	2601	2547	2687	2795	4775	3784	3871	4184	6372	3980	43697	32763	20738	191	132841
	Category B ECPs	-	-	-	-	-	-	-	-	119	121	122	135	135	142	774	1052	552	68	2446
	Subtotal	17925	43382	[illegible]302	5492	5903	5883	6354	6667	9071	8799	9166	10016	12323	10231	95207	131093	48896	2349	338852
	G & A	1883	9049	729	735	771	778	845	882	1208	1148	1202	1312	1631	1320	12561	13189	5905	185	42772
	Category C ECPs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5695
	Subtotal-Escalated Dollars	19808	52431	[illegible]031	6227	667[illegible]	6661	7199	7549	10279	9947	10368	11328	13954	11551	107768	144282	54801	2534	387319

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure

Phase I

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1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)			10. Planned Current Fiscal Year FY82																
(cont.)		FY80	FY81	O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	Land	213	17	-	-	-	-	-	-	-	-	-	-	292	-	292	11696	-	-	12218
	Grand Total	20021	52448	6031	6227	6674	6661	7199	7549	10279	9947	10368	11328	14246	11551	108060	155978	54801	2534	399537

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

U. S. DEPARTMENT OF ENERGY
BASELINE

Level III WBS Summary

Phase II

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1. Contract Identification	2. Contract Number
Demonstration of the Solvent Refined Coal Process	DE-AC05-78OR03054
3. Contractor (name, address) International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date 10 July 1978 5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.1	Construction Facilities & Equipment			552	5651	11018	8817	2056	-	28094
1.2.1	SRC			44704	79325	83319	57175	8926	-	273449
1.2.2	Coke & Liquid Products			14381	22615	27642	32544	6535	-	103717
1.2	Product			59085	101940	110961	89719	15461	-	377166
1.3.1	Cryogenic Systems			21	1773	31641	9992	651	-	44078
1.3.2	Gas Systems			37816	43402	106188	55556	5062	-	248024
1.3	Support Processes			37837	45175	137829	65548	5713	-	292102
1.4.1	Utilities & Offsites			38270	115806	150399	74434	11221	-	390130
1.4.2	Central Control System			-	211	3540	299	-	-	4050
1.4	Outside Battery Limits & Central Control System			38270	116017	153939	74733	11221	-	394180
1.5	Project Management & Support			10326	27357	45397	41159	32294	6030	162563
1.6	Operations			18924	12525	6008	17325	111443	28211	194436
1.0	Subtotal			164994	308665	465152	297301	178188	34241	1448541
	G & A			1925	4901	6995	7410	9047	1905	32183
	Category C ECPs			-	-	-	-	-	-	20506
	Total-1Q FY82 Dollars			166919	313566	472147	304711	187235	36146	1501230
	Escalation			23942	71693	159538	138758	107679	23607	531186 *
	Grand Total - Escalated			190861	385259	631685	443469	294914	59753	2032416

16. Remarks * Includes escalation on Category C ECPs of $5,969.

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Level III WBS Summary

Phase II

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1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.1	Construction Facilities & Equipment			645	7067	14937	12866	3193	-	38708
1.2.1	SRC			51060	99289	112967	83281	13879	-	360476
1.2.2	Coke & Liquid Products			16350	26168	36557	47000	10156	-	136231
1.2	Product			67410	125457	149524	130281	24035	-	496707
1.3.1	Cryogenic Systems			24	2235	38247	14558	1008	-	56072
1.3.2	Gas Systems			43120	51422	142106	80597	7832	-	325077
1.3	Support Processes			43144	53657	180353	95155	8840	-	381149
1.4.1	Utilities & Offsites			44047	142908	203098	108552	17449	-	516054
1.4.2	Central Control System			-	264	4469	441	-	-	5174
1.4.1	Outside Battery Limits & Central Control System			44047	143172	207567	108993	17449	-	521228
1.5	Project Management & Support			11818	34193	61713	60476	51302	10176	229678
1.6	Operations			21621	15664	8231	24885	176082	46344	292827
1.0	Subtotal			188685	379210	622325	432656	280901	56520	1960297
	G & A			2176	6049	9360	10813	14013	3233	45644
	Category C ECPs			-	-	-	-	-	-	26475
	Grand Total-Escalated Dollars			190861	385259	631685	443469	294914	59753	2032416

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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Organizational Breakdown Structure Summary

Phase II

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1. Contract Identification	2. Contract Number
Demonstration of the Solvent Refined Coal Process	DE-AC05-780R03054
3. Contractor (name, address) International Coal Refining Company, P. O. Box 2752, Allentown, PA 18001	4. Contract Start Date 10 July 1978
	5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
	Catalytic			47667	53791	2579	991	-	-	105028
	Lummus			14308	20411	6609	2902	774	-	45004
	APCI ASU/HPU			-	573	27735	1644	221	-	30173
	Parsons			38745	26173	4452	2357	1250	-	72977
	Rust - Utilities & Offsites			21449	20241	2878	1357	-	-	45925
	Johnson Controls			-	211	3540	299	-	-	4050
	Stone & Webster			18372	158344	384511	247596	37344	-	846167
	ICRC			32008	36277	40088	44813	138815	34241	326242
	Category B ECP's			(7555)	(7356)	(7240)	(4658)	(216)	-	(27025)
	Subtotal 1st Qtr. FY82 $'s			164994	308665	465152	297301	178188	34241	1448541
	G & A			1925	4901	6995	7410	9047	1905	32183
	Category C ECP's									20506
	Subtotal			166919	313566	472147	304711	187235	36146	1501230
	Escalation			23942	71693	159538	138758	107679	23607	531186
	Grand Total - Escalated			190861	385259	631685	443469	294914	59753	2032416

16. Remarks	Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars	17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

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(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase II

PAGE OF

1. Contract Identification	2. Contract Number
Demonstration of the Solvent Refined Coal Process	DE-AC05-78OR03054
3. Contractor (name, address) International Coal Refining Company, P. O. Box 2752, Allentown, PA 18001	4. Contract Start Date: 10 July 1978
	5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
	Catalytic			54431	67177	3511	1461	-	-	126580
	Lummus			16348	23407	7750	3721	1232	-	52458
	APCI ASU/HPU			-	717	32086	2426	351	-	35580
	Parsons			44266	30176	5736	3477	1962	-	85617
	Rust - Utilities & Offsites			24505	23381	4056	2237	-	-	54179
	Johnson Controls			-	264	4469	441	-	-	5174
	Stone & Webster			21384	198438	521033	360334	58007	-	1159196
	ICRC			36383	44839	53540	65429	219693	56520	476404
	Category B ECP's			(8632)	(9189)	(9856)	(6870)	(344)	-	(34891)
	Subtotal			188685	379210	622325	432656	280901	56520	1960297
	G & A			2176	6049	9360	10813	14013	3233	45644
	Category C ECP's									26475
	Grand Total			190861	385259	631685	443469	294914	59753	2032416

15. Remarks	Dollars Expressed in Thousands - Escalated Dollars	17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

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Phase I

1 Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3 Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82: O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.0	OPEX/PACE WBS Split																			
	OPEX:																			
	1.5.1	35	100	10	11	12	11	12	13	17	16	17	18	23	19	179	93	61	-	468
	1.5.2	396	910	80	81	87	35	92	97	128	124	129	138	176	141	1358	968	693	43	4368
	1.5.4	430	1202	277	287	307	300	324	340	451	437	455	486	521	495	4780	4894	3512	97	14915
	G & A	92	456	50	52	56	55	59	61	82	79	83	88	113	90	868	683	645	15	2759
	Total - OPEX	953	2668	417	431	462	451	487	511	678	656	684	730	933	745	7185	6638	4911	155	22510
	Total - PACE	19068	49780	5614	5796	6212	6050	6550	6875	9127	8826	9197	9827	12553	10025	96662	131631	38863	1678	337682
	Category C ECPs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4995
	Total Before Escalation	20021	52448	6031	6227	6674	6511	7037	7386	9805	9482	9881	10557	13486	10770	103847	138269	43774	1833	365187
	Escalation	-	-	-	-	-	150	162	163	474	464	489	770	761	780	4213	17709	11027	701	34350*
	Grand Total - Escalated	20021	52448	6031	6227	6674	6651	7199	7549	10279	9945	10370	11327	14247	11550	108060	155978	54801	2534	399537

16. Remarks * Includes escalation in Category C ECPs of $700.

Dollars Expressed in Thousands - 1st Qtr. Thousands

17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date

19 Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P
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U. S. DEPARTMENT OF ENERGY
BASELINE

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Phase I

1. Contract Identification Demonstration of the Solvent Refined Coal Process	2. Contract Number DE-AC05-78OR03054
3. Contractor (name, address) International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date 10 July 1978 5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)			10. Planned Current Fiscal Year FY82																
		FY80	FY81	O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.0	OPEX/PACE WBS Split																			
	OPEX:																			
	1.5.1	35	100	10	11	12	11	12	12	18	17	18	19	25	20	185	106	76	-	502
	1.5.2	396	910	80	81	87	87	94	100	134	130	136	148	189	152	1418	1106	866	59	4755
	1.5.4	430	1202	277	287	307	308	332	349	474	459	477	523	668	532	4993	5591	4387	132	16735
	G & A	92	456	50	52	56	56	61	63	86	83	87	95	121	97	907	780	806	20	3061
	Total - OPEX	953	2668	417	431	462	462	499	524	712	689	718	785	1003	801	7503	7583	6135	211	25053
	Total - PACE	19068	49780	5614	5796	6212	6199	6700	7025	9567	9257	9652	10542	13244	10749	100557	148395	48666	2323	368789
	Category C ECPs																			5695
	Grand Total - Escalated	20021	52448	6031	6227	6674	6661	7199	7549	10279	9946	10370	11327	14247	11550	108060	155978	54801	2534	399537

15. Remarks	Dollars Expressed in Thousands - Escalated Dollars	17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

U. S. DEPARTMENT OF ENERGY
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Phase II

PAGE OF

1. Contract Identification	2. Contract Number
Demonstration of the Solvent Refined Coal Process	DE-AC05-78OR03054
3. Contractor (name, address) International Coal Refining Company, P. O. Box 2752, Allentown, PA 18001	4. Contract Start Date 10 July 1978
	5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.0	OPEX/PACE WBS Split									
	OPEX:									
	1.5.1			105	45	26	74	524	33	807
	1.5.2			188	250	748	986	3672	899	6743
	1.5.4			-0-	-0-	2350	2359	2765	839	8313
	Recruiting and Training			-	853	2312	6267	4137	245	13814
	Checkout and Commissioning			18924	11672	3696	11058	107306	27966	180622
	G & A			254	249	184	755	9312	2831	13585
	Total - OPEX			19471	13069	9316	21459	127716	32813	223884
	Total - PACE			147448	300497	462831	283252	59519	3333	1256840
	Category C ECPs									20506
	Total Before Escalation			166919	313566	472147	304711	187235	36146	1501230
	Escalation			23942	71693	159538	138758	107679	23607	531186*
	Grand Total - Escalated			190861	385259	631685	443469	294914	59753	2032416

15. Remarks	16.	17. Cost Plan Date
* Includes escalation on Category C ECPs of $5,969.	Dollars Expressed in Thousands -1st Qtr. FY82 Dollars	March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

DOE Form CR-433P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Phase II

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-780R03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.0	OPEX/PACE WBS Split									
	OPEX:									
	1.5.1			120	56	35	109	835	57	1212
	1.5.2			215	312	1019	1454	5850	1546	10396
	1.5.4			-	-	3199	3480	4405	1443	12527
	Recruiting and Training			-	1066	3148	9244	6591	421	20470
	Checkout and Commissioning			21621	14582	5032	16310	170960	48099	276604
	G & A			290	311	251	1114	14836	4869	21671
	Total - OPEX			22246	16327	12684	31711	203477	56435	342880
	Total - PACE			168615	368932	619001	411758	91437	3318	1663061
	Category C ECPs									26475
	Grand Total - Escalated			190861	385259	631685	443469	294914	59753	2032416

16. Remarks

Dollars Expressed in Thousands -Escalated Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

C. SCHEDULE AND SUMMARY

SUMMARY

Currently, the SRC-I Project has no specific schedule, no definite restart date. Because of a lack of funding, the DOE has decided to shut down the project. In essence, the engineering has not progressed much beyond the establishment of this Revised Project Baseline, i.e., no detailed engineering has been done such as, the development of mechanical equipment designs, structural designs, foundations, piping, wiring, instrumentation, etc. Actual procurement of equipment was never authorized and, as a result, vendor engineering was never realized. The FEIS Record of Decision was never received and, consequently, land was never actually purchased. Before a new meaningful schedule can be developed, allowances must be made for: restarting and mobilizing the engineering effort; obtaining the FEIS Record of Decision; purchasing and rezoning the land, and; authorizing the procurement of the equipment, etc.

It is estimated that a minimum period of one year, after reactivation of the project, would be required up front to accomplish the above items in order to restore the project to the position in which it was when work was curtailed. Then, barring any very large increases in national economic activity, the time spans from the original Project Schedule Baseline could be applied to produce a revised schedule. Very high industrial activity could extend equipment delivery dates which would necessitate additional schedule modifications.

In this scenario, the original project schedule has been carried over into the Revised Schedule Baseline to show the interrelationship and interdependence of the various activities upon each other, to show the relative time spans required for the activities, and to provide a basis on which a cash-flow can be developed.

INTRODUCTION

The original Project Baseline Schedule comprised a hierarchy of four schedule levels, which were in ascending order: Detail, Intermediate, Master, and Executive.

The Detail Schedules were computerized networks consisting of about 65,000 total activities. They had been prepared by the Area Contractors, the Construction Manager/Constructor, and the ICRC cost account managers. The Detail Schedules were maintained by the respective Area Contractors and served as the data base from which the Intermediate Schedule were developed.

The Intermediate Schedule was a Critical Path Method (CPM) network consisting of approximately 10,000 activities. This schedule consolidated all the Detail Schedules and was the level at which all work performed by the subcontractors involved in the SRC-I project was interfaced. The Intermediate Schedule was maintained by ICRC and served as the data base for the Master and Executive Schedules.

The Master Schedule, which consolidates the information contained in the Intermediate Schedule, consisted of approximately 700 milestones and was presented in the form of a Gantt bar chart with associated milestone logs. The milestones were based on early start and complete dates extracted from the Intermediate Schedule CPM logic network. In addition to the early dates, the latest start and complete dates for each milestone were shown on the computer-generated milestone logs. The Master Schedule activities associated with each of the level III WBS elements can be found in appropriate subsequent sections of this Baseline submittal (e.g., Section II for Construction Facilities and Equipment (WBS 1.1)).

The Executive Schedule summarized the milestones contained in the Master Schedule and had been developed to provide an overview of the entire project. It consisted of approximately 100 milestones and was also presented in the form of a Gantt bar chart with associated milestone logs. The Executive Schedule logs also showed late was well as early start and complete dates for each milestone.

SCHEDULE CRITERIA AND ASSUMPTIONS

In accordance with DOE guidelines, the Project Baseline Schedule had been based on the following criteria:

1. Commencement of procurement selection process (bid requests) to begin on 15 June 1981.
2. FEIS Record of Decision to be made on 15 October 1982.

3. Commencement of equipment fabrication to begin on 1 November 1982.
4. Fixed-price type construction contracts to be let.

Furthermore, the Schedule Baseline was based on the following ICRC assumptions:

1. Project status as of 1 October 1981 was to be used.
2. Contractors would not be restrained by funding limitations.
3. Engineering and construction manpower would be available, as required.
4. Condemnation proceedings would not be required for acquisition of land.
5. Move on site date would be 15 April 1983.
6. Construction work week would be 40 hours.
7. Procurement Cycles and Milestone Process Hazards Review Cycles would be in accordance wtih ICRC Master Project Procedure 9-1, Rev. 1, dated 25 September 1981.

SCHEDULE OVERVIEW AND HIGHLIGHTS

Phase I, defined as Detailed Engineering and Design, encompassed engineering and design efforts by various Area Contractors and included equipment inquiry preparation, bid submittals, evaluations, placement of purchase orders, and the engineering by equipment vendors required to support the Area Contractors' detailed design. Phase I was scheduled to be completed in February 1985.

Phase II, defined as Procurement and Construction, began with the release for equipment fabrication on 1 November 1982. This phase included procuring major materials, fabricating equipment, constructing the facility, and commissioning. Phase II was scheduled for completion in December 1987.

Phase III, defined as Operation and Evaluation, began in December 1987 and extended for 2½ years. Phase IIIA, Plant Optimization, ran for 6 months during which the operation of the plant was optimized. This was followed by a 2-year period, Phase IIIB, that culminated with the Plant Buyout Decision, scheduled for June 1990.

Significant Milestones contained in the Project Baseline Schedule are highlighted below:

°	Obtain FEIS Record of Decision	15 October 1982
°	Begin Phase II (Equipment Fabrication)	1 November 1982
°	Complete land acquisition including rezoning	April 1983
°	Move on site	15 April 1983
°	Complete Phase I	February 1985
°	Complete Phase II/Start Phase IIIA	December 1987
°	Start Phase IIIB	June 1988
°	Complete Phase IIIB/Plant Buyout Decision	June 1990

CRITICAL PATH

A critical-path analysis of the Project Baseline Schedule showed that three areas of the project were essential for completion of Phase II in the fourth quarter of calendar 1987:

- The first path began with engineering in the Gasification Area, followed by construction and commissioning of the Gasification Systems, followed by commissioning of the SRC Feed Reaction and Recovery System.
- The second path extended from engineering in the Off-Sites Interconnectiong Systems Area through construction of the Interconnecting Systems, followed by commissioning of Utilities Systems.
- The third path began with the delivery of the Utilities Boiler, followed by construction and, finally, commissioning of the Utilities Systems.

In addition to these, the following paths were nearly critical to completion on time:

- Engineering in the Plant Utilities Area, followed by construction and, finally, commissioning of the Utilities Systems.
- Acquisition of land, site development, and, finally, construction and commissioning.
- Engineering through construction of the Water and Waste Treatment Facilities, followed by commissioning of the Utilities Systems.

CHAPTER II. CONSTRUCTION FACILITIES AND EQUIPMENT (WBS 1.1)

Page

A. TECHNICAL SCOPE

The lease of temporary offices and related office equipment at Newman, Kentucky prior to moving on-site, construction items and services such as roadwork, barge facility, craft transportation, parking lots, temporary fences, storage yards, construction buildings, temporary power and water, security, janitorial service, and trash pickup, which are not specific to an area, will be budgeted and charged to the Construction Facilities and Equipment WBS element.

Buildings which will be constructed include an administration building, warehouse, time offices, craft change houses, guardhouses, an icehouse, first aid houses, a test lab, and a maintenance shop. The administration building will be sized to accommodate a CM/C staff of approximately 275 people plus 25 people each for ICRC and DOE. The estimated sizes of the various buildings are as follows:

1	Administration Building	50,000 sq ft
3	Time Offices at 2,000 sq ft each	6,000 sq ft
6	Craft Change Houses at 7,500 sq ft each	45,000 sq ft
1	Warehouse	120,000 sq ft
5	Guardhouses at 150 sq ft each	750 sq ft
1	Icehouse	1,000 sq ft
2	First Aid Houses at 1,200 sq ft each	2,400 sq ft
1	Test Lab	2,000 sq ft
1	Maintenance Shop	6,000 sq ft

Toilet facilities will be provided for the entire site. Ten toilet trailers and an average of fifty Porta-Johns will be used at peak work loads to service 4,000 men. A septic tank will be installed for each stationary facility. Service contracts will be let for sanitation and janitorial services and trash pickup.

Temporary yard work to support the total project includes:

Roads with gravel surface	15,000 lin ft
Parking lots with gravel surface (craft)	110,000 sq yd
Fences for parking lots, storage areas, etc.	25,000 lin ft

Storage yard with gravel surface	40 acres
Storage yard, graded only	60 acres
Drainage ditches with gravel surface	58,000 lin ft
Fabrication shop area with gravel surface	40 acres
Subcontractor trailer park with gravel surface	5 acres
Barge unloading facility at Owensboro	1

The installation of all temporary utilities will also be charged to this element. After installation of the temporary utilities, the CM/C will be responsible for maintenance and repair of the systems.

A bus service to the jobsite will be provided for craft personnel when the site manpower level increases to a point where traffic congestion occurs on the incoming highway. The cost of this service will be charged to this element.

The CM/C will supply equipment for the warehousing effort and maintenance and repair of the roads and utilities. Costs for the equipment are included in this element.

There were no revisions to the Technical Scope of Construction Facilities and Equipment during the Post-Baseline period.

B. COST PLANS

The following cost plan data from the original Baseline for the Construction Facilities and Equipment, Work Breakdown Structure element 1.1 are included for reference and comparison. They were coordinated and compiled by the International Coal Refining Company (ICRC) based on a construction cost estimate developed by Stone and Webster Engineering Corporation (SWEC). This cost plan data did not include any allowance for contingency.

There were no Phase I costs included in this WBS element. The Phase II Cost Plans were presented in first quarter FY 82 and escalated costs.

The escalated costs were developed using the following rates compounded yearly: 10% for FY 82 and FY 83, 9% for FY 84 and FY 85 and 8% thereafter. Escalation on equipment had been calculated based on a committed basis and distributed on a cash flow basis.

For this Revised Project Baseline, there are no changes in the capital cost estimate in first-quarter FY 82 dollars for Construction Facilities and Equipment. Because of the lack of a definitive project schedule and agreed escalation factors, no attempt has been made to escalate the costs or to develop new cost plans.

REVISED

International Coal Refining Company

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR Stone & Webster

WBS LEVEL 1.1 , NUMBER 010

WBS ELEMENT TITLE Const. Facilities & Equip.

DATE

REVISION NO.

PAGE OF

1ST QTR FY82 (THOUSANDS)

ITEM			FINAL BASELINE LABOR MH	LABOR $	MAT'L $			TOTAL $
EQUIP	A/C PURCHASE							
EQUIP	CM/C	PURCHASE						
EQUIP	CM/C	ERECT						
	ICRC	SPARE PARTS						
TOTAL EQUIP								
Site & Earthwork								
Concrete								
Structural Steel								
Piping								
Electrical								
Instrumentation								
Architectural, Painting, and Insulation								
SUBTOTAL - BULKS								
TOTAL DIRECTS								
Distributables & Indirects								
TOTAL DIRECTS & INDIRECTS								
A/C Engr.	Phase I							
A/C Engr.	Vendor Engr'g							
A/C Engr.	Phase II							
CM/C	Phase I			455.0				455.0
CM/C	Phase II		184.6	7747.6	20346.8			28094.4
TOTAL ENGINEERING + CM/C			184.6	8202.6	20346.8			28549.4
ICRC	Phase I							
ICRC	Phase II							
SUBTOTAL								
CATEGORY B ECP's								
CATEGORY C ECP's								
SUBTOTAL – OTHER								
ESCALATION	Phase I							
ESCALATION	Phase II							
CONTINGENCY	Phase I							
CONTINGENCY	Phase II							
	POST MECH MODS							
SUBTOTAL – CONTINGENCY								
GRAND TOTAL			184.6	8202.6	20346.8			28549.4

FORM 9637 (3/82)

ORIGINAL

International Coal Refining Company

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR Stone & Webster

WBS LEVEL 1.1 , NUMBER 010

WBS ELEMENT TITLE Const. Facilities & Equip.

DATE ____

REVISION NO. ____

PAGE ____ OF ____

ITEM			FINAL BASELINE					
			LABOR		MAT'L	Subtotal	Escalation	TOTAL
			MH	$	$	$	$	$
EQUIP	A/C PURCHASE							
EQUIP	CM/C	PURCHASE						
EQUIP	CM/C	ERECT						
	ICRC	SPARE PARTS						
TOTAL EQUIP								
Site & Earthwork								
Concrete								
Structural Steel								
Piping								
Electrical								
Instrumentation								
Architectural, Painting, and Insulation								
SUBTOTAL - BULKS								
TOTAL DIRECTS								
Distributables & Indirects								
TOTAL DIRECTS & INDIRECTS								
A/C Engr.	Phase I							
A/C Engr.	Vendor Engr'g							
A/C Engr.	Phase II							
CM/C	Phase I			455.0		455.0	68.0	523.0
CM/C	Phase II		184.6	7747.6	20346.8	28094.4	10613.3	38707.7
TOTAL ENGINEERING + CM/C			184.6	8202.6	20346.8	28549.4	10681.3	39230.7
ICRC	Phase I							
ICRC	Phase II							
SUBTOTAL								
CATEGORY B ECP's								
CATEGORY C ECP's								
SUBTOTAL – OTHER								
ESCALATION	Phase I							
ESCALATION	Phase II							
CONTINGENCY	Phase I							
CONTINGENCY	Phase II							
CONTINGENCY	POST MECH MODS							
SUBTOTAL – CONTINGENCY								
GRAND TOTAL			184.6	8202.6	20346.8	28549.4	10681.3	39230.7

FORM 9637 (3/82)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level II WBS Summary

Phase I

PAGE OF

DOE Form CR-533P (1-78)

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.1	Constr. Facil. & Equip.	–	–	–	–	–	–	–	–	–	3	3	5	5	5	21	355	79	–	455
	Category B ECP's	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Total 1.1	–	–	–	–	–	–	–	–	–	3	3	5	5	5	21	355	79	–	455
	Escalation	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	51	16	–	68
	Total - Escalated	–	–	–	–	–	–	–	–	–	3	3	5	5	6	22	406	95	–	523

15. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR433P
(1-78)

U. S. DEPARTMENT OF ENERGY Level II WBS Summary
BASELINE

Phase I

PAGE OF

1. Contract Identification	2. Contract Number
Demonstration of the Solvent Refined Coal Process	DE-AC05-78OR03054
3. Contractor (name, address) International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date 10 July 1978 5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.1	Constr. Facil. & Equip.	-	-	-	-	-	-	-	-	-	3	3	5	5	6	22	406	95	-	523
	Category B ECP's	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total 1.1	-	-	-	-	-	-	-	-	-	3	3	5	5	6	22	406	95	-	523

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary
Phase I

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82: O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	SWEC	–	–	–	–	–	–	–	–	–	3	3	5	5	5	21	355	79	–	455
	Category B ECP's	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Total 1.1	–	–	–	–	–	–	–	–	–	3	3	5	5	5	21	355	79	–	455
	Escalation	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	51	16	–	68
	Total Escalated	–	–	–	–	–	–	–	–	–	3	3	5	5	6	22	406	95	–	523

15. Remarks:

1st Qtr FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary
Phase I

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	SWEC	-	-	-	-	-	-	-	-	-	3	3	5	5	6	22	406	95	-	523
	Category B ECP's	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total 1.1	-	-	-	-	-	-	-	-	-	3	3	5	5	6	22	406	95	-	523

16. Remarks

Escalated Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

U. S. DEPARTMENT OF ENERGY
BASELINE

Level II WBS Summary
Phase II

DOE Form CR-533P (1-78)

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.1	Constr. Facil. & Equip.			552	5651	11018	8817	2056	–	28094
	Category B ECF's			–	–	–	–	–	–	–
	Total 1.1			552	5651	11018	8817	2056	–	28094
	Escalation			93	1416	3919	4049	1137	–	10614
	Total - Escalated			645	7067	14937	12866	3193	–	38708

15. Remarks

Dollars Expressed in Thousands-1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

U. S. DEPARTMENT OF ENERGY
BASELINE

Level II WBS Summary
Phase II

PAGE OF

DOE Form CR-533P (1-78)

1. Contract Identification: Demonstration of the Solvent Refined Coal Process	2. Contract Number: DE-AC05-78OR03054
3. Contractor (name, address): International Coal Refining Company, P. O. Box 2752, Allentown, PA 18001	4. Contract Start Date: 10 July 1978
	5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.1	Constr. Facil. & Equip.			645	7067	14937	12866	3193	–	38708
	Category B ECP's			–	–	–	–	–	–	–
	Total 1.1			645	7067	14937	12866	3193	–	38708

16. Remarks	Dollars Expressed in Thousands-Escalated Dollars	17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

DOE Form CR-533P (1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary
Phase II

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	SWEC			552	5651	11018	8817	2056	–	28094
	Category B ECP's			–	–	–	–	–	–	–
	Total 1.1			552	5651	11018	8817	2056	–	28094
	Escalation			93	1416	3919	4049	1137	–	10614
	Total - Escalated			645	7067	14937	12866	3193	–	38708

16. Remarks

1st Qtr.FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary
Phase II

PAGE OF

1. Contract Identification
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Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
	SWEC			645	7057	14937	12866	3193	–	38708
	Category B ECP's			–	–	–	–	–	–	–
	Total 1.1			645	7057	14937	12866	3193	–	38708

16. Remarks

Escalated Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

C. SCHEDULE

The construction facilities included in WBS 1.1 are outlined in the preceding Section A, Technical Scope. Most are of a temporary nature to serve the project during the construction phase.

Initial roadwork, storage lots, utilities, temporary buildings and the like were to be constructed between April 1983 and August 1984. Maintenance of these facilities and construction services will be ongoing activities to the end of Phase II when permanent facilities and services will be in place.

Construction tools will be purchased in substantial quantities early in Phase II and will be maintained and replenished throughout construction. Erection equipment will be obtained and used throughout Phase II.

While there is no current schedule for the resumption and completion of the SRC-I Project, the time durations for the original project activities can and should be considered in the development of any new preliminary schedules.

CHAPTER III. PRODUCTS (WBS 1.2)

A. SRC PROCESS AREA (WBS 1.2.1)

1. TECHNICAL SCOPE

The SRC-I direct coal liquefaction process produces solvent-refined coal (SRC), liquid fuels, and gaseous and solid by-products (Figures 6 and 7). Required raw materials are pulverized coal, hydrogen, and deashing solvent.

In the SRC Process Area, the pulverized coal is mixed with a process-derived solvent and hydrogen and then heated and reacted. Reactor effluent includes acid gas, hydrocarbon gases and liquids, and molten SRC reaction products, as well as unconverted coal and ash. The gases and liquids are separated from the SRC and solids and further processed to recover fuel gas, naphtha, medium oil, and heavy oil products. A Critical Solvent Deashing process separates the ash and unconverted carbon solids from the molten SRC, which is either cooled to form solid SRC product, or further hydrogenated in the Expanded-Bed Hydrocracker (Area 13), or coked in the Coker/Calciner (Area 13). The overall Terminal Stream Balance which corresponds to Figures 6 and 7, Index Flow Diagrams, is presented in Table 11.

Coal, pulverized to 70% -200 mesh and containing no more than 2% moisture, is fed to the process at a continuous rate of 5,590 tons per stream day on a moisture-free basis. The coal is slurried with two recycle streams: hot process solvent and light SRC. The coal slurry is then pressurized to approximately 2,500 psia and pumped to the Coal Slurry/Hot Oil Exchangers, where it is heated from about 400 to 460°F against process solvent. This preheated coal slurry is mixed with hot recycle-hydrogen from the Gasification Area (15) and delivered to the Coal Slurry Heaters, where it is further heated from 460 to 760°F. At the heater exit, additional hot recycle-hydrogen is added.

The vapor/slurry mixture is then fed to two Coal Dissolvers operated in series. Because an exothermic hydrogenation reaction occurs in the Dissolvers, quench hydrogen is added between them. Reaction products leave the second Dissolver at approximately 2,000 psig and 840°F and enter the Coal Dissolver Effluent Separator, which separates the slurry from the vapors. The slurry portion is first quenched by injecting condensed solvent that is recycled from the High-Pressure Separator; it is then let-down in pressure to approximately 100 psig and phase-separated in the Medium-Pressure (MP) Flash Drum. The slurry from the MP drum is also let-down in pressure to approximately 25 psig and again phase-separated, in the Low-Pressure (LP) Flash Drum. Finally, the slurry from the LP Flash Drum is flashed into the Vacuum Column at about 0.6 psia. The bottoms from the Vacuum Column is an SRC slurry containing only 6 wt % of process solvent. This slurry is pumped to the Critical Solvent Deashing section.

The Deashing Unit (Figure 8) separates the SRC slurry into product SRC, light SRC, and by-product ash concentrate. The SRC slurry is first mixed with recycled critical solvent and then sent to the First-Stage Settler where ash, unconverted coal solids, and insoluble SRC are separated as a heavy phase. This heavy phase is withdrawn from the bottom of the settler, let-down in pressure, and sent to Solvent Separator #1, to recover the critical solvent contained in the ash concentrate. The ash concentrate, a free-flowing powder, is then classified and pneumatically conveyed to the Gasification Section (Area 15) for further processing.

The light phase from the First-Stage Settler, consisting of soluble SRC and critical solvent, is heated and fed to the Second-Stage Settler. Heating the critical solvent reduces its density, which results in rejection of part of the SRC to the heavy phase. This heavy phase is withdrawn and sent to the Solvent Separator #2 to recover critical solvent from the SRC. The ash-free molten SRC stream from the separator is evenly divided into three streams: (1) one-third is solidified as product; (2) one-third is sent to the Coker/Calciner (Area 13) to produce anode coke; and (3) one-third is sent to the Expanded-Bed Hydrocracker (Area 13) for further hydrogenation and conversion to liquid feedstock for the Product Oil Fractionator.

The light phase from the Second-Stage Settler is let-down in pressure with a resultant temperature decrease and sent to the Third-Stage Settler. There, the density of the critical solvent is decreased to reject the remaining SRC to the heavy phase. This heavy phase is sent to Solvent Separator #3 to recover critical solvent. The light phase from the Third-Stage Settler and the solvent recovered in all three solvent separators are recycled.

The product from the Third-Stage settler is called light SRC. Adjustment of process conditions in the Second-Stage Settler can vary the relative quantities of SRC and light SRC over a broad range. The light SRC is recycled to the Slurry Preparation and Pumping Section.

The portion of molten SRC from deashing that is sent to the Solidification Section is cooled and solidified by a batch process. The molten SRC is pumped onto trays and cooled indirectly by water. After the SRC solidifies, the tray are vibrated, causing the solid to fracture. The SRC is dumped onto conveyors and transported to Product Storage (Area 11). Any fumes generated during solidification are removed by Solidifier Fume Control Units. This section also solidifies TSL-SRC, a vacuum residue from the Expanded-Bed Hydrocracker (Area 13).

The vapor streams from the Coal Dissolver Effluent Separator and the MP Flash Drum are partially condensed and phase-separated to recover maximum amounts of hydrogen and specification process solvent and to effectively separate water from hydrocarbons. The medium-pressure gases are compressed and combined with the high-pressure gas stream and sent to Gas Treatment (Area 15) for hydrogen purification.

Gases recovered in the LP System and liquids recovered in the MP System are fed to the Solvent Column to recover specification process solvent from the bottom of the fractionator. Most of the process solvent is used as a heat recovery medium and is eventually recycled to the Coal Slurry Drum to supply part of the process solvent needed to slurry the pulverized coal. Smaller portions are used as additional heat recovery medium and as flush oil for the packings of slurry pumps. The remainder is sent to the Product Vacuum Column for product recovery.

The Solvent Column overhead, a light hydrocarbon stream, is partially condensed and phase-separated. The vapor is compressed and sent to the Gas Treatment Area (Area 15) for acid gas removal. The condensed portion of the overhead, a hydrocarbon/water mixture, is also phase-separated. Hydrocarbons are sent to the Naphtha Fractionator for product recovery, and the sour water is sent to the Ammonia Sulfide Water Stripper in the Gas Systems Area (Area 15).

The Vacuum Column also recovers specification process solvent as a side draw, most of which is also used as a heat recovery medium. A smaller portion is used to scrub the vent vapor from the Coal Slurry Drum and eventually to provide the balance of the process solvent required to slurry the pulverized coal in the Coal Slurry Drum. The remaining portion of the side draw is sent to the Product Vacuum Column for product recovery. The Vacuum Column overhead is condensed and phase-separated. The noncondensibles are sent to the Vent Vapor System, the hydrocarbon liquids are sent to the Naphtha Fractionator for product recovery, and the sour water is sent to the Ammonia Sulfide Water Stripper (Area 15).

The hydrocarbon liquid streams from the Solvent and Vacuum Columns, the Coker (Area 13), the Expanded-Bed Hydrocracker (Area 13), and Hydrogen Purification Unit (Area 15) are fractionated in the Naphtha Fractionator and Product Vacuum Column to produce specification products of naphtha and medium and heavy oil. Also, the light hydrocarbon gas recovered in the Naphtha Fractionator is sent to the Gas Treatment Area (Area 15) for sulfur removal and eventual addition to the fuel gas supply.

The following is a tabulation of some of the major items of equipment in each of the Level 4 WBS elements of the SRC Product Area (WBS 1.2.1):

WBS 1.2.1.1--Integrated Facilities

IN-12101	Vent Waste Incinerator
V-12101	Flush Solvent Storage Drum
V-12110	Slurry Slop Tank

WBS 1.2.1.2--Slurry Preparation and Pumping

BH-12201	Coal Feed Calibration Bins (2)
V-12201	Coal Slurry Drums (2)
P-12202	Coal Slurry Feed Pumps (8)
E-12202	Coal Slurry/Hot-Oil Exchangers (6)

WBS 1.2.3.1--Slurry Heaters

H-12301	Coal Slurry Heaters (6)

WBS 1.2.1.4--Hydrogen Recovery and Dissolvers

C-12401	Sour Gas Compressors (2)
R-12401	Coal Slurry Dissolver No. 1
R-12402	Coal Slurry Dissolver No. 2
V-12401	Coal Dissolver Effluent Separator
P-12401	Low-Pressure Slurry Pumps (2)

WBS 1.2.1.5--Solvent Recovery

T-12501	Solvent Column
T-12502	Naphtha Fractionator
T-12503	Product Vacuum Column
P-12512	Process Solvent/Hot-Oil Pumps

WBS 1.2.1.6--Vacuum Column

T-12601	Vacuum Column
P-12601	Vacuum Column Bottoms Pump (2)
P-12608	CSD Feed Pumps (2)

WBS 1.2.1.7--Critical Solvent Deashing

V-12704	First-Stage Settlers (2)
V-12707	Second-Stage Settler
V-12708	Third-Stage Settler

WBS 1.2.1.8--Solidification

SO-12801	SRC Solidifiers (7)
SO-12802	SRC/TSL-SRC Solidifiers (4)

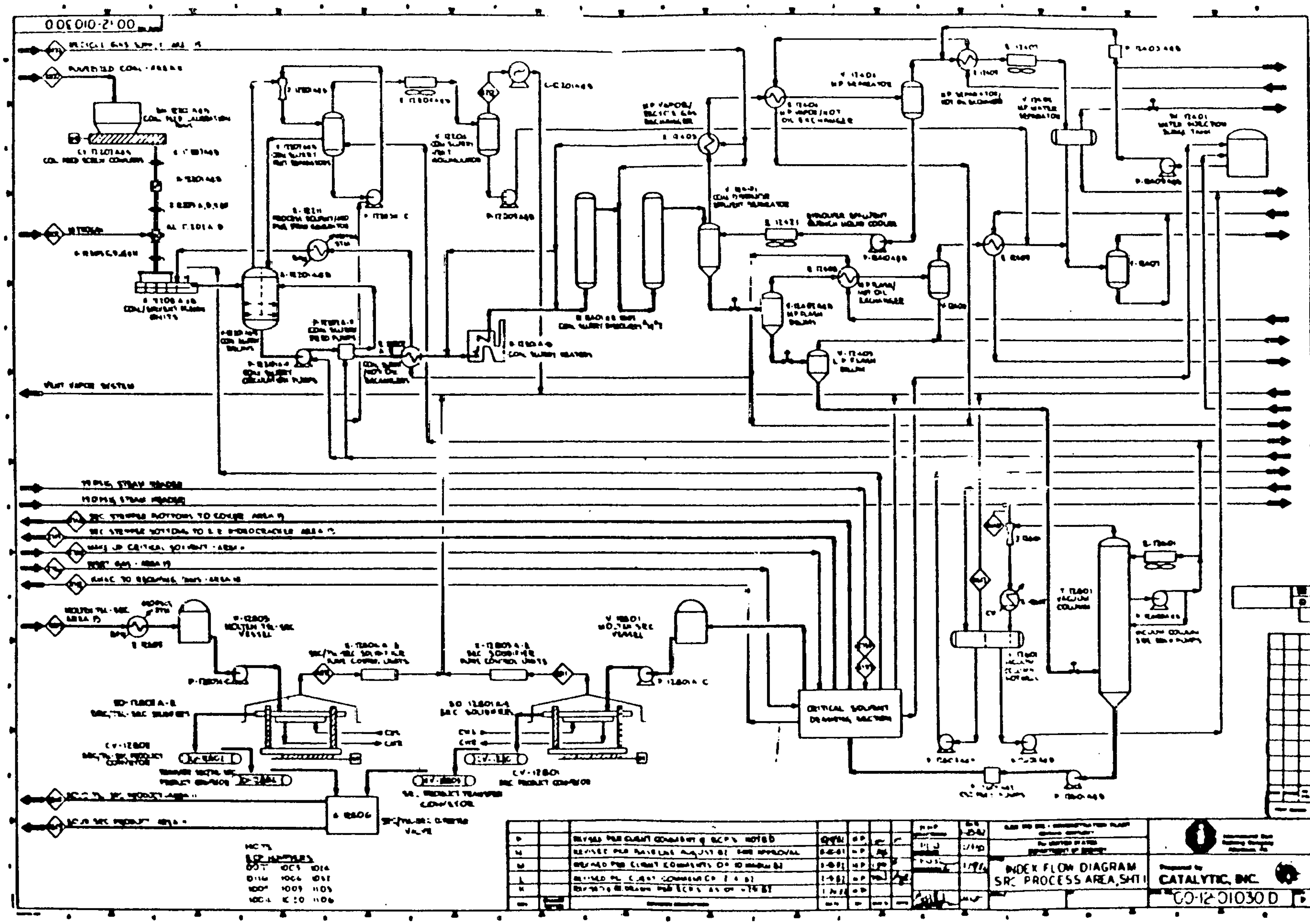

INDEX FLOW DIAGRAM
SRC PROCESS AREA, SHT I
CATALYTIC, INC.
CO-12-01030 D

Figure 5

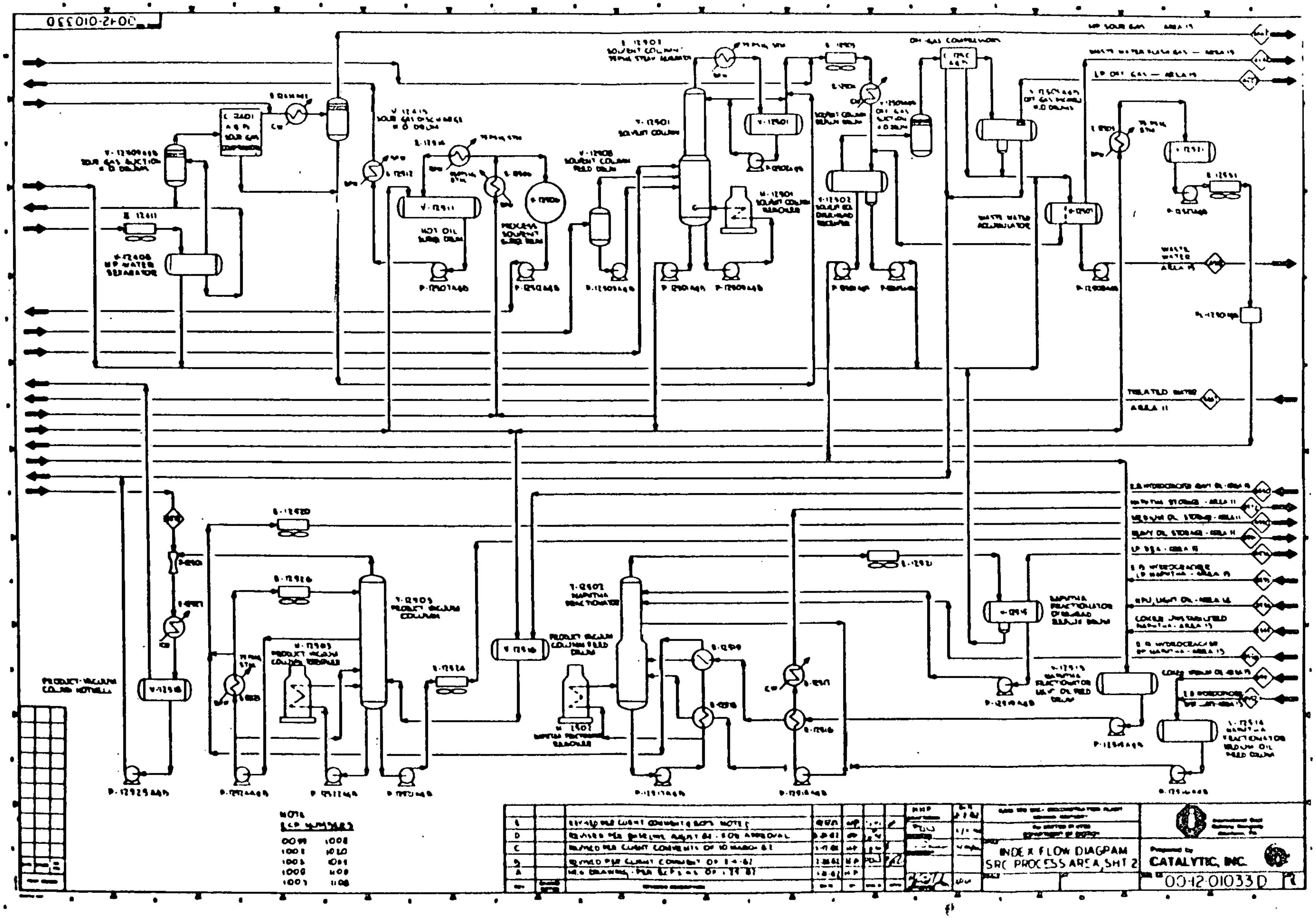

INDEX FLOW DIAGRAM
SRC PROCESS AREA, SHT 2
CATALYTIC, INC.
0042-01033 D

Figure 7

TABLE 11

SRC PROCESS AREA

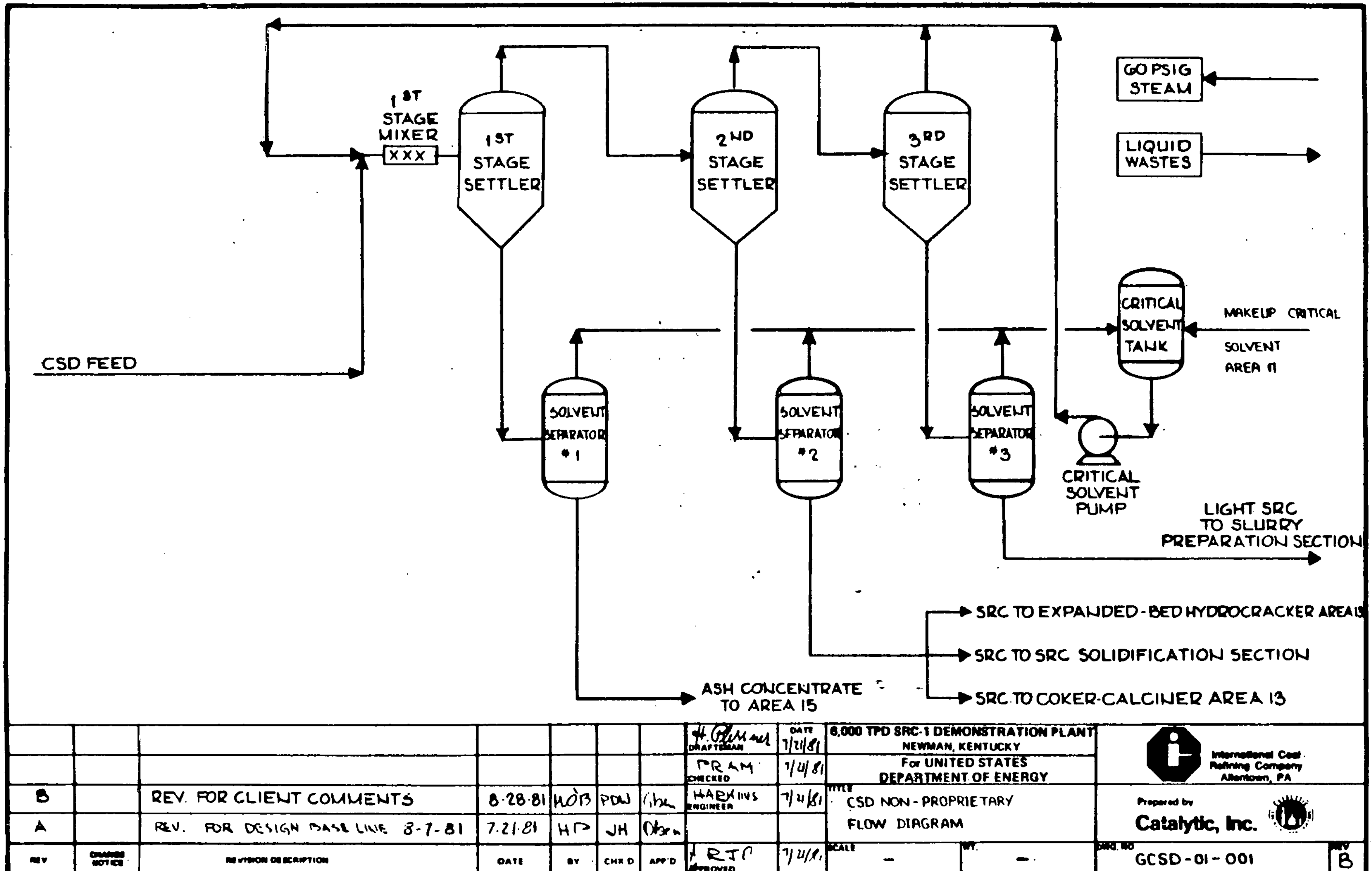
OVERALL TERMINAL STREAM BALANCE

WBS 1.2.1.2 through 1.2.1.8

	Stream Number	Stream Name	Flow, lb/hr
IN.	*4200	Coal Feed to BH-12201 A&B	475,150
	**4202	Nitrogen Purge to AL-12202 A-C	401
	4467	Treated Water to TK-12401	39,723
	4473	Total Recycle Gas to Area 12	94,070
	4550	EBH Heavy Oil to V-12516	13,167
	4551	Coker Medium Oil to V-12514	8,822
	4552	EBH Distillate to V-12514	21,919
	4553	EBH LP Naphtha to V-12513	12,482
	4554	HPU Light Oil to V-12513	3,255
	4555	Coker Unstabilized Naphtha to V-12513	2,076
	4556	EBH HP Naphtha to T-12502	447
	4575	130 psig Steam to J-12501	600
	4616	130 psig Steam to J-12601	3,168
	4700	Make-Up Critical Solvent to V-12706	1,496
	4734	60 psig Stripping Steam to T-12701	11,083
	4737	60 psig Stripping Steam to T-12702	1,015
	4803	Molten TSL-SRC to E-12805	14,148
		Total In:	703,022
OUT.	4212	Vent Accumulator Vapor to C-12201 A or B	471
	4462	HP Sour Gas to Gas Treating	116,115
	4519	Wastewater to Area 15	93,492
	4527	LP Off Gas to Gas Treating	1,446
	4542	Wastewater Flash Gas to Area 15	36
	4572	Naphtha Product to Storage	45,994
	4574	Naphtha Fractionator Off Gas from V-12515	1,093
	4590	Medium Oil Product to Storage	68,807
	4591	Heavy Oil Product to Storage	13,254
	4611	Vacuum Column Vapor to Vent Vapor System	117
	4712	KMAC to Receiving Bins (Area 15)	126,389
	4745	SRC Stripper Bottoms to Expanded Bed Hydrocracker (Area 13)	73,887
	4746	SRC Stripper Bottoms to Coker (Area 13)	73,886
	4809	Solid SRC Product to Storage	14,106
	4811	Fumes from SO-12801 A-E	222
	4812	Fumes from SO-12802 A-E	42
		Total Out:	703,022

*This total flow is two times value to each of BH-12201 A&B.
**This total flow is two times value to each of BH-12202 A&C.

FIGURE 8



W B S 1.2.1.7 CS DEASHING

2. COST PLANS

The following cost plan data from the Original Baseline for the SRC Process Area, Work Breakdown Structure element 1.2.1 are included for reference and comparison. They were coordinated and compiled by the International Coal Refining Company (ICRC) based on engineering, vendor engineering and equipment estimates and material take-off quantities developed by Catalytic, Inc., a construction cost estimate developed by Stone and Webster Corporation, and a Phase I and II support estimate developed by ICRC. This cost plan data did not include any allowance for contingency.

The Cost Plans were presented in first quarter FY 82 and escalated costs in the following formats:

Phase I - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

Phase II - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

The escalated costs were developed using the following rates compounded yearly: 10% for FY 82 and FY 83, 9% for FY 84 and FY 85 and 8% thereafter. Escalation on equipment had been calculated based on a committed basis and distributed on a cash flow basis.

For this Revised Project Baseline, the capital costs in first quarter FY 82 dollars for the SRC Process Area rose from $327.223 million to $339.402 million--an increase of $12.179 million. The increase is due to the revised capital costs resulting from the finalized Category B, C, and Post-Baseline ECPs and the attendant adjustment to the factored costs for spare parts.

No attempt has been made to escalate the revised costs or to develop new cost plans because of the lack of a definitive project schedule and agreed escalation factors.

REVISED

International Coal Refining Company

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR Catalytic

WBS LEVEL 1.2.1 , NUMBER 100

WBS ELEMENT TITLE Catalytic Area Summary

DATE ____________

REVISION NO. ____________

PAGE ______ OF ______

1st QTR FY '82 (THOUSANDS)

ITEM			FINAL BASELINE					
			LABOR		MAT'L			TOTAL
			MH	$	$			$
EQUIP	A/C PURCHASE				93474.8			93474.8
EQUIP	CM/C	PURCHASE			2412.3			2412.3
EQUIP	CM/C	ERECT	194.8 (1)	1055.1	4020.4			5075.5
	ICRC	SPARE PARTS						
TOTAL EQUIP			194.8	1055.1	99907.5			100962.6
Site & Earthwork			98.9	1291.0	2558.8			3849.8
Concrete			500.3	6442.4	3407.3			9849.7
Structural Steel			219.3	3404.7	8696.5			12101.2
Piping			1318.8	21092.5	30126.3			51218.8
Electrical			258.1	3784.1	8873.5			12657.6
Instrumentation			331.0	4972.2	9275.2			14247.4
Architectural, Painting, and Insulation			354.3	5199.6	9193.7			14393.3
SUBTOTAL - BULKS			3080.7	46186.5	72131.3			118317.8
TOTAL DIRECTS			3275.5	47241.6	172038.8			219280.4
Distributables & Indirects			848.0	28043.9	17548.9			45592.8
TOTAL DIRECTS & INDIRECTS			4123.5	75285.5	189587.7			264873.2
A/C Engr.	Phase I			30018.3				30018.3
A/C Engr.	Vendor Engr'g				10477.7			10477.7
A/C Engr.	Phase II			5927.9				5927.9
CM/C	Phase I			521.0				521.0
CM/C	Phase II		10.1	4972.3	2596.4			7568.7
TOTAL ENGINEERING + CM/C			10.1	41439.5	13074.1			54513.6
ICRC	Phase I			13310.0				13310.0
ICRC	Phase II			6705.0				6705.0
SUBTOTAL				20015.0				20015.0
CATEGORY B ECP's								
CATEGORY C ECP's								
SUBTOTAL – OTHER				20015.0				20015.0
ESCALATION	Phase I							
ESCALATION	Phase II							
CONTINGENCY	Phase I							
CONTINGENCY	Phase II							
	POST MECH MODS							
SUBTOTAL – CONTINGENCY								
GRAND TOTAL			4133.6	136740.0	202661.8			339401.8

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(1) Includes manhours for field erected equipment. Dollar value of these hours appears in material column.

ORIGINAL

International Coal Refining Company

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR Catalytic

WBS LEVEL 1.2.1 , NUMBER 100

WBS ELEMENT TITLE Catalytic Area Summary

DATE

REVISION NO.

PAGE ____ OF ____

ITEM			FINAL BASELINE					
			LABOR MH	LABOR $	MAT'L $	Subtotal $	Escalation $	TOTAL $
EQUIP	A/C PURCHASE				99209.0			99209.0
EQUIP	CM/C	PURCHASE			2412.3			2412.3
EQUIP	CM/C	ERECT	192.1	1014.5	4020.4			5034.9
	ICRC	SPARE PARTS						
TOTAL EQUIP			192.1	1014.5	105641.7			106656.2
Site & Earthwork			105.4	1376.3	2423.5			3799.5
Concrete			480.5	6187.4	3229.4			9416.8
Structural Steel			187.4	2909.3	7230.0			10139.3
Piping			1389.2	22217.8	32493.5			54711.3
Electrical			260.7	3822.6	8679.1			12501.7
Instrumentation			307.5	4619.5	9035.8			13655.3
Architectural, Painting, and Insulation			371.4	5451.2	8827.0			14278.2
SUBTOTAL - BULKS			3102.1	46584.1	71917.3			118501.4
TOTAL DIRECTS			3292.9	47598.4	177560.1			125949.5
Distributables & Indirects			848.5	28058.9	17558.3			45617.2
TOTAL DIRECTS & INDIRECTS			4141.4	75657.3	195118.4	270775.7	84756.8	355532.5
A/C Engr.	Phase I			28699.0		28699.0	3589.0	32288.0
A/C Engr.	Vendor Engr'g				10426.0	10426.0	1606.0	12032.0
A/C Engr.	Phase II			5819.0		5819.0	1599.0	7418.0
CM/C	Phase I			521.0		521.0	64.0	585.0
CM/C	Phase II		10.5	5171.9	2596.4	7768.3	3259.7	11028.0
TOTAL ENGINEERING + CM/C			10.5	40210.9	13022.4	53233.3	10117.7	63351.0
ICRC	Phase I			13310.0		13310.0	632.0	13942.0
ICRC	Phase II			6705.0		6705.0	2323.0	9028.0
SUBTOTAL				20015.0		20015.0	2955.0	22970.0
CATEGORY B ECP's					(16801.0)	(16801.0)	(4774.0)	(21575.0)
CATEGORY C ECP's								
SUBTOTAL – OTHER				20015.0	(16801.0)	3214.0	(1819.0)	1395.0
ESCALATION	Phase I							
ESCALATION	Phase II							
CONTINGENCY	Phase I							
CONTINGENCY	Phase II							
CONTINGENCY	POST MECH MODS							
SUBTOTAL – CONTINGENCY								
GRAND TOTAL			4151.9	135883.2	191339.8	327223.0	93055.5	420278.5

FORM 9637 (3/82)

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase I

PAGE OF

1. Contract Identification	2. Contract Number
Demonstration of the Solvent Refined Coal Process	DE-AC05-78OR03054

3. Contractor (name, address)	4. Contract Start Date / 5. Contract Completion Date
International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date: 10 July 1978 5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.2.1	SRC																			
1.2.1.1	Area Engineering Integration	272	962	13	35	41	62	59	53	60	65	67	70	73	83	681	1787	1956	164	5822
1.2.1.2	Slurry Preparation & Pumping	85	312	1	6	9	10	16	18	21	27	36	50	64	76	334	2093	760	108	3693
1.2.1.3	Slurry Heater	23	79	5	8	11	15	19	26	30	31	35	40	46	54	320	3577	676	17	4697
1.2.1.4	H2 Recovery & Dissolver	102	233	4	10	13	19	20	29	49	55	63	71	64	64	461	2897	674	-	4367
1.2.1.5	Solvent Recovery	62	152	18	21	24	23	26	27	33	33	40	42	47	55	389	679	367	75	1724
1.2.1.6	Vacuum Column	45	92	13	14	13	14	15	17	17	17	18	20	20	23	201	758	403	-	1499
1.2.1.7	Critical Solvent Deashing	99	243	27	32	33	37	42	46	52	54	51	60	2463	69	2966	2289	654	-	6251
1.2.1.8	Solidification	30	123	9	10	12	15	21	23	23	25	16	16	22	24	216	753	446	-	1568
1.2.1.9	Engineering Tech. Support	1749	2550	159	160	163	157	216	142	352	416	419	421	352	350	3307	1643	789	-	10038
1.2.1.10	Area Management	1334	2360	247	244	255	256	258	262	289	301	322	321	320	326	3411	2797	2427	918	13297
	Category B ECP's	-	-	-	-	-	-	-	-	30	30	30	40	40	46	216	291	263	48	818
	Total 1.2.1	3857	7106	496	540	584	608	692	643	956	1054	1097	1151	3511	1170	12502	19564	9415	1330	53774
	Escalation	-	-	-	-	-	14	18	17	48	54	56	85	84	89	465	2672	2320	572	6029
	Total - Escalated	3857	7106	496	540	584	622	710	660	1004	1108	1153	1236	3595	1259	12967	22236	11735	1902	59803

16. Remarks	Dollars Express in Thousands - 1st Qtr FY 82 Dollars	17. Cost Plan Date
		March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

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(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase I

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-780R03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.2.1	SRC																			
1.2.1.1	Area Engineering Integration	272	962	13	35	41	62	60	55	64	68	71	75	78	89	711	2042	2445	223	6655
1.2.1.2	Slurry Preparation & Pumping	86	312	1	6	9	11	16	18	22	28	38	54	69	82	354	2405	962	146	4265
1.2.1.3	Slurry Heater	28	79	5	9	11	16	19	26	31	32	37	43	49	59	337	4086	845	24	5399
1.2.1.4	H2 Recovery & Dissolver	102	233	4	10	13	19	21	30	51	57	67	77	68	69	486	3184	803	-	4808
1.2.1.5	Solvent Recovery	62	152	18	21	24	23	27	28	34	35	42	45	50	60	407	775	459	102	1957
1.2.1.6	Vacuum Column	45	92	12	14	13	14	16	18	18	18	19	21	21	25	210	866	504	-	1717
1.2.1.7	Critical Solvent Deashing	99	243	27	32	33	38	43	48	55	57	53	65	2467	74	2992	2611	824	-	6769
1.2.1.8	Solidification	30	123	9	10	12	16	22	23	24	26	16	17	24	26	225	860	560	-	1798
1.2.1.9	Engineering Tech. Support	1749	2550	159	160	163	161	222	146	370	436	440	452	379	376	3464	1878	985	-	10626
1.2.1.10	Area Management	1384	2360	247	243	265	262	264	268	304	320	338	344	347	349	3551	3197	3019	1342	14853
	Category B ECP's	-	-	-	-	-	-	-	-	31	31	32	43	43	50	230	332	329	65	956
	Total 1.2.1	3857	7106	496	540	584	622	710	660	1004	1108	1153	1236	3995	1259	12967	22236	11735	1902	59803

16. Remarks

Thousands - Escalated Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase I

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	Catalytic	2121	4148	263	332	363	406	436	457	529	551	574	625	664	720	5920	17217	8114	1282	38802
	Stone & Webster	-	-	-	-	-	-	-	-	-	24	38	22	22	23	129	385	7	-	521
	Rust Engineering Svcs.	-	69	6	5	6	5	5	5	7	5	5	6	5	5	65	100	89	-	323
	ICRC	1736	2889	227	203	215	197	251	181	390	444	450	458	2780	376	6172	1571	942	-	13310
	Category B ECP's	-	-	-	-	-	-	-	-	30	30	31	40	40	46	216	291	263	48	818
	Total 1.2.1	3857	7106	496	540	584	608	692	643	956	1054	1097	1151	3511	1170	12502	19564	9415	1330	53774
	Escalation	-	-	-	-	-	14	18	17	48	54	56	85	84	89	465	2672	2320	572	6029
	Total - Escalated	3857	7106	496	540	584	622	710	660	1004	1108	1153	1236	3595	1259	12967	22236	11735	1902	59803

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase I

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(1-78)

PAGE OF

1. Contract Identification	2. Contract Number
Demonstration of the Solvent Refined Coal Process	DE-AC05-78OR03054
3. Contractor (name, address) International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date 10 July 1978 5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	Catalytic	2121	4148	263	332	363	415	447	469	556	579	604	671	714	774	6187	19554	10107	1837	43954
	Stone & Webster	-	-	-	-	-	-	-	-	-	25	40	23	24	25	137	440	8	-	585
	Rust Engineering Svcs.	-	69	6	5	6	5	5	5	7	7	5	6	5	6	68	115	114	-	366
	ICRC	1736	2889	227	203	215	202	258	186	410	466	472	493	2809	404	6345	1795	1177	-	13942
	Category B ECP's	-	-	-	-	-	-	-	-	31	31	32	43	43	50	230	332	329	65	956
	Total 1.2.1	3857	7106	496	540	584	622	710	660	1004	1108	1153	1236	3595	1259	12967	22236	11735	1902	59803

16. Remarks	Dollars Expressed in Thousands - Escalated Dollars	17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase II

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.2.1	SRC									
1.2.1.1	Area Engineering Integration			2650	11158	29901	10298	442	-	54449
1.2.1.2	Slurry Preparation & Pumping			7355	9293	9561	9347	1782	-	37838
1.2.1.3	Slurry Heater			10709	30308	10143	4646	376	-	56182
1.2.1.4	H_2 Recovery & Dissolver			9150	16081	11739	9506	726	-	47202
1.2.1.5	Solvent Recovery			2721	594	1358	5330	774	-	10777
1.2.1.6	Vacuum Column			5933	2908	5069	1925	31	-	15866
1.2.1.7	Critical Solvent Deashing			4931	11167	9365	7369	1273	-	34105
1.2.1.8	Solidification			3694	1266	4147	5345	2341	-	16793
1.2.1.9	Engineering Tech. Support			1083	1276	2046	1771	438	-	6614
1.2.1.10	Area Management			824	1878	3482	3965	1093	-	11242
	Category B ECP's			(4846)	(6604)	(3492)	(2327)	(350)	-	(17619)
	Total 1.2.1			44704	79325	83319	57175	8926	-	273449
	Escalation			6356	19964	29648	26106	4953	-	87027
	Total - Escalated			51060	99289	112967	33281	13879	-	360476

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P (1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase II

PAGE OF

1. Contract Identification Demonstration of the Solvent Refined Coal Process	2. Contract Number DE-AC05-78OR03054
3. Contractor (name, address) International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date 10 July 1978 5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.2.1	SRC									
1.2.1.1	Area Engineering Integration			3027	14035	40468	14901	680	-	73111
1.2.1.2	Slurry Preparation & Pumping			8974	11603	12956	13658	2770	-	49961
1.2.1.3	Slurry Heater			12235	37885	13718	6731	579	-	71148
1.2.1.4	H_2 Recovery & Dissolver			10459	20101	15974	13811	1124	-	61469
1.2.1.5	Solvent Recovery			3114	732	1874	7815	1192	-	14727
1.2.1.6	Vacuum Column			6780	3657	6872	2790	47	-	20146
1.2.1.7	Critical Solvent Deashing			5635	14022	12678	10723	1988	-	45046
1.2.1.8	Solidification			4220	1581	5665	7865	3651	-	22982
1.2.1.9	Engineering Tech. Support			1237	1594	2786	2612	698	-	8927
1.2.1.10	Area Management			916	2329	4730	5807	1708	-	15490
	Category B ECP's			(5537)	(8250)	(4754)	(3432)	(558)	-	(22531)
	Total 1.2.1			51060	99289	112967	83281	13879	-	360476

15. Remarks	Dollars Expressed in Thousands - Escalated Dollars	17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase II

PAGE OF

DOE Form CR-533P (1-78)

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
	Catalytic			47667	53791	2579	991	-	-	105028
	SWEC			751	30778	82207	56761	8838	-	179335
	ICRC			1132	1360	2025	1750	438	-	6705
	Category B ECP's			(4846)	(6604)	(3492)	(2327)	(350)	-	(17619)
	Total 1.2.1			44704	79325	83319	57175	8926	-	273449
	Escalation			6356	19964	29648	26106	4953	-	87027
	Total - Escalated			51060	99289	112967	83281	13879	-	360476

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase II

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-780R03054

3. Contractor (name, address):
International Coal Refining Company
P. C. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
	Catalytic			54431	67177	3511	1461	-	-	126580
	SWEC			873	38663	111453	82671	13739	-	247399
	ICRC			1293	1699	2757	2581	698	-	9028
	Category B ECP's			(5537)	(8250)	(4754)	(3432)	(558)		(22531)
	Total 1.2.1			51060	99289	112967	83281	13879	-	360476

16. Remarks

Dollars Expressed In Thousands-Escalated Dollars

17. Cost Plan Date: March, 1982

18. Signature ... Title

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

3. MILESTONE SCHEDULES

The original Project Master Schedule, included here, showed significant design and procurement milestones for the SRC Process Area, WBS element 1.2.1. A bar chart format graphically depicted the scheduled predicted and actual occurrence dates; it was supported by a computerized tabulation of the same data. This information had been extracted electronically from the Intermediate Schedule which was developed by ICRC and Catalytic, Inc. The basis of the Intermediate Schedule was a detailed logic network schedule which was developed by Catalytic, Inc. to control internally its portion of the SRC-I project.

The schedule included DOE imposed restraints on the beginning of purchasing activities. It indicated the completion of Phase I work in February 1985, the beginning of construction in October 1983 and a mechanical completion date of September 1986.

While there is no current schedule for the resumption and completion of the SRC-I Project, the time durations for the original project activities can and should be considered in the development of any new preliminary schedules.

