Stream Number	54-1	54-2	54-3	54-4
Stream Name	Storm Water	Oily Water	Oily Condensate	1500# Boiler Blowdown
Water, lb/hr	104,500	130,000	Normally 0	11,500
(gpm)	(209)	(260)		(23)
Solids, lb/hr				
Total, lb/hr	104,500	130,000		11,500
Pressure, psia	13.7	13.7		53.7
Temperature, °F	60	60		285

TABLE 6.3.15-1

MATERIAL BALANCE

WASTE WATER TREATMENT - UNIT 54

54-4	54-5	54-6	54-7	54-8	54-9	54-10
1500# Boiler Blowdown	U.C.T Makeup Water	DAF Effluent Biotreating	Stripped Gas Liquor	Waste Heat Boiler Blowdown	Treated Water From Sanitary Sewer	Water From Rectisol
1,500	107,000	136,000	942,000	24,000	23,500	38,500
(23)	(214)	(272)	(1884)	(48)	(47)	(77)
			2000			
1,500	107,000	136,000	944,000	24,000	23,500	38,500
53.7	8.7	13.7	145.0	53.7	13.7	13.7
285	80	65	100	285	80	63

T

WASTE

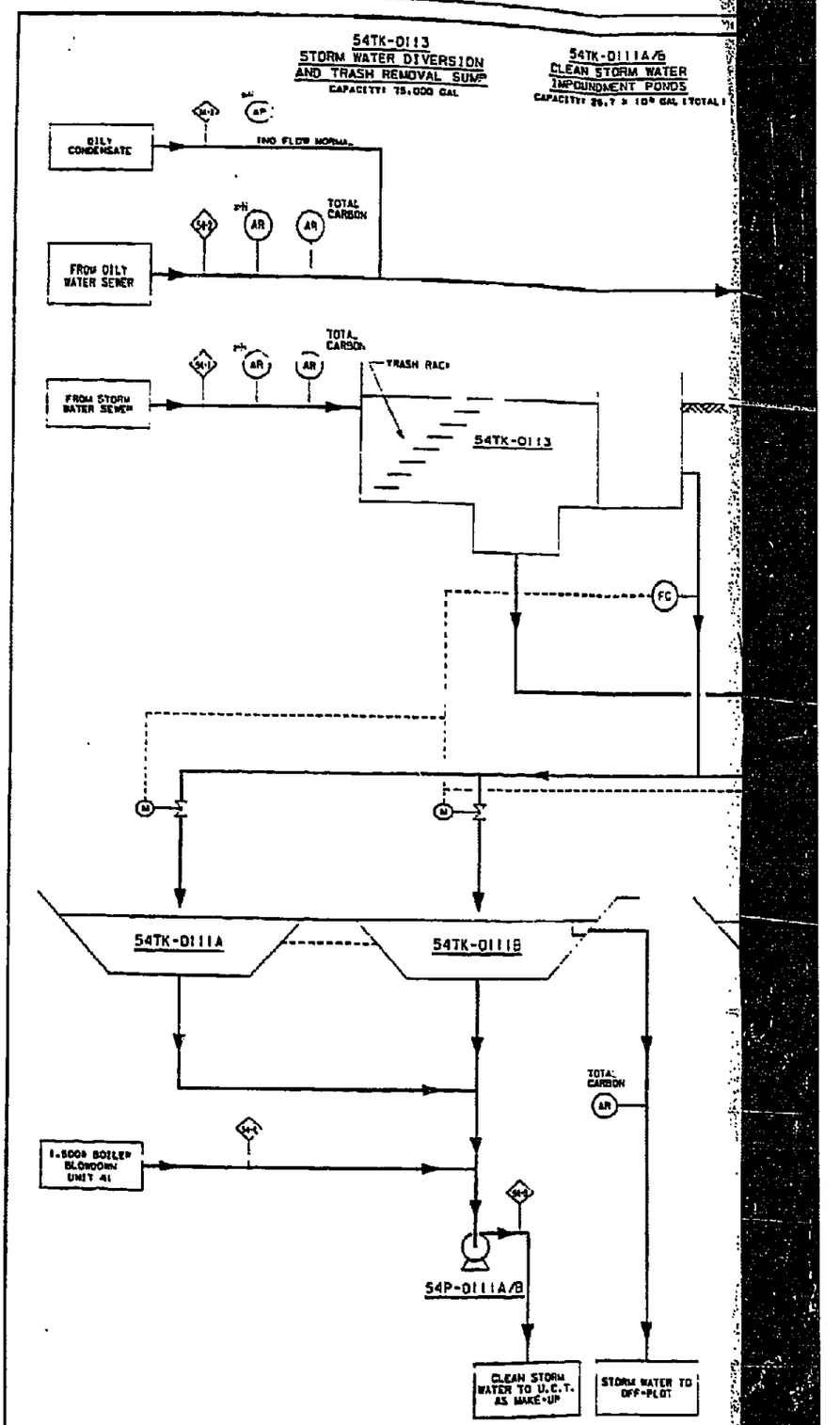
Stream Number	54-11	54-12	54-13	54-14
Stream Name	Water From POX Unit	Incineration Ash To Landfill	Effluent Evaporation Loss	Evap Feed To PC Syste
Water, lb/hr	3,000		2,500	1,185,5
(gpm)	(6)		(5)	(237
Solids, lb/hr		1000		
Total, lb/hr	3,000	1,000	2,500	1,185,5
Pressure, psia	13.7	13.7	13.7	
Temperature, °F	100	100	208	

