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MASTER

Waste Management, Inc.
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DISCLAIMER

UNITED STATES
DEPARTMENT OF ENERGY

CONTRACT NO. EY-76-C-02-2770

A.S.E.F. SOLID WASTE TO METHANE GAS

POMPANO BEACH, FLORIDA

"RefCOM - Status Report"

Covering the Start-Up Phase

March 15 - October 15, 1978

PRIME CONTRACTOR:
WASTE MANAGEMENT, INC.
OAK BROOK, ILLINOIS 60521

October 18, 1978

RefCOM FACILITY, POMPANO BEACH, FLORIDA - START-UP

Summary

The RefCOM Start-Up Program began on the 15th of March, with inspections of all installed equipment as regards to proper installation, alignment, grouting, painting and so forth. This complete check-out involved two weeks of inspections.

The initial inspection of all equipment indicated the need to make some minor modifications to the Conveyors. Some of the transition points had obvious restrictions. These restrictions were relieved.

The first electrical system check-out for the Dry-End was started on March 31. After the initial electrical system check-out, all equipment was run for a few hours each day for several days to check electrical current draw on each motor, belt tracking and vibration. This initial electrical check-out required about 10 working days to complete.

On April 10, the first unforeseen delay was encountered. This was due to the Reduction Center Expansion Project running behind schedule. Landfill Discharge Conveyors #14 and #13 were not operational. A temporary power supply was installed for these conveyors, but the initial start-up of the RefCOM Project was, nevertheless, delayed by two weeks. Because of this delay, a full compliment of personnel was not required to be on hand at the facility at that time.

In the first week of April, we also started the check-out of the electronic controls for the entire facility. We found some defective printed circuit boards, level indicators and a defective D.C. Controller. Most of these components were shipped back to the factory to be repaired. Returned components were then reinstalled and initial calibrations were made. In the month of April we had factory representatives from Rexnord to calibrate the Infeed Conveyor, from Reliance to calibrate the D.C. Controller, from Lightning Co. to help with the initial start-up of the agitators, and from Clayton Manufacturing Co. to help with the initial start-up of the agitators, and from Clayton Manufacturing Co. to help with the initial start-up of the Steam Generator. All of these factory representatives had to make some kind of adjustment or repairs to their related equipment. Some required a second visit to complete their repairs.

During this delay, we also moved into the laboratory and started our initial equipment set up. At this time, it was recognized that the electrical service would not be sufficient to power all ovens and related gear. It was also recognized that the temperature range for the Digester Thermocouples were wrong. Range Change Kits were ordered to correct this problem.

In the interest of time, orientation and training classes were held during the construction delay with all personnel involved with the RefCOM Project. These classes were held twice daily for an hour each class, for 10 days. All the operational and mechanical aspects of the plant as well as the bacterial mechanisms pertaining to the process were covered.

In the middle of April we experienced our first problems with the Screw Conveyors. The manufacturer sent a representative to the site and suggested a few modifications to stop the water leaks which the crew performed. This particular modification did not resolve the problem. We again contacted the manufacturer who agreed to redesign the drive unit to make them water and gas tight. This turned out to be a serious start-up delay as the drive units did not arrive on site until the 6th of June. It was decided at this time that no attempt would be made to produce gas until all leaks were taken care of, in order to minimize the risk of explosion.

At this point in the start-up program, a considerable number of man hours were devoted to the RefCOM dedication and N.S.W.M.A. tour.

On May 4, the first run of the entire dry-end, excluding the air classification system, was attempted. Even at a low rate of approximately two tons per hour, two jams developed; one with the infeed conveyor, the other with the vibratory feeder. Subsequent runs at this low rate proved that the shear blade in the infeed conveyor had to be reversed and vibratory feeder removed. During these runs, it was obvious that a dust control system would have to be provided. This would include at least: covers for all conveyors with skirts, and a cover for the trommel screen.

During the next run of the dry-end system, a large metal object was inadvertently fed to the secondary shredder and did considerable damage to the hammer and grates. This pointed out a need for a reject chute.

The next operational run of the dry-end included the start-up of the classification system. A temporary by-pass chute was built to keep the material out of the Pre-Mix Tank until the preliminary adjustments were made and the product needed for the project was obtained. This initial run with the classification system was approximately one hour in duration; the results of which were most satisfactory.

The Reduction Center crew fabricated a complete set of conveyor covers, a cover for the top of the trommel and different skirts around the Shredder Discharge Conveyor. This was the initial attempt to contain the dust.

During the first run of the digester agitator, it became obvious that the Thermocouples and Thermowells were experiencing excessive vibration due to the turbulence inside the digester. It was decided to remove all the Thermocouples and shorten them to alleviate this problem. We also moved both of the level indicators in the digesting tanks to the Weir box. This significantly reduces the exposure to the turbulence.

The new screw conveyors drive assemblies were received on site. These assemblies were successful in eliminating the gas leaks. The tanks were then pressurized and numerous leaks were detected, most notably at the hatch covers and the agitator shaft packing gland. It was not until July 8 and after four modifications that the leak around the hatch cover was eliminated. The leak associated with the packing gland was brought to the attention of Lighting Manufacturing Company. They responded by sending a factory representative to the site. Following their investigation and numerous telephone conversations, it was mutually agreed that a vapor seal would be needed in this application. The time frame for installation of these vapor seals supplied by Lighting warranted us to proceed to design and install our own variation. This task was not completed until July 15.

While the above modifications were being completed, considerable work was done to the secondary shredder which included redesigned grates, modified hammers and a temporary reject chute.

Once the dry-end was performing in a reliable manner, and the air classifier was fine tuned, the temporary diverter chute was removed and the material allowed to enter the pre-mix tank. This presented us with two additional problems; inadequate mixing in the pre-mix tank, and continual clogging of the screw conveyors. Several modifications were performed on the pre-mix tank agitator at the suggestion of the factory representative. These modifications produced an improvement in mixing characteristics.

The screw conveyor manufacturer was unable to suggest any effective solution to the jamming problem, so for the next two weeks, the RefCOM crew tried numerous variations with the screw conveyor feed systems in an attempt to achieve some reliability. These included:

1. The installation of paddles in the screw conveyor auger.

2. Varying the operating speed

3. Varying the operating angle in a step-wise fashion, ranging from the original positive slope and ending with a negative slope.

All of the above attempted modifications proved futile. It was only after the auger was removed from the screw conveyor housing that material was able to flow into the digesters. Based on the above, it was clear that this type of equipment is not applicable to our operation. The decision was then made to eliminate the screw conveyors from the system and replace it with a rotary feeder. This new feed system was installed by the 7th of September and has performed satisfactorily since then.

In an effort to reduce operating down time, a screw from the Reduction Center performed modifications to the secondary shredder while the screw conveyors were being modified. This included a redesigned reject chute and diverter valve, as well as enclosing the infeed conveyor head pulley to eliminate fires. Although all of the above modifications produced some improvement, it should be noted that this particular shredder model is not designed for the solid waste field.

In the future, a significant improvement should be recognized in the operation of the facility when the infeed material is supplied by S.W.R.C.'s small mill. This change in operating procedure came about a result of:

1. The characteristics of the 1000 H.P. shredder and product occasionally containing large metallic objects, belted tires and large sections of carpet. These items are not acceptable to the RefCOM solids handling equipment.

2. The inability of the RefCOM infeed conveyor to handle the new mill's throughput.

ITEMIZED, CHRONOLOGICAL LIST OF
PLANT MODIFICATIONS INCLUDING COST OF LABOR AND MATERIALS

Infeed Pan Conveyor

March 28 - Adjusted Speed to meet design specification. This required the changing of new drive sprockets and shortening of the drive chain.

Labor $169.92
Material None
Total $169.92

May 15-16 - Reversed refuse shear blade. Original configuration caused material to back up, resulting in a jam. (See figure #1)

Labor $424.80
Materials $41.60
Total $466.40

May 17 - Replace new D.C. signal-generator to Pan Conveyor automatic drive unit. (Work performed by operating personnel).

Oscillating Pan Conveyor

March 18 - Removed hinged plate on Discharge Chute that was a probable jam area. (Work performed by operating personnel).

Trommel Screen

May 23-29 - Install cover to trommel screen for dust control. (Supporting work performed by operating personnel). (See figure #2)

Labor $116.25
Materials $205.00
Total $321.25

Vibratory Feeder

May 16-17 - Remove feeder and replace with transfer Chute. (See figure #2). (Supporting work performed by operating personnel).

Labor $424.80
Materials $205.16
Total $629.96

Secondary Shredder

June 21-23 - Fabricated new shredder grates. These were made of 1/2 inch plate and had rectangular openings. (Work performed by operating personnel).

Materials $1,244.00

August 10-14 - Fabricated and installed secondary shredder reject chute. (See figure #3).

Total Labor $1,911.60

Secondary Shredder (Continued)

August 23-25 - Fabricated and installed revised, secondary shredder reject Chute #2 (See figure #4).

Total Labor $991.20

August 29-30 - Modified shredder infeed conveyor head pulley. This was an attempt to eliminate the pulley shaft exposure to material and thus discouraging fires, resulting from friction and material build-up.

Total Labor $283.20

September 26-30 - Installed a dust control system from the secondary shredder infeed chute to the west side of the baghouse filter. (See figure #5).

Labor and Material $8,053.00

Air Classifier Package

March 27-28 - Installed stabilizing spring and provide necessary labor to balance both inlet and exhaust fans. Supporting work performed by operating personnel.

Labor and Material $169.92

March 29 - Install a slide base on air compressor drive motor, to provide for belt adjustment.

Labor and Material $84.96

April 18 - Modified Air Classifier fluidizing chamber as per factory representative. (See figure #5).

Labor and Material $127.44

May 22 - Air Classifier inlet duct developed a crack during operating and was welded shut. Work performed by operating personnel.

July 6-7 - Installed a 4 inch PVC duct from MB706 and MB707 transition chute to the classifier exhaust duct. This was our first attempt at a dust collection system. (See figure #7). Work performed by operating personnel.

Materials $141.00

Allis Chalmers Conveyors

April 5-15 - Fabricated, installed and painted new conveyor covers for those conveyors located in the classification building. These conveyors we also equipped with rubber skirts during this period. (See figure #8). Supporting work performed by operating personnel.

Labor $3,766.56
Materials $589.80
Total $4,356.36

May 9-22 - Installed access doors on all conveyor transition points. Work performed by operating personnel.

Allis Chalmers Conveyors (Continued)

June 26 - Fabricated and installed caps for the classification building conveyor covers. Work performed by operating personnel. (See figure #8).

Materials $166.29

Pre-Mix Tank

July 5 - Removed lower half of baffles in tank to increase the agitation which had been inadequate. Work performed by operating personnel.

July 8 - Added a canvas tarpaulin around the exposed upper region of the Pre-Mix Tank to contain debris. Work performed by operating personnel.

July 27 - Modified agitator impellor blade with the addition to two extenders. Work performed by operating personnel. (See figure #9).

August 25 - Changed the agitator drive unit over from a variable speed, to a fixed speed unit, using two 3-belt sheaves.

Labor $1,132.80
Materials $205.40
Total $1,338.20

August 31 - Installed diverter plates at the steam sparger, level indicator and baffles to eliminate the build-up of material around these areas. Work performed by operating personnel.

September 15 - Remove impellor blade extensions which were causing too much power draw on the agitator motor. Work performed by operating personnel.

Digester Feed System

April 20 - Attempted to eliminate leaks in screw conveyors per recommendations of the factory representative. This included packing the head end with cotton and oil and the drilling of additional bolt holes to both the head and tail end plates. Work performed by operating personnel.

June 6-9 - Installed new screw conveyor drive assembly. This included the following equipment:

2-9" x 2" Shelf type through ends complete with 3 ring adjustable pump type seal glands.
2-Dodge type E roller bearing pillow blocks.
2-Special drive shafts.
2-Falk 1115320 shaft mounts.

Work performed by operating personnel.

June 28 - Installed slide gate at screw conveyor discharge chute. (See figure #10). Work performed by operating personnel.

Materials $205.40

June 28 - Repaired leak around screw conveyor discharge chute using FRP lay-up technique. Work performed by operating personnel.

Digester Feed System (Continued)

July 25 - Installed a hose bib at screw conveyor tail end plate. This was used to flush out frequent jams. Work performed by operating personnel.