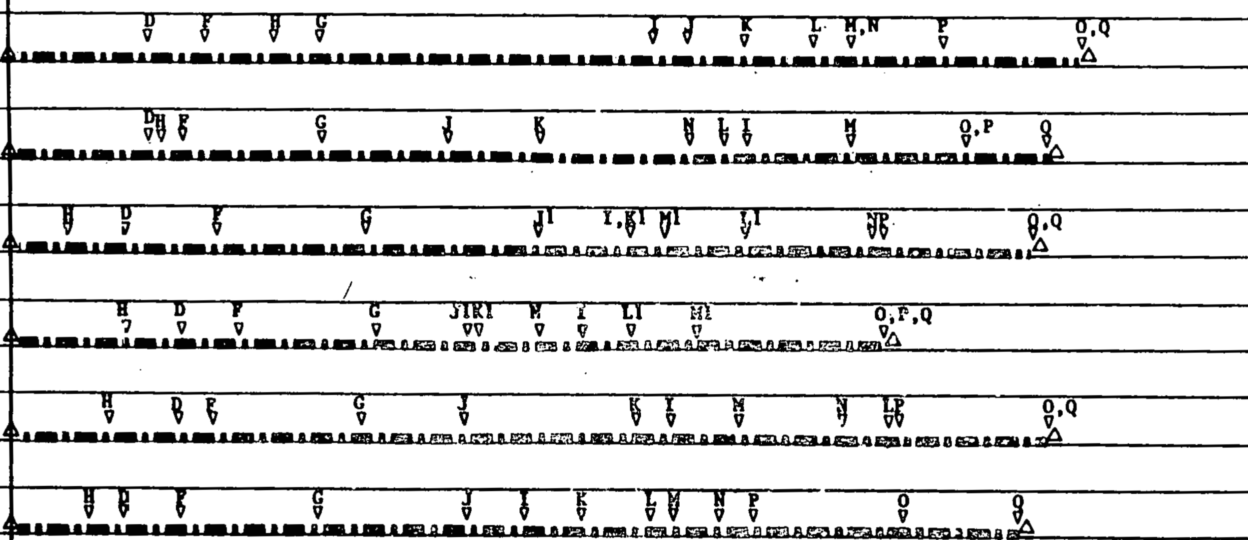
DOE Form CR-635
(1-78)

U.S. DEPARTMENT OF ENERGY

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification	2. Reporting Period	3. Contract Number
SRC - MASTER SCHEDULE	through	
4. Contractor (name, address)		5. Contract Start Date
		6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months (1981 – 1987: OND JFM AMJ JAS)	10. Percent Complete a) Planned	b) Actual
130	SOLIDIFICATION			
131	CRITICAL SOLVENT DEASHING			
132	H_2 RECOVERY & DISSOLVER			
133	AREA ENGINEERING INTEGRATION			
134	SLURRY PREPARATION & PUMPING			
135	SLURRY HEATER			



11. Remarks
Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date

13. Signature of Government Technical Representative and Date

U.S. DEPARTMENT OF ENERGY

DOE Form CR-636 (1-78)

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification	2. Reporting Period	3. Contract Number
SRC - MASTER SCHEDULE	through	

4. Contractor (name, address)

5. Contract Start Date

6. Contract Completion Date

Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1981 (OND), 1982 (JFM AMJ JAS), 1983 (OND JFM AMJ JAS), 1984 (OND JFM AMJ JAS), 1985 (OND JFM AMJ JAS), 1986 (OND JFM AMJ JAS), 1987 (OND JFM AMJ)	10. Percent Complete a) Planned	b) Actual
136	SOLVENT RECOVERY	H D E G I J K L M N P O Q		
137	VACUUM COLUMN	D H F G J1 K1 M1 I,N L1 O P,Q		
800	ENGINEERING TECHNICAL SUPPORT	A1 B1,C D		

11. Remarks: Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date

13. Signature of Government Technical Representative and Date

U.S. DEPARTMENT OF ENERGY

DOE Form CR-636 (1-78)

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification	2. Reporting Period	3. Contract Number
SRC PROCUREMENT - MASTER SCHEDULE	through	
4. Contractor (name, address)		5. Contract Start Date
		6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1981 (OND) – 1982 (JFM, AMJ, JAS) – 1983 (OND, JFM, AMJ, JAS) – 1984 (OND, JFM, AMJ, JAS) – 1985 (OND, JFM, AMJ, JAS) – 1986 (OND, JFM, AMJ, JAS) – 1987 (OND, JFM, AMJ)	10. Percent Complete a) Planned	b) Actual
100	SRC STRIPPER #1	A B C E		
101	SRC STRIPPER #2	A B C E		
102	SLURRY DISSOLVER #1	A B C E		
103	SLURRY DISSOLVER #2	A B C E		
104	SOUR GAS COMPRESSOR	A B C E		
105	SLURRY FEED PUMP	A B C E		
106	COAL SLURRY DRUM	A B C E		

11. Remarks: Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date

13. Signature of Government Technical Representative and Date

U.S. DEPARTMENT OF ENERGY

DOE Form CR-635 (1-78)

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification: SRC PROCUREMENT - MASTER SCHEDULE

2. Reporting Period: through

3. Contract Number:

4. Contractor (name, address):

5. Contract Start Date:

6. Contract Completion Date:

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1981 (OND) 1982 (JFM AMJ JAS) 1983 (OND JFM AMJ JAS) 1984 (OND JFM AMJ JAS) 1985 (OND JFM AMJ JAS) 1986 (OND JFM AMJ JAS) 1987 (OND JFM AMJ)	10. Percent Complete a) Planned	b) Actual
107	VACUUM COLUMN HEATERS	A B C E		
108	VACUUM COLUMN	A B C E		
138	SOLIDIFIERS	A B C E		
141	HI-PRES PURGE PUMP	A B C E		
143	COAL SLURRY HEATERS	A B C E		
144	SOLVENT COLUMN	A B C E		

11. Remarks: Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date

13. Signature of Government Technical Representative and Date

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 40 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC SOLIDIFICATION WBS ELEMENT #: 1.2.1.8

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
130A	BGN PROC DSGN - SOLIDIFICATION	2JAN80	02JAN80	2JAN80		
130B	BGN DETAILED DSGN - SOLIDIFICATION	1JUN81	01JUN81	1JUN81		
130C	1ST M/SR - SOLIDIFICATION	1JUN81	01JUN81	1JUN81		
130D	2ND M/SR - SOLIDIFICATION	20MAY82		20MAY82	21NOV83	
130F	BGN PSAR - SOLIDIFICATION	10AUG82		10AUG82	13FEB84	
130G	COMPL PSAR - SOLIDIFICATION	29MAR83		29MAR83	14JAN85	
130H	1ST SIGNIF CONSTR PKG - SOLIDIFICATION	9DEC82		9DEC82	14JAN85	
130I	END PH I-SOLIDIF	19SEP84		19SEP84	25JUN86	
130J	SOLIDIF-1ST CONSTR PKG AWARD(S/C	20NOV84		20NOV84	21JUN85	
130K	SOLIDIFICATION - BGN STEEL ERECTION	18FEB85		18FEB85	17SEP85	
130L	SOLIDIFICATION-BGN PIPE	6JUN85		6JUN85	06JAN86	
130M	SOLIDIFICATION-BGN ELEC	23AUG85		23AUG85	03DEC86	
130N	SOLIDIFICATION-COMPL STEEL ERECTION	23AUG85		23AUG85	03DEC86	
130O	SOLIDIFICATION-COMPL PIPE	26SEP86		26SEP86	28APR87	
130P	SOLIDIFICATION-COMPL ELEC	17JAN86		17JAN86	28APR87	
130Q	SOLIDIFICATION-MECH COMPL	26SEP86		26SEP86	28APR87	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DA'

REPORTING ELEMENT: SRC CRITICAL SOLVENT DEASHING WBS ELEMENT #: 1.2.1.7

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
131A	BGN PROC DSGN - CSD	2JAN80	02JAN80	2JAN80		
131B	BGN DETAILED DSGN - CSD	1JUN81	01JUN81	1JUN81		
131C	1ST M/SR - CSD	1JUN81	01JUN81	1JUN81		
131D	2ND M/SR - CSD	10MAY82		10MAY82	09NOV83	
131F	BGN PSAR - CSD	29JUL82		29JUL82	01FEB84	
131G	COMPL PSAR - CSD	17MAR83		17MAR83	07DEC84	
131H	1ST SIGNIF CONS'R PKG - CSD	18JUN82		18JUN82	07DEC84	
131I	END PH I-CSD	4FEB85		4FEB85	12JUN86	
131J	CSD-1ST CONSTR PKG AWARD (S/C)	27OCT83		27OCT83	17MAY85	
131K	CSD - BGN STEEL ERECTION	14MAR84		14MAR84	09OCT85	
131L	CSD-BGN PIPE	29JAN85		29JAN85	04FEB86	
131M	CSD-BGN ELEC	15JUL85		15JUL85	25AUG86	
131N	CSD-COMPL STEEL ERECTION	30NOV84		30NOV84	07JUL86	
131O	CSD-COMPL PIPE	24MAR86		24MAR86	26DEC86	
131P	CSD-COMPL ELEC	3MAR86		3MAR86	13APR87	
131Q	CSD-MECH COMPL	11JUL86		11JUL86	13APR87	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC H2 RECOVERY & DISSOLVER WBS ELEMENT #: 1.2.1.4

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
132A	BGN PROC DSGN - DISSLVR	2JAN80	02JAN80	2JAN80		
132B	BGN DETAILED DSGN - DISSLVR	1JUN81	01JUN81	1JUN81		
132C	1ST M/SR - DISSLVR	1JUN81	01JUN81	1JUN81		
132D	2ND M/SR - DISSLVR	23APR82		23APR82	08DEC83	
132F	BGN PSAR - DISSLVR	27SEP82		27SEP82	28FEB84	
132G	COMPL PSAR - DISSLVR	17MAY83		17MAY83	11DEC84	
132H	1ST SIGNIF CONSTR PKG - DISSLVR	26JAN82		26JAN82	31DEC84	
132I	END PH I -DISSOLVER	14AUG84		14AUG84	10FEB86	
132J1	DISSOLVER-1ST CONSTR PKG AWARD (S/C)	14MAR84		14MAR84	10JUN85	
132K1	DISSOLVER - BGN STEEL ERECTION	7AUG84		7AUG84	30OCT85	
132L1	DISSOLVER-BGN PIPE	20FEB85		20FEB85	21JAN86	
132M1	DISSOLVER-BGN ELEC	31OCT84		31OCT84	21JUL86	
132N	COMPL STEEL ERECTION	23SEP85		23SEP85	1[illegible]NOV80	
132O	COMPL PIPE	18JUN86		18JUN86	11DEC86	
132P	COMPL ELEC	7OCT85		7OCT85	11DEC86	
132Q	MECH COMPL	18JUN86		18JUN86	11DEC86	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC AREA ENGINEERING INTEGRATION WBS ELEMENT #: 1.2.1.1

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
133A	BGN PROC DSGN - INTEGRATED	2JAN80	02JAN80	2JAN80		
133B	BGN DETAILED DSGN - INTEGRATED	1JUN81	01JUN81	1JUN81		
133C	1ST M/SR - INTEGRATED	1JUN81	01JUN81	1JUN81		
133D	2ND M/SR - INTEGRATED	22JUL82		22JUL82	10JUN83	
133F	BGN PSAR - INTEGRATED	11OCT82		11OCT82	30AUG83	
133G	COMPL PSAR - INTEGRATED	1JUN83		1JUN83	11MAY84	
133H	1ST SIGNIF CONSTR PKG - INTEGRATED	6APR82		6APR82	11MAY84	
133I	END PH I-INTEGRATED	1MAY84		1MAY84	26NOV85	
133J1	MAIN RACK #2-1ST CONSTR PKG AWARD(S/C)	7NOV83		7NOV83	18OCT84	
133K1	MAIN RACK #5 - BGN STEEL ERECTION	7DEC83		7DEC83	2JAN85	
133L1	MAIN RACK #1-BGN PIPE	6AUG84		6AUG84	30JAN85	
133M1	MAIN RACK #5-BGN ELEC	13DEC84		13DEC84	8MAY86	
133N	COMPL STEEL ERECTION	9MAR84		9MAR84	20NOV85	
133O	COMPL PIPE	14OCT85		14OCT85	11DEC86	
133P	COMPL ELEC	14OCT85		14OCT85	11DEC86	
133Q	MECH COMPL	14OCT85		14OCT85	11DEC86	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 6 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-0 UNIT=DAY

REPORTING ELEMENT: SRC SLURRY PREPARATION & PUMPING WBS ELEMENT #: 1.2.1.2

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
134A	BGN PROJ DSGN - SLURRY PREP	2JAN80	02JAN80	2JAN80		
134B	BGN DETAILED DSGN - SLURRY PREP	1JUN81	01JUN81	1JUN81		
134C	1ST M/SR - SLURRY PREP	1JUN81	01JUN81	1JUN81		
134D	2ND M/SR - SLURRY PREP	13JUL82		13JUL82	2AUG83	
134F	BGN PSAR - SLURRY PREP	30SEP82		30SEP82	20OCT83	
134G	COMPL PSAR - SLURRY PREP	20MAY83		20MAY83	14NOV84	
134H	1ST SIGNIF CONSTR PKG - SLURRY PREP	16MAR82		16MAR82	14NOV84	
134I	END PH I-SLURRY PREP	25OCT84		25OCT84	22OCT85	
134J	SLURRY PREP-1ST CONSTR PKG AWARD (S/C)	18NOV83		18NOV83	26APR85	
134K	SLURRY PREP - BGN STEEL ERECTION	23AUG84		23AUG84	1JUL85	
134L	SLURRY PREP-BGN PIPE	3OCT85		3OCT85	11MAR86	
134M	SLURRY PREP-BGN ELEC	21FEB85		21FEB85	18MAR86	
134N	SLURRY PREP-COMPL STEEL ERECTION	2JUL85		2JUL85	8MAY86	
134O	SLURRY PREP-COMPL PIPE	8JUL86		8JUL86	11DEC86	
134P	SLURRY PREP-COMPL ELEC	14NOV85		14NOV85	11DEC86	
134Q	SLURRY PREP-MECH COMPL	8JUL86		8JUL86	11DEC86	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

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CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC SLURRY HEATER WBS ELEMENT #: 1.2.1.3

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
135A	BGN PROC DSGN - SLURRY HEATER	2JAN80	02JAN80	2JAN80		
135B	BGN DETAILED DSGN - SLURRY HEATER	1JUN81	01JUN81	1JUN81		
135C	1ST M/SR - SLURRY HEATER	1JUN81	01JUN81	1JUN81		
135D	2ND M/SR - SLURRY HEATER	29APR82		29APR82	16AUG83	
135F	BGN PSAR - SLURRY HEATER	20JUL82		20JUL82	3NOV83	
135G	COMPL PSAR - SLURRY HEATER	8MAR83		8MAR83	25JUN84	
135H	1ST SIGNIF CONSTR PKG - SLURRY HEATER	16FEB82		16FEB82	25JUN84	
135I	END PH I-SLURRY HTR	27FEB84		27FEB84	10FEB85	
135J	SLURRY HEATER-1ST CONSTR PKG AWARD(S/C	3NOV83		3NOV83	3DEC84	
135K	SLURRY HEATER - BGN STEEL ERECTION	25MAY84		25MAY84	24JUN85	
135L	SLURRY HEATER-BGN PIPE	4SEP84		4SEP84	6NOV85	
135M	SLURRY HEATER-BGN ELEC	16OCT84		16OCT84	21JUL86	
135N	SLURRY HEATER-COMPL STEEL ERECTION	15JAN85		15JAN85	21JUL86	
135O	SLURRY HEATER-COMPL PIPE	18NOV85		18NOV85	11DEC86	
135P	SLURRY HEATER-COMPL ELEC	11MAR85		11MAR85	11DEC86	
135Q	SLURRY HEATER-MECH COMPL	13MAY86		13MAY86	11DEC86	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

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CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC SOLVENT RECOVERY WBS ELEMENT #: 1.2.1.5

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
136A	BGN PROC DSGN - SOLV RECOV	2JAN80	02JAN80	2JAN80		
136B	BGN DETAILED DSGN - SOLV RECOV	1JUN81	01JUN81	1JUN81		
136C	1ST M/SR - SOLV RECOV	1JUN81	01JUN81	1JUN81		
136D	2ND M/SR - SOLV RECOV	3MAY82		3MAY82	1JUN83	
136F	BGN PSAR - SOLV RECOV	22JUL82		22JUL82	19AUG83	
136G	COMPL PSAR - SOLV RECOV	10MAR83		10MAR83	25APR85	
136H	1ST SIGNIF CONSTR PKG - SOLV RECOV	20APR82		20APR82	25APR85	
136I	END PH I-RECOV	4JAN85		4JAN85	27DEC85	
136J	SOLV RECOV-1ST CONSTR PKG AWARD (S/C)	11FEB85		11FEB85	2OCT85	
136K	SOLV RECOV - BGN STEEL ERECTION	8MAY85		8MAY85	30DEC85	
136L	SOLV RECOV-BGN PIPE	19JUL85		19JUL85	8MAY86	
136M	SOLV RECOV-BGN ELEC	19JUL85		19JUL85	8MAY86	
136N	SOLV RECOV-COMPL STEEL ERECTION	2AUG85		2AUG85	18AUG86	
136O	SOLV RECOV-COMPL PIPE	22APR86		22APR86	11DEC86	
136P	SOLV RECOV-COMPL ELEC	21FEB86		21FEB86	11DEC86	
136Q	SOLV RECOV-MECH COMPL	13MAY86		13MAY86	11DEC86	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

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CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC VACUUM COLUMN WBS ELEMENT #1 1.2.1.6

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
137A	BGN PROC DSGN - VAC CLMN	2JAN80	02JAN80	2JAN80		
137B	BGN DETAILED DSGN - VAC CLMN	1JUN81	01JUN81	1JUN81		
137C	1ST M/SR - VAC CLMN	1JUN81	01JUN81	1JUN81		
137D	2ND M/SR - VAC CLMN	29APR82		29APR82	20OCT83	
137F	BGN PSAR - VAC CLMN	20JUL82		20JUL82	12JAN84	
137G	COMPL PSAR - VAC CLMN	8MAR83		8MAR83	29JAN85	
137H	1ST SIGNIF CONSTR PKG - VAC CLMN	1JUN82		1JUN82	29JAN85	
137I	END PH I-VAC CLMN	9OCT84		9OCT84	27JAN86	
137J1	SOLV TANKS-1ST CONSTR PKG AWARD (S/C)	20OCT83		20OCT83	03JUN85	
137K1	VAC CLMN - BGN STEEL ERECTION	28MAR84		28MAR84	29JAN85	
137L1	VAC CLMN-BGN PIPE	18APR85		18APR85	27JAN86	
137M1	VAC CLMN-BGN ELEC	13SEP84		13SEP84	13DEC85	
137N	COMPL STEEL ERECTION	24OCT84		24OCT84	11MAR86	
137O	COMPL PIPE	24JAN86		24JAN86	22MAY86	
137P	COMPL ELEC	21MAR86		21MAR86	11DEC86	
137Q	MECH COMPL	21MAR86		21MAR86	11DEC86	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

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CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC ENGINEERING TECHNICAL SUPPORT WBS ELEMENT #: 1.2.1.9

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
800A1	BGN DSGN SUPPORT PROGRAMS - SRC	1OCT81		1OCT81		
800B1	BGN OPER SUPPORT PROGRAMS - SRC	12AUG86		12AUG86	12DEC86	
800C	COMPL DSGN SUPPORT PROGRAMS - SRC	12AUG86		12AUG86	12AUG86	
800D	COMPL OPER SUPPORT PROGRAMS-SRC	10AUG87		10AUG87	10DEC87	

0 4 RECORDS. TOTAL ACTIVITY WEIGHT = 0

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CONTRACT 00100 RUN 26MAR82 90-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC CRITICAL SOLVENT DEASHING PROCUREMENT: SRC STRIPPER #1

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
100A	SRC STRIPPER #1 - ISS MECH SPEC	29OCT81		29OCT81	18SEP84	
100B	SRC STRIPPER #1 - ISS P.O/BGN VNDR ENG	9SEP82		9SEP82	28DEC85	
100C	SRC STRIPPER #1-COMPL VNDR ENG/BGN FAB	18NOV82		18NOV82	11MAR85	
100E	SRC STRIPPER #1 - DEL TO SITE	13JUN83		13JUN83	30SEP85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

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CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC CRITICAL SOLVENT DEASHING PROCUREMENT: SRC STRIPPER #2

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
101A	SRC STRIPPER #2 - ISS MECH SPEC	29OCT81		29OCT81	18SEP84	
101B	SRC STRIPPER #2 - ISS P.O/BGN VNDR ENG	9SEP82		9SEP82	28DEC84	
101C	SRC STRIPPER #2-COMPL VNDR ENG/BGN FAB	18NOV82		18NOV82	11MAR85	
101E	SRC STRIPPER #2 - DEL TO SITE	13JUN83		13JUN83	30SEP85	

D 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 25 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC H2 RECOVERY & DISSOLVER PROCUREMENT: SLURRY DISSOLVER #1

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
102A	SLURRY DISSLVR #1 - ISS MECH SPFC	29OCT81		29OCT81	06JUN83	
102B	SLURRY DISSLVR #1-ISS P.O/BGN VNDR ENG	6DEC82		6DEC82	16DEC83	
102C	SLURRY DISSLVR#1-COMPL VND ENG/BGN FAB	16FEB83		16FEB83	28FEB84	
102E	SLURRY DISSLVR #1 - DEL TO SITE	29AUG84		29AUG84	26DEC85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 26 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC H2 RECOVERY & DISSOLVER PROCUREMENT: SLURRY DISSOLVER #2

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
103A	SLURRY DISSLVR #2 - ISS MECH SPEC	29OCT81		29OCT81	06JUN83	
103B	SLURRY DISSLVR#2 -ISS P.O/BGN VNDR ENG	6DEC82		6DEC82	16DEC83	
103C	SLURRY DISSLVR#2-COMPL VND ENG/BGN FAB	16FEB83		16FEB83	28FEB84	
103E	SLURRY DISSLVR #2 - DEL TO SITE	29AUG84		29AUG84	26DEC85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 27 PAGE 1

CONTRACT 00100 RUN 25MAR82 DO-1-4821 ICRC MASTER SCHEDULE - REV #01-L UNIT=DAY

REPORTING ELEMENT: SRC H2 RECOVERY & DISSOLVER PROCUREMENT: SOUR GAS COMPRESSOR

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
104A	SOUR GAS COMPR - ISS MECH SPEC	29OCT81		29OCT81	04SEP84	
104B	SOUR GAS COMPR - ISS P.O/BGN VNDR ENG	9SEP82		9SEP82	13DEC84	
104C	SOUR GAS COMPR -COMPL VNDR ENG/BGN FAB	18NOV82		18NOV82	25FEB85	
104E	SOUR GAS COMPR - DEL TO SITE	3JAN84		3JAN84	08APR86	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 7 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC SLURRY PREPARATION & PUMPING PROCUREMENT: SLURRY FEED PUMP

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
105A	SLURRY FEED PUMP - ISS MECH SPEC	29OCT81		29OCT81	27OCT82	
105B	SLURRY FEED PUMP-ISS P.O/BGN VNDR ENG	6DEC82		6DEC82	12MAY83	
105C	SLURRY FEED PUMP-COMPL VND ENG/BGN FAB	16FEB83		16FEB83	25JUL83	
105E	SLURRY FEED PUMP - DEL TO SITE	25JAN84		25JAN84	09SEP85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 8 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC SLURRY PREPARATION & PUMPING PROCUREMENT: COAL SLURRY DRUM

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
106A	COAL SLURRY DRUM - ISS MECH SPEC	29OCT81		29OCT81	02AUG83	
106B	COAL SLURRY DRUM -ISS P.O/BGN VNDR ENG	6DEC82		6DEC82	20JUL84	
106C	COAL SLURRY DRUM-COMPL VND ENG/BGN FAB	16FEB83		16FEB83	01OCT84	
106F	COAL SLURRY DRUM - DEL TO SITE	25JAN84		25JAN84	09SEP85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 33 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC VACUUM COLUMN PROCUREMENT: VACUUM COLUMN HEATERS

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
107A	VAC CLMN HEATERS-ISS MECH SPEC	29OCT81		29OCT81	19APR83	
107B	VAC CLMN HEATERS-ISS P.O/BGN VNDR ENG	6DEC82		6DEC82	28OCT83	
107C	VAC CLMN HEATERS-COMPL VND ENG/BGN FAB	16FEB83		16FEB83	12JAN84	
107E	VAC CLMN HEATERS-DEL TO SITE	27JUL83		27JUL83	08APR86	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

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CONTRACT 00100 RUN 26MAR82 00-1-4H21 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC VACUUM COLUMN PROCUREMENT: VACUUM COLUMN

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
108A	VAC CLMN - ISS MECH SPEC	29OCT81		29OCT81	19APR83	
108B	VAC CLMN - ISS P.O/BGN VNDR ENG	6DEC82		6DEC82	28OCT83	
108C	VAC CLMN - COMPL VNDR ENG/BGN FAB	16FEB83		16FEB83	12JAN84	
108E	VAC CLMN - DEL TO SITE	27JUL83		27JUL83	06APR86	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

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CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC SOLIDIFICATION PROCUREMENT: SRC SOLIDIFIERS

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
138A	SRC SOLIDIFIERS - ISS MECH SPEC	29OCT81		29OCT81	11OCT82	
138B	SRC SOLIDIFIERS - ISS P.O/BGN VNDR ENG	6DEC82		6DEC82	1DEC83	
138C	SRC SOLIDIFIERS-COMPL VNDR ENG/BGN FAB	16FEB83		16FEB83	13FEB84	
138E	SRC SOLIDIFIERS - DEL TO SITE	8SEP83		8SEP83	14APR86	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

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CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC AREA ENGINEERING INTEGRATION PROCUREMENT: HI-PRES PURGE PUMP

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
141A	HI-PRES PURGE PUMP-ISS MECH SPEC	29OCT81		29OCT81	19APR83	
141B	HI-PRES PURGE PMP-ISS P.O/BGN VNDR ENG	6DEC82		6DEC82	28OCT83	
141C	H-PRES PURGE PMP-COMPL VND ENG/BGN FAB	16FEB83		16FEB83	12JAN84	
141E	HI-PRES PURGE PUMP-DEL TO SITE	17NOV83		17NOV83	7MAR86	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

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CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC SLURRY HEATER PROCUREMENT: COAL SLURRY HEATERS

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
143A	COAL SLURRY HEATERS-ISS MECH SPEC	29OCT81		29OCT81	17MAY83	
143B	COAL SLURRY HEATER-ISS P.O/BGN VND ENG	6DEC82		6DEC82	29NOV83	
143C	COAL SLURRY HTR-COMPL VNDR ENG/BGN FAB	16FEB83		16FEB83	9FEB84	
143F	COAL SLURRY HEATERS-DEL TO SITE	27JUL83		27JUL83	9AUG85	

0 4 RECORDS. TOTAL ACTIVITY WEIGHT = 0

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CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: SRC SOLVENT RECOVERY PROCUREMENT: SOLVENT COLUMN

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
144A	SOLVENT CLMN - ISS MECH SPEC	29OCT81		29OCT81	13DEC84	
144H	SOLVENT CLMN - ISS P.O/BGN VNDR ENG	9SEP82		9SEP82	25MAR85	
144C	SOLVENT CLMN - CCMPL VNDR ENG/BGN FAB	18NOV82		18NOV82	6JUN85	
144F	SOLVENT CLMN - DEL TO SITE	27JUN83		27JUN83	10JAN86	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

B. COKE AND LIQUID PRODUCTS AREA (WBS 1.2.2)

1. TECHNICAL SCOPE

a. COKER/CALCINER (WBS 1.2.2.1)

Delayed Coker (WBS 1.2.2.1.2)

The Delayed Coker uses conventional delayed coking technology to convert SRC into "green coke" and by-product hydrocarbon gases and liquids (Figures 5 and 6).

A nominal one-third of the deashed molten SRC from the SRC Process Area (Area 12) is fed to the bottom of the Combination Tower where it mixes with recycle-liquid condensed in the tower. The mixture of fresh charge and recycle from the bottom of the tower is pumped by the Coking Heater Charge Pump to the Coking Heater, which heats it to the required coil outlet temperature. The effluent from the Coking Heater flows through a switch valve into the bottom of one of two Coke Drums where coke formation takes place. The Coke Drums are operated in 48-hr cycles to maintain continuity of operation. One of these drums is always in service to receive the effluent from the Coking Heater, while the other is either being cooled, decoked, pressure-tested, or reheated. The effluent vapor from the Coke Drum flows to the Combination Tower.

In the Combination Tower, the vapor is contacted with refluxed liquids and is fractionated to produce sour off-gas, unstabilized naphtha, and medium oil products. The sour off-gas is compressed by the Wet Gas Compressors and sent to the Gas Treatment Section in the Gas Systems Area (Area 15). A portion of the unstabilized naphtha from the Overhead Accumulator is returned to the top of the tower as reflux and the remainder is sent to the Product Oil Fractionator in the SRC Process Area (Area 12) for stabilization. A portion of the medium oil withdrawn from the middle of the tower is steam-stripped of light material in a Sidestream Stripper before being pumped to the Product Oil Fractionator for further fractionation; the remainder is recycled to the tower as reflux. The stripping steam is condensed, separated from unstabilized naphtha in the Overhead Accumulator, and pumped to the Ammonia-Sulfide Water Stripping (ASWS) Unit in the Gas Treatment Section.

After a Coke Drum is filled to the proper level with coke, the effluent from the Coking Heater is switched to the empty drum. The full drum is then steamed, water-cooled, and decoked. Initially, it is steamed out with a small amount of steam, which is sent to the Combination Tower along with the vapor from the other drum in which coke is being formed. After a short period, the vapor from the steaming Coke Drum is switched from the Combination Tower to the Blowdown Tower, and the steam rate is increased to the maximum level.

The steam-stripped oil, and a small amount of noncondensibles are introduced near the bottom of the Blowdown Tower. The heavier oil is condensed and is withdrawn from the bottom of the tower. Part of it is cooled and recirculated in the tower, while another portion is heated and combined with the column feed to evaporate any water in the feed. However, the excess condensed oil is sent to the Combination Tower directly or cooled and sent to the Dry Slop Oil Drum for later reprocessing in the Combination Tower.

Overhead vapors, including steam, from the Blowdown Tower are condensed and sent to the Blowdown Tower Overhead Separator Drum. The liquid is decanted to separate the oil and sour water. The oil is pumped to the Wet Slop Oil Drum before being recycled by combining this oil with the Blowdown Tower feed. The water is pumped to the ASWS Unit in the Gas Systems Area.

After the steaming operation, water is pumped to the Coke Drum and the steam generated by contact with hot coke is sent to the blowdown system. After the drum has been filled with water and sufficiently cooled, the water is drained to the Sluiceway and into the coke pit from which it is pumped to the Clarifier.

When the Coke Drum has been drained, it is decoked by water jets. The coke and water pass through the Green Coke Crusher. The crushed coke and water fall from the crusher into the Sluiceway and flow into the coke pit. This slurry of green coke and water is pumped from the coke pit to the Hydrobins where the water is drained from the coke. Water from the Hydrobins flows to the Clarifier which separates coke fines from the water. Coke slurry from the bottom of the Clarifier is returned to the Hydrobins, while the clear water is sent to the Clear-Water Tank. The green coke product is discharged from the Hydrobins onto the Green Coke Storage Conveyor, which transports the product to Hold Bins before it is further processed in the calcining section of the plant.

Calciner (WBS 1.2.2.1.3)

The calcining process is a high-temperature treatment of green coke which eliminates volatile substances and moisture from the coke and transforms heavy hydrocarbons into additional coke (Figure 7).

Green coke is fed from the Hold Bins to the Rotary Kiln where a reactive atmosphere of hot flue gases produced by the combustion of fuel gas and the volatile combustibles contained in the green coke calcines the coke. The hot coke discharged from the Kiln is cooled in the Rotary Cooler by a water spray quench. The cooled, calcined coke is transferred onto the Rotary Cooler Conveyor where a dedusting oil is sprayed on the coke.

The flue gas leaves the Kiln from the end at which the green coke feed enters and is sent to the Afterburner. Volatile matter still contained in the flue gas and entrained coke particles are burned in the Afterburner. The effluent gases from the Afterburner flow to the Waste Heat Boiler for residual heat recovery.

The Waste Heat Boiler cools the hot flue gas by generating 900 psig, superheated steam. High-pressure boiler feedwater is preheated in a coil within the Steam Drum and further heated in the economizer section of the boiler before being fed to the Stream Drum. The boiler feed-water circulates through the Waste Heat Boiler steam generation coils in which the steam is generated. The saturated steam generated is separated in the Steam Drum and superheated to 850°F in the superheater section of the Waste Heat Boiler. The cooled flue gas is discharged to the Calciner Flue Gas Treating System for the removal of particulate matter and the reduction of sulfur dioxide to an environmentally acceptable limit before it is rejected to the atmosphere.

In the treating system the flue gas enters a Venturi Scrubber which reduces its quantity of sulfur dioxide and particulates. The removal is achieved in two stages. The first stage is in the Venturi throat and the second stage is a combination spray and sieve tray assembly. A waste caustic solution is used as the scrubbing liquid. The treated flue gas is discharged to the atmosphere through the Scrubber Stack.

Scrubbing liquid from the bottom of the Venturi Scrubber is recycled to the Venturi throat and to the combined spray and sieve tray assembly, except for a small purge stream which is sent to the Wastewater Treatment in the Off-Sites Area (Area 17). The waste caustic stream is added to the solution that is recycled from the Scrubber bottom. The makeup solution replaces the caustic which has reacted with the sulfur dioxide and the water that has evaporated in the scrubber.

The calcined coke is transferred from the Rotary Cooler to the Product Storage Silos by the Rotary Cooler Conveyor and the Product Storage Conveyor. Dedusting oil is added to the coke in the Rotary Cooler Conveyor. From the silos, the calcined coke product is discharged into rail cars for delivery to markets.

The following is a tabulation of some of the major items of equipment in each of the Level 5 WBS elements of the Coker/Calciner Area (WBS 1.2.2.1):

WBS 1.2.2.1.2--Delayed Coker

H-13101	Coking Heater
R-13101	Coke Drums
T-13101	Combination Tower
BH-13150	Hydrobins
CL-13150	Clarifier
C-13101	Wet Gas Compressor
G-13150	Green Coke Crusher

WBS 1.2.2.1.3--Calciner

IN-13175	Afterburner
K-13175	Rotary Kiln
E-13175	Rotary Cooler
BH-13191	Product Storage Silos
B-13175	Waste Heat Boiler
S-13175	Venturi Scrubber

b. EXPANDED-BED HYDROCRACKER (WBS 1.2.2.2)

The Expanded Bed Hydrocracker (EBH) converts deashed molten SRC into liquid feedstock fractions which are processed in the Product Oil Fractionator in the SRC Process Area (Area 12) and a gas fraction which is upgraded in the Gas Systems Area (Area 15) before being utilized in the fuel gas system. The EBH comprises a Reaction Area and a Fractionation Area (Figure 8).

Reaction Area

The Reaction Area consists of the Reactor System; the Hydrogen/SRC-Oil Heating System; the Gas Recovery System, including high-pressure exchangers and vessels; the Gas Purification System, including the Recycle-Hydrogen Compressor, Makeup-Gas and Hydrogen-Rich Flash Gas Compressors; the Catalyst Handling System, and; auxiliary equipment.

A nominal one-third of the deashed molten SRC from the SRC Process Area is combined with a recycle stream from the Fractionation Section and pumped to reaction pressure. The recycle stream comprises solvent and unconverted SRC in the base design or high-conversion mode, and solvent only in the alternate design or low-conversion mode. The recycle of unconverted SRC increases the net conversion of SRC to distillable products and the recycle of solvent lowers the viscosity of the feed. The high-pressure SRC/oil mixture and a high-pressure, hydrogen-rich stream are heated in the Hydrogen/SRC-Oil Heating System before entering the Reactor System. The hydrogen-rich stream includes a makeup-hydrogen stream from the Gas Systems Area (Area 15), which has been compressed by the Makeup-Gas Compressor(s), and a recycle-hydrogen stream from the Gas Purification System. This makeup recycle hydrogen-rich stream provides the hydrogen that is consumed in the reaction.

The hot hydrogen/SRC-oil mixture from the heating system flows to the Reactor System for hydrocracking. The Reactor System consists of two Reactors in series. The Reactors are of the expanded-catalyst-bed type in which the catalyst particles are kept in random motion by the internal circulation of the liquid phase. Each Reactor is provided with a recirculation pump. The Reactor System products are quenched with recycle gas and sent to the Gas Recovery System.

In the Gas Recovery System, a high-pressure, hydrogen-rich gas stream is recovered from the vapor effluent of the Reaction System by partial condensation followed by phase separation. A portion of the heat recovered by cooling the vapor is used to preheat the makeup/recycle-hydrogen stream. The high-pressure hydrogen-rich stream is sent to the Gas Purification System for removal of a portion of the methane, hydrogen sulfide, and heavier hydrocarbons. The purified recycle-hydrogen stream, which constitutes most of the high-pressure vapor, is then compressed and combined with the makeup-hydrogen stream for feed to the Reaction System. A gas stream of lower pressure, containing a significant amount of hydrogen, is generated in the Gas Recovery and Purification Systems by the flashing of the liquid portion of the effluent from the Reactor and the high-pressure condensate streams. This low-pressure, hydrogen-rich flash gas is compressed by the Hydrogen-Rich Flash Gas Compressor(s) and sent to the High-Pressure Diethanolamine (HP DEA) Unit in the Gas Systems Area for the removal of acid gases before hydrogen recovery in the Hydrogen Purification Unit (Area 14) of the Gas Systems Area. The condensate remaining after the let-down in pressure of the high-pressure liquid streams in the Gas Recovery and Gas Purification System is sent to the Fractionation Area for separation into various hydrocarbon fractions.

The Catalyst Handling System includes the equipment to transfer fresh catalyst into and spent catalyst out of the Reactor System while it is on-stream. Fresh catalyst is purged of oxygen and heated in preparation for its addition to the Reactors. Partially spent catalyst withdrawn from the second Reactor is transported to a transfer vessel and is replaced by the heated fresh catalyst. Totally spent catalyst is withdrawn from the first Reactor and is replaced with an equal volume of partially spent catalyst from the second Reactor via the transfer vessel. The spent catalyst is cleaned and cooled with light oils generated in the Fractionation Area.

The system will have the capability to remove and store catalyst inventory during a shutdown and to remove and package spent catalyst for shipment from the plant site. The spent catalyst will be sold to outside contractors for the reclamation of valuable metals.

Fractionation Area

The liquids from the Gas Recovery and Gas Purification Systems are sent to the Atmospheric Fractionation Unit where they are fractionated into: an unstabilized naphtha stream and a distillate stream, which are sent to the Product Oil Fractionator in the SRC Process Area; a heavy-oil stream, which is recycled to the Reaction Section and from which any excess is sent to the Product Oil Fractionator; and a heavy-oil/SRC mixture. During operation in the base design or high-conversion mode, a portion of the heavy-oil/SRC mixture is recycled to the Reaction Section and the remainder is fed to the Vacuum Fractionation Unit. During operation in the alternate design or low-conversion mode, all of the heavy-oil/SRC mixture is sent to the Vacuum Fractionation Unit. In both modes, raw fuel gas from the Atmospheric Fractionation Unit is compressed and sent to the DEA Unit in the Gas Systems Area for treatment.

The heavy-oil/SRC mixture fed to the Vacuum Fractionation Unit is separated into heavy (recycle) oil streams and a vacuum residue. Heavy oil that is not recycled to the Reaction Section is sent to the Product Oil Fractionator. The vacuum residue is pumped to the SRC Solidification Unit in the SRC Process Area.

The following is a tabulation of some of the major items of equipment in each of the Level 5 WBS elements of the EBH Area (WBS 1.2.2.2):

WBS 1.2.2.2.2--Reaction Section

H-13202	Hydrogen Heater
H-13201	Feed-Oil Heater
R-13201	EBH Reactors
C-13202	Recycle Gas Compressors
C-13203	HP Off Gas Compressors
C-13201	Makeup Gas Compressors

WBS 1.2.2.2.3--Fractionation Section

T-13221	Atmospheric Tower
T-13261	Vacuum Tower
H-13261	Vacuum Tower Heater

c. NAPHTHA HYDROTREATER (WBS 1.2.2.5)

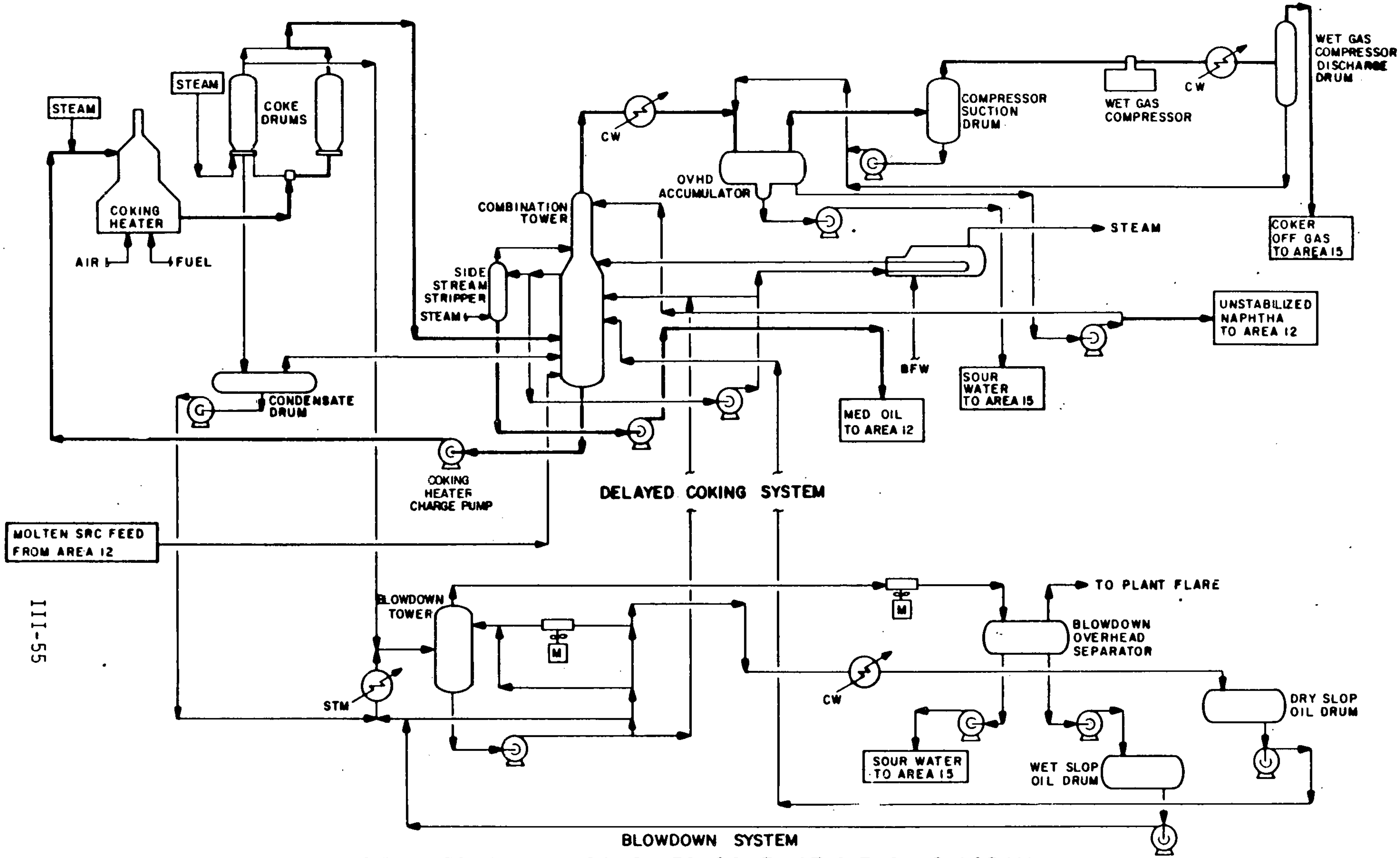
The liquid hydrocarbons produced in the SRC Process, Coker and EBH Areas are combined and fractionated into raw naphtha, middle and heavy distillate fractions. The raw naphtha is mixed with recycle-hydrogen and methanated makeup-hydrogen, preheated, and passed over a conventional hydrotreating catalyst in the fixed-bed reactor of the Naphtha Hydrotreater to reduce the sulfur, nitrogen and oxygen contents to 1, 1, and 100 ppmw, respectively (see Figure 13). In the process, the sulfur, nitrogen and oxygen combine with the hydrogen to form hydrogen sulfide, ammonia and water, respectively.

The reacted effluent is cooled against the incoming streams and sprayed with process water to prevent plugging and to facilitate the removal of ammonium hydrosulfide (NH_4HS) in a flash separator. Except for a side stream that is purged, the hydrogen-rich flash vapors are recompressed and recycled to the reactor. The flash liquids are sent to a steam stripper to remove residual sour gases and light ends. The sour gases are compressed, combined with the recycle side stream and sent to the DEA Unit in the Gas Systems Area before they are used for fuel gas. The stripped product naphtha is sent to storage.

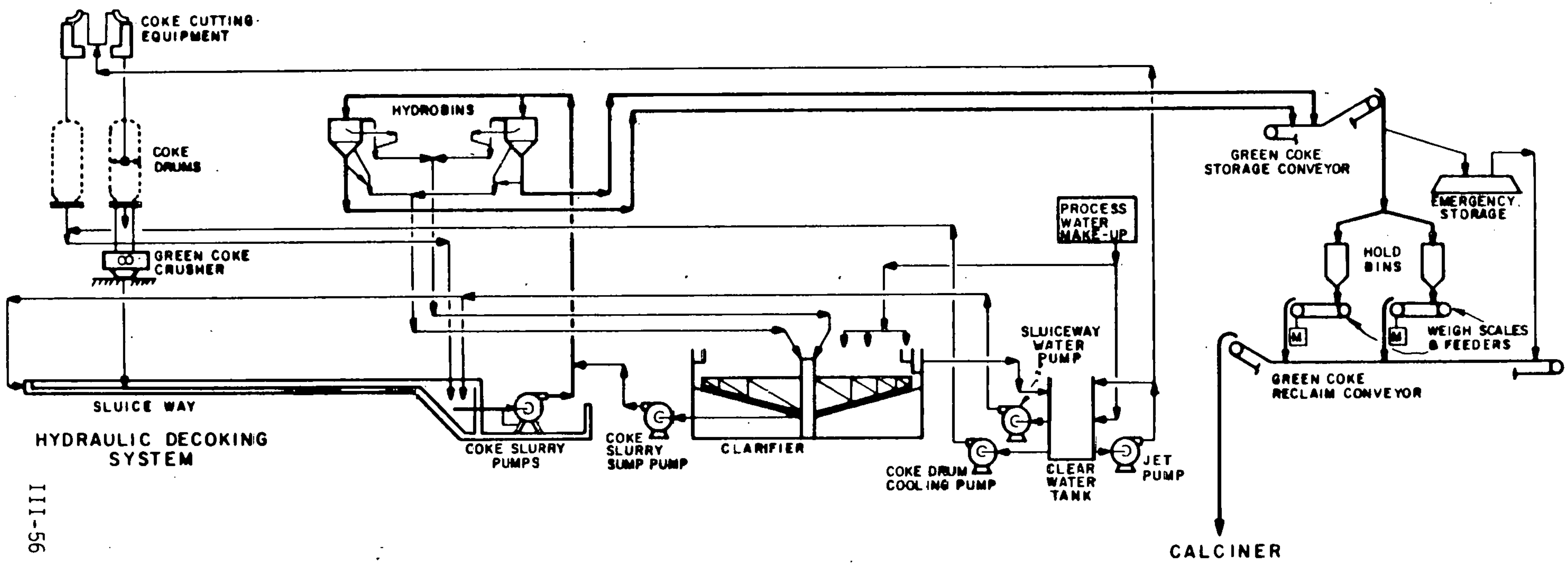
The following is a tabulation of some of the major items of equipment of the Naphtha Hydrotreater (WBS 1.2.2.5):

WBS 1.2.2.5--Naphtha Hydrotreater

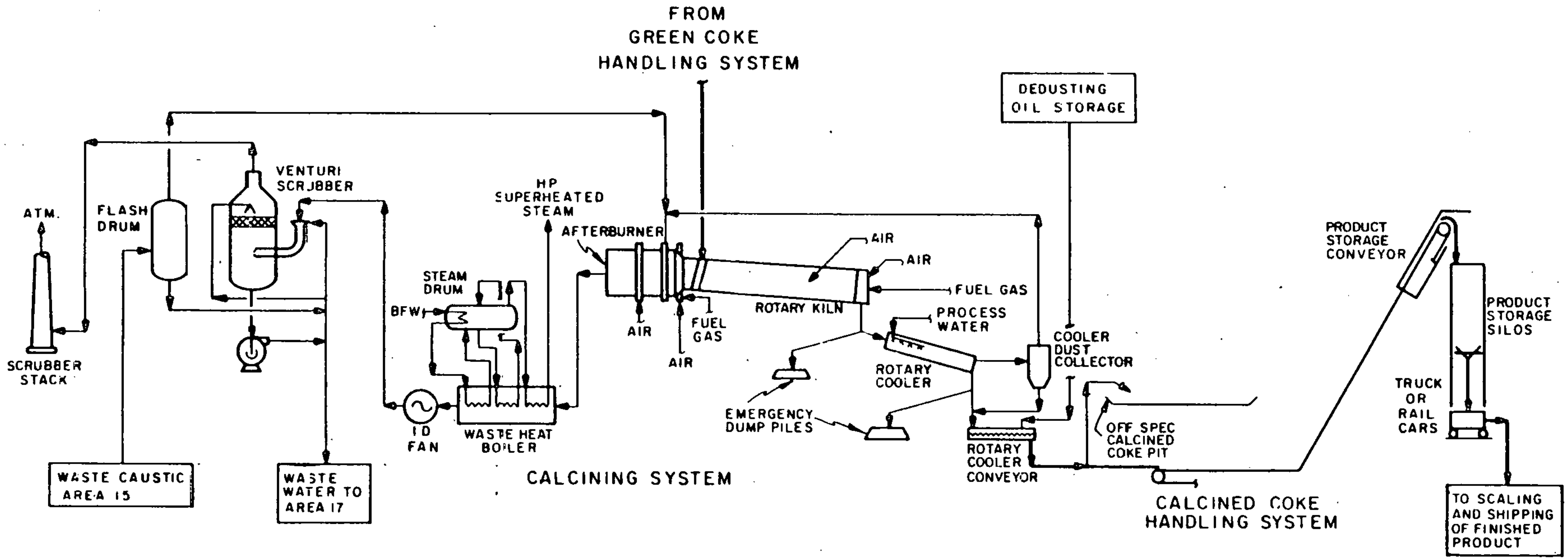
T-13301	Prefractionator
R-13301, -2, -3,	Reactors
T-13302	Stabilizer
H-13301	Reaction Heater
H-13302	Stabilizer Reboiler



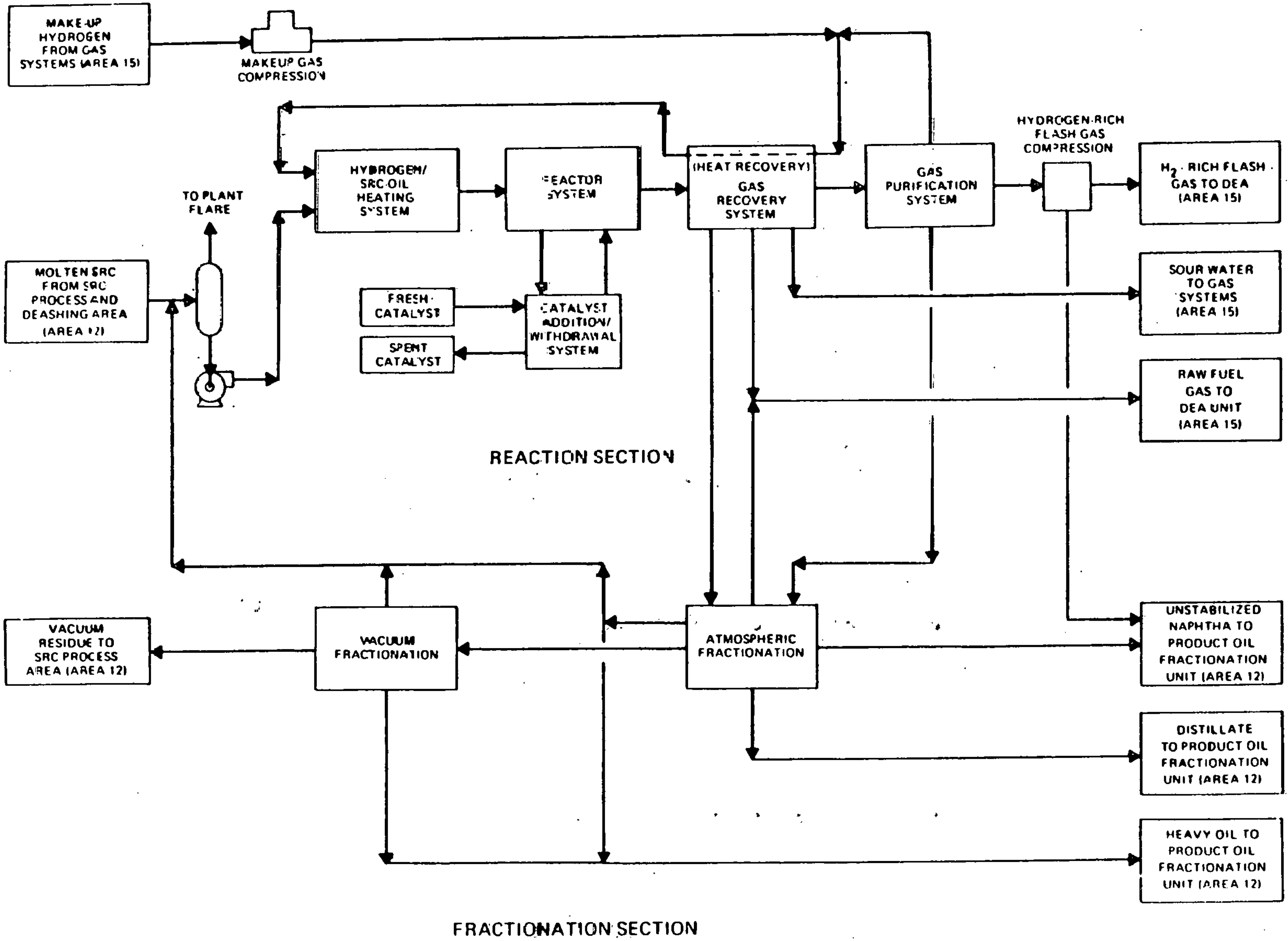
DELAYED COKER/CALCINER SCHEMATIC FLOW DIAGRAM
DELAYED COKING AND BLOWDOWN SYSTEMS
FIGURE 9



DELAYED COKER/CALCINER SCHEMATIC FLOW DIAGRAM
GREEN COKE HANDLING SYSTEM
FIGURE 10



DELAYED COKER/CALCINER SCHEMATIC FLOW DIAGRAM
CALCINING AND MATERIAL HANDLING SYSTEMS
FIGURE II

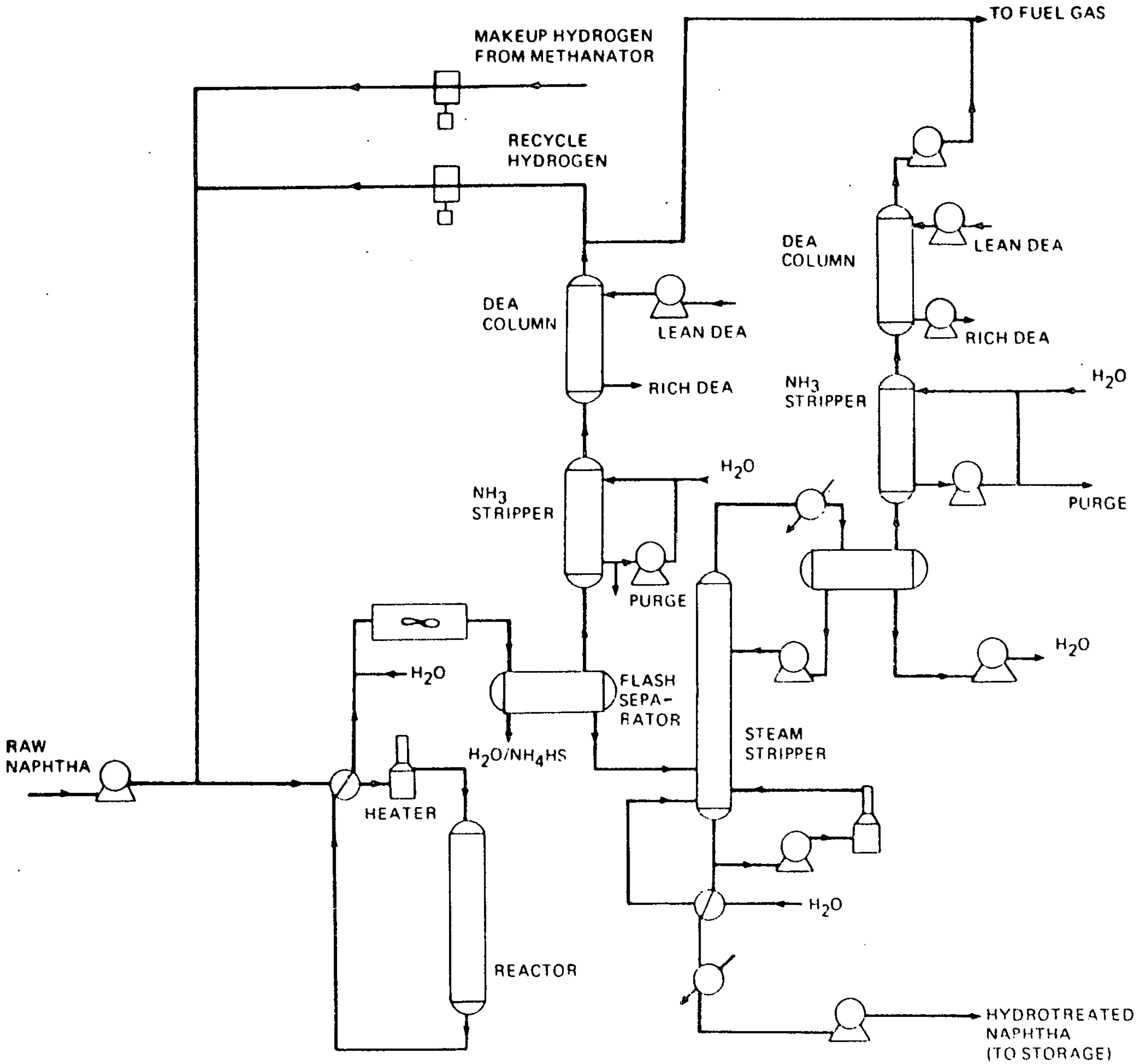


EXPANDED-BED HYDROCRACKER FLOW DIAGRAM

Figure 12

Figure 13

HYDROTREATER PROCESS FLOWSHEET



2. COST PLANS

The following cost plan data from the Original Baseline for the Coke and Liquid Products Area, Work Breakdown Structure element 1.2.2 are included here for reference and comparison. They were coordinated and compiled by the International Coal Refining Company (ICRC) based on engineering, vendor engineering and equipment estimates and material take-off quantities developed by The Lummus Company, a construction cost estimate developed by Stone and Webster Engineering Corporation, and a Phase I and II support estimate developed by ICRC. This cost plan data did not include any allowance for contingency. Although the Naphtha Hydrotreater was structured in the WBS as part of the element WBS 1.2.2, the unit was designed, and cost estimated by others than the Lummus Company, and therefore is shown as a separate entity and is not an integral part of the "Lummus Area Summary."

The Cost Plans were presented in first quarter FY 82 and escalated costs in the following formats:

Phase I - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

Phase II - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

The escalated costs were developed using the following rates compounded yearly: 10% for FY 82 and FY 83, 9% for FY 84 and FY 85 and 8% thereafter. Escalation on equipment had been calculated based on a committed basis and distributed on a cash flow basis.

For this Revised Project Baseline, the capital costs in first quarter FY 82 dollars for the Coke and Liquid Products Area decreased by $336 thousand from $129.338 million to $129.002 million. The decrease is due to the revised capital costs resulting from the finalized Category C and Post-Baseline ECPs. Some of the cost effects of these ECPs are actually reflected in the summary for WBS element 1.4.1.

No attempt has been made to escalate the revised costs or to develop new cost plans because of the lack of a definitive project schedule and agreed escalation factors.

REVISED

International Coal Refining Company

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR Lummus

WBS LEVEL 1.2.2 , NUMBER 200

WBS ELEMENT TITLE Lummus Area Summary

DATE

REVISION NO.

PAGE ____ OF ____

1st QTR FY '82 (THOUSANDS)

ITEM			FINAL BASELINE LABOR MH	LABOR $	MAT'L $			TOTAL $
EQUIP	A/C PURCHASE				39694.2			39694.2
	CM/C	PURCHASE			373.9			373.9
		ERECT	209.5(1)	2134.0	671.0			2805.0
	ICRC	SPARE PARTS						
TOTAL EQUIP			209.5	2134.0	40739.1			42873.1
Site & Earthwork			27.7	360.3	557.4			917.7
Concrete			116.1	1474.3	1370.7			2845.0
Structural Steel			82.0	1272.7	3240.7			4513.4
Piping			377.9	6051.7	8233.0			14284.7
Electrical			68.4	1002.6	3078.6			4081.2
Instrumentation			63.3	966.9	5219.1			6186.0
Architectural, Painting, and Insulation			98.8	1466.7	1420.4			2887.1
SUBTOTAL - BULKS			834.2	12595.2	23119.9			35715.1
TOTAL DIRECTS			1043.7	14729.2	63859.0			78588.2
Distributables & Indirects			262.6	8634.3	5428.8			14063.1
TOTAL DIRECTS & INDIRECTS			1306.3	23363.5	69287.8			92651.3
A/C Engr.	Phase I			17793.5				17793.5
	Vendor Engr'g				3623.0			3623.0
	Phase II			4411.0				4411.0
CM/C	Phase I			344.0				344.0
	Phase II		7.2	2166.5	1320.9			3487.4
TOTAL ENGINEERING + CM/C			7.2	24715.0	4943.9			29658.9
ICRC	Phase I			4015.0				4015.0
	Phase II			2677.0				2677.0
SUBTOTAL				6692.0				6692.0
CATEGORY B ECP's								
CATEGORY C ECP's								
SUBTOTAL – OTHER				6692.0				6692.0
ESCALATION	Phase I							
	Phase II							
CONTINGENCY	Phase I							
	Phase II							
	POST MECH MODS							
SUBTOTAL – CONTINGENCY								
GRAND TOTAL			1313.5	54770.5	74231.7			129002.2

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(1) Includes manhours for field erected equipment. Dollar value of these hours appears in material column.

International Coal Refining Company

ORIGINAL

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR Lummus

WBS LEVEL 1.2.2 NUMBER 200

WBS ELEMENT TITLE Lummus Area Summary

DATE

REVISION NO.

PAGE OF

ITEM			FINAL BASELINE					
			LABOR		MAT'L	Subtotal	Escalation	TOTAL
			MH	$	$	$	$	$
EQUIP	A/C PURCHASE				40593.0			40593.0
EQUIP	CM/C	PURCHASE			373.9			373.9
EQUIP	CM/C	ERECT	224.5	2359.6	671.0			3030.6
	ICRC	SPARE PARTS						
TOTAL EQUIP			224.5	2359.6	41637.9			43997.5
Site & Earthwork			41.4	539.2	619.7			1158.9
Concrete			117.0	1486.0	1385.0			2871.0
Structural Steel			84.5	1311.1	3292.5			4603.6
Piping			382.9	6131.4	8310.4			14441.8
Electrical			69.1	1012.8	3083.5			4096.3
Instrumentation			64.3	981.8	5260.2			6242.0
Architectural, Painting, and Insulation			101.6	1508.8	1414.4			2923.2
SUBTOTAL - BULKS			860.8	12971.1	23365.7			36336.8
TOTAL DIRECTS			1085.4	15330.9	65003.6			80334.5
Distributables & Indirects			272.5	8959.0	5633.0			14592.0
TOTAL DIRECTS & INDIRECTS			1357.9	24289.9	70636.6	94926.5	29106.2	124032.7
A/C Engr.	Phase I			17691.0		17691.0	1774.0	19465.0
A/C Engr.	Vendor Engr'g				3623.0	3623.0	510.0	4133.0
A/C Engr.	Phase II			4411.0		4411.0	1670.0	6081.0
CM/C	Phase I			344.0		344.0	44.0	388.0
CM/C	Phase II		6.9	2075.8	1265.6	3341.4	1518.1	4859.5
TOTAL ENGINEERING + CM/C			6.9	24521.8	4888.6	29410.4	5516.1	34926.5
ICRC	Phase I			4015.0		4015.0	270.0	4285.0
ICRC	Phase II			2677.0		2677.0	678.0	3355.0
SUBTOTAL				6692.0		6692.0	948.0	7640.0
CATEGORY B ECP's					(1691.0)	(1691.0)	(467.0)	(2158.0)
CATEGORY C ECP's								
SUBTOTAL – OTHER				6692.0	(1691.0)	5001.0	481.0	5482.0
ESCALATION	Phase I							
ESCALATION	Phase II							
CONTINGENCY	Phase I							
CONTINGENCY	Phase II							
CONTINGENCY	POST MECH MODS							
SUBTOTAL – CONTINGENCY								
GRAND TOTAL			1364.8	55503.7	73834.2	129337.9	35103.3	164441.2

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International Coal Refining Company

REVISED
BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR Naphtha Hydrotreater

DATE ______

WBS LEVEL ______, NUMBER ______

REVISION NO. ______

WBS ELEMENT TITLE ______

PAGE ______ OF ______

1st QTR FY82 (THOUSANDS)

ITEM	FINAL BASELINE LABOR MH	LABOR $	MAT'L $			TOTAL $
EQUIP – A/C PURCHASE			3403.9			3403.9
EQUIP – CM/C – PURCHASE						
EQUIP – CM/C – ERECT	13.8	196.5	116.9			313.4
ICRC – SPARE PARTS						
TOTAL EQUIP	13.8	196.5	3520.8			3717.3
Site & Earthwork						
Concrete	16.1	196.6	88.9			285.5
Structural Steel	8.0	120.8	130.5			251.3
Piping	61.1	884.7	1336.9			2221.6
Electrical	13.3	200.0	347.0			547.0
Instrumentation	6.5	98.5	407.8			506.3
Architectural, Painting, and Insulation	23.4	351.6	275.2			626.8
SUBTOTAL - BULKS	128.4	1852.2	2586.3			4438.5
TOTAL DIRECTS	142.2	2048.7	6107.1			8155.8
Distributables & Indirects	33.0	1090.0	744.6			1834.6
TOTAL DIRECTS & INDIRECTS	175.2	3138.7	6851.7			9990.4
A/C Engr. – Phase I		1193.0				1193.0
A/C Engr. – Vendor Engr'g			410.0			410.0
A/C Engr. – Phase II		280.0				280.0
CM/C – Phase I		25.0				25.0
CM/C – Phase II	6.1	200.2	101.8			302.0
TOTAL ENGINEERING + CM/C	6.1	1698.2	511.8			2210.0
ICRC – Phase I		1200.0				1200.0
ICRC – Phase II		700.0				700.0
SUBTOTAL		1900.0				1900.0
CATEGORY B ECP's						
CATEGORY C ECP's						
SUBTOTAL – OTHER		1900.0				1900.0
ESCALATION – Phase I						
ESCALATION – Phase II						
CONTINGENCY – Phase I						
CONTINGENCY – Phase II						
POST MECH MODS						
SUBTOTAL – CONTINGENCY						
GRAND TOTAL	181.3	6736.9	7363.5			14100.4

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U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV and V WBS Summary

Phase I

PAGE OF

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1. Contract Identification Demonstration of the Solvent Refined Coal Process	2. Contract Number DE-AC05-78OR03054
3. Contractor (name, address) International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date 10 July 1978 5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)			10. Planned Current Fiscal Year FY82																
		FY80	FY81	O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.2.2	Coke & Liquid Products																			
1.2.2.1.1	C/C Integrated Facilities	55	128	4	3	5	4	4	5	13	16	40	44	45	57	240	301	74		798
1.2.2.1.2	Coker	112	672	36	29	25	23	23	23	36	58	99	124	152	240	868	1691	34		3377
1.2.2.1.3	Calciner	11	75	12	9	22	11	11	23	26	28	58	59	56	72	387	1073	95		1641
	Total 1.2.2.1	178	875	52	41	52	38	38	51	75	102	197	227	253	369	1495	3065	203		5816
1.2.2.2.1	EBH Integrated Facilities	106	87	7	8	12	8	8	11	7	12	18	19	23	29	162	316	104		775
1.2.2.2.2	Reaction Section	84	267	41	40	26	21	24	30	44	50	75	67	74	93	585	3223	635		4794
1.2.2.2.3	Fractionation Section	2	155	26	21	22	18	16	24	16	28	50	48	48	45	362	724	544		1787
	Total 1.2.2.2	192	509	74	69	60	47	48	65	67	90	143	134	145	167	1109	4263	1283		7356
1.2.2.3	Area Management	528	1646	142	121	147	123	125	145	145	141	241	265	248	264	2107	2480	1384		8145
1.2.2.4	Engineering Tech. Support	326	775	43	41	42	53	61	64	136	137	132	133	124	126	1092	462	303		2958
	Lummus Fee	61	203	13	11	13	10	11	14	16	19	31	33	36	46	253	534	158	189	1398
	Category B ECP's	-	-	-	-	-	-	-	-	-	-	1	1	1	-	3	(58)	3		(52)
	Total 1.2.2	1285	4008	324	283	314	271	283	339	439	489	745	793	807	972	6059	10746	3334	189	25621
	Escalation	-	-	-	-	-	6	6	8	22	25	37	60	61	72	297	1449	827	16	2589
	Total - Escalated	1285	4008	324	283	314	277	289	347	461	514	782	853	868	1044	6356	12195	4161	205	28210

16. Remarks	Dollars Expressed in Thousands - 1st Qtr FY82 Dollars	17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV and V WBS Summary

Phase I

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18C01

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.2.2	Coke & Liquid Products																			
1.2.2.1.1	C/C Integrated Facilities	55	128	4	3	5	4	4	6	13	17	42	47	48	61	254	344	92		873
1.2.2.1.2	Coker	112	672	36	29	25	23	23	24	38	61	104	133	163	258	917	1911	42		3654
1.2.2.1.3	Calciner	11	75	12	9	22	11	11	24	27	30	62	63	60	77	408	1226	118		1838
	Total 1.2.2.1	178	875	52	41	52	38	38	54	78	108	208	243	271	396	1579	3481	252		6365
1.2.2.2.1	EBH Integrated Facilities	106	87	7	8	12	8	8	11	8	12	20	21	24	31	170	360	129		852
1.2.2.2.2	Reaction Section	84	267	41	40	26	21	25	30	46	53	79	72	80	100	613	3623	793		5380
1.2.2.2.3	Fractionation Section	2	155	26	21	22	18	16	25	17	30	53	52	51	48	379	827	679		2042
	Total 1.2.2.2	192	509	74	69	60	47	49	66	71	95	152	145	155	179	1162	4810	1601		8274
1.2.2.3	Area Management	528	1646	142	121	147	128	128	148	153	148	250	285	269	284	2203	2834	1729		8940
1.2.2.4	Engineering Tech. Support	326	775	43	41	42	54	63	65	142	143	138	143	133	136	1143	527	378		3149
	Lummus Fee	61	203	13	11	13	10	11	14	17	20	33	36	39	49	266	610	197	205	1542
	Category B ECP's	-	-	-	-	-	-	-	-	-	-	1	1	1	-	3	(67)	4	-	(60)
	Total 1.2.2	1285	4008	324	283	314	277	289	347	461	514	782	853	868	1044	6356	12195	4161	205	28210

15. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR 533P (1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

PAGE OF

Phase I

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-780R03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82: O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	Lummus	1176	3304	229	197	219	178	187	245	274	330	537	580	630	797	4403	9418	2824	189	21314
	Stone & Webster	-	-	-	-	-	-	-	-	-	-	46	46	14	14	120	168	56	-	344
	ICRC	109	704	95	86	95	93	96	94	165	159	161	166	162	161	1533	1218	451	-	4015
	Category B ECP's	-	-	-	-	-	-	-	-	-	-	1	1	1	-	3	(58)	3	-	(52)
	Total 1.2.2	1285	4008	324	283	314	271	283	339	439	489	745	793	807	972	6059	10746	3334	189	25621
	Escalation	-	-	-	-	-	6	6	8	22	25	37	60	61	72	297	1449	827	16	2589
	Total - Escalated	1285	4008	324	283	314	277	289	347	461	514	782	853	868	1044	6356	12195	4161	205	28210

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase I

PAGE OF

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1. Contract Identification Demonstration of the Solvent Refined Coal Process	2. Contract Number DE-AC05-78OR03054
3. Contractor (name, address) International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date 10 July 1978 5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	Lummus	1176	3304	219	197	219	182	191	251	288	347	564	624	678	856	4626	10760	3527	205	23598
	Stone & Webster	-	-	-	-	-	-	-	-	-	-	48	50	15	15	128	192	67		387
	ICRC	109	704	95	86	95	95	98	96	173	167	169	178	174	173	1599	1310	563		4285
	Category B ECP's	-	-	-	-	-	-	-	-	-	-	1	1	1	-	3	(67)	4		(60)
	Total 1.2.2	1285	4008	324	283	314	277	289	347	461	514	782	853	868	1044	6356	12195	4161	205	28210

16. Remarks	Dollars Expressed in Thousands-Escalated Dollars	17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

DOE Form CR-533P (1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV and V WBS Summary

Phase II

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process	2. Contract Number: DE-AC05-78OR03054
3. Contractor (name, address): International Coal Refining Company, P. O. Box 2752, Allentown, PA 18001	4. Contract Start Date: 10 July 1978 5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.2.2	Coke & Liquid Products									
1.2.2.1.1	C/C Integrated Facilities			-	42	97	223	219	-	581
1.2.2.1.2	Coker			3034	5746	10148	10462	1243	-	30633
1.2.2.1.3	Calciner			2396	5115	558	6402	1752	-	16223
	Total 1.2.2.1			5430	10903	10803	17087	3214	-	47437
1.2.2.2.1	EBH Integrated Facilities			-	37	149	404	247	-	837
1.2.2.2.2	Reaction Section			7930	8782	11003	7967	760	-	36442
1.2.2.2.3	Fractionation Section			850	1576	4123	4782	1375	-	12706
	Total 1.2.2.2			8780	10395	15275	13153	2382	-	49985
1.2.2.3	Area Management			681	757	1285	2121	787	-	5631
1.2.2.4	Engineering Tech. Support			331	454	500	500	125	-	1910
1.2.2.5	Naphtha Hydrotreater				75					75
	Lummus Fee			41	52	52	70	103	-	318
	Category B ECP's			(882)	(21)	(273)	(387)	(76)		(1639)
	Total 1.2.2			14381	22615	27642	32544	6535	-	103717
	Escalation			1969	3553	8915	14456	3621	-	32514
	Total - Escalated			16350	26168	36557	47000	10156	-	136231

16. Remarks	Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars	17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

DOE Form CR 531P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV and V WBS Summary

Phase II

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-780R03054

3. Contractor (name, address): International Coal Refining Company, P. O. Box 2752, Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.2.2	Coke & Liquid Products									
1.2.2.1.1	C/C Integrated Facilities			-	52	133	329	348	-	862
1.2.2.1.2	Coker			3446	6693	13539	14866	1925	-	40519
1.2.2.1.3	Calciner			2738	5846	652	9293	2704	-	21233
	Total 1.2.2.1			6184	12591	14374	24488	4977	-	62614
1.2.2.2.1	EBH Integrated Facilities			-	47	203	595	392	-	1237
1.2.2.2.2	Reaction Section			9000	10090	14195	11550	1174	-	46009
1.2.2.2.3	Fractionation Section			971	1815	5651	6985	2138	-	17560
	Total 1.2.2.2			9971	11952	20049	19130	3704	-	64806
1.2.2.3	Area Management			778	945	1754	3112	1232	-	7821
1.2.2.4	Engineering Tech. Support			378	567	681	738	199	-	2563
1.2.2.5	Naphtha Hydrotreater			-	75	-	-	-	-	75
	Lummus Fee			47	64	71	103	165	-	450
	Category B ECP's			(1008)	(26)	(372)	(571)	(121)	-	(2098)
	Total 1.2.2			16350	26168	36557	47000	10156		136231

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P (1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase II

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address): International Coal Refining Company, P. O. Box 2752, Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
	Lummus			14308	20411	6609	2902	774	-	45004
	ICRC			946	606	500	500	125	-	2677
	SWEC			9	1619	20806	29529	5712	-	57675
	Category B ECP's			(882)	(21)	(273)	(387)	(76)	-	(1639)
	Total 1.2.2			14381	22615	27642	32544	6535	-	103717
	Escalation			1969	3553	8915	14456	3621	-	32514
	Total - Escalated			16350	26168	36557	47000	10156	-	136231

15. Remarks

Dollars Expressed in Thousands - 1st Qtr FY 82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase II

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA, 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
	Lummus			16348	23407	7750	3721	1232	-	52458
	ICRC			999	738	681	738	199	-	3355
	SWEC			11	2349	28498	43112	8846	-	82516
	Category B ECP's			(1008)	(26)	(372)	(571)	(121)	-	(2098)
	Total 1.2.2			16350	26468	36557	47000	10156	-	136231

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

3. MILESTONE SCHEDULES

The Original Project Master Schedule, included here, showed significant design and procurement milestones for the Coke and Liquid Products Area, WBS element 1.2.2. A bar chart format graphically depicted the scheduled predicted and actual occurrence dates; it was supported by a computerized tabulation of the same data. This information had been extracted electronically from the Intermediate Schedule which was developed by ICRC and The Lummus Company. The basis of the Intermediate Schedule was a detailed logic network schedule which was developed by The Lummus Company to control internally its portion of the SRC-I project.