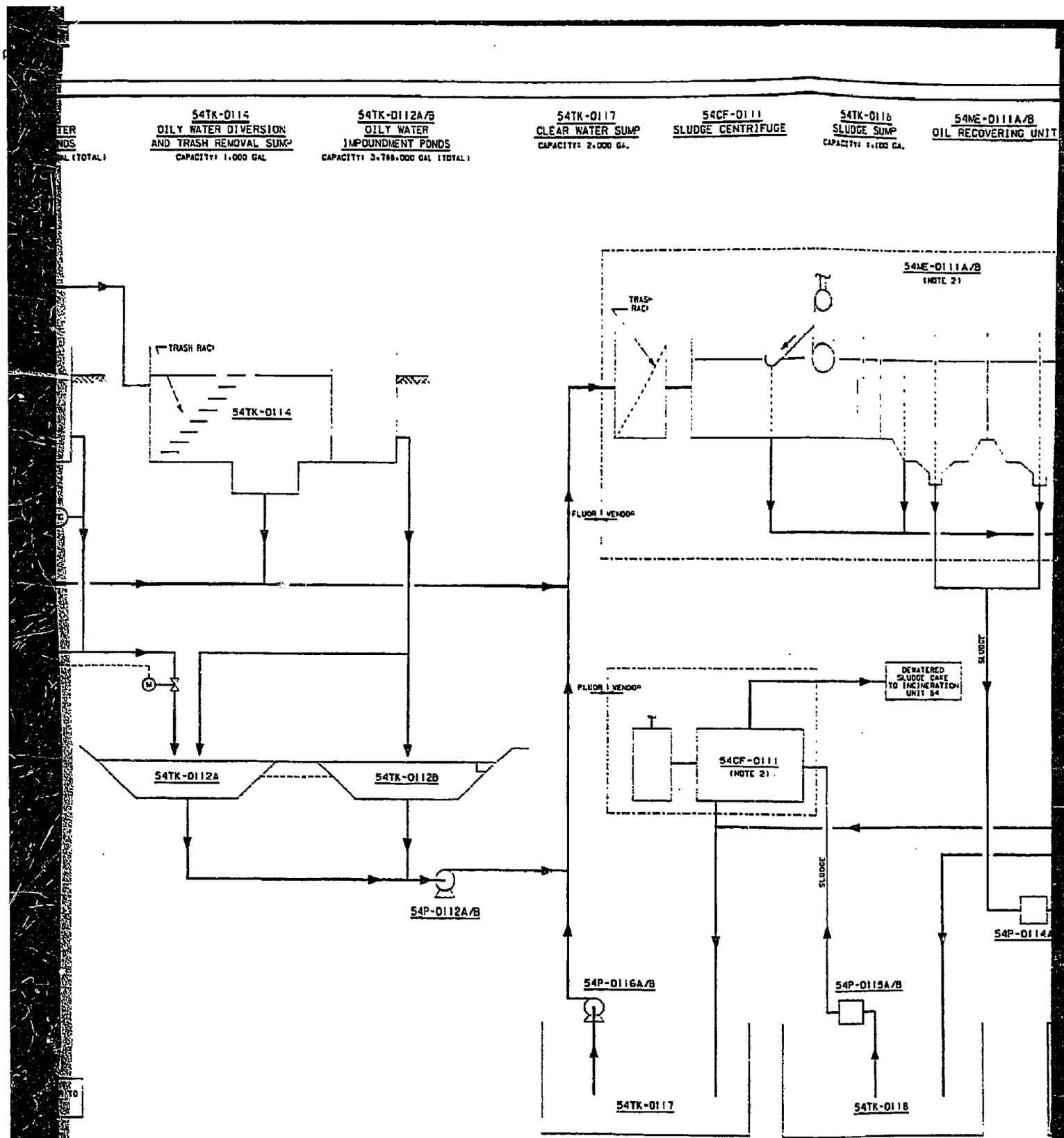
TABLE 6.3.15-1 (Continued)