August 10-11 - Modified screw conveyor auger with the addition of paddles and also enlarged the infeed chute. (See figure #11).

Labor $849.60

August 16-17 - Reversed the angle of the screw conveyor from a positive slope to a negative slope, in a step wise fashion, with the screw conveyor infeed chute eventually being bolted directly to the Pre-Mix Tank. (See figure #11).

Experimented with a trash pump eventually being clogged after a short period of operation. Supporting work performed by operating personnel.

August 18 - Removed paddles from auger.
Labor $424.80

August 22 - Removed auger from conveyor housing and gravity fed the digesters. Supporting work performed by operating personnel.

Labor $212.40

August 30-September 7 - Install new digester feed system which is presently in operation. (See figure #12). Work performed by operating personnel.

Materials $2,288.00

Digesters

May 27 - Due to excessive turbulance created by the Digester agitator, the level indicators were relocated to the overflow Weir box. Work performed by operating personnel.

May 29-June 2 - All thermocouples and thermowells were removed, shortened, and reinstalled and temperature indicators removed also as a result of excessive turbulance. Work performed by operating personnel.

June 15-16 - Install first modification of hold down brackets for fiberglass hatch cover. Work performed by operating personnel. (See figure #13).

Material $52.82

June 24 - Install second modification of hold down brackets for fiberglass hatch cover. Work performed by operating personnel. (See figure #14).

June 18-13 - Discarded fiberglass hatch in favor of a half inch steel plate utilizing a third modification of hold down brackets. This modification was successful. Work performed by operating personnel. (See figure #15).

Materials $123.94

Digesters (Continued)

June 29-July 3 - First noticed leak at impellor shaft flanges. The leaks were eliminated, but only after trying three different types of gasket material and fiberglassing all bolt studs, nuts, and washers. Work performed by operating personnel.

July 12 - Made decision to design, build and install our own variation of the vapor seal on agitator drive shaft. This eliminates the need for a packing gland whose expected life was considered very short. (See figure #15). Work performed by operating personnel.

Materials $631.80

July 14-15 - Installed vapor seal to Digester #2.

Labor $495.60 Total $1,127.40

August 1-2 - Installed vapor seal to Digester #1.

Same as above price.

July 11 - Installed a 1½" PVC drain line for the digester heat exchanger water. This eliminates the need for P106 to be operational 24 hours per day. (See figure #17). Work performed by operating personnel.

Laboratory

April 4 - First suspected that electrical service to laboratory was insufficient.

April 7 - Ordered range change kits for digester thermocouple automatic printer.

June 20-28 - The new laboratory addition was completed. This consisted of enclosing the existing canopy, providing space for additional required analytical equipment, and spare parts storage.

Material and Labor $1,605.00

July 10 - Installed an acid drain field for the Kjeldahl digestion-distillation unit. Work performed by operating personnel.

Materials $57.00

July 14-August 10 - Installed new electrical service to laboratory, providing additional capacity needed by analytical equipment.

Material and Labor $2,500.00

Pumps

March 28-29 - The recycle wastewater pump (P-104) was inadvertently run in reverse rotation resulting in a cracked impellor housing. This housing was brazed, reinstalled and the pump realigned.

Labor $84.96

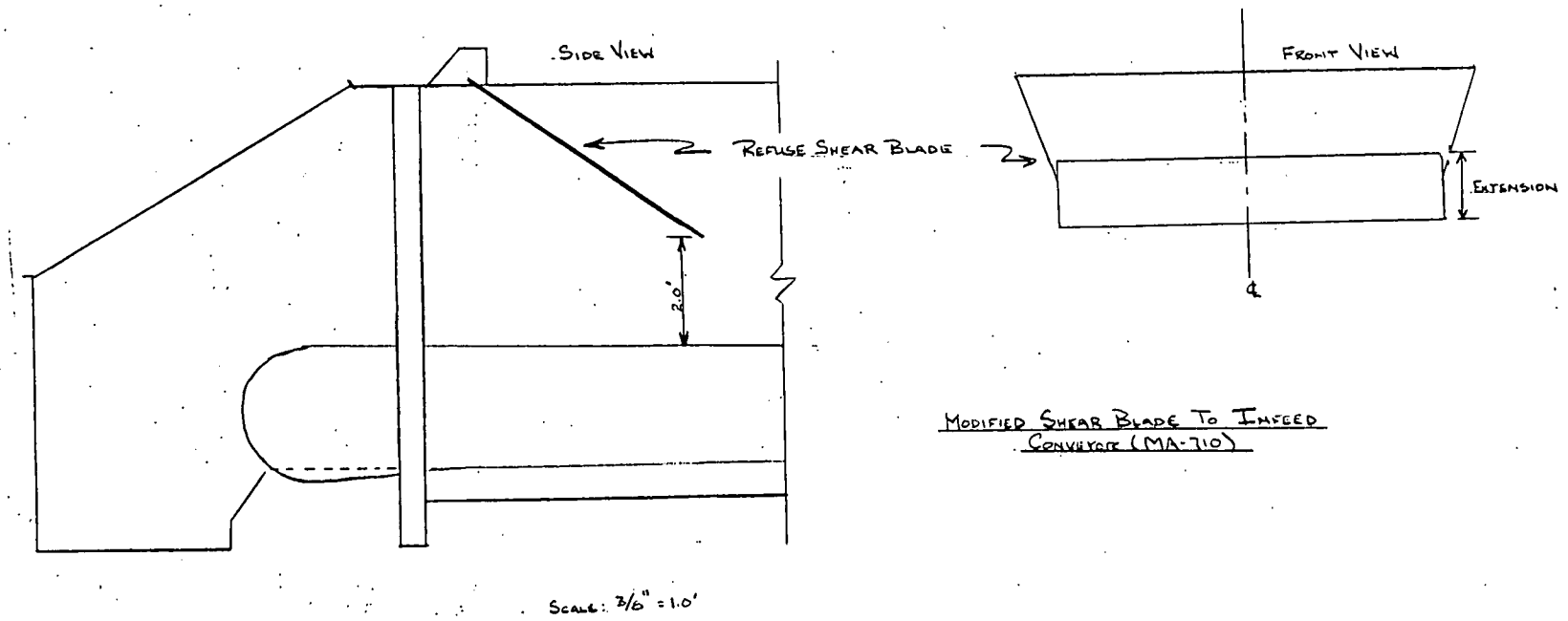
Pumps (Contined)

April 10 - The Flow Indicator Control (FIC-6), associated with P-104, was found to be inoperable. This piece of equipment has yet to function as intended.

April 10 - The low flow switch, associated with the vacuum filter feed pump (P-106) shuts down the pump prematurely and eventually was jumped out of the electrical circuit. Work performed by operating personnel.

June 9 - The control circuitry associated with the sludge unloading pump (P-103), installed incorrectly during construction, was rewired in accordance with the drawings. Work performed by operating personnel.

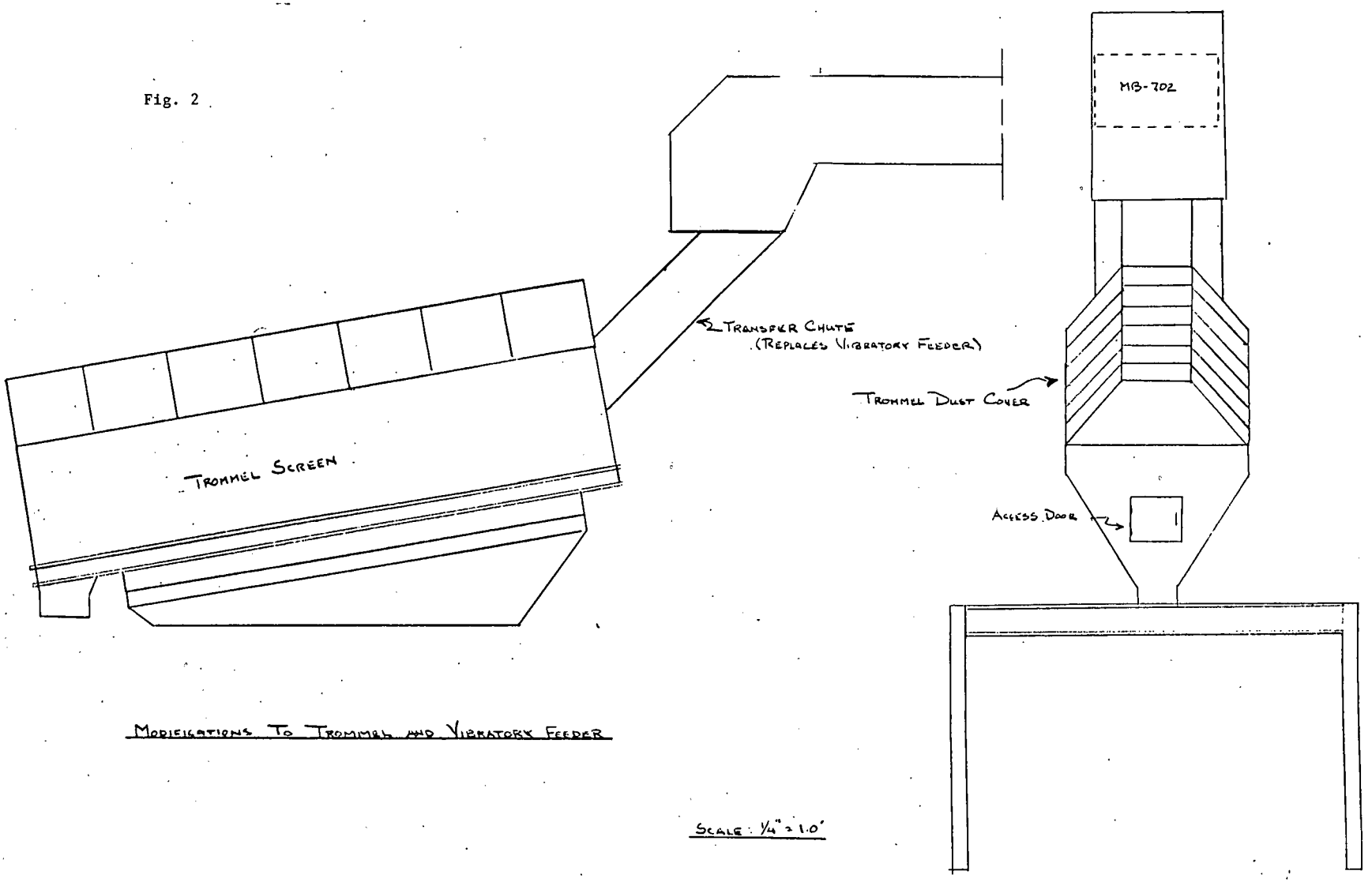
Fig. 1



Modified Shear Blade To Infeed Conveyor (MA-710)

Scale: 3/8" = 1.0'

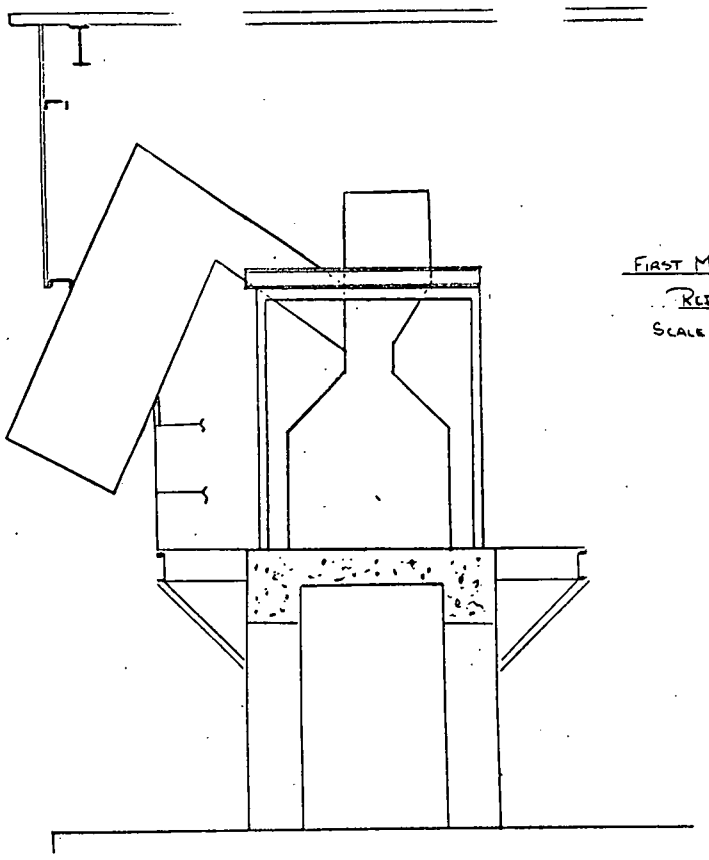
Fig. 2



MODIFICATIONS TO TROMMEL AND VIBRATORY FEEDER

SCALE: 1/4" = 1.0'