The schedule included DOE imposed restraints on the beginning of purchasing activities. For the Coker/Calciner, it indicated the completion of Phase I work in October 1984, the beginning of construction in July 1984 and a mechanical completion date of December 1986. For the Expanded Bed Hydrocracker, it indicated completion of the Phase I work in October 1984, the beginning of construction in January 1985, and a mechanical completion date of September 1986.

The time durations for the original project activities can and should be considered in the development of any new preliminary schedules, since there is no current schedule for the resumption and completion of the SRC-I Project.

U.S. DEPARTMENT OF ENERGY

DOE Form CR-636 (1-78)

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification: COKE & LIQUID PRODUCTS - MASTER SCHEDULE

2. Reporting Period: through

3. Contract Number:

4. Contractor (name, address):

5. Contract Start Date:

6. Contract Completion Date:

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1981 (OND), 1982 (JFM AMJ JAS), 1983 (OND JFM AMJ JAS), 1984 (OND JFM AMJ JAS), 1985 (OND JFM AMJ JAS), 1986 (OND JFM AMJ JAS), 1987 (OND JFM AMJ)	10. Percent Complete a) Planned	b) Actual
592	COKER	C F D G H J I K L M P N O,Q		
593	CALCINER	B C F D G H I J K ML PNO,Q		
590	EBH FRACTIONATION SECTION	B C F D H G I J K L MN P O Q		
594	EBH REACTION SECTION	B C F D H G,I J KL M N P O Q		
801	ENGINEERING TECHNICAL SUPPORT	AI B		

11. Remarks: Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date

13. Signature of Government Technical Representative and Date

U.S. DEPARTMENT OF ENERGY

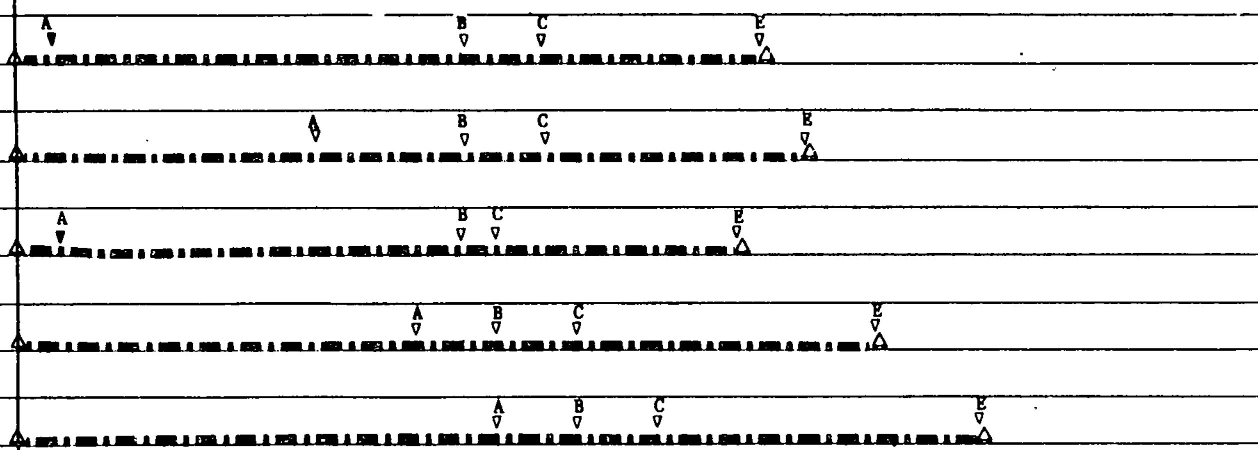
DOE Form CR-536 (1-78)

MILESTONE SCHEDULE AND STATUS REPORT

PAGE 1 OF 1

1. Contract Identification: COKE & LIQUID PRODUCTS PROCUREMENT - MASTER SCHEDULE	2. Reporting Period: through	3. Contract Number
4. Contractor (name, address)		5. Contract Start Date
		6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1980 (OND), 1981 (JFM AMJ JAS), 1982 (OND JFM AMJ JAS), 1983 (OND JFM AMJ JAS), 1984 (OND JFM AMJ JAS), 1985 (OND JFM AMJ JAS), 1986 (OND JFM AMJ)	10. Percent Complete a) Planned	b) Actual
500	WET GAS COMPRESSOR			
501	COKE HEATER			
502	COKE DRUM			
595	REACTOR TOWER			
597	REACTOR CYCLE PUMP			



11. Remarks: Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date

13. Signature of Government Technical Representative and Date

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 43 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: COKE & LIQUID PRODUCTS - COKER WBS ELEMENT #: 1.2.2.1.2

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
592A	BGN PROC DSGN - COKER	3NOV80	03NOV80	3NOV80		
592B	BGN DETAILED DSGN - COKER	3NOV80	03NOV80	3NOV80		
592C	1ST M/SR - COKER	23APR82		23APR82	20JUL83	
592D	2ND M/SR - COKER	21OCT82		21OCT82	29NOV83	
592F	BGN PSAR - COKER	18AUG82		18AUG82	29DEC83	
592G	COMPL PSAR - COKER	13JUL83		13JUL83	16AUG84	
592H	1ST SIGNIF CONSTR PKG - COKER	21FEB84		21FEB84	16AUG84	
592I	END PH I-COKER	8OCT84		8OCT84	4FEB86	
592J	COKER-1ST CONSTR PKG AWARD (S/C)	31JUL84		31JUL84	25JAN85	
592K	COKER - BGN STEEL ERECTION	29JAN85		29JAN85	21AUG85	
592L	COKER - BGN PIPE	26MAR85		26MAR85	17OCT85	
592M	COKER-BGN ELEC	28JUN85		28JUN85	5DEC86	
592N	COKER - COMPL STEEL ERECTION	10MAR86		10MAR86	1OCT86	
592O	COKER - COMPL PIPE	17NOV86		17NOV86	12JUN87	
592P	COKER - COMPL ELEC	6JAN86		6JAN86	12JUN87	
592Q	COKER - MECH COMP	17NOV86		17NOV86	12JUN87	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 48 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: COKE & LIQUID PRODUCTS - CALCINER WBS ELEMENT #: 1.2.2.1.3

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
593A	BGN PROC DSGN - CALCINER	29FEB80	29FEB80	29FEB80		
593B	BGN DETAILED DSGN - CALCINER	15OCT81		15OCT81	22DEC81	
593C	1ST M/SR - CALCINER	23APR82		23APR82	20JUL83	
593D	2ND M/SR - CALCINER	21OCT82		21OCT82	29NOV83	
593F	BGN PSAR - CALCINER	18AUG82		18AUG82	29DEC83	
593G	COMPL PSAR - CALCINER	13JUL83		13JUL83	16AUG84	
593H	1ST SIGNIF CONSTR PKG - CALCINER	24JAN84		24JAN84	3OCT85	
593I	END PH I-CURRENT . LATE	8OCT84		8OCT84	19AUG86	
593J	CALCINER-1ST CONSTR PKG AWARD (S/C)	17SEP85		17SEP85	13MAR86	
593K	CALCINER - BGN STEEL ERECTION	17FEB86		17FEB86	13AUG86	
593L	CALCINER - BGN PIPE	5JUN86		5JUN86	11MAR87	
593M	CALCINER-BGN ELEC	21MAY86		21MAY86	28JAN87	
593N	CALCINER - COMPL STEEL ERECTION	10NOV86		10NOV86	8MAY87	
593O	CALCINER - COMPL PIPE	24DEC86		24DEC86	22JUN87	
593P	CALCINER - COMPL ELEC	13OCT86		13OCT86	22JUN87	
593Q	CALCINER - MECH COMPL	24DEC86		24DEC86	22JUN87	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 53 PAGE 1

CONTRACT 00100 RUN 26MAR82 U0-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: EBH FRACTIONATION SECTION WBS ELEMENT #: 1.2.2.2.3

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
590A	BGN PROC DSGN - FRACTIONATION	9FEB81	09FEB81	9FEB81		
590B	BGN DETAILED DSGN - FRACTIONATION	2APR82		2APR82	8JUN82	
590C	1ST M/SR - FRACTIONATION	9JUN82		9JUN82	16JAN84	
590D	2ND M/SR - FRACTIONATION	3NOV83		3NOV83	24MAY84	
590F	BGN PSAR - FRACTIONATION	4OCT82		4OCT82	25JUN84	
590G	COMPL PSAR - FRACTIONATION	25JUL84		25JUL84	12FEB85	
590H	1ST SIGNIF CONSTR PKG - FRACTIONATION	13MAR84		13MAR84	5MAR85	
590I	END PH I-EBH-FRACT	10OCT84		10OCT84	9APR86	
590J	EBH-FRACTION-1ST CONSTR PKG AWARD(S/C)	3JAN85		3JAN85	13AUG85	
590K	EBH-FRACTIONATION - BGN STEEL ERECTION	4APR85		4APR85	13NOV85	
590L	EBH-FRACTIONATION - BGN PIPE	4JUN85		4JUN85	11FEB86	
590M	EBH-FRACTION-BGN ELEC	14AUG85		14AUG85	16SEP86	
590N	EBH-FRACTIONATION-COMPL STEEL ERECTION	26SEP85		26SEP85	11DEC86	
590O	EBH-FRACTIONATION - COMPL PIPE	15JUL86		15JUL86	23MAR87	
590P	EBH-FRACTIONATION - COMPL ELEC	19FEB86		19FEB86	23MAR87	
590Q	EBH-FRACTIONATION - MECH COMPL	12AUG86		12AUG86	23MAR87	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 50 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: EBH REACTION SECTION WBS ELEMENT #: 1.2.2.2.2

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
594A	BGN PROC DSGN - REACTION	9FEB81	09FEB81	9FEB81		
594B	BGN DETAILED DSGN - REACTION	26MAR82		26MAR82	8JUN82	
594C	1ST M/SH - REACTION	9JUN82		9JUN82	16JAN84	
594D	2ND M/SH - REACTION	3NOV83		3NOV83	24MAY84	
594F	BGN PSAR - REACTION	4OCT82		4OCT82	25JUN84	
594G	COMPL PSAR - REACTION	25JUL84		25JUL84	12FEB85	
594H	1ST SIGNIF CONSTR PKG - REACTION	21FEB84		21FEB84	12FEB85	
594I	END PH I-EBH-REACT	25JUL84		25JUL84	23APR85	
594J	EBH-REACTION-1ST CONSTR PKG AWARD(S/C)	3JAN85		3JAN85	23JUL8-	
594K	EBH-REACTION - BGN STEEL ERECTION	29APR85		29APR85	11FEB86	
594L	EBH-REACTION - BGN PIPE	28MAY85		28MAY85	8MAY86	
594M	EBH-REACTION-BGN ELEC	19SEP85		19SEP85	30SEP86	
594N	EBH-REACTION - COMPL STEEL ERECTION	31OCT85		31OCT85	4DEC86	
594O	EBH-REACTION - COMPL PIPE	11APR86		11APR86	23MAR87	
594P	EBH-REACTION - COMPL ELEC	12MAR86		12MAR86	23MAR87	
594Q	EBH-REACTION - MECH COMPL	3SEP86		3SEP86	23MAR87	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 12 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: COKE&LIQ PRODUCTS-ENG TECHNICAL SUPPORT WBS ELEMENT #: 1.2.2.4

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
801A1	BGN DSGN SUPPT PROG-COKE&LIQ PROD	1OCT81		1OCT81	06JUN85	
801B	COMPL DSGN SUPPT PROGRAMS -COKE&LIQ PR	29APR83		29APR83	20MAR87	

0 2 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 44 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: COKE & LIQUID PRODUCTS - COKER PROCUREMENT: WET GAS COMPRESSOR

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
500A	WET GAS COMPR - ISS MECH SPEC	1DEC80	01DEC80	1DEC80		
500B	WET GAS COMPR - ISS P.O/BGN VNDR ENG	21OCT82		21OCT82	1MAR84	
500C	WET GAS COMPR - COMPL VNDR ENG/BGN FAB	23MAR83		23MAR83	1AUG84	
500F	WET GAS COMPR - DEL TO SITE	13MAR84		13MAR84	23JUL85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 45 PAGE 1

CONTRACT 00100 RUN 26MAR82 J0-1-4821 ICRC MASTER SCHEDULE - REV #01-0 UNIT=DAY

REPORTING ELEMENT: COKE & LIQUID PRODUCTS - COKER PROCUREMENT: COKE HEATER

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
501A	COKE HEATER - ISS MECH SPEC	1FEB82		1FEB82	10AUG83	
501B	COKE HEATER - ISS P.O/BGN VNDR ENG	21OCT82		21OCT82	4JAN84	
501C	COKE HEATER - COMPL VNDR ENG/BGN FAB	3MAR83		3MAR83	14MAY84	
501E	COKE HEATER - DEL TO SITE	11MAY84		11MAY84	23JUL85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 46 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: COKE & LIQUID PRODUCTS - COKER PROCUREMENT: COKE DRUM

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
502A	COKE DRUM - ISS MECH SPEC	19DEC80	19DEC80	19DEC80		
502B	COKE DRUM - ISS P.O./BGN VNDR ENG	21OCT82		21OCT82	20APR83	
502C	COKE DRUM - COMPL VNDR ENG/BGN FAB	13DEC82		13DEC82	9JUN83	
502E	COKE DRUM - DEL TO SITE	24JAN84		24JAN84	23JUL85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 54 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: FBH FRACTIONATION SECTION PROCUREMENT: REACTOR TOWER

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
595A	REACTOR TWR - ISS MECH SPEC	26JUL82		26JUL82	04MAR84	
595B	REACTOR TWR - ISS P.O/BGN VNDR ENG	16DEC82		16DEC82	26SEP84	
595C	REACTOR TWR - COMPL VNDR ENG/BGN FAB	27APR83		27APR83	05FEB85	
595E	REACTOR TWR - DEL TO SITE	24SEP84		24SEP84	17JUL86	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 51 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: FBH REACTION SECTION PROCUREMENT: REACTOR CYCLE PUMP

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
597A	REACTOR CYCLE PUMP - ISS MECH SPEC	3DEC82		3DEC82	21JUL83	
597B	REACTOR CYCLE PUMP-ISS P.O/AGN VND ENG	28APR83		28APR83	13DEC83	
597C	REACTR CYCLE PMP-COMPL VND ENG/AGN FAB	26SEP83		26SEP83	04SEP84	
597E	REACTOR CYCLE PUMP - DEL TO SITE	28MAR85		28MAR85	07MAR86	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

CHAPTER IV. SUPPORT PROCESSES (WBS 1.3)

A. CRYOGENIC SYSTEMS (WBS 1.3.1)

1. TECHNICAL SCOPE

The Air Separation Unit (ASU) and the associated gaseous product compression systems and liquid product storage and vaporization systems constitute the Cryogenic Systems Area (see Figure 14) of the Demonstration Plant. The ASU separates air cryogenically into oxygen and nitrogen. The oxygen is used by the Gasifiers in the Gas Systems and Wastewater Treatment Areas and the nitrogen is distributed throughout the facility for use as a blanketing inert gas, a stripping gas, and a conveying medium for the ash concentrate produced in the SRC deashing operation. Slipstreams of liquid oxygen (LOX) and liquid nitrogen (LIN) are also generated and sent to liquid storage.

Ambient air is filtered by the Inlet Air Filter to remove particulate matter, and compressed in the centrifugal Main Air Compressor. Cooling between compression stages is provided by intercoolers. The air discharged from the compressor is cooled by direct contact with recirculated cooling water in the Direct Contact Aftercooler. Entrained droplets of water in the air stream are removed in the demister section of the aftercooler. The recirculated water is continually pumped by the Direct Contact Aftercooler (DCAC) Pump, and cooled by process cooling water in the DCAC Water Cooler. The air then enters the Cold Box, where it is cooled, purified, liquefied, and fractionated to produce the oxygen and nitrogen products.

In the Cold Box, the air enters a reversing circuit of extended-surface, air/oxygen/nitrogen reversing exchangers, where it is cooled by product and waste streams below temperatures at which moisture and carbon dioxide are condensed and deposited. These deposits are evaporated and purged by a waste-nitrogen stream when the flow paths are reversed by a system of switch and check valves.

The cooled, relatively moisture- and carbon dioxide-free air is partially liquefied by product gases in a liquefier heat exchanger. The air enters the high-pressure distillation column where it is separated into various streams. The gaseous overhead stream is essentially pure nitrogen which is split into two streams. The first stream is warmed by the air feed after which it is split: a small portion of it passes through the heat exchangers to be used ultimately for reactivation and purge nitrogen applications; the remainder is expanded through an expansion turbine. The turbine exhaust is recycled through a nonreversing passage of the exchangers where it is warmed by cooling the incoming air, and then compressed to about 50 psig. The other part of the nitrogen overhead stream is condensed in a reboiler-condenser to provide boil-up for the low-pressure distillation column. The condensed nitrogen is split into three streams: the first stream is returned to the high-pressure column as reflux; the second stream (LIN) is directed to the liquid nitrogen storage tank; and the third stream is subcooled and expanded through a Joule-Thompson valve for use as reflux for the top section of the low-pressure column.

A crude liquid oxygen stream is withdrawn from the bottom of the high-pressure column, subcooled, and passed through hydrocarbon adsorbers. The adsorbers operate on a switching cycle so that one unit is onstream while the other unit is being reactivated. The crude oxygen stream from the adsorbers is expanded through a Joule-Thompson valve into an intermediate point of the low-pressure column. For safety considerations, liquid oxygen from the sump of the low-pressure column is circulated through a guard adsorber and back to the sump to prevent the buildup of hydrocarbons in the sump of the low-pressure column. Additionally, a continuous, small liquid oxygen stream is purged from the sump of the low-pressure column to prevent the hydrocarbon level buildup; the stream is vaporized in a disposal vaporizer and vented. Another LOX slip stream is directed to the liquid oxygen storage tank. Gaseous product oxygen is taken from the sump of the low-pressure column and warmed in nonreversing passages of the reversing heat exchangers before it is compressed by the centrifugal oxygen compression system for delivery to the Gasifiers in the Gasification Area.

A gaseous nitrogen stream is taken from the top of the low-pressure column and heat-exchanged against high-pressure column liquid streams before it joins the expander exhaust to become the product nitrogen stream. This stream is compressed by the centrifugal nitrogen compression system for distribution throughout the facility. A waste nitrogen stream is withdrawn from an intermediate point of the low-pressure column and is discharged from the plant after it has given up its refrigeration to the incoming air in the reversing heat exchangers.

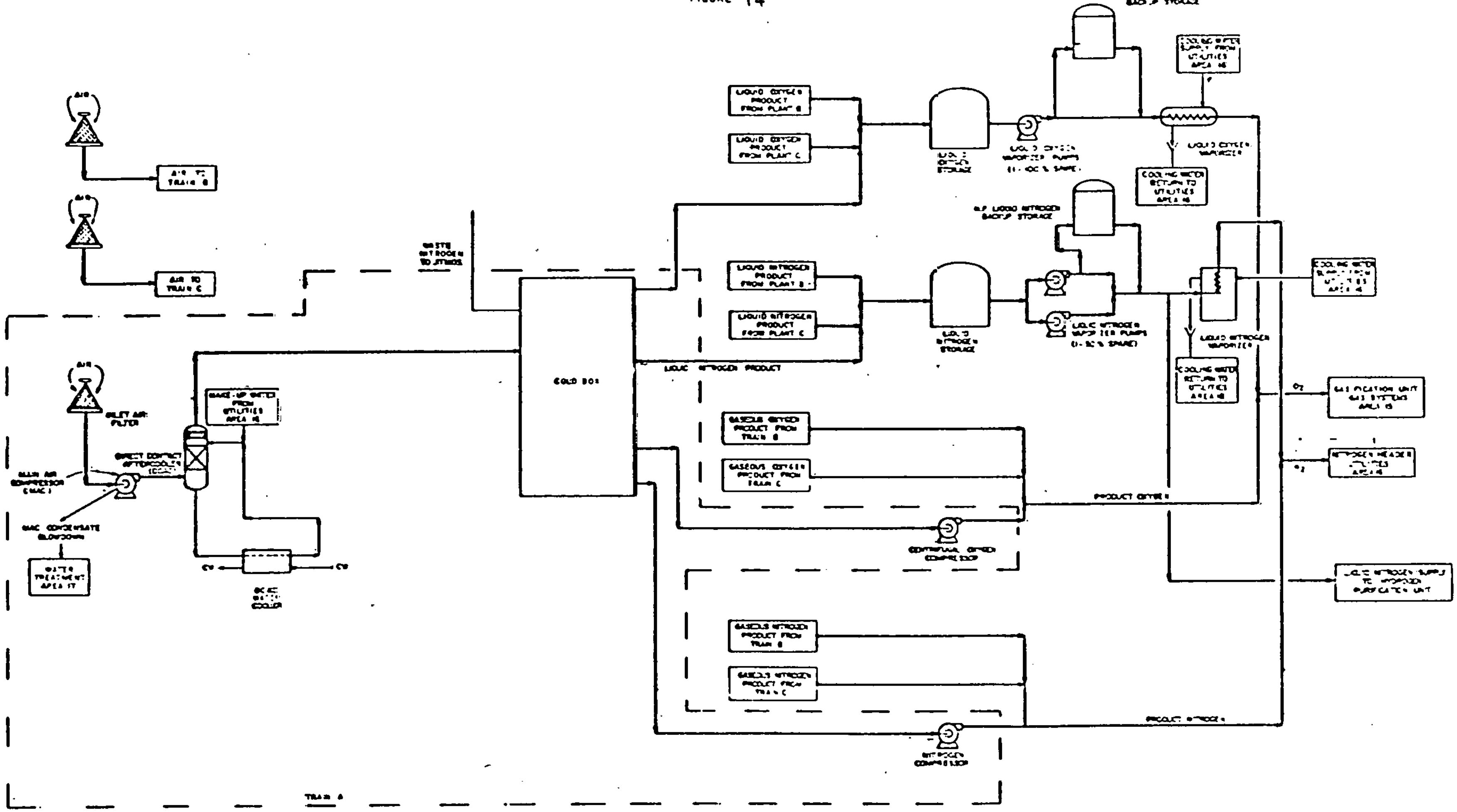
The LOX and LIN storages serve as backup capacity to the gaseous products generated in the ASU. The storage tanks are provided with the respective pumps and vaporizers to supplement the gaseous oxygen and nitrogen supplies at the required process conditions of pressure and temperature.

The following is a tabulation of some of the major items of equipment in each of the Level 5 WBS elements of the Cryogenic Systems Area (WBS 1.3.1.1):

WBS 1.3.1.1--Air Separation Units (3)

C-14102	Main Air Compressors
V-14119	Direct Contact Aftercoolers
C-14167	Oxygen Compressors
C-14181	Nitrogen Compressors
X-14130	Heat Exchanger Cold Boxes
X-14140	Column Cold Boxes
X-14150	Miscellaneous Equipment Cold Boxes
X-14155	Economizer Cold Boxes

CRYOGENIC SYSTEMS
AREA 14
AIR SEPARATION AREA
FIGURE 14



2. COST PLANS

The following cost plan data from the Original Baseline for the Cryogenic Systems Area, Work Breakdown Structure element 1.3.1 are included here for reference and comparison. They were coordinated and compiled by the International Coal Refining Company (ICRC) based on engineering, vendor engineering and equipment cost estimates and computerized material take-off quantities developed by Air Products and Chemicals, Inc., a construction cost estimate developed by Stone and Webster Engineering Corporation, and a Phase I and II support estimate developed by ICRC. This cost plan data did not include any allowance for contingency.

The Cost Plans were presented in first quarter FY 82 and escalated costs in the following formats:

Phase I - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

Phase II - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

The escalated costs were developed using the following rates compounded yearly: 10% for FY 82 and FY 83, 9% for FY 84 and FY 85 and 8% thereafter. Escalation on equipment had been calculated based on a committed basis and distributed on a cash flow basis.

For this Revised Project Baseline, the capital costs in first quarter FY 82 dollars for the Cryogenic Systems Area rose $104 thousand--from $54.526 million to $54.630 million. The increase is due to the revised capital costs resulting from the finalized Category C ECP.

No attempt has been made to escalate the revised costs or to develop new cost plans because of the lack of a definitive project schedule and agreed escalation factors.

REVISED

International Coal Refining Company

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR APCI

WBS LEVEL 1.3.1 , NUMBER 300

WBS ELEMENT TITLE APCI Area Summary

DATE

REVISION NO.

PAGE OF

1st QTR FY '82 (THOUSANDS)

ITEM	FINAL BASELINE LABOR MH	LABOR $	MAT'L $			TOTAL $
EQUIP — A/C PURCHASE			19483.0			19483.0
EQUIP — CM/C PURCHASE			262.7			262.7
EQUIP — CM/C ERECT	60.6(1)	726.4	217.6			944.0
EQUIP — ICRC SPARE PARTS						
TOTAL EQUIP	60.6	726.4	19963.3			20689.7
Site & Earthwork	5.6	73.7	2.7			76.4
Concrete	42.2	547.0	403.8			950.8
Structural Steel	14.3	222.3	516.3			738.6
Piping	108.0	1726.5	2247.0			3973.5
Electrical	27.9	408.5	719.4			1127.9
Instrumentation	85.4	1343.4	1274.5			2617.9
Architectural, Painting, and Insulation	19.3	286.6	386.0			672.6
SUBTOTAL - BULKS	302.7	4608.0	5549.7			10157.7
TOTAL DIRECTS	363.3	5334.4	25513.0			30847.4
Distributables & Indirects	98.3	3311.9	1878.3			5190.2
TOTAL DIRECTS & INDIRECTS	461.6	8646.3	27391.3			36037.6
A/C Engr. — Phase I		7777.3				7777.3
A/C Engr. — Vendor Engr'g			1909.0			1909.0
A/C Engr. — Phase II		6556.6				6556.6
CM/C — Phase I		14.0				14.0
CM/C — Phase II	6.9	979.6	523.9			1503.5
TOTAL ENGINEERING + CM/C	6.9	15327.5	2432.9			17760.4
ICRC — Phase I		779.0				779.0
ICRC — Phase II		53.0				53.0
SUBTOTAL		832.0				832.0
CATEGORY B ECP's						
CATEGORY C ECP's						
SUBTOTAL – OTHER		832.0				832.0
ESCALATION — Phase I						
ESCALATION — Phase II						
CONTINGENCY — Phase I						
CONTINGENCY — Phase II						
POST MECH MODS						
SUBTOTAL – CONTINGENCY						
GRAND TOTAL	468.5	24805.8	29824.2			54630.0

FORM 9637 (3/82)

(1) Includes manhours for field erected equipment. Dollar value of these hours appears in material column.

ORIGINAL

International Coal Refining Company

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR APCI

WBS LEVEL 1.3.1 , NUMBER 300

WBS ELEMENT TITLE APCI Area Summary

DATE

REVISION NO.

PAGE ____ OF ____

ITEM			FINAL BASELINE					
			LABOR		MAT'L	Subtotal	Escalation	TOTAL
			MH	$	$	$	$	$
EQUIP	A/C PURCHASE				19450.0			19450.0
	CM/C	PURCHASE			262.7			262.7
		ERECT	60.6	726.4	217.6			944.0
	ICRC	SPARE PARTS						
TOTAL EQUIP			60.6	726.4	19930.3			20656.7
Site & Earthwork			5.6	73.7	2.7			76.4
Concrete			41.3	535.0	398.8			933.8
Structural Steel			13.9	215.8	514.3			730.1
Piping			107.4	1718.5	2238.0			3956.5
Electrical			27.6	404.5	713.4			1117.9
Instrumentation			85.0	1338.4	1270.5			2608.9
Architectural, Painting, and Insulation			18.7	277.8	380.2			658.0
SUBTOTAL - BULKS			299.5	4563.7	5517.9			10081.6
TOTAL DIRECTS			359.9	5290.2	25448.2			30738.4
Distributables & Indirects			97.9	3299.9	1872.3			5172.2
TOTAL DIRECTS & INDIRECTS			457.8	8590.1	27320.5	35910.6	9402.3	45312.9
A/C Engr.	Phase I			7742.0		7742.0	1036.0	8778.0
	Vendor Engr'g				1907.0	1907.0	271.0	2178.0
	Phase II			6556.6		6556.6	1944.4	8501.0
CM/C	Phase I			14.0		14.0	2.0	16.0
	Phase II		6.9	978.5	523.3	1501.8	614.4	2116.2
TOTAL ENGINEERING + CM/C			6.9	15291.1	2430.3	17721.4	3867.8	21589.2
ICRC	Phase I			779.0		779.0	51.0	830.0
	Phase II			53.0		53.0	11.0	64.0
SUBTOTAL				832.0		832.0	62.0	894.0
CATEGORY B ECP's					62.0	62.0	24.0	86.0
CATEGORY C ECP's								
SUBTOTAL – OTHER				832.0	62.0	894.0	86.0	980.0
ESCALATION	Phase I							
	Phase II							
CONTINGENCY	Phase I							
	Phase II							
	POST MECH MODS							
SUBTOTAL – CONTINGENCY								
GRAND TOTAL			464.7	24713.2	29812.8	54526.0	13356.1	67882.1

FORM 9637 (3/82)

DOE Form CR-533P (1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase I

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

8. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)			10. Planned Current Fiscal Year FY82																
		FY80	FY81	O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.3.1	Cryogenic Systems																			
1.3.1.1	Air Separation Unit	12	59	1	2	36	4	2	4	6	13	6	6	35	22	137	3357	932	-	4497
1.3.1.3	Area Management	468	753	98	100	110	104	104	108	118	128	133	142	136	143	1424	2227	1070	3	5945
	Category B ECP's	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	3	2	-	7
	Total 1.3.1	480	812	99	102	146	108	106	112	124	141	139	148	172	166	1563	5587	2004	3	10449
	Escalation	-	-	-	-	-	3	3	3	7	6	8	10	12	12	64	797	500	-	1361
	Total - Escalated	480	812	99	102	146	111	109	115	131	147	147	158	184	178	1627	6384	2504	3	11810

16. Remarks:

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

U. S. DEPARTMENT OF ENERGY Level IV WBS Summary
BASELINE

DOE Form CR-533P
(1-78)

Phase I

PAGE OF

1. Contract Identification	2. Contract Number
Demonstration of the Solvent Refined Coal Process	DE-AC05-78OR03054
3. Contractor (name, address) International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date 10 July 1978 5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.3.1	Cryogenic Systems																			
1.3.1.1	Air Separation Unit	12	59	1	2	36	4	2	4	6	13	7	7	37	24	143	3835	1164	-	5213
1.3.1.3	Area Management	468	753	98	100	110	107	107	111	125	134	140	151	146	153	1482	2545	1338	3	6589
	Category B ECP's	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	4	2	-	8
	Total 1.3.1	480	812	99	102	146	111	109	115	131	147	147	156	184	178	1627	6384	2504	3	11810

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-633P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary
Phase I

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)			10. Planned Current Fiscal Year FY82																
		FY80	FY81	O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	Air Products	401	634	73	80	121	83	81	87	94	113	111	116	142	135	1236	5460	1915	3	9649
	Stone & Webster	-	-	-	-	-	-	-	-	-	-	-	1	1	1	3	8	3	-	14
	ICRC	79	178	26	22	25	25	25	25	30	28	28	31	28	29	322	116	84	-	779
	Category B ECP's	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	3	2	-	7
	Total 1.3.1	480	812	99	102	146	108	106	112	124	141	139	148	172	166	1563	5587	2004	3	10449
	Escalation	-	-	-	-	-	3	3	3	7	6	8	10	12	12	64	797	500	-	1361
	Total - Escalated	480	812	99	102	146	111	109	115	131	147	147	158	184	178	1627	6384	2504	3	11810

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY Organizational Breakdown Structure Summary
BASELINE

Phase I

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)			10. Planned Current Fiscal Year FY82																
		FY80	FY81	O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	Air Products	401	634	73	80	121	85	83	89	99	118	118	124	152	145	1287	6238	2393	3	10956
	Stone & Webster	-	-	-	-	-	-	-	-	-	-	-	1	1	1	3	9	4	-	16
	ICRC	79	178	26	22	25	26	26	26	32	29	29	33	30	31	335	133	105	-	830
	Category B ECP's	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	4	2	-	8
	Total 1.3.1	480	812	99	102	146	111	109	115	131	147	147	158	184	178	1627	6384	2504	3	11810

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase II

PAGE OF

FORM APPROVED OMB NO. 38-R 0448

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-780R03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.3.1	Cryogenic Systems									
1.3.1.1	Air Separation Unit			1	1033	27332	8331	388	-	37085
1.3.1.3	Area Management			20	648	1478	1379	238	-	3763
	Category B ECPs			-	-	27	28	-	-	55
	G & A - APCI			-	92	2804	254	25	-	3175
	Total 1.3.1			21	1773	31641	9992	651	-	44078
	Escalation			3	462	6606	4566	357	-	11994
	Total - Escalated			24	2235	38247	14558	1008	-	56072

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary
Phase II

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process	2. Contract Number: DE-AC05-780R03054
3. Contractor (name, address): International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date: 10 July 1978 5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.3.1	Cryogenic Systems									
1.3.1.1	Air Separation Unit			1	1305	32956	12116	597	-	46975
1.3.1.3	Area Management			23	815	2007	2027	372	-	5244
	Category B ECPs			-	-	37	41	-	-	78
	G & A - APCI			-	115	3247	374	39	-	3775
	Total 1.3.1			24	2235	38247	14558	1008	-	56072

16. Remarks	Dollars Expressed in Thousands - Escalated Dollars	17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

DOE Form CR-133P (1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase II

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
	Air Products			-	573	23732	1555	147	-	26007
	ICRC			20	33	-	-	-	-	53
	SWEC			1	1167	7882	8409	504	-	17963
	Category B ECP's			-	-	27	28	-	-	55
	Total 1.3.1			21	1773	31641	9992	651	-	44078
	Escalation			3	462	6606	4566	357	-	11994
	Total - Escalated			24	2235	38247	14558	1008	-	56072

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-633P (1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase II

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address): International Coal Refining Company, P. O. Box 2752, Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
	Air Products			-	717	27480	2293	233	-	30723
	ICRC			23	41	-	-	-	-	64
	SWEC			1	1477	10730	12224	775	-	25207
	Category B ECP's			-	-	37	41	-	-	78
	Total 1.3.1			24	2235	38247	14558	1008	-	56072

16. Remarks:

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

3. MILESTONE SCHEDULES

The original Project Master Schedule included here, showed significant design and procurement milestones for the Cryogenic Systems Area, WBS element 1.3.1. A bar chart format graphically depicted the scheduled predicted and actual occurrence dates; it was supported by a computerized tabulation of the same data. This information had been extracted electronically from the Intermediate Schedule which was developed by ICRC and Air Products and Chemicals, Inc. The basis of the Intermediate Schedule was a detailed logic network schedule which was developed by Air Products and Chemicals, Inc. to control internally its portion of the SRC-I project.

The schedule included DOE imposed restraints on the beginning of purchasing activities. It indicated the completion of Phase I work in June 1984, the beginning of construction in June 1984 and a mechanical completion date of August 1986.

While there is no current schedule for the resumption and completion of the SRC-I Project, the time durations for the original project activities can and should be considered in the development of any new preliminary schedules.

U.S. DEPARTMENT OF ENERGY

DOE Form CR435 (1-78)

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification	2. Reporting Period	3. Contract Number
CRYOGENIC SYSTEMS - MASTER SCHEDULE	through	
4. Contractor (name, address)		5. Contract Start Date
		6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1981 (OND), 1982 (JFM AMJ JAS), 1983 (OND JFM AMJ JAS), 1984 (OND JFM AMJ JAS), 1985 (OND JFM AMJ JAS), 1986 (OND JFM AMJ JAS), 1987 (OND JFM AMJ)	10. Percent Complete a) Planned	b) Actual
480	ASU	F E H G J I KLMN O P Q		
802	ENGINEERING TECHNICAL SUPPORT	A B		

11. Remarks

Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

U.S. DEPARTMENT OF ENERGY

DOE Form CR-535 (1-78)

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification	2. Reporting Period	3. Contract Number
CRYOGENIC SYSTEMS PROCUREMENT - MASTER SCHEDULE	through	

4. Contractor (name, address)	5. Contract Start Date
	6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months 1980	1981				1982				1983				1984					1985			1986			10. Percent Complete	
		OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	a) Planned	b) Actual
400	C. B. CORES				A					B	C			D												
401	MAIN AIR COMPRESSOR		A							B	C				E											

11. Remarks

Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 56 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4621 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: CRYOGENIC SYSTEMS - ASU WBS ELEMENT #: 1.3.1.1

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
480A	BGN PROC DSGN - ASU	15AUG80	15AUG80	15AUG80		
480B	BGN DETAILED DSGN - ASU	30SEP81	30SEP81	30SEP81		
480C	1ST M/SR - ASU	30SEP81	30SEP81	30SEP81		
480E	2ND M/SR MTG - ASU	13JUN83		13JUN83	12OCT83	
480F	BGN PSAR - ASU	14DEC82		14DEC82	17JAN84	
480G	COMPL PSAR - ASU	18JAN84		18JAN84	23JUL84	
480H	1ST SIGNIF CONSTR PKG - ASU	16DEC83		16DEC83	4SEP84	
480I	END PH I-ASU	2OCT84		2OCT84	17JAN86	
480J	ASU-1ST CONSTR PKG AWARD (S/C)	8AUG84		8AUG84	12FEB85	
480K	ASU - BGN STEEL ERECTION	10MAY85		10MAY85	6JAN86	
480L	ASU - BGN PIPE	24MAY85		24MAY85	29MAY86	
480M	ASU-BGN ELEC	24MAY85		24MAY85	26JUN86	
480N	ASU - COMPL STEEL ERECTION	24JUN85		24JUN85	25JUL86	
480O	ASU - COMPL PIPE	18SEP85		18SEP85	6OCT86	
480P	ASU - COMPL ELEC	16OCT85		16OCT85	24DEC86	
480Q	ASU - MECH COMPL	20JUN86		20JUN86	24DEC86	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 14 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: CRYOGENIC SYSTEMS - ENG TECHNICAL SUPPORT WBS ELEMENT #1 1.3.1.4

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
802A1	BGN DSGN SUPPORT PROGRAMS - CRYO SYS	1OCT81		1OCT81		
802B	COMPL DSGN SUPPORT PROGRAMS-CRYO SYS	19OCT82		19OCT82	05JUN85	

2 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 57 PAGE 1

CONTRACT 0J100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: CRYOGENIC SYSTEMS - ASU PROCUREMENT: C.B. CORES

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
400A	C.B. CORES - ISS MECH SPEC	30SEP81	30SEP81	30SEP81		
400B	C.B. CORES - ISS P.O/BGN VNDR ENG	29NOV82		29NOV82	13JAN83	
400C	C.B. CORES - COMPL VNDR ENG/BGN FAB	19JAN83		19JAN83	3MAR83	
400D	C.B. CORES - DEL TO C.B. FAB	15DEC83		16DEC83	2DAUG84	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 58 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: CRYOGENIC SYSTEMS - ASU PROCUREMENT: MAIN AIR COMPRESSOR

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
401A	MAIN AIR COMPR - ISS MECH SPEC	27JAN81	27JAN81	27JAN81		
401B	MAIN AIR COMPR - ISS P.O/BGN VNDR ENG	4NOV82		4NOV82	3JAN84	
401C	MAIN AIR COMPR-COMPL VNDR ENG/BGN FAB	16MAR83		16MAR83	10MAY84	
401E	MAIN AIR COMPR - DEL TO SITE	13MAR84		13MAR84	8MAY85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

B. GAS SYSTEMS (WBS 1.3.2)

1. TECHNICAL SCOPE

The Gasification, Gas Treating, and Sulfur Recovery Systems constitute the Gas Systems Area of the Demonstration Plant (see Figure 15).

Process descriptions for the Gas Systems Area (Area 15) are based on the following subdivision of areas and processing units:

- GASIFICATION AREA

  Dust Preparation Unit
  Coal Gasification Unit
  Wash-Water Treatment Unit
  Raw Syngas Compression Unit
  Shift Unit
  Methanation Unit

- GAS TREATING AREA

  Selexol Unit
  Diethanolamine (DEA) Unit
  Ammonia-Sulfide Water Stripping (ASWS) Unit
  Hydrogen Purification Unit (HPU)
  Liquefied Petroleum Gas (LPG) Recovery Unit
  Hydrogen Compression Unit

- SULFUR RECOVERY AREA

  Claus Unit
  Beavon Sulfur Removal (BSR) Unit

A simplified process block flow diagram for the Gas Systems Area is shown in Figure 15. Schematic diagrams for each processing unit are also provided.

a. Gasification Area

Dust Preparation Unit (DPU)

The DPU receives the supplemental coal, if required, from the Coal Preparation Area, and the ash concentrate (KMAC) from the SRC Deashing Area. This unit is being designed to provide the proper blend for the feed to the Coal Gasification Unit.

As shown in Figure 16, Kerr-McGee Ash Concentrate (KMAC) enters the Gasification Unit battery limit at the KMAC Receiving Bunker. The KMAC is humidified to obtain the proper moisture content for use as feed to the Gasification Reactors in the Gasification Unit.

Supplemental coal enters the Dust Preparation Unit at the common Coal Dust Receiving Bunker. The coal is then blended with the humidified KMAC to achieve proper mixing and the combined dust is routed to the Finished Dust Bunker. The coal/KMAC dust mixture is conveyed via pneumatic pumps using nitrogen as the conveying medium to the Service Bunkers in the Coal Gasification Unit.

Nitrogen used for conveying and bunker fluidization is combined after use, filtered to remove dust, and routed to the Nitrogen Recycle/Solvent Recovery Section of the Dust Preparation Unit. The nitrogen is compressed, cooled to recover water and solvent condensate, and recycled for use in the Dust Preparation Unit.

Coal Gasification Unit

The GKT coal gasification process will be used to generate the makeup-hydrogen required for the SRC Process, Naphtha Hydrotreater, and Expanded Bed Hydrocracker Areas (see Figure 17).

KMAC/coal dust is conveyed by nitrogen from the DPU to the Service Bunkers serving each Gasifier Burner. The KMAC/coal dust is then passed to the Feed Bunkers from which the mix is fed, via variable-speed Screw Feeders, to one of the four burners of each of three operating Gasification Reactors. In the Gasification Reactor, solids are partially oxidized in the presence of oxygen and steam. Slag leaves from the bottom of the Gasification Reactor. The raw gas effluent is quenched and then cooled in a Waste Heat Recovery System

(WHRS). The gas leaving the WHRS passes through a series of gas cleaning, cooling, and washing steps. Particulate-laden water from the various quenching, cleaning, cooling, and washing steps is sent to the Wash-Water Treatment Unit. Slag is conveyed to the battery limits for ultimate disposal in the ash ponds located in the Offsites Area.

Raw Gas Blowers move the raw syngas to the Raw Gas Holder in the Raw Syngas Compression Unit.

Wash-Water Treatment Unit

The Wash-Water Treatment Unit is being designed to remove the solid material, fly ash and slag, from the water used in the Coal Gasification Unit for the various quenching, cooling, and washing steps (see Figure 18).

Wash-water from the Coal Gasification Unit and an overflow water stream from the settling ponds outside battery limits enter a common enclosed Clarifier. Vapors are drawn off from the wash-water duct conveying line, as well as from the air space in the enclosed Clarifier by fans. Solids are separated from the water in the Clarifier by gravity, and a sludge scraper rakes the settled material into the settling basin from which it is continuously pumped to the facility Ash Ponds. The clarified wash-water is passed over a weir at the edge of the Clarifier into a discharge system from which it flows through a Cooler to the Coal Gasification Unit. The plate-type coolers are back-flushed periodically with clarified wash-water to minimize fouling resulting from solids deposition.

Raw Syngas Compression Unit

The Raw Syngas Compression Unit is provided to boost the pressure of the raw syngas from the Coal Gasification Unit (see Figure 19). The raw syngas from the Raw Gas Holder passes through a single Electrostatic Precipitator for the final particulate removal. The syngas is then compressed from atmospheric pressure to more than 800 psig by a five-stage centrifugal machine. A Catalytic Reactor is installed between the first and second stages of the compressor to remove traces of NO_x and O_2 contained in the raw gas to prevent reactions with sulfur species resulting in the precipitation of elemental sulfur. An aftercooler and condensate knockout pot are provided after the first four stages of compression. Condensate from the knockout drums is combined and routed to the Ammonia-Sulfide Water Stripping Unit (ASWS) in the Gas Treating Area. The hot raw syngas leaving the final stage of compression is sent to the Shift Unit.

Shift Unit

The Shift Unit is being designed to convert most of the carbon monoxide in the raw syngas to hydrogen (see Figure 20). Raw synthesis gas from the Raw Syngas Compression Unit is combined with steam before entering a three-stage shift section. A portion of this steam is generated in the Shift Unit, another portion is imported from the Methanation Unit, and the final portion is imported from the steam system of the Utilities Area. In a series of steps, the gas is passed over a sulfur-resistant catalyst whereupon carbon monoxide and steam react to generate hydrogen and carbon dioxide. Reaction heat generated by the exothermic reaction is used to preheat the feed gas entering the first Shift Converter and to generate steam. After use in the generation of steam, the preheating of boiler feedwater and CO_2 waste gas, and final cooling, the effluent from the third Shift Converter is sent to the Selexol Unit of the Gas Treating Area for final gas processing. Condensate separated from the gas is depressurized to free the dissolved sour gas. The depressurized condensate is then cooled and divided into two streams. One stream is sent to the Gasification Unit and another is sent to the Ammonia-Sulfide Water Stripping Unit.

Methanation Unit

The Methanation unit processes the portion of makeup-hydrogen leaving the Selexol Unit of the Gas Treating Area that is routed to the EBH Area and the Naphtha Hydrotreater. The carbon oxides contained in this gas stream are almost completely converted to methane (see Figure 21).

The sweetened hydrogen gas from the Selexol Unit, containing approximately 3% CO, 0.2% CO_2 and 1.4 ppmv of sulfur compounds, is preheated by the effluent gas from the Methanation Unit and passed through a ZnO bed for removal of trace sulfur compounds. The gas is then passed through a methanation catalyst reactor. The methanated gas, which contains only 20 ppmv of CO plus CO_2, is cooled and then sent to the EBH Area and the Naphtha Hydrotreater.

b. Gas Treating Area

This area processes the raw gas and sour water streams generated in the SRC facility for the removal of acid gases (H_2S, CO_2), as well as other minor contaminants (e.g., HCl, NH_3, and COS). The acid gases are routed to the Sulfur Recovery Area while the treated sour water is sent to the Wastewater Treating Area. Liquefied petroleum gas (LPG) is recovered from the fuel gas reject stream of the Hydrogen Purification Unit (HPU). The Hydrogen Compression Unit compresses the total hydrogen gas streams and delivers them to the SRC Process Area and the EBH.

Selexol Unit

The Selexol Unit treats the high-pressure raw makeup-hydrogen stream generated in the Gasification Area (see Figure 22). Initially, the raw gas passes through an H_2S Absorber where CO_2-saturated solvent selectively removes H_2S. The rich solvent is flashed twice before entering the H_2S Stripper. The vapors generated in the flashing steps are compressed and recycled to the H_2S Absorber. Steam is used to supply the energy required to regenerate the solvent in the H_2S Stripper. Acid gases are sent to the Claus Unit for sulfur recovery. Cold, lean solvent removes CO_2 from the desulfurized gas in the CO_2 Absorber. The rich solvent is flashed twice before entering the CO_2 Stripper. The high-pressure flash gas is recycled to the H_2S Absorber. CO_2 is stripped from the rich solvent with N_2 in the CO_2 Stripper. The gas mixture leaving the CO_2 Stripper is combined with the CO_2-rich, low-pressure flash vapors and heated in the Shift Unit before being vented. The sweetened makeup-hydrogen gas leaving the top of the CO_2 Absorber is then split. One part is routed to the Methanation Unit in the Gasification Section and the remaining portion is routed to the Hydrogen Compression Unit.

Diethanolamine (DEA) Unit

The DEA Unit treats a high-pressure raw hydrogen-rich gas stream and a low-pressure raw fuel gas stream from the SRC Process Area; a low-pressure raw fuel gas stream from the Coker/Calciner Area; and a high-pressure raw hydrogen-rich gas stream and a low-pressure fuel gas stream from the EBH Area. This unit will be designed to remove hydrogen chloride, ammonia, hydrogen sulfide, and carbon dioxide from the high-pressure and low-pressure gases (see Figure 23).

The DEA process is designed to treat high-pressure raw hydrogen-rich gas streams and low-pressure raw fuel gas streams in high- and low-pressure absorbers, respectively. The high-pressure raw hydrogen-rich gas stream is a combination of two independent flash gas streams. One stream originates in the SRC Process Area and the other stream originates in the EBH Area. The low-pressure raw fuel-gas streams originate in the SRC Process, the Coker/Calciner, and Hydrocracking Areas.

The sweetened high-pressure hydrogen-rich gas is split. A portion is bypassed directly to the Hydrogen Compression Unit while the remaining portion is routed to the HPU. The treated low-pressure fuel-gas is sent to the plant fuel gas header. Both the high-pressure raw hydrogen-rich gas and the low-pressure raw fuel-gas are scrubbed with water to remove NH_3. The high-pressure raw hydrogen-rich gas and the low-pressure raw fuel-gas then flow to the HP and LP Absorbers, respectively, where acid gases are chemically removed by DEA solution. The high-pressure gas leaving the top of the HP Absorber is washed with caustic solution for final H_2S and CO_2 removal. The high-pressure rich solution leaving the bottom of the HP Absorber is flashed and combined with the low-pressure rich solution. The combined rich solution, containing the acid gases removed from both the high- and low-pressure gas streams, is sent to the DEA Regenerator. Acid gases are stripped from the solution by the vapors generated by the condensation of steam in the Regenerator Reboiler. The overhead acid gases are routed to the downstream Claus unit for the bulk recovery of sulfur.

Ammonia-Sulfide Water Stripping Unit (ASWS)

This unit processes sour water originating in various units of the SRC-I facility to remove hydrogen sulfide, ammonia, and some portions of other trace contaminants (see Figure 24).

Sour-water streams originate in the SRC Process Area, the Raw Syngas Compression Unit, the Shift Unit, the Coker/Calciner Area, the EBH Area, the DEA Unit, and the Beavon Sulfur Removal Unit. Intermittent sour-water streams also originate in the Hydrogen Compression Unit and Claus Units. The combined sour-water streams are sent to a flash drum where most of the dissolved light hydrocarbons and some CO_2, H_2S, and NH_3 are flashed and combined with the overhead gases from the Stripper. Oil is separated from the water in the flash drum and sent to the slop oil collection system. Free-ammonia, H_2S, and CO_2 are stripped from the water in an Ammonia Sulfide Water Stripper. Lime slurry is added to free fixed-ammonia in the water stream from the Ammonia Sulfide Water Stripper. The free-ammonia formed is stripped in the ammonia stripper by steam produced in the reboiler. Water leaving the bottom of the stripper is cooled and then sent to the Wastewater Treating System in the Off-Sites Area. The stripped gases from the top of the Ammonia Sulfide Water Stripper are combined with the gases from the Flash Drum and settler and sent to the Claus Unit.

Hydrogen Purification Unit (HPU)

The HPU comprises an Oil Scrub Section which removes heavy hydrocarbons from the entering feed gas; a Feed Gas Drier which will remove moisture and carbon dioxide; and a Cold Box which will separate lighter hydrocarbons from hydrogen cryogenically (see Figure 25).

The rich scrub oil containing benzene and heavier hydrocarbons scrubbed from the feed gas exits from the bottom of the Oil Scrub Column. After exchanging heat in the Rich-Oil/Lean-Oil Exchanger against hot lean oil from the Oil Stripping Column, the rich oil is heated in the Rich-Oil Heater and then fed to the Oil Stripping Column to remove absorbed heavy hydrocarbons by stripping with saturated steam. The lean oil flowing out of the bottom of the Oil Stripping Column contains less than one ppmv of benzene and heavier hydrocarbons. The lean oil is cooled first in the Rich-Oil/Lean-Oil Exchanger against the rich oil from the Oil Scrub Column, and then by cooling water in the Lean-Oil Cooler. It is then pumped by one of the Lean-Oil Recirculation Pumps to the Oil Scrub Column.

The overhead stream leaving the Oil Stripping Column is cooled in an Oil Stripper Water Condenser. The condensed water flows to a Hydrocarbon Water Decanter, and the uncondensed vapor is further cooled in an Oil Stripper Glycol Condenser to condense most of the remaining water vapor and heavy hydrocarbons, which then flow to the Decanter. The uncondensed hydrocarbons are compressed by the Oil Stripper Vapor Compressor and then combined with the reactivation gas downstream of the Feed Gas Driers. An Aromatic Pump recycles a small portion of the heavy hydrocarbons flowing out of the Decanter to the top of the Oil Stripping Column as reflux to reduce the oil carry-over in the column overhead. The rest of the heavy hydrocarbons are sent to the SRC Process Area. The hydrocarbon-contaminated water from the Decanter is sent to the Wastewater Treatment System.

The scrubbed gas is cooled against glycol, after which condensate is separated from the gas in the Feed Condensate Separator. The gas enters one of the three switching Feed Driers charged with molecular sieve where the remaining moisture and carbon dioxide are removed by adsorption. The feed gas then passes through a Drier Afterfilter to remove any molecular sieve particles before entering the Cold Box for the separation of hydrogen and light hydrocarbons. Fuel gas from the Cold Box is sent to the LPG Recovery Unit.

After the water and heavy hydrocarbons in the feed gas are reduced to levels sufficient to prevent freeze-out, the feed gas enters the Cold Box. Here the feed gas is cooled to a low temperature against the returning product hydrogen and fuel streams to effect separation into a hydrogen-rich gas and a hydrocarbon-rich liquid. The hydrogen-rich stream contains approximately 86.5 mol % hydrogen and 13.5 mol % of impurities consisting primarily of nitrogen, argon, carbon monoxide, and methane. After warming against the feed gas, the hydrogen-rich stream leaves the Cold Box.

The hydrocarbon-rich liquid separated from the hydrogen gas is flashed to reduce the temperature sufficiently to produce the desired cooling. This fuel stream is then warmed against the feed gas and leaves the Cold Box.

The Feed Driers are operated on an 8-hr on-stream, 16-hr reactivation cycle. The off-stream beds are reactivated with a portion of the fuel gas from the LPG Recovery Unit. The reactivation gas is heated in a Reactivation Stream Heater and passed through the off-stream bed. When removal of impurities from the molecular sieve bed is complete, the bed is cooled by means of reactivation gas cooled in the Reactivation Glycol Cooler and placed on-stream. The saturated bed is then removed from service for subsequent reactivation. After being used for reactivation, the low-pressure fuel stream is cooled in a Reactivation Aftercooler, and condensate is removed in a Reactivation Condensate Separator.

The reactivation gas is combined with the remaining portion of the fuel stream which is not used for reactivation and with the Oil Stripper vapor stream which has been compressed by the Oil Stripper Vapor Compressor. This total stream is then sent to the fuel gas header.

Liquefied Petroleum Gas (LPG) Recovery Unit

This unit recovers propane, butane, and a small amount of pentane from the fuel gas reject stream of the HPU. The LPG is sent to the pilot gas system and to storage, and the by-product fuel-gas stream is routed to the HPU Unit and to the fuel gas header (see Figure 26).

The fuel gas reject stream from the HPU is first compressed in the L.P. Feed Gas Compressor, then compressed further in the compressor side of the Compander. The gas is then cooled and chilled by heat exchange with the residue gas from the De-ethanizer. Heavier components in the feed gas are condensed and the liquid fraction is separated and fed to the De-ethanizer, while the vapor fraction is sent to the expander side of the Compander. As the vapor expands isentropically in the expander section, its temperature is lowered because of the extraction of energy as mechanical work. Thus, more ethane and heavier components are condensed. This two-phase stream flows to the top of the De-ethanizer, where it combines with the vapor from the top tray. The resulting equilibrium produces reflux liquid for the De-ethanizer and cold residue gas. The residue gas leaving the top section of the De-ethanizer is warmed by the compressed feed gas and is then split. A portion is routed to the HPU to be used as reactivation gas for the Feed Driers. The remaining portion is sent to the fuel gas header. Specification quality LPG is taken from the bottom of the De-ethanizer and pumped to LPG storage.

Hydrogen Compression

The Compression Area consists of only the Hydrogen Compression Unit, which compresses a portion of the makeup-hydrogen gas stream from the Selexol Unit (SRC makeup-hydrogen), the bypass hydrogen-rich gas stream from the DEA Unit, and the recycle-hydrogen gas stream from the HPU in separate stages (see Figure 27). The SRC makeup hydrogen, the bypass hydrogen-rich gas, and the recycle-hydrogen gas streams are then combined, and the total combined hydrogen gas stream is delivered to the SRC Process Area.

c. Sulfur Recovery

Claus Unit

The Claus Unit processes the acid gases from the Selexol and DEA Units and the ammonia-laden gas from the ASWS Unit. The unit will remove the bulk of the sulfur contained in the acid gases and thermally decompose the ammonia in the gas from the ASWS unit (see Figure 28).

The Claus Unit is a three-stage ammonia-burning plant. The NH_3-laden gas originating in the ASWS Unit is combusted at high temperature in the front end of the external combustion chamber. A portion of acid gas from the DEA unit is mixed with the NH_3-laden gas such that all of the NH_3 is combusted in the front end of the external combustion chamber. A smaller portion of DEA acid gas is sent to the in-line auxiliary burner. The remaining DEA acid gas and the Selexol acid gas are mixed and sent to the second section of the combustion chamber. The heat generated by the exothermic reactions is used to generate steam. The gas leaving the Reaction Furnace flows to the first Sulfur Condenser. From the first condenser, the process gas stream passes through three stages of catalytic conversion. Each stage consists of an in-line Auxiliary Burner, a catalyst bed, and a Sulfur Condenser. Condensed sulfur is drained to the Sulfur Pit. The tail gas from the last Sulfur Condenser is sent to the Beavon Sulfur Removal (BSR) Unit for removal of the residual sulfur compounds.

Beavon Sulfur Removal (BSR) Unit

The BSR Unit treats the tail gas from the Claus Unit (see Figure 29).

The tail gas is heated in a Reducing Gas Generator. Steam is added to the generator to ensure adequate hydrogen production. All sulfur compounds in the tail gas are hydrogenated to H_2S in a catalytic reactor, and the gas is then cooled before entering the Stretford portion of the unit. In that section, circulating Stretford solution removes H_2S from the gas. The gas leaving the Tail Gas Absorber is vented to the atmosphere.

Vapors from the Sulfur Pit are blown into the Sulfur Pit Vapor Absorber where they contact oxidized Stretford solution which partially removes sulfur. The vapor effluents pass through the upper bed of the Tail Gas Absorber, where they again contact oxidized Stretford solution. Reduced Stretford solution from the tail gas, fuel gas, and Pit Vapor Absorbers flows by gravity to the Reaction Tank and then to the Oxidizer Tanks. Reduced Stretford solution is regenerated by oxidation with air. Sulfur is recovered as a slurry and pumped to the Vacuum Filter. The oxidized Stretford solution is separated and recovered from the Vacuum Filter. Sulfur cake from the Vacuum Filter is reslurried with steam condensate. The reslurried sulfur is pumped to a Decanter where steam injection melts the sulfur. Sulfur is removed from the bottom of the Decanter and sent to the Sulfur Pit. The oxidized Stretford solution from the Vacuum Filter and the Decanter is returned to the Balance Tank from which it is pumped back to the absorbers.