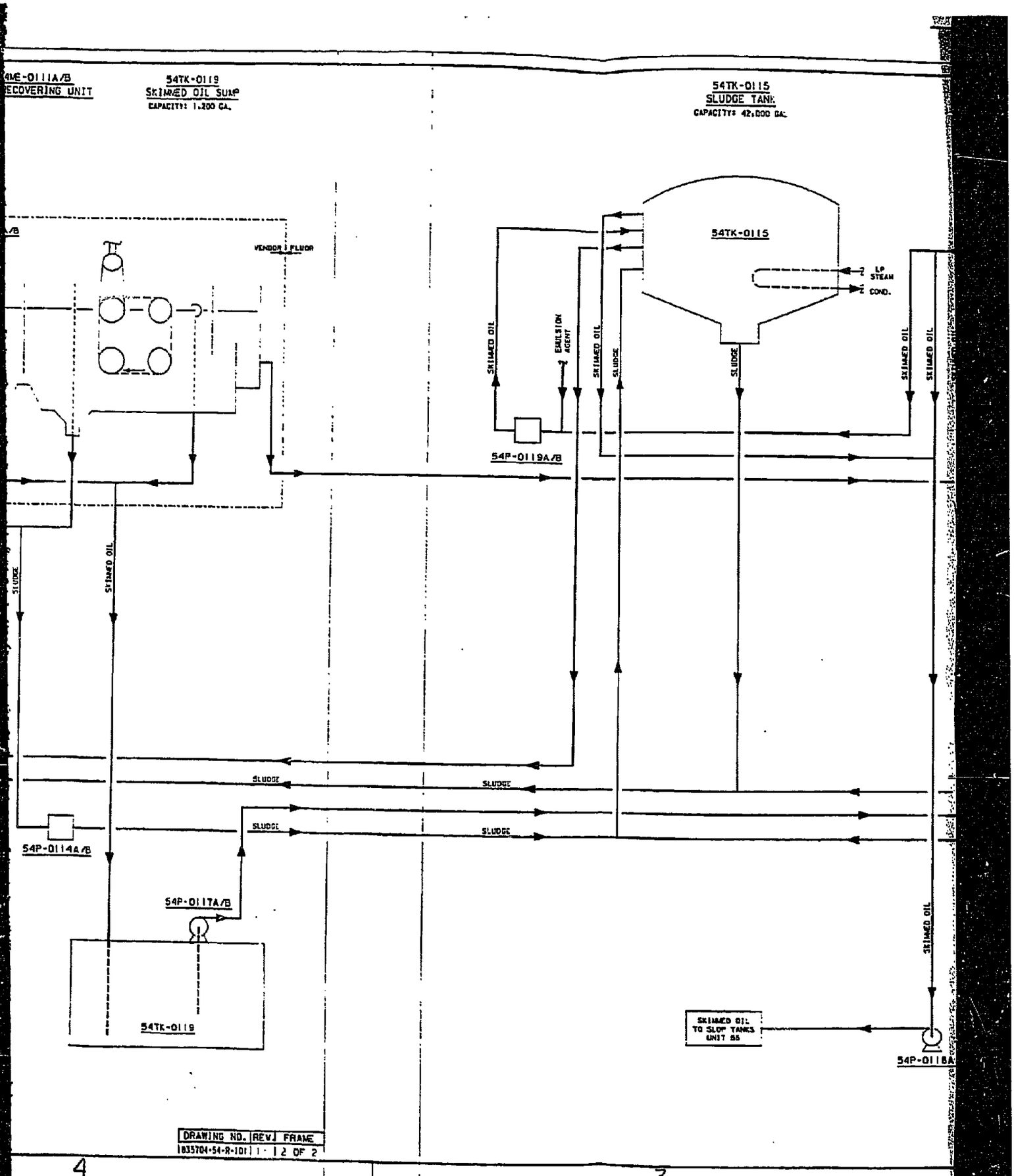
MATERIAL BALANCE

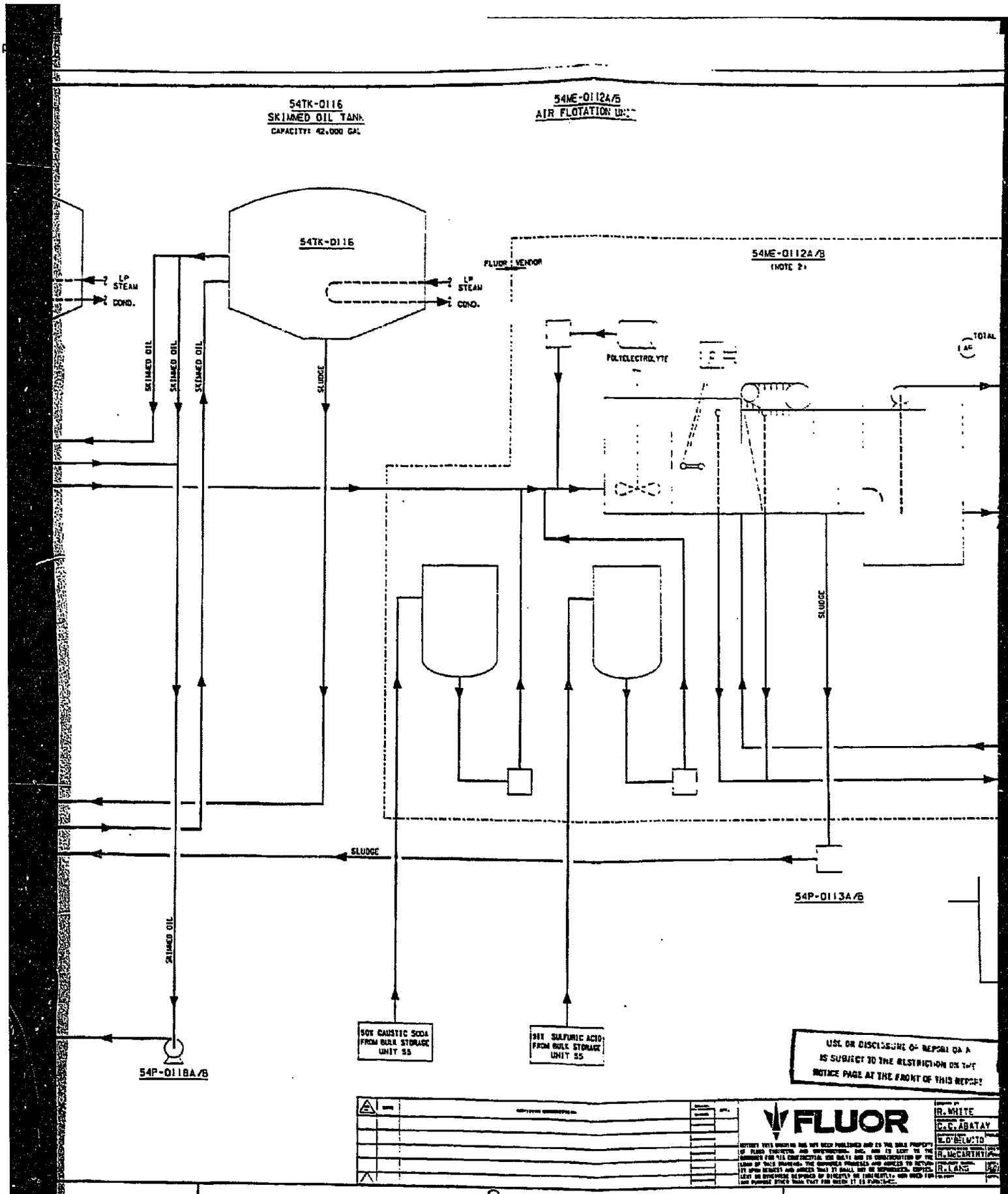
WASTE WATER TREATMENT - UNIT 54

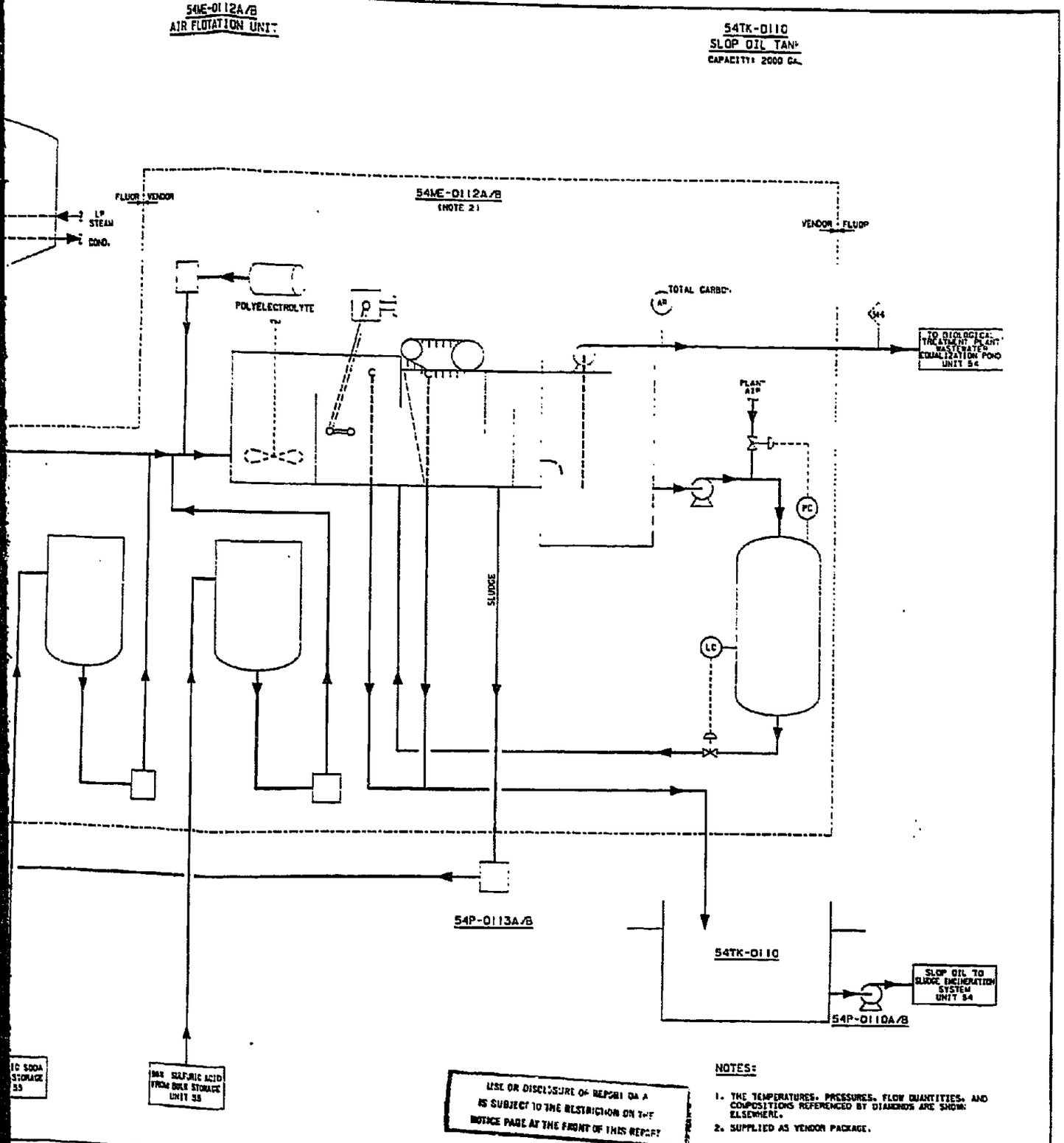
54-14	54-15	54-16	54-17	54-18	54-19	54-20
Evap. Feed To PCT System	Evap. Feed NaZ Softner	Combined From PCT Reject	Combined Evaporation Load	Evap. Effluent Evaporation Load	Evap. Effluent To Solar Pond	Evap. Effluent Water PCT
1,185,500	1,500	295,000	140,000	436,500	21,500	41,500
(2371)	(3)	(590)	(280)	(873)	(43)	(830)
1,185,500	1,500	295,000	140,000	436,500	21,500	415,000
63.7	13.7	300	15.7	13.7	13.7	13.7
80	80	80	80	80	100	100