Fig. 3

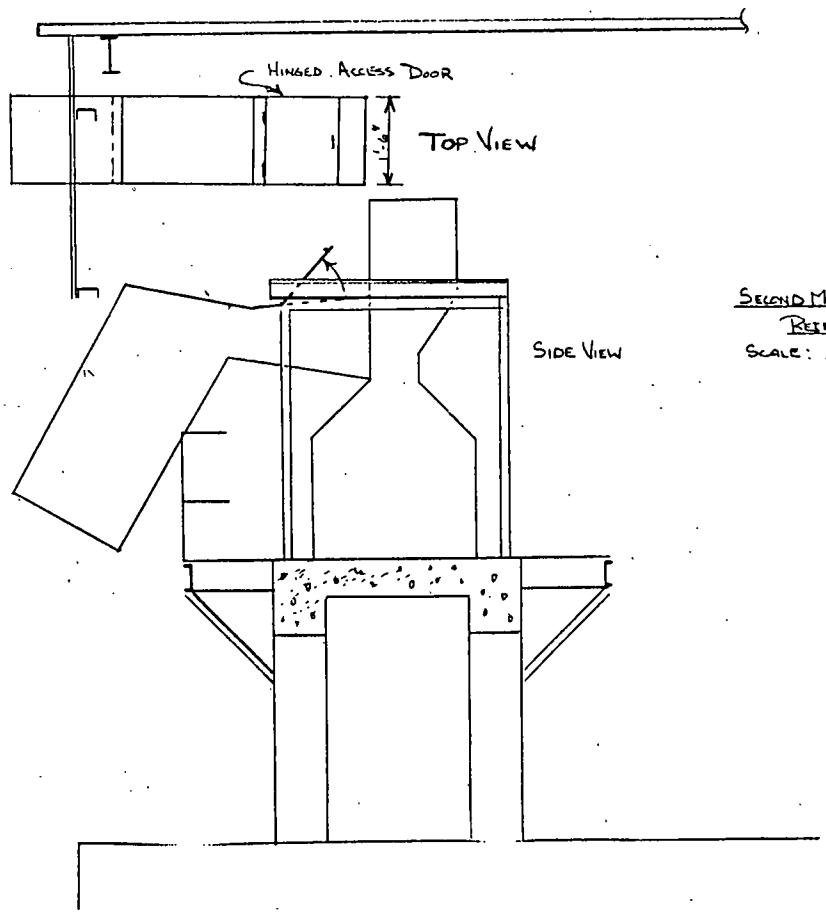


FIRST MODIFICATION 2° SHREDDER

REJECT CHUTE

SCALE 1/4" = 1.0'

Fig. 4



SECOND MODIFICATION 2° SHREDDER
REJECT CHUTE
SCALE: 1/4" = 1.0'

Fig. 5

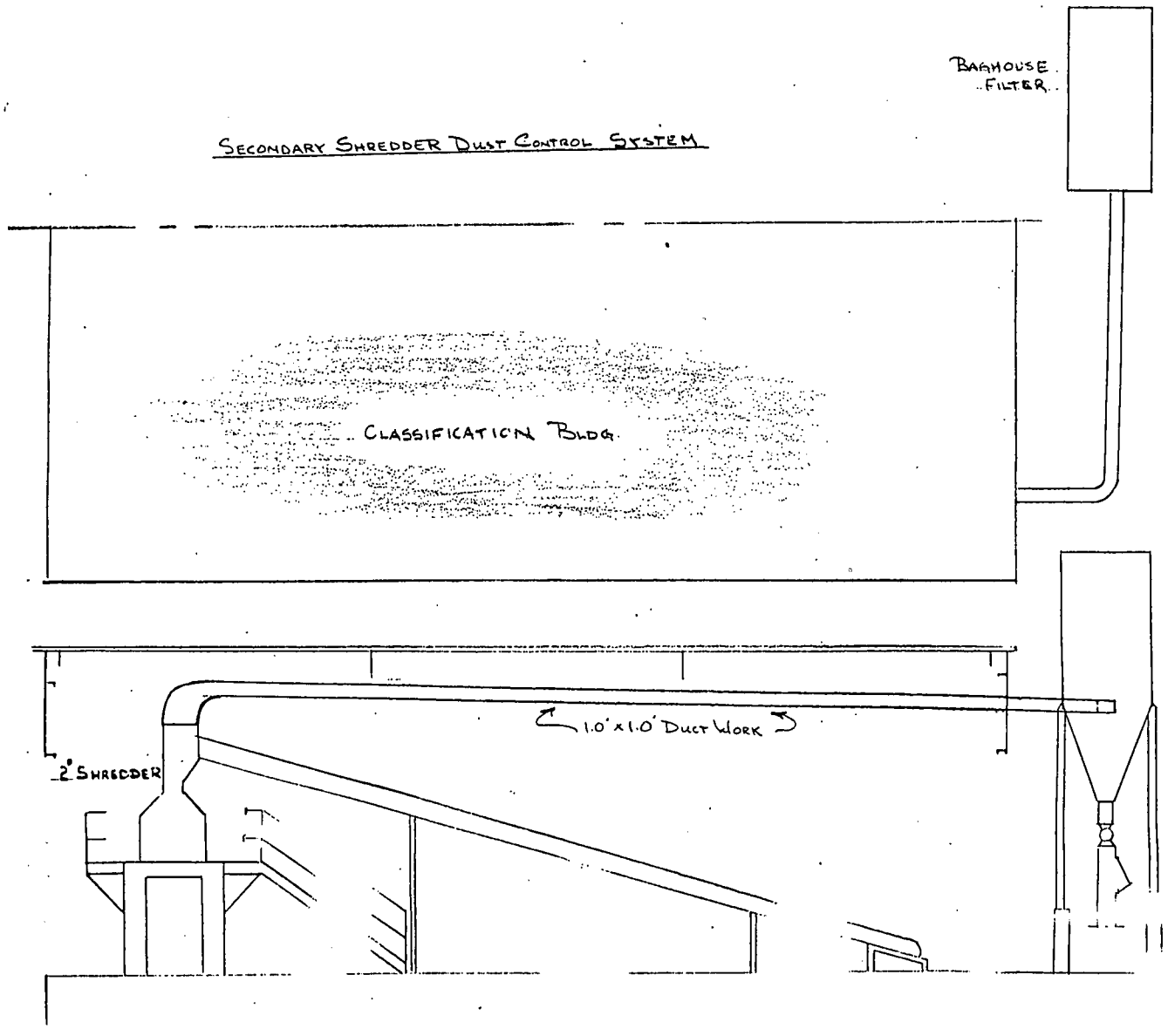
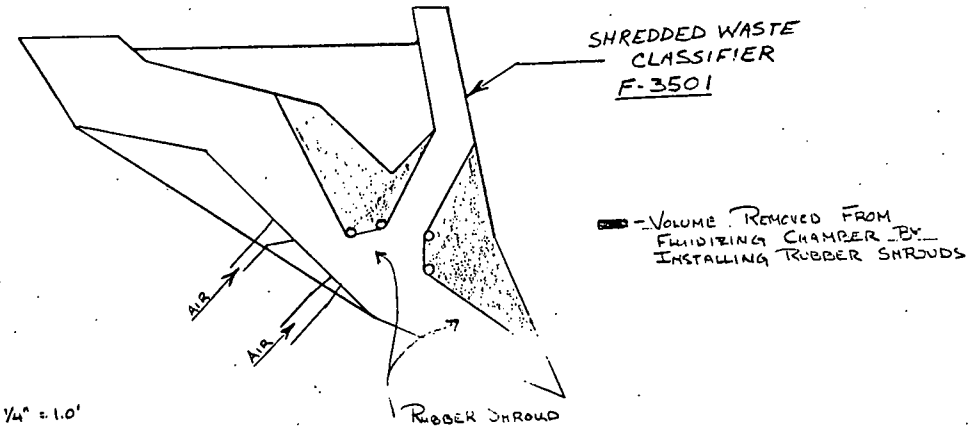
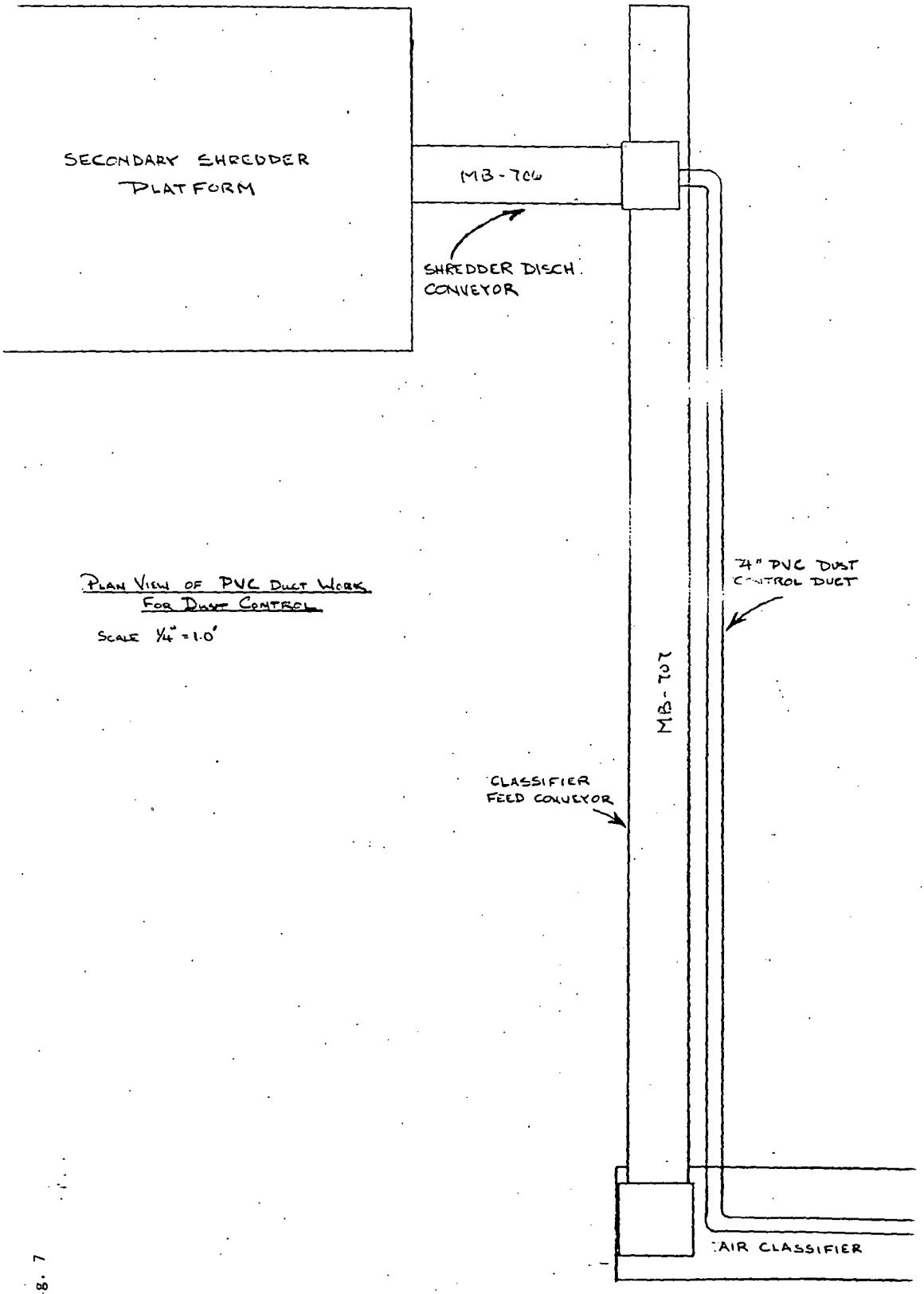