The following is a tabulation of some of the major items of equipment in the Gas Systems Area (WBS 1.3.2):

WBS 1.3.2.1--Gasification

R-15051	Gasifiers (3)
B-15051	Waste Heat Recovery Boilers (3)
S-15051	Raw Gas Cooling Washers (3)
TK-15051	Gas Holder
X-15201	Electrostatic Precipitator
C-15201	Raw Gas Compressor
R-15251	First Shift Reactor
R-15252	Second Shift Reactor
R-15253	Third Shift Reactor

WBS 1.3.2.2--Gas Treating and Hydrogen Purification Unit

T-15303	Treated Gas Wash Column
T-15304	HP DEA Absorber
T-15305	LP DEA Absorber
T-15306	DEA Regenerator
T-15401	H_2S Absorber
T-15402	H_2S Stripper
T-15403	CO_2 Absorber
T-15404	CO_2 Stripper

T-15501	ASWS Stripper
C-15551	Feed Gas Compressor
C-15601	Hydrogen Compressors (3)
D-14600	Feed Gas Driers (3)
S-14700	Oil Scrub Column
T-14710	Oil Stripping Column
X-14850	Cold Box

WBS 1.3.2.4--Sulfur Recovery Unit

C-15701,21	Air Blower
H-15701,21	Reaction Furnace
H-15706	Stack
V-15704,24	Converter
H-15800	Reducing Gas Generator
V-15801	Tail Gas Absorber
V-15806	Sulfur Decanter No. 2
FL-15800	Vacuum Filter

FIGURE 15
GAS SYSTEMS
AREA 15
MAJOR PROCESS FLOWSCHEME

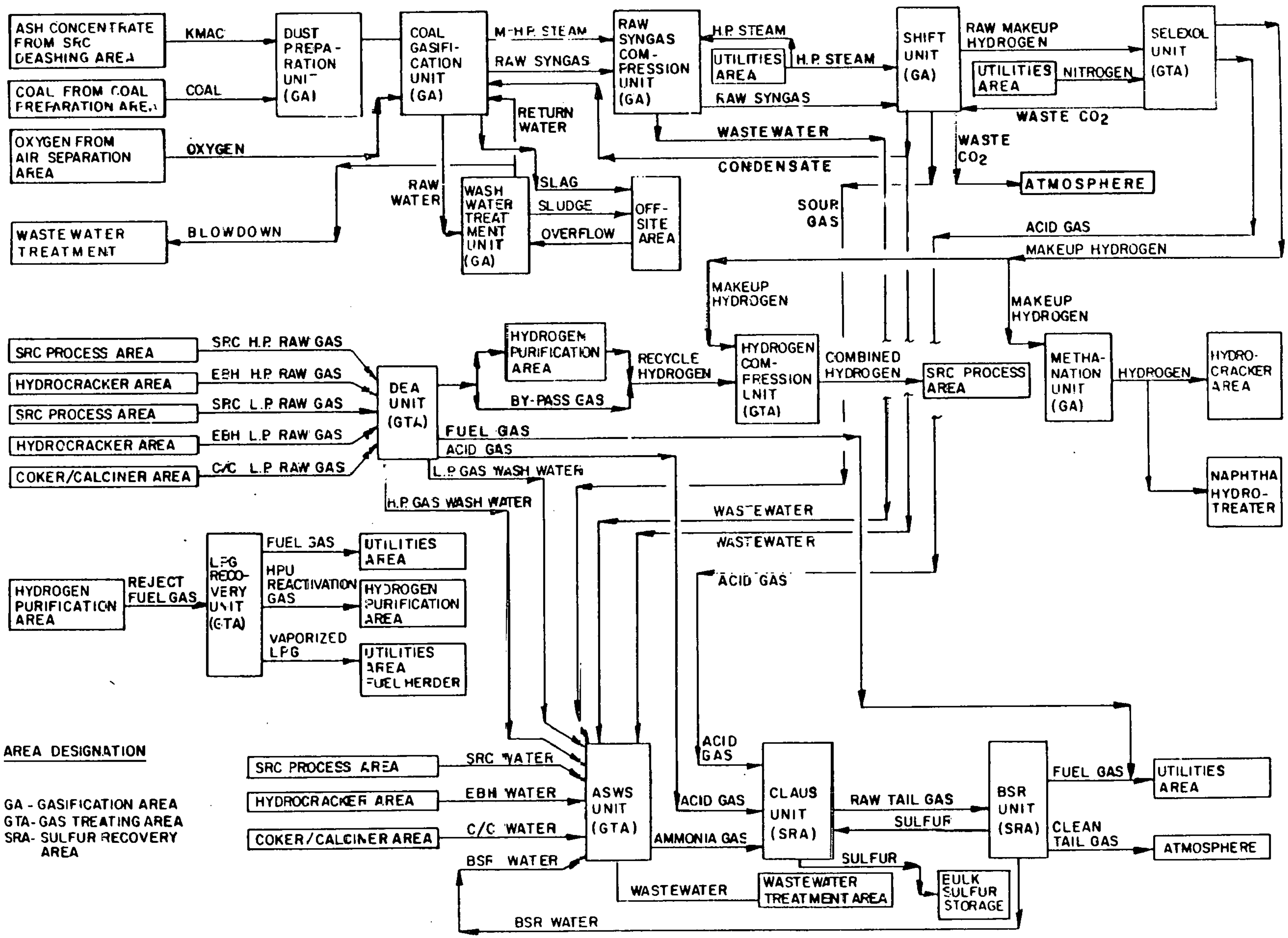
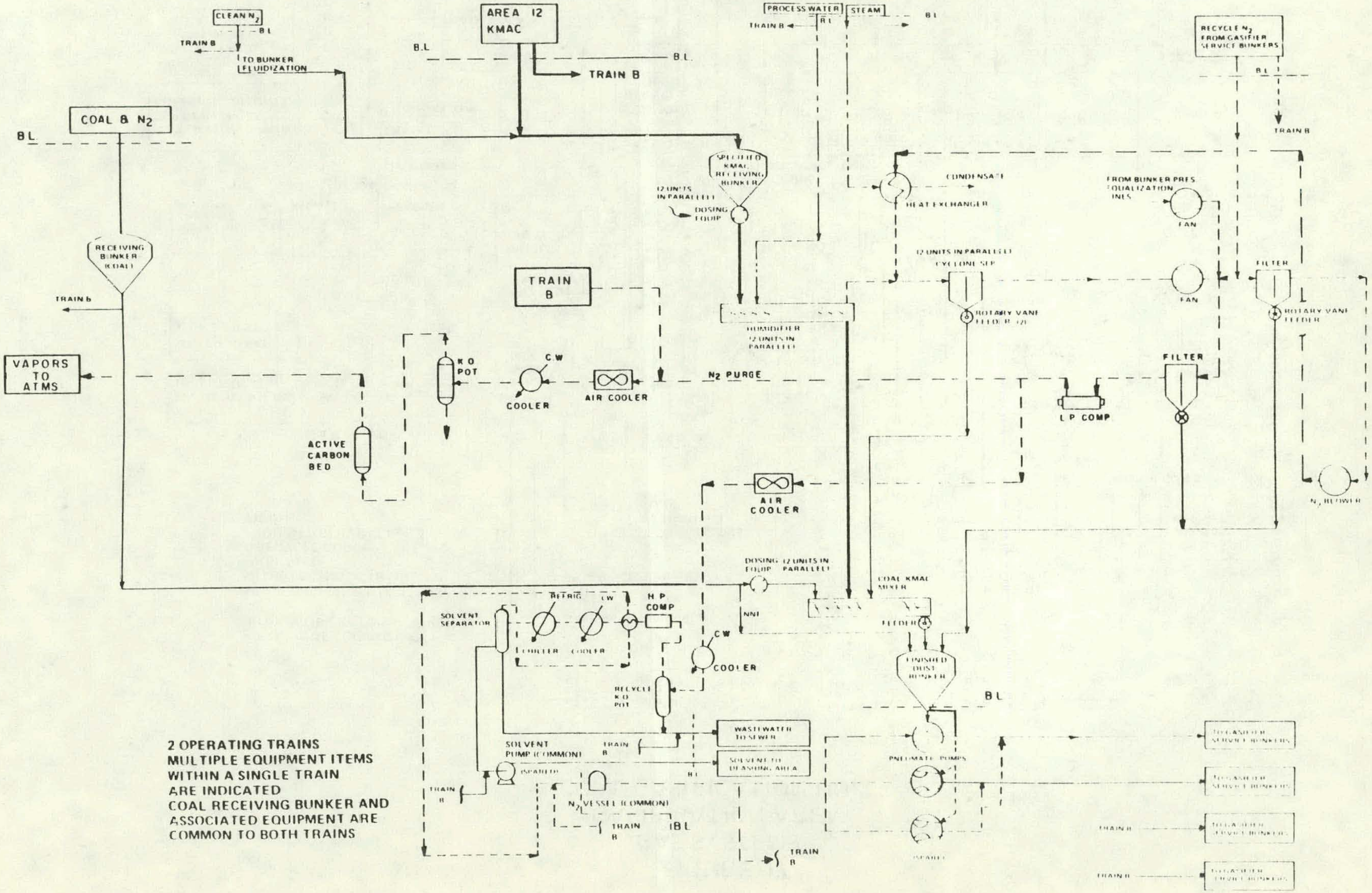


FIGURE 16
GAS SYSTEMS
GASIFICATION AREA
DUST PREPARATION UNIT



2 OPERATING TRAINS
MULTIPLE EQUIPMENT ITEMS WITHIN A SINGLE TRAIN ARE INDICATED
COAL RECEIVING BUNKER AND ASSOCIATED EQUIPMENT ARE COMMON TO BOTH TRAINS

FIGURE 17
GAS SYSTEMS
GASIFICATION AREA
COAL GASIFICATION UNIT

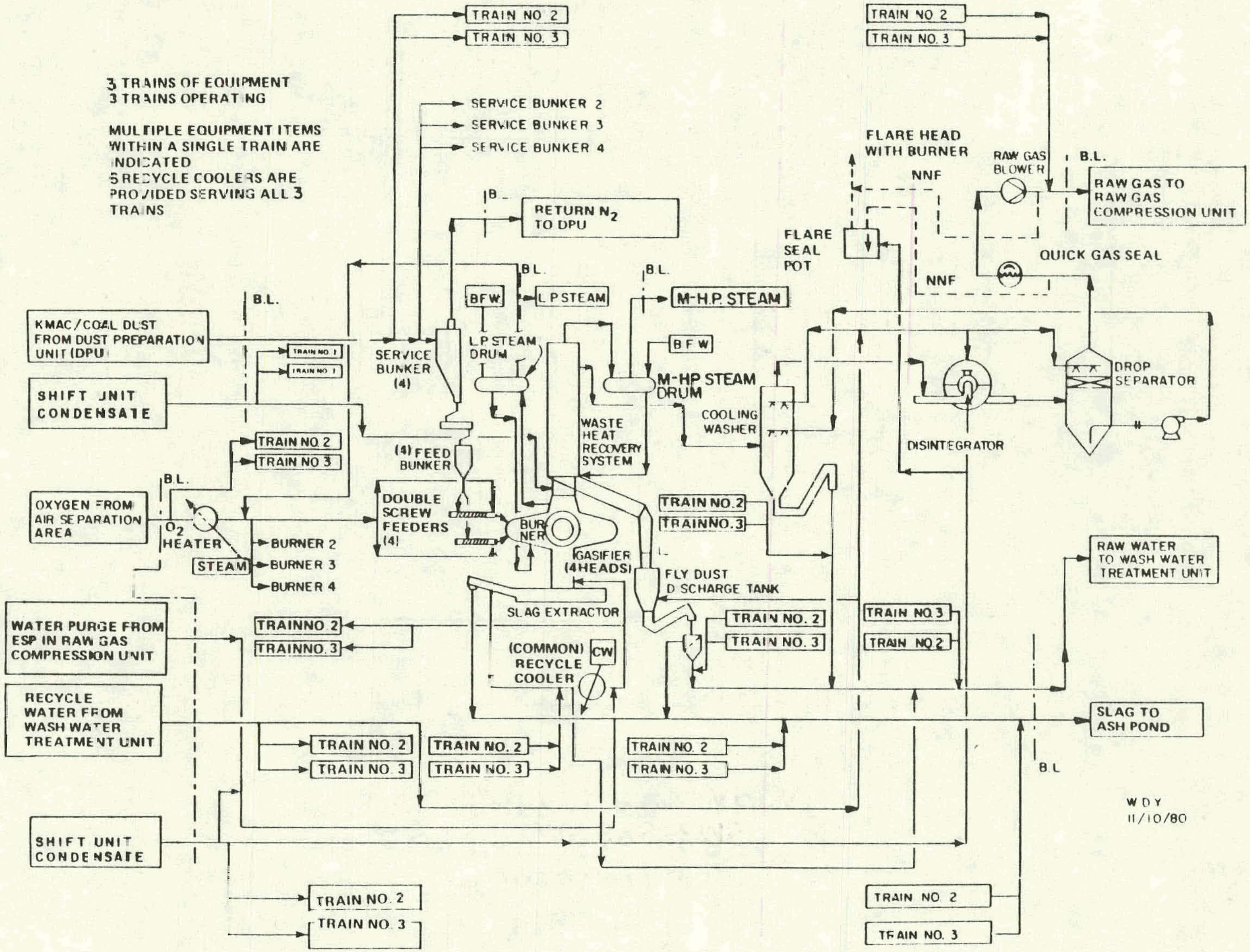


FIGURE 18
GAS SYSTEMS
GASIFICATION AREA
WASH WATER TREATMENT UNIT

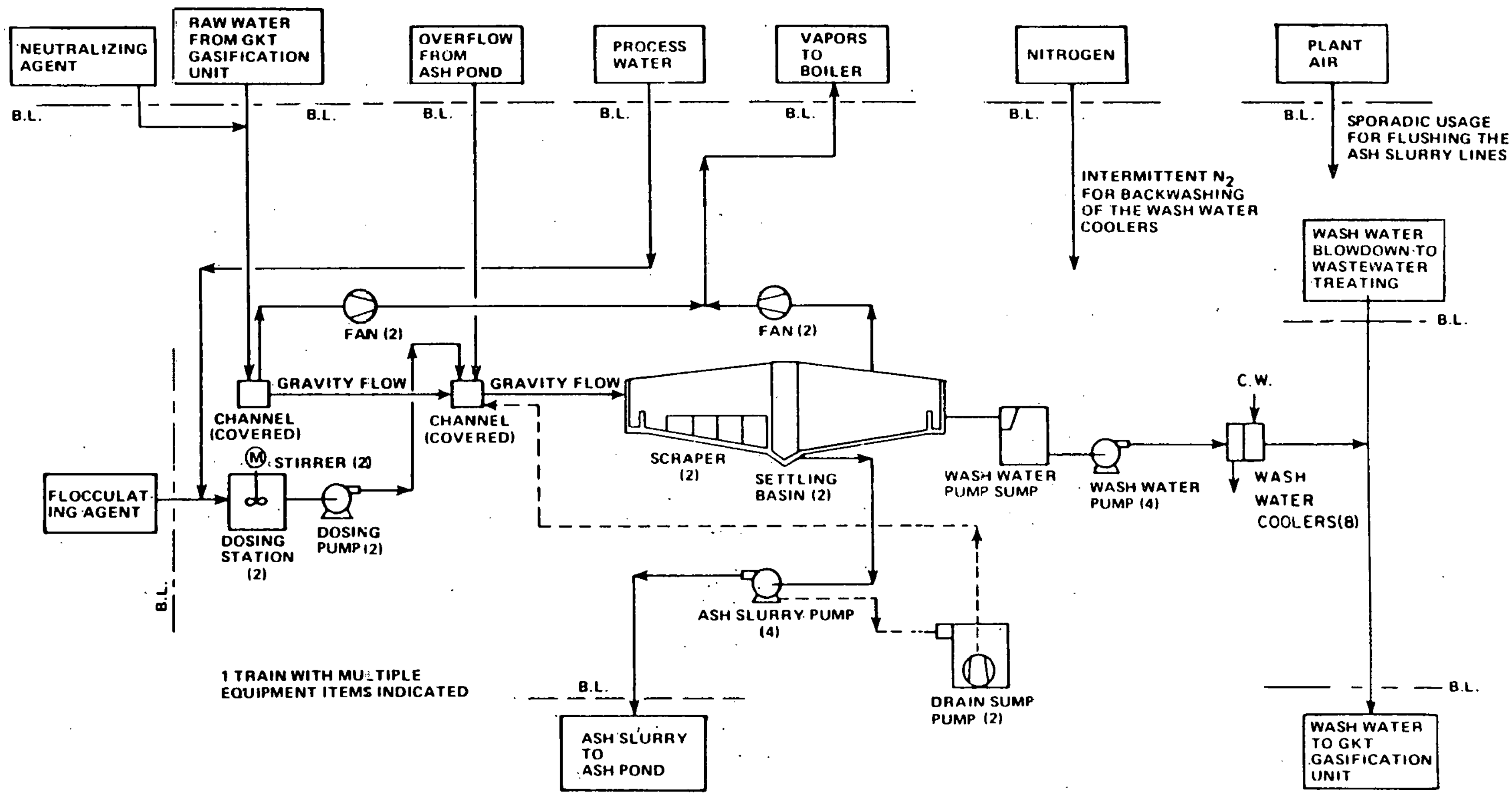


FIGURE 19
GAS SYSTEMS
GASIFICATION AREA
RAW GAS COMPRESSION UNIT

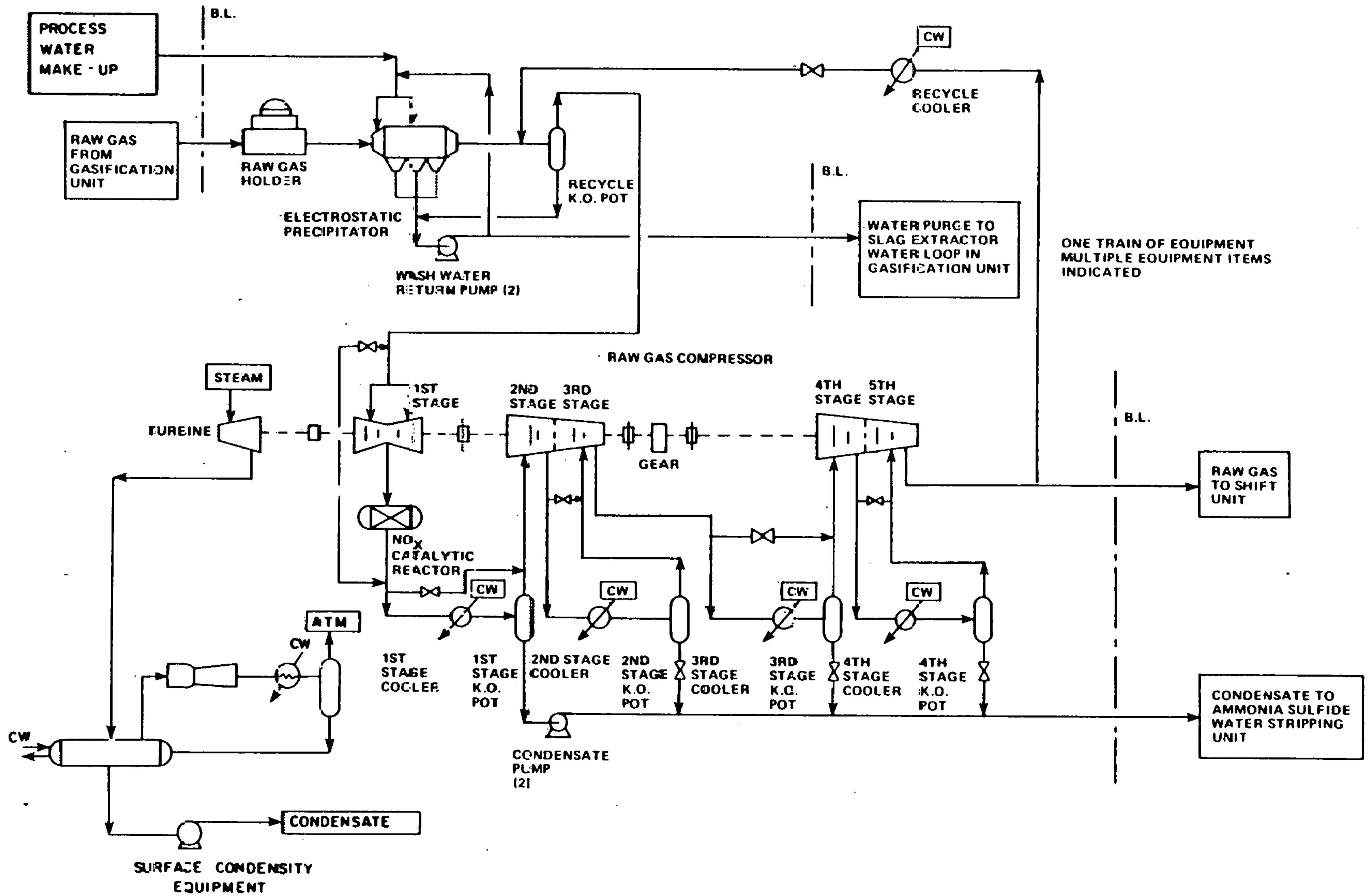
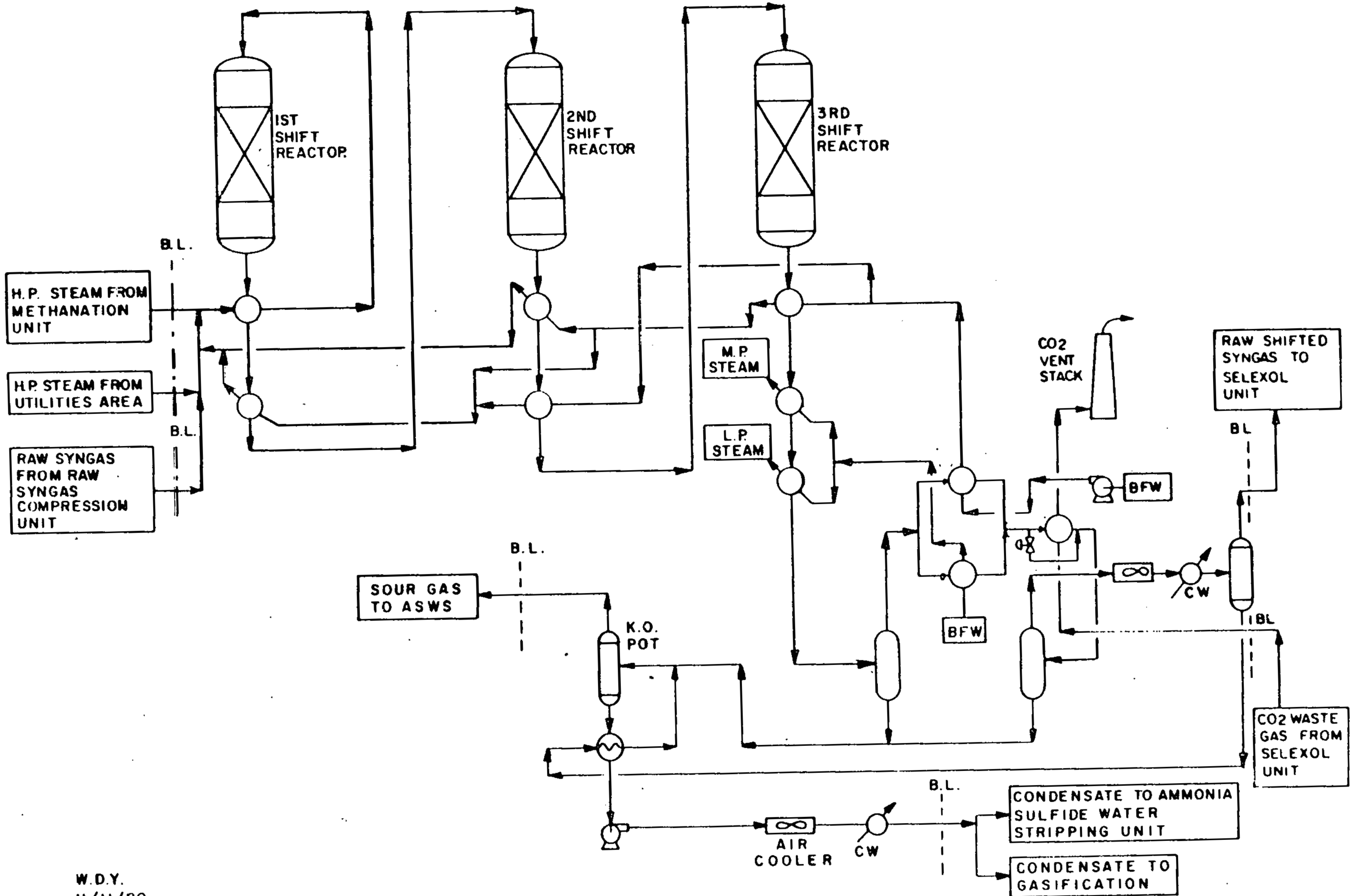


FIGURE 20
GAS SYSTEMS
GASIFICATION AREA
SHIFT UNIT



W.D.Y.
11/11/80

FIGURE 21
GAS SYSTEMS
METHANATION UNIT

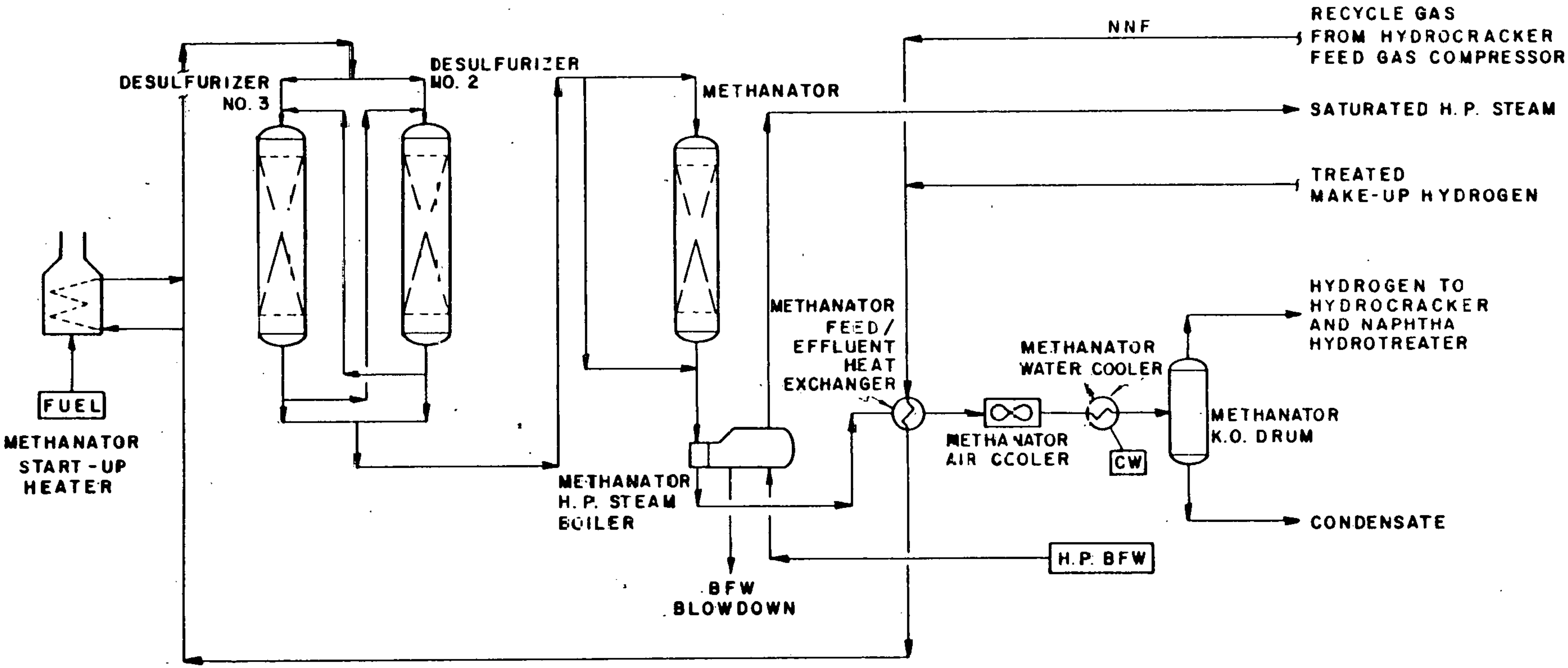
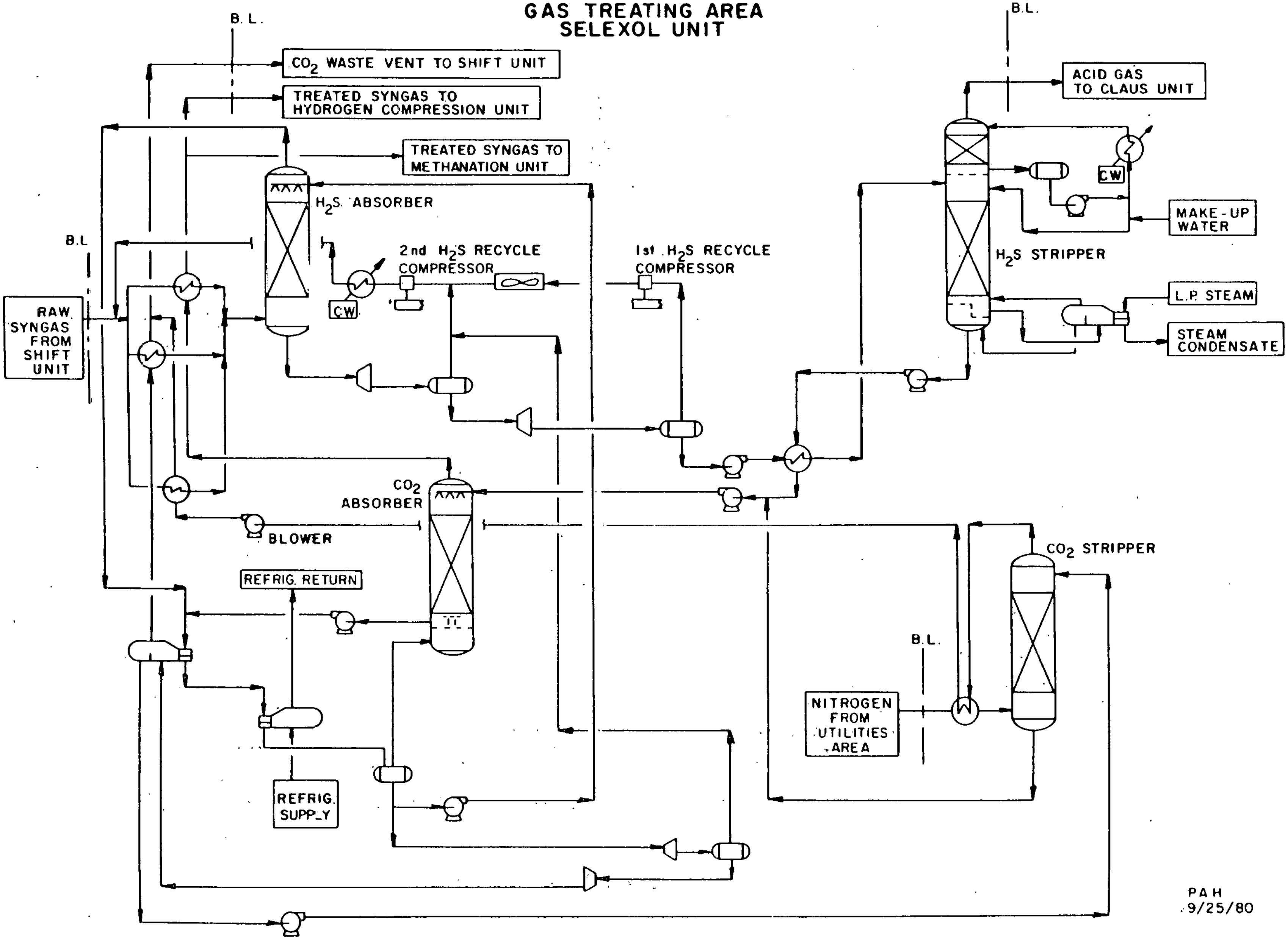


FIGURE 22
GAS SYSTEMS
GAS TREATING AREA
SELEXOL UNIT



PAH
9/25/80

FIGURE 23
GAS SYSTEMS
GAS TREATING AREA
DEA UNIT

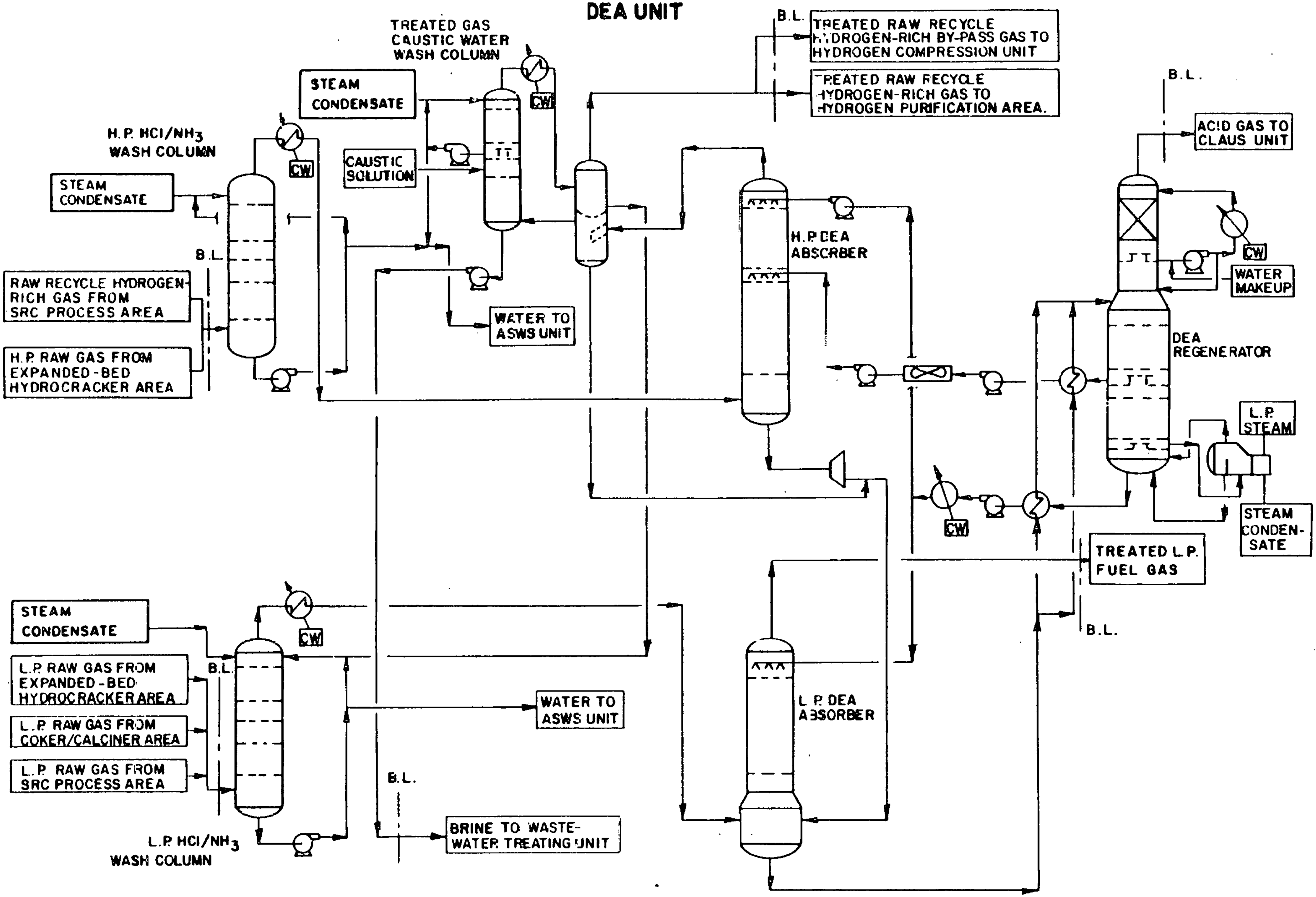
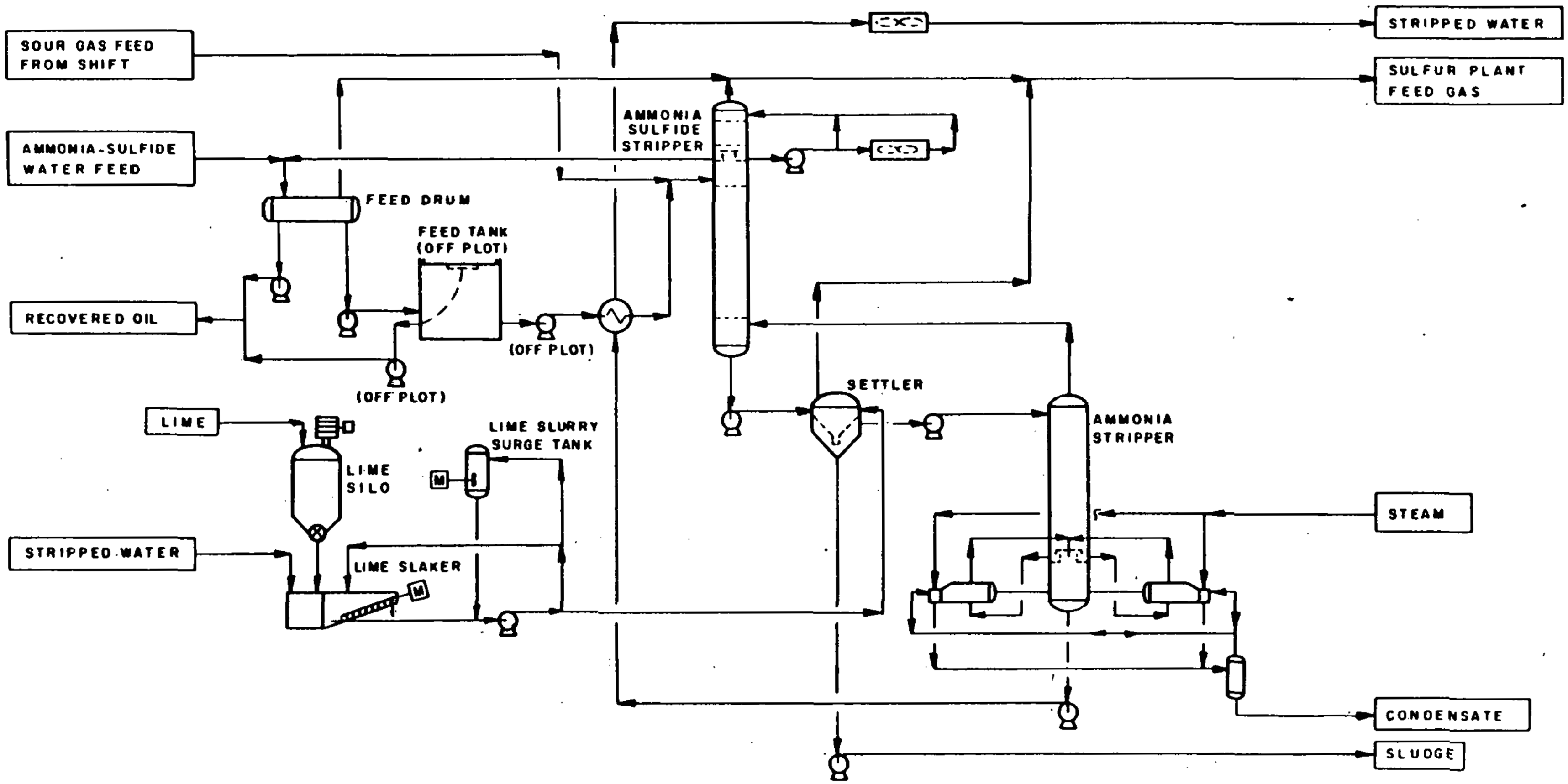


FIGURE 24
GAS SYSTEMS
GAS TREATING AREA
AMMONIA-SULFIDE WATER STRIPPING (ASWS) UNIT



CRYOGENIC SYSTEMS
AREA 14
HYDROGEN PURIFICATION AREA
FIGURE 25

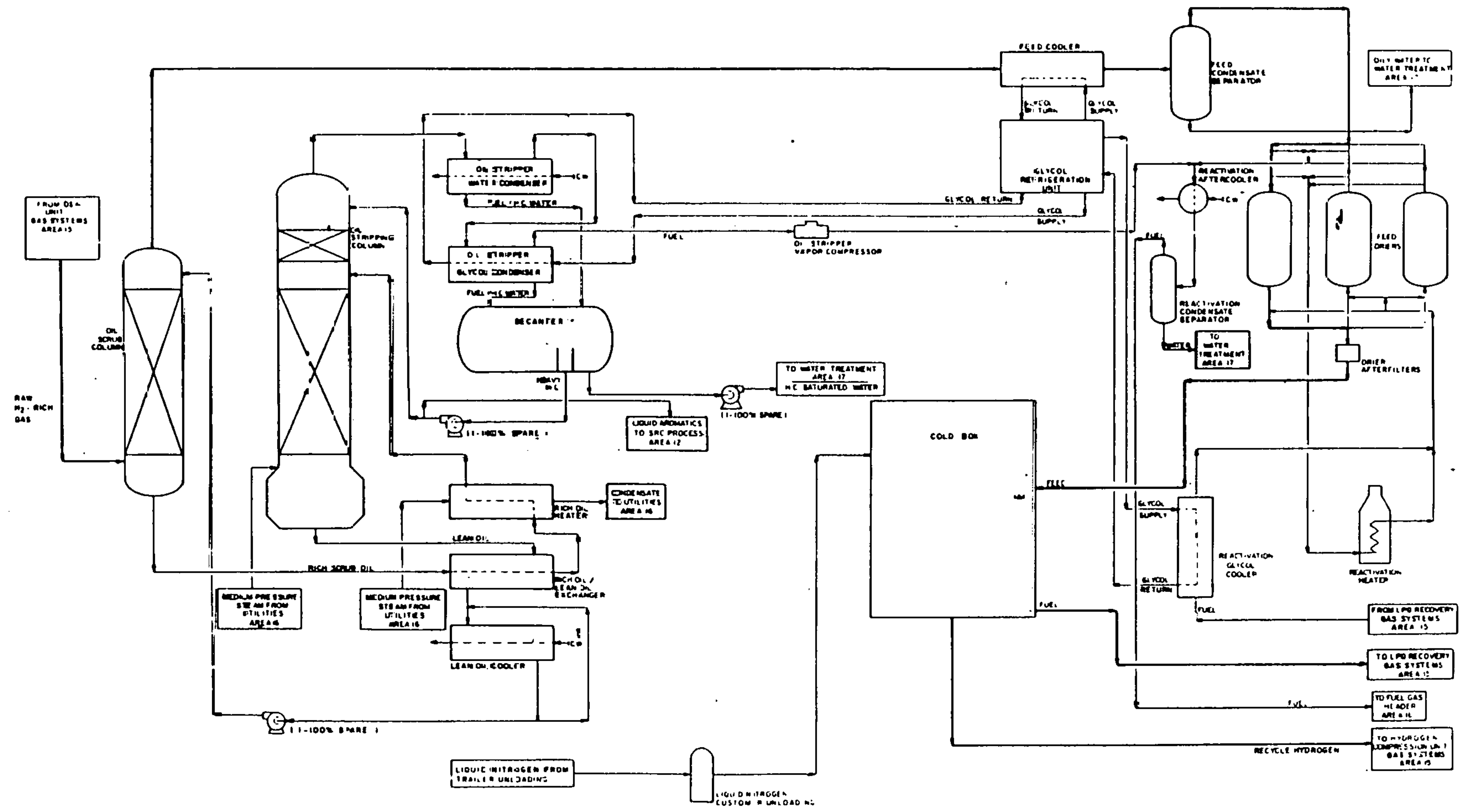


FIGURE 26
GAS SYSTEMS
GAS TREATMENT AREA
LIQUEFIED PETROLEUM GAS (LPG) RECOVERY UNIT

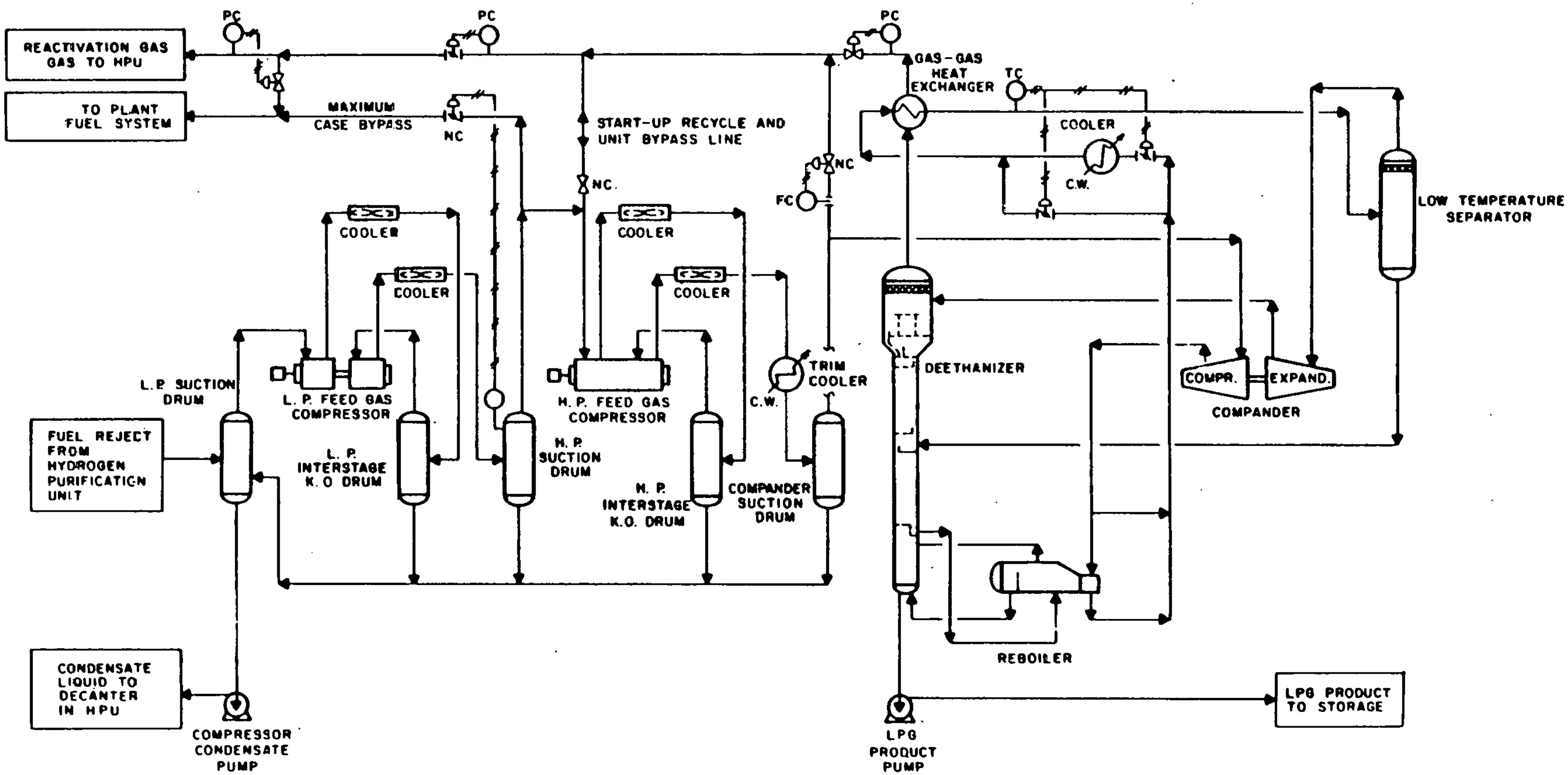
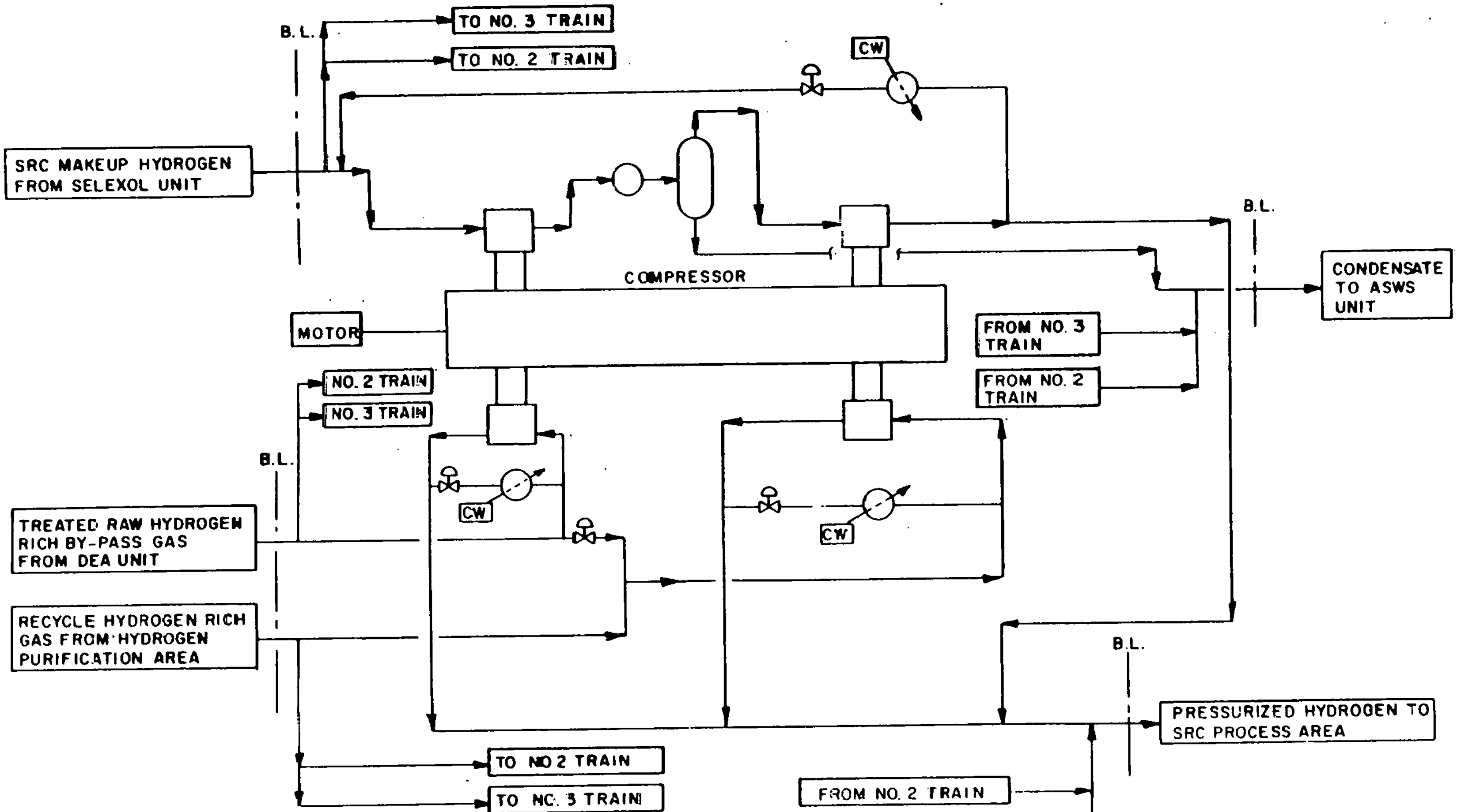


FIGURE 27
GAS SYSTEMS
GAS TREATING AREA
HYDROGEN COMPRESSION UNIT



ONE TRAIN OF COMPRESSION SHOWN

NUMBER OF TRAINS 3

NUMBER OF SPARE TRAINS 1

CAPACITY OF EACH TRAIN 50%

W.D.Y.
11/11/80

FIGURE 28
GAS SYSTEMS
SULFUR RECOVERY AREA
CLAUS UNIT

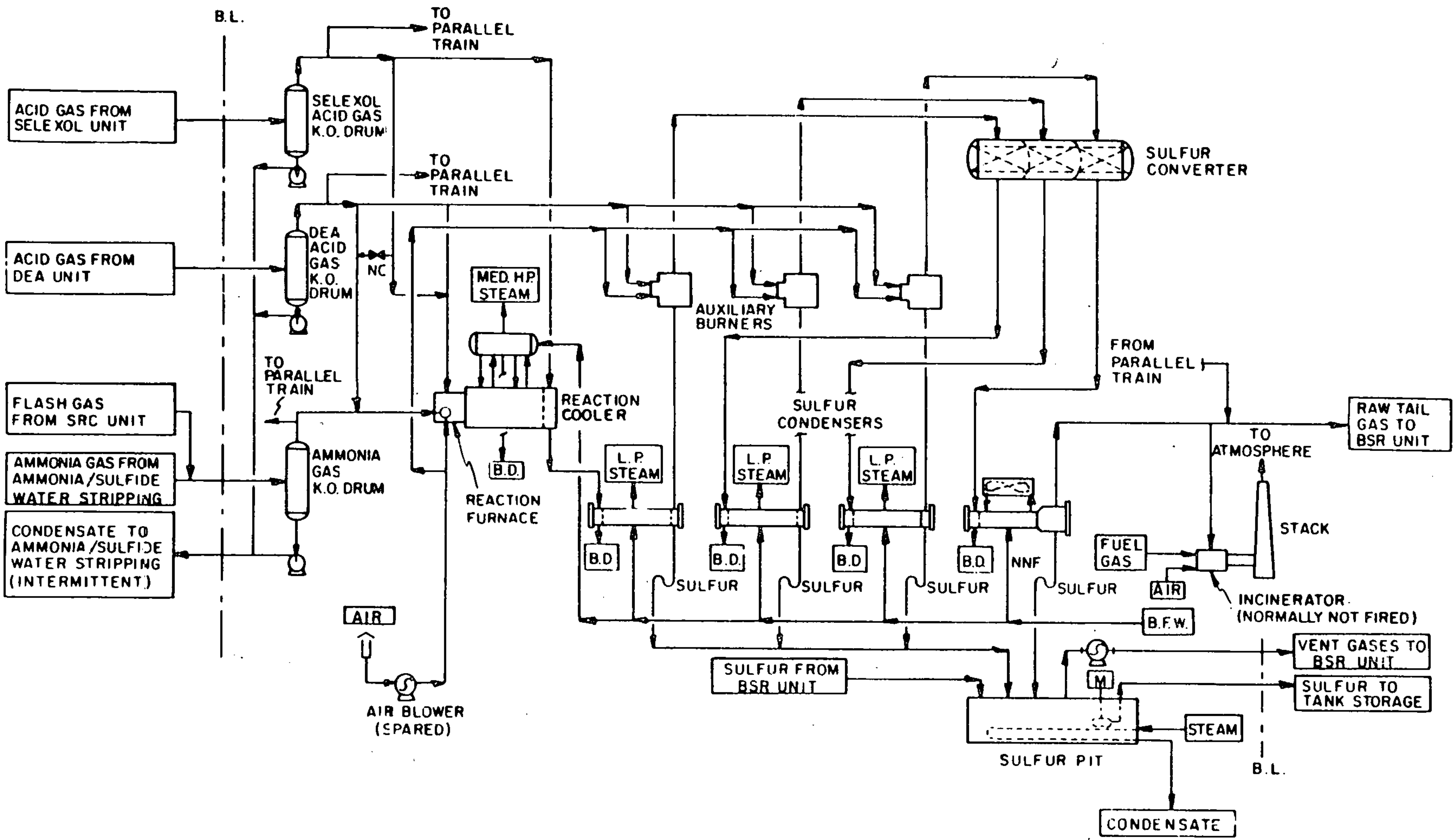
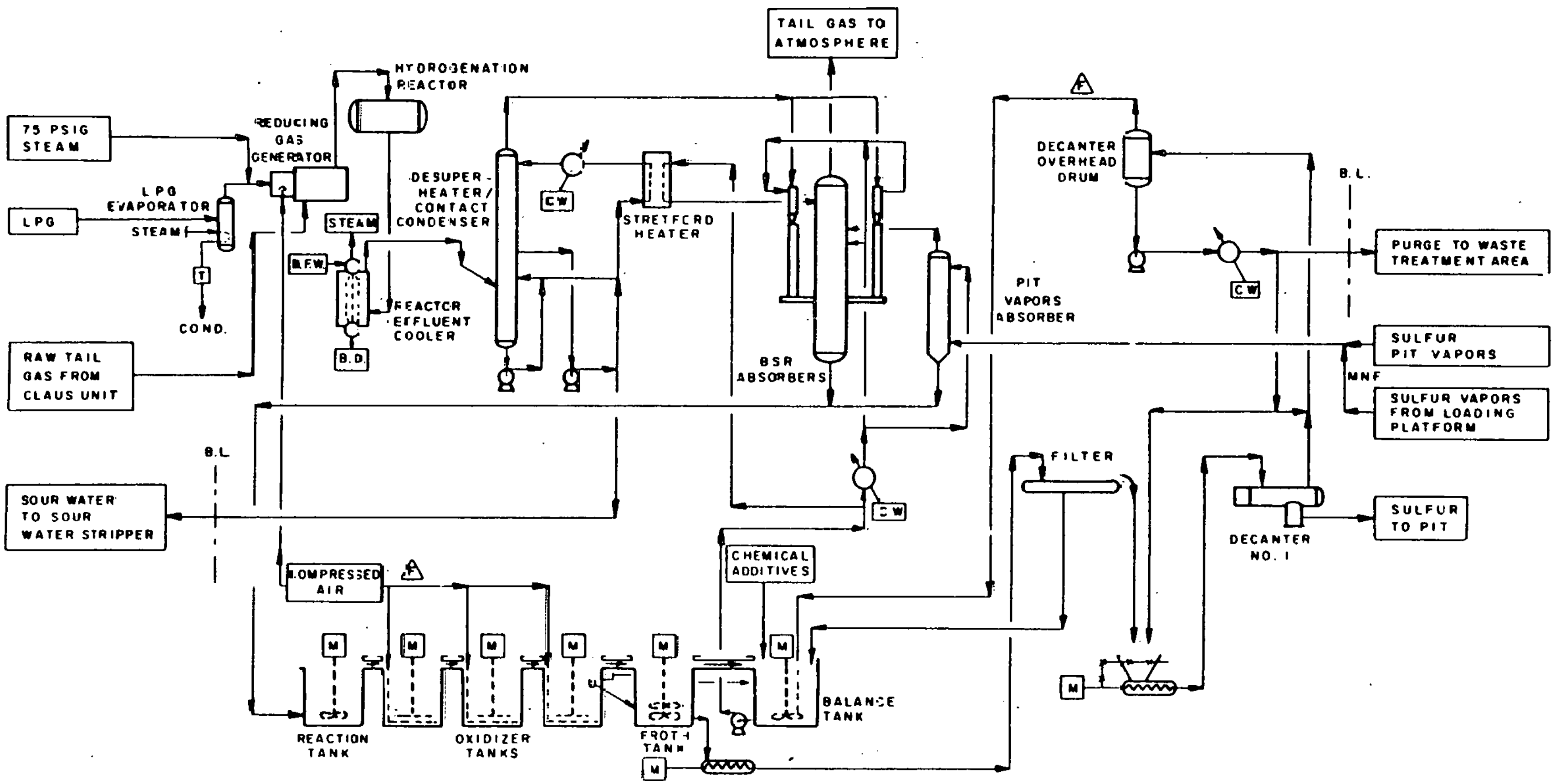


FIGURE 29
GAS SYSTEMS
SULFUR RECOVERY AREA
BEAVON SULFUR RECOVERY UNIT



2. COST PLANS

The following cost plan data from the Original Baseline for the Gas Systems Area, Work Breakdown Structure element 1.3.2 are included here for reference and comparison. They were coordinated and compiled by the International Coal Refining Company (ICRC) based on engineering, vendor engineering and equipment cost estimates and material take-off quantities developed by The Ralph M. Parsons Company and Air Products and Chemicals, Inc., a construction cost estimate developed by Stone and Webster Engineering Corporation, and a Phase I and II support estimate developed by ICRC. This cost plan data did not include any allowance for contingency.

The Cost Plans were presented in first quarter FY 82 and escalated costs in the following formats:

<u>Phase I</u> - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

<u>Phase II</u> - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

The escalated costs were developed using the following rates compounded yearly: 10% for FY 82 and FY 83, 9% for FY 84 and FY 85 and 8% thereafter. Escalation on equipment had been calculated based on a committed basis and distributed on a cash flow basis.

During the Post-Baseline period, the capital costs in first quarter FY 82 dollars for the Gas Systems Area increased by $8.577 million--from $301.118 million to $309.695 million. The increase is partially due to the revised capital costs resulting from the finalized Category B, C, and Post-Baseline ECPs. In addition, the results of the revised bulk material takeoffs in the Dust Preparation and Gasification Units were allowed to supercede the ECP results in these units.

No attempt has been made to escalate the revised costs or to develop new cost plans because of the lack of a definitive project schedule and agreed escalation factors.

REVISED

International Coal Refining Company

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR R. M. Parsons

WBS LEVEL 1.3.2 NUMBER 400

WBS ELEMENT TITLE Parsons Area Summary

DATE 30 Sept. 1983

REVISION NO. ______

PAGE ______ OF ______

1st QTR FY82 (THOUSANDS)

ITEM			FINAL BASELINE LABOR MH	FINAL BASELINE LABOR $	FINAL BASELINE MAT'L $			FINAL BASELINE TOTAL $
EQUIP	A/C PURCHASE				64307.5			64307.5
EQUIP	CM/C	PURCHASE			735.7			735.7
EQUIP	CM/C	ERECT	379.3 (1)	2364.1	6841.9			9206.0
EQUIP	ICRC	SPARE PARTS						
TOTAL EQUIP			379.3	2364.1	71885.1			74249.2
Site & Earthwork			115.2	1439.8	2817.5			4257.3
Concrete			431.7	5453.7	2925.9			8379.6
Structural Steel			232.9	3618.8	9974.8			13593.6
Piping			992.9	15904.5	33737.7			49642.2
Electrical			504.3	7381.4	8876.6			16258.0
Instrumentation			239.3	3685.7	10720.9			14406.6
Architectural, Painting, and Insulation			217.6	3187.3	2986.3			6173.6
SUBTOTAL - BULKS			2733.9	40671.2	72039.7			112710.9
TOTAL DIRECTS			3113.2	43035.3	143924.8			186960.1
Distributables & Indirects			799.5	26444.6	17381.0			43825.5
TOTAL DIRECTS & INDIRECTS			3912.7	69479.9	161305.8			2 85.7
A/C Engr.	Phase I			40390.0				40390.0
A/C Engr.	Vendor Engr'g				4530.0			4530.0
A/C Engr.	Phase II			11234.3				11234.3
CM/C	Phase I			378.0				378.0
CM/C	Phase II		10.5	4329.1	2223.0			6552.1
TOTAL ENGINEERING + CM/C			10.5	56331.4	6753.0			63084.4
ICRC	Phase I			9778.0				9778.0
ICRC	Phase II			6047.0				6047.0
SUBTOTAL				15825.0				15825.0
CATEGORY B ECP's								
CATEGORY C ECP's								
SUBTOTAL - OTHER				15825.0				15825.0
ESCALATION	Phase I							
ESCALATION	Phase II							
CONTINGENCY	Phase I							
CONTINGENCY	Phase II							
CONTINGENCY	POST MECH MODS							
SUBTOTAL - CONTINGENCY								
GRAND TOTAL			3923.2	141636.3	168058.8			309695.1

FORM 9637 (3/82)

International Coal Refining Company

ORIGINAL

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR Parsons

WBS LEVEL 1.3.2 NUMBER 400

WBS ELEMENT TITLE Parsons Area Summary

DATE 31 March 1982

REVISION NO. 0

PAGE ____ OF ____

ITEM			FINAL BASELINE					
			LABOR		MAT'L	Subtotal	Escalation	TOTAL
			MH	$	$	$	$	$
EQUIP	A/C PURCHASE				66134.0			[illegible]
	CM/C	PURCHASE			768.2			768.2
		ERECT	369.8	2221.1	6360.4			8581.5
	ICRC	SPARE PARTS						
TOTAL EQUIP			369.8	2221.1	73252.6			754[illegible].7
Site & Earthwork			109.6	1369.3	2845.6			4214.9
Concrete			435.5	5501.3	3074.0			8575.3
Structural Steel			273.3	4246.4	12034.7			16281.1
Piping			1039.8	16655.7	33963.3			50619.0
Electrical			544.0	7962.4	9081.9			17044.3
Instrumentation			247.5	3812.5	11172.0			14984.5
Architectural, Painting, and Insulation			211.1	3092.4	2941.8			6034.2
SUBTOTAL - BULKS			2860.8	42640.0	75113.3			117753.3
TOTAL DIRECTS			3230.6	44861.9	148375.9			193237.8
Distributables & Indirects			836.3	27663.3	17973.8			45637.1
TOTAL DIRECTS & INDIRECTS			4066.9	72525.2	166349.7	238874.9	74968.2	3138[illegible]
A/C Engr	Phase I			37237.0		37237.0	3207.0	[illegible]
	Vendor Eng'g				4667.0	4667.0	665.0	5332.0
	Phase II			11009.3		11009.3	3906.5	14915.8
CM/C	Phase I			378.0		378.0	45.0	423.0
	Phase II		12.1	4997.1	2578.0	7575.1	3180.8	10755.9
TOTAL ENGINEERING - CM/C			12.1	53621.4	7245.0	60866.4	11004.3	71870.7
ICRC	Phase I			9778.0		9778.0	223.0	10001.0
	Phase II			6047.0		6047.0	67.0	6114.0
SUBTOTAL				15825.0		15825.0	290.0	16115.0
CATEGORY B ECP's					(14448.0)	(14448.0)	(4943.0)	(1939[illegible])
CATEGORY C ECP's								
SUBTOTAL - OTHER				15825.0	(14448.0)	1377.0	(4653.0)	(3276.0)
ESCALATION	Phase I							
	Phase II							
CONTINGENCY	Phase I							
	Phase II							
	POST MECH MODS							
SUBTOTAL - CONTINGENCY								
GRAND TOTAL			4079.0	141971.6	159146.7	301118.3	81319.5	3824[illegible]

FORM 9637 (3/82)

DOE Form CR-533P (1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase I

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)			10. Planned Current Fiscal Year FY82																
		FY80	FY81	O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.3.2	Gas Systems																			
1.3.2.1	Gasification	22	4910	815	684	291	353	430	437	452	417	389	392	387	378	5425	5352	845	-	16554
1.3.2.2	Gas Treating	33	1060	123	173	282	301	325	472	348	365	367	365	430	429	3980	4356	852	-	10281
1.3.2.4	Sulfur Recovery	3	145	36	57	81	102	118	118	124	180	124	121	121	121	1303	1273	223	-	2947
1.3.2.5	Area Management	1490	2752	295	389	506	622	693	709	733	749	776	779	745	729	7725	4081	1725	30	17803
1.3.2.6	Engineering Tech. Support	-	92	11	4	4	19	31	29	62	125	125	132	126	146	814	178	-	-	1084
	Parsons Fee	91	297	40	60	83	107	121	124	128	131	127	127	127	125	1300	1100	264	3	3055
	APCI G & A	1	12	3	2	12	3	1	1	1	2	4	4	16	17	66	214	43	-	336
	Category B EEPs	-	-	-	-	-	-	-	-	74	74	74	75	76	76	449	428	155	2	1034
	Total 1.3.2	1640	9268	1323	1369	1259	1507	1719	1890	1922	2043	1986	1995	2028	2021	21062	16982	4107	35	53094
	Escalation	-	-	-	-	-	36	42	42	92	100	99	150	150	147	858	2369	1027	13	4267
	Total 1.3.2 - Escalated	1640	9268	1323	1369	1259	1543	1761	1932	2014	2143	2085	2145	2178	2168	21920	19351	5134	48	57361

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase I

PAGE OF

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2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

8. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.3.2	Gas Systems																			
1.3.2.1	Gasification	22	4910	815	684	291	361	439	446	472	437	408	421	416	406	5596	6065	1056	-	17649
1.3.2.2	Gas Treating	33	1060	123	173	282	308	333	480	365	384	386	393	462	460	4149	4976	1065	-	11283
1.3.2.4	Sulfur Recovery	3	145	36	57	81	105	121	121	130	186	130	130	130	130	1357	1454	279	-	3238
1.3.2.5	Area Management	1490	2752	295	389	506	637	711	727	769	786	814	838	800	783	8055	4663	2157	41	19158
1.3.2.6	Engineering Tech. Support	-	92	11	4	4	19	32	30	65	131	131	142	135	157	861	203	-	-	1156
	Parsons Fee	91	297	40	60	63	110	124	127	134	138	133	137	137	134	1357	1257	330	4	3336
	APCI G & A	1	12	3	2	2	3	1	1	1	2	4	4	18	13	69	245	54	-	381
	Category B ECPs	-	-	-	-	-	-	-	-	78	79	79	80	80	80	476	488	193	3	1160
	Total 1.3.2	1640	9268	1323	1369	1259	1543	1761	1932	2014	2143	2085	2145	2178	2168	21920	19351	5134	48	57361

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P (1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase I

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	Parsons	1310	4295	504	760	1049	1355	1529	1566	1618	1658	1608	1602	1602	1577	16428	13903	3339	33	39308
	Air Products	16	97	17	12	76	17	6	4	4	10	26	27	104	107	410	1433	269	-	2225
	Rust Engineering Services	-	69	10	9	10	9	9	9	10	9	10	10	8	8	111	98	93	-	371
	Stone & Webster	-	-	-	-	-	-	-	-	-	-	48	48	15	15	126	229	23	-	378
	ICRC	314	4807	792	588	124	126	175	311	216	292	220	233	223	238	3538	891	228	-	9778
	Category B ECPs	-	-	-	-	-	-	-	-	74	74	74	75	76	76	449	428	155	2	1034
	Total 1.3.2	1640	9268	1323	1369	1259	1507	1719	1890	1922	2043	1986	1995	2028	2021	21062	16982	4107	35	53094
	Escalation	-	-	-	-	-	36	42	42	92	100	99	150	150	147	858	2369	1027	13	4267
	Total - Escalated	1640	9268	1323	1369	1259	1543	1761	1932	2014	2143	2085	2145	2178	2168	21920	19351	5134	48	57361

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase I

PAGE OF

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2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	Parsons	1310	4295	504	760	1049	1389	1567	1604	1698	1741	1687	1723	1723	1694	17139	15884	4172	45	42845
	Air Products	16	97	17	12	16	17	6	4	4	11	28	29	112	114	430	1637	337	-	2517
	Rust Engineering Services	-	69	10	9	10	9	10	10	10	9	10	11	8	8	114	113	119	-	415
	Stone & Webster	-	-	-	-	-	-	-	-	-	-	50	52	16	16	134	261	28	-	423
	ICRC	314	4807	732	588	124	128	178	314	224	303	231	250	239	255	3627	968	285	-	10001
	Category B ECPs	-	-	-	-	-	-	-	-	78	79	79	80	80	80	476	488	193	3	1160
	Total 1.3.2	1640	9268	1323	1369	1259	1543	1761	1932	2014	2143	2085	2145	2178	2168	21920	19351	5134	48	57361

16. Remarks

Dollars Expressed In Thousands - Escalated Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary
Phase II

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.3.2	Gas Systems									
1.3.2.1	Gasification			17923	30290	72946	34074	2518	-	157751
1.3.2.2	Gas Treating			16948	12314	24427	14110	985	-	68784
1.3.2.4	Sulfur Recovery			5121	1414	8815	4710	190	-	20250
1.3.2.5	Area Management			499	2038	5341	5785	1498	-	15161
1.3.2.6	Engineering Tech. Support			152	-	-	-	-	-	152
	Parsons Fee			100	227	263	209	109	-	908
	APCI G & A			-	-	473	15	12	-	500
	Category B ECPs			(2927)	(2881)	(6077)	(3347)	(250)	-	(15482)
	Total 1.3.2			37816	43402	106188	55556	5062	-	248024
	Escalation			5304	8020	35918	25041	2770	-	77053
	Total 1.3.2 - Escalated			43120	51422	142106	80597	7832	-	325077

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE F ... CR-633P

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase II

PAGE OF

1. Contract Identification	2. Contract Number
Demonstration of the Solvent Refined Coal Process	DE-AC05-780R03054
3. Contractor (name, address) International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date 10 July 1978
	5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.3.2	Gas Systems									
1.3.2.1	Gasification			20413	35822	97743	49432	3890	-	207300
1.3.2.2	Gas Treating			19351	14579	32518	20457	1521	-	88426
1.3.2.4	Sulfur Recovery			5842	1785	11939	6845	292	-	26703
1.3.2.5	Area Management			570	2552	7275	8469	2333	-	21199
1.3.2.6	Engineering Tech. Support			174	-	-	-	-	-	174
	Parsons Fee			114	293	360	309	174	-	1240
	APCI G & A			-	-	544	22	20	-	586
	Category B ECPs			(3344)	(3599)	(3273)	(4937)	(398)	-	(20551)
	Total 1.3.2			43120	51422	142106	80597	7832	-	325077

16. Remarks	Dollars Expressed in Thousands - Escalated Dollars	17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase II

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
	Parsons			38745	26173	4452	2357	1250	-	72977
	Air Products			-	-	4003	89	74	-	4166
	ICRC			973	2056	3018	-	-	-	6047
	SWEC			1025	18054	100792	56457	3988	-	180316
	Category B ECPs			(2927)	(2881)	(6077)	(3347)	(250)	-	(15482)
	Total 1.3.2			37816	43402	106188	55556	5062	-	248024
	Escalation			5304	8020	35918	25041	2770	-	77053
	Total - Escalated			43120	51422	142106	80597	7832	-	325077

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase II

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
	Parsons			44266	30176	5736	3477	1962	-	85617
	Air Products			-	-	4606	133	118	-	4857
	ICRC			1007	2089	3018	-	-	-	6114
	SWEC			1191	22756	137019	81924	6150	-	249040
	Category B ECPs			(3344)	(3599)	(8273)	(4937)	(398)	-	(20551)
	Total 1.3.2			43120	51422	142106	80597	7832	-	325077

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

3. MILESTONE SCHEDULES

The original Project Master Schedule, included here, showed significant design and procurement milestones for the Gas Systems Area, WBS element 1.3.2. A bar chart format graphically depicted the scheduled predicted and actual occurrence dates; it was supported by a computerized tabulation of the same data. This information had been extracted electronically from the Intermediate Schedule which was developed by ICRC and The Ralph M. Parsons Company. The basis of the Intermediate Schedule was a detailed logic network schedule which was developed by The Ralph M. Parsons Company to control internally its portion of the SRC-I project.

The schedule included DOE imposed restraints on the beginning of purchasing activities. It indicated the completion of Phase I work in September 1984, the beginning of construction in May 1984 and a mechanical completion date of August 1986.

The time durations for the original project activities can and should be considered in the development of any new preliminary schedules since there is no current shcedule for the resumption and completion of the SRC-I Project.