54TK-0113
STORM WATER DIVERSION
AND TRASH REMOVAL SUMP
CAPACITY: 75,000 GAL
54TK-0111A/B
CLEAN STORM WATER
IMPOUNDMENT PONDS
OILY CONDENSATE
END FLOW NORMAL
TOTAL CARBON
FROM OILY WATER SEWER
FROM STORM WATER SEWER
TRASH RACK
54TK-0113
FC
54TK-0111A
54TK-0111B
TOTAL CARBON
1-5000 BOILER BLOWDOWN UNIT 41
54P-0111A/B
CLEAN STORM WATER TO U.C.T. AS MAKE-UP
STORM WATER TO OFF-PLOT


54TK-0114
OILY WATER DIVERSION AND TRASH REMOVAL SUMP
CAPACITY: 1,000 GAL
54TK-0112A/B
OILY WATER IMPOUNDMENT PONDS
CAPACITY: 3,788,000 GAL (TOTAL)
54TK-0117
CLEAR WATER SUMP
CAPACITY: 2,000 GAL
54CF-0111
SLUDGE CENTRIFUGE
54TK-0118
SLUDGE SUMP
CAPACITY: 8,100 GAL
54ME-0111A/B
OIL RECOVERING UNIT
54ME-0111A/B
(NOTE 2)
TRASH RACK
54TK-0114
FLUOR I VENDOR
DEWATERED SLUDGE CAKE TO INCINERATION UNIT 54
54CF-0111
(NOTE 2)
SLUDGE
54TK-0112A
54TK-0112B
54P-0112A/B
54P-0116A/B
54P-0115A/B
54P-0114A
54TK-0117
54TK-0118


54TK-0119
SKIMMED OIL SUMP
CAPACITY: 1,200 GAL.
54TK-0115
SLUDGE TANK
CAPACITY: 42,000 GAL.
VENDOR FLUOR
54TK-0115
LP STEAM
COND.
SKIMMED OIL
EMULSION AGENT
SKIMMED OIL
SLUDGE
SLUDGE
SKIMMED OIL
SKIMMED OIL
54P-0119A/B
SLUDGE
SKIMMED OIL
SLUDGE
SLUDGE
SLUDGE
SLUDGE
54P-0114A/B
54P-0117A/B
54TK-0119
SKIMMED OIL
SKIMMED OIL TO SLOP TANKS UNIT 55
54P-0118A
DRAWING NO. REV. FRAME
1835704-54-R-101 1 12 OF 2


54TK-0116
SKIMMED OIL TANK
CAPACITY: 42,000 GAL
54ME-0112A/B
AIR FLOTATION UNIT
54TK-0116
LP STEAM
COND.
FLUOR VENDOR
54ME-0112A/B
(NOTE 2)
POLYELECTROLYTE
TOTAL
SKIMMED OIL
SKIMMED OIL
SKIMMED OIL
SLUDGE
SLUDGE
SLUDGE
SKIMMED OIL
54P-0113A/B
54P-0118A/B
50% CAUSTIC SODA FROM BULK STORAGE UNIT 55
98% SULFURIC ACID FROM BULK STORAGE UNIT 55
USE OR DISCLOSURE OF REPORT DATA IS SUBJECT TO THE RESTRICTION ON THE NOTICE PAGE AT THE FRONT OF THIS REPORT
FLUOR
R. WHITE
G. R. ABATAY
W. D'BELMITO
R. McCARTHY
R. LANG



USE OR DISCLOSURE OF REPORT DATA IS SUBJECT TO THE RESTRICTION ON THE NOTICE PAGE AT THE FRONT OF THIS REPORT

NOTES:

1. THE TEMPERATURES, PRESSURES, FLOW QUANTITIES, AND COMPOSITIONS REFERENCED BY DIAMONDS ARE SHOWN ELSEWHERE.
2. SUPPLIED AS VENDOR PACKAGE.

FLUOR

R. WHITE
C. C. ABATAY
R. O'BELLMID
R. McCARTHY
R. LANG

PROCESS FLOW DIAGRAM
WASTE WATER TREATMENT SYSTEM
STORM & OILY WATER COLLECTION SECTION
UNIT 54

CROW TRIBE OF INDIANS — SYNFUELS FEASIBILITY STUDY