BAGHOUSE FILTER
SECONDARY SHREDDER DUST CONTROL SYSTEM
CLASSIFICATION BLDG.
1.0' x 1.0' DUCT WORK
2' SHREDDER

Fig. 6

AIR CLASSIFIER MODIFICATION
AS PER FACTORY REPRESENTATIVE



SCALE 1/4" = 1.0'

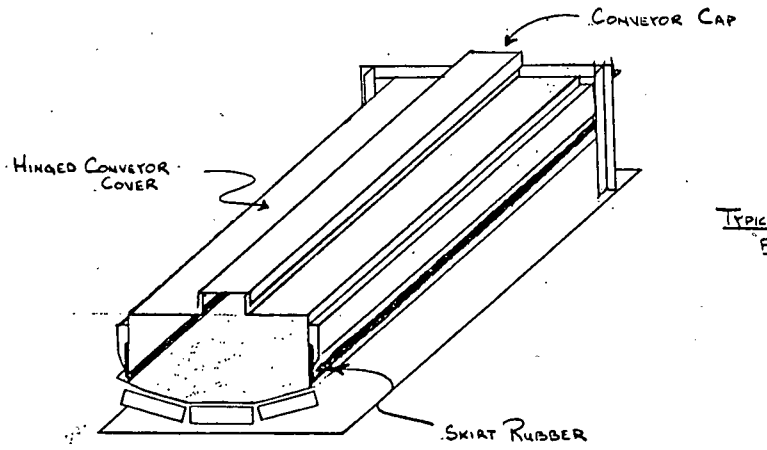


PLAN VIEW OF PVC DUCT WORK FOR DUST CONTROL

SCALE 1/4" = 1.0'

Fig. 7

Fig. 8



Typical Modified Convetor For Dust Control

Scal

PRE-MIX TANK IMPELLER BLADE MODIFICATION

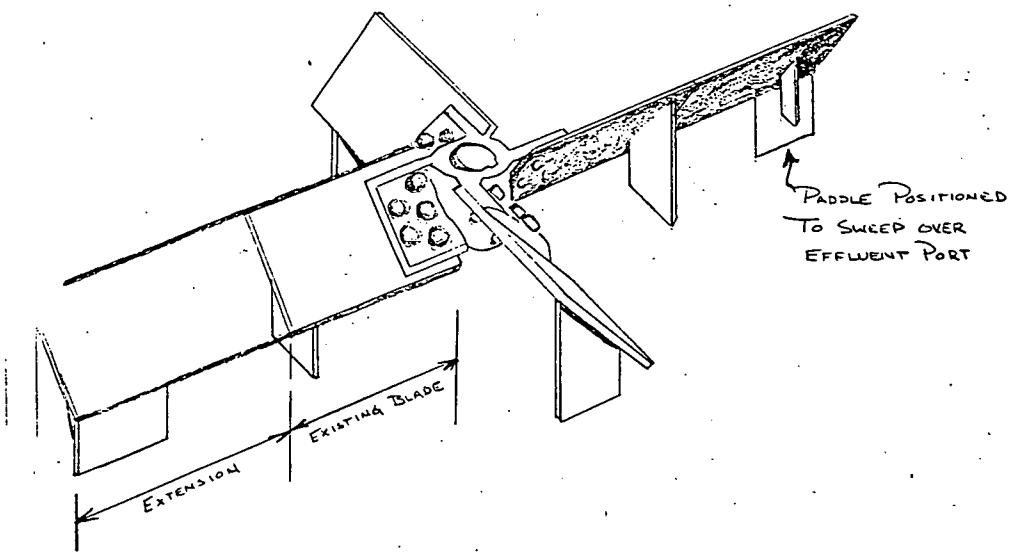
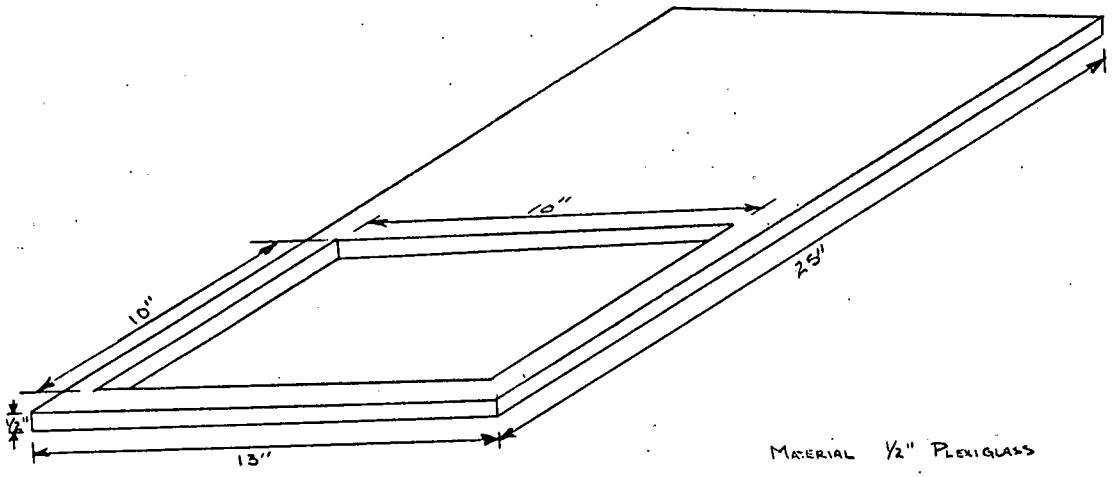


Fig. 9

Fig. 10

Screw Conveyor Discharge Chute Slide Gate



Material ½" Plexiglass

Scale: None

Fig. 11

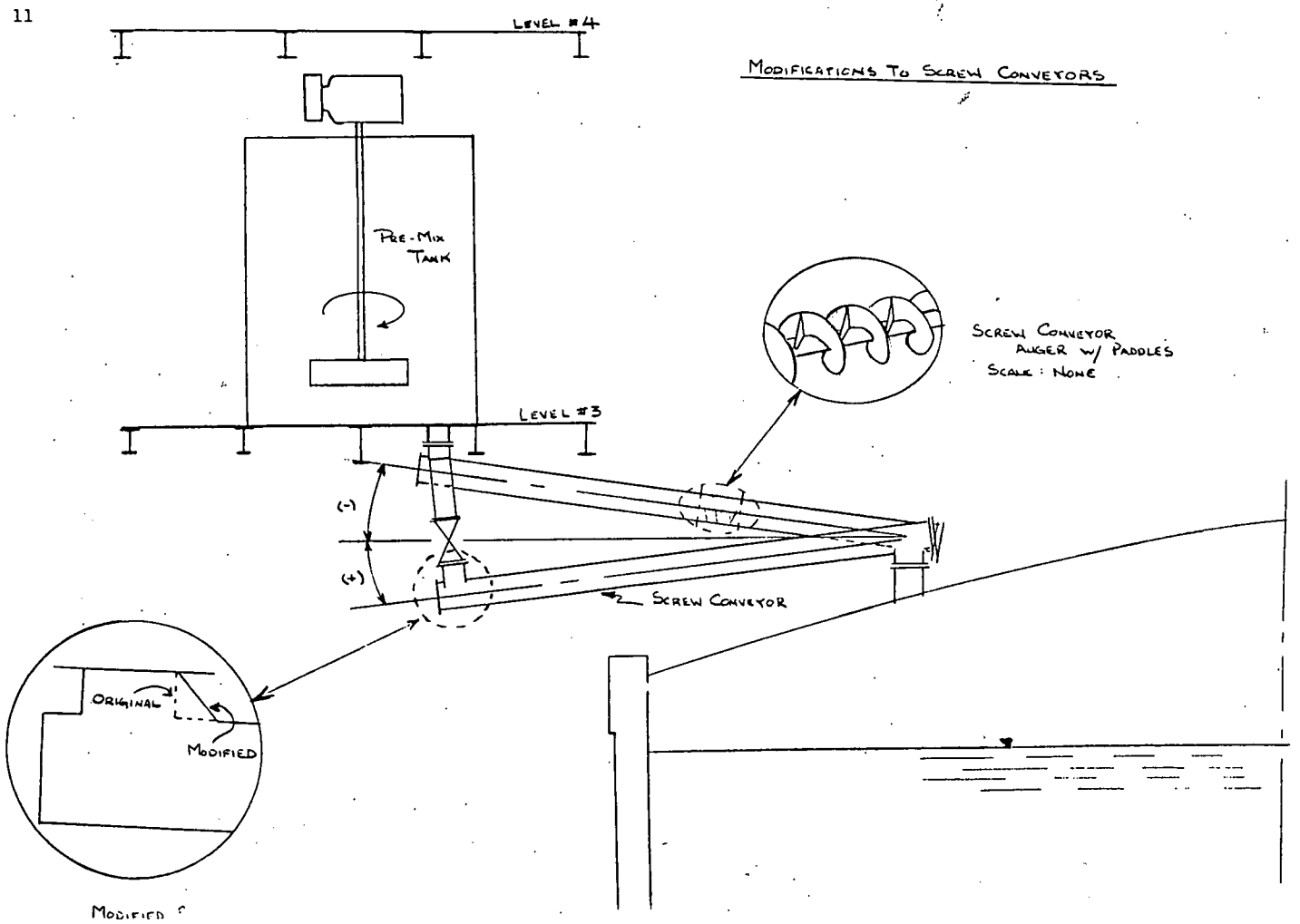
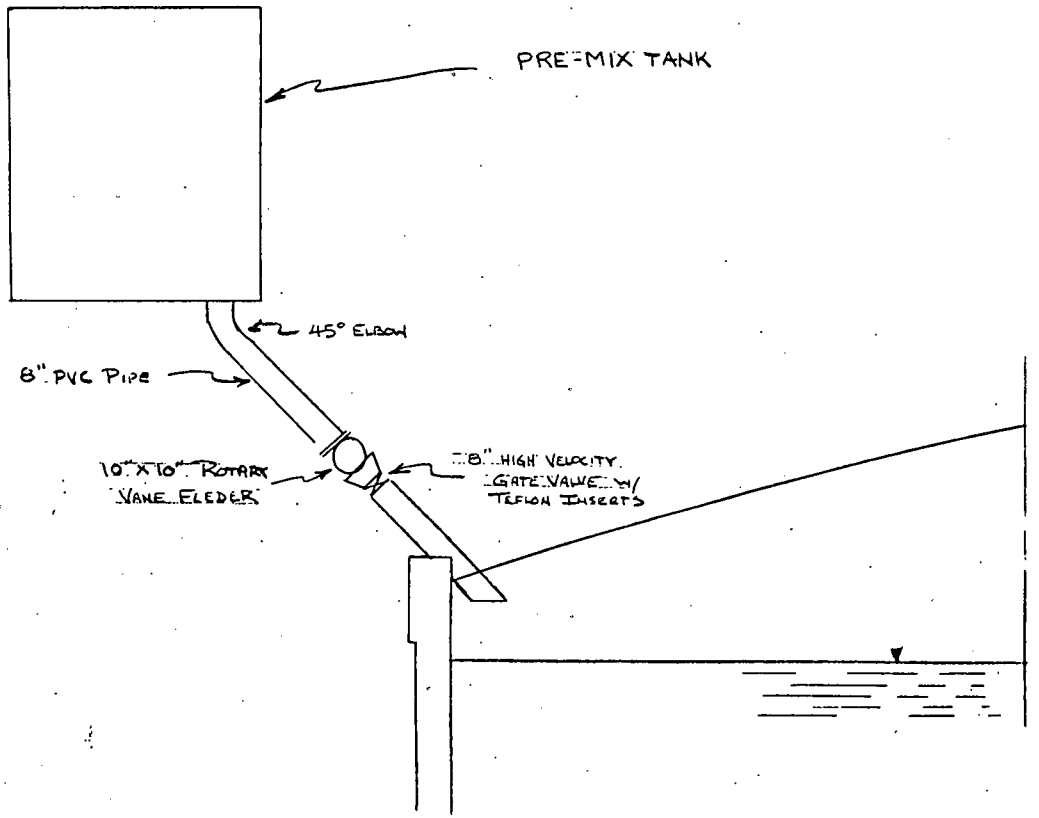
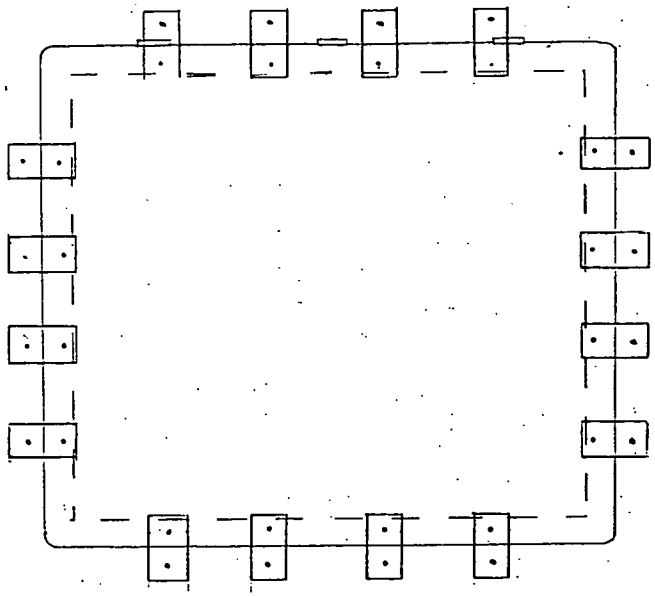