DOE Form CR-636 (1-78)

U.S. DEPARTMENT OF ENERGY

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification	2. Reporting Period	3. Contract Number
GAS SYSTEMS - MASTER SCHEDULE	through	
4. Contractor (name, address)		5. Contract Start Date
		6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1981 (OND), 1982 (JFM AMJ JAS), 1983 (OND JFM AMJ JAS), 1984 (OND JFM AMJ JAS), 1985 (OND JFM AMJ JAS), 1986 (OND JFM AMJ JAS), 1987 (OND JFM AMJ)	10. Percent Complete a) Planned	b) Actual
300	GASIFICATION	D, HI, G, IJI, KIHIL, I, N, O,P,Q		
301	GAS TREATING	C, DD, HI, G,I, JI, I, KI, LI,HI, N, P, O,Q		
302	SULFUR RECOVERY	D, G, H, I, J, K, L,H, N, P, O,Q		
803	ENGINEERING TECHNICAL SUPPORT	AI, B, C, D		

11. Remarks

Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

DOE Form CR435
(1-78)

U.S. DEPARTMENT OF ENERGY

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification	2. Reporting Period	3. Contract Number
GAS SYSTEMS PROCUREMENT - MASTER SCHEDULE	through	

4. Contractor (name, address)	5. Contract Start Date
	6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1980 (OND), 1981 (JFM AMJ JAS), 1982 (OND JFM AMJ JAS), 1983 (OND JFM AMJ JAS), 1984 (OND JFM AMJ JAS), 1985 (OND JFM AMJ JAS), 1986 (OND JFM AMJ)	10. Percent Complete a) Planned	b) Actual
350	DISINTEGRATOR	A B C E		
351	GASIFICATION REACTORS	A B C E		
352	WASTE HEAT BOILER	A B C E		
353	H_2 COMPRESSOR	A B C E		
354	H_2S COMPRESSOR	A B C E		
373	FEED GAS COMPRESSOR	A B C E		

11. Remarks

Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date

13. Signature of Government Technical Representative and Date

REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 60 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: GAS SYSTEMS - GASIFICIATION WBS ELEMENT #: 1.3.2.1

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
300A1	BGN PROC DSGN - SYNGAS COMPR	23JUN80	23JUN80	23JUN80		
300B1	BGN DETAILED DSGN - SHIFT	3OCT80	03OCT80	3OCT80		
300C	1ST M/SR	2JUL81	02JUL81	2JUL81		
300D	2ND M/SR	8OCT82		8OCT82	3NOV82	
300F1	BGN PSAR - SHIFT	23JAN81	23JAN81	23JAN81		
300G	COMPL PSAR	21SEP83		21SEP83	17JAN84	
300H1	1ST SIGNIF CONSTR PKG - SHIFT	25AUG83		25AUG83	17JAN84	
300I	END PH I-GKT	3APR84		3APR84	7APR86	
300J1	DUST PREP-1ST CONSTR PKG AWARD (S/C)	4MAY84		4MAY84	25JUN84	
300K1	SWITCH YARD - BGN STEEL ERECTION	21AUG84		21AUG84	15JAN85	
300L1	SHIFT FEED - BGN PIPE	25OCT84		25OCT84	22JUL85	
300M1	SWITCH YARD-BGN ELEC	12SEP84		12SEP84	12AUG85	
300N	COMPL STEEL ERECTION	12DEC85		12DEC85	23SEP86	
300O	COMPL PIPE	24NOV86		24NOV86	6APR87	
300P	COMPL ELEC	3NOV86		3NOV86	24NOV86	
300Q	MECH COMPL	24NOV86		24NOV86	6APR87	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 65 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: GAS SYSTEMS - GAS TREATING WBS ELEMENT #: 1.3.2.2

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
301A1	BGN PROC DSGN - LPG	23JUN80	23JUN80	23JUN80		
301B1	BGN DETAILED DSGN - DEA	11JUL80	11JUN80	11JUL80		
301C	1ST M/SR	22DEC81		22DEC81		
301D	2ND M/SR	4JAN83		4JAN83	2FEB83	
301D	2ND M/SR - HPU	28FEB83		28FEB83	21JUN84	
301F1	BGN PSAR - SELEXOL	8MAY81	08MAY81	8MAY81		
301G	COMPL PSAR	8NOV83		8NOV83	4MAR85	
301H1	1ST SIGNIF CONSTR PKG - HPU	27MAY83		27MAY83	23OCT84	
301I	END PH I-AS#S	14SEP84		14SEP84	7MAR86	
301I	END PH I-HPJ	8NOV83		8NOV83	4MAR85	
301J1	DEA/AS#S-1ST CONSTR PKG AWARD (S/C)	29JUN84		29JUN84	26APR85	
301K1	DEA/AS#S - BGN STEEL ERECTION	2OCT84		2OCT84	24JUN85	
301L1	COMPR/LPG/HPU - BGN PIPE	4FEB85		4FEB85	12NOV85	
301M1	COMP/LPG/HPJ-BGN ELEC	4FEB85		4FEB85	10FEB86	
301N	COMPL STEEL ERECTION	29AUG85		29AUG85	21MAY86	
301O	COMPL PIPE	12MAY86		12MAY86	15SEP86	
301P	COMPL ELEC	24DEC85		24DEC85	23JAN87	
301Q	MECH COMPL	12MAY86		12MAY86	23JAN87	

0 18 RECORDS, TOTAL ACTIVITY WEIGHT = 0

REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 70 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: GAS SYSTEMS - SULFUR RECOVERY WBS ELEMENT #: 1.3.2.4

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
302A	BGN PROC DSGN - SULF RECOV	24OCT80	24OCT80	24OCT80		
302B	BGN DETAILED DSGN - SULF RECOV	10JUL81	10JUL81	10JUL81		
302C	1ST M/SR - SULF RECOV	17JUL81	17JUL81	17JUL81		
302D	2ND M/SR - SULF RECOV	8SEP82		8SEP82	31AUG83	
302F	BGN PSAR - SULF RECOV	14AUG81	14AUG81	14AUG81		
302G	COMPL PSAR - SULF RECOV	10JUN83		10JUN83	15MAY85	
302H	1ST SIGNIF CONSTR PKG - SULF RECOV	3APR84		3APR84	15MAY85	
302I	END PH I-SULF RECOV	9JUL84		9JUL84	12NOV85	
302J	SULF RECOV-1ST CONSTR PKG AWARD (S/C)	30OCT84		30OCT84	23OCT85	
302K	SULF RECOV - BGN STEEL ERECTION	28DEC84		28DEC84	20DEC85	
302L	SULF RECOV - BGN PIPE	28JAN85		28JAN85	25MAR86	
302M	SULF RECOV-BGN ELEC	28JAN85		28JAN85	13MAR86	
302N	SULF RECOV - COMPL STEEL ERECTION	16AUG85		16AUG85	19AUG86	
302O	SULF RECOV - COMPL PIPE	3JAN86		3JAN86	5JAN87	
302P	SULF RECOV - COMPL ELEC	11NOV85		11NOV85	5JAN87	
302Q	SULF RECOV - MECH COMPL	10JAN86		10JAN86	5JAN87	

0 16 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 16 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: GAS SYSTEMS - ENG TECHNICAL SUPPORT WBS ELEMENT #: 1.3.2.6

ID #	MILE STONE	0 EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
803A1	BGN DSGN SUPPORT PROGRAMS - GAS SYS	1OCT81		1OCT81		
803B	BGN OPER SUPPOR PROGRAMS - GAS SYS	19OCT82		19OCT82	01AUG83	
803C	COMPL DSGN SUPPORT PROGRAMS-GAS SYS	29APR83		29APR83	27DEC84	
803D	COMPL OPER SUPPORT PROGRAMS-GAS SYS	29MAY87		29MAY87	10DEC87	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: GAS SYSTEMS - GASIFICATION PROCUREMENT: DISINTEGRATOR

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
350A	DISINTEGRATOR - ISS MECH SPEC	7JAN82		7JAN82	7OCT82	
350B	DISINTEGRATOR - ISS P,O/BGN VNDR ENG	6DEC82		6DEC82	22APR83	
350C	DISINTEGRATOR - COMPL VNDR ENG/BGN FAB	16MAR83		16MAR83	2AUG83	
350E	DISINTEGRATOR - DEL TO SITE	22JUN84		22JUN84	19JUN85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 62 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: GAS SYSTEMS - GASIFICATION PROCUREMENT: GASIFICATION REACTORS

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
351A	GASIF REACTORS - ISS MECH SPEC	12NOV81	12NOV81	12NOV81		
351B	GASIF REACTORS - ISS P.O/BGN VNDR ENG	6DEC82		6DEC82	23FEB83	
351C	GASIF REACTORS-COMPL VNDR ENG/BGN FAB	13MAY83		13MAY83	2AUG83	
351E	GASIF REACTORS - DEL TO SITE	4SEP84		4SEP84	19JUN85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 63 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: GAS SYSTEMS - GASIFICATION PROCUREMENT: WASTE HEAT BOILER

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
352A	WASTE HEAT BOILER - ISS MECH SPEC	28JUL82		28JUL82	23FEB83	
352B	WASTE HEAT BOILER-ISS P.O/BGN VNDR ENG	9FEB83		9FEB83	2AUG83	
352C	WASTE HEAT BOILR-COMPL VND ENG/BGN FAB	20JUN83		20JUN83	19JUN85	
352E	WASTE HEAT BOILER - DEL TO SITE	21JAN85		21JAN85	19JUN85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 66 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: GAS SYSTEMS - GAS TREATING PROCUREMENT: H2 COMPRESSOR

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
353A	H2 COMPR - ISS MECH SPEC	10JUL81	10JUL81	10JUL81		
353B	H2 COMPR - ISS P.O/BGN VNDR ENR	21OCT82		21OCT82	12OCT83	
353C	H2 COMPR - COMPL VNDR ENG/BGN FAB	2FEB83		2FEB83	24JAN84	
353F	H2 COMPR - DEL TO SITE	1JUN84		1JUN84	2JAN86	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 30OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 67 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: GAS SYSTEMS - GAS TREATING PROCUREMENT: H2S COMPRESSOR

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
354A	H2S COMPR - ISS MECH SPEC	20MAR81	20MAR81	20MAR81		
354B	H2S COMPR - ISS P.O/BGN VNDR ENG	21OCT82		21OCT82	16NOV83	
354C	H2S COMPR - COMPL VNDR ENG/BGN FAB	2FEB83		2FEB83	28FEB84	
354E	H2S COMPR - DEL TO SITE	28FEB84		28FEB84	4DEC85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 68 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: GAS SYSTEMS - GAS TREATING PROCUREMENT: FEED GAS COMPRESSOR

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
373A	FEED GAS COMPR - ISS MECH SPEC	20MAR81	20MAR81	20MAR81		
373B	FEED GAS COMPR - ISS P.O/BGN VNDR ENG	21OCT82		21OCT82	12OCT83	
373C	FEED GAS COMPR-COMPL VNDR ENG/BGN FAB	2FEB83		2FEB83	24JAN84	
373E	FEED GAS COMPR - DEL TO SITE	17JUL84		17JUL84	2JAN86	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

CHAPTER V. OUTSIDE BATTERY LIMITS FACILITIES AND CENTRAL CONTROL SYSTEM (WBS 1.4)

A. UTILITIES AND OFF SITES (WBS 1.4.1)

1. TECHNICAL SCOPE

The process and facilities descriptions presented here are based on the current design information defined in the Design Basis Memorandum (ICRC Document No. 001-01-007, Rev. 4) and a comprehensive system specification. At a Project Configuration Control Board meeting on 17 December 1981, the DOE judged the process design to be suitable for configuration management, a sound basis for scheduling and cost control and a viable point of departure for detailed engineering.

The Utilities and Off-Sites Area consists of the following sub-areas: Utility Systems; Off-Site Facilities; and Raw Materials and Product Storage and Handling Systems.

a. Utility Systems

The Utility Systems consist of those parts of the plant which contain the process units and equipment that distribute various utilities throughout the Demonstration Plant and interconnect the process areas. Such systems include:

- Electrical power distribution systems
- Fire protection system
- Boiler feedwater/steam/condensate systems
- Cooling towers and cooling water systems
- Plant/instrument air system
- Flare system
- Nitrogen distribution system
- Fuel distribution system
- Interconnecting System

Electrical Power Distribution System

The Green River Electric Corporation will supply 161 KV of electrical power to the Demonstration Plant, which will be transformed to 13.8 KV and distributed to all substations in the process areas (see Figure 30). The normal power load will be approximately 120 MW. The design will include the facility's grounding, emergency power, load shedding, peak shaving, relay coordination, power factor correction, and short circuit studies. Provisions for emergency power will include a skid-mounted Gas Turbine Generator and four diesel-generator sets for quick response to emergency power requirements.

Fire Protection System

The fire protection system will follow Factory Mutual (FM) and National Fire Protection Association (NFPA) guidelines for refinery and coal handling facility fire protection. The system will encompass two independent firewater tanks as sources, diesel-driven supply pumps, and a loop-type firewater distribution system (see Figure 31). Monitor hydrants, hose houses, mobile fire fighting equipment with foam capability, and portable equipment will be included. Each of the two independent firewater sources and their associated pumps will be capable of supplying the 7,500-gpm maximum firewater demand.

Boiler Feedwater/Steam/Condensate Systems

Boiler feedwater makeup is provided by demineralizing and deaerating process water (see Figure 32). The boiler feedwater and polished condensate will be held in a storage tank before being pumped to the deaerator. The boiler feedwater will be pumped from the deaerator storage tank and distributed at 220 and 1,100 psig through two boiler feedwater distribution systems.

The steam will be distributed at 900, 450, 150, 75, and 27 psig. The steam will be collected in the appropriate steam headers from the area process heat recovery boilers and will be redistributed to the various process areas to satisfy their steam requirements. To meet start-up steam requirements, two boilers will be required, each rated at 200,000 lb/hr at 900 psig. Normal plant steam manufacture is approximately 1 million lb/hr.

Condensate will be collected from each area, polished in a condensate polishing system, and returned to the deaerator.

Cooling Towers and Cooling Water Systems

Cooling water will be supplied to the process areas using conventional mechanical-draft Cooling Towers and support systems (see Figure 33). The cooling water will be supplied at a design temperature of 88°F. The total facility requirements will exceed 104,000 gpm. Process water, steam condensate blowdown and treated effluent will be added to the cooling tower basin to offset evaporation losses, and chlorination, corrosion inhibition (nonchromate), and cooling tower blowdown systems will be provided.

Plant/Instrument Air System

The compressed air system will provide 10,300 SCFM of air at 100 psig and -40°F dew point for both plant and instrument air use. Equipment will include three 50% centrifugal air compressors and two complete air drier systems (see Figure 34).

Flare System

An integrated, environmentally acceptable flare system including the main flare header system will be provided. Blowdown drums with quenching will minimize any adverse environmental effects. A single derrick-type elevated flare will be designed to handle 1 million lb/hr of hydrocarbon releases (see Figure 35). A Liquid Thermal Oxidizer sized to handle 2,500 lb/hr of slop oil and a Vent Gas Incinerator sized to burn 2,500 lb/hr of continuous vents, with support systems, will be provided.

Nitrogen Distribution System

The nitrogen system will distribute 1,400 TPD of nitrogen from the Air Separation Unit (Area 14) to all areas of the facility requiring an inert blanketing and conveying fluid (see Figure 36).

Fuel Distribution System

Plant fuel requirements will be met through a fuel distribution system (see Figure 37). The primary supply will be plant-generated fuel gas. Fuel oil and LPG, stored on site, will be start-up and backup fuels.

Interconnecting System

The distribution of all utilities and the interconnection of all process lines and sewers between the various battery limits will be provided (see Figure 38). Some high-pressure and high-temperature pipelines will be designed by the associated Area Contractor; the Outside Battery Limits Facility Contractor will provide only pipe bridge space.

b. Off-Site Facilities

Off Sites include water- and waste-treatment facilities, nonprocess buildings, railroads, plant roads, fencing, site preparation, and river structures (see Figure 39).

Process and Potable Water Treatment Systems

Water withdrawn from the Green River at a nominal rate of 4.2 million gpd (8.6 million gpd maximum) will be treated to provide process water for the Demonstration Plant. Treatment will include screening, coagulation, filtration, and chlorination before the water is distributed to the cooling towers, the boiler feedwater treatment system, and other users (see Figures 40 and 41).

Potable water will be supplied from on-site wells at a nominal rate of 35 gpm (898 gpm maximum). The well water will be aerated, filtered, and chlorinated to meet all applicable federal and state regulations on water quality.

Wastewater Treatment System

The Demonstration Plant will generate approximately 2.5 million gpd (4.7 million gpd maximum) of wastewater. Wastewater treatment consists of two separate systems--one strong waste treatment system and one weak (see Figure 42). Wastewater streams such as sour-water stripper bottoms, coal- and SRC-pile runoff, and GKT blowdown will be sent to the strong waste treatment system. This system will include primary treatment to remove toxic metals and oils, two-stage biological treatment, Wet Air Oxidation, filtration, and Reverse

Osmosis. The treated effluent will be recycled to the cooling tower. Cooling tower blowdown, Stretford purge, and the reverse osmosis reject are sent to an evaporator for further removal of dissolved solids.

The weak system will treat streams such as process pad runoff and sanitary waste. After oil removal, aerated stabilization, and filtration, the treated effluent will be sent to the cooling tower.

Solid Waste Disposal

The Demonstration Plant will generate both hazardous and nonhazardous wastes, which will be stored in on-site landfills. The hazardous waste, approximately 42,700 cu yd/yr, will include evaporator residue, metal and biological sludge from wastewater treatment, spent activated carbon, spent catalysts, and slop oil. Because evaporator residue is water soluble, it will be stabilized before disposal. Any slop oil will be incinerated in the Thermal Oxidizer of the flare system. The remaining wastes will be stored in hazardous landfills designed and constructed according to Resource Conservation and Recovery Act (RCRA) regulations and applicable state and local ordinances.

Preliminary tests indicate that the Gasifier fly ash and slag (estimated to be generated normally at rates of 545 and 200 TPD, respectively) are nonhazardous. However, they will be stored in landfills having the same key features as the hazardous landfills: clay barrier, linings, and leachate collection.

The nonhazardous wastes (11,500 cu yd/yr), including water-treatment sludge and plant trash, will be stored in nonhazardous landfills designed and constructed in accordance with all applicable federal, state, and local regulations.

Railroads, Roadways, Parking, Fencing, and Site Preparation

The plant rail system will be designed as a dual rail loop: an inside track for coal-unloading and an outside track for product shipment. A marshalling yard will be provided to store about 420 rail cars. Altogether the marshalling yard and railroad loop will require 79,300 linear feet of railroad.

Security fencing will be constructed to enclose the total site.

The in-plant road system will consist of main plant roads and maintenance roads. The main plant roads, built from bituminous concrete, will be 20 ft wide, with 5 ft shoulders. The maintenance roads will have a crushed aggregate surface and will be constructed around the ash ponds, tank farm, and coal storage areas. The main plant and maintenance roads will total about 78,560 and 28,000 linear feet, respectively.

The Demonstration Plant will require a site area of approximately 750 acres. Approximately 4,300,000 cu yds will be graded to meet flood elevation, erosion, and plot plan requirements.

River Structures

The structures to withdraw water from and discharge effluent to the Green River will be designed to conform to all federal, state, and local regulations. The water intake structure will be a conventional type. The effluent river diffuser, consisting of a pipe with numerous orifices, is designed to distribute flow evenly across the Green River.

Nonprocess Buildings

The following nonprocess buildings, having the approximate areas indicated, will be constructed, and will include necessary equipment and furnishings:

Central Control Building	33,400 sq ft
Administration Building	29,500 sq ft
Service Change Building	43,500 sq ft
Contract Maintenance Change Building	16,200 sq ft
Warehouse	36,200 sq ft
Maintenance Building	33,600 sq ft
Operator Shelters	1,700 sq ft

c. Raw Materials and Product Storage and Handling

Liquid Storage System

The liquid-storage tank farm, consisting of 14 tanks with a total capacity of 450,000 barrels, will store oil products, crude oil intermediates, solvents, and fuel oil (see Figure 43). Oil products produced in the SRC Process and Naphtha Hydrotreater areas will be stored up to 30 days (at 71% plant utilization factor) before shipment. Intermediate storage of crude oil fractions is provided for up to 7 day working inventory. The process solvents and fuel oil inventory is provided based on start-up requirements.

Coal Storage and Transfer

The Demonstration Plant will incorporate a system capable of receiving, by railroad, 6,000 TPSD of coal on a dry basis, blending six different coals from their 30,000-ton each storage piles, and storing an additional 180,000 tons of coal in long-term, emergency piles (see Figure 44).

Coal Preparation and Distribution

This system (Figure 45) will dry as-received coal to a maximum of 2% total moisture content, and pulverize it to a size specification which meets the GKT requirements of 90% passing through 170 mesh (nominal 400 TPSD, dry basis) and SRC requirements of 70% passing through 200 mesh (nominal 5,600 TPSD, dry basis). With minor adjustments, the system will be able to pulverize two-thirds of the incoming coal to pass 90% through 20 mesh at the same feed rate and dryness. Moisture and particle-size control of the coal feed to the Gasification Area will be independent of the controls for feed to the SRC Process Area. During start-up, the system will be able to feed 1,100 TPSD to the Gasification Area.

SRC Handling and Storage

A system will be provided to receive and ship 2,200 TPSD of SRC and two stage liquefaction (TSL-SRC) solids; storage capacity will be 60,000 tons (see Figure 46).

The following is a tabulation of some of the major items of equipment in each of the Level 5 WBS elements of the Utilities and Off-Sites Area (WBS 1.4.1):

WBS 1.4.1.1--Utilities

WBS 1.4.1.1.1--Electrical Power Distribution

X-16510	Gas Turbine Generator

WBS 1.4.1.1.2--Plant Utilities

Fire Protection

P-16301	Firewater Pump
TK-16303	Firewater Storage Tank
TK-16304	Firewater Storage Tank

Boiler Feedwater and Condensate Treatment

X-16406	Cation Exchangers
X-16407	Anion Exchangers
X-16410	Condensate Polishers

Steam and Condensate System

B-16501	Boiler
C-16501	Forced Draft Fan
P-16401	High-Pressure Boiler Feedwater Pump
P-16402	Low-pressure Boiler Feedwater Pump

Cooling Water

CT-16601	Cooling Tower
P-16603	Cooling Water Supply Pump
CT-16610	Cooling Tower
P-16612	Cooling Water Supply Pump

Compressed Air

C-16701	Air Compressor

Flare and Incinerators

P-16801	Quench Liquid Pump
IN-16913	Liquid Thermal Oxidizer
IN-16919	Vent Gas Incinerator
X-16810	Elevated Flare

WBS 1.4.2.1--Off-Sites

WBS 1.4.1.2.1--Water and Waste Treatment

Potable Water

P-17201	Well Pump
A-17201	Well Water Aerator

Process Water

X-17101	River Water Clarifier
P-17108	Process Water Pump

Wastewater and Solid Waste

X-17407	Oil Removal System
CL-17401	Metals Removal Clarifier/Thickener
TK-17405	Equalization Basin
TK-17407	First-Stage Activated Sludge Aeration Basin
CL-17403	First-Stage Activated Sludge Clarifier
TK-17410	Second-Stage Activated Sludge Aeration Basin
CL-17404	Second-Stage Activated Sludge Clarifier
CL-17405	Weak Waste Primary Clarifier
TK-17415	Aerated Stabilization Basin
X-17601	Wet Air Oxidation

X-17501	Reverse Osmosis System
X-17502	Evaporator System
FL-17601	Belt Pressure Filter

WBS 1.4.1.3--Raw Material and Product Handling and Storage

WBS 1.4.1.3.1--Liquid Storage

C_5-160°F Cut Storage Tank
Product Naphtha Tank
Middle Distillate Tank
Heavy Oil Tank
Naphtha Hydrotreater Feed Tank
Crude Light Oil Tank
Crude Medium Oil Tank
Crude Heavy Oil Tank
Critical Solvent Tank
SRC Process Solvent Tank
Fuel Oil Tank

WBS 1.4.1.3.2--Coal Storage and Transfer

X-11210	Stacker
CV-11203	Conveyor
X-11205	Sampling System

WBS 1.4.1.3.3--Coal Pulverizing

BH-11301	Coal Storage Silo
C-11310	Mill Sytem Fan
G-11322	Pulverizer

WBS 1.4.1.3.4--SRC Handling and Storage

X-11402	SRC Stacker
X-11406	Sampler

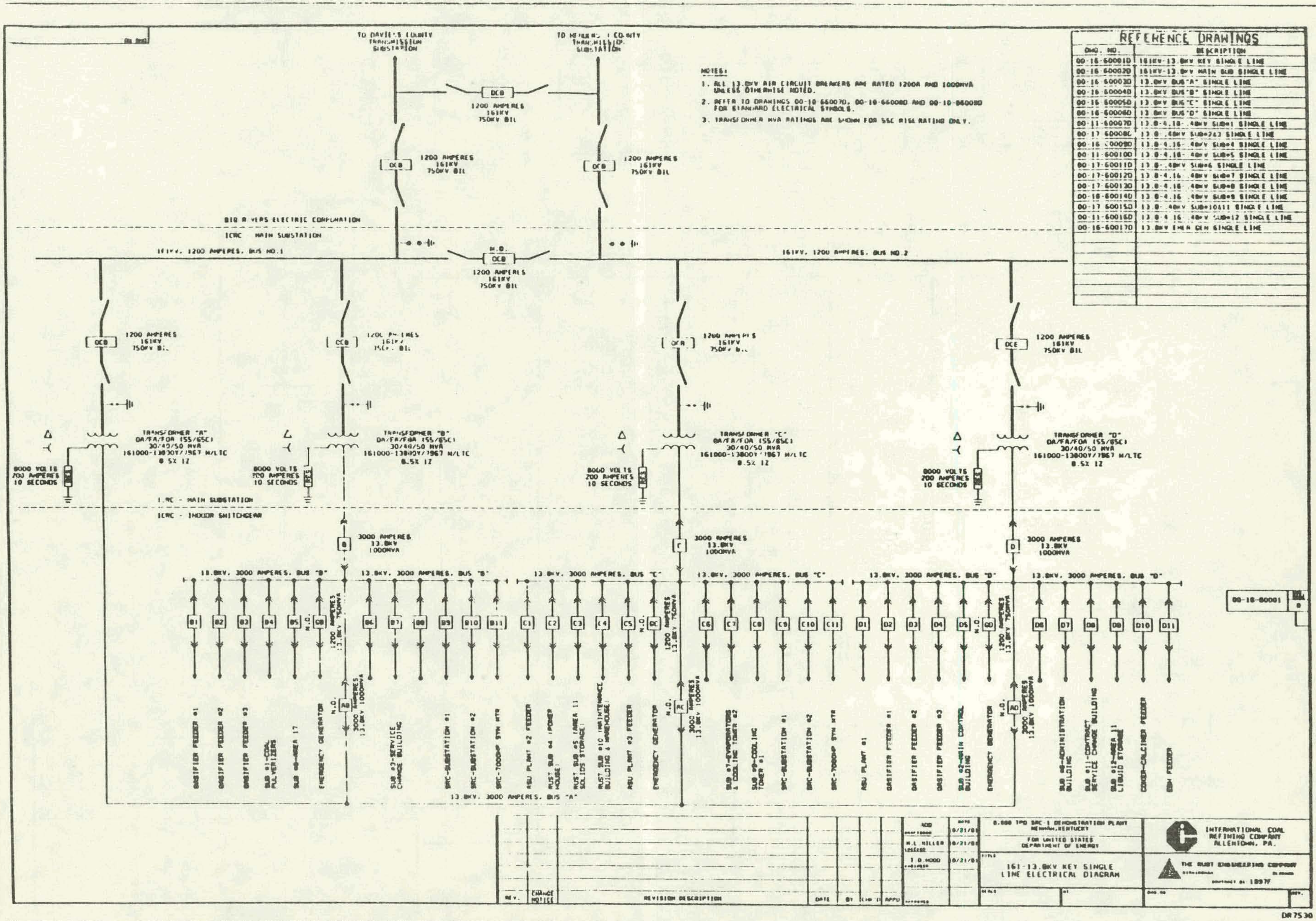

REFERENCE DRAWINGS
NOTES:
TRANSFORMER "A"
TRANSFORMER "B"
TRANSFORMER "C"
TRANSFORMER "D"
13.8KV, 3000 AMPERES, BUS "A"
FOR UNITED STATES
DEPARTMENT OF ENERGY
161-13.8KV KEY SINGLE
LINE ELECTRICAL DIAGRAM
INTERNATIONAL COAL
REFINING COMPANY
ALLENTOWN, PA.
DR7530

Figure 30

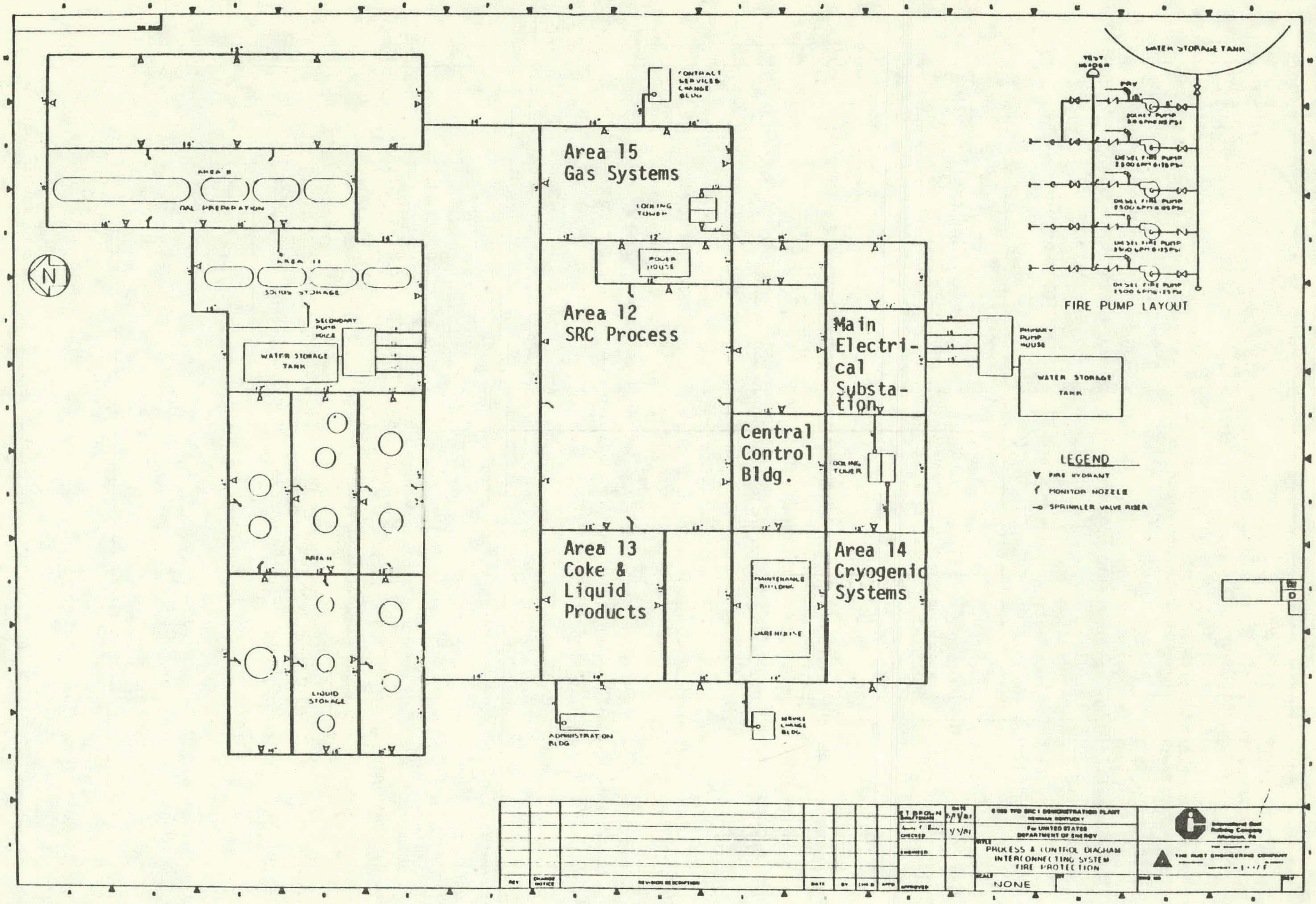
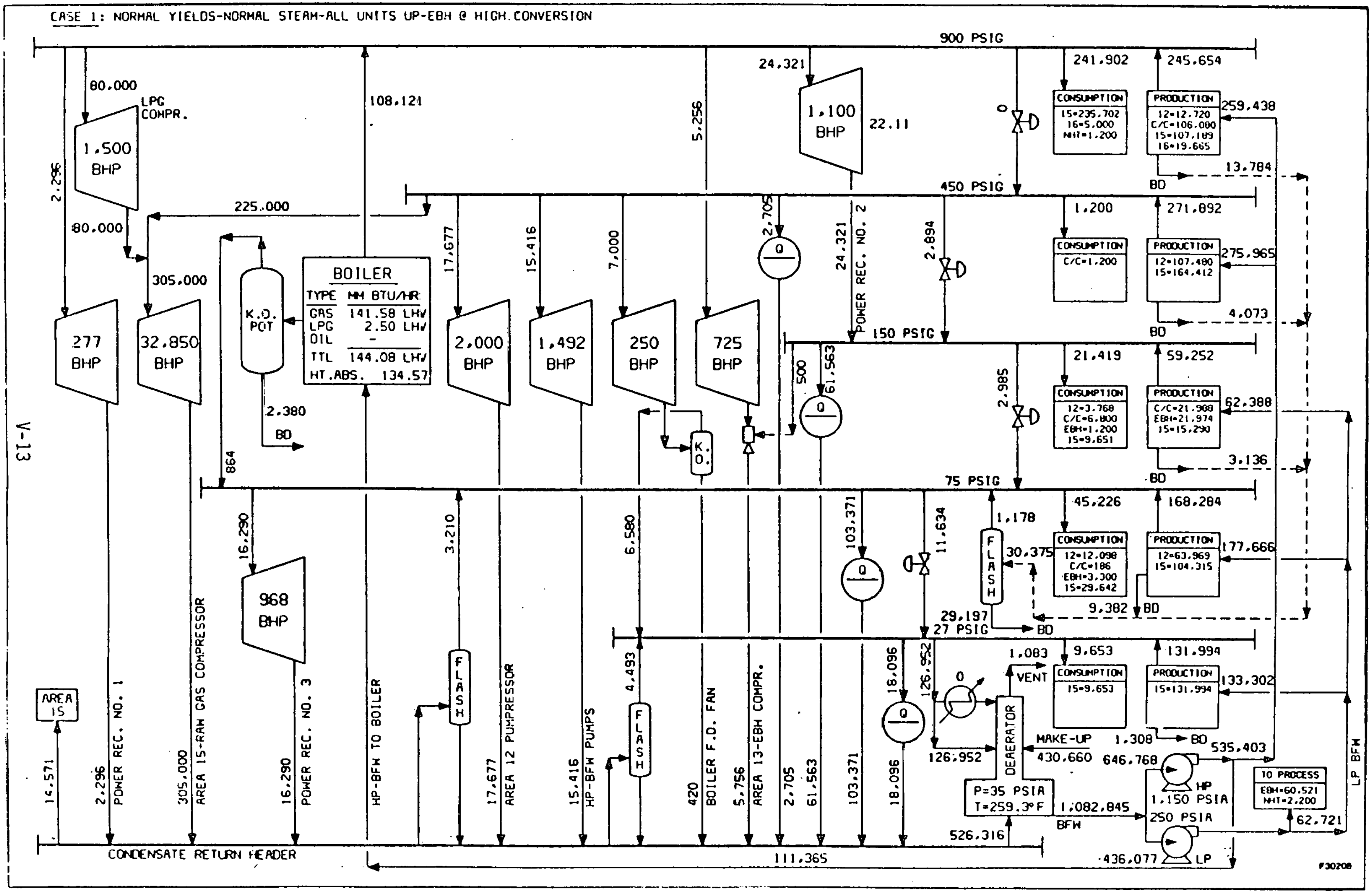
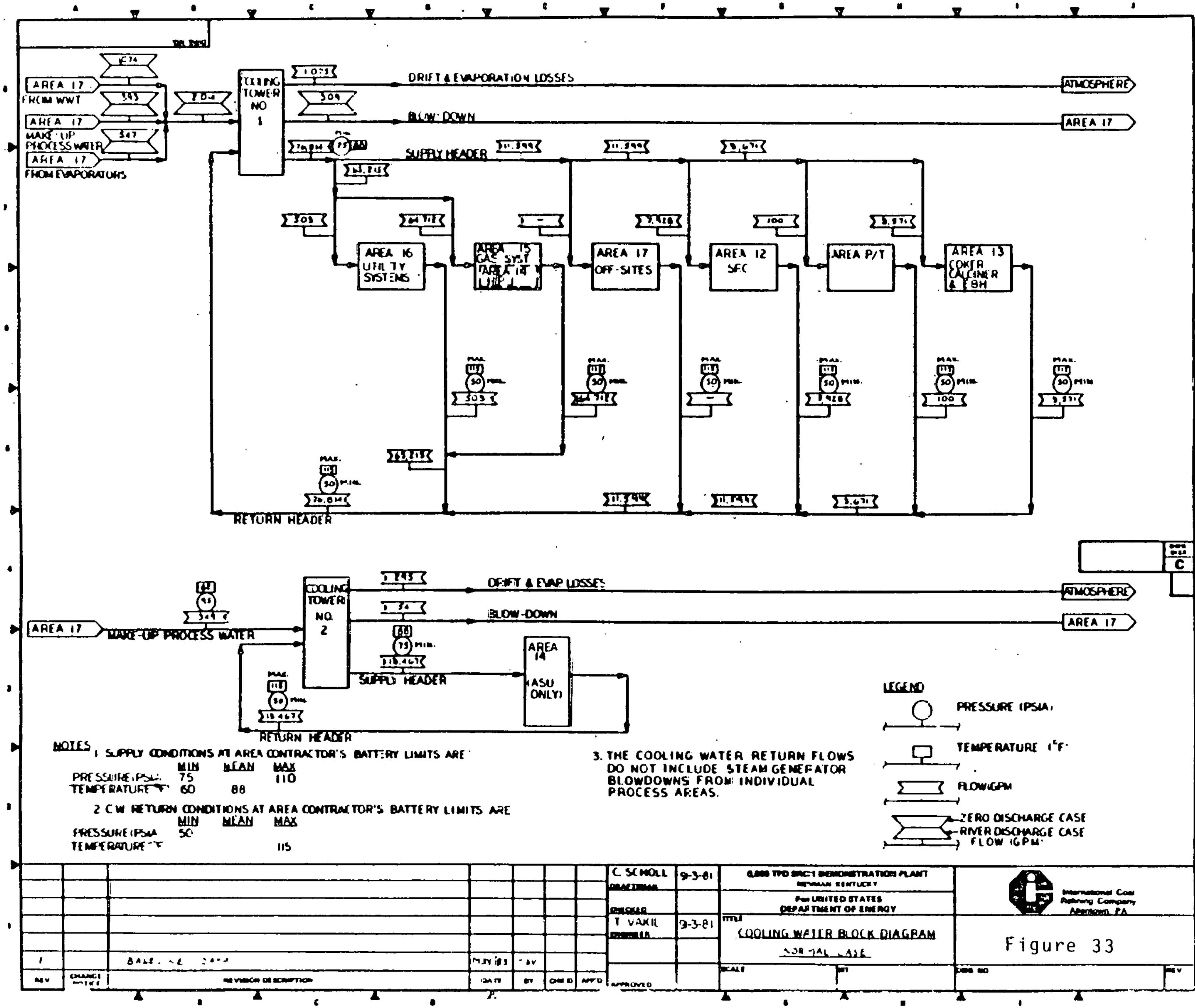

Area 15
Gas Systems
Area 12
SRC Process
Main
Electri-
cal
Substa-
tion
Central
Control
Bldg.
Area 13
Coke &
Liquid
Products
Area 14
Cryogenic
Systems
COOLING TOWER
POWER HOUSE
CONTRACT SERVICES CHANGE BLDG
SECONDARY PUMP HOUSE
WATER STORAGE TANK
LIQUID STORAGE
MAINTENANCE BUILDING
WAREHOUSE
ADMINISTRATION BLDG
SERVICE CHANGE BLDG
PRIMARY PUMP HOUSE
WATER STORAGE TANK
TEST HEADER
PRV
DIESEL FIRE PUMP
FIRE PUMP LAYOUT
LEGEND
FIRE HYDRANT
MONITOR NOZZLE
SPRINKLER VALVE RISER
For UNITED STATES
DEPARTMENT OF ENERGY
PROCESS & CONTROL DIAGRAM
INTERCONNECTING SYSTEM
FIRE PROTECTION
NONE
THE RUST ENGINEERING COMPANY

Figure 31

Figure 32 BFW/STEAM/CONDENSATE SYSTEM




AREA 17 FROM WWT
AREA 17 MAKE-UP PROCESS WATER
AREA 17 FROM EVAPORATORS
COOLING TOWER NO 1
DRIFT & EVAPORATION LOSSES
ATMOSPHERE
BLOW-DOWN
AREA 17
SUPPLY HEADER
AREA 16 UTILITY SYSTEMS
AREA 15 GAS SYST AREA 14 (HP)
AREA 17 OFF-SITES
AREA 12 SFC
AREA P/T
AREA 13 COKER CALCINER & EBH
RETURN HEADER
COOLING TOWER NO. 2
DRIFT & EVAP LOSSES
ATMOSPHERE
BLOW-DOWN
AREA 17
AREA 17 MAKE-UP PROCESS WATER
SUPPLY HEADER
AREA 14 (ASU ONLY)
RETURN HEADER
LEGEND
PRESSURE (PSIA)
TEMPERATURE (°F)
FLOW(GPM)
ZERO DISCHARGE CASE
RIVER DISCHARGE CASE FLOW (GPM)
NOTES
1. SUPPLY CONDITIONS AT AREA CONTRACTOR'S BATTERY LIMITS ARE:
MIN MEAN MAX
PRESSURE (PSIA) 75 110
TEMPERATURE °F 60 88
2. CW RETURN CONDITIONS AT AREA CONTRACTOR'S BATTERY LIMITS ARE
MIN MEAN MAX
PRESSURE (PSIA) 50
TEMPERATURE °F 115
3. THE COOLING WATER RETURN FLOWS DO NOT INCLUDE STEAM GENERATOR BLOWDOWNS FROM INDIVIDUAL PROCESS AREAS.
C. SCHOLL 9-3-81
T. VAKIL 9-3-81
6,000 TPD SRC-I DEMONSTRATION PLANT NEWMAN KENTUCKY
For UNITED STATES DEPARTMENT OF ENERGY
COOLING WATER BLOCK DIAGRAM
NORMAL CASE
International Coal Refining Company Allentown, PA
Figure 33

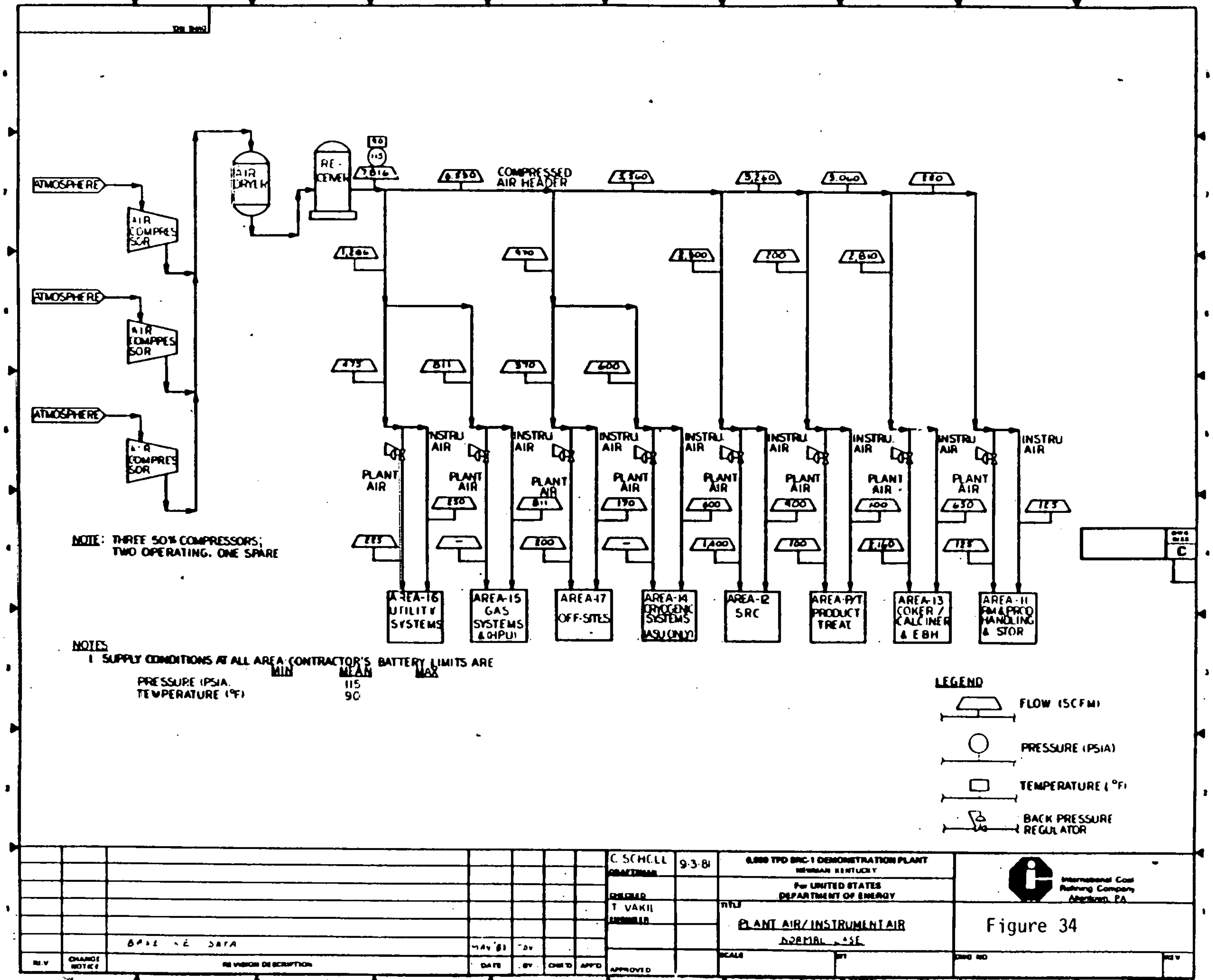
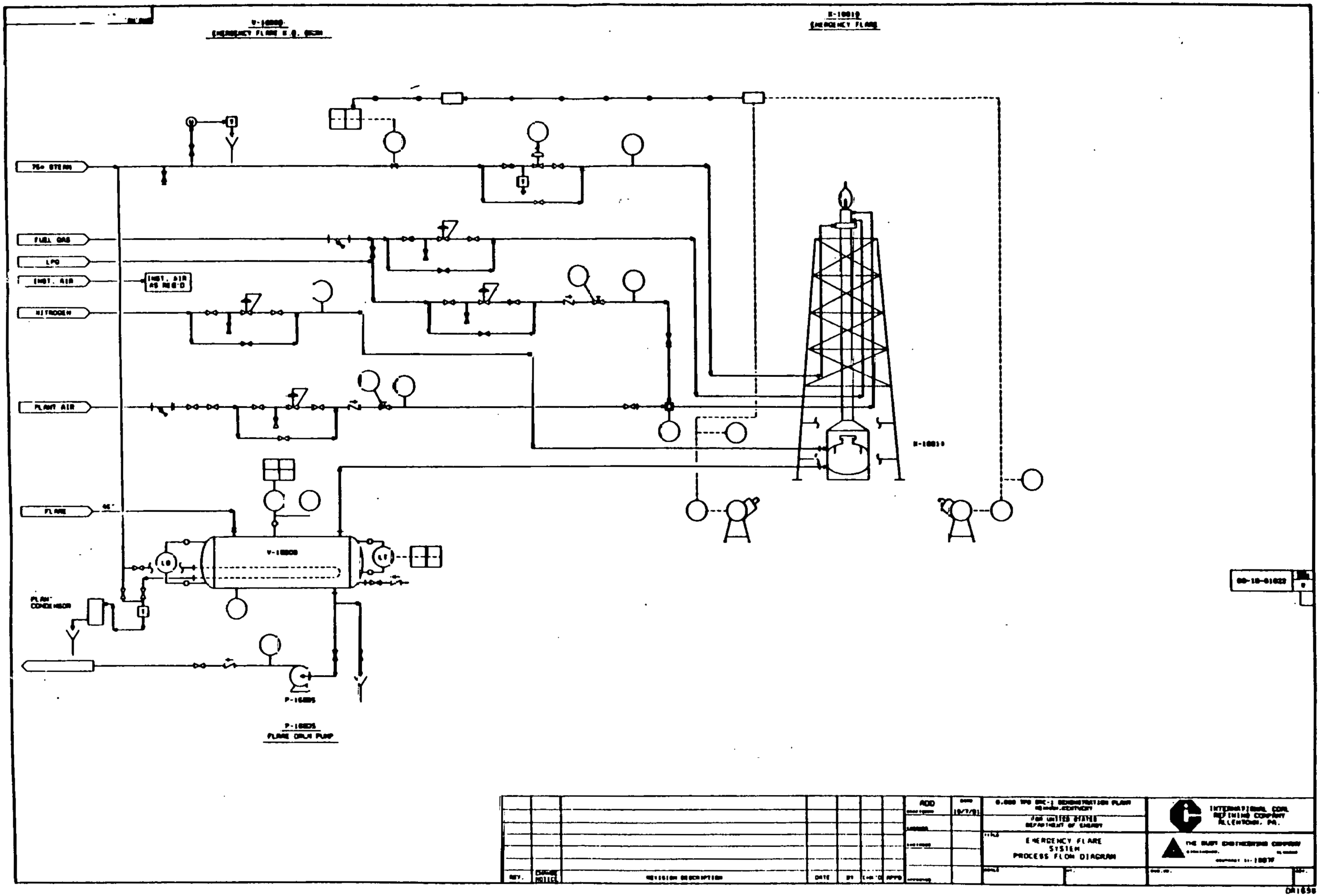
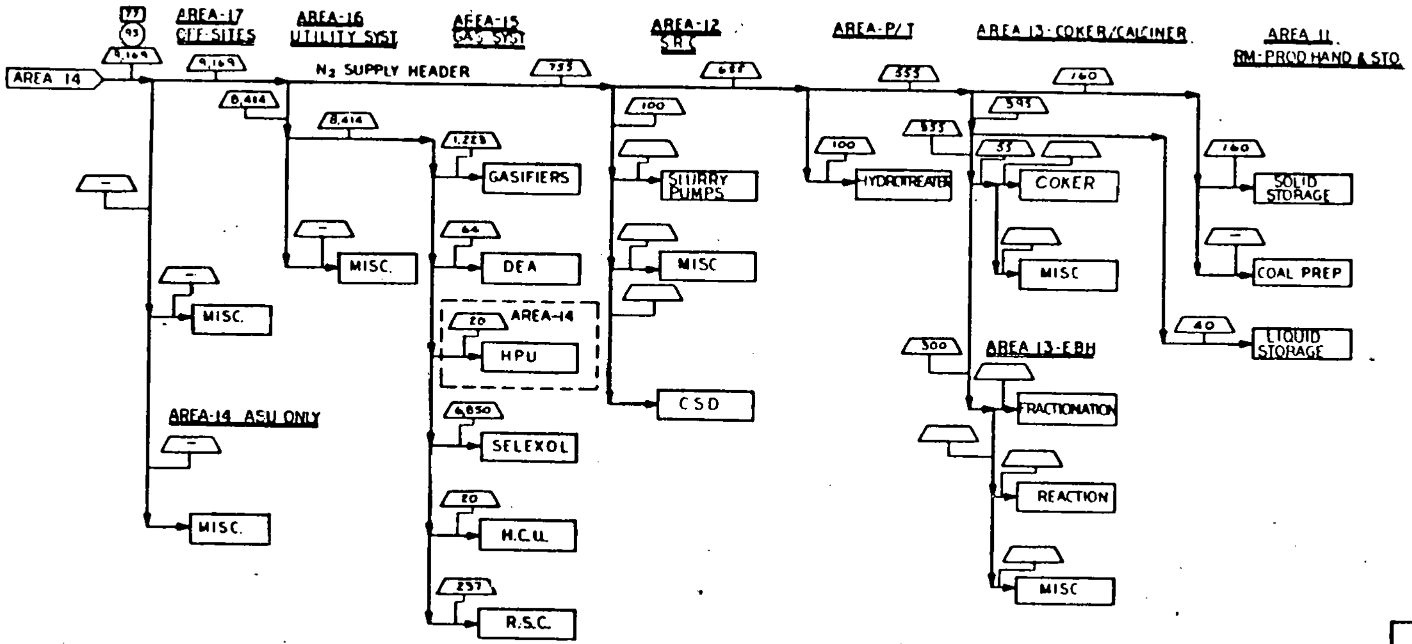

ATMOSPHERE
AIR COMPRESSOR
AIR DRYER
RECEIVER
COMPRESSED AIR HEADER
INSTRU AIR
PLANT AIR
AREA-16 UTILITY SYSTEMS
AREA-15 GAS SYSTEMS & HPU
AREA-17 OFF-SITES
AREA-14 CRYOGENIC SYSTEMS (ASU ONLY)
AREA-12 SRC
AREA-P/T PRODUCT TREAT
AREA-13 COKER / CALCINER & EBH
AREA-11 RM & PROD HANDLING & STOR
NOTE: THREE 50% COMPRESSORS; TWO OPERATING, ONE SPARE
NOTES
1 SUPPLY CONDITIONS AT ALL AREA CONTRACTOR'S BATTERY LIMITS ARE
MIN MEAN MAX
PRESSURE (PSIA) 115
TEMPERATURE (°F) 90
LEGEND
FLOW (SCFM)
PRESSURE (PSIA)
TEMPERATURE (°F)
BACK PRESSURE REGULATOR
C. SCHELL 9-3-81
T. VAKIL
6,000 TPD SRC-1 DEMONSTRATION PLANT
NEWMAN KENTUCKY
For UNITED STATES DEPARTMENT OF ENERGY
International Coal Refining Company Allentown, PA
PLANT AIR/INSTRUMENT AIR
NORMAL CASE

Figure 34



FUEL GAS
LPG
INST. AIR
INST. AIR AS REQ'D
NITROGEN
PLANT AIR
FLARE
REV.
REVISION DESCRIPTION
DATE
BY
APPD
FOR UNITED STATES DEPARTMENT OF ENERGY
EMERGENCY FLARE
SYSTEM
PROCESS FLOW DIAGRAM
INTERNATIONAL COAL
REFINING COMPANY
ALLENTOWN, PA.
DR1658

Figure 35



NOTES

1. SUPPLY CONDITIONS AT ALL AREA CONTRACTORS BATTERY LIMITS ARE:

	MIN	MEAN	MAX
PRESSURE (PSIA)	75	95	115
TEMPERATURE (°F)	20	77	110

LEGEND

FLOW (SCFM)

PRESSURE (PSIA)

TEMPERATURE (°F)

REV	CHANGE NOTICE	REVISION DESCRIPTION	DATE	BY	CHK'D	APP'D
1		BASELINE DATA	MAY '81	TSV		

C SCHOLL 9-3-81
DRAFTSMAN

CHECKED
T VAKIL 9-3-81
ENGINEER

APPROVED

6,000 TPD SRC-I DEMONSTRATION PLANT
NEWMAN KENTUCKY
For UNITED STATES
DEPARTMENT OF ENERGY

TITLE
UTILITY NITROGEN BLOCK DIAGRAM
NORMAL CASE

International Coal Refining Company
Allentown, PA

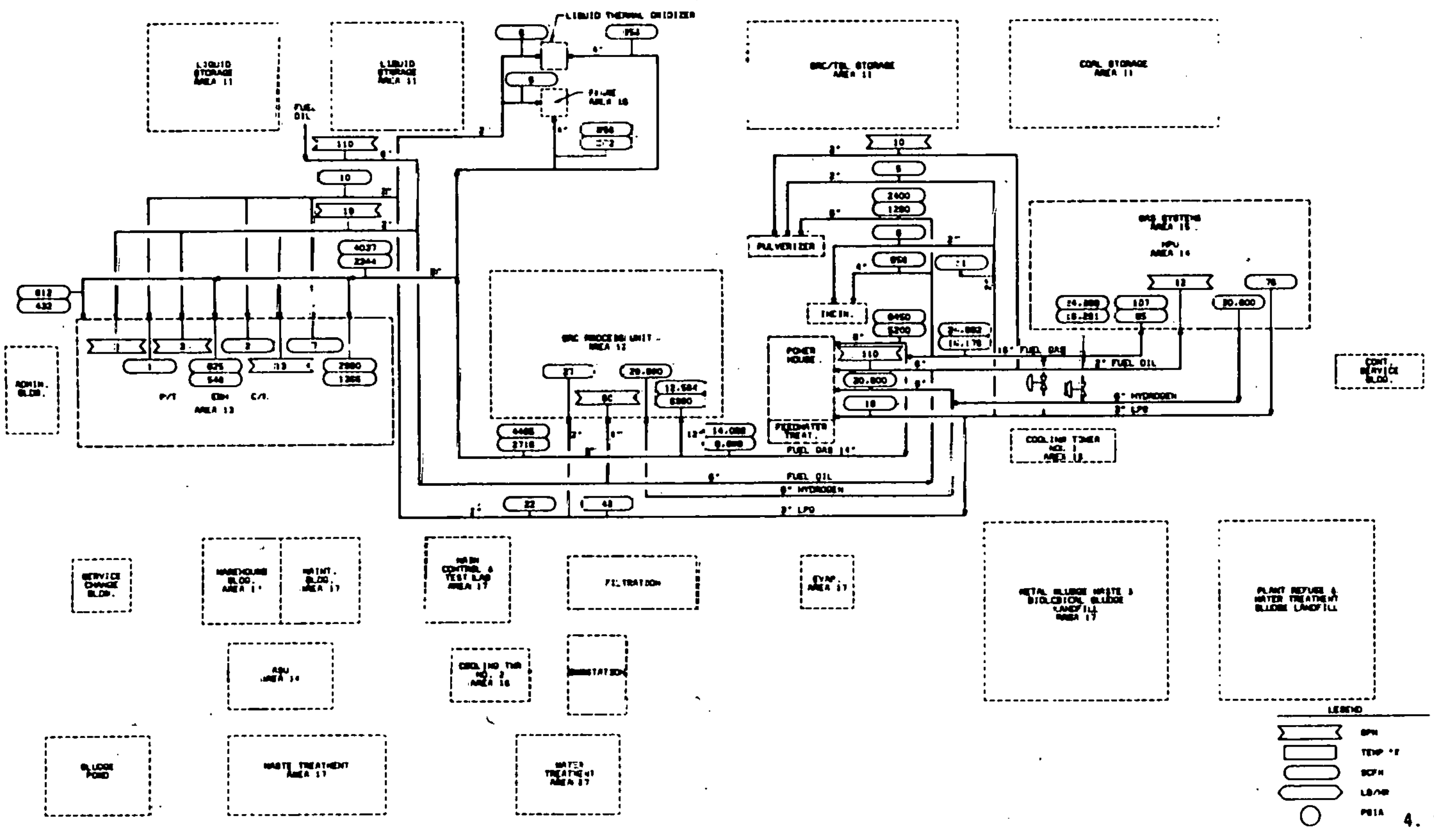
FIGURE 36

SCALE

DWG NO

REV

C



NOTES:

1. THIS DRAWING DOES NOT SHOW PIPING WITHIN ANOTHER CONTRACTOR'S AREA OF RESPONSIBILITY.
2. WHEN TWO FLOWS ARE SHOWN, THE UPPER FLOW IS THE PEAK FLOW AND THE LOWER FLOW IS FOR CASE 2 OPERATION. WHEN ONE FLOW IS SHOWN, IT IS THE PEAK FLOW.
3. LPG DISTRIBUTION IS FOR PILOT LIGHTS.
4. Supply conditions at Area Contractors' Battery limits for fuel and LPG gas are:

	Min.	Mean	Max.
Pressure (PSIA)	75	88	95
Temp. (°F)	78	-	105

FIGURE 37

Flow rates and pipe sizing given is preliminary design information developed by Rust Engg. Co.

INTERCONNECTING PIPING SYSTEM PLANT FUELS

FOR UNITED STATES DEPARTMENT OF ENERGY

INTERNATIONAL COAL REFINING COMPANY ALLENTOWN, PA.

00-16-40010

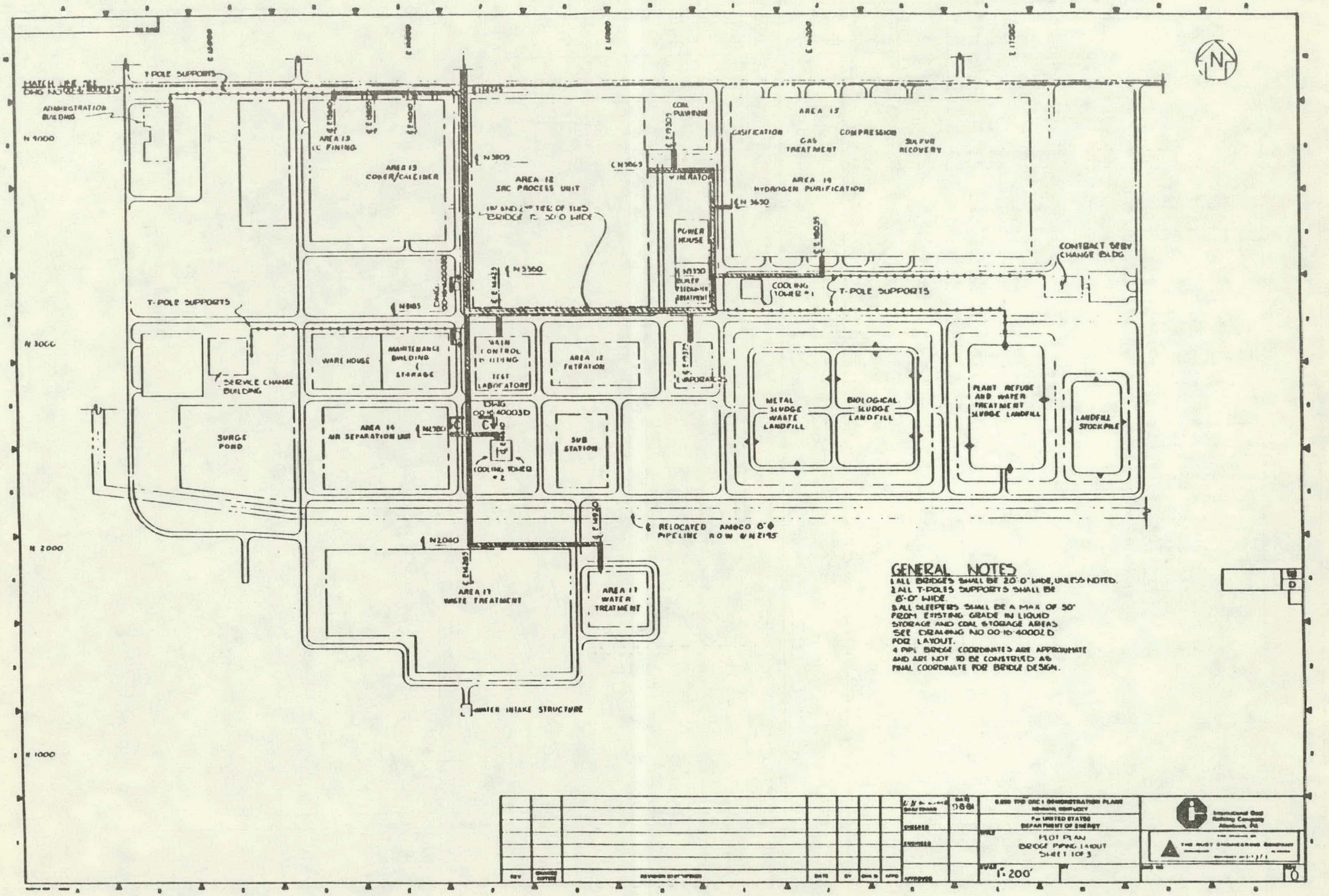
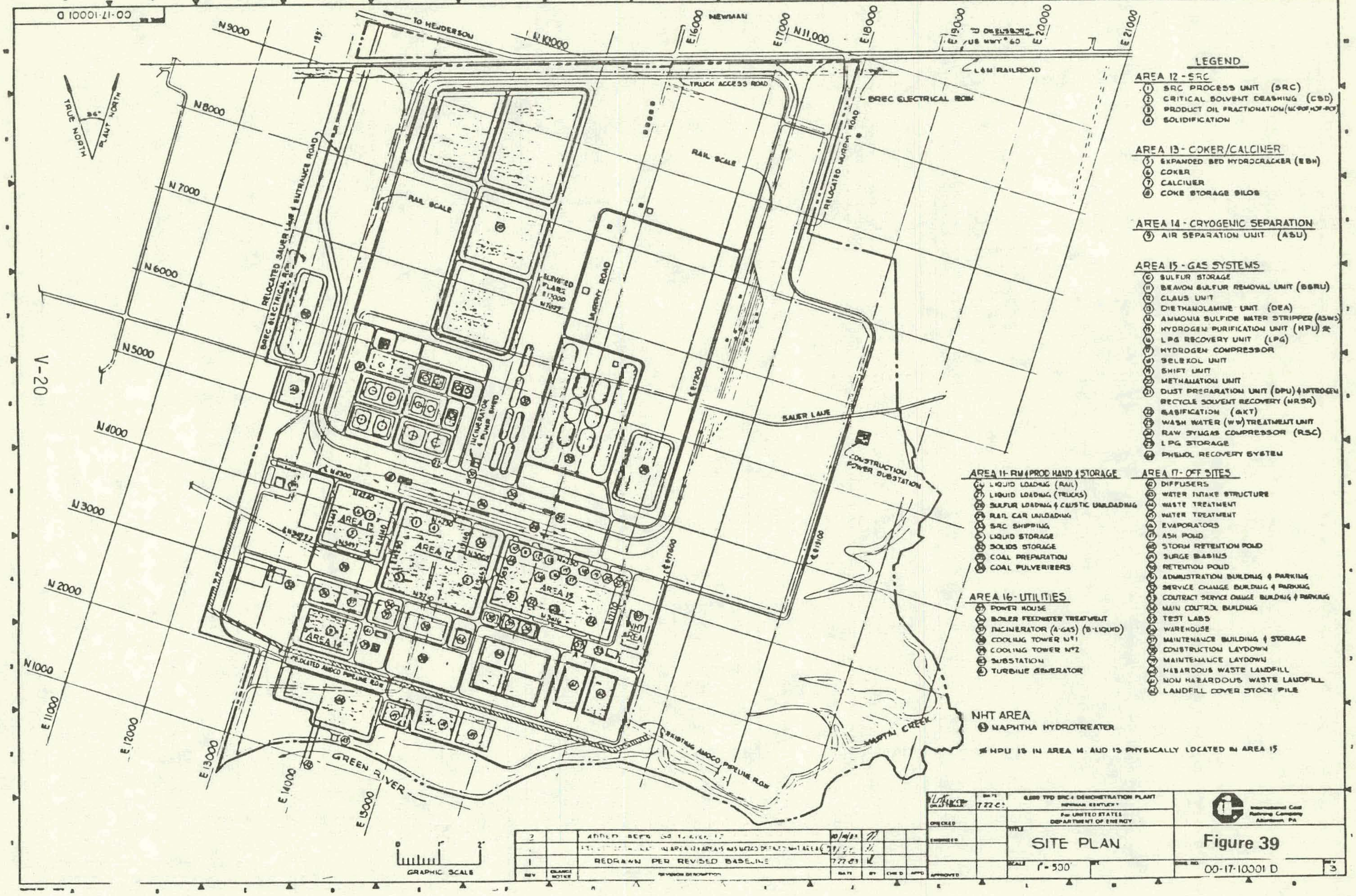
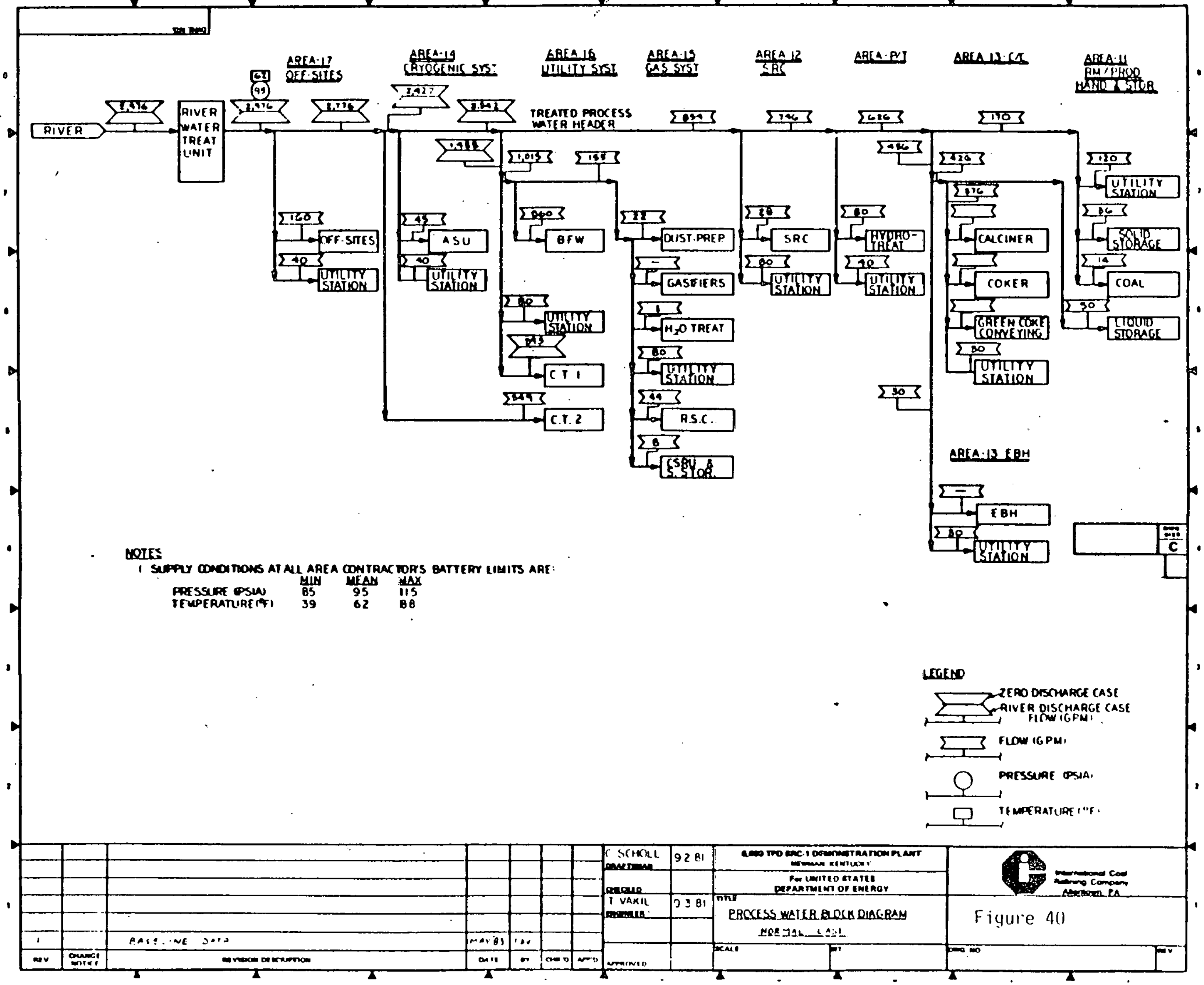

T-POLE SUPPORTS
ADMINISTRATION BUILDING
N 4000
N 3000
N 2000
N 1000
AREA 13 LC FINING
AREA 13 COKER/CALCINER
AREA 12 SRC PROCESS UNIT
AREA 15
GASIFICATION
GAS TREATMENT
COMPRESSION
SULFUR RECOVERY
AREA 19 HYDROGEN PURIFICATION
POWER HOUSE
COOLING TOWER #1
CONTRACT SERV CHANGE BLDG
WARE HOUSE
MAINTENANCE BUILDING & STORAGE
SERVICE CHANGE BUILDING
MAIN CONTROL BUILDING
TEST LABORATORY
AREA 12 FILTRATION
EVAPORATOR
METAL SLUDGE WASTE LANDFILL
BIOLOGICAL SLUDGE LANDFILL
PLANT REFUSE AND WATER TREATMENT SLUDGE LANDFILL
LANDFILL STOCKPILE
SURGE POND
AREA 14 AIR SEPARATION UNIT
COOLING TOWER #2
SUB STATION
RELOCATED AMOCO 8" PIPELINE ROW @ N2195
AREA 17 WASTE TREATMENT
AREA 17 WATER TREATMENT
WATER INTAKE STRUCTURE
GENERAL NOTES
1 ALL BRIDGES SHALL BE 20'-0" WIDE, UNLESS NOTED.
2 ALL T-POLES SUPPORTS SHALL BE 8'-0" WIDE.
3 ALL SLEEPERS SHALL BE A MAX OF 30" FROM EXISTING GRADE IN LIQUID STORAGE AND COAL STORAGE AREAS
SEE DRAWING NO 00-16-40002 D FOR LAYOUT.
4 PIPE BRIDGE COORDINATES ARE APPROXIMATE AND ARE NOT TO BE CONSTRUED AS FINAL COORDINATE FOR BRIDGE DESIGN.
For UNITED STATES DEPARTMENT OF ENERGY
PLOT PLAN
BRIDGE PIPING LAYOUT
SHEET 1 OF 3
1" = 200'
International Coal Refining Company
THE RUST ENGINEERING COMPANY