LEVEL #4
MODIFICATIONS TO SCREW CONVEYORS
PRE-MIX TANK
SCREW CONVEYOR AUGER W/ PADDLES
SCALE : NONE
LEVEL #3
(-)
(+)
SCREW CONVEYOR
ORIGINAL
MODIFIED
MODIFIED

Fig. 12

EXISTING DIGESTER FEED SYSTEM





First Modification To

FIBERGLASS HATCH COVER

SCALE 3/4" = 1'-0"

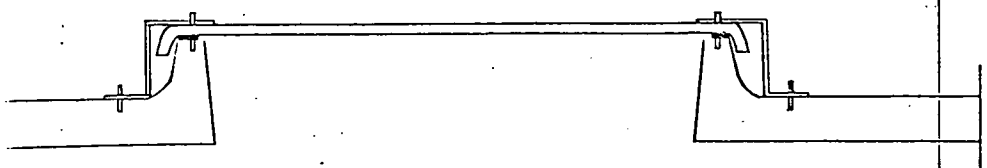
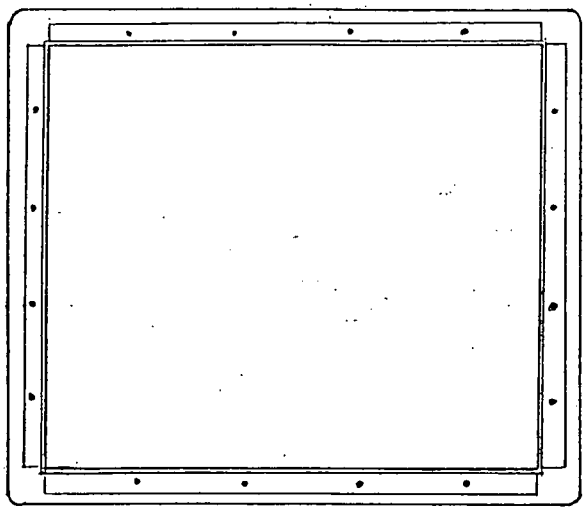


Fig. 13



SECOND MODIFICATION TO

FIBERGLASS HATCH COVER

SCALE 3/4" = 1'-0"

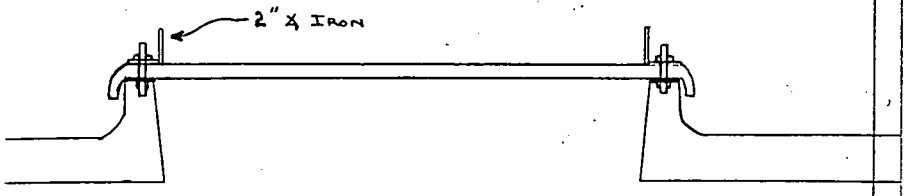
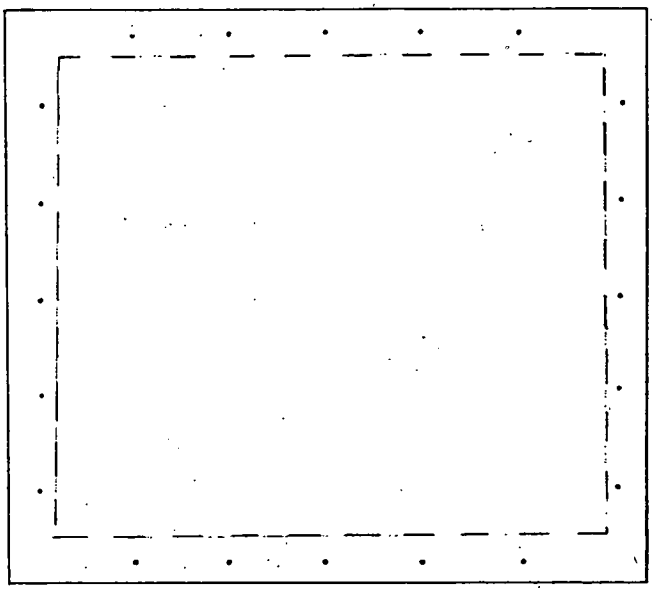


Fig. 14



STEEL PLATE HATCH COVER

SCALE 3/4" = 1'-0"

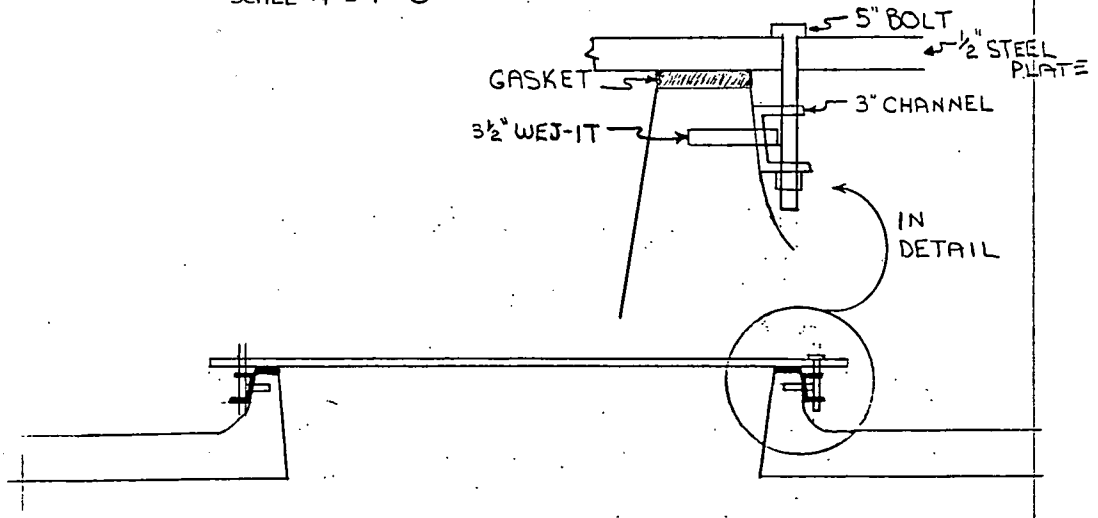


Fig. 15

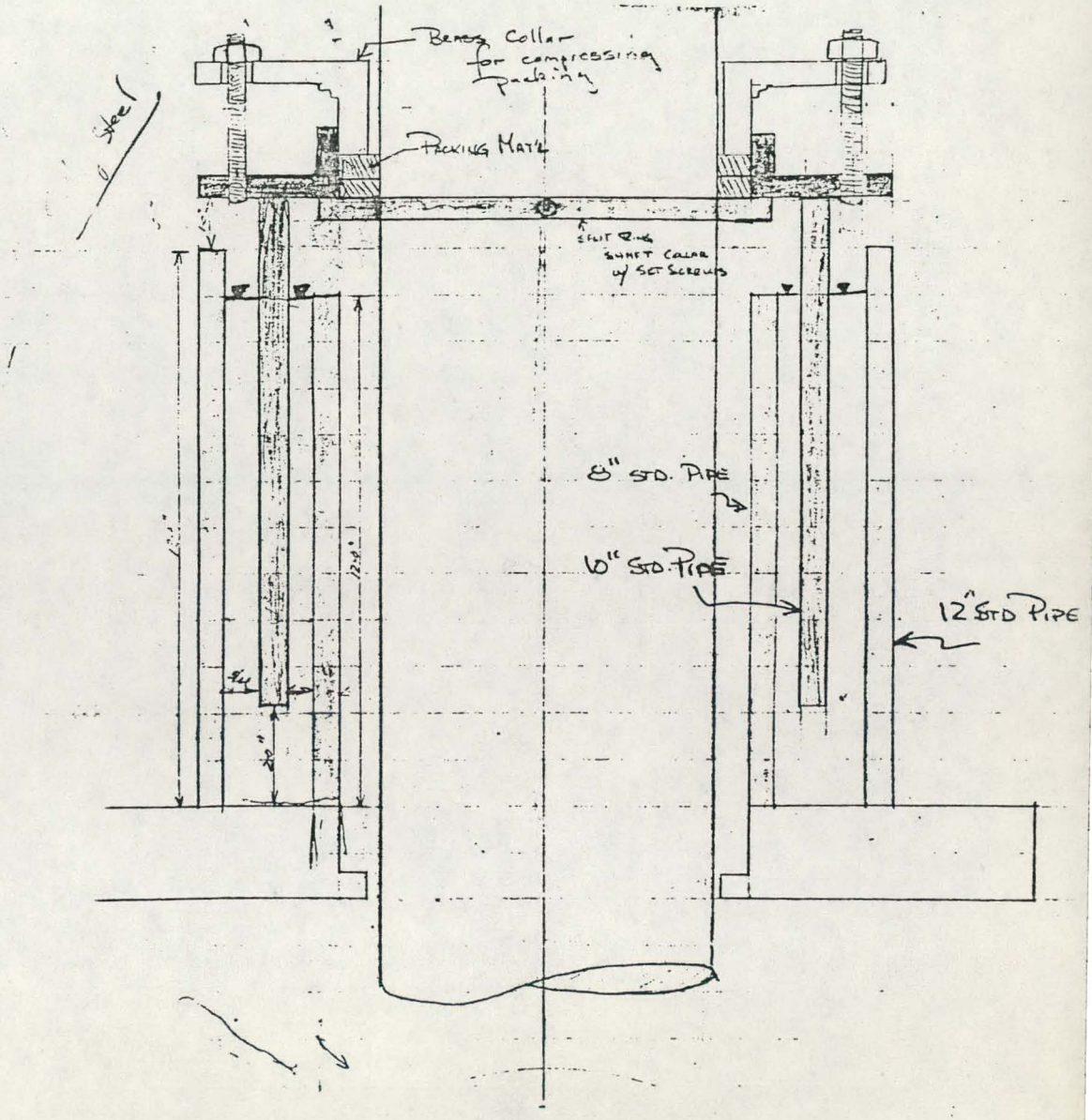

Brass Collar for compressing packing
Packing Mat'l
Split Ring Shaft Collar w/ Set Screws
8" Std. Pipe
6" Std. Pipe
12" Std Pipe

Fig. 16

Fig. 17

HEAT EXCHANGER WATER BY-PASS TO LEACHATE CANAL

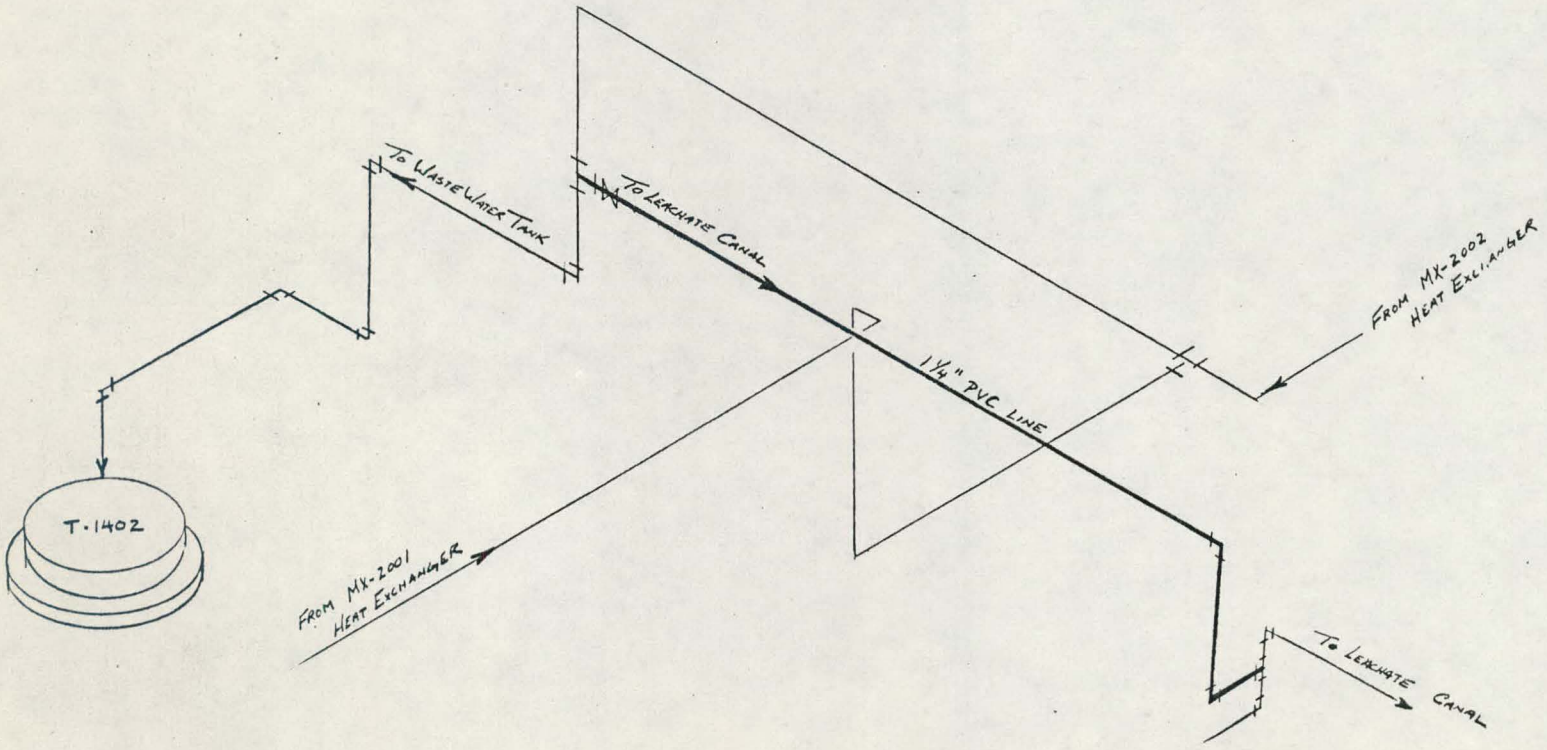
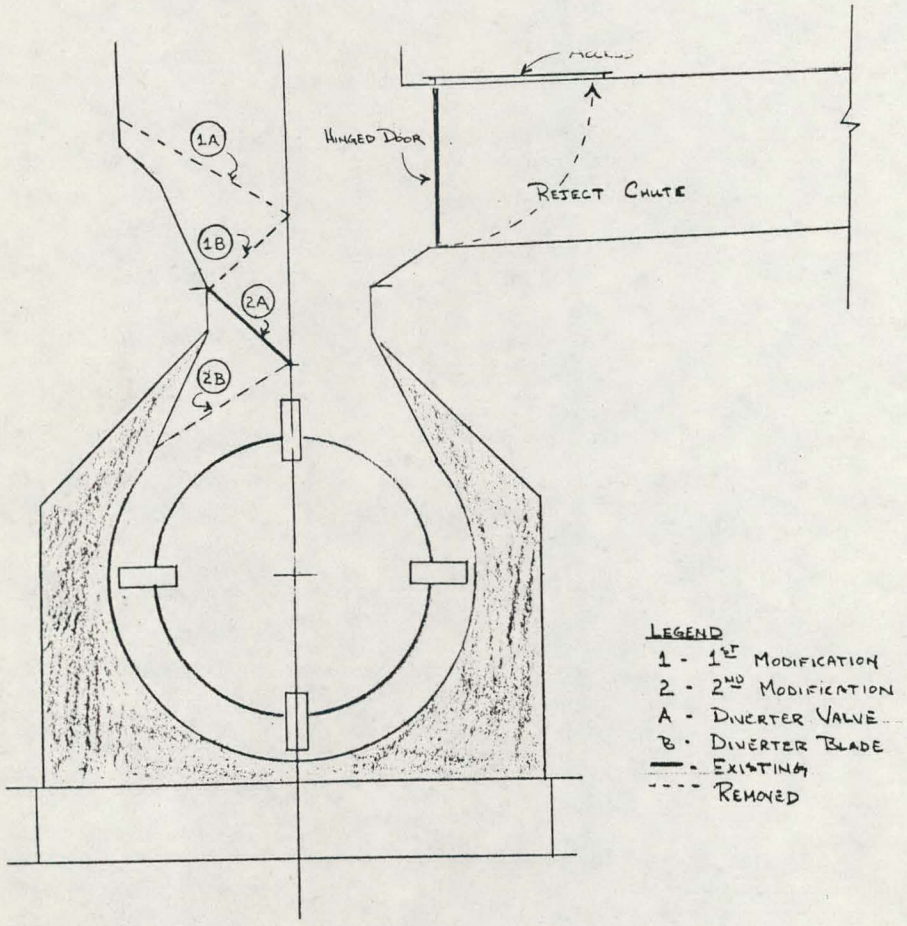


Fig. 18



SECONDARY SHREDDER

DATE	ESTIMATED TONNAGE PROCESSED	ACCUMULATED TONNAGE PROCESSED	OTHER
5/18			Digester #1 receives 2000 lbs. soda ash
6/14			14,000 gal. was.
6/15			14,000 gal. was.
7/17			15,000 gal. anaerobic sludge
7/18			28,000 gal. anaerobic sludge
7/19			14,000 gal. anaerobic sludge
7/20	6.3		
7/21	4.5	10.8	
7/24	2.8	13.6	4,500 gal. anaerobic sludge
7/25	1.5	15.1	
7/28	2.1	17.2	
7/29	1.2	18.4	
7/31	1.8	20.2	
8/1	1.8	22.0	
8/2	4.2	26.2	
8/3	2.7	28.9	
8/7	3.6	32.5	
8/8	3.6	36.1	
8/9	2.4	38.5	
9/13-14			Removed 30,000 gal. digester supernatent
9/20	4.5	43.0	
9/22	6.3	49.3	
10/11	5.0	54.3	
10/13	3.6	57.9	
10/14	2.7	60.6	
10/16	6.8	67.4	
10/17	2.7	70.1	
10/18	2.4	72.5	
10/19	3.9	76.4	
10/21	1.2	77.6	
10/23	3.8	81.4	
10/24	4.8	86.2	
10/25	2.7	88.9	

RefCOM WEEKLY LOG SHEET 7/17/78 - 7/21/78

Power Consumption (KWH)

Date	Time	Today	Yesterday	Usage
7 - 18	3:50	1554.5	___	___
7 - 19	4:10	1561.5	1554.5	7.0
7 - 20	4:46	1568.8	1561.5	7.3
7 - 21	5:10	1578.9	1568.8	10.1

SHREDDER RUNNING TIME (HOURS)

7 - 18	3:50	17.8	___	___
7 - 19	4:10	18.9	17.8	1.1
7 - 20	4:46	23.4	18.9	4.5
7 - 21	5:10	28.4	23.4	5.0

TOTAL GAS PRODUCTION (ft^3) VALUES CORRECTED

_____	_____	___	___	___

RefCOM WEEKLY LOG SHEET 7/24/78 - 7/29/78
POWER CONSUMPTION (KWH)
* All values this Table x 120

DATE	TIME	TODAY	YESTERDAY	USAGE
7 - 24	4:30	1591.1	1578.9	12.2
7 - 25	4:00	1596.0	1591.1	5.9
7 - 26	4:15	1600.0	1596.0	4.0
7 - 27	4:15	1605.0	1600.0	5.0
7 - 28	----	-------	------	---
7 - 29	----	-------	------	---

SHREDDER RUNNING TIME (HOURS)

7 - 24	4:30	33.5	28.5	5.1
7 - 25	4:00	36.1	33.5	2.6
7 - 26	4:15	37.3	36.1	1.2
7 - 27	4:15	38.0	37.3	0.7
7 - 28	----	----	----	---
7 - 29	----	----	----	---

TOTAL GAS PRODUCTION ($ft.^3$)
VALUES CORRECTED

				Production
7 - 24	4:30	8140	----	---
7 - 25	4:00	8660	8140	520
7 - 26	4:15	8837	8660	177
7 - 27	4:15	9016	8837	179
7 - 28	----	----	----	---
7 - 29	----	----	----	---

RefCOM - DAILY SHEET

DATE October 10, 1978

REFUSE RECEIVED: NONE TONS PROCESSED ~1.8 TONS
LEFT FROM PRIOR DAY (EST.) 14 BUCKETS
TOTAL AVAILABLE 14 BUCKETS TOTAL LEFT (EST.) 8 BUCKETS

SHREDDER:
RUNNING TIME:

	START	STOP	HRS.
C.W.	113.6	116.4	2.8
C.C.W.			

TONS SHREDDED: 1.8
TONS PER HOUR:
CUMULATIVE TONNAGE:

CURRENT HAMMERS:
C.W.
C.C.W.

KWH METER READINGS:

* DRY-END	TODAY	174	YESTERDAY	172	USAGE	2
** WET-END	TODAY	89	YESTERDAY	87	USAGE	2
FUEL OIL	TODAY		YESTERDAY		USAGE	

MANPOWER: 1st SHIFT 5 1st SHIFT ACTUAL 4
2nd SHIFT 2nd SHIFT ACTUAL

TOTAL GAS PRODUCTION (CF):

DIGESTER #1: TIME TODAY YESTERDAY TOTAL
DIGESTER #2: TIME TODAY YESTERDAY TOTAL

EQUIPMENT CONDITION :

REMARKS:

* ALL READINGS x 160
** All READINGS x 240

EMPLOYEES SIGNATURE:

RefCOM - DAILY SHEET

DATE October 11, 1978

REFUSE RECEIVED: ± 15 TONS — TONS PROCESSED 5.0 TONS
LEFT FROM PRIOR DAY (EST.) 6 Buckets
TOTAL AVAILABLE _____ — TOTAL LEFT (EST.) _____

SHREDDER:
RUNNING TIME:

	START	STOP	HRS.
C.W.	116.4	121.6	5.2
C.C.W.			

TONS SHREDDED: 5.0
TONS PER HOUR: _____
CUMULATIVE TONNAGE: _____

CURRENT HAMMERS:
C.W. _____
C.C.W. _____

KWH METER READINGS:

* DRY-END	TODAY	178	YESTERDAY	174	USAGE	4
** WET-END	TODAY	92	YESTERDAY	89	USAGE	3
FUEL OIL	TODAY		YESTERDAY		USAGE	

MANPOWER: 1st SHIFT 5 — 1st SHIFT ACTUAL 5
2nd SHIFT _____ — 2nd SHIFT ACTUAL _____

TOTAL GAS PRODUCTION (CF):

DIGESTER #1: TIME _____ TODAY _____ YESTERDAY _____ TOTAL _____
DIGESTER #2: TIME _____ TODAY _____ YESTERDAY _____ TOTAL _____

EQUIPMENT CONDITION : _____

REMARKS: _____

* ALL READINGS x 160
** All READINGS x 240

EMPLOYEES SIGNATURE: _____

RefCOM - DAILY SHEET

DATE October 13, 1978

REFUSE RECEIVED: None — TONS PROCESSED 3.6 TONS
LEFT FROM PRIOR DAY (EST.) 15 TONS
TOTAL AVAILABLE — TOTAL LEFT (EST.)

SHREDDER:
RUNNING TIME:

	START	STOP	HRS.
C.W.	1214	1274	6.0
C.C.W.			

TONS SHREDDED: 3.6
TONS PER HOUR:
CUMULATIVE TONNAGE:

CURRENT HAMMERS:
C.W.
C.C.W.