Figure 38



LEGEND
AREA 12 - SRC
SRC PROCESS UNIT (SRC)
CRITICAL SOLVENT DEASHING (CSD)
PRODUCT OIL FRACTIONATION
SOLIDIFICATION
AREA 13 - COKER/CALCINER
EXPANDED BED HYDROCRACKER (EBH)
COKER
CALCINER
COKE STORAGE SILOS
AREA 14 - CRYOGENIC SEPARATION
AIR SEPARATION UNIT (ASU)
AREA 15 - GAS SYSTEMS
SULFUR STORAGE
BEAVON SULFUR REMOVAL UNIT (BSRU)
CLAUS UNIT
DIETHANOLAMINE UNIT (DEA)
AMMONIA SULFIDE WATER STRIPPER (ASWS)
HYDROGEN PURIFICATION UNIT (HPU) *
LPG RECOVERY UNIT (LPG)
HYDROGEN COMPRESSOR
SELEXOL UNIT
SHIFT UNIT
METHANATION UNIT
DUST PREPARATION UNIT (DPU) & NITROGEN RECYCLE SOLVENT RECOVERY (NRSR)
GASIFICATION (GKT)
WASH WATER (WW) TREATMENT UNIT
RAW SYNGAS COMPRESSOR (RSC)
LPG STORAGE
PHENOL RECOVERY SYSTEM
AREA 11 - RM & PROD HAND & STORAGE
LIQUID LOADING (RAIL)
LIQUID LOADING (TRUCKS)
SULFUR LOADING & CAUSTIC UNLOADING
RAIL CAR UNLOADING
SRC SHIPPING
LIQUID STORAGE
SOLIDS STORAGE
COAL PREPARATION
COAL PULVERIZERS
AREA 16 - UTILITIES
POWER HOUSE
BOILER FEEDWATER TREATMENT
INCINERATOR (A-GAS) (B-LIQUID)
COOLING TOWER Nº1
COOLING TOWER Nº2
SUBSTATION
TURBINE GENERATOR
AREA 17 - OFF SITES
DIFFUSERS
WATER INTAKE STRUCTURE
WASTE TREATMENT
WATER TREATMENT
EVAPORATORS
ASH POND
STORM RETENTION POND
SURGE BASINS
RETENTION POND
ADMINISTRATION BUILDING & PARKING
SERVICE CHANGE BUILDING & PARKING
CONTRACT SERVICE CHANGE BUILDING & PARKING
MAIN CONTROL BUILDING
TEST LABS
WAREHOUSE
MAINTENANCE BUILDING & STORAGE
CONSTRUCTION LAYDOWN
MAINTENANCE LAYDOWN
HAZARDOUS WASTE LANDFILL
NON HAZARDOUS WASTE LANDFILL
LANDFILL COVER STOCK PILE
NHT AREA
NAPHTHA HYDROTREATER
* HPU IS IN AREA 14 AND IS PHYSICALLY LOCATED IN AREA 15
TRUE NORTH
PLANT NORTH
TO HENDERSON
NEWMAN
US HWY 60
L&N RAILROAD
TRUCK ACCESS ROAD
BREC ELECTRICAL ROW
RAIL SCALE
RELOCATED MURPHY ROAD
MURPHY ROAD
SAUER LANE
CONSTRUCTION POWER SUBSTATION
GREEN RIVER
RELOCATED AMOCO PIPELINE R.O.W.
EXISTING AMOCO PIPELINE R.O.W.
AREA 12
AREA 13
AREA 14
AREA 15
NHT AREA
GRAPHIC SCALE
REDRAWN PER REVISED BASELINE
For UNITED STATES DEPARTMENT OF ENERGY
SITE PLAN
1" = 300'
00-17-10001 D

Figure 39


AREA-17 OFF-SITES
AREA-14 CRYOGENIC SYST
AREA-16 UTILITY SYST
AREA-15 GAS SYST
AREA-12 SRC
AREA-P/T
AREA-13-C/C
AREA-11 RM/PROD HAND & STOR
RIVER
RIVER WATER TREAT UNIT
TREATED PROCESS WATER HEADER
OFF-SITES
UTILITY STATION
ASU
BFW
C T 1
C.T. 2
DUST-PREP
GASIFIERS
H2O TREAT
R.S.C.
CSBU & S. STOR.
SRC
HYDRO-TREAT
CALCINER
COKER
GREEN COKE CONVEYING
COAL
SOLID STORAGE
LIQUID STORAGE
AREA-13 EBH
EBH
NOTES
1 SUPPLY CONDITIONS AT ALL AREA CONTRACTOR'S BATTERY LIMITS ARE:
MIN MEAN MAX
PRESSURE (PSIA) 85 95 115
TEMPERATURE (°F) 39 62 88
LEGEND
ZERO DISCHARGE CASE
RIVER DISCHARGE CASE FLOW (GPM)
FLOW (GPM)
PRESSURE (PSIA)
TEMPERATURE (°F)
C. SCHOLL 9 2 81
T. VAKIL 9 3 81
6,000 TPD SRC-I DEMONSTRATION PLANT
NEWMAN, KENTUCKY
For UNITED STATES DEPARTMENT OF ENERGY
PROCESS WATER BLOCK DIAGRAM
NORMAL CASE
International Coal Refining Company Allentown, PA
BASELINE DATA
REV
CHANGE NOTICE
REVISION DESCRIPTION
DATE
BY
APPROVED
Figure 40

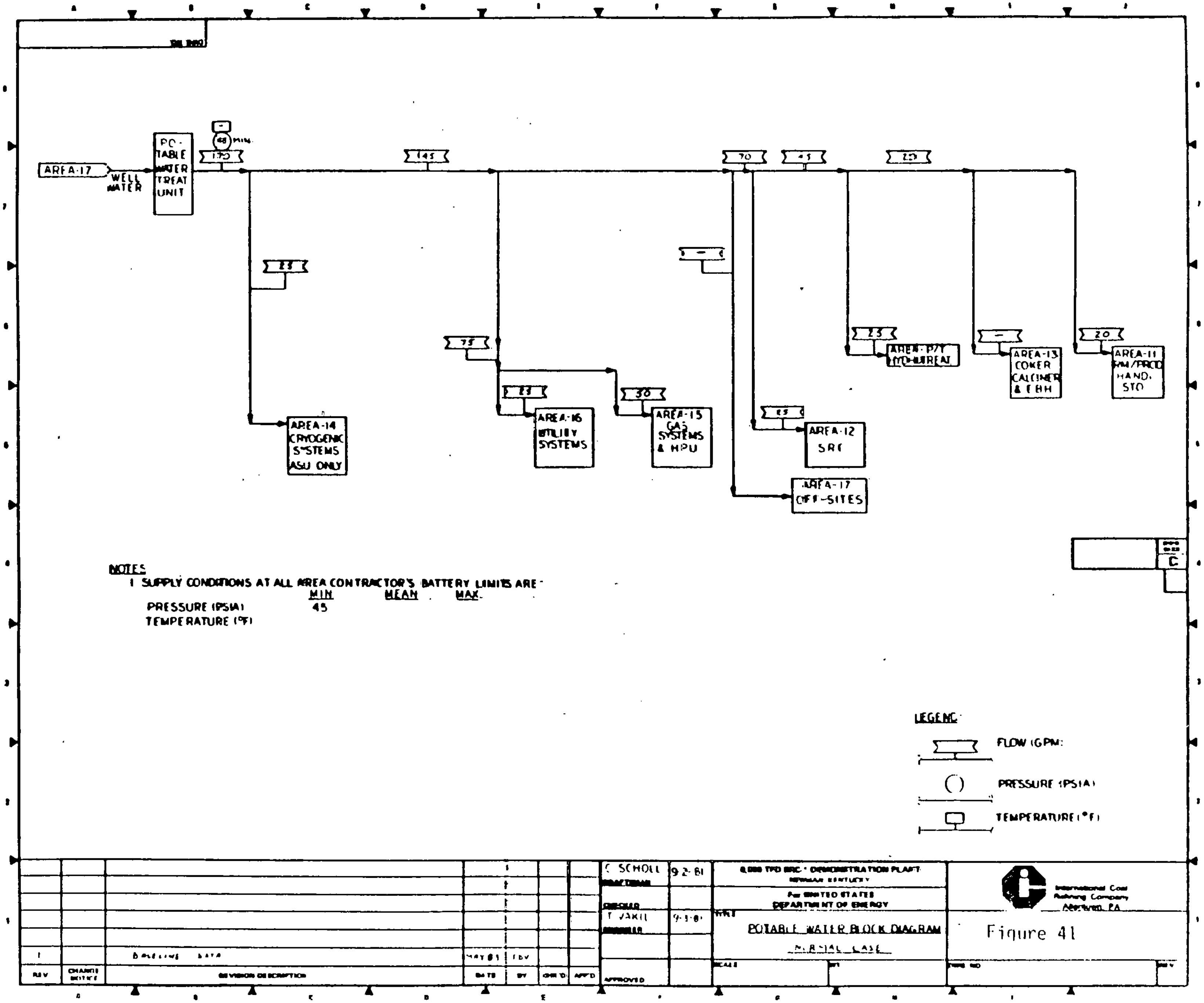

AREA-17
WELL WATER
POTABLE WATER TREAT UNIT
170
48 MIN.
145
70
45
20
23
AREA-14 CRYOGENIC SYSTEMS ASU ONLY
75
23
AREA-16 UTILITY SYSTEMS
30
AREA-15 GAS SYSTEMS & HPU
23
AREA-12 SRC
AREA-17 OFF-SITES
23
AREA-P/T HYDROTREAT
AREA-13 COKER CALCINER & EBH
20
AREA-11 RM/PROD HAND. STO
NOTES
1 SUPPLY CONDITIONS AT ALL AREA CONTRACTOR'S BATTERY LIMITS ARE:
MIN MEAN MAX
PRESSURE (PSIA) 45
TEMPERATURE (°F)
LEGEND
FLOW (GPM)
PRESSURE (PSIA)
TEMPERATURE (°F)
C. SCHOLL 9-2-81
T. VAKIL 9-3-81
1 BASELINE DATA
REV CHANGE NOTICE REVISION DESCRIPTION DATE BY CHK'D APP'D
APPROVED
DEPARTMENT OF ENERGY
POTABLE WATER BLOCK DIAGRAM
NORMAL CASE
International Coal Refining Company Allentown, PA

Figure 41

FIGURE 42 - BLOCK FLOW DIAGRAM FOR THE WASTEWATER TREATMENT FACILITY

ZERO DISCHARGE MODE

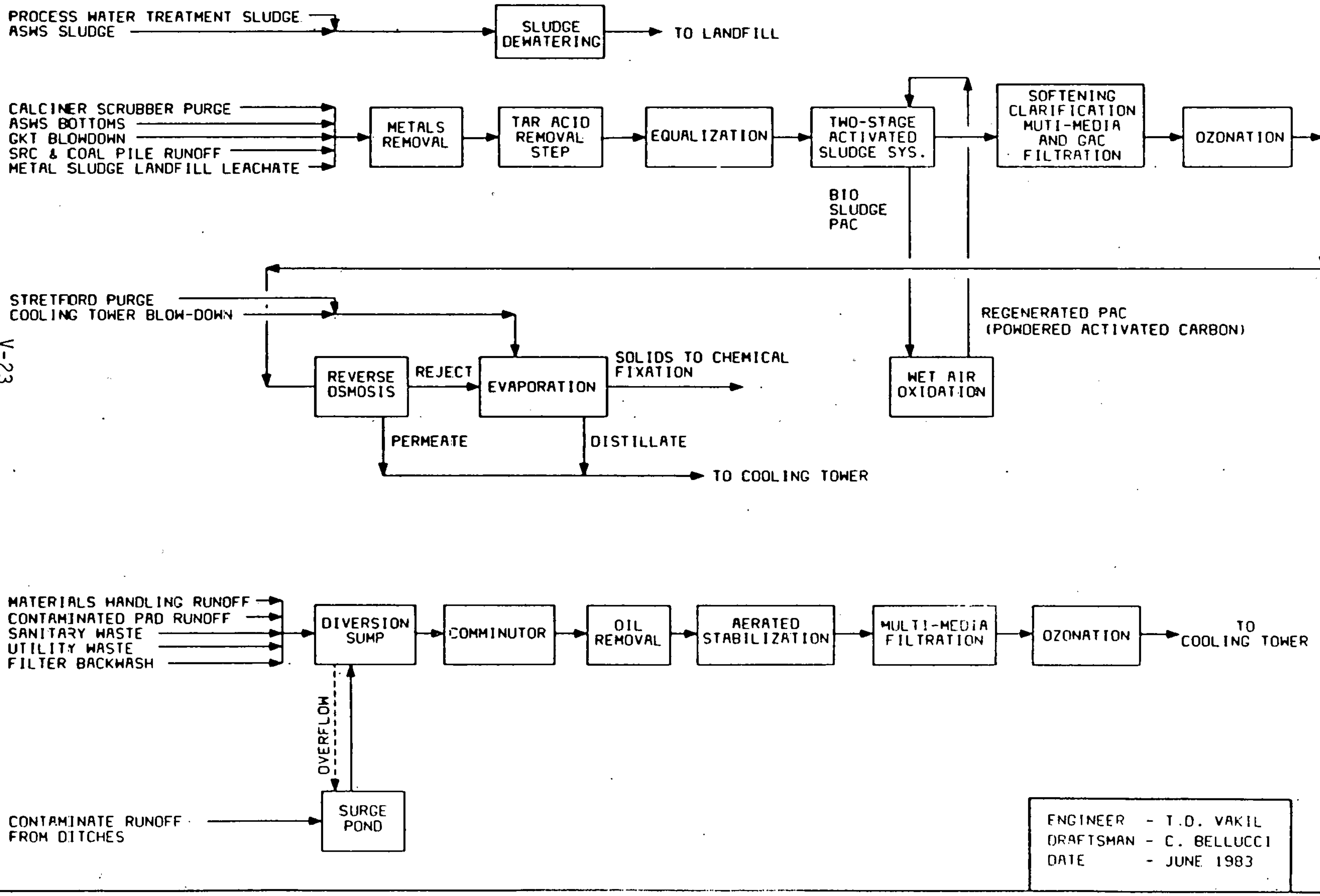
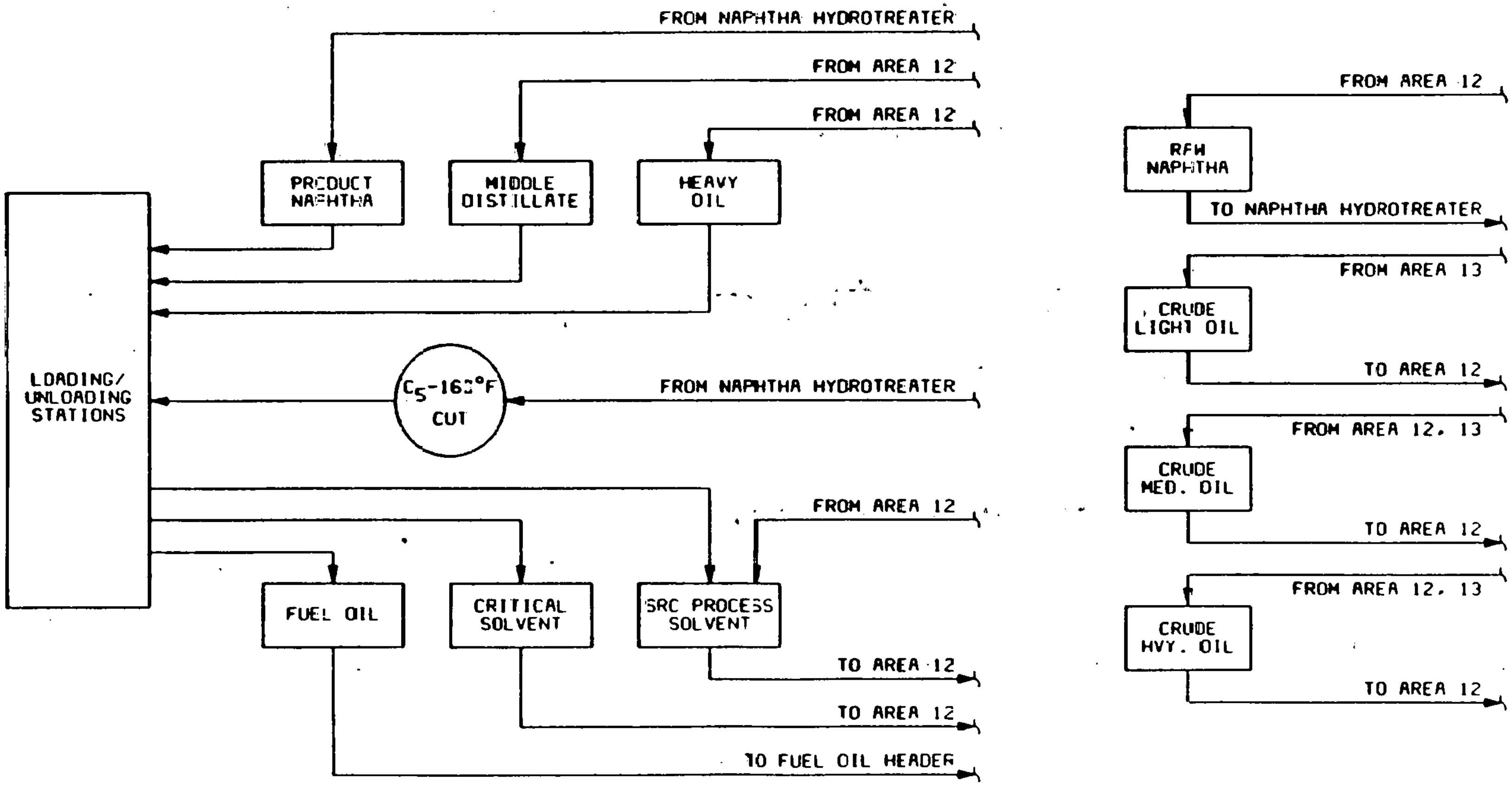


Figure 43

TANK FARM BLOCK DIAGRAM



F30230

COAL STORAGE SAMPLING & TRANSFER

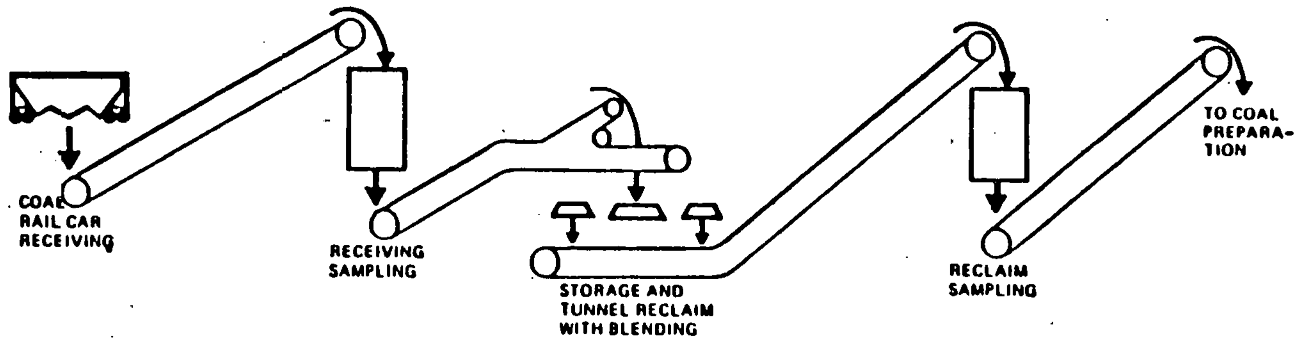


Figure 44

COAL PREPARATION & DISTRIBUTION

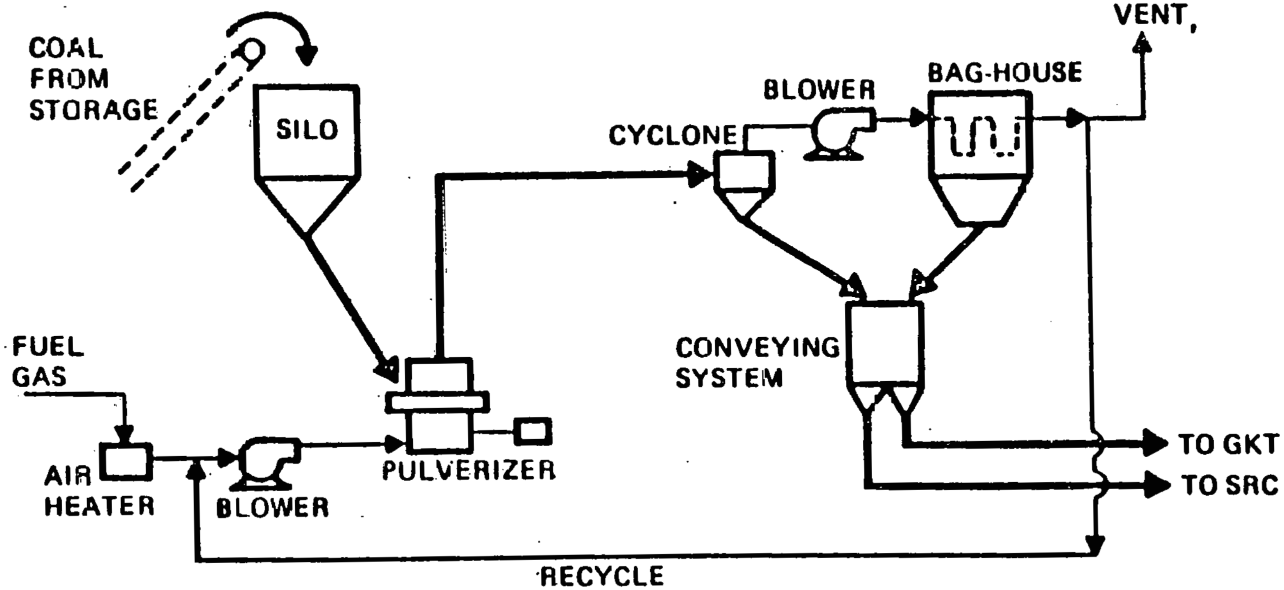


Figure 45

SRC HANDLING & STORAGE

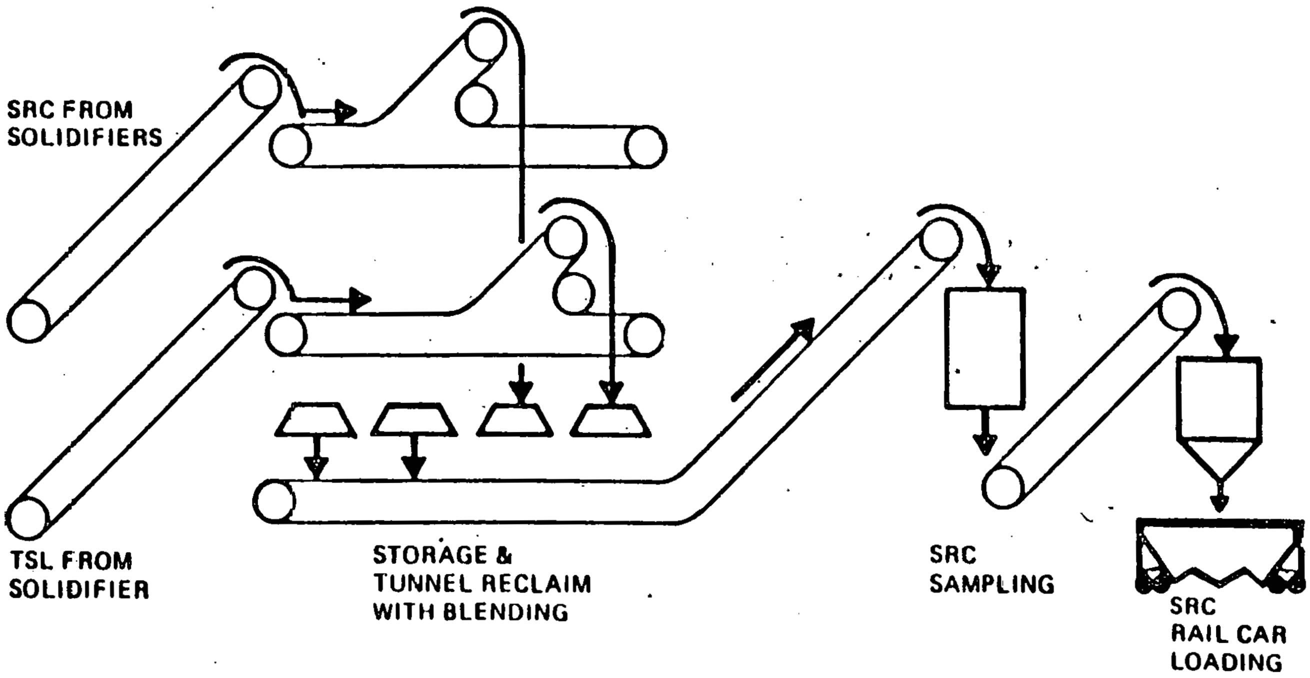


Figure 46

2. COST PLANS

The following cost plan data from the Original Baseline for the Utilities and Off Sites Area, Work Breakdown Structure element 1.4.1 are included here for reference and comparison. They were coordinated and compiled by the International Coal Refining Company (ICRC) based on engineering, vendor engineering and equipment cost estimates and computerized material take-off quantities developed by The Rust Engineering Company, a construction cost estimate developed by Stone and Webster Engineering Corporation, and a Phase I and II support estimate developed by ICRC. This cost plan data did not include any allowance for contingency.

The Cost Plans were presented in first quarter FY 82 and escalated costs in the following formats:

Phase I - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

Phase II - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

The escalated costs were developed using the following rates compounded yearly: 10% for FY 82 and FY 83, 9% for FY 84 and FY 85 and 8% thereafter. Escalation on equipment had been calculated based on a committed basis and distributed on a cash flow basis.

During the Post-Baseline period, the capital costs in first quarter FY 82 dollars for the Utilities and Off Sites Area decreased by $5.836 million--from $446.527 million to $440.691 million. The decrease is due to the revised capital costs resulting from the finalized Category C ECPs and the attendant adjustment to the factored costs for spare parts.

No attempt has been made to escalate the revised costs or to develop new cost plans because of the lack of a definitive project schedule and agreed escalation factors.

REVISED

International Coal Refining Company

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR Rust
WBS LEVEL 1.4.1, NUMBER 500
WBS ELEMENT TITLE Rust Area Summary

DATE ______
REVISION NO. ______
PAGE ______ OF ______

1st QTR FY '82 (THOUSANDS)

ITEM			FINAL BASELINE LABOR MH	LABOR $	MAT'L $			TOTAL $
EQUIP	A/C PURCHASE				40094.0			40094.0
	CM/C	PURCHASE			30.0			30.0
		ERECT	664.5(1)	7244.7	25358.8			32603.5
	ICRC	SPARE PARTS						
TOTAL EQUIP			664.5	7244.7	65482.8			72727.5
Site & Earthwork			1580.6	20977.0	15781.5			36758.5
Concrete			1212.1	15633.7	10370.7			26004.4
Structural Steel			305.2	4736.3	12247.2			16983.5
Piping			1200.0	19193.3	24662.6			43855.9
Electrical			678.7	9936.5	12683.4			22619.9
Instrumentation			258.3	3963.8	6236.6			10200.4
Architectural, Painting, and Insulation			953.5	13259.1	15314.5			28573.6
SUBTOTAL - BULKS			6188.4	87699.7	97296.5			184996.2
TOTAL DIRECTS			6852.9	94944.4	162779.3			257723.7
Distributables & Indirects			1785.3	65036.8	40732.2			105769.0
TOTAL DIRECTS & INDIRECTS			8638.2	159981.2	203511.5			363492.7
A/C Engr.	Phase I			40710.0				40710.0
	Vendor Engr'g				8147.8			8147.8
	Phase II			7579.0				7579.0
CM/C	Phase I			567.0				567.0
	Phase II		16.0	8501.6	3839.3			12340.9
TOTAL ENGINEERING + CM/C			16.0	57357.6	11987.1			69344.7
ICRC	Phase I			6952.0				6952.0
	Phase II			902.0				902.0
SUBTOTAL				7854.0				7854.0
CATEGORY B ECP's								
CATEGORY C ECP's								
SUBTOTAL – OTHER				7854.0				7854.0
ESCALATION	Phase I							
	Phase II							
CONTINGENCY	Phase I							
	Phase II							
	POST MECH MODS							
SUBTOTAL – CONTINGENCY								
GRAND TOTAL			8654.2	225192.8	215498.6			440691.4

FORM 9637 (3/82)

(1) Includes manhours for field erected equipment. Dollar value of these hours appears in material column

International Coal Refining Company

ORIGINAL

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR Rust

WBS LEVEL 1.4.1 . NUMBER 500

WBS ELEMENT TITLE Rust Area Summary

DATE ______

REVISION NO. ______

PAGE ______ OF ______

ITEM			FINAL BASELINE					
			LABOR		MAT'L	Subtotal	Escalation	TOTAL
			MH	$	$			$
EQUIP	A/C PURCHASE				38510.0			38510.0
EQUIP	CM/C	PURCHASE			30.0			30.0
EQUIP	CM/C	ERECT	659.0	7162.1	25358.8			32520.9
	ICRC	SPARE PARTS						
TOTAL EQUIP			659.0	7162.1	63898.8			71060.9
Site & Earthwork			1582.1	20996.5	15795.6			36792.1
Concrete			1201.9	15502.3	10300.7			25803.0
Structural Steel			284.5	4415.7	11540.8			15956.5
Piping			1286.6	20578.1	26313.8			46891.9
Electrical			669.0	9794.1	12559.1			22353.2
Instrumentation			255.7	3923.5	6206.2			10129.7
Architectural, Painting, and Insulation			946.8	13165.5	15131.0			28296.5
SUBTOTAL - BULKS			6226.6	88375.7	97847.2			186222.9
TOTAL DIRECTS			6885.9	95537.0	161746.0			257283.0
Distributables & Indirects			1779.0	64805.7	40642.7			105448.4
TOTAL DIRECTS & INDIRECTS			8664.9	160342.7	202388.7	362731.4	116137.7	478869.1
A/C Engr.	Phase I			40532.0		40532.0	4243.0	44775.0
A/C Engr.	Vendor Engr'g				7958.0	7958.0	1150.0	9108.0
A/C Engr.	Phase II			7415.0		7415.0	2767.0	10182.0
CM/C	Phase I			617.0		617.0	86.0	703.0
CM/C	Phase II		16.1	8555.6	3866.3	12421.9	4758.5	17180.4
TOTAL ENGINEERING + CM/C			16.1	57119.6	11824.3	68943.9	13004.5	81948.4
ICRC	Phase I			6952.0		6952.0	376.0	7328.0
ICRC	Phase II			902.0		902.0	177.0	1079.0
SUBTOTAL				7854.0		7854.0	553.0	8407.0
CATEGORY B ECP's					6998.0	6998.0	2129.0	9127.0
CATEGORY C ECP's								
SUBTOTAL – OTHER				7854.0	6998.0	14852.0	2682.0	17534.0
ESCALATION	Phase I							
ESCALATION	Phase II							
CONTINGENCY	Phase I							
CONTINGENCY	Phase II							
	POST MECH MODS							
SUBTOTAL – CONTINGENCY								
GRAND TOTAL			8681.0	225316.3	221211.0	446527.3	131824.2	578351.5

FORM 9637 (3/82)

DOE Form CR-33P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary
Phase I

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)			10. Planned Current Fiscal Year FY82																
		FY80	FY81	O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.4.1	Utilities & Offsites																			
1.4.1.1	Utility Systems	28	96	25	73	108	53	74	124	154	165	195	177	178	189	1515	5106	784	-	7529
1.4.1.2	Offsites	276	412	76	107	159	178	248	296	292	563	501	419	501	400	3770	5781	212	-	10451
1.4.1.3	Raw Material, Product Handling & Storage	4	98	10	113	148	182	163	214	166	181	129	128	128	183	1745	5552	74	-	7473
1.4.1.4	Area Management	1096	1705	422	537	629	546	530	487	699	674	707	723	618	672	7244	6671	2407	-	19123
1.4.1.5	Engineering Tech. Support	877	1551	171	157	150	131	129	118	305	305	335	236	296	330	2713	1484	784	-	7409
	Rust G & A	-	601	46	77	98	88	94	104	122	152	143	137	137	144	1342	1744	387	-	4074
	Category B ECPs	-	-	-	-	-	-	-	-	10	10	10	10	10	11	61	258	19	-	338
	Total 1.4.1	2281	4463	750	1064	1292	1178	1238	1343	1748	2050	2020	1910	1868	1929	18390	26596	4667	-	56397
	Escalation	-	-	-	-	-	29	31	33	87	103	100	115	139	145	812	3792	1295	-	5899
	Total 1.4.1 - Escalated	2281	4463	750	1064	1292	1207	1269	1376	1835	2153	2120	2055	2007	2074	19202	30388	5962	-	62296

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary
Phase I

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

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International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.4.1	Utility & Offsites																			
1.4.1.1	Utility Systems	28	96	25	73	108	54	75	127	162	173	206	190	190	203	1586	5833	977	-	8520
1.4.1.2	Offsites	276	412	76	107	159	182	254	303	306	592	527	482	539	431	3958	6605	264	-	11515
1.4.1.3	Raw Material, Product Handling & Storage	4	98	10	113	148	186	167	220	174	190	135	136	139	198	1816	6343	94	-	8355
1.4.1.4	Area Management	1096	1705	422	537	629	559	545	499	734	706	740	782	664	720	7537	7625	3143	-	21106
1.4.1.5	Engineering Tech. Support	877	1551	171	157	150	136	131	120	321	321	352	307	318	356	2840	1694	977	-	7939
	Rust G & A	-	601	46	77	98	90	97	107	128	160	150	147	147	155	1402	1993	483	-	4479
	Category B ECPs	-	-	-	-	-	-	-	-	10	11	10	11	10	11	63	295	24	-	382
	Total 1.4.1	2281	4463	750	1064	1292	1207	1269	1376	1835	2153	2120	2055	2007	2074	19202	30388	5962	-	62296

15. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary PAGE OF

Phase I

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)			10. Planned Current Fiscal Year FY82																
		FY80	FY81	O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	Rust	1552	2801	507	855	1089	980	1047	1155	1347	1673	1578	1509	1513	1579	14832	25033	3983	-	48201
	Stone & Webster	-	-	-	-	-	-	-	-	-	-	47	47	15	15	124	381	112	-	617
	ICRC	729	1642	235	203	195	191	185	181	383	361	378	336	323	318	3289	823	469	-	6952
	Rust Engineering Services	-	20	8	6	8	7	6	7	8	6	7	8	7	6	84	101	84	-	289
	Category B ECPs	-	-	-	-	-	-	-	-	10	10	10	10	10	11	61	258	19	-	338
	Total 1.4.1	2231	4463	750	1064	1292	1178	1238	1343	1748	2050	2020	1910	1868	1929	18390	26596	4667	-	56397
	Escalation	-	-	-	-	-	29	31	33	87	103	100	145	139	145	812	3792	1295	-	5899
	Total Escalated	2281	4463	750	1064	1292	1207	1269	1376	1835	2153	2120	2055	2007	2074	19202	30388	5962	-	62296

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary
Phase I

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

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International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	Rust	1552	2801	507	855	1089	1004	1074	1185	1414	1757	1658	1623	1626	1697	15489	28601	5106	-	53549
	Stone & Webster	-	-	-	-	-	-	-	-	-	-	49	51	16	16	132	435	136	-	703
	ICRC	729	1642	235	203	195	196	189	185	402	379	397	361	347	342	3431	940	586	-	7328
	Rust Engineering Services	-	20	8	6	8	7	6	6	9	6	6	9	8	8	87	117	110	-	334
	Category B ECPs	-	-	-	-	-	-	-	-	10	11	10	11	10	11	63	295	24	-	382
	Total 1.4.1	2281	4463	750	1064	1292	1207	1269	1376	1835	2153	2120	2055	2007	2074	19202	30388	5962	-	62296

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase II

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address): International Coal Refining Company, P. O. Box 2752, Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.4.1	Utilities & Offsites									
1.4.1.1	Utility System			14746	38538	60686	24211	4309	-	142490
1.4.1.2	Offsites			15275	42261	50731	22672	1505	-	132444
1.4.1.3	Raw Material, Product Handling & Storage			5275	27614	29645	21074	4189	-	87797
1.4.1.4	Area Management			1218	4117	6298	4913	1058	-	17604
1.4.1.5	Engineering Tech. Support			583	933	648	367	-	-	2531
	Rust G & A			73	193	216	122	-	-	604
	Category B ECPs			1100	2150	2175	1075	160	-	6660
	Total 1.4.1			38270	115806	150399	74434	11221	-	390130
	Escalation			5777	27102	52699	34118	6228	-	125924
	Total 1.4.1 - Escalated			44047	142908	203098	108552	17449	-	516054

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase II

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.4.1	Utilities & Offsites									
1.4.1.1	Utility System			16927	48019	81531	35223	6705	-	188405
1.4.1.2	Offsites			17609	52175	68540	32925	2314	-	173563
1.4.1.3	Raw Material, Product Handling & Storage			6109	33475	40108	30679	6529	-	116900
1.4.1.4	Area Management			1396	5146	8713	7348	1646	-	24249
1.4.1.5	Engineering Tech. Support			666	1166	951	611	-	-	3394
	Rust G & A			83	241	294	180	-	-	798
	Category B ECPs			1257	2686	2961	1586	255	-	8745
	Total 1.4.1			44047	142908	203098	108552	17449	-	516054

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date
March, 1982

18 Signature of Contractor's Project Manager and Date

19 Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase II

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address): International Coal Refining Company, P. O. Box 2752, Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.4.1	Utilities & Offsites									
	Rust			21449	20241	2378	1357	-	-	45925
	SWEC			15281	92953	145346	72002	11061	-	336643
	ICRC			440	462	-	-	-	-	902
	Category B ECPs			1100	2150	2175	1075	160	-	6660
	Total 1.4.1			38270	115806	150399	74434	11221	-	390130
	Escalation			5777	27102	52599	34118	6228	-	125924
	Total 1.4.1 - Escalated			44047	142908	203198	108552	17449	-	516054

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P (1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase II

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address): International Coal Refining Company, P. O. Box 2752, Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.4.1	Utilities & Offsites									
	Rust			24505	23381	4056	2237	-	-	54179
	SWEC			17783	116264	196081	104729	17194	-	452051
	ICRC			502	577	-	-	-	-	1079
	Category B ECPs			1257	2686	2961	1586	255	-	8745
	Total 1.4.1			44047	142908	203098	108552	17449	-	516054

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

3. MILESTONE SCHEDULES

The Project Master Schedule, included here, showed significant design and procurement milestones for the Outside Battery Limits Facilities Area, WBS element 1.4.1. A bar chart format graphically depicted the scheduled predicted and actual occurrence dates; it was supported by a computerized tabulation of the same data. This information had been extracted electronically from the Intermediate Schedule which was developed by ICRC and The Rust Engineering Company. The basis of the Intermediate Schedule was a detailed logic network schedule which was developed by The Rust Engineering Company to control internally its portion of the SRC-I project.

The schedule included DOE imposed restraints on the beginning of purchasing activities. It indicated the completion of Phase I work in February 1984, the beginning of construction in April 1983 and a mechanical completion date of November 1986.

While there is no current schedule for the resumption and completion of the SRC-I Project, the time durations for the original project activities can and should be considered in the development of any new preliminary schedules.

DOE Form CR-535
(1-78)

U.S. DEPARTMENT OF ENERGY

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification	2. Reporting Period	3. Contract Number
UTILITY & OFFSITES SYSTEMS - MASTER SCHEDULE	through	

4. Contractor (name, address)	5. Contract Start Date
	6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1981 (OND), 1982 (JFM AMJ JAS), 1983 (OND JFM AMJ JAS), 1984 (OND JFM AMJ JAS), 1985 (OND JFM AMJ JAS), 1986 (OND JFM AMJ JAS), 1987 (OND JFM AMJ)	10. Percent Complete a) Planned	b) Actual
250	UTILITY SYSTEMS	AI BI BFI C D HI JI GI KI MI LI N P O Q		
251	OFFSITES SYSTEMS	AI BI F1C HI,S V W D U G I J T K L MN O P,QR		
252	RAW MATERIAL & PRODUCT HANDLING & STORAGE	AI BI F1C DHI G I JI KI MI LI N O P,Q		
804	ENGINEERING TECHNICAL SUPPORT	AI BI,C D		

11. Remarks

Milestone dates a e based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

DOE Form CR-535
(1-78)

U.S. DEPARTMENT OF ENERGY

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification	2. Reporting Period	3. Contract Number
UTILITY & OFFSITES SYSTEMS PROCUREMENT - MASTER SCHEDULE	through	

4. Contractor (name, address)	5. Contract Start Date
	6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1981 (OND); 1982 (JFM AMJ JAS); 1983 (OND JFM AMJ JAS); 1984 (OND JFM AMJ JAS); 1985 (OND JFM AMJ JAS); 1986 (OND JFM AMJ JAS); 1987 (OND JFM AMJ)	10. Percent Complete a) Planned	b) Actual
200	MAIN POWER TRANSFORMER	A B C E		
201	13.8 KV SWITCH GEAR	A B C E		
202	BOILER	A B C E		
203	BOILER FW PUMPS	A BC E		

11. Remarks

Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

DOE Form CR-535
(1-78)

U.S. DEPARTMENT OF ENERGY

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification	2. Reporting Period	3. Contract Number
UTILITY & OFFSITES SYSTEMS PROCUREMENT - MASTER SCHEDULE	through	

4. Contractor (name, address)	5. Contract Start Date
	6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1981 OND; 1982 JFM AMJ JAS; 1983 OND JFM AMJ JAS; 1984 OND JFM AMJ JAS; 1985 OND JFM AMJ JAS; 1986 OND JFM AMJ JAS; 1987 OND JFM AMJ	10. Percent Complete a) Planned	b) Actual
220	LIQUID STORAGE TANKS	A B C E		
221	COAL STORAGE CONVEYOR	A B C E		
222	SRC HANDLING CONVEYOR	A B C E		
226	EVAPORATORS	A B C E		

11. Remarks

Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 72 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: UTILITIES & OFFSITES - UTILITY SYSTEMS WBS ELEMENT #: 1.4.1.1

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
250A1	BGN PROC DSGN - STEAM/COND	1OCT81		1OCT81	9SEP82	
250B	BGN DETAILED DSGN - INTERCONNECT	17MAY82		17MAY82	22JUL82	
250B1	BGN DETAILED DSGN - COMP AIR	8JAN82		8JAN82	8APR82	
250C	1ST M/SR	10DEC82		10DEC82	11MAY83	
250D	2ND M/SR	22APR83		22APR83	8DEC83	
250F1	BGN PSAR - BFW TRT	15JUN82		15JUN82	18AUG83	
250G	COMPL PSAR	11JAN84		11JAN84	5JUL85	
250H1	1ST SIGNIF CONSTR PKG - FIRE PROTECT	10JUN83		10JUN83	10MAY84	
250I	END PH I - UTIL SYS	27FEB84		27FEB84	20AUG85	
250J1	PLANT UTIL-1ST CONSTR PKG AWARD (S/C)	20OCT83		20OCT83	6APR84	
250K1	ELEC PWR - BGN STEEL ERECTION	11APR84		11APR84	20JUN84	
250L1	I/C SYS - BGN PIPE	3JUL84		3JUL84	16AUG84	
250M1	I/C SYS - BGN ELEC	14JUN84		14JUN84	5SEP85	
250N	I/C SYS - COMPL STEEL ERECTION	26APR85		26APR85	17SEP86	
250O	PLANT UTIL - COMPL PIPE	7JUL86		7JUL86	17SEP86	
250P	PLANT UTIL - COMPL ELEC	6DEC85		6DEC85	17SEP86	
250Q	PLANT UTIL - MECH COMPL	4AUG86		4AUG86	11DEC86	

0 17 RECORDS, TOTAL ACTIVITY WEIGHT = 0

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: UTILITIES & OFFSITES - OFFSITES WBS ELEMENT #: 1.4.1.2

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
251A1	BGN PROC DSGN - POT WTR	1DEC81		1DEC81	11MAY82	
251B1	BGN DETAILED DSGN - POT WTR	11FEB82		11FEB82	27OCT82	
251C	1ST M/SH	24JUN82		24JUN82	18MAY83	
251D	2ND M/SH	7APR83		7APR83	27SEP83	
251F1	BGN PSAR - SEWERS	11MAY82		11MAY82	20MAY83	
251G	COMPL PSAR	23DEC83		23DEC83	10JAN84	
251H1	1ST SIGNIF CONSTR PKG - SOLID WASTE	23SEP82		23SEP82	10JAN84	
251I	END PH I - OFFSITES	10JAN84		10JAN84	15JAN86	
251J	WTR&WASTE TRT-1ST CONSTR PKG AWARD(S/C	28MAR84		28MAR84	18JUN84	
251K	WTR & WASTE TRT - BGN STEEL ERECTION	7DEC84		7DEC84	26FEB85	
251L	WTR & WASTE TRT - BGN PIPE	12MAR85		12MAR85	19NOV85	
251M	WTR&WASTE TRT-BGN ELEC	18APR85		18APR85	8JUL85	
251N	WTR & WASTE TRT - COMPL STEEL ERECTION	16MAY85		16MAY85	16APR86	
251O	WTR & WASTE TRT - COMPL PIPE	9APR86		9APR86	29AUG86	
251P	WTR & WASTE TRT - COMPL ELEC	12JUN86		12JUN86	29AUG86	
251Q	WTR & WASTE TRT - MECH COMPL	12JUN86		12JUN86	29AUG86	
251R	NON PROC BLDGS - COMPL WAREHOUSE	13AUG86		13AUG86	4DEC86	
251S	SITE DEV & ROADS PKG TO CM/C	23SEP82		23SEP82	13JAN83	
251T	NON PROC BLDGS - COMPL ADMIN BLDG	31OCT84		31OCT84	18SEP86	
251U	FNL GRADING PKG TO CM/C	7OCT83		7OCT83	24MAR87	
251V	ROUGH GRADING PKG TO CM/C	15DEC82		15DEC82	24FEB87	
251W	SITE DEV - CONSTR PKG AWARD	3MAR83		3MAR83	22JUN83	

0 22 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 81 PAGE 1

CONTRACT 00100 RUN 26MAR82 #0-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: U&O-RAW MATERIAL&PRODUCT HANDLING&STORAGE WBS ELEMENT #: 1.4.1.3

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
252A1	BGN PROC DSGN - COAL REC	1OCT81		1OCT81	23MAR82	
252B1	BGN DETAILED DSGN - COAL REC	13JAN82		13JAN82	1SEP82	
252C	1ST M/SR	14JUN82		14JUN82	6MAY83	
252D	2ND M/SR	27DEC82		27DEC82	15SEP83	
252F1	BGN PSAR - COAL RECOV	24MAY82		24MAY82	10FEB83	
252G	COMPL PSAR	14SEP83		14SEP83	9MAR84	
252H1	1ST SIGNIF CONSTR PKG - COAL STRG	14JAN83		14JAN83	29SEP83	
252I	END PH I - RAW MATL&PROD HDLG&STRG	23NOV83		23NOV83	17MAR86	
252J1	COAL STRG-1ST CONSTR PKG AWARD (S/C)	4JAN84		4JAN84	8MAR84	
252K1	LIQ STRG - BGN STEEL ERECTION	18MAY84		18MAY84	8NOV84	
252L1	LIQ STRG - BGN PIPE	5MAR85		5MAR85	24OCT85	
252M1	LIQ STRG-BGN ELEC	31JUL84		31JUL84	3DEC85	
252N	COMPL STEEL ERECTION	31JAN86		31JAN86	14JUL87	
252O	COMPL PIPE	25JUN86		25JUN86	14OCT87	
252P	COMPL ELEC	14NOV86		14NOV86	9DEC87	
252Q	MECH COMPL	14NOV86		14NOV86	9DEC87	

0 15 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 18 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: UTILITIES&OFFSITES-ENG TECHNICAL SUPPORT WBS ELEMENT #: 1.4.1.5

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
8D4A1	BGN DSGN SUPPORT PROGRAMS - U&O	1OCT81		1OCT81		
8D4B1	BGN OPER SUPPORT PROGRAMS - U&O	16JAN85		16JAN85	12DEC86	
8D4C	COMPL DSGN SUPPORT PROGRAMS-U&O	16JAN85		16JAN85	12DEC86	
8D4D	COMPL OPER SUPPORT PROGRAMS-U&O	14JAN86		14JAN86	10DEC87	

0 4 RECORDS. TOTAL ACTIVITY WEIGHT = 0

REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 73 PAGE 1

CONTRACT 00100 RUN 26MAR82 03-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: UTILITIES & OFFSITES - UTILITY SYSTEMS PROCUREMENT: MAIN POWER TRANSFORMER

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
200A	MAIN PWR TRANSFMR - ISS MECH SPFC	25MAR82		25MAR82	4NOV83	
200B	MAIN PWR TRANSFMR-ISS P.O/BGN VNDR ENG	21OCT82		21OCT82	29MAR84	
200C	MAIN PWR TRANSFM-COMPL VND ENG/BGN FAB	9MAR83		9MAR83	15AUG84	
200E	MAIN PWR TRANSFMR - DEL TO SITE	30AUG83		30AUG83	29JUL85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

IREPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 74 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: UTILITIES & OFFSITES - UTILITY SYSTEMS PROCUREMENT: 13.8 KV SWITCH GEAR

ID #	MILE. STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
201A	13.8 KV SWGR - ISS MECH SPEC	11MAR82		11MAR82	6DEC83	
201B	13.8 KV SWGR - ISS P.O/BGN VNDR ENG	21OCT82		21OCT82	14MAY84	
201C	13.8 KV SWGR - COMPL VNDR ENG/BGN FAB	26JAN83		26JAN83	15AUG84	
201E	13.8 KV SWGR - DEL TO SITE	6JUN83		6JUN83	29JUL85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 75 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: UTILITIES & OFFSITES - UTILITY SYSTEMS PROCUREMENT: BOILER

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
202A	BOILER - ISS MECH SPEC	10MAR82		10MAR82	25JUN82	
202B	BOILER - ISS P.O/BEN VNDR ENG	21OCT82		21OCT82	17DEC82	
202C	BOILER - COMPL VND ENG/BGN FAB	16FEB83		16FEB83	14APR83	
202E	BOILER - DEL TO SITE	18SEP84		18SEP84	12NOV84	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 76 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: UTILITIES & OFFSITES - UTILITY SYSTEMS PROCUREMENT: BOILER FW PUMPS

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
203A	BOILER FW PUMPS - ISS MECH SPEC	10MAR82		10MAR82	25AUG82	
203B	BOILER FW PUMPS - ISS P.O/BGN VNDR ENG	21OCT82		21OCT82	9FEB83	
203C	BOILER FW PUMPS -COMPL VND ENG/BGN FAB	18NOV82		18NOV82	9MAR83	
203F	BOILER FW PUMPS - DEL TO SITE	30MAR83		30MAR83	12NOV84	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 82 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: U&O-RAW MATERIAL&PRODUCT HANDLING&STORAGE PROCUREMENT: LIQUID STORAGE TANKS

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
220A	LIQ STRG TANKS - ISS MECH SPEC	18MAR82		18MAR82	24AUG83	
220B	LIQ STRG TANKS - ISS P.O/BGN VNDR ENG	21OCT82		21OCT82	24OCT84	
220C	LIQ STRG TANKS- COMPL VNDR ENG/BGN FAB	20DEC82		20DEC82	21DEC84	
220E	LIQ STRG TANKS - DEL TO SITE	16MAR83		16MAR83	19MAR85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: U&O-RAW MATERIAL&PRODUCT HANDLING&STORAGE PROCUREMENT: COAL STORAGE CONVEYOR

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
221A	COAL STRG CONVEYOR - ISS MECH SPEC	20JAN82		20JAN82	20DEC82	
221B	COAL STRG CONVEY-ISS P.O/BGN VNDR ENG	23SEP82		23SEP82	1AUG84	
221C	COAL STRG CONVEY-COMPL VND ENG/BGN FAB	20DEC82		20DEC82	25OCT84	
221E	COAL STRG CONVEYOR - DEL TO SITE	30MAR83		30MAR83	6FEB85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 84 PAGE 1

CONTRACT 00100 RUN 26MAR82 V0-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: U&O-RAW MATERIAL&PRODUCT HANDLING&STORAGE PROCUREMENT: SRC HANDLING CONVEYOR

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
222A	SRC HDLG CONVEYOR - ISS MECH SPEC	20JAN82		20JAN82	1JUN83	
222B	SRC HDLG CONVEYOR-ISS P.O/BGN VNDR ENG	21OCT82		21OCT82	7FEB86	
222C	SRC HDLG CONVEY-COMPL VNDR ENG/BGN FAB	20DEC82		20DEC82	8APR86	
222E	SRC HDLG CONVEYOR - DEL TO SITE	30MAR83		30MAR83	17JUL86	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 79 PAGE 1

CONTRACT 00100 RUN 26MAR82 DC-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: UTILITIES & OFFSITES - OFFSITES PROCUREMENT: EVAPORATORS

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
226A	EVAPORATORS - ISS MECH SPEC	18FEB82		18FEB82	4OCT82	
226B	EVAPORATORS - ISS P.O/BGN VNDR ENG	6DEC82		6DEC82	29APR83	
226C	EVAPORATORS - COMPL VNDR ENG/BGN FAB	9MAR83		9MAR83	5OCT83	
226F	EVAPORATORS - DEL TO SITE	21FEB84		21FEB84	12JUN85	

0 4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

B. CENTRAL CONTROL SYSTEM (WBS 1.4.2)

1. TECHNICAL SCOPE

a. Phase I

The primary result of this element of work effort will be to ensure the development by the Area Contractors of a complete and functional design package for transmittal to the Central Control System supplier(s). The work will encompass the review of all ICRC and Construction Manager/Constructor (CM/C) activities related to the Central Control Systems specification and design.

The Central Control System will be a modular, microprocessor-based, distributed system interfaced with a process management host computer located in a Central Control Room. The overall facility will be operated principally from this room, which will contain the operating interface for all operating areas. The system will use multiple CRT displays and printers.

The microprocessor equipment specified by the Area Contractors will be distributed throughout the plant, mounted in instrument racks located in individual operating area Instrument and Control Systems (I&CS) equipment rooms. Redundant communications lines will connect the equipment rooms to the Central Control Room specified by the I&CS Managing Contractor. Control operators will not be stationed in the I&CS equipment rooms.

The process-management host computer will be interfaced to each data communications line primarily to gather information and generate reports. Capability for direct digital control (DDC)/supervisory control will be available.

The ICRC I&CS Project Manager will coordinate principal cost, schedule, and other interfacing with the I&CS Managing Contractor, and ICRC Project Design personnel will provide additional control system technical interface support.

The I&CS Managing Contractor will develop overall design criteria that completely define the Central Control System, and will promote and monitor the successful implementation of ICRC resources and execution of the design criteria by the Area Contractors, Central Control System Supplier, and the CM/C. To implement these criteria, the I&CS Managing Contractor will supply the following minimum requirements:

- Review and recommend appropriate Central Control System philosophy, implementation plans, and system suppliers, and assist in evaluating selected primary element data;
- Review control instrumentation specifications that interface with the Central Control System, including the control room design, functional content, and location;
- Initiate timely and efficient transfer of Central Control System design information to ICRC, Area Contractors, the Central System Supplier, and CM/C;
- Maintain the proper flow of information (schedules, status reports, meeting notes) to the ICRC I&CS Project Manager to ensure adequate documentation and distribution of project and technical decisions;
- Review and recommend Central Control System design philosophy for the integration of emergency shutdown requirements; and
- Ensure that spare parts have been defined adequately.

b. Phase II

The primary result of this element of work effort by the I&CS Managing Contractor will be all of the work necessary to successfully procure, install, and operate the system. This effort will encompass the review of all Area Contractor procurements and installations, and of ICRC and Construction Manager/ Constructor (CM/C) activities relating to the Central Control System.

The ICRC I&CS Project Manager will supervise cost/schedule and interface coordination by the I&CS Managing Contractor. Additional technical support will be performed by personnel provided by the ICRC Project Design Section Manager.

The CM/C will provide installation support services including support of delivery schedules, transportation routing, unloading, warehousing, and the responsibility for site placement and installation.

The I&CS Contractor will develop an overall plan to install the Central Control System and will promote and monitor the successful execution of the plan by the Area Contractors, Central System Supplier, and CM/C. As part of the plan, the I&CS Managing Contractor must be instrumental in at least the following activities:

- Initiating timely and efficient transfer of Central Control System information across ICRC, Area Contractor, Central System Supplier, and CM/C interfaces;
- Maintaining the proper flow of information (schedules, status reports, and meeting notes) to the ICRC I&CS Project Manager to ensure adequate documentation and distribution of project and technical decisions;
- Actively participating in the evaluation of the Central Control System during preshipment testing;
- Ensuring that spare parts have been adequately defined and acquired;
- Ensuring that operator training has been developed adequately and is available in conjunction with labor schedules for the operations;
- Ensuring that appropriate installation and maintenance have been arranged for start-up and long-term operation of the Central Control Systems in liaison with the appropriate Purchasing groups;
- Ensuring that adequate technical assistance is provided during installation and start-up of the Central Control System.

2. COST PLANS

The following cost plan data from the Original Baseline for the Central Control System, Work Breakdown Structure element 1.4.2 are included for reference. They were coordinated and compiled by the International Coal Refining Company (ICRC) based on engineering, vendor engineering and equipment cost estimates developed by Johnson Controls, Inc., a construction cost estimate developed by Stone and Webster Engineering Corporation, and a Phase I and II support estimate developed by ICRC. This cost plan data did not include any allowance for contingency.

The Cost Plans were presented in first quarter FY 82 and escalated costs in the following formats:

<u>Phase I</u> - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

<u>Phase II</u> - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

The escalated costs were developed using the following rates compounded yearly: 10% for FY 82 and FY 83, 9% for FY 84 and FY 85 and 8% thereafter. Escalation on equipment had been calculated based on a committed basis and distributed on a cash flow basis.

The capital costs, in first quarter FY 82 dollars, for the Central Control System did not change during the Post-Baseline period. No attempt has been made to escalate the costs or to develop new cost plans because of the lack of a definitive project schedule and agreed escalation factors.

REVISED

International Coal Refining Company

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR Johnson Controls

DATE

WBS LEVEL 1.4.2 , NUMBER 800

REVISION NO.

WBS ELEMENT TITLE Central Control System

PAGE OF

1ST QTR FY82 (THOUSANDS)

ITEM			FINAL BASELINE LABOR MH	LABOR $	MAT'L $			TOTAL $
EQUIP	A/C PURCHASE				3125.0			3125.0
	CM/C	PURCHASE						
		ERECT						
	ICRC	SPARE PARTS						
TOTAL EQUIP					3125.0			3125.0
	Site & Earthwork							
	Concrete							
	Structural Steel							
	Piping							
	Electrical							
	Instrumentation							
	Architectural, Painting, and Insulation							
	SUBTOTAL - BULKS							
TOTAL DIRECTS					3125.0			3125.0
	Distributables & Indirects							
TOTAL DIRECTS & INDIRECTS					3125.0			3125.0
	A/C Engr.	Phase I		1404.0				1404.0
		Vendor Engr'g						
		Phase II		925.0				925.0
	CM/C	Phase I						
		Phase II						
TOTAL ENGINEERING + CM/C				2329.0				2329.0
	ICRC	Phase I		259.0				259.0
		Phase II						
	SUBTOTAL			259.0				259.0
	CATEGORY B ECP's							
	CATEGORY C ECP's							
SUBTOTAL – OTHER				259.0				259.0
	ESCALATION	Phase I						
		Phase II						
	CONTINGENCY	Phase I						
		Phase II						
		POST MECH MODS						
	SUBTOTAL – CONTINGENCY							
GRAND TOTAL				2588.0	3125.0			5713.0

FORM 9637 (3/82)

ORIGINAL

International Coal Refining Company

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR Johnson Controls

WBS LEVEL 1.4.2 , NUMBER 800

WBS ELEMENT TITLE Central Control System

DATE ______

REVISION NO. ______

PAGE ______ OF ______

ITEM			FINAL BASELINE					
			LABOR		MAT'L	Subtotal	Escalation	TOTAL
			MH	$	$			$
EQUIP	A/C PURCHASE				3125.0			3125.0
EQUIP	CM/C	PURCHASE						
EQUIP	CM/C	ERECT						
	ICRC	SPARE PARTS						
TOTAL EQUIP					3125.0			3125.0
Site & Earthwork								
Concrete								
Structural Steel								
Piping								
Electrical								
Instrumentation								
Architectural, Painting, and Insulation								
SUBTOTAL - BULKS								
TOTAL DIRECTS					3125.0			3125.0
Distributables & Indirects								
TOTAL DIRECTS & INDIRECTS					3125.0	3125.0	779.0	3904.0
A/C Engr.	Phase I			1404.0		1404.0	134.0	1538.0
A/C Engr.	Vendor Engr'g							
A/C Engr.	Phase II			925.0		925.0	345.0	1270.0
CM/C	Phase I							
CM/C	Phase II							
TOTAL ENGINEERING + CM/C				2329.0		2329.0	479.0	2808.0
ICRC	Phase I			259.0		259.0	4.0	263.0
ICRC	Phase II							
SUBTOTAL				259.0		259.0	4.0	263.0
CATEGORY B ECP's								
CATEGORY C ECP's								
SUBTOTAL – OTHER				259.0		259.0	4.0	263.0
ESCALATION	Phase I							
ESCALATION	Phase II							
CONTINGENCY	Phase I							
CONTINGENCY	Phase II							
	POST MECH MODS							
SUBTOTAL – CONTINGENCY								
GRAND TOTAL				2588.0	3125.0	5713.0	1262.0	6975.0

FORM 9637 (3/82)

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U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase I

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.4.2	Central Control System																			
1.4.2.1	Central Control System	-	123	8	-	-	-	-	4	7	8	7	11	10	11	66	217	85	-	491
1.4.2.7	Area Management	-	320	20	16	16	18	16	18	21	18	18	20	18	19	218	138	81	-	757
1.4.2.8	Engineering Tech. Support	-	55	5	-	-	-	-	6	5	4	5	9	9	8	51	146	30	-	282
	Johnson Fee	-	33	2	1	1	1	1	2	2	2	2	3	3	3	23	54	23	-	133
	Category B ECP's	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total 1.4.2	-	531	35	17	17	19	17	30	35	32	32	43	40	41	358	555	219	-	1663
	Escalation	-	-	-	-	-	-	-	-	1	-	-	1	1	1	4	80	54	-	138
	Total - Escalated	-	531	35	17	17	19	17	30	36	32	32	44	41	42	362	635	273	-	1801

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY 82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase I

PAGE OF

1. Contract Identification	2. Contract Number
Demonstration of the Solvent Refined Coal Process	DE-AC05-78OR03054
3. Contractor (name, address) International Coal Refining Company, P. O. Box 2752, Allentown, PA 18001	4. Contract Start Date: 10 July 1978
	5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.4.2	Central Control System																			
1.4.2.1	Central Control System	-	123	8	-	-	-	-	4	7	6	7	11	10	11	66	248	106	-	543
1.4.2.7	Area Management	-	320	20	16	16	18	16	18	22	18	18	21	19	20	222	158	101	-	801
1.4.2.8	Engineering Tech. Support	-	55	5	-	-	-	-	6	5	4	5	9	9	8	51	167	37	-	310
	Johnson Fee	-	33	2	1	1	[illegible]	1	2	2	2	2	3	3	3	23	62	29	-	147
	Category B ECP's	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total 1.4.2	-	531	35	17	17	19	17	30	36	32	32	44	41	42	362	635	273	-	1801

16. Remarks	Dollars Expressed in Thousands - Escalated Dollars	17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure

Phase I

PAGE OF

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5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.4.2	Central Control System																			
	Johnson Controls	-	371	25	10	8	11	10	21	25	25	25	33	33	33	259	555	219	-	1404
	SWEC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ICRC	-	160	10	7	9	8	7	9	10	7	7	10	7	8	99	-	-	-	259
	Category B ECP's	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total 1.4.2	-	531	35	17	17	19	17	30	35	32	32	43	40	41	358	555	219	-	1663
	Escalation	-	-	-	-	-	-	-	-	1	-	-	1	1	1	4	80	54	-	138
	Total - Escalated	-	531	35	17	17	19	17	30	36	32	32	44	41	42	362	635	273	-	1801

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure

Phase I

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.4.2	Central Control System																			
	Johnson Controls	-	371	25	10	8	11	10	21	25	25	25	33	33	33	259	635	273	-	1538
	SWEC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ICRC	-	160	10	7	9	8	7	9	11	7	7	11	8	9	103	-	-	-	263
	Category B ECP's	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total 1.4.2	-	531	35	17	17	19	17	30	36	32	32	44	41	42	362	635	273	-	1801

15. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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BASELINE

Level IV WBS Summary

Phase II

PAGE OF

1. Contract Identification Demonstration of the Solvent Refined Coal Process	2. Contract Number DE-AC05-78OR03054
3. Contractor (name, address) International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date 10 July 1978 5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.4.2	Central Control System									
1.4.2.1	Central Control System			-	-	3125	-	-	-	3125
1.4.2.7	Area Management			-	-	-	-	-	-	-
1.4.2.8	Engineering Tech. Support			-	192	378	273	-	-	843
	Johnson Fee			-	19	37	26	-	-	82
	Category B ECP's			-	-	-	-	-	-	-
	Total 1.4.2			-	211	3540	299	-	-	4050
	Escalation			-	53	929	142	-	-	1124
	Total - Escalated			-	264	4469	441	-	-	5174

15. Remarks	Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars	17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase II

PAGE OF

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1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-780R03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.4.2	Central Control System									
1.4.2.1	Central Control System			-	-	3904	-	-	-	3904
1.4.2.7	Area Management			-	-	-	-	-	-	-
1.4.2.8	Engineering Tech. Support			-	240	515	402	-	-	1157
	Johnson Fee			-	24	50	39	-	-	113
	Category B ECP's			-	-	-	-	-	-	-
	Total 1.4.2			-	264	4469	44[illegible]	-	-	5174

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure

Phase II

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. C. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.4.2	Central Control System									
	Johnson Controls			-	211	3540	299	-	-	4050
	SWEC			-	-	-	-	-	-	-
	ICRC			-	-	-	-	-	-	-
	Category B ECP's			-	-	-	-	-	-	-
	Total 1.4.2			-	211	3540	299	-	-	4050
	Escalation			-	53	929	142	-	-	1124
	Total - Escalated			-	264	4469	441	-	-	5174

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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Organizational Breakdown Structure

Phase II

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	5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.4.2	Central Control System									
	Johnson Controls			-	264	4469	441	-	-	5174
	SWEC			-	-	-	-	-	-	-
	ICRC			-	-	-	-	-	-	-
	Category B ECP's			-	264	4469	441	-	-	5174
	Total 1.4.2									

16. Remarks	Dollars Expressed in Thousands - Escalated Dollars	17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

3. MILESTONE SCHEDULES

The Original Project Master Schedule, included here, showed design and procurement milestones for the Central Control System, WBS element 1.4.2. A bar chart format graphically depicted the scheduled, predicted and actual occurrence dates; it was supported by a computerized tabulation of the same data. This information had been extracted electronically from the Intermediate Schedule developed by ICRC with input from Johnson Controls, Inc.

The schedule included DOE imposed restraints on the beginning of purchasing activities and indicates delivery of the Control System between April and June 1985.

The time durations for the original project activities can and should be considered in the development of any new preliminary schedules since there is no current schedule for the resumption and completion of the SRC-I Project.

DOE Form CR-626
(1-78)

U.S. DEPARTMENT OF ENERGY

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification CENTRAL CONTROL SYSTEMS - MASTER SCHEDULE	2. Reporting Period through	3. Contract Number
4. Contractor (name, address)		5. Contract Start Date
		6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1981 OND; 1982 JFM AMJ JAS; 1983 OND JFM AMJ JAS; 1984 OND JFM AMJ JAS; 1985 OND JFM AMJ JAS; 1986 OND JFM AMJ JAS; 1987 OND JFM AMJ	10. Percent Complete a) Planned	b) Actual
700	CENTRAL CONTROL SYSTEM	A-I J		

11. Remarks
Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 86 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U .UNIT=DAY

REPORTING ELEMENT: CENTRAL CONTROL SYSTEM WBS ELEMENT #: 1.4.2.1

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
700A	J.C. SYS DEL - APCI	9APR85		9APR85	03OCT86	
700B	J.C. SYS DEL - RUST - MATL HDLG & STRG	9APR85		9APR85	17SEP86	
700C	J.C. SYS DEL - RUST - UTILITIES	9APR85		9APR85	28AUG86	
700D	J.C. SYS DEL - RUST - OFFSITES	9APR85		9APR85	28AUG86	
700E	J.C. SYS DEL - LUMMUS C/C	9APR85		9APR85	11JUN87	
700F	J.C. SYS DEL - CATALYTIC #3	9APR85		9APR85	10DEC86	
700G	J.C. SYS DEL - PARSONS	9APR85		9APR85	20NOV86	
700H	J.C. SYS DEL - CATALYTIC #2	9APR85		9APR85	10DEC86	
700I	J.C. SYS DEL - LUMMUS ERH	9APR85		9APR85	20MAR87	
700J	J.C. SYS DEL - CATALYTIC #1	21JUN85		21JUN85	10DEC86	

0 10 RECORDS, TOTAL ACTIVITY WEIGHT = 0

CHAPTER VI. PROJECT MANAGEMENT AND SUPPORT (WBS 1.5)

A. TECHNICAL SCOPE

1. PROJECT MANAGEMENT (WBS 1.5.1)

Detailed design, procurement, and construction of the Demonstration Plant falls under the domain of Project Management. This group will perform all activities necessary to effectively plan, staff, coordinate, and execute design and construction of the plant.

The principal responsibilities of Project Management are to prepare the Project Procedures and design standards; to monitor, coordinate, and integrate design, procurement, and construction activities of the Area Contractors and CM/C and to distribute and handle documents generated by Area Contractors and the CM/C relative to plant design and construction.

a. Project Administration

Project Administration establishes and manages a document control center and system to ensure proper and timely flow of information to various functional departments within ICRC and its timely return to Area Contractors, the CM/C and DOE. The document control systems of the Area Contractors and the CM/C will be audited by ICRC periodically to ensure their adequacy and effective implementation. A central filing system is administered to ensure that project records are maintained properly and information can be retrieved easily. Word processing, drawing reproduction, and printing facilities are staffed and managed.

Project Administration also prepares and distributes Master Project Procedures to guide the administrative functions of ICRC and its subcontractors. The procedures cover such subjects as document control, equipment procurement responsibilities, interface drawings and tie-in lists, operating manuals, spare parts and special tool requirements, Process Hazards Reviews, First and Second Milestone Reviews, reliability analyses, and Critical Technology.

b. Project Design

The preparation of General Engineering Specifications and major equipment design standards for use by subcontractors is the responsibility of Project

Design, which reports to Project Management. The specifications apply to all engineering disciplines, including civil, structural and architectural, piping, electrical, and instrumentation. Requirements for items ranging from earthwork, concrete, and fencing to pipe, valves, electrical substations, flow meters, and insulation are covered. The equipment design standards specify mechanical design criteria and fabrication codes that apply to pressure vessels and tanks, heat-transfer equipment, rotating machinery, piping and piping components, electrical equipment, instrumentation and control systems, buildings and structures, and material handling equipment.

The engineering design work of the subcontractors is reviewed for compliance to specifications and design standards, and quality assurance assessments will be checked. Critical Technology Equipment poses a significant technical risk to the Demonstration Plant's success; without process or equipment modifications that exceed the overall budget or schedule requirements, such risks could prevent the achievement of major objectives. Critical Technology Equipment and Processes will be subjected to more detailed reviews in order to recommend action to reduce the technical risk to an acceptable level, and to ensure acceptance by the ICRC Hazards Review Committee.

c. Project Coordination

Project Management defines, monitors, coordinates, reviews, and approves the work of the Area Contractors in preparing the detailed design of the facilities and in all procurement activities. The Contractor Work Breakdown Structure (CWBS), budgets for cost estimates and forecasts, and schedules for measuring performance have been and will continue to be agreed upon. The work, budgets, schedules, and performance of the CM/C are monitored, reviewed, and approved similarly.

In order to promote the objectives of the project, Project Management seeks and obtains advice, concurrence and approval from other ICRC groups on technical, operational, financial and contract matters.

Cost and schedule data prepared and submitted by the Area Subcontractors and the CM/C are reviewed and approved to ensure performance in a timely manner according to approved budgets and schedules. Engineering Change Proposals (ECPs) submitted by subcontractors are reviewed and approved, and timely, accurate logs are maintained to facilitate sound cost forecasting. Company home office costs in the project management area of responsibility are also forecasted.

This group also coordinates quality assurance assessments and safety reviews performed by the Area Contractors and ICRC so that they are performed on time. The efforts of each Area Contractor are coordinated and interfaced with other Area Contractors and the CM/C. Feedstock, product, utility, and waste-stream data on quantities and conditions must be interchanged between Area Contractors. Tie-in points for piping, wiring, structures, and roads must be interfaced also. Individual area plot plans must be integrated into an optimum facility plot plan to provide constructability, operability, access for maintenance and repair, and an economic arrangement. Constructability reviews will be undertaken in concert with the Area Contractors and the CM/C.

d. Project Construction

Project Management will assist the CM/C in its efforts with local authorities to establish the site. The progress and cost of construction will be monitored through the management control systems of the CM/C to ensure adequate and acceptable performance relative to cost and schedule. Critical equipment deliveries will be monitored so they can be expedited on a timely basis.

Project Management also will monitor the quality of the construction work to guarantee that it is of high quality and complies with all standards, specifications, design criteria, and drawings. The quality control activities of the CM/C, Area Contractors and ICRC will be coordinated so that technical problems are reviewed on time. Any known deficiencies will then be corrected.

Productivity of the construction crafts will be monitored and improved if necessary. Adequate surveillance will be provided to ensure that the workplace is safe, that safety programs are observed, and that the work is performed professionally.

Certification will be provided when the CM/C's construction work is complete and ready for acceptance.

e. Project Procurement

Effective procurement plans and strategies will be developed and implemented. The purchase needs of the project, including price, performance, delivery, quality, and service, will be met at the lowest ultimate cost.

The procurement plans and activities of the Area Contractors and CM/C will be reviewed to ensure that purchases are made in the best interests of ICRC and DOE and to ensure compliance with approved procurement procedures, federal and DOE procurement regulations, and prime contract requirements. Compliance with Small Business and Disadvantaged Business plans and goals and government source requirements will be monitored.

Purchasing, expediting, and traffic activities of all subcontractors will be coordinated and integrated to ensure compatibility with overall project requirements. Project Procurement will also review and approve negotiations, contracts, and amendments for the subcontracts.

f. Project Accounting

Project Accounting will perform accounting, budgeting, forecasting, analysis, and reporting of project costs for ICRC and the overall SRC-I project. Systems for collection and reporting costs will be implemented and maintained to guarantee timely and accurate flow of information. Project costs will be reported on a consolidated basis.

Project Accounting will monitor and assess the adequacy of the cost management systems of all subcontractors, and analyze costs, verify project costs, and identify cost variances and trends as necessary. All project-related financial and funding documents will be prepared for submission to DOE. These documents include: fiscal year budgets; cost and manpower plans; monthly cost and manpower reports; cost performance reports; and contract pricing proposals (Optional Form 60). The flow of data required to consolidate project-related cost reports will be coordinated for both internal and external use. Necessary project-related financial and economic analyses will be performed, by using charts and graphs.

g. Performance Measurement

Performance and configuration management and cost estimation are the responsibilities of Management Systems, who work in conjunction with Project Management. The group will effectively plan, staff, coordinate, and measure the cost and schedule performance of the Area Contractors and the CM/C. Principal responsibilities of Management Systems will include the following:

- Preparing an overall project schedule which will be used to establish priorities for technical decisions and to monitor the progress of ICRC and Area Contractors

- Maintaining an independent overview of the project cost and schedule and report impending problems to senior management

- Establishing and maintaining a complete set of Management Systems Procedures for ICRC, Area Contractor, and CM/C compliance

- Establishing of Configuration Management/Change Control procedures to control changes to the Project Baseline

- Monitoring ICRC, Area Contractor, and CM/C compliance with Cost/Schedule Control System Criteria

The procedures of the Area Contractors and the CM/C will be monitored for compliance with the Master Project Procedures. Cost and schedule analyses will be prepared and any necessary corrective actions will be recommended to Project Management. Highlights of the status of project costs and schedules will be provided to ICRC senior management and DOE to ensure that the cost and schedule impacts of decisions are known. Before they are awarded, contractual and purchase-order commitments will be reviewed to evaluate compliance with budgets and schedules. Information will be provided to the Finance Department for preparing financial statements, budgets, forecasts, and reports to DOE.

To verify subcontractor Engineering Change Proposals, and internal ICRC estimates, independent cost estimates will be prepared, as required. A control log for budget changes is maintained, including the current status of the budget baseline, management reserve, undistributed budget, and Engineering Change Proposals under consideration.

Management Systems will also supply estimating philosophy data to groups preparing management plans or other control documentation for DOE. Preparation and review of capital-cost estimates for trade-off studies will be coordinated with Economic Evaluation. Field construction costs and productivity trends and costs and schedules will be evaluated for ICRC's Project Manager of Construction.

h. Contract Management

Preparation, negotiation, and maintenance of key SRC-I project contracts in conformance with government policy and procedure will be coordinated and administered by Contract Management to ensure compliance. All aspects of individual contracts will be managed. Procedures for reimbursing subcontractors will be developed, documentation will be maintained, and interfacing between ICRC, DOE, and subcontractors will be coordinated. Also, proposals to DOE for project work will be developed, submitted, and negotiated by Contract Management.

2. ADMINISTRATION AND PLANNING (WBS 1.5.2)

a. Administration (WBS 1.5.2.1)

Administration of the SRC-I Project will be directed not only toward successful completion of each phase of the work, but also toward encompassing any activities necessary to continue the work through succeeding phases and to evaluate the commercialization of the SRC-I process. Administrative personnel will perform all activities necessary to effectively plan, organize, staff, and execute all work on the SRC-I Project. Administration represents ICRC and its industrial partners in the interfaces with the DOE and other government agencies and with its subcontractors.

The primary responsibility is to ensure compliance with the DOE/ICRC Contract. This involves management planning, baseline preparation, and subsequent monitoring, site acquisition, design, procurement, construction, quality assurance, subcontract management, expenditure control, and commercial development of SRC products. As the Prime Contractor, ICRC's management is responsible for preparing and providing all deliverables to DOE according to the Contract. In addition, ICRC will hire and develop appropriate management personnel having the skills, experience and training needed to manage the company and the SRC-I Project and to perform the general tasks just described.

Human Resources. The Human Resources Department must maintain the professional standards of ICRC personnel by working with managers to recruit qualified personnel for openings, making formal offers of employment, and coordinating the relocation of employees. This department will work with departmental managers to develop annual salary plans and maintain current position descriptions. Responsibilities include developing and administering the salary and benefit programs and other employee relations procedures, in-house training and development programs, individual employee personal development plans, and departmental organization plans and improvements.

A key factor in the success of the SRC-I project will be the employment of skilled personnel at the plant. To this end, the Human Resources Department will assist the Manufacturing Department in coordinating training programs for plant operating and maintenance personnel. Also, it will interface with labor and management, negotiate labor agreements, where appropriate, and develop an equal opportunity employment program and affirmative action plan to meet the objectives for employment and promotion of minorities.

Finance. The Finance Department implements and maintains the cost collection and reporting procedures and systems for ICRC and the overall project to ensure the timely and accurate flow of information and to satisfy the requirements of project management for cost reports in accordance with DOE's reporting guidelines. Also, the department monitors ICRC and Area Contractors to ensure that all costs are being reported accurately.

The Accounting Section prepares ICRC's financial statements, budgets, forecasts, and all reports to the government involving financial and cost information from inputs supplied by appropriate, responsible managers. This section will prepare all of the tax-return and other government forms that require financial input. Accounting will also establish and implement procedures for the collection of ICRC data; recording and reporting of accounting transactions, including accounts payable, accounts receivable, and payroll; and all asset, liability, revenue, and expense activities. It will establish and maintain accounting control of ICRC's assets, liabilities, revenues, and expenses.

Accounting will manage all government property possessed by ICRC and will assess the efforts and compliance with contractual requirements by all subcontractors and Area Contractors which are required by their contracts with ICRC. These functions will include: the preparation of a Property Manual; control of the property and record keeping; surveillance of Area Contractor and subcontractor procedures; the controls, record keeping and reporting; and preparation of reports required by DOE.

The Finance Department will maintain records of funding and those records required to support expenditures that are made against authorized funding. The modified letter of credit will be used to process costs for payment with government funds. Reports will be generated as to the types of costs, i.e., labor, overhead, subcontract costs, etc. for which the government has reimbursed ICRC. Also, Finance will maintain records and reports to support the split in funding between OPEX and PACE funds.

The Finance Department will assess the financial aspects and effects of ICRC contracts, and establish and implement ICRC administrative procedures, practices, and required forms. Also, Finance will implement procedures for internal audits of the financial and accounting systems, procedures, and activities of ICRC and its subcontractors.

In accordance with the DOE agreement, the Finance Department will evaluate additional equity partners for the project and explore alternate financing proposals for this project.

Information Systems. The Information Systems Department develops and maintains a cost-collection system to ensure the timely and accurate flow of information. The department will assist in assessing subcontractor cost-management systems; analyzing systems and operations requirements as requested by management; reviewing and approving all requests for new electronic data processing (EDP) hardware and software; and providing systems and programming advice and expertise to various user departments.

Legal. The Legal Department provides general legal and intellectual property law services, including handling of patents, licenses, know-how/proprietary data/trade secrets, secrecy/nondisclosure matters, trademarks/trade names, and copyrights.

It prepares and/or approves all contracts executed by ICRC and maintains the corporate file of originals of all executed contracts. This department represents ICRC in all litigation and ensures that systems do exist to effect compliance with the DOE agreement and all other contracts.

Transfer of Technology and Public Affairs. ICRC will transfer certain technology to the public domain on a national basis in accordance with the agreement with DOE. A Technology Transfer Plan has been developed and implemented to ensure the transfer of process, end-use, and end-product information.

ICRC has established a Public Affairs Program for interfacing with those who are interested or involved in the SRC-I Project and related synthetic fuels issues, including environmental groups, labor, and industry, and the news media. The Public Affairs Program involves interfaces with public and private agencies, organizations, and groups that are in a position to further disseminate and enhance public support and acceptance of the Demonstration Plant and its products. The program provides information to and interacts with the landowners and the public at the selected site in Newman, Kentucky.

ICRC provides technical and other information concerning the SRC-I Project, its processes, products, and their end uses to the committees, offices, and other organizations of the U.S. Congress and Federal Administration in Washington, D.C. Also, the Public Affairs Department provides information and interfaces with the local and state governments of Kentucky regarding the SRC-I Project and related synthetic fuels issues.

Support Services. ICRC provides support for consulting contractors and others designated by the DOE, by furnishing such personnel with office space and necessary ancillary services. Support services necessary for efficient operation include, but are not be limited to: building rental and cleaning services; copier and reproduction services; the supply and control of general office supplies; communication services; cafeteria services; and security services. These functions are currently provided at ICRC's main office and will be provided at the plant site.

b. Planning (WBS 1.5.2.2)

The Planning Group is responsible for commercial and market analysis activities that provide research data needed to define markets for demonstration- and commercial-plant products. A Strategic Planning Program will be developed and implemented. Work includes evaluating the technical feasibility, economic viability, and environmental acceptability of SRC-I products in various energy markets.

The Demonstration Plant and Commercial Plant economics are being and will continue to be analyzed in detail to evaluate the economic viability of the SRC-I technology. Assessing the economics of the Commercial Plant may significantly impact the operations and modifications of the Demonstration Plant, and will form the basis for commercialization of the SRC-I technology.

The planning efforts are categorized under three major activities: commercial development, business analysis, and strategic planning.

Commercial Development. Activities are aimed toward identifying various energy market opportunities and comparing product advantages and disadvantages. New SRC-I products may also be identified and developed.

The principal activities include:

- developing forecasts of energy-market characteristics, including supply, demand, and price projections for raw energy materials; for solid, liquid, and gaseous fuel products; and for conversion technologies that could potentially compete with the SRC-I process;
- developing comparative economics of the fuel products and conversion processes identified above;
- determining the relative importance of various product attributes to the purchase decision of the potential customer;
- managing the efforts to analyze the potential for switching of fuels within major energy market sectors;

- assessing the potential impact of governmental and regulatory measures that could affect commercialization of the SRC-I process;
- characterizing the structure of the synfuels industry and the plan for the commercialization of the SRC-I process with respect to those structural factors;
- considering the financing alternatives for SRC-I commercialization;
- instigating and managing of market analysis subcontracts;
- establishing pricing policies and guidelines;
- identifying potential new SRC-I products and/or markets;
- developing plus researching and engineering the feasibility of new SRC-I product applications; and
- coordinating interdepartmental activities to develop plans and programs for the introduction of new products.

Business Analysis. Activities are concentrated on analyzing and evaluating the SRC-I products from the Demonstration and Commercial Plants in terms of size, economics, alternative product mix, and product costs. Activities also include liaison with governmental and regulatory agencies and business management support for ICRC's technical groups.

Business analysis activities include, but are not limited to the following:

- determining and evaluating the necessary basis for evaluation, establishment, and modification of feasible SRC-I products through internal and external sources;
- assessing government and regulatory impacts on the SRC-I project and products;
- evaluating operating economics to determine product costs;
- assessing alternative product mixes, production costs, and cost allocations to determine cost controlled product prices;
- establishing and evaluating the end-use economics of SRC-I products;
- instigating and managing market-analysis subcontracts, and coordinating interdepartmental activities;
- evaluating various pricing structures and formulas for SRC-I products;
- evaluating the impact of various financing options on SRC-I project economics and product costs;

- managing the preparation of appropriate reports for DOE, internal use, and outside publications;
- coordinating business and market support with technical groups of ICRC;
- providing liaison with DOE, and coordinating activities with the appropriate groups of DOE and other federal and state regulatory agencies; and
- providing support to market-development groups for the preparation of proposals to government agencies and industrial users of SRC-I products.

Strategic Planning. The Planning Group will also develop, implement and administer a Strategic Planning Program, which will include:

- gathering, analysis, and interpretation of technical, environmental and economic data and development of proper business strategy;
- work with other ICRC departments to obtain appropriate input, to assess strategy, and to recommend alternative strategies;
- administration of the Strategic Planning Program;
- support of the planning work of the marketing area; and
- advice to the marketing areas concerning ideas and developments, within the industry or economy that may be of possible interest or that may impact the success of a marketing area.

3. TECHNICAL SUPPORT (WBS 1.5.3)

a. Design Confirmation (WBS 1.5.3.1)

Design Confirmation will provide expertise in the areas of data-analysis instrumentation, materials selection, corrosion control, process-equipment design, mechanical equipment review, process development, and critical technology analysis. Such knowledge will help to maximize the probability of successful operation of the Demonstration Plant and will help to ensure that the highest standards of operability and integrity are incorporated into critical technology equipment and systems.

Thermodynamic and physical properties data bases used in the design have been and will continue to be evaluated and confirmed; additional data needs and sources for such data will be identified. Recommendations have been made for process design, process control, and mechanical design. Assistance will be provided for hazard reviews. Work performed by Area Contractors and vendors will continue to be reviewed as necessary to ensure that process and equipment specifications, and selection of materials and instrumentation, are consistent with the best available data, and are compatible with acceptable standards for operability, safety, reliability, maintainability, quality, environmental requirements, and costs.

Equipment and instrumentation will be inspected in the shop and in the field. Data from ICRC and other ongoing DOE and non-DOE development programs have been and will continue to be evaluated and used to assist in the final detailed design and the installation of process equipment. Aid will continue to be provided, as necessary, in the execution of design changes that result from significant new technical information.

ICRC will initiate and monitor subcontracted testing to resolve problems in equipment design, such as those related to the Coal Pulverizer and Slurry Premixer. Commissioning, start-up, and maintenance procedures will be reviewed as they become available. Field support will be provided during commissioning and start-up.

b. <u>Data Base (WBS 1.5.3.2)</u>

To ensure the technical viability of the Demonstration Plant, the data base for its design, construction, and operation must be supported during Phases I and II. Activities in this work element include process R&D, technical support of the Wilsonville pilot plant, and data analysis.

The Process R&D Plan, which ICRC submitted to DOE as a deliverable during Phase I, is described in Appendix B, Section 5.0. The R&D Plan identifies gaps in technology and proposes specific experimental programs to address those needs according to the following classifications: (1) direct design support, (2) design verification, (3) operations support, (4) evaluation of process improvement, and (5) general technical support. R&D programs have been and will continue to be performed by the ICRC Coal Liquefaction Research Group, ICRC partner-affiliated organizations, and other subcontractors. All programs in the R&D Plan are associated with one of the following WBS elements:

1.2.1.9--SRC Engineering Technical Support
1.2.1.4--Coke and Liquid Products Engineering Technical Support
1.3.2.6--Gas Systems Engineering Technical Support
1.4.1.5--Utilities and Off-Sites Engineering Technical Support
1.5.3.2--Technical Support Data Base

The scope of work for the Data Base includes the identification, coordination, evaluation, and management of partner-affiliated and subcontracted R&D, as well as management of the R&D Plan itself. Also included is the monitoring of the R&D work of other DOE contractors (e.g., Oak Ridge National Laboratory and the Pittsburgh Energy Technology Center).

An important part of the technical support required to ensure success of the SRC-I project must come from the Wilsonville pilot plant. A Wilsonville Technical Support Plan, covering a one-year period, was developed and managed as part of this work element; details are presented in the Process R&D Plan. Also, Appendix B, Section 25.0, defines the long-range requirements for the support of Wilsonville through Phase II.

The staffing plan for this work element includes Research and Technology Development Department (RTDD) participation in the following area matrix teams: SRC, Gas Systems, Utilities and Off Sites, Coal Supply, Analytical Laboratory, and Data Analysis. ICRC anticipates that personnel will be provided during Phase II to assist in the development of start-up and operating plans for Phase III.

c. Modeling (WBS 1.5.3.3)

In accordance with the contract between DOE and ICRC, a steady-state model of the facility will be developed to permit verification of process control design and intermediate holdup vessel design. The model will be adequate for use as an operator training tool.

The "ASPEN" steady-state simulation model developed by the Massachusetts Institute of Technology with DOE funding was assessed for applicability to design and operation and an enhanced version will be utilized. The modeling activity outlines a program which will complete that work. The program has three distinct objectives:

- to enhance the ASPEN steady-state simulation capability for confirmation of the SRC-I process design and analysis of plant operation;
- to develop a dynamic simulation capability for process-control investigations, in time to support operation of the Demonstration Plant;
- to carry out limited dynamic studies for analysis of the operability of process control strategies, as necessary.

The modeling program was broken down into three major elements which are mutually supportive and which include ICRC management and technical support:

- affiliate support to provide steady-state simulation capability for process studies conducted by ICRC;
- those tasks necessary to collate and correlate various data in support of modeling and other areas of the project such as process design and operation;
- the ability to provide short-term timely response to ICRC-generated requests for limited-scope studies of computer applications.

A subcontract to provide a complete steady-state simulation capability is expected to be assigned during fiscal year 1984 and completed early in fiscal year 1985.

Limited dynamic studies, in support of plant design, are ongoing, and are expected to continue throughout the project.

4. PRODUCT UTILIZATION (WBS 1.5.4)

The product utilization activities have been designed to demonstrate the successful commercial viability of the SRC-I technology. Both short-term demonstration product markets and long-term commercial-product markets are being addressed. Priority is being given to the placement of SRC-I products as substitutes for petroleum-derived products.

The overall product utilization activities are based on integrated operation of five action programs: market analysis; product demonstration and application engineering (PD&AE); sales; coal supply; and distribution.

The results of closely coordinated market studies, application engineering programs, and sales have been incorporated, wherever possible, into the design of the Demonstration Plant and will form the basis for commercialization of SRC-I technology.

a. Market Analysis

Market analysis activities include identifying and determining the size of target markets for SRC-I products. The market analyses are addressing both existing and future markets for SRC-I product applications. Determination of the existing market demand distribution within the respective target markets will indicate the areas for concentrated sales efforts for Demonstration Plant products. Sales activities provide the market data to be incorporated into market analyses.

Within each target market, the factors for technical, environmental, and economic impact on SRC-I product utilization have been examined. For example, analysis of regulatory impacts on product use will be required to uncover possible limitations and additional costs for the user. In addition, the economic impact of the requirements for any equipment developments or modifications for customer utilization of product will be determined.

Product pricing depends on the results of the market analyses and product cost performance data. Competitive product prices have been identified and maintained for inclusion in the economic comparison studies and pricing determinations. These studies will require updating to reflect the continuing change in the domestic and international economic environments. The SRC-I production costs are being analyzed to ensure that the financial objectives of product demonstration and commercialization are met.

Identification of present and future market trends and their impact on the use of SRC-I products aids in market forecasts. A market forecast will include future new commercial market applications and possible new SRC-I products. A study of alternative technologies that will compete with SRC-I technology after commercialization will provide a basis for understanding the future competition in the marketplace.

b. Product Demonstration and Application Engineering (PD&AE)

PD&AE activities include identifying, implementing, and supervising the applications and development tests and evaluations required for use of SRC-I products in the target markets. The PD&AE programs will evaluate and address any challenges related to product utilization. PD&AE personnel will interface with Engineering Technology and Manufacturing to ensure the production of usable products.

The areas being investigated for all SRC-I products are listed below:

- Technical and environmental performance of the product in each market application
- Product characterization
- Product upgrading technology
- Equipment modification requirements for product utilization at each Demonstration Plant product user (customer) site
- Safety and health procedures for end use
- Product distribution factors including transportation, storage and handling, and quality control and specification development
- Technical support to product users

Technical feasibility and cost studies will be completed before the commitment of funds for large development programs.

c. Sales

Sales activities are directed toward the execution of Product Demonstration Use Contracts for the purchase of SRC-I demonstration products in priority target markets. Priority market applications are those in which the SRC-I product will be demonstrated to be technically feasible, economically viable, environmentally acceptable, commercially profitable, and applicable for many markets.

An initial demonstration agreement will commit ICRC and the customer to site engineering and economic evaluations to determine retrofit costs, if any. This is conditioned upon the satisfactory demonstration, by ICRC, of the use of the product for the specific application prior to a finalized agreement. The retrofit equipment may be used only for the two- to five-year demonstration period of the project. Therefore, the retrofit costs must be reimbursed as part of the total SRC-I Demonstration Project cost. DOE's consent to reimburse retrofit costs will be requested prior to contract finalization. In addition, ICRC will, in some instances, have to indemnify the customer against loss as a result of the utilization of the SRC-I product at the site of the buyer, which would not have occurred with the use of customary products.

A definitive Demonstration Use Contract will be negotiated at a later date between ICRC and the customer. Demonstration of the product at the site of the customer will commence with Demonstration Plant start-up and product delivery to the site.

The sales efforts are being guided by market analysis activities and PD&AE results. They also provide feedback from the marketplace to the market analyses and PD&AE programs. This integration of sales with market analysis and PD&AE programs will ensure the optimal placement of products in the marketplace.

Within the scope of responsibilities for sales is the maintenance of contacts throughout the target markets. The interest and awareness of the market segments, concerning SRC-I product utilization potential, will serve as a support base for the SRC-I Project and meet the transfer of technology requirements as well as facilitate the utility of the products. The participation of ICRC personnel in various technical and industrial associations provides the contacts required for product sales. Technical presentations and active participation in conferences and symposiums will help to establish the market acceptance of SRC-I products. ICRC expertise within the respective markets will be developed through these sales efforts.

The SRC-I product sales approach integrates market analysis, PD&AE and sales, which are the three action programs within the product utilization strategy. Placing products that will displace oil in priority target markets for demonstration use is the short-term sales objective. The sale of products at competitive market prices will be the longer term commercial sales objective.

d. Coal Supply

During Phase I, ICRC's Coal-Supply Group will identify and obtain commitments necessary to ensure adequate supplies of western Kentucky No. 9 or other acceptable coals to serve as the primary feedstock for the Demonstration Plant. The group will emphasize three areas on carrying out its objectives: development and implementation of a coal-supply strategy; identification and evaluation of potential coal-supply sources; and preparation of Requests for Proposal and bidder evaluation.

Development and Implementation of a Coal-Supply Strategy. To develop and implement a supply strategy, the Coal-Supply Group will assess coal-procurement objectives and integrate coal-supply functions with operational, environmental and design considerations of the SRC-I Plant. Coal Supply will manage a matrix team of representatives from various disciplines within the company to review such factors as: (1) quantity requirements; (2) specifications; (3) design of plant-receipt, handling, and processing systems; and (4) transportation to the site. This function will include work-activity scheduling and budgeting in the CPM system and establishment of a mechanism to test and evaluate various candidate coals. Coal-market supply and demand conditions and the economics of coal, from the perspective of both mining and transportation costs, will also be assessed.

Identification and Evaluation of Potential Coal-Supply Sources. Identifying and evaluating potential supply sources is an interactive process that balances the establishment of Bidder Qualification Criteria with an assessment of coal supplier capabilities. To be included on the acceptable Bidders List, coal suppliers must meet ICRC's minimum qualification criteria; they will also be evaluated for their ability to meet the most optimistic procurement objectives.

Request for Proposal Preparation and Bidder Evaluation. Requests for Proposals (RFP) will include a Statement of Work defining ICRC's requirements, a draft contract for supplying coal in terms favorable to both the company and the Federal Government, and a series of questionnaires addressing the technical, price and cost, and business-management capabilities of the bidder. The

Coal-Supply Group will coordinate RFP preparation and the mechanism for bidder evaluation and will manage the subcontractors who assist in testing and evaluating candidate coals. The bid review will be a multistep screening process designed to minimize unnecessary expenditures of time and money by eliminating unqualified candidates at the earliest possible stage. Through a Source Evaluation Board, Coal Supply will nominate primary coal-supply candidates to be selected by senior company management.

During Phase II, the Coal Supply Group will negotiate and execute contractual agreement with suppliers of western Kentucky No. 9 or other equivalent, acceptable coals who have been selected by ICRC senior management. Agreements for transportation services will be concluded, if necessary. Detailed procedures for coal-contract administration including release to ship, price-escalation-monitoring mechanisms, and lines of communication will be established.

Concurrent with the negotiation of supply agreements, Coal Supply will carry out and monitor an Advanced Screening Program which includes recycle runs in the Coal Process Development Unit (CPDU), pilot-plant runs at Wilsonville, and runs of core samples of reserves to be produced during the Demonstration Plant operating period in the microautoclave (Tubing Bomb).

e. Distribution

The Distribution Group will plan and manage cost and feasibility analyses for the transportation of SRC-I raw materials and finished products. A Strategic Transportation Plan will be developed to support activities of the Marketing and Coal-Supply Groups. The Distribution Group will forecast transportation availability by mode and cost and provide information to the Market Development and Planning Groups for their use in conducting economic studies.

The group will also assist prospective customers in determining the optimum means of SRC-I product delivery to user sites. The Distribution Group will provide all transportation inputs to ICRC's Coal-Supply Strategy and will consult with potential coal suppliers to ensure cost-effective and orderly receipt of coal to the SRC-I Plant. Distribution will assist Project Engineering and Manufacturing in developing plant shipping and receiving facilities that will permit efficient delivery of raw materials and distribution of products. Included will be an assessment of all railcar needs for coal and product transport.

The Distribution Group will establish administrative procedures and a departmental organization to handle long-term transportation requirements, including policies related to the safe transportation of hazardous materials. In addition, all government transportation regulations will be monitored for their impact upon ICRC and appropriate courses of action will be recommended.

5. ENVIRONMENTAL, PERMITS AND LAND ACQUISITION (EPLA) SUPPORT (WBS 1.5.5)

a. Environmental and Permits

Environmental support consists of six related, but separate, project support activities: pollution control engineering, toxicity testing, environmental monitoring, permitting, worker health protection, and environmental assessment.

Pollution control engineering services are needed to help develop design criteria for all elements of the Demonstration Plant that may cause, contribute to, or otherwise be associated with the release or discharge of pollutants to the environment. Design criteria may be based on applicable statutory or regulatory emission or discharge limits, or on other limits or conditions negotiated during the environmental permitting process (described below). Ultimately, criteria must be technically sound and achievable, and they must ensure that the plant design is compatible with pollution control objectives and environmental quality goals. Once developed, environmental design critera are issued to the Area Contractors for appropriate consideration in their respective design activities. ICRC pollution control specialists systematically review the Area Contractor design deliverables to confirm that those criteria are being incorporated faithfully into the Demonstration Plant design.

A toxicity testing program is needed to assess in a responsible manner the potential hazards of Demonstration Plant products, process intermediates and wastes to human health and the environment. Program activities include planning, management of subcontract laboratory testing, quality assurance, and data review and interpretation. The progam scope includes physical/chemical characterization, environmental fate studies, and human and ecosystem toxicity testing. Human toxicity studies, which comprise the bulk of the technical scope, will include a battery of genetic toxicology tests (mutagenesis) and whole animal tests (acute and chronic toxicity). Program results will be used for: the Premanufacturing Notification (PMN) required by the Environmental Protection Agency (EPA) pursuant to the provisions of the Toxic Substance Control Act (TOSCA); development of Material Safety Data Sheets to be used by product transporters and consumers; and the development of a comprehensive worker health protection program. Program results are also expected to assist in the promotion of government and public acceptance of SRC-I products and the plans for their distribution and use.

A comprehensive environmental monitoring program will provide the data needed to identify and characterize, in a quantitative and scientifically rigorous fashion, any environmental effects that may be caused by construction and operation of the Demonstration Plant. Program activities include defining the monitoring requirements; developing monitoring plans; conducting monitoring studies, primarily through the use of highly specialized and expert subcontract effort; managing program data; and evaluating and integrating program results. The program scope includes aquatic, atmospheric, and terrestrial system studies to be conducted in four phases paralleling the baseline, construction, shakedown, and operation phases of the Demonstration Project. A detailed scope of work for the baseline phase of the program was approved by the DOE and published on 10 August 1981 as the Preconstruction Environmental Monitoring Program Plan for the SRC-I Demonstration Project. The Phase II scope will include studies designed to look specifically at the expected effects of plant construction activities on the local environment and will include an effort to confirm Baseline program finding just before plant commissioning activities begin. Shakedown and operations phases scopes of work are discussed in Chapter V, Section E of the Phases IIIA and IIIB Project Baseline.

The ICRC permitting staffs will conduct those activities necessary to secure permits associated with construction and operation of the Demonstration Plant. More than a dozen major permits, primarily environmental permits, are needed from federal and state regulatory authorities in connection with air contaminant sources, hazardous waste and solid waste management facilities, the wastewater treatment system, and a number of other plant facilities and systems. A list of these permits can be found in the Project Baseline, Phases I and II, Appendix B, Section 10. Permitting activities may include the definition of permit requirements; the development of permitting strategies; the direction and coordination of the permit support activities of the Area Contractors and consultants; the preparation of the required documentation (applications); and finally, the shepherding of the applications through the regulatory review process. The permit application preparation and review process must be successfully completed and the permits must be in hand by the time the regulated construction and operation activities are scheduled to commence.

The worker health protection program has four primary functions. The first function is to provide industrial hygiene input to the design process. The second is to safeguard the health of ICRC employees and the subcontractors who may be engaged in R&D studies with SRC-I materials. The third function is to assist in the protection of the health of construction workers at the Demonstration Plant. The fourth, and perhaps the most important program function, is to prepare a detailed plan to protect the health of the Demonstration Plant work force. This plan will include provisions for worker education, safe work practices, medical and work place monitoring and maintenance of records. An outline of this Worker Health Protection Plan is contained in the Project Baseline, Phases III A and III B, Chapter V.

Although the final project Environmental Impact Statement (EIS) has been published, the National Environmental Policy Act (NEPA) process for the Demonstration Project has not been completed, and additional EIS-related project support will be needed. An effort must be made to follow through on EIS commitments to make certain that they are incorporated into the appropriate design, operations planning, or support program activities. This will be done according to the plan described in the document entitled FEIS Environmental Commitments, which is included in Section 10.0 of Appendix B.

A first comprehensive overview of the environmental implications of the individual and cumulative changes in design occurring between the publication of the FEIS and the Revised Project Baseline is contained in the technical report entitled <u>Final Environmental Impact Statement/Baseline Design Reconiciliation</u> which was submitted to the DOE on 8 February 1983.

b. <u>Land Acquisition</u>

The proposed SRC-I plant site at Newman, Kentucky contains 28 separate parcels, representing 1,484.334 acres. These can be grouped as follows:

- There will be two parcels totaling 817.563 acres which are controlled by the Commonwealth of Kentucky. The right of Kentucky to acquire these parcels will expire on 25 August 1984, unless it is extended by Kentucky.
- ICRC has options on 21 parcels totaling 334.382 acres. These options will expire on 25 August 1984; unless they are exercised or extended by that date, federal condemnation may become necessary.
- There are five parcels totaling 332.389 acres that are not under control. Some of the landowners in this category have indicated an unwillingness to move. Federal condemnation will most likely become necessary.

ICRC does not intend to acquire any of the 28 parcels until completion of the NEPA process has determined the proposed site to be acceptable and funding is authorized for construction. Rezoning would not commence until ICRC, Kentucky or the United States controls the entire site.

Ownership of all parcels comprising the overall tract has been confirmed of record. A complete search of the records of Daviess County by local counsel, skilled and experienced in real estate and title matters, has revealed ordinary encumbrances only to title which are routinely attached to property in that part of Kentucky. These encumbrances are expected to be removed during acquisition of the site.

On the basis of meetings with local utilities and county officials, ICRC anticipates that all easements and rights-of-way within the tract will be vacated or released and relocated to new roads planned around the perimeter of the site. The AMOCO Pipeline Company has agreed to relocate its right-of-way and pipeline to another portion of the tract where its presence would not interfere with construction and operation of the Demonstration Plant.

B. COST PLANS

The following cost plan data from the Original Baseline for Project Management and Support, Work Breakdown Structure element 1.5, are included here for reference and comparison. They were coordinated and compiled by the International Coal Refining Company (ICRC) based on a construction cost estimate developed by Stone and Webster Engineering Corporation, and a Phase I and II support estimate developed by ICRC. This cost plan data did not include any allowance for contingency.

The Cost Plans were presented in first quarter FY 82 and escalated costs in the following formats:

Phase I - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

Phase II - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars
Organizational Breakdown Structure Summary - 1st Quarter FY 82 dollars
Organizational Breakdown Structure Summary - Escalated dollars

The escalated costs were developed using the following rates compounded yearly: 10% for FY 82 and FY 83, 9% for FY 84 and FY 85 and 8% thereafter. Escalation on equipment had been calculated based on a committed basis and distributed on a cash flow basis.

For this Revised Project Baseline, there are no changes in the capital cost estimate in first-quarter FY 82 dollars for Project Management and Support, Because of a lack of a definitive project schedule and agreed escalation factors, no attempt has been made to escalate the costs or to develop new cost plans.

REVISED

International Coal Refining Company

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR ____________ DATE ____________

WBS LEVEL 1.5 , NUMBER ____________ REVISION NO. ____________

WBS ELEMENT TITLE Proj. Mgmt. & Support PAGE ____ OF ____

1ST QTR FY82 (THOUSANDS)

ITEM			FINAL BASELINE LABOR MH	LABOR $	MAT'L $			TOTAL $
EQUIP	A/C PURCHASE							
EQUIP	CM/C	PURCHASE						
EQUIP	CM/C	ERECT						
	ICRC	SPARE PARTS						
TOTAL EQUIP								
Site & Earthwork								
Concrete								
Structural Steel								
Piping								
Electrical								
Instrumentation								
Architectural, Painting, and Insulation								
SUBTOTAL - BULKS								
TOTAL DIRECTS								
Distributables & Indirects								
TOTAL DIRECTS & INDIRECTS								
A/C Engr.	Phase I			5663.0				5663.0
A/C Engr.	Vendor Engr'g							
A/C Engr.	Phase II							
CM/C	Phase I			13412.0				13412.0
CM/C	Phase II			24429.6	21711.1			46140.7
TOTAL ENGINEERING + CM/C				43504.6	21711.1			65215.7
ICRC	Phase I			87966.0				87966.0
ICRC	Phase II			115422.0				115422.0
SUBTOTAL				203388.0				203388.0
CATEGORY B ECP's					1000.0			1000.0
CATEGORY C ECP's								
SUBTOTAL – OTHER				203388.0	1000.0			204388.0
ESCALATION	Phase I							
ESCALATION	Phase II							
CONTINGENCY	Phase I							
CONTINGENCY	Phase II							
	POST MECH MODS							
SUBTOTAL – CONTINGENCY								
GRAND TOTAL				246892.6	22711.1			269603.7

FORM 9637 (3/82)

ORIGINAL

International Coal Refining Company

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR ______ DATE ______

WBS LEVEL 1.5 , NUMBER ______ REVISION NO. ______

WBS ELEMENT TITLE Project Mang. & Support PAGE ______ OF ______

ITEM			FINAL BASELINE					
			LABOR		MAT'L	Subtotal	Escalation	TOTAL
			MH	$	$	$	$	$
EQUIP	A/C PURCHASE							
EQUIP	CM/C	PURCHASE						
EQUIP	CM/C	ERECT						
	ICRC	SPARE PARTS						
TOTAL EQUIP								
Site & Earthwork								
Concrete								
Structural Steel								
Piping								
Electrical								
Instrumentation								
Architectural, Painting, and Insulation								
SUBTOTAL - BULKS								
TOTAL DIRECTS								
Distributables & Indirects								
TOTAL DIRECTS & INDIRECTS								
A/C Engr.	Phase I			5663.0		5663.0	430.0	6093.0
A/C Engr.	Vendor Engr'g							
A/C Engr.	Phase II							
CM/C	Phase I			13412.0		13412.0	1351.0	14763.0
CM/C	Phase II			24429.6	21711.1	46140.7	18133.7	64274.4
TOTAL ENGINEERING + CM/C				43504.6	21711.1	65215.7	19914.7	85130.4
ICRC	Phase I			87966.0		87966.0	8226.0	96192.0
ICRC	Phase II			115422.0		115422.0	48515.0	163937.0
SUBTOTAL				203388.0		203388.0	56741.0	260129.0
CATEGORY B ECP's					1000.0	1000.0	466.0	1466.0
CATEGORY C ECP's								
SUBTOTAL – OTHER				203388.0	1000.0	204388.0	57207.0	261595.0
ESCALATION	Phase I							
ESCALATION	Phase II							
CONTINGENCY	Phase I							
CONTINGENCY	Phase II							
	POST MECH MODS							
SUBTOTAL – CONTINGENCY								
GRAND TOTAL				246892.6	22711.1	269603.7	77121.7	346725.4

FORM 9637 (3/82)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level IV WBS Summary

Phase I

DOE Form CR-633P (1-78)

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address):
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.5.1	Project Management & Support																			
1.5.1	Project Management	4405	6492	871	891	873	681	744	676	574	675	703	1119	1083	1084	9974	19934	7405	-	48210
1.5.2	Administration & Planning	2256	5181	603	430	574	459	493	518	569	479	483	554	481	456	6099	4532	1901	43	20012
1.5.3	Technical Support	273	2968	442	425	431	424	441	430	550	570	641	720	744	792	6610	2823	1476	-	14150
1.5.4	Product Utilization	609	979	186	166	196	174	177	187	1320	430	469	455	519	501	4780	4894	3512	97	14871
1.5.5	E.P.L.A. Support	839	1574	173	205	217	318	296	347	409	415	410	436	387	397	4010	2446	929	-	9798
	Category B ECPs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total 1.5	8382	17194	2275	2117	2291	2056	2151	2158	3422	2569	2706	3284	3214	3230	31473	34629	15223	140	107041
	Escalation	-	-	-	-	-	48	48	49	168	130	138	236	231	230	1278	4869	3809	51	10007
	Total 1.5 - Escalated	8382	17194	2275	2117	2291	2104	2199	2207	3590	2699	2844	3520	3445	3460	32751	39498	19032	191	117048

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

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DOE Form CR-633P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level II and III WBS Summary

Phase I

PAGE OF

1. Contract Identification	2. Contract Number
Demonstration of the Solvent Refined Coal Process	DE-AC05-78OR03054

3. Contractor (name, address)	4. Contract Start Date / 5. Contract Completion Date
International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	10 July 1978

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	FY80	FY81	10. Planned Current Fiscal Year FY82 O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
1.5	Project Management & Support																			
1.5.1	Project Management	4405	6492	871	851	873	694	757	688	600	710	740	1192	1154	1154	10324	22709	9265	-	53195
1.5.2	Administration & Planning	2256	5181	603	430	574	471	506	530	597	503	508	596	517	489	6324	5178	2375	59	21373
1.5.3	Technical Support	273	2968	442	425	431	435	452	441	578	598	673	774	800	851	6900	3225	1844	-	15210
1.5.4	Product Utilization	609	979	186	166	196	178	181	192	1386	452	492	489	558	539	5015	5591	4387	132	16713
1.5.5	E.P.L.A. Support	839	1574	173	205	217	326	303	356	429	436	431	469	416	427	4188	2795	1161	-	10557
	Category B ECP's	-	-													-	-	-	-	-
	Total 1.5	8382	17194	2275	2117	2291	2104	2199	2207	3590	2699	2844	3520	3445	3460	32751	39498	19032	191	117048

16. Remarks	Dollars Expressed in Thousands - Escalated Dollars	17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

DOE Form CR-633P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organizational Breakdown Structure Summary

Phase I

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)			10. Planned Current Fiscal Year FY82																
		FY80	FY81	O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	SWEC	-	145	285	436	327	191	249	210	50	238	248	611	627	642	4114	9137	16	-	13412
	ICRC	6482	15623	1957	1650	1938	1845	1883	1931	3357	2316	2443	2658	2572	2573	27123	24172	14426	140	87966
	Rust Engineering Services	1900	1426	33	31	26	20	19	17	15	15	15	15	15	15	236	1320	781	-	5663
	Category B ECPs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total 1.5	8382	17194	2275	2117	2291	2056	2151	2158	3422	2569	2706	3284	3214	3230	31473	34629	15223	140	107041
	Escalation	-	-	-	-	-	48	48	49	168	130	138	236	231	230	1278	4869	3809	51	10007
	Total - Escalated	8382	17194	2275	2117	2291	2104	2199	2207	3590	2699	2844	3520	3445	3460	32751	39498	19032	191	117048

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-633P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organization Breakdown Structure Summary

Phase I

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)			10. Planned Current Fiscal Year FY82																
		FY80	FY81	O	N	D	J	F	M	A	M	J	J	A	S	Total FY82	FY83	FY84	FY85	Total
	SWEC	-	145	285	436	327	191	249	210	50	250	260	646	663	679	4246	10356	16	-	14763
	ICRC	6482	15623	1957	1650	1938	1892	1931	1979	3523	2433	2566	2858	2765	2765	28257	27617	18022	191	96192
	Rust Engineering Svcs.	1900	1426	33	31	26	21	19	18	17	16	18	16	17	16	248	1525	994	-	6093
	Category B ECP's															-	-	-	-	-
	Total 1.5	8382	17194	2275	2117	2293	2104	2199	2207	3590	2699	2844	3520	3445	3460	32751	39498	19032	191	117048

16. Remarks

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-631P (1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level II and III WBS Summary
Phase II

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process	2. Contract Number: DE-AC05-78OR03054
3. Contractor (name, address): International Coal Refining Company, P. O. Box 2752, Allentown, PA 18001	4. Contract Start Date: 10 July 1978
	5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.5	Project Management & Support									
1.5.1	Project Management			2719	14539	25941	25104	14266	1614	84183
1.5.2	Administration & Planning			1369	4115	5992	5861	5979	1298	24614
1.5.3	Technical Support			4677	6857	8271	5778	7209	1814	34656
1.5.4	Product Utilization			-	-	2350	2359	2765	839	8313
1.5.5	E.P.I.A. Support			1561	1846	2443	1757	1775	415	9797
	Category B ECP's			-	-	400	300	300	-	1000
	Total 1.5			10326	27357	45397	41159	32294	6030	162563
	Escalation			1492	6836	16316	19317	19008	4146	67115
	Total 1.5 - Escalated			11818	34193	61713	60476	51302	10176	229678

16. Remarks	Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars	17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

DOE Form CR-633P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level II and III WBS Summary

Phase II

PAGE OF

1. Contract Identification Demonstration of the Solvent Refined Coal Process	2. Contract Number DE-AC05-780R03054
3. Contractor (name, address) International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date 10 July 1978 5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.5	Project Management & Support									
1.5.1	Project Management			3126	18179	35223	36795	22580	2724	118627
1.5.2	Administration & Planning			1564	5141	8158	8544	9526	2190	35223
1.5.3	Technical Support			5344	8567	11261	8522	11485	3146	48325
1.5.4	Product Utilization			-	-	3200	3480	4405	1416	12501
1.5.5	E.P.L.A. Support			1734	2306	3326	2592	2828	700	13536
	Category B ECP's			-	-	545	443	478	-	1466
	Total 1.5			11818	34193	61713	60476	51302	10176	229678

15. Remarks	Dollars Expressed in Thousands - Escalated Dollars	17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

DOE Form CR-633P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organization Breakdown Structure Summary

Phase II

PAGE OF

1. Contract Identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address): International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
	SWEC			753	8122	16460	15621	5185	-	46141
	ICRC			9573	19235	28537	25238	26809	6030	115422
	Category B ECP's			-	-	400	300	300	-	1000
	Total 1.5			10326	27357	45397	41159	32294	6030	162563
	Escalation			1492	6836	16316	19317	19008	4146	67115
	Total - Escalated			11818	34193	61713	60476	51302	10176	229678

16. Remarks

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-533P (2-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Organization Breakdown Structure Summary

Phase II

PAGE OF

1. Contract Identification Demonstration of the Solvent Refined Coal Process	2. Contract Number DE-AC05-78OR03054
3. Contractor (name, address) International Coal Refining Company P. O. Box 2752 Allentown, PA 18001	4. Contract Start Date 10 July 1978 5. Contract Completion Date,

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
	SWEC			880	10162	22315	22808	8110	-	64275
	ICRC			10938	24031	38853	37225	42714	10176	163937
	Category B ECP's			-	-	545	443	478	-	1466
	Total 1.5			11818	34193	61713	50476	51302	10176	229678

16. Remarks	Dollars Expressed in Thousands - Escalated Dollars	17. Cost Plan Date March, 1982

18. Signature of Contractor's Project Manager and Date	19. Signature of Contractor's Authorized Financial Representative and Date	20. Signature of Government Technical Representative and Date

C. MILESTONE SCHEDULE

1. Technical Support

Included in this section is that part of the Original Project Master Schedule showing milestones, based on early start/complete dates, for Technical Support, WBS element 1.5.3 A bar chart format was used to graphically show the scheduled, predicted and actual occurrence dates; it was supported by a computerized tabulation of the same data. This information had been extracted electronically from the Intermediate Schedule developed by ICRC, for which the basis is the Process Research and Development (R&D) Plan.

The schedule indicated Design Support R&D and Operations Support R&D Programs being conducted throughout Phase I and Phase II of the Project, respectively.

The time durations for the original project activities can and should be considered in the development of any new preliminary schedules since there is no current schedule for the resumption and completion of the SRC-I Project.

DOE Form CR436
(1-78)

U.S. DEPARTMENT OF ENERGY

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification PROJECT MANAGEMENT & SUPPORT - MASTER SCHEDULE	2. Reporting Period through	3. Contract Number
4. Contractor (name, address)		5. Contract Start Date 6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months 1981: OND 1982: JFM AMJ JAS 1983: OND JFM AMJ JAS 1984: OND JFM AMJ JAS 1985: OND JFM AMJ JAS 1986: OND JFM AMJ JAS 1987: OND JFM AMJ	10. Percent Complete a) Planned	b) Actual
805	DATA BASE ENGINEERING TECHNICAL SUPPORT	BI,C D		

11. Remarks
Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 98 PAGE 1

CONTRACT 00100 RUN 26MAR82 DE-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: DATA BASE - ENG TECHNICAL SUPPORT WBS ELEMENT #: 1.5.3.2

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
805B1	BGN OPER SUPPT PROGRAM-PROJ MGMT&SUPPT	12AUG86		12AUG86	12DEC86	
805C	COMPL DSGN SUPPT PROG-PROJ MGMT&SUPPT	12AUG86		12AUG86	12DEC86	
805D	COMPL OPER SUPPT PROG-PROJ MGMT&SUPPT	10AUG87		10AUG87	10DEC87	

D 3 RECORDS, TOTAL ACTIVITY WEIGHT = 0

2. Product Utilization

The Original Project Master Schedule showed significant milestones, based on early start/complete dates, for Product Utilization, WBS element 1.5.4. A bar chart format was used to graphically show the scheduled, predicted and actual occurence dates; it was supported by computerized tabulations of the same data. This information had been extracted electronically from the Intermediate Schedule developed by ICRC.

The schedules indicated the availability of coal in April 1986 and product delivery beginning late December 1987.

Since there is no current schedule for the resumption and completion of the SRC-I Project, the time durations for the original project activities can and should be considered in the development of any new preliminary schedules.

U.S. DEPARTMENT OF ENERGY

DOE Form CR-535 (1-78)

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification	2. Reporting Period	3. Contract Number
PRODUCT UTILIZATION - MASTER SCHEDULE	through	

4. Contractor (name, address)	5. Contract Start Date
	6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1980 OND; 1981 JFM AMJ JAS; 1982 OND JFM AMJ JAS; 1983 OND JFM AMJ JAS; 1984 OND JFM AMJ JAS; 1985 OND JFM AMJ JAS; 1986 OND JFM AMJ	10. Percent Complete a) Planned	b) Actual
902	COAL SUPPLY	A B C		

11. Remarks

Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 90 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-0 UNIT=DAY

REPORTING ELEMENT: PRODUCT UTILIZATION - COAL SUPPLY WBS ELEMENT #: 1.5.4.2

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
902A	START COAL SUPPLY EFFORTS	31DEC80	31DEC80	31DEC80		
902B	EXECUTE CONTRACT FOR COAL SUPPLY	1OCT85		1OCT85	03MAR86	
902C	BGN COAL DEL	18APR86		18APR86	17SEP86	

0 3 RECORDS, TOTAL ACTIVITY WEIGHT = 0

U.S. DEPARTMENT OF ENERGY

DOE Form CR-435 (1-78)

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification: PRODUCT UTILIZATION - MASTER SCHEDULE	2. Reporting Period: through	3. Contract Number
4. Contractor (name, address)		5. Contract Start Date
		6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1983 AMJJASOND, 1984 JFMAMJJASOND, 1985 JFMAMJJASOND, 1986 JFMAMJJASOND, 1987 JFMAMJJASOND, 1988 JFMAMJJASOND, 1989 JFMAMJJASOND	10. Percent Complete a) Planned	b) Actual
903	MARKETING			

11. Remarks

Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date

13. Signature of Government Technical Representative and Date

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 88 PAGE 1

CONTRACT 00100 RUN 26MAR82 03-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: PRODUCT UTILIZATION - MARKETING WBS ELEMENT #: 1.5.4.1

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
903A1	BGN MARKET ANALYSIS - SOLID SRC	4JAN82		4JAN82	26JUL84	R
903B	COMPL PROD UTILIZATION SUPPORT	26SEP89		26SEP89	20JUN90	
903B1	COMPL MARKET ANALYSIS	4JAN85		4JAN85	05JUN89	
903C	PRODUCT UTILIZE STUDIES	7JAN86		7JAN86	03OCT89	
903D	COMPL SALES COMMITMENT	9SEP88		9SEP88	03OCT89	
903F1	BGN PRODUCT DEL - MID DIST/HVY OIL	29DEC87		29DEC87	20JUN90	

0 6 RECORDS, TOTAL ACTIVITY WEIGHT = 0

3. Environmental Permits, Land Acquisition (EPLA) Support

The Original Project Master Schedule showed significant milestones, based on early start/complete dates, for Environmental Permits, Land Acquisition (EPLA) Support, WBS element 1.5.5. A bar chart format was used to graphically show the scheduled, predicted and actual occurence dates; it was supported by computerized tabulations of the same data. This information had been extracted electronically from the Intermediate Schedule developed by ICRC.

The schedule indicated land acquisition to occur in April 1983 and the receipt of major environmental permits to occur between September 1982 and July 1985.

The time durations for the original project activities can and should be considered in the development of any new preliminary schedules since there is no current schedule for the resumption and completion of the SRC-I Project.

DOE Form CR-535 (1-78)

U.S. DEPARTMENT OF ENERGY

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification: E.P.L.A. SUPPORT - MASTER SCHEDULE	2. Reporting Period: through	3. Contract Number
4. Contractor (name, address)		5. Contract Start Date
		6. Contract Completion Date

9. Fiscal Years and Months: 1979, 1980, 1981, 1982, 1983, 1984, 1985

Quarters: JAS OND JFM AMJ JAS OND JFM AMJ JAS OND JFM AMJ JAS OND JFM AMJ JAS OND JFM AMJ JAS OND JFM

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months	10. Percent Complete a) Planned	b) Actual
901/905	LAND ACQUISITION	1A 5A 1B 5B C		

11. Remarks: Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date

13. Signature of Government Technical Representative and Date

1REPORT DATE 1OCT81 CRITICAL PATH INTERNATIONAL COAL REFINING COMPANY REPORT 94 PAGE 1

CONTRACT 00100 RUN 26MAR82 00-1-4021 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: E.P.L.A. SUPPORT - LAND ACQUISITION WBS ELEMENT #: 1.5.5.3

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
901A	COMPL PWR SUPPLY EFFORTS	5SEP79	05SEP79	5SEP79		
901B	FNLZ PWR SUPPLY AGREEMENT	31MAR82		31MAR82	28NOV84	
901C	PWR DEL TO SITE	11JAN84		11JAN84	08SEP86	
905A	START LAND ACQ EFFORTS	1MAY80	01MAY80	1MAY80		
905B	COMPL LAND ACQ & REZONE	5APR83		5APR83	20JUN83	

0 5 RECORDS, TOTAL ACTIVITY WEIGHT = 0

U.S. DEPARTMENT OF ENERGY

DOE Form CR435 (1-78)

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification	2. Reporting Period	3. Contract Number
E.P.L.A. SUPPORT - MASTER SCHEDULE	through	

4. Contractor (name, address)	5. Contract Start Date
	6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months	10. Percent Complete a) Planned	b) Actual
		1980 OND; 1981 JFM AMJ JAS; 1982 OND JFM AMJ JAS; 1983 OND JFM AMJ JAS; 1984 OND JFM AMJ JAS; 1985 OND JFM AMJ JAS; 1986 OND JFM AMJ		
904	PERMITS	A B C D E F		

11. Remarks

Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

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CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: E.P.L.A. SUPPORT - PERMITS WBS ELEMENT #: 1.5.5.2

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
904A	START PERMITS EFFORT	1OCT80	01OCT80	1OCT80		
904B	PSD PERMIT ISS	15SEP82		15SEP82	20JUN83	
904C	NPDES EPA APPL TO CONSTR	3JAN83		3JAN83	20JUN83	
904D	NPDES KDN APPL TO CONSTR	1FEB84		1FEB84	15JUN84	
904F	NPDES APPL TO START OPER	1JUL85		1JUL85	28AUG86	
904F	HAZARD WASTE APPL TO START OPER	4MAR85		4MAR85	28AUG86	

0 6 RECORDS, TOTAL ACTIVITY WEIGHT = 0

CHAPTER VII. OPERATIONS (WBS 1.6)

A. TECHNICAL SCOPE

1. SPARE PARTS (WBS 1.6.1)

A facility cannot operate successfully for any appreciable period without the availability of sufficient spare parts. Accordingly, sufficient spare parts and materials will be maintained at the Newman facility to:

- provide for immediate replacement or repair of worn or damaged parts during preventive maintenance inspections and overhauls;
- provide insurance for major equipment subject to potential catastrophic failure that could result in long and costly plant outages if spares were not available.

The following procedure will be implemented to place the proper emphasis upon the selection, purchase, receipt, coding, and storage of spare parts and materials:

a. The initial selection and procurement of major and insurance-type spare parts will be made by each Area Contractor except as specified below. The parts will be ordered simultaneously with the original equipment to ensure timely delivery and eliminate the possibility of higher prices if ordered separately.

b. Common and duplicated spare parts will be ordered by the Construction Manager/Contractor (CM/C) if possible. This procedure will result in more purchases at better discounted prices by reducing the probability of various Area Contractors ordering identical or similar parts.

c. Master Project Procedure (MPP 6-2) has been prepared by the ICRC Manufacturing Department to guide Area Contractors and the CM/C in selecting spare parts and materials. This procedure presents ICRC's viewpoint on the parts that should be ordered.

d. Manufacturing Department personnel will review and approve the purchase of all spare parts and materials selected by the Area Contractor and the CM/C.

e. Manufacturing Department personnel will assist the CM/C during the selection and receipt of all spare parts at the Newman facility.

f. The Manufacturing Department will establish a system for the receipt, coding, and storage of all spare parts and materials maintained in the warehouse at the facility site.

g. A computerized system will track the receipt, storage, inventory, and issuance of parts and materials.

From past experience, there are several ways to estimate the cost of spare parts and materials required to maintain a facility: from a detailed machinery and equipment list, as a percent of total plant investment, or as a percent of total cost of materials and equipment in the plant.

Because the specific manufacturers and models of equipment are not yet known and because this facility is prototypical, which can distort total plant investment costs, the decision has been made to estimate the spare parts cost as a percent of equipment and materials cost. After studying several comparable facilities, it was concluded that a budget of approximately 5% of equipment and materials would represent the minimum requirement for the Newman facility. Further study of each area and refinement of figures resulted in the following total spare parts budget for each Area.

	Original Baseline	Revised Baseline
SRC Process Area	$13,159,000	$12,610,000
Coke and Liquid Products Area	3,087,000	3,020,000
Naphtha Hydrotreater		255,000
Cryogenic Systems Area	1,400,000	1,380,000
Gas Systems Area	7,367,000	7,090,000
Outside Battery Limits Facilitites Area	5,769,000	5,810,000
Central Control System Area	156,000	160,000
Operations Area Capital Equipment	75,000	75,000
Total Spares	$31,013,000	$30,400,000

The Area Contractor or CM/C will purchase major spare parts simultaneously with original plant equipment. Deliveries of spare parts will be scheduled for timely arrival in accordance with the plant commissioning schedules, to be accordance with the plant commissioning schedules; deliveries will not necessarily be concurrent with the respective equipment deliveries.

To coordinate the selection of spares parts, engineering and supervisory technical personnel were to be hired according to the following schedule: November 1982, Planning Supervisor; April 1983, Instrument Supervisor; May 1983, Electrical Supervisor; June 1983, Mechanical Supervisor; and July 1983, Mechanical Engineer. To coordinate coding, receipt, and storage of spare parts, qualified personnel will work with the CM/C according to the following schedule: November 1982, Materials Handling Supervisor; and December 1982, Warehouse Supervisor.

ICRC estimated that the earliest date the Manufacturing Department warehouse would be able to store spare parts and materials would be February 1984. Transferring spare parts from the custody of CM/C to ICRC Manufacturing was to occur shortly after the availability of the warehouse, at a time mutually acceptable to both CM/C and Manufacturing.

Naturally, all of the above dates must be revised if and when a new schedule for the resumption and completion of the SRC-I Project is adopted.

2. CHECKOUT AND COMMISSIONING (WBS 1.6.2)

During Phase II, the Manufacturing Department will engage in checkout and commissioning as well as recruiting and training. Preparation for checkout and commissioning, or precommissioning, will begin when the commitment to build the plant is made. Precommissioning will be directed toward the planning and preparation for plant acceptance and commissioning and will include the following:

- Monitoring the installation of equipment and machinery to ensure that design criteria are met and that recommendations from the hazards reviews are implemented
- Establishing plant safety policies and preparing safety manuals and procedures
- Preparing manuals and procedures to implement the industrial hygiene strategy developed in response to toxicological investigations
- Preparing and implementing training programs in plant safety and fire fighting for the initial staff and for ongoing plant-safety review training
- Establishing a maintenance management system that includes a work-order system, a maintenance planning and scheduling system, and a machinery history system
- Establishing a computerized maintenance parts and material control system
- Establishing a computerized preventive maintenance control program including frequency, notification, and documentation of maintenance
- Preparing maintenance manuals, procedures, standards, and mechanical catalogs
- Preparing operating manuals, standard procedures, and emergency procedures
- Preparing detailed commissioning, start-up, and test-operation plans
- Reviewing for adequacy the equipment and machinery inspection and acceptance test procedures to ensure that equipment and systems are ready for commissioning

Checkout and commissioning has been divided into four phases for each Area indicated on the Project Schedule. These phases are defined as follows:

- Phase IIA--Preoperational Checkout: After the completion of tests and the written acceptance of the area from Construction, the Manufacturing Department representatives will continue to operate the equipment or systems with simulants or process materials.
- Phase IIB--Commissioning: Equipment or systems will be run-in with simulants or process materials, as appropriate, to prepare for commissioning of the entire area to produce products.
- Phase IIC--Commissioning/Downstream Support: The area will be commissioned by operating it with simulants, followed by process materials, until specification products are being produced consistently. Then the area will be operated to supply specification products to storage or to supply downstream systems or areas with feed materials.
- Phase IID--Commissioning/Optimization: The system or area will be operated to continue supplying products to storage or feed materials to downstream systems or areas. Concurrently, operating conditions will be optimized, and rates will be increased, if feasible, until design conditions are attained or problems and limitations are identified and corrected.

Detailed plans for these commissioning activities will be prepared during Phase II after the plant supervisory and technical staff is recruited and trained.

A determination will be made for extra start-up assistance during commissioning, and a survey will be made of the types of assistance required that are available from ICRC, its participating partners, the Area Contractors and CM/C start-up organizations, and the process vendors such as Kerr-McGee, Allied, and GKT.

Arrangements will also be made for vendor service representatives to be present for the initial checkout and commissioning of major equipment and for follow-up consultation and service in case of equipment malfunctions or problems after start-up.

Below is a general plan for sequential commissioning by Area. Manufacturing representatives will direct activities during all four phases in each area to accomplish the tasks set forth.

a. Outside Battery Limits Facilities Area

i. Utilities Area

Phase IIA--Preoperational Checkout.

- Check the electrical system to eliminate any faults and to energize it.
- Commission the process water system.
- Recheck the major control system, stroke valves, test alarms/shutdowns; calibrate control loops and check motor rotations.
- Purge and flush vessels and piping with process pumps equipped with suction strainers, as necessary.
- Passivate the necessary piping, vessels, and heat exchangers.
- Institute the Safety Work Permit System.
- Perform preliminary vendor-directed run-ins of compressors and large pumps.
- Commission the fuel storage.

Phase IIB--Commissioning.

- Receive and introduce treatment chemicals, as necessary.
- Operate the cooling tower system.
- Operate the compressed-air and drying system to dry the instrument air system.
- Operate the process water treatment and boiler-feed water (BFW) treatment systems.
- Flow check the fire protection system.
- Introduce start-up fuels and cure the refractories.
- Operate the steam boilers to produce steam that will be vented or consumed in other areas of the plant.
- Correct any problems or limitations that could inhibit normal operation.

Phase IIC--Commissioning/Downstream Support.

- Operate the water treatment and BFW treatment systems to produce BFW of proper quality to support 900 psig steam production.
- Operate each boiler to produce 900 psig of steam.
- Check the control system for the integrated plant/instrument air system.
- Introduce fuel oil to the incinerator and check the controls.

Phase IID--Commissioning/Optimization.

- Operate the plant/instrument air system to produce air at design pressure and dryness. Rates will be increased, if appropriate, until design conditions are met.
- Operate the BFW treatment system to produce BFW according to design specifications. Rates will be increased, if appropriate, until design conditions are attained, or problems or limitations are identified and corrected.
- Operate the boilers to produce steam at design temperatures and pressures. Rates will be increased on the boilers, if appropriate, until design conditions are attained, or problems or limitations are identified and corrected.
- Operate the cooling towers to produce cooling water at design quality, pressures, and flow. Heat loads will be introduced to the cooling tower, if appropriate, until design flow and approach temperatures are attained, or problems or limitations are identified and corrected.
- Operate the flare and incineration systems under simulated loads to confirm design conditions of heat load or flow until otherwise required by the process. Any problems or limitations will be identified and corrected.
- Operate the fire protection system to confirm design response and flow. Any problems or limitations will be identified and corrected promptly, and simultaneously plant operations will be limited, if required, to protect the plant equipment and personnel.

ii. Off-Sites Area

Phase IIA--Preoperational Checkout.

- Commission and check all building utilities and fire protection systems.
- Commission the laboratory and analytical instrumentation on standard samples.
- Commission the utilities to the water and wastewater treatment systems.
- Passivate the necessary piping and equipment.
- Recheck the major control systems, stroke valves, test alarms/shutdowns, calibrate control loops, and check motor rotations.
- Flush piping and vessels with process pumps equipped with suction strainers, as necessary.
- Using the railcar mover, check the railroad system for proper clearances and designs.
- Check all rotating and moving equipment to eliminate any encumbrances.

Phase IIB--Commissioning.

- Receive and introduce treatment chemicals, as necessary.
- Fill all treatment facilities with water, as required, and operate all rotating equipment.
- Establish, as necessary, the water and steam flows to the Reverse Osmosis and Evaporator systems.
- Check the railroad system with the plant locomotive.
- Correct any problems or limitations that could inhibit normal operation.
- Check all necessary mobile/support equipment.

Phase IIC--Commissioning/Downstream Support.

- Start the controlled flow of all treatment chemicals to the Water and Wastewater Treatment Systems.
- Adjust the dosage of treatment chemicals to meet design quality standards for the products.

- Operate the Wastewater Treatment System in the zero-discharge mode.
- Deliver treated process water to the BFW and utility water systems, as required.
- Check the railroad system with loaded coal cars, as available.
- Establish and culture a biologically active strain of bacteria in the Biological Treatment System.
- Begin analyzing process streams in the analytical laboratory, as necessary.

Phase IID--Commissioning/Optimization.

- Operate the analytical laboratory facilities to provide current and accurate analyses to support each operating area, as required.
- Operate the Water Treatment System to produce water of sufficient quality and quantity for BFW and other process and utility water requirements. Operating conditions will be optimized and chemical consumption minimized consistent with quality required and good operating practice. Rates will be increased, if appropriate, until design conditions are attained, or problems or limitations are identified and corrected.
- Operate the Wastewater Treatment System to produce an effluent that is within the limits specified by the National Pollutant Discharge Elimination System (NPDES) permit. Operating conditions and rates will be optimized according to the commissioning schedule for all parts of the plant and adjusted, as appropriate, until design flow conditions are attained, or problems or limitations are identified and corrected.
- Operate the solids disposal facilities to dispose of the solid wastes from Water Treatment, Wastewater Treatment and other parts of the plant, as required, in an environmentally acceptable manner. Any problems or limitations will be identified and corrected.
- Operate the railroad system smoothly and on schedule to move railcars into and within the plant to meet requirements for raw material unloading and product and by-product loading as well as for marketing planning and operating. Any problems or limitations will be identified and corrected.

iii. Raw Materials and Products Handling and Storage Area

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Perform preliminary vendor-directed run-in of all solids conveyor belts, and make the final splices.
- Flush and passivate all piping and equipment, as required.
- Recheck the major control system, stroke valves, test alarms/shutdowns; calibrate control loops and check motor rotations.
- Operate the process and loading pumps equipped with suction strainers with process water, as necessary.
- Operate all stacking and tripping conveyors.
- Operate all dust suppression and handling systems.
- Institute the Safety Work Permit System.
- Operate all mobile and service equipment, as necessary.
- Perform preliminary vendor-directed run-in of the pulverizers and auxiliary equipment.

Phase IIB--Commissioning.

- Receive and introduce treatment chemicals, as necessary.
- Operate all pumps and compressors on water and air, respectively, to confirm that design conditions are attainable.
- Drain and purge the water from the piping and vessels that handle hydrocarbons.
- Purge all systems that handle hydrocarbons and the enclosed coal-handling equipment, as necessary, to render their atmospheres inert.
- Commission the flare and incinerator systems.
- Receive and unload coal, chemicals, and solvents, as necessary.
- Introduce fuel and operate the coal preparation equipment at design temperature.
- Correct any problems or limitations that could inhibit normal operation.

Phase IIC--Commissioning/Downstream Support.

- Operate the coal-receiving and storage equipment to begin building up the compacted emergency coal-storage pile.
- Operate the liquids-storage and shipping equipment on fuel oil to confirm that design rates and conditions can be met.
- Operate the coal-reclaiming systems by using mobile equipment to recycle coal from the pulverizer feed silos to storage, to confirm that design performance can be attained under loads.
- Using coal, operate the SRC-TSL conveyors, stackers, and reclaim and shipping systems to confirm their satisfactory performance under load.
- Operate the coal pulverizing/drying system and then feed coal to the Gasification and SRC Process Areas, as required, to demonstrate that design particle size and drying conditions and emissions can be met.
- Operate the ash-handling equipment to confirm that the system meets environmental standards.

Phase IID--Commissioning/Optimization.

- Operate the coal-receiving and storage systems to demonstrate that unit trains of coal can be weighed, unloaded, sampled, analyzed, and stacked at design rates.
- Operate the coal-reclaiming system to supply coal to the coal preparation area at required rates. Rates will be increased, if appropriate, until design conditions are attained, or problems or limitations are identified and corrected.
- Operate the coal preparation system to provide pulverized, dried coal to the Gasification and SRC Process Areas. Operating conditions will be optimized for particle size, dryness, and emissions according to good operating practices. Rates will be increased, if appropriate, until design conditions are attained or problems or limitations are identified and corrected.
- Operate the liquid-storage and shipping systems to store and ship products according to a schedule that supports operations and the marketing plan. Rates will be increased, if appropriate, until

design conditions are attained or problems or limitations are identified and corrected.

- Operate the SRC-TSL solids storage and shipping systems to store and ship products according to a schedule that supports operations and the marketing plan. Rates will be increased, if appropriate, until design conditions are attained or problems or limitations are identified and corrected.
- Operate, according to environmental standards, the ash-handling and storage systems to handle the slag and ash by-products produced in the Gasification Area. Rates will be increased, if appropriate, until design conditions are attained or problems or limitations are identified and corrected.

iv. Central Control System Area

Phase IIA--Preoperational Checkout.

- Commission all necessary utilities.
- Commission the radio communication system.
- Perform individual loop checks to ascertain that all field instruments function properly.
- Check all auxiliaries for proper operation, e.g., diagnostics, printers, copiers, alarm lights.
- Check the electrical circuits to the uninterruptible power supply (UPS) for proper action in each Area of the plant.
- Check all redundancies for proper response, such as data highways, cathode ray tubes (CRTs), programmable logic controllers (PLCs).