KWH METER READINGS:

* DRY-END	TODAY	183	YESTERDAY	178	USAGE	5
** WET-END	TODAY	97	YESTERDAY	92	USAGE	5
FUEL OIL	TODAY		YESTERDAY		USAGE	

MANPOWER: 1st SHIFT 5 — 1st SHIFT ACTUAL 5
2nd SHIFT — 2nd SHIFT ACTUAL

TOTAL GAS PRODUCTION (CF):

DIGESTER #1:	TIME	TODAY	YESTERDAY	TOTAL
DIGESTER #2:	TIME	TODAY	YESTERDAY	TOTAL

EQUIPMENT CONDITION :

REMARKS: Shredder jammed 4 TIMES
Trommel jammed 3 TIMES
FIRE IN SHREDDER

* ALL READINGS x 160
** All READINGS x 240

EMPLOYEES SIGNATURE:

RefCOM - DAILY SHEET

DATE October 14, 1976

REFUSE RECEIVED: NONE TONS PROCESSED 2.7
LEFT FROM PRIOR DAY (EST.) 15 TONS
TOTAL AVAILABLE _____ TOTAL LEFT (EST.) _____

SHREDDER:
RUNNING TIME:

	START	STOP	HRS.
C.W.	1276	130.9	3.3
C.C.W.			

TONS SHREDDED: 2.7
TONS PER HOUR: _____
CUMULATIVE TONNAGE: _____

CURRENT HAMMERS:
C.W. _____
C.C.W. _____

KWH METER READINGS:

* DRY-END	TODAY	185	YESTERDAY	183	USAGE	2
** WET-END	TODAY	99	YESTERDAY	97	USAGE	2
FUEL OIL	TODAY		YESTERDAY		USAGE	

MANPOWER: 1st SHIFT 5 1st SHIFT ACTUAL 5
2nd SHIFT _____ 2nd SHIFT ACTUAL _____

TOTAL GAS PRODUCTION (CF):

DIGESTER #1: TIME _____ TODAY _____ YESTERDAY _____ TOTAL _____
DIGESTER #2: TIME _____ TODAY _____ YESTERDAY _____ TOTAL _____

EQUIPMENT CONDITION : _____

REMARKS: _____

* ALL READINGS x 160
** All READINGS x 240

EMPLOYEES SIGNATURE: _____

RefCOM - DAILY SHEET

DATE October 16, 1978

REFUSE RECEIVED: _____ TONS PROCESSED 6.8 TONS
LEFT FROM PRIOR DAY (EST.) _____
TOTAL AVAILABLE _____ TOTAL LEFT (EST.) _____

SHREDDER:
RUNNING TIME:

	START	STOP	HRS.
C.W.	130.9	137.0	6.1
C.C.W.			

TONS SHREDDED: 6.8 TONS
TONS PER HOUR: _____
CUMULATIVE TONNAGE: _____

CURRENT HAMMERS:
C.W. _____
C.C.W. _____

KWH METER READINGS:

* DRY-END	TODAY	189	YESTERDAY	185	USAGE	4
** WET-END	TODAY	102	YESTERDAY	99	USAGE	3
FUEL OIL	TODAY		YESTERDAY		USAGE	

MANPOWER: 1st SHIFT 5 1st SHIFT ACTUAL 5
2nd SHIFT _____ 2nd SHIFT ACTUAL _____

TOTAL GAS PRODUCTION (CF):

DIGESTER #1: TIME _____ TODAY _____ YESTERDAY _____ TOTAL _____
DIGESTER #2: TIME _____ TODAY _____ YESTERDAY _____ TOTAL _____

EQUIPMENT CONDITION : _____

REMARKS: _____

* ALL READINGS x 160
** All READINGS x 240

EMPLOYEES SIGNATURE: _____

RefCOM - DAILY SHEET

DATE October 17, 1978

REFUSE RECEIVED: _____ TONS PROCESSED 2.7 TONS

LEFT FROM PRIOR DAY (EST.) _____

TOTAL AVAILABLE _____ TOTAL LEFT (EST.) _____

SHREDDER:

RUNNING TIME:

	START	STOP	HRS.
C.W.	137.0	140.8	3.8
C.C.W.			

TONS SHREDDED: 2.7 TONS

TONS PER HOUR: _____

CUMULATIVE TONNAGE: _____

CURRENT HAMMERS:

C.W. _____

C.C.W. _____

KWH METER READINGS:

* DRY-END	TODAY	191	YESTERDAY	189	USAGE	2
** WET-END	TODAY	106	YESTERDAY	102	USAGE	4
FUEL OIL	TODAY		YESTERDAY		USAGE	

MANPOWER: 1st SHIFT 5 1st SHIFT ACTUAL 4

2nd SHIFT _____ 2nd SHIFT ACTUAL _____

TOTAL GAS PRODUCTION (CF):

DIGESTER #1: TIME _____ TODAY _____ YESTERDAY _____ TOTAL _____

DIGESTER #2: TIME _____ TODAY _____ YESTERDAY _____ TOTAL _____

EQUIPMENT CONDITION : _____

REMARKS: _____

* ALL READINGS x 160

** All READINGS x 240

EMPLOYEES SIGNATURE: _____

C.C.W.

TONS SHREDDED: START 140.8

TONS PER HOUR:

CUMULATIVE TONNAGE: 2.4 TONS

STOP 143.7

TOTAL LEFT

CURRENT HAMMERS:
C.W.
C.C.W.

KWH METER READINGS:

* DRY-END TODAY 194 YESTERDAY 191 USAGE

** WET-END TODAY 110 YESTERDAY 106 USAGE

FUEL OIL TODAY YESTERDAY USAGE

MANPOWER: 1st SHIFT 5 1st SHIFT ACTUAL

2nd SHIFT 2nd SHIFT ACTUAL 5

TOTAL GAS PRODUCTION (CF):

DIGESTER #1: TIME TODAY YESTERDAY TOTAL

DIGESTER #2: TIME TODAY YESTERDAY TOTAL

EQUIPMENT CONDITION : Rebuilt Grates in Shredder

REMARKS:

* ALL READINGS x 160

** All READINGS x 240

EMPLOYEES SIGNATURE:

RefCOM - DAILY SHEET

DATE October 21, 1978

REFUSE RECEIVED: _____ TONS PROCESSED 1.2 TONS

LEFT FROM PRIOR DAY (EST.) _____

TOTAL AVAILABLE _____ TOTAL LEFT (EST.) _____

SHREDDER:

RUNNING TIME:

	START	STOP	HRS.
C.W.	151.2	154.2	3.0
C.C.W.			

TONS SHREDDED: 1.2 TONS

TONS PER HOUR: _____

CUMULATIVE TONNAGE: _____

CURRENT HAMMERS:

C.W. _____

C.C.W. _____

KWH METER READINGS:

* DRY-END	TODAY	202	YESTERDAY	199	USAGE	3
** WET-END	TODAY	124	YESTERDAY	117	USAGE	7
FUEL OIL	TODAY		YESTERDAY		USAGE	

MANPOWER: 1st SHIFT 5 1st SHIFT ACTUAL 5

2nd SHIFT _____ 2nd SHIFT ACTUAL _____

TOTAL GAS PRODUCTION (CF):

DIGESTER #1: TIME _____ TODAY _____ YESTERDAY _____ TOTAL _____

DIGESTER #2: TIME _____ TODAY _____ YESTERDAY _____ TOTAL _____

EQUIPMENT CONDITION : _____

REMARKS: _____

* ALL READINGS x 160

** All READINGS x 240

EMPLOYEES SIGNATURE: _____

RefCOM - DAILY SHEET

DATE October 24, 1978

REFUSE RECEIVED: _____ TONS PROCESSED 4.8 TONS
LEFT FROM PRIOR DAY (EST.) _____
TOTAL AVAILABLE _____ TOTAL LEFT (EST.) _____

SHREDDER:
RUNNING TIME:

	START	STOP	HRS.
C.W.	160.8	166.4	5.6
C.C.W.			

TONS SHREDDED: 4.8 TONS
TONS PER HOUR: _____
CUMULATIVE TONNAGE: _____

CURRENT HAMMERS:
C.W. _____
C.C.W. _____

KWH METER READINGS:

* DRY-END	TODAY	209	YESTERDAY	206	USAGE	3
** WET-END	TODAY	134	YESTERDAY	129	USAGE	5
FUEL OIL	TODAY		YESTERDAY		USAGE	

MANPOWER: 1st SHIFT 5 1st SHIFT ACTUAL 5
2nd SHIFT _____ 2nd SHIFT ACTUAL _____

TOTAL GAS PRODUCTION (CF):

DIGESTER #1: TIME _____ TODAY _____ YESTERDAY _____ TOTAL _____
DIGESTER #2: TIME _____ TODAY _____ YESTERDAY _____ TOTAL _____

EQUIPMENT CONDITION : _____

REMARKS: Trommel Jammed 2 Times
Shredder Jammed 2 Times
Conveyors #3 & #14 Down Several Hours

* ALL READINGS x 160
** All READINGS x 240

EMPLOYEES SIGNATURE: _____

RefCOM - DAILY SHEET

DATE October 25 1978

REFUSE RECEIVED: _____ TONS PROCESSED 2.7 TONS
LEFT FROM PRIOR DAY (EST.) _____
TOTAL AVAILABLE _____ TOTAL LEFT (EST.) _____

SHREDDER:
RUNNING TIME:

	START	STOP	HRS.
C.W.	1614	1617	2.3
C.C.W.			

TONS SHREDDED: 2.7 TONS
TONS PER HOUR: _____
CUMULATIVE TONNAGE: _____

CURRENT HAMMERS:
C.W. _____
C.C.W. _____

KWH METER READINGS:

* DRY-END	TODAY	213	YESTERDAY	209	USAGE	4
** WET-END	TODAY	141	YESTERDAY	134	USAGE	7
FUEL OIL	TODAY		YESTERDAY		USAGE	

MANPOWER: 1st SHIFT 5 1st SHIFT ACTUAL 5
2nd SHIFT _____ 2nd SHIFT ACTUAL _____

TOTAL GAS PRODUCTION (CF):

DIGESTER #1: TIME _____ TODAY _____ YESTERDAY _____ TOTAL _____
DIGESTER #2: TIME _____ TODAY _____ YESTERDAY _____ TOTAL _____

EQUIPMENT CONDITION : _____

REMARKS: Fire in Baghouse

* ALL READINGS x 160
** All READINGS x 240

EMPLOYEES SIGNATURE: _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 10-23-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		84.50
Volatile Acids(mg/l as Acetic Acid)		198.00 + 192.60
Alkalinity(mg/l as $CaCO_3$)		1206.08
pH		6.64
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total _____
- Volatile _____

Suspended Solids,%
- Total _____
- Volatile _____

pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 2 of 2

Date 10-23-78

Sample 8. RAW SLUDGE

Solids Analysis,%
Moisture _____
Fixed
Volatile _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 9a. DIGESTOR OFF-GAS
9b.

DIGESTOR 1. (T-1301)
Methane,% _____
Carbon Dioxide,% _____
DIGESTOR 2. (T-1302)
Methane,% 51.519 %
Carbon Dioxide,% 48.394 %

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 10-20-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia-Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		183.6 ↓ 190.8
Alkalinity(mg/l as $CaCO_3$)		1171.65
pH		7.25
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total _____
- Volatile _____

Suspended Solids,%
- Total _____
- Volatile _____

pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 2 of 2

Date 10-19-78

Sample 8. RAW SLUDGE

Solids Analysis,%
Moisture _____
Fixed _____
Volatile _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 9a. DIGESTOR OFF-GAS
9b.

DIGESTOR 1. (T-1301)
Methane,% _____
Carbon Dioxide,% _____
DIGESTOR 2. (T-1302)
Methane,% 44.81
Carbon Dioxide,% 52.28
NITROGEN, % 2.91

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 10-19-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture
- Fixed
- Volatile

Total Kjeldahl Nitrogen(mg/l)

Total Phosphorus(mg/l)

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		85.60
Volatile Acids(mg/l as Acetic Acid)		211.50 + 184.50
Alkalinity(mg/l as $CaCO_3$)		1155.60
pH		7.34
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total
- Volatile

Suspended Solids,%
- Total
- Volatile

pH

Alkalinity(mg/l as $CaCO_3$)

Volatile Acids(mg/l as Acetic Acids)

Total Kjeldahl Nitrogen(mg/l)

Total Phosphorus(mg/l)

Date 10-18-78

Sample 8. RAW SLUDGE

Solids Analysis,%
Moisture _____
Fixed _____
Volatile _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 9a. DIGESTOR OFF-GAS
9b.

DIGESTOR 1. (T-1301)
Methane,% _____
Carbon Dioxide,% _____
DIGESTOR 2. (T-1302)
Methane,% 42.16
Carbon Dioxide,% 52.87
NITROGEN, % 5.16

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 10-18-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture
- Fixed
- Volatile

Total Kjeldahl Nitrogen(mg/l)

Total Phosphorus(mg/l)

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		84.00
Volatile Acids(mg/l as Acetic Acid)		158.40 + 168.96
Alkalinity(mg/l as $CaCO_3$)		1166.30
pH		7.13
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total
- Volatile

Suspended Solids,%
- Total
- Volatile

pH

Alkalinity(mg/l as $CaCO_3$)

Volatile Acids(mg/l as Acetic Acids)

Total Kjeldahl Nitrogen(mg/l)

Total Phosphorus(mg/l)

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 2 of 2

Date 10-16-78

Sample 8. RAW SLUDGE

Solids Analysis,%
Moisture _____
Fixed _____
Volatile _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 9a. DIGESTOR OFF-GAS
9b.

DIGESTOR 1. (T-1301)
Methane,% _____
Carbon Dioxide,% _____
DIGESTOR 2. (T-1302)
Methane,% 49.07
Carbon Dioxide,% 40.11
NITROGEN 10.81
OXYGEN NONE

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 10-16-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture
- Fixed
- Volatile

Total Kjeldahl Nitrogen(mg/l)

Total Phosphorus(mg/l)

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia-Nitrogen(mg/l as NH_3-N)		85.00
Volatile Acids(mg/l as Acetic Acid)		200.64 + 174.24
Alkalinity(mg/l as $CaCO_3$)		1182.91
pH		7.49
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		3

Sample 6. FILTERATE

Solids Analysis,%
- Total
- Volatile

Suspended Solids,%
- Total
- Volatile

pH

Alkalinity(mg/l as $CaCO_3$)

Volatile Acids(mg/l as Acetic Acids)

Total Kjeldahl Nitrogen(mg/l)

Total Phosphorus(mg/l)

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 10-13-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture
- Fixed
- Volatile

Total Kjeldahl Nitrogen(mg/l)
Total Phosphorus(mg/l)

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		86.00
Volatile Acids(mg/l as Acetic Acid)		290.40 + 248.16
Alkalinity(mg/l as $CaCO_3$)		1276.40
pH		7.2
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total
- Volatile

Suspended Solids,%
- Total
- Volatile

pH
Alkalinity(mg/l as $CaCO_3$)
Volatile Acids(mg/l as Acetic Acids)
Total Kjeldahl Nitrogen(mg/l)
Total Phosphorus(mg/l)

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 10-12-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
Moisture _____
Fixed _____
Volatile _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		85.11
Volatile Acids(mg/l as Acetic Acid)		496.32 & 475.20
Alkalinity(mg/l as $CaCO_3$)		1228.62
pH		7.0
Total Kjeldahl Nitrogen(mg/l)		89.61
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
Total _____
Volatile _____
Suspended Solids,%
Total _____
Volatile _____
pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 2 of 2

Date 10-11-78

Sample 8. RAW SLUDGE

Solids Analysis,%
Moisture _____
Fixed _____
Volatile _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 9a. DIGESTOR OFF-GAS
9b.

DIGESTOR 1. (T-1301)
Methane,% _____
Carbon Dioxide,% _____
DIGESTOR 2. (T-1302)
Methane,% 46.66
Carbon Dioxide,% 34.65
NITROGEN, % 15.67
OXYGEN, % 3.04

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 10-11-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		98.00
Volatile Acids(mg/l as Acetic Acid)		330.00+348.48
Alkalinity(mg/l as $CaCO_3$)		1198.40
pH		6.86
Total Kjeldahl Nitrogen(mg/l)		82.54
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total _____
- Volatile _____

Suspended Solids,%
- Total _____
- Volatile _____

pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 10-10-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture
- Fixed
- Volatile

Total Kjeldahl Nitrogen(mg/l)

Total Phosphorus(mg/l)

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		134.90
Volatile Acids(mg/l as Acetic Acid)		475.20 + 464.64
Alkalinity(mg/l as $CaCO_3$)		1185.03
pH		6.7
Total Kjeldahl Nitrogen(mg/l)		18.85
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total
- Volatile

Suspended Solids,%
- Total
- Volatile

pH

Alkalinity(mg/l as $CaCO_3$)

Volatile Acids(mg/l as Acetic Acids)

Total Kjeldahl Nitrogen(mg/l)

Total Phosphorus(mg/l)

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 10-2-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		83.0
Volatile Acids(mg/l as Acetic Acid)		496.32 + 475.20
Alkalinity(mg/l as $CaCO_3$)		1231.04
pH		6.84
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total _____
- Volatile _____

Suspended Solids,%
- Total _____
- Volatile _____

pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 9-21-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture
- Fixed
- Volatile

Total Kjeldahl Nitrogen(mg/l)
Total Phosphorus(mg/l)

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		417
Volatile Acids(mg/l as Acetic Acid)		570.24 + 559.68
Alkalinity(mg/l as $CaCO_3$)		1203.75
pH		6.83
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total
- Volatile

Suspended Solids,%
- Total
- Volatile

pH
Alkalinity(mg/l as $CaCO_3$)
Volatile Acids(mg/l as Acetic Acids)
Total Kjeldahl Nitrogen(mg/l)
Total Phosphorus(mg/l)

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 9-13-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture
- Fixed
- Volatile

Total Kjeldahl Nitrogen(mg/l)
Total Phosphorus(mg/l)

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		82.0
Volatile Acids(mg/l as Acetic Acid)		480.48 + 496.32
Alkalinity(mg/l as $CaCO_3$)		1674.75
pH		6.9
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total
- Volatile

Suspended Solids,%
- Total
- Volatile

pH
Alkalinity(mg/l as $CaCO_3$)
Volatile Acids(mg/l as Acetic Acids)
Total Kjeldahl Nitrogen(mg/l)
Total Phosphorus(mg/l)

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 8-28-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture
- Fixed
- Volatile

Total Kjeldahl Nitrogen(mg/l)
Total Phosphorus(mg/l)

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		411.84 + 385.44
Alkalinity(mg/l as $CaCO_3$)		1662.21
pH		6.62
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total
- Volatile

Suspended Solids,%
- Total
- Volatile

pH
Alkalinity(mg/l as $CaCO_3$)
Volatile Acids(mg/l as Acetic Acids)
Total Kjeldahl Nitrogen(mg/l)
Total Phosphorus(mg/l)

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 8-9-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		300.96 + 253.44
Alkalinity(mg/l as $CaCO_3$)		1552.34
pH		6.58
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total _____
- Volatile _____

Suspended Solids,%
- Total _____
- Volatile _____

pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 8-8-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture
- Fixed
- Volatile

Total Kjeldahl Nitrogen(mg/l)

Total Phosphorus(mg/l)

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		435.6 & 401.28
Alkalinity(mg/l as $CaCO_3$)		1553.00
pH		6.55
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total
- Volatile

Suspended Solids,%
- Total
- Volatile

pH

Alkalinity(mg/l as $CaCO_3$)

Volatile Acids(mg/l as Acetic Acids)

Total Kjeldahl Nitrogen(mg/l)

Total Phosphorus(mg/l)

Date 8-7-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		496.32 469.92
Alkalinity(mg/l as $CaCO_3$)		1543.90
pH		6.60
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total _____
- Volatile _____

Suspended Solids,%
- Total _____
- Volatile _____

pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 8-4-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
Moisture _____
Fixed _____
Volatile _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		538.564 535.92
Alkalinity(mg/l as $CaCO_3$)		1501.87
pH		6.60
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
Total _____
Volatile _____
Suspended Solids,%
Total _____
Volatile _____
pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 8-3-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
Moisture _____
Fixed 1.04
Volatile _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		628.32 + 41 7.12
Alkalinity(mg/l as $CaCO_3$)		1516.74
pH		6.56
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
Total _____
Volatile _____
Suspended Solids,%
Total _____
Volatile _____
pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 8-2-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		459.36 + 385.44
Alkalinity(mg/l as $CaCO_3$)		1498.15
pH		6.65
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total _____
- Volatile _____

Suspended Solids,%
- Total _____
- Volatile _____

pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 8-1-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		454.08+43296
Alkalinity(mg/l as $CaCO_3$)		1483.23
pH		6.60
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total _____
- Volatile _____

Suspended Solids,%
- Total _____
- Volatile _____

pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 7-31-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		448.8 + 454.08
Alkalinity(mg/l as $CaCO_3$)		1470.01
pH		6.5
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total _____
- Volatile _____

Suspended Solids,%
- Total _____
- Volatile _____

pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 7-28-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		454.03 + 496.92
Alkalinity(mg/l as $CaCO_3$)		1466.86
pH		6.52
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total _____
- Volatile _____

Suspended Solids,%
- Total _____
- Volatile _____

pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 7-25-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		496.32 + 469.92
Alkalinity(mg/l as $CaCO_3$)		1438.26
pH		6.65
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total _____
- Volatile _____

Suspended Solids,%
- Total _____
- Volatile _____

pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 7-24-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		382.7+202.6
Alkalinity(mg/l as $CaCO_3$)		1371.34
pH		6.63
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total _____
- Volatile _____

Suspended Solids,%
- Total _____
- Volatile _____

pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 7-6-78

ANEROBIC SLUDGE FROM TREATMENT PLANT

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

Sample 5a. DIGESTOR EFFLUENT
5b.

~~DIGESTOR~~	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia-Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		135.00 + 123.75
Alkalinity(mg/l as $CaCO_3$)		1989.35
pH		6.9
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total _____
- Volatile _____

Suspended Solids,%
- Total _____
- Volatile _____

pH _____
Alkalinity(mg/l as $CaCO_3$) _____
Volatile Acids(mg/l as Acetic Acids) _____
Total Kjeldahl Nitrogen(mg/l) _____
Total Phosphorus(mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 7-10-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture 96.84
- Fixed
- Volatile

Total Kjeldahl Nitrogen(mg/l)
Total Phosphorus(mg/l)

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		
Alkalinity(mg/l as $CaCO_3$)		
pH		
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total
- Volatile

Suspended Solids,%
- Total
- Volatile

pH
Alkalinity(mg/l as $CaCO_3$)
Volatile Acids(mg/l as Acetic Acids)
Total Kjeldahl Nitrogen(mg/l)
Total Phosphorus(mg/l)

EXPERIMENTAL PROGRAM DATA SHEET (DRY END)

Date 7-6-78

Sample 1. RAW FEED

Solids Analysis,%
- Moisture 60.20%
- Fixed _____
- Volatile _____

Calorific value
- BTU/lb. Vol. Solids _____
- BTU/lb. Dry Solids _____

Sample 2. HEAVY FRACTION

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Calorific value
- BTU/lb. Vol. Solids _____
- BTU/lb. Dry Solids _____

Sample 3. LIGHT FRACTION

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Calorific value
- BTU/lb. Vol. Solids _____
- BTU/lb. Dry Solids _____

Sample 7. FILTER CAKE

Solids Analysis,%
- Moisture _____
- Fixed _____
- Volatile _____

Calorific value
- BTU/lb. Vol. Solids _____
- BTU/lb. Dry Solids _____

Total Kjeldahl Nitrogen (mg/l) _____

Total Phosphorus (mg/l) _____

EXPERIMENTAL PROGRAM DATA SHEET (WET END) SHEET 1 of 2

Date 7-5-78

Sample 4. DIGESTOR FEED

Solids Analysis,%
- Moisture 96.68
- Fixed
- Volatile

Total Kjeldahl Nitrogen(mg/l)
Total Phosphorus(mg/l)

Sample 5a. DIGESTOR EFFLUENT
5b.

DIGESTOR	(T-1301)	(T-1302)
Solids Analysis,%		
Moisture		
Fixed		
Volatile		
Ammonia-Nitrogen(mg/l as NH_3-N)		
Volatile Acids(mg/l as Acetic Acid)		
Alkalinity(mg/l as $CaCO_3$)		
pH		
Total Kjeldahl Nitrogen(mg/l)		
Total Phosphorus(mg/l)		

Sample 6. FILTERATE

Solids Analysis,%
- Total
- Volatile

Suspended Solids,%
- Total
- Volatile

pH
Alkalinity(mg/l as $CaCO_3$)
Volatile Acids(mg/l as Acetic Acids)
Total Kjeldahl Nitrogen(mg/l)
Total Phosphorus(mg/l)