Phase IIB--Commissioning.

- Introduce water, air, or other simulants, if possible, in each process area to verify instrument signals and responses with real signals.
- Perform preliminary instrument tuning on the control loops, as necessary.
- Operate the control system for introducing intentional upsets, and monitor the recovery response.
- Correct any problems or limitations that could inhibit normal operation.

Phase IIC--Commissioning/Downstream Support.

- Introduce normal process feeds and perform final instrument tuning, as each Area approaches design conditions.
- Institute the requirements for documenting controls to continually update all configurations, constants, settings, and reporting.

Phase IID--Commissioning/Optimization. Operate the Central Control System within its normal capability to adequately monitor and control the process for the integrated facility and to meet all operations objectives such as product quality, cost, environmental acceptability, and safety. Rates will be increased, if appropriate, until design conditions are attained or problems or limitations are identified and corrected.

b. Cryogenic Systems Area

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Passivate the cooling water heat exchangers.
- Recheck the major control systems, stroke valves, test safety devices, calibrate control loops, and check motor rotations.
- Institute the Safety Work Permit System.
- Flush the Direct-Contact Aftercooler (DCAC) and associated equipment using process pumps. Construction debris will be cleaned out of all suction strainers.
- Clean the piping, heat exchangers, and compressors in oxygen service and use an ultraviolet light to check the cleanliness.
- Perform preliminary, vendor-directed run-in of the Air, Nitrogen, and Oxygen Compressors on air or nitrogen.

Phase IIB--Commissioning.

- Blow out and defrost the Cold Box with compressed air from the Main Air Compressor with the DCAC in normal operation.

- Operate the Oxygen Compressor on nitrogen/carbon dioxide simulation. The compressor case will be disassembled, reinspected, and reassembled and run again on nitrogen recycle.
- Purge and cool the cryogenic liquid tanks with purchased liquid nitrogen and liquid oxygen to expedite the Air Separation Unit (ASU) start-up if not previously completed.
- Commission the liquid nitrogen vaporization system to expedite the ASU start-up.
- Correct all problems or limitations that could inhibit normal operation.

Phase IIC--Commissioning/Downstream Support.

- Begin purging the insulation in the Cold Boxes with vaporized nitrogen from storage, after the Cold Boxes have been defrosted.
- Begin cooling the Cold Box to air liquefaction temperature, and produce specification products.
- Start the Nitrogen Compressor and deliver gaseous nitrogen to the utility headers when nitrogen of correct specification is available.
- Begin oxygen/nitrogen test runs on the Oxygen Compressor, when gaseous oxygen of the correct specifications is available.
- Operate the Oxygen Compressor on pure oxygen and direct the gas to the Gasification Unit in the Gas Systems Area, as required.
- Vent the gaseous oxygen and gaseous nitrogen at the Cold Box, as required, to support commissioning the SRC-I Demonstration Plant.
- Operate the Cold Boxes to produce liquid oxygen and liquid nitrogen to fill the cryogenic storage tanks.

Phase IID--Commissioning/Optimization. Operate the ASU to produce gaseous oxygen and nitrogen to the Gasifiers and utility header, respectively. Operating conditions will be optimized and venting of gases between the Cold Box and product compressors will be minimized according to good normal operating practices. Operating rates will be increased, if appropriate, until design conditions are attained, or problems or limitations are identified and corrected.

The first ASU will be commissioned before the second and third units to supply gaseous nitrogen to the coal-preparation subareas in the Utilities and Gas Systems. The second and third ASUs will be brought on line to support commissioning of the Gasifiers.

c. Gas Systems Area

i. Gasification System

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Passivate the equipment, as required.
- Recheck the major control systems, stroke valves, test safety devices, calibrate control loops, and check motor rotations.
- Activate the nitrogen purge systems.
- Commission the temperature maintenance systems.
- Commission the fuel system, and institute the Safety Work Permit System.
- Flush the liquid lines and vessels with water by using process pumps. Construction debris will be cleaned from all suction/line strainers.
- Purge and dry the equipment, as required.
- Sinter the refractory of the Gasifier Reactor.

Phase IIB--Commissioning.

- Commission the Gasifier flare system.
- Establish normal nitrogen purge rates through the bunkers.
- Operate the Nitrogen Recycle Compressor and conveying equipment on pure nitrogen. Correct all problems or limitations that will inhibit operation with normal products.
- Commission the oxygen feed to the screw-feeder block valves.
- Using coal feedstock, operate the dust preparation area, including the handling equipment for Kerr-McGee Ash Concentrte (KMAC) to simulate humidifying/blending KMAC with coal feedstock. Correct all problems or limitations that will inhibit operation with normal products.
- Operate the Screw Feeders on recycle to the service bunkers in order to calibrate and adjust the Screw Feeder head.

- Operate the entire wash-water treatment system and ash-removal section of the gasification train with process water. Correct problems or limitations that inhibit operation on normal products.

Phase IIC--Commissioning/Downstream Support.

- Continue to operate the KMAC handling equipment on coal to deliver humidified feedstock to the Gasifier service bunkers.
- Continue to operate the wash-water treatment system with process water.
- Start one Gasifier on normal start-up with coal/oxygen/nitrogen feeds.
- Flare the product gas at the local Gasifier flarestack until reliable operation is achieved.
- When the first gasifier is operable, begin start-up with the remaining Gasifiers, one-at-a-time, on coal/oxygen/nitrogen feeds.
- Operate single Gasifiers at rates varying from 70 to 110% to detect limitations or problems requiring future correction. A second gasifier will be operated, if frequent shutdowns delay commissioning of downstream units.
- Operate the Gasifier to support the commissioning of downstream gas system units.
- Begin withdrawing coal and increasing KMAC feed rates to the Gasifier System, when KMAC is available from the SRC deashing area.
- Correct all problems or limitations that will inhibit normal operation with KMAC/coal feed.

Phase IID--Commissioning/Optimization. Operate the Gasification System to produce makeup hydrogen to the Raw Syngas Compressor. Operating conditions will be optimized, and venting to the flare will be minimized according to good normal operating practices to provide feed to the Raw Syngas Compressor. Rates will be increased, if appropriate, until design conditions are attained, or problems or limitations are identified and corrected.

ii. Raw Syngas Compression, Shift, and Ammonia Sulfide Water Stripper (ASWS) Systems

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Passivate the equipment, as required.
- Recheck major control systems, stroke valves, test safety devices, calibrate control loops, and check motor rotations.
- Commission the temperature maintenance systems.
- Commission the fuel system, and institute the Safety Work Permit System.
- Flush the liquid lines and vessels with water by using process pumps. Construction debris will be cleaned from all suction/line strainers.
- Purge and dry the equipment, as required.
- Recheck the alignment of the Raw Syngas Compressor and Turbine train.
- Operate the seal gas and lube oil system on the Raw Syngas Compressor and Turbine train.
- Purge and dry out the equipment, as required, including the Shift Start-up Heater refractory.

Phase IIB--Commissioning.

- Commission the route to the plant flare system.
- Operate the Raw Gas Holder, Electrostatic Precipitator (ESP), Raw Syngas Compressor, and Shift systems on nitrogen. Correct all problems or limitations that will inhibit operation with normal feedstock.
- Begin sulfiding the shift catalyst by following the catalyst vendor procedures and by using the Raw Gas Holder and compressor.
- Begin storing Shift and Raw Syngas Compressor condensate in the ASWS storage tank for later feed material to the Claus Sulfur Plant.
- Commission the high-pressure, medium-pressure, and low-pressure steam systems in the Shift system.

Phase IIC--Commissioning/Downstream Support.

- Continue to operate the Raw Gas Holder, ESP, Raw Syngas Compressor and Shift systems on nitrogen in the recycle mode.
- Continue to feed sour condensate to the ASWS.
- Begin to displace nitrogen in the Raw Gas Holder with syngas after a single gasifier has completed Phase IIC operation.
- Begin normal operation of the ESP and introduce syngas to the Raw Syngas Compressor and Shift systems.
- Operate the Shift Start-up Heater as a trim heater, if required, at this rate of turndown.
- Flare gas at the exit of the Shift system until reliable operation is achieved.
- Operate the Gasifiers, raw syngas compression system, ASWS, and Shift systems to support downstream commissioning of the Gas Systems units, i.e., Selexol and hydrogen compression systems.
- Correct all problems or limitations that inhibit normal operation.

Phase IID--Commissioning/Optimization. The Raw Syngas Compression, Shift, and ASWS systems will be operated as a unit to produce makeup hydrogen to the Selexol unit. Operating conditions will be optimized and venting of gas to the flare will be minimized, according to good normal operating practices, as required, to provide reliable feed to the Selexol unit. Rates will be increased, if appropriate, until design conditions are attained, or problems or limitations are identified and corrected.

iii. DEA, HPU, LPG Systems

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Passivate the equipment, as required.
- Recheck major control systems, stroke valves, test safety devices, calibrate control loops, and check motor rotations.
- Commission the temperature maintenance systems.

- Commission the fuel system, and institute the Safety Work Permit System.
- Flush the liquid lines and vessels with water by using process pumps. Construction debris will be cleaned from all suction/ line strainers.
- Dry out the Hydrogen Purification Unit (HPU) Reactivation Heater refractory.
- Purge and dry equipment with nitrogen, as required.
- Recheck the alignment on compressors and perform preliminary vendor-directed run-ins on the HPU Fuel Gas Compressor and Chiller and Liquefied Petroleum Gas (LPG) Feed Gas Compressor.
- Defrost and dry out the HPU and LPG cryogenic equipment with nitrogen.

Phase IIB--Commissioning.

- Commission the route to the plant flare system.
- Operate the HPU Fuel Gas Compressor and LPG Feed Gas Compressor on nitrogen, and correct all problems or limitations that will inhibit operation with normal feed.
- Operate the HPU Chiller on recycle with hot gas bypass.
- Reactivate the HPU mole sieve drier beds with nitrogen by using the Reactivation Heater.
- Operate the DEA and HPU columns and pumps with water and nitrogen simulation; drain and dry out the system, as required.
- Correct all problems or limitations that will inhibit operation with normal feeds.

Phase IIC--Commissioning/Downstream Support.

- Charge diethanolamine (DEA) and water solution to the Absorbers and Stripper.
- Charge caustic soda to the tanks and pots, etc.
- Charge HPU scrub oil to the tanks, Absorber and Stripper.
- Charge condensate to pots and columns in the DEA system.
- Pressurize the DEA and HPU columns; begin circulating of DEA, caustic soda, condensate, and scrub oil.

- Begin pressurizing the DEA Absorbers with normal feeds when the steady flow of hydrogen recycle or low-pressure flash gas is available from the SRC area.
- Heat the DEA Reboiler Stripper and begin normal operation of the DEA Unit, venting recycle gas to the flare at the battery limits of the HPU and delivering fuel gas to the header.
- Correct all problems or limitations that will inhibit normal operation.
- Pressurize the HPU Absorber with treated gas from the DEA high-pressure absorber. Heat the HPU Stripper/Reboiler and begin normal operation of the HPU to produce rejected fuel for feed to the LPG system.
- Let down the high-pressure recycle gas with a bypass flow control valve to the low-pressure Fuel Gas Absorber in the DEA system to allow operation at turndown conditions.
- Vent the treated recycle gas from the HPU at the battery limits of the Hydrogen Compression system.
- Correct all problems or limitations that will inhibit normal operation.
- Pressurize the LPG Feed Gas Compressor with rejected fuel gas from the HPU.
- Operate the LPG Feed Gas Compressors on normal feed, venting gas to the fuel-gas header.
- Pressurize the LPG De-thanizer Column, Compander, etc., and begin cooling the column to produce LPG product.
- Transfer the LPG product to storage.
- Deliver the column overheads to the fuel-gas headers.
- Correct all problems or limitations that will inhibit normal operation.

Phase IID--Commissioning/Optimization. The DEA, HPU, and LPG systems will be operated as a unit to produce specification recycle hydrogen to be compressed in the hydrogen compression unit. By-product LPG will be produced, as required, to satisfy the plant fuel balance. Operation conditions will be optimized and venting to the flare will be minimized, consistent with good normal operating practices, as required, to provide reliable feed to the downstream units. Rates will be increased, if appropriate, until design conditions are attained, or problems or limitations are identified and corrected.

iv. Selexol, Claus, and Beavon Systems

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Passivate the equipment, as required.
- Recheck the major control systems, stroke valves, test safety devices, calibrate control loops, and check motor rotations.
- Commission the temperature maintenance systems.
- Commission the fuel system, and institute the Safety Work Permit System.
- Flush the liquid lines and vessels with water by using process pumps. Construction debris will be cleaned from all suction/line strainers.
- Purge and dry the equipment, as required.
- Perform preliminary, vendor-directed run-ins on the H_2S Recycle Compressor, Claus blowers, Selexol Refrigeration Unit, and CO_2 Blower.
- Dry out the Claus and Beavon systems refractories.

Phase IIB--Commissioning.

- Commission the route to the plant flare system.
- Operate the CO_2 Blower and H_2S Recycle Compressors on nitrogen. Correct all problems that will inhibit operation with normal feeds.
- Operate the Selexol system with water and nitrogen simulation; then drain and dry out the system with nitrogen, as required.
- Operate the Beavon system with water and nitrogen or air simulation. Drain and dry out the system with nitrogen, as required.
- Correct all problems or limitations that will inhibit operation with normal feeds.

Phase IIC--Commissioning/Downstream Support.

- Charge the Selexol solution to Absorbers, Strippers and flash tanks.
- Pressurize the system with nitrogen and begin circulating Selexol solution.

- Cool the Selexol circuit with the Refrigeration Unit.
- Heat the inventory in the H_2S Stripper.
- Begin to feed the Selexol system with syngas after the Shift system has been precommissioned through Phase IIC.
- Operate the H_2S Recycle Compressor on normal feed.
- Preheat the Claus plant according to vendor instructions.
- Operate the Claus plant on acid gas feeds from the Selexol and ASWS systems to produce elemental sulfur in the Claus sulfur pit.
- Operate the Selexol Strippers with the normal stripping medias of steam and nitrogen.
- Operate the CO_2 Blower with normal feed from the Selexol system.
- Charge Stretford solution chemicals and water to the Beavon-System Oxidizer Tanks and Absorbers.
- Pressurize the system with nitrogen and begin circulating the Stretford solution.
- Preheat the Beavon-System Furnace, Incinerator, and hydrogenation beds according to vendor instructions.
- Commission the medium- and low-pressure steam systems of the Claus and Beavon systems.
- Operate the Beavon system on tail gas feedstock from the Claus plant.
- Operate the Sulfur Decanter of the Beavon system and transfer the elemental sulfur to the storage pit.
- Flare the hydrogen from the Selexol system at the exit of the economizers after the CO_2 Absorber until reliable operation is achieved for the Selexol, Claus and Beavon systems.
- Correct all problems or limitations that will inhibit normal operation.

<u>Phase IID--Commissioning/Optimization</u>. The Selexol, Claus and Beavon systems will be operated as a unit to produce specification makeup hydrogen to the H_2 compression and methanation systems. Operating conditions will be optimized and venting to the flare will be minimized according to good normal operating practices, as required, to provide reliable feed to the downstream units. Rates will be increased, if appropriate, until design conditions are attained, or problems or limitations are identified and corrected.

v. Hydrogen Compression System

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Recheck the major control systems, stroke valves, test alarms/ safety devices, calibrate control loops, and check motor rotations.
- Commission the temperature maintenance system.
- Institute the Safety Work Permit System.
- Recheck critical clearances in the compressors.
- Operate the nitrogen-purge lube oil systems on the hydrogen compressors.
- Perform preliminary, vendor-directed run-ins of the compressors on air and nitrogen.

Phase IIB--Commissioning.

- Commission the route to the plant flare system.
- Operate the hydrogen compressors on nitrogen recycle.
- Correct all problems or limitations that will inhibit operation with hydrogen feed.

Phase IIC--Commissioning/Downstream Support.

- Pressurize makeup gas compressor cylinders with hydrogen when it is available from the Selexol system.
- Pressurize the recycle and bypass cylinders from the HPU and DEA, respectively, with hydrogen letdown from the discharge pressure of the makeup cylinder.
- Start the compressor with the associated support equipment; operate the compressor on total recycle.
- Correct all problems or limitations that will inhibit operation.
- Vent the hydrogen on the suction side of the compressor to the flare, as required, to satisfy the demand in the SRC Process Area.

Phase IID--Commissioning/Optimization. The hydrogen compressors will be operated to supply makeup and recycle hydrogen to the SRC Process Area. Operating conditions will be optimized, and recycle and venting to the flare will be minimized according to good normal operating practices, as required, to provide reliable feed to the downstream units. Rates will be increased, if appropriate, until design conditions are attained, or problems or limitations are identified and corrected.

vi. Methanation System

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Recheck the major control system, stroke valves, test alarm/safety devices, calibrate control loops, and check motor rotations.
- Commission the temperature maintenance systems.
- Commission the fuel system to the Start-up Heater, and institute the Safety Work Permit System.
- Flush the liquid lines, pots and heat exchangers with water by using process pumps, and clean all suction/line strainers.
- Purge the equipment with nitrogen in preparation for Phase IIB.
- Dry out the refractory in the Start-up Heater.

Phase IIB--Commissioning.

- Commission the route to the flare system.
- Heat the catalyst beds with nitrogen by using the Start-up Heater.
- Commission the Waste Heat Boiler during the heating cycle.
- Correct all problems or limitations that will inhibit operation on normal feed.

Phase IIC--Commissioning/Downstream Support.

- Begin the feed of makeup hydrogen to pressurize the system to full design operating pressure after the Selexol unit has been put through its Phase IIC.

- Continue to operate the Start-up Heater and begin reducing gas flow through the catalyst beds to produce a controlled exotherm.
- Increase the gas flow as the exotherm lines out and decrease firing in the Start-up Heater until normal operation is attained during its shutdown.
- Adjust the steam/gas ratio to control the exotherm in the first Methanator bed.
- Correct all problems or limitations that will inhibit normal operation.

Phase IID--Commissioning/Optimization. The Methanation system will be operated to produce specification hydrogen to the Coke and Liquid Products Area. Operating conditions will be optimized and venting to the flare will be minimized consistent with good normal operating practices, as required, to provide reliable feed to the Coke and Liquid Products Area. Rates will be increased, when appropriate, until design conditions are attained, or problems or limitations are identified and corrected.

d. SRC Products Area

i. Auxiliaries (Dowtherm, Compressor Cooling Water, and Flush and Drain Systems)

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Check the control systems and mechanical equipment, stroke valves, test safety devices, and check motor rotations.
- Charge water to the equipment and circulate it to check the functioning of pumps, valves, and instruments. Construction debris will be cleaned from temporary strainers and other collection points.
- Commission the steam tracing systems.
- Commission the fuel system, and institute the Safety Work Permit System.
- Purge and dry the equipment and lines, and dry the refractory.

Phase IIB--Commissioning.

- Commission the flare system.
- Unload Dowtherm from tank cars into the plant system to establish the normal operating level in the surge tank.
- Heat the Dowtherm system slowly to cure the heater refractory and to drive water out of the system.
- Charge boiler feed-quality water to the compressor cooling water systems. Add ethylene glycol antifreeze and treatment chemicals, and circulate the water mixture.
- Charge start-up process solvent to the Flush Solvent Tank. The solvent pumps will be used to circulate solvent to process lines that are available. This solvent will be allowed to drain to the drain tanks and be returned to the Flush Solvent Tank via the Solvent Slop Tank.
- Heat the solvent slowly to dry out the system.

Phase IIC--Commissioning/Downstream Support.

- Continue the circulation of Dowtherm to all equipment and pipeline heat tracing, jacketing, and heat exchangers. The fluid will be heated to normal operating temperature, and all control systems will be put in service.
- Test the function of all controls, alarms, and safety devices in the Dowtherm system.
- Continue circulating compressor cooling water and test the functioning of all controls, alarms, and safety devices in that system.
- Empty the drain system returning the process solvent inventory to the Flush Solvent Tank. The contents of the tank will be heated to normal operating temperature.
- Recheck and remove all temporary strainers.
- Provide Dowtherm, compressor cooling water, and flush solvent to the Dissolver subarea as required for commissioning that equipment.

Phase IID--Commissioning/Optimization. Operate the auxiliary equipment to support the commissioning of the balance of the SRC Process Area.

ii. Reaction Recovery: Slurry Preparation, Heating, Reaction and H_2 Recovery, Vacuum, and Solvent Recovery

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Passivate the equipment, as required.
- Check control systems and mechanical equipment, stroke valves, test safety devices, and check motor rotations.
- Flush all equipment and lines by circulating water with process pumps and nitrogen with process compressors. Construction debris will be cleaned from equipment suction strainers.
- Commission the coal handling equipment for a dry run.
- Commission the fuel system, and institute the Safety Work Permit System.
- Fire the heaters on the Vacuum and Process Solvent Columns to boil the water and commission the overhead systems.
- Dry the refractory in the Coal-Slurry Heaters.
- Drain all equipment of water, and purge and dry it.

Phase IIB--Commissioning.

- Charge start-up process solvent to the slurry preparation system. The solvent will be pumped through the normal process route to establish normal levels in the slurry heaters and reactors, and hydrogen recovery and vacuum areas.
- Circulate and heat the solvent slowly to dry out the system.
- Determine that the Gas Systems Area is ready to supply hydrogen and receive sour gas.
- Commission the hydrogen feed system and the hydrogen recovery area, including the Sour Gas Compressors.
- Determine that the storage area is ready to receive crude-oil, medium oil, and heavy oil product.
- Continue heating and circulating the system. The Process Solvent Column will be commissioned when feed becomes available.
- Check and remove all temporary strainers.
- Test the functioning of all controls, alarms, and safety devices in the liquid and gas handling equipment.

Phase IIC--Commissioning/Downstream Support.

- Continue circulating oil and hydrogen at 50% of design rate, while increasing the temperature and pressure to near design conditions.
- Determine that the Solidifier is commissioned and ready to operate and that the Gas Treating Area is ready to receive low-pressure off gas and sour water.
- Start coal feed at a low rate; gradually, increase the rate until design slurry strength is obtained.
- Begin the letdown to the off-specification SRC tank in the Solidifier Subarea, when the Vacuum Column bottoms solvent concentration is reduced to near design concentration.
- Stabilize the operation at 50% of design rate.
- Discontinue feeding the Vacuum Column bottoms to the Solidifier, and start feeding the stream to the Deashing Unit when the Deashing Unit has been commissioned and is ready to receive feed.
- Increase the feed rates slowly to the limit of the process or the downstream equipment.

Phase IID--Commissioning/Optimization. Operate the Reactor/Recovery Area to supply feedstock to the Deashing Area. Operating conditions will be optimized and rates will be increased until design conditions are attained, or problems or limitations are identified and corrected.

iii. Solidification Area

Phase IIA--Preoperational Checkout.

- Check the control and mechanical equipment, stroke valves, test safety devices, and check motor rotations.
- Commission the cooling water system.
- Flush the system by circulating water with the feed pumps. Construction debris will be cleaned from strainers.
- Commission the product conveyors and determine that the take-away conveyors have been commissioned.
- Purge and dry equipment and lines.

Phase IIB--Commissioning.

- Activate the Solidifier and fume handling system.
- Commission the fume incinerator.
- Begin feeding one Solidifier unit, when the Vacuum Column bottoms are available in the off-specification tank.
- Adjust the Solidifier Cycle Controller to obtain a reasonably thick solid product.
- Activate additional Solidifiers, as needed, to solidify the Vacuum Column bottoms stream.

Phase IIC--Commissioning/Downstream Support.

- Clean the Vacuum Column bottoms from the system and begin producing specification SRC, when deashed SRC is available from the Deashing Unit.
- Increase the rates, as necessary, to solidify feed from the Deashing Unit.
- Begin solidifying of TSL-SRC material when it is available from the EBH.

Phase IID--Commissioning/Optimization. Operate the Solidifier to produce specification product. Operating conditions will be optimized, and rates will be increased until design conditions are attained, or problems or limitations are identified and corrected.

iv. Critical Solvent Deashing

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Passivate the equipment, as required.
- Check control systems and mechanical equipment, stroke valves, test safety devices, and check motor rotations.

- Flush all equipment and lines by circulating water with process pumps. Construction debris will be cleaned from equipment suction strainers.
- Commission the fuel system and institute the Safety Work Permit System.
- Fire the second-stage heaters to cure the refractory and heat water.
- Boil water in the product strippers to commission the overhead system.
- Drain equipment of water; purge and dry it.

Phase IIB--Commissioning.

- Charge deashing solvent to the separators. The vessels will be filled completely and circulation and heating will begin.
- Let down the pressure of the excess material to the medium-pressure and low-pressure solvent loops, as the solvent expands.
- Charge process solvent to the SRC and Light SRC (LSRC) strippers. The pumps will be commissioned and flushed, and the system will be started.
- Bring the entire unit up to normal operating temperature and pressure with deashing solvent and process solvent.

Phase IIC--Commissioning/Downstream Support.

- Determine that Vacuum Column Bottoms of design composition are available, that the Solidifier is ready to receive deashed SRC, and that the Gasifiers are ready to receive KMAC.
- Start the Vacuum Column Bottoms at a low feed rate to the First-Stage Settler. The settler bottoms will be taken to the start-up system.
- Begin the letdown into the KMAC bin and activate the KMAC transfer system when acceptable ash concentrate is being made.
- Begin the flow to the Solidifier subarea when SRC is available from the stripper bottoms. Begin the flow to the Slurry Preparation subarea, when LSRC is available.
- Route stripper bottoms to the Coker and EBH when the units are ready to receive SRC.

Phase IID--Commissioning/Optimization. Operate the SRC Deashing Area to supply feedstock to the Solidifier, Coker, and Expanded Bed Hydrocracker. Operating conditions will be optimized, and rates will be increased until design conditions are attained, or problems or limitations are identified and corrected.

v. Product Fractionation

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Passivate the equipment, as required.
- Check control systems and mechanical equipment, stroke valves, test safety devices, and check motor rotations.
- Flush the equipment with water by using the process pumps. Construction debris will be cleaned from suction strainers.
- Commission the fuel system, and institute the Safety Work Permit System.
- Commission the fired heaters and boil water in the columns to commission the overheads systems.
- Purge and dry equipment and lines.

Phase IIB--Commissioning.

- Fill the columns and vessels to normal operating levels when crude oil products are available from the SRC reaction area.
- Circulate and heat the oils to dry out the system.
- Test the functioning of all controllers, safety devices, and alarms.
- Flush the product lines to the tank farm.
- Recheck and remove all temporary strainers.

Phase IIC--Commissioning/Downstream Support.

- Determine that a steady supply of crude oils is available from the SRC reaction area.
- Start feed to the columns and line them out at design conditions.

- Begin transferring products to storage tanks after products have been tested and found to be within specifications.
- Add oils from the Coker and EBH to the Fractionator feed when they become available.

Phase IID--Commissioning/Optimization. Operate the Product Fractionator to produce product oils. Operating conditions will be optimized, and rates will be increased until design conditions are attained, or problems or limitations are identified and corrected.

e. Coke and Liquid Products Area

i. Delayed Coker Area

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Passivate equipment such as hydraulic systems, as required.
- Check the control systems, stroke valves, and test logic systems; calibrate critical control circuits, test safety devices, and check motor rotations.
- Flush the system by circulating water with process pumps and nitrogen or air with process compressors. Construction debris will be cleaned from all equipment suction strainers.
- Commission and test the auxiliaries, including slide valves, hoists, crusher cars, hydraulic systems, conveyors, and the coke-cutting and anti-foam-addition systems.
- Commission the temperature maintenance systems.
- Commission the fuel system, and institute the Safety Work Permit System.
- Purge and dry the equipment and lines; dry the refractory.

Phase IIB--Commissioning.

- Commission the flare system.
- Pump simulation oil from the tank farm to the Combination Tower. Fill seal and flushing oil tanks.

- Circulate oil through the Coking Heater, process lines, and Combination Tower; raise the temperature to dry out the circuits.
- Flush and heat all primary circuits with hot oil, including the Blowdown Towers, wet and dry slop systems, flushing systems, hot and cold drain systems, and all test-control circuits.
- Fill the sluiceway, Hydrobins, and Clarifier circuit with process water; establish circulation to test the mechanical equipment and control circuits.
- Start inert gas circulation with the compressors, and establish the pressure control in the coke drum and tower.
- Establish the flows, levels, and temperatures as close to the design values as possible, but exclude the coking system.
- Check and clean the start-up suction strainers on all pumps and compressors.
- Correct the problems or limitations that will inhibit commissioning from producing products.

Phase IIC--Commissioning/Downstream Support.

- Continue or reestablish oil circulation by controlling temperature and pressure with makeup oil from storage.
- Ascertain that the SRC Process Area is ready to receive light and middle distillates, and that the Gas Systems Area is ready to receive sour gas and sour water.
- Increase the Coking Heater outlet temperature until reaction temperatures are approached; then direct the effluent into a Coke Drum for coke production.
- Stabilize the operation and addition of SRC, through normal feed lines to the bottom of the Combination Tower.
- Gradually adjust the feed to 100% SRC and increase operating rates, as appropriate.
- Switch the Coke Drums and operate the coke-removal, coke-transport, and dewatering systems to supply green coke for commissioning the Calciner.
- Continue the operation to supply green coke to feed the Calciner.

Phase IID--Commissioning/Optimization. Operate the Delayed Coker/Calciner system as a unit to produce specification product to storage. Operating conditions will be optimized and rates will be increased until design conditions are attained or problems or limitations are identified and corrected.

ii. Calciner Commissioning Plan

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Passivate equipment such as the waste heat boiler, as required.
- Check the control systems, stroke valves, calibrate critical control circuits, and check motor rotations.
- Flush the Sulfur Dioxide Scrubber and closed-loop water system with process water. Construction debris will be cleaned from all equipment suction strainers.
- Commission and test the auxiliaries, including slide valves, conveyors, emergency drivers for the Kiln and Coke Cooler, the closed-loop cooling water system, guillotine dampers, Rotary Airlocks, dedusting oil-injection system, and the soda ash feeder and mix system.
- Commission the fuel system, and institute the Safety Work Permit System.
- Start air flow through the Kiln, Coke Cooler, Incinerator, Waste Heat Boiler, and Alternative Stack, but bypass the scrubber. A primary burner will be lit in the Kiln to dry the refractory in this equipment.

Phase IIB--Commissioning.

- Charge the Scrubber to normal operating level with spent caustic from the DEA Unit. Begin circulation and test the density and pH analyzers.
- Fill the Dedusting Oil Tank with the specified oil from either the liquid storage tank or outside delivery.

- Maintain the Calciner, Incinerator, and Waste Heat Boiler above 300°F, after the refractory has been dried, to avoid water absorption into the refractory and prevent the refractory from cracking during heating.
- Raise the temperature in the Kiln, Incinerator, Coke Cooler, and Waste Heat Boiler by using primary-air and combustion-air fans and Incinerator and Kiln burners.
- Commission the BFW supply to the steam drum, as the system is heating, and produce low-pressure steam. The low-pressure steam will be vented to the atmosphere or low-pressure header, until design temperatures for this firebox are obtained.
- Dry out the system by using flue gas produced in the Kiln. In this respect, commissioning of the Calciner will be carefully coordinated with commissioning of the Delayed Coker, to minimize thermal cycling and excess fuel consumption. A process simulant will not be run through the Kiln because of the nature of the solid green-coke feed and the reliability of the process.
- Set the Kiln and Coke Cooler speed, and start rotation.
- Start the auxiliary fans, e.g., secondary-air, tertiary-air, and seal air fans, as the Kiln heats.
- Test all of the control circuits, e.g., variable-speed control, and fuel/air ratio control.
- Start a small amount of process water on temperature control to the rotary Coke Cooler; recycle the water vapor through the Cooler Exhaust Fan, when the Kiln reaches the specified temperature.
- Correct all problems or bottlenecks that will inhibit the charging of green coke to the Kiln.

Phase IIC--Commissioning/Downstream Support.

- Generate high-pressure steam in the Waste Heat Boiler, when the Kiln and Incinerator are at the design temperatures, and export the steam through the 900 psig steam header outside battery limits.
- Start green-coke feed from the Hold Bin and Weight-Scale Feeder to the Calciner at this time.

- Adjust the feed rates, Calciner temperatures, Kiln speed, and air staging, as required.
- Increase the green-coke-feed flow rate from the Hold Bin until the specified rates are reached.
- Cool the calcined coke to 300°F with the direct water spray and route the product anode coke via conveyors to the Product Storage Silos.
- Route the effluent flue gas from the Wastewater Treatment Plant; maximize the scrubber's efficiency in removing sulfur dioxide from the flue gas.

<u>Phase IID--Commissioning/Optimization</u>. Operate the Calciner and auxiliary systems as a unit to produce anode-grade coke and by-product 900-psig steam. Operating conditions will be optimized and rates will be increased until design conditions are attained, or problems or limitations are identified and corrected.

iii. <u>Expanded-Bed Hydrocracker</u>

<u>Phase IIA--Preoperational Checkout</u>.

- Commission the utilities.
- Passivate the equipment, as required.
- Check the control systems, stroke valves, test logic systems such as the reactor shutdown system to avoid overtemperatures, calibrate critical control circuits, and check motor rotations.
- Flush the systems by circulating water with process pumps and nitrogen or air with process compressors. Construction debris will be cleaned from all equipment suction strainers.
- Commission and test the auxiliaries, including the Catalyst Loading and Unloading System, Filming-Amine-Injection System, Neutralizing Amine Injection System, and lube oil system for compressors.
- Commission the temperature maintenance systems.
- Commission the fuel and flare systems, and institute the Safety Work Permit System.
- Purge and dry equipment and lines; dry the refractory in process heaters.

Phase IIB--Commissioning.

- Fill the start-up tanks with light and heavy process oils or simulants from the Liquid Storage Area.
- Fill the pump seal as well as the flushing oil tanks or drums.
- Check the availability of fuel gas to the makeup compressor; use the Compressor to pressurize the system to test for leaks.
- Charge light oil from the start-up tank to the Feed Oil Heater and Reactors via the Feed Oil Surge Drum.
- Circulate the light oil through the Charge Oil Heater, Reactors, high-pressure separators, and the start-up tank, via a start-up cooler.
- Commission the Oil Heater and increase the temperatures in the Reactors 10 to 15°F per hour until the specified heating temperature is reached. Then recheck the system for leaks.
- Increase the pressure in the reaction circuit at the rate of 150 psi per hour to the specified limit.
- Commission the Hydrogen Recycle Compressor, and establish gas flow through the Hydrogen Heater and Reactors.
- Commission the Hydrogen Heater and check the system for leaks. The Reactors will be heated to the maximum temperature limited by the properties of the light oil.
- Fill the hot-oil circulation loop with the specified oil and circulate it.
- Commission the seal oil system and run the Catalyst Ebullating Pumps at a low speed.
- Reduce the pressure in the reaction section at the rate of 150 psi per hour to the specified limit.
- Shut down the Hydrogen Heater and Recycle-Gas Compressor.
- Fill the Catalyst Circulating Oil Drum and circulate the oil through the catalyst lines and high-pressure catalyst transfer system.
- Batch-load the catalyst at a low system pressure by using the catalyst transfer system; maintain the reactor temperature by circulating light oil through the Feed Oil Furnace.
- Expand the catalyst bed after the catalyst is loaded, and control its level with the Catalyst Ebullating Pump.

- Pump oil from the Start-up Tanks to the low-pressure separation drums and fractionation system, establish oil levels, and circulate the oil.
- Heat the fractionation system by means of the Vacuum Column Heater to dry out the circuit.
- Flush the drain systems with start-up oil.
- Conduct a series of dummy runs in the fractionation and reaction systems to ensure that all equipment and instrumentation are operable.
- Raise the pressure in the reaction section with fuel gas, and recommission the Hydrogen Recycle Compressor and the Hydrogen Heater.
- Introduce hydrogen and establish normal operating pressure.
- Presulfide the catalyst and continue to check all control circuits, while the oil is circulated.
- Heat the fractionation system to the specified maximum, which is limited by the boiling point of the light oil, after the system has been dried out.
- Correct all problems or limitations that will inhibit the production of products.

Phase IIC--Commissioning/Downstream Support.

- Continue circulating oil through the reactor and fractionation trains by controlling temperature and pressure.
- Establish one circulating oil loop that includes all process equipment; gradually, displace the light oil with the heavy oil. The heavy oil will be recycled from the bottom of the Vacuum Tower to the Feed Oil Surge Drum.
- Ascertain that other operating areas outside battery limits are ready to receive products. For example, the SRC Process Area will receive light and heavy atmospheric gas oil, as well as vacuum gas oils in the Oil Fractionation Unit. Unstabilized naphtha will go to the stabilizer, Vacuum Tower bottoms to the Solidifiers. The Gas Systems Area will receive high-pressure (HP) off-gas in the HP DEA Unit and low-pressure (LP) off-gas in the LP DEA Unit. Sour water purge will go the the Sour Water Stripper.
- After heavy oil has displaced light oil, increase the temperatures of the Reactors to the specified limit, in order to hold density and viscosity conditions within desired operating limits.

- Fill the Wash Water Drum with BFW and commission the wash water and chemical inhibitor systems.
- Gradually, charge SRC to the Feed Oil Surge Drum until the desired feed viscosity is obtained; recycle the solvent from the Vacuum and Atmospheric Towers.
- Recycle the Vacuum Tower bottom stream until the desired pressures and temperatures are reached; then transport the Vacuum Tower bottom stream which conforms to specifications, to the Solidifiers in the SRC Process Area.
- Circulate naphtha in the Sponge Absorber circuit.
- Add fresh catalyst, as required.

Phase IID--Commissioning/Optimization. Optimize operating conditions, and increase rates until design conditions are attained, or problems or limitations are identified and corrected. Two sets of design conditions, high and low conversion, will be attempted and optimized for the LC-Finer.

vii. Hydrotreater System.

Phase IIA--Preoperational Checkout.

- Commission the utilities.
- Recheck the major control systems, stroke valves, test safety devices, calibrate control loops, and check motor rotations.
- Commission the temperature maintenance systems.
- Commission the fuel system to the fired Reactor Heater and institute the Safety Work Permit System.
- Flush the liquid lines/equipment with water using process pumps and clean all suction/line strainers.
- Perform the preliminary vendor-directed run-ins on the compressors by using air and nitrogen.
- Purge and dry out the equipment with nitrogen, as required.
- Dry the fired-heater refractory.

Phase IIB--Commissioning.

- Charge water to the Absorbers and Strippers.
- Operate the compressors on nitrogen recycle.
- Operate the DEA and ASWS on water and nitrogen simulation.
- Begin heating the reactor catalyst bed with nitrogen by using the fired heater.
- Operate the Steam Stripper and Reboiler on water/steam simulation.
- Correct all problems or limitations that will inhibit operation with naphtha and hydrogen.

Phase IIC--Commissioning/Downstream Support.

- Charge DEA and condensate to the DEA Absorbers and Ammonia Strippers.
- Charge naphtha to the circuit and begin normal heating using the Reactor Heater and Steam Stripper Reboiler.
- Operate the Makeup and Recycle Hydrogen Compressor cylinders on hydrogen and begin the feed to the Reactor.
- Establish the normal DEA and condensate flows in the Absorbers and Strippers.
- Pump the hydrotreated naphtha to storage and deliver the purge gas to the fuel header.
- Correct all problems or limitations that will inhibit normal operation.

Phase IID--Commissioning/Optimization. The Hydrotreater system will be operated to produce specification naphtha. Operating conditions will be optimized and excessive venting of hydrogen and purge gas to the flare will be minimized according to good normal operating practices, as required, to produce specification naphtha. Rates will be increased, if appropriate, until design conditions are attained, or problems or limitations are identified and corrected.

3. CAPITAL EQUIPMENT (WBS 1.6.3)

There are seven categories of plant capital equipment as defined below. This equipment will be procured to support the commissioning and operating schedule for the Demonstration Plant.

a. Mobile Equipment

Typically, the mobile equipment listed would be found in a plant having size, configuration, and requirements similar to those of the Demonstration Plant. The size and units selected are considered to be minimal for the requirements foreseen for the Newman site.

The equipment specified for use in maintaining and servicing the plant was selected on a cost-effective basis to perform routine functions. The equipment will be necessary to access, lift, haul, and otherwise service the plant facilities. Some jobs will be required to be performed that are not within the capabilities of this equipment (size, height, weight, etc.) or are not performed frequently enough, e.g., major plant turnarounds, to justify larger sizes or numbers of units. The requirements of such jobs will be met by means of equipment rentals or subcontracts.

The warehouse equipment is typical of that required to service the receipt, storage of parts, and transportation for such a facility.

The railroad equipment will be required to routinely move raw material and product railcars through unloading, loading, and marshalling and to minimize the capital outlay for stationary loading/unloading equipment.

The solids-handling equipment will be minimal and typical for the support and handling of over 2 million TPY of coal, 35,000-45,000 cu yds/yr of landfill sludges and waste, and up to 900 TPD of ash and slag.

Providing cryogenic and tank trailers will be a cost-effective way to handle liquid nitrogen and slop oils within the plant.

The personnel and safety transportation equipment will permit plant personnel to perform their duties successfully and on time and will meet safety requirements for the plant.

b. Plant Maintenance Equipment

This equipment includes shop maintenance equipment, mechanics' tool boxes, special tools, and tool crib supplies selected from experience and surveys of other similar shop facilities. The equipment selected is considered to meet the minimum requirements for routinely maintaining a facility the size of the Demonstration Plant. The shop will be equipped to handle maintenance activities on a cost-effective basis. During plant turnarounds and other large jobs, contracts will be awarded to some outside service shops to handle special jobs.

Machine Shop. The machine shop will be equipped to handle normal machining, drilling, grinding, cutting, sawing, pressing, lapping, metallizing, degreasing, grit-blasting, cleaning, and relief-valve testing. All of these services will be frequent, routine requirements and should be performed economically on-site. For example, the three lathes specified vary from a capacity for small precision work to a swing of 24 in. at the chuck. Vendors in outside ships will do larger, less frequent work. The machine shop equipment selected is typical for a plant such as this.

Welding and Pipe Shop. This shop will be set up to perform metal cutting, welding, chipping, grinding, sawing, and threading in the shop and throughout the facility. These are normal services found in chemical plants and refineries. The equipment selected is considered minimal for a plant of this type and size.

Pump and Machinery Shop. This shop will be equipped to perform disassembly, sanding, grinding, cleaning, drilling, cutting, welding, weighing, pressing, bearing pulling, and field balancing. The equipment selected is normal equipment for a pump and machinery repair shop. Most pumps and plant machinery repairs will be handled in this shop; however, some work will still require specialty work to be performed by vendors in local outside shops.

Carpenter and Insulation Shop. Equipment selected for this shop will perform sawing, cutting, planing, drilling, metal breaking, and metal shearing as well as woodworking, insulating and metal working required within the plant. Insulation will be a major item for machinery, piping, and vessels. There will be many buildings requiring some carpentry. The equipment selected will permit most work to be handled by plant maintenance personnel.

Vehicle Repair Shop. The equipment selected for this shop is normal in any garage that services automobiles and other mobile equipment. It is anticipated to perform service work on 60 to 70 units of automobiles, pickup trucks, scooters, forklift trucks, cherry pickers, trucks, bulldozers, farm tractors, mowers, and trailers. Because of the relative remoteness of the area and in order to save time, most vendor service work on specialized mobile equipment will be handled at the plant site.

Electric Shop. The equipment selected for this shop is primarily test equipment to service the electrical equipment within the plant and to perform some conduit and wiring revisions. No plans are made to rewind motors or to perform other major electrical repairs to plant equipment. If major repair work is required, the damaged equipment will be shipped to specialty shops for repairs, or vendor service personnel will be brought to the plant site to make special repairs.

Instrument Shop. The equipment selected for the instrument shop is basically test equipment to be used in testing, calibrating, and repairing the instrumentation used throughout the plant.

Tool Room Equipment. This equipment was selected to repair and identify shop tools.

Cleaning Pad Area. The equipment selected will be used to clean heat-exchanger shells and bundles as well as other machinery items. Paint sprayers will be used for plant steelwork, piping, and structures. The gunite rig will be used for the refractory, fire proofing steel-work, and protection of ditch and dike surfaces.

Yard Maintenance Equipment. This equipment will include a portable air compressor, air blowers, industrial vacuum cleaners, scaffolding, portable sump pumps, air tuggers, portable space heaters, a cement mixer, and gang tool boxes required to maintain equipment and yard facilities.

Miscellaneous. Tools are required for maintenance and manufacturing personnel to perform their duties. A review of several plants was made to aid in determining the requirements for personnel toolboxes and for toolcrib supplies. The tools included in this estimate include normal hand tools, precision tools, and other special tools for mechanics found in chemical plants and refineries that are similar to the Demonstration Plant.

c. Building Furnishings

The building furnishings were determined by inventorying the requirements of offices, rooms, and other functional areas of each major building in the plant. Standardizing office requirements within each level of responsibility aided this determination. Requirements for other functional areas such as lunchrooms, service change areas, and warehouses were determined for each from a detailed equipment list, sketches, drawings, and the number of people served. Vendors and experienced people were consulted, as necessary, to complement these determinations. Allowances were made for desks, stools, lunch tables, storage cabinets, and chairs for identified field operating areas.

d. Plant Analytical Laboratory Equipment

The equipment requirements for the central laboratory were determined by a task force assigned to determine the analytical test methods and analyses required for the processes, raw materials, products, and environmental monitoring. This determination was made cost-effectively from a composite list of samples, results, and frequency requirements as determined by those who will be responsible for setting and executing operating conditions and parameters. Some tests will be performed by outside laboratories for which the cost of required equipment could not be justified.

e. Field Laboratory Equipment

Some process control tests are within the scope of process operators' duties and will be performed in the field. A determination of these tests and the requirement for associated equipment was made for each process area and summarized for the total plant. No capital-intensive tests were included.

f. Communications Equipment

Many communication networks are required for a plant of this type and size. An assessment of communication needs resulted in selecting networks for telephone, portable and mobile radios, paging, and loudspeakers. The detailed list was determined from individual network requirements for each operating area of the plant. These requirements are typical of refineries of Demonstration Plant size.

g. Safety Equipment

These requirements were compiled after the geographical plant layout, buildings, descriptive employment, hazards, monitoring, and anticipated policies and practices of the plant were considered. The number of units was determined by a detailed analysis of each of these considerations. The requirements are consistent with and typical of refinery and chemical plants similar to the Demonstration Plant.

4. RECRUITING AND TRAINING (WBS 1.6.4)

In conjunction with planning and implementing the checkout and commissioning, plans will also be made for recruiting and training plant staff. Although some of the technical and supervisory personnel who have been working on Phase I will transfer to the plant staff, ICRC expects that most of the new people will be recruited locally or elsewhere.

The projected plant staff is summarized as follows:

	Exempt	Nonexempt	Total
Management and Administration	25	12	37
Technical Support	19	32	51
Occupational Health	5	3	8
Production	33	195	228
Maintenance	24	199	223
Total ICRC Employees	106	441	547
Average Number of Contractors			210
Supervisory and Hourly Personnel			
Plant Total			757

As soon as the commitment is made to build the plant, appropriate members of the plant supervisory, administrative, and technical staff must be transferred or recruited into the Manufacturing Department to begin detailed planning for recruiting and training by performing detailed personnel surveys and contacts in the Newman area. A Training Director will be appointed to coordinate and direct these plans. Also, a training assistance contractor will be hired to provide professional, experienced assistance in developing a complete, effective recruiting and training program and to assist in carrying out the program, particularly in preparing line supervisors to become proficient, enthusiastic instructors in the program.

The detailed Recruiting and Training Plan will be completed approximately 12 months after a commitment is made to build the plant. This master plan will define the needs, methodology, activities, schedule, and responsibilities for implementing of training and recruiting during Phase II.

The breakdown of training and recruiting needs will include closely analyzing organization, operations, and labor. The organization analysis will define and itemize company goals, policies, practices, and procedures. Cost or schedule constraints that would impede fulfillment of goals and objectives will be analyzed and compensations will be made.

The operations analysis will define equipment and process systems in each area or unit. The operating manual will be a basis for analysis; job definitions and responsibilities in each area, including major tasks, minimum required knowledge, and necessary skills, will be reviewed and itemized. Other documents, such as the hazards analysis and unit control philosophy, will also be used to prepare the operations analysis.

The labor analysis will be the basis for developing recruiting objectives. Labor requirements, based on the complexity of the job tasks, will be documented and reviewed. Qualifications for hiring or recruiting consist of experience, education, skills, knowledge, behavior, attitude, and physical abilities. This compiled information will be used to develop job definitions or position descriptions and in recruiting procedures.

According to directives outlined in the master plan, training methods and activities will be defined and documented for future incorporation into a future Training Program. Some activities deemed necessary for training personnel to satisfactorily and safely perform specific tasks include mechanical instruction for maintenance, operating instruction, and quality control instruction for laboratory analysis, industrial hygiene, and safety. Training methodology will define training tools and type of training required for classroom and field instruction. Training aids, beneficial in transferring knowledge, will be used as much as practicable. These aids will include audiovisual presentations, movies, field demonstrations, dynamic simulators, and off-site training programs conducted by equipment vendors such as Louisiana State Universtiy (LSU) fire fighting school, John Zink burner school, and Honeywell digital control training.

After developing the Training Program, ICRC will develop a schedule highlighting the extent of classroom, process, equipment, field, and on-the-job training. On the average, operators and mechanics will report for training nine and six months, respectively, prior to scheduled commissioning in an area. These lead times will vary depending upon a person's skill or experience, the complexity of the process area to which he will be assigned, and the extent of on-the-job training required, e.g., training varies for an operating gasifier or delayed coker plant. Most of the training will be conducted by plant line supervisors, who must be available with enough lead time to prepare for this task. Lead time will be about one year before operator and mechanic training classes begin. The operator training program will begin approximately nine months before plant utilities and off sites commissioning have begun and will continue through commissioning for the entire facility.

To accurately monitor and control the training program, a management committee will be established. The training committee, in its primary function, will ensure that the training activities are effective and consistent with company policies. The committee will also determine priorities for training needs, establish ongoing changes in training guidelines, and coordinate training among specific areas.

Responsibility for coordinating the training activities, schedules, and expenses will be assigned to a Training Manager, who is scheduled to be hired in January, 1983. A time-phased cost estimate has been developed to support this recruiting and training program.

B. COST PLANS

The following cost plan data from the Original Baseline for Operations, Work Breakdown Structure element 1.6, are included for reference. They were coordinated and compiled by the International Coal Refining Company (ICRC) based on spare parts, checkout and commissioning, capital equipment and recruiting and training estimates. This cost plan data did not include any allowance for contingency.

The Cost Plans were presented in first quarter FY 82 and escalated costs in the following formats:

Phase I - Not Applicable

Phase II - Level IV WBS Summary - 1st Quarter FY 82 dollars
Level IV WBS Summary - Escalated dollars

The escalated costs had been developed using the following rates compounded yearly: 10% for FY 82 and FY 83, 9% for FY 84 and FY 85 and 8% thereafter. Escalation on equipment had been calculated based on a committed basis and distributed on a cash flow basis.

For this Revised Project Baseline, the costs, in first-quarter FY 82 dollars, for spare parts and checkout and commissioning were lowered while the costs for capital equipment and recruiting and training remained the same.

The costs for spare parts were reduced by $613,000 from $31.013 million to $30.4 million as a result of the lower capital cost estimate for the plant. Spare parts are factored at approximately 5% of plant material and equipment costs.

A relatively large decrease of $13.832 million was realized in checkout and commissioning costs. This was primarily due to both lower fuel projections based on Energy Information Administration's 1982 Annual Energy Outlook.

International Coal Refining Company

REVISED

BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR ____________________ DATE ____________________

WBS LEVEL 1.6 , NUMBER ____________________ REVISION NO. ____________________

WBS ELEMENT TITLE Operations PAGE ________ OF ________

1st QTR FY'82 (THOUSANDS)

ITEM	FINAL BASELINE: LABOR MH	LABOR $	MAT'L $			TOTAL $
EQUIP – A/C PURCHASE						
EQUIP – CM/C – PURCHASE						
EQUIP – CM/C – ERECT						
EQUIP – ICRC – SPARE PARTS			30400.0			30400.0
TOTAL EQUIP			30400.0			30400.0
Site & Earthwork						
Concrete						
Structural Steel						
Piping						
Electrical						
Instrumentation						
Architectural, Painting, and Insulation						
SUBTOTAL - BULKS						
TOTAL DIRECTS			30400.0			30400.0
Distributables & Indirects						
TOTAL DIRECTS & INDIRECTS			30400.0			30400.0
A/C Engr – Phase I						
A/C Engr – Vendor Engr'g						
A/C Engr – Phase II						
CM/C – Phase I						
CM/C – Phase II						
TOTAL ENGINEERING + CM/C						
ICRC – Phase I						
ICRC – Phase II		149591.0				149591.0
SUBTOTAL		149591.0				149591.0
CATEGORY B ECP's						
CATEGORY C ECP's						
SUBTOTAL – OTHER		149591.0				149591.0
ESCALATION – Phase I						
ESCALATION – Phase II						
CONTINGENCY – Phase I						
CONTINGENCY – Phase II						
CONTINGENCY – POST MECH MODS						
SUBTOTAL – CONTINGENCY						
GRAND TOTAL		149591.0	30400.0			179991.0

FORM 9637 (3/82)

International Coal Refining Company

ORIGINAL
BASELINE ESTIMATE
PHASE I & PHASE II

AREA and CONTRACTOR ______________________ DATE ______________

WBS LEVEL 1.6 NUMBER ______________ REVISION NO ______________

WBS ELEMENT TITLE Operations PAGE ______ OF ______

ITEM			FINAL BASELINE					
			LABOR		MAT'L	Subtotal	Escalation	TOTAL
			MH	$	$			$
EQUIP	A/C PURCHASE							
	CM/C	PURCHASE						
		ERECT						
	ICRC	SPARE PARTS			31013.0	31013.0		31013.0
TOTAL EQUIP								
Site & Earthwork								
Concrete								
Structural Steel								
Piping								
Electrical								
Instrumentation								
Architectural, Painting, and Insulation								
SUBTOTAL - BULKS								
TOTAL DIRECTS					31013.0	31013.0		31013.0
Distributables & Indirects								
TOTAL DIRECTS & INDIRECTS					31013.0	31013.0	5837.0	36850.0
A/C Engr	Phase I							
	Vendor Engr'g							
	Phase II							
CM/C	Phase I							
	Phase II							
TOTAL ENGINEERING - CM/C								
ICRC	Phase I							
	Phase II			163423.0		163423.0	92554.0	255977.0
SUBTOTAL				163423.0		163423.0	92554.0	255977.0
CATEGORY B ECP's								
CATEGORY C ECP's								
SUBTOTAL – OTHER				163423.0		163423.0	92554.0	255977.0
ESCALATION	Phase I							
	Phase II							
CONTINGENCY	Phase I							
	Phase II							
	POST MECH MODS							
SUBTOTAL – CONTINGENCY								
GRAND TOTAL				163423.0	31013.0	194436.0	98391.0	292827.0

FORM 9637 (3/82)

DOE Form CR433P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level II and III WBS Summary*
Phase II

PAGE OF

1. Contract identification: Demonstration of the Solvent Refined Coal Process

2. Contract Number: DE-AC05-78OR03054

3. Contractor (name, address): International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date: 10 July 1978

5. Contract Completion Date:

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.6.1	Spare Parts									
	ICRC			18924	11161	737	179	12	-	31013
	Total 1.6.1			18924	11161	737	179	12	-	31013
1.6.2	Checkout & Commissioning									
	Revenues			-	-	-	-	(14600)	(16400)	(31000)
	Coal Costs			-	-	-	-	13453	9074	22527
	Other Costs			-	511	1799	5816	107214	35292	150632
	Total 1.6.2			-	511	1799	5816	106067	27966	142159
1.6.3	Capital Equipment									
	ICRC			-	-	1160	5063	1227	-	7450
	Total 1.6.3			-	-	1160	5063	1227	-	7450
1.6.4	Recruiting & Training									
	ICRC			-	853	2312	6267	4137	245	13814
	Total 1.6.4			-	853	2312	6267	4137	245	13814
1.6	Operations			18924	12525	6008	17325	111443	28211	194436
	Escalation			2697	3139	2223	7560	64639	18133	98391
	Total 1.6 - Escalated			21621	15664	8231	24885	176082	46344	292827

16. Remarks: No Category B ECPs in the 1.6 WBS Elements.
Refer to Appendix 5.0 for Discussion of Commissioning Revenues.
*All costs for 1.6 area are ICRC costs; therefore, no OBS summary is attached.

Dollars Expressed in Thousands - 1st Qtr. FY82 Dollars

17. Cost Plan Date: March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

DOE Form CR-532P
(1-78)

U. S. DEPARTMENT OF ENERGY
BASELINE

Level II and WBS Summary*

Phase II

PAGE OF

1. Contract Identification
Demonstration of the Solvent Refined Coal Process

2. Contract Number
DE-AC05-78OR03054

3. Contractor (name, address)
International Coal Refining Company
P. O. Box 2752
Allentown, PA 18001

4. Contract Start Date
10 July 1978

5. Contract Completion Date

6. Identification Number	7. Reporting Category (e.g., contract line item or work breakdown structure element)	8. Planned Prior Fiscal Years	9. Actual Prior Fiscal Years	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
1.6.1	Spare Parts									
	ICRC			21621	13943	1003	264	19	-	36850
	Total 1.6.1			21621	13943	1003	264	19	-	36850
1.6.2	Checkout & Commissioning									
	Revenues			-	-	-	-	(23300)	(28200)	(51500)
	Coal Costs			-	-	-	-	21614	15163	36777
	Other Costs			-	648	2465	7793	169292	58971	239169
	Total 1.6.2			-	648	2465	7793	167606	45934	224446
1.6.3	Capital Equipment									
	ICRC			-	-	1601	7520	1936	-	11057
	Total 1.6.3			-	-	1601	7520	1936	-	11057
1.6.4	Recruiting & Training									
	ICRC			-	1073	3162	9308	6521	410	20474
	Total 1.6.4			-	1073	3162	9308	6521	410	20474
1.6	Operations			21621	15664	8231	24885	176082	46344	292827

16. Remarks No Category B ECPs in the 1 6 WBS Elements.
Refer to Appendix 5.0 for D scussion of Commissioning Revenues.
*All costs for 1.6 area are ICRC costs; therefore, no OBS summary is attached.

Dollars Expressed in Thousands - Escalated Dollars

17. Cost Plan Date
March, 1982

18. Signature of Contractor's Project Manager and Date

19. Signature of Contractor's Authorized Financial Representative and Date

20. Signature of Government Technical Representative and Date

ICRC - REVISED BASELINE
CHECKOUT AND COMMISSIONING 1.6.2

$(000)

	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	TOTAL
I. FT 1982 1st Qtr. $						
Labor	$ 315	$1,041	$2,311	$ 11,162	$ 3,873	$ 18,702
Overhead	196	682	1,236	5,391	1,911	9,416
Chemicals				1,420	747	2,167
Catalysts				1,131	595	1,726
Lubricants				83	44	127
Power				10,200	4,708	14,908
Fuel				17,050	6,000	23,050
Coal				13,560	9,147	22,707
LIN				679	194	873
Maintenance		75	19	28,100	11,450	39,644
Startup Assistance			168	1,798	305	2,271
License Fees			1,733	4,543	-	6,276
Initial Charge - Chemicals & Catalysts			349	9,711	-	10,060
TOTAL	$ 511	$1,798	$5,816	$104,828	$38,974	$151,927

ICRC - BASELINE
CHECKOUT AND COMMISSIONING 1.6.2
$(000)

	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	TOTAL
I. FY82 1st Qtr. $						
Labor	315	1,041	2,311	11,162	3,873	18,702
Overhead	196	682	1,236	5,391	1,911	9,416
Chemicals				2,141	1,127	3,268
Catalysts				1,131	595	1,725
Lubricants				72	38	110
Power				9,395	4,336	13,731
Fuel				32,811	11,343	44,154
Coal				13,453	9,074	22,527
LIN				679	194	873
Maintenance		76	19	28,380	11,570	40,045
Startup Assistance			168	1,798	305	2,271
License Fees			1,733	4,543	-	6,276
Initial Charge-Chemicals & Catalysts			349	9,711	-	10,060
TOTAL	511	1,799	5,816	120,667	44,366	173,159
II. Escalated $						
Labor	399	1,427	3,420	17,879	6,472	29,597
Overhead	249	934	1,829	8,644	3,193	14,849
Chemicals				3,453	1,883	5,336
Catalysts				1,824	994	2,818
Lubricants				115	63	178
Power				15,119	7,245	22,364
Fuel				52,699	18,954	71,653
Coal				21,614	15,163	36,777
LIN				1,086	324	1,410
Maintenance		104	27	45,716	19,333	65,180
Startup Assistance			255	2,872	510	3,637
License Fees*			1,733	4,543	-	6,276
Intial Charge-Chemicals & Catalysts			529	15,342	-	15,871
TOTAL	648	2,465	7,793	190,906	74,134	275,946

NOTE: Escalation developed utilizing quarterly time-phased costs and factors.
* No escalation applied to License Fees.

REVISED

CHECKOUT AND COMMISSIONING

1. Labor - The labor rates applied to the manpower are consistent with Recruiting and Training and Phase III. The exempt rate of $34,320 is the average rate based on the positions and current APCI position salary ranges. The nonexempt rate of $20,592 was derived from a wage survey of the Owensboro, Kentucky, area conducted by ICRC's Personnel Department.

2. Overhead and Fringes - Fringes are calculated at 35% of direct labor. Overhead includes costs for Occupational Health programs and monitoring.

3. Chemicals, Catalysts, Lubricants, Power, Fuel, LIN, and Maintenance - These costs are self-explanatory. During Commissioning, indices applied to "Standard Operating Year" costs, as set forth in Appendix 5.0, P. 5-24, are used. The standards and indices are as follows:

	($000) Standard	% FY 87:1	% FY 87:2	% FY 87:3	% FY 87:4	% FY 88:1
Chemicals	$ 5,987	10	15	20	50	50
Catalysts	4,643	10	15	20	50	50
Lubricants	349	10	15	20	50	50
Power	30,314	15	25	30	60	60
Fuel[1]	2,160	100	1,000	1,000	1,000	1,000
LIN	774	50	100	100	100	100
Maintenance[2]	49,180	20	45	85	100	100

[1] The $2,160 fuel cost is expressed as a 1982 price in 1982 dollars. The prices used in Commissioning reflect real price increases and are consistent with prices used in generating revenues.

[2] The $49,180 standard maintenance includes ICRC labor, contract labor, and maintenance materials. The maintenance costs have been reduced by the ICRC labor (exempt and nonexempt) which is included with total labor costs.

4. Coal - The coal costs are based on actual tonnage received for each given period as specified in the Appendix 5.0. The prices used are $1.61 per million Btu through FY 1987 and $1.62 thereafter. The increase reflects the procurement of coal via seconadry suppliers.

5. Start-Up Assistance - These are the costs for Area Contractor, Process Vendor, and Mechanical Vendor support in getting each plant area started up.

6. License Fees - The basis is the licensing schedule of payments.

7. Initial Charge - The inital charge of Chemicals and Catalysts are budgeted in the quarter preceding the actual commissioning of that particular area.

ORIGINAL

CHECKOUT & COMMISSIONING

1. Labor - The labor rates applied to the manpower are consistent with Recruiting & Training and Phase III. The exempt rate of $34,320 is the average rate based on the positions and current APCI position salary ranges. The non-exempt rate of $20,592 was derived from a wage survey of the Owensboro, Kentucky, area conducted by ICRC's Personnel Department.

2. Overhead & Fringes - Fringes are calculated at 35% of direct labor. Overhead includes costs for Occupational Health programs and monitoring.

3. Chemicals, Catalysts, Lubricants, Power, Fuel, LIN, and Maintenance - These costs are self-explanatory. During Commissioning, indices applied to "Standard Operating Year" costs, as set forth in Appendix 2.0, are used. The standards and indices are as follows:

	($000) Standard	% FY87:1	% FY87:2	% FY87:3	% FY87:4	% FY88:1
Chemicals	$ 9,018	10	15	20	50	50
Catalysts	4,760	10	15	20	50	50
Lubricants	303	10	15	20	50	50
Power	28,909	15	25	30	60	60
Fuel 1)	3,046	100	1000	1000	1000	1000
LIN	774	50	100	100	100	100
Maintenance 2)	50,000	20	45	85	100	100

1) The $3,046 fuel cost is expressed as a 1982 price in 1982 dollars. The prices used in Commissioning reflect real price increases and are consistent with prices used in generating revenues.

2) The $50,000 standard maintenance includes ICRC labor, contract labor, and maintenance materials. The maintenance costs have been reduced by the ICRC labor (exempt and non-exempt) which is included with total labor costs.

4. Coal - The coal costs are based on actual tonnage received for each given period as specified in the Appendix "Coal." The prices used are $1.61 per million BTU through FY 1987 and $1.62 thereafter. The increase reflects the procurement of coal via secondary suppliers.

5. Start-up Assistance - These are the costs for Area Contractor, Process Vendor and Mechanical Vendor support in getting each plant area started up.

6. License Fees - The basis is the licensing schedule of payments.

7. Initial Charge - The initial charge of Chemicals and Catalysts are budgeted in the quarter preceding the actual commissioning of that particular area.

ICRC

BASELINE

RECRUITING AND TRAINING - WBS 1.6.4

$(000)

	FY84	FY85	FY86	FY87	FY88	Total
Man - Months:						
Exempt	30	136	405	156	9	736
Non-Exempt	-	18	1,280	1,224	75	2,597
Total	30	154	1,685	1,380	84	3,333
FY82 1st Quarter Dollars						
Labor	$ 86	$ 418	$3,354	$2,547	$155	$ 6,560
Overhead	30	269	1,426	1,057	66	2,848
Training Consultant	68	68	64	-	-	200
Relocation	120	724	740	232	24	1,840
Travel	19	115	187	59	-	380
Advertising	-	60	120	60	-	240
Employment & Agency Fees	30	158	376	182	-	746
Training Simulator	500	500	-	-	-	1,000
Total	$ 853	$2,312	$6,267	$4,137	$245	$13,814
Escalated Dollars						
Labor	$ 109	$ 576	$5,002	$4,013	$259	$ 9,959
Overhead	38	370	2,123	1,667	111	4,309
Training Consultant	85	92	94	-	-	271
Relocation	151	1,010	1,095	366	40	2,662
Travel	24	156	275	93	-	548
Advertising	-	83	178	94	-	355
Employment & Agency Fees	37	216	541	288	-	1,082
Training Simulator	629	659	-	-	-	1,288
Total	$1,073	$3,162	$9,308	$6,521	$410	$20,474

NOTE: Escalation was calculated using time-phased costs by quarters.

RECRUITING AND TRAINING - WBS 1.6.4

PHASE II

1. Labor: Personnel are costed using the standard SRC-I plant rates of $34,320 per year and $20,592 per year for exempt and non-exempt personnel, respectively. The exempt labor rates utilized are from comparable salary ranges using APCI rate ranges. The non-exempt labor rates are from a survey of the Owensboro area.

2. Overhead: Fringes of 35% of labor plus miscellaneous supplies make up these costs.

3. Training Consultant: This is the cost of outside parties hired to assist in training the plant personnel. The basis is $5,600 per month for 36 months. The ICRC baseline assumes that the majority of training aids and facilities will be supplied by the State of Kentucky and local vocational training programs.

4. Relocation: This is the cost of relocating transferred employees and new hires who will staff the SRC-I plant. For baseline purposes, the major elements of the relocation costs were estimated as:

Transportation of Household Goods	$ 4,000
Travel Costs Enroute to New Location	500
Sale of Former Residence ($70,000 x 7%)	4,900
Closing Costs on New Residence ($70,000 x 2%)	1,400
Temporary Living ($1,000 per month for 2 months)	2,000
Mortgage Interest Differential ($60,000 x 4% rate differential x 3 years)	7,200
	$20,000

It is assumed that 70 exempt personnel will require full relocation. Additionally, 110 non-exempts will be given partial relocation of $4,000 per employee move. The costs are budgeted in the quarter following the move.

5. Travel: This is the cost of travel and living for interviewees and new hires while commuting to the plant site. The assumptions are as follows:

52 exempt positions to be recruited at 3 candidates per position and $500 per trip	$ 78,000
Non-exempt interview travel (estimated)	30,000
70 relocated exempts at 4 trips at $500 per trip	140,000
110 relocated non-exempts at 4 trips at $300 per trip	132,000
	$380,000

6. Advertising: This is the cost of advertising in local area and limited national newspapers and trade journals. These costs are estimated at $10,000 per month for 24 months.

7. Employment and Agency Fees: This is the cost of hiring and recruiting all new ICRC employees who will staff the SRC-I plant. The agency fees were estimated at 20% of the average exempt salary and 15% of the average non-exempt as follows:

Exempt	$7,000
Non-Exempt	$3,000

The baseline assumes that 80% of exempt new hires and 35% of non-exempt new hires are recruited through agencies. The remaining personnel are hired as a result of advertising responses.

8. Training Simulator: This is the cost of the dynamic simulator which will be used in training plant operators.

C. MILESTONE SCHEDULE

Check-Out and Commissioning

The Original Project Master Schedule showed significant milestones, based on early start/complete dates, for Check-Out and Commissioning, WBS element 1.6.2 The scheduled, predicted and actual occurrence dates were shown graphically on a bar chart format which was supported by a computerized tabulation of the same data. This information had been extracted electronically from the Intermediate Schedule developed by ICRC.

The schedules indicated that commissioning/startup would commence in August 1984 and would be completed in December 1987, the end of Phase II.

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U.S. DEPARTMENT OF ENERGY

MILESTONE SCHEDULE AND STATUS REPORT

1. Contract Identification	2. Reporting Period	3. Contract Number
OPERATIONS - MASTER SCHEDULE	through	
4. Contractor (name, address)		5. Contract Start Date
		6. Contract Completion Date

7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months: 1984 JASOND; 1985 JFMAMJJASOND; 1986 JFMAMJJASOND; 1987 JFMAMJJASOND; 1988 JFMAMJJASOND; 1989 JFMAMJJASOND; 1990 JFMAMJJASOND	10. Percent Complete a) Planned	b) Actual
900	CHECKOUT & COMMISSIONING	A1 C B A		

11. Remarks

Milestone dates are based on Early Start and Complete. For available float see Log Sheets.

12. Signature of Contractor's Project Manager and Date	13. Signature of Government Technical Representative and Date

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CONTRACT 00100 RUN 26MAR82 00-1-4821 ICRC MASTER SCHEDULE - REV #01-U UNIT=DAY

REPORTING ELEMENT: OPERATIONS WBS ELEMENT #: 1.6.2

ID #	MILE STONE	EARLY PLANNED	ACTUAL DATE	CURRENT PLANNED	LATE PLANNED	COMMENTS
900A	DEMO PLANT BUYOUT DECISION	23JUN89		23JUN89	23JUN89	
900A1	BGN START-UP	15AUG84		15AUG84	04JUN86	
900B	COMPL START-UP	11DEC87		11DEC87	11DEC87	
900C	UPDATE COMMERCIAL PLANT ECON ANALYSIS	3JUN87		3JUN87	23DEC87	

4 RECORDS, TOTAL ACTIVITY WEIGHT = 0

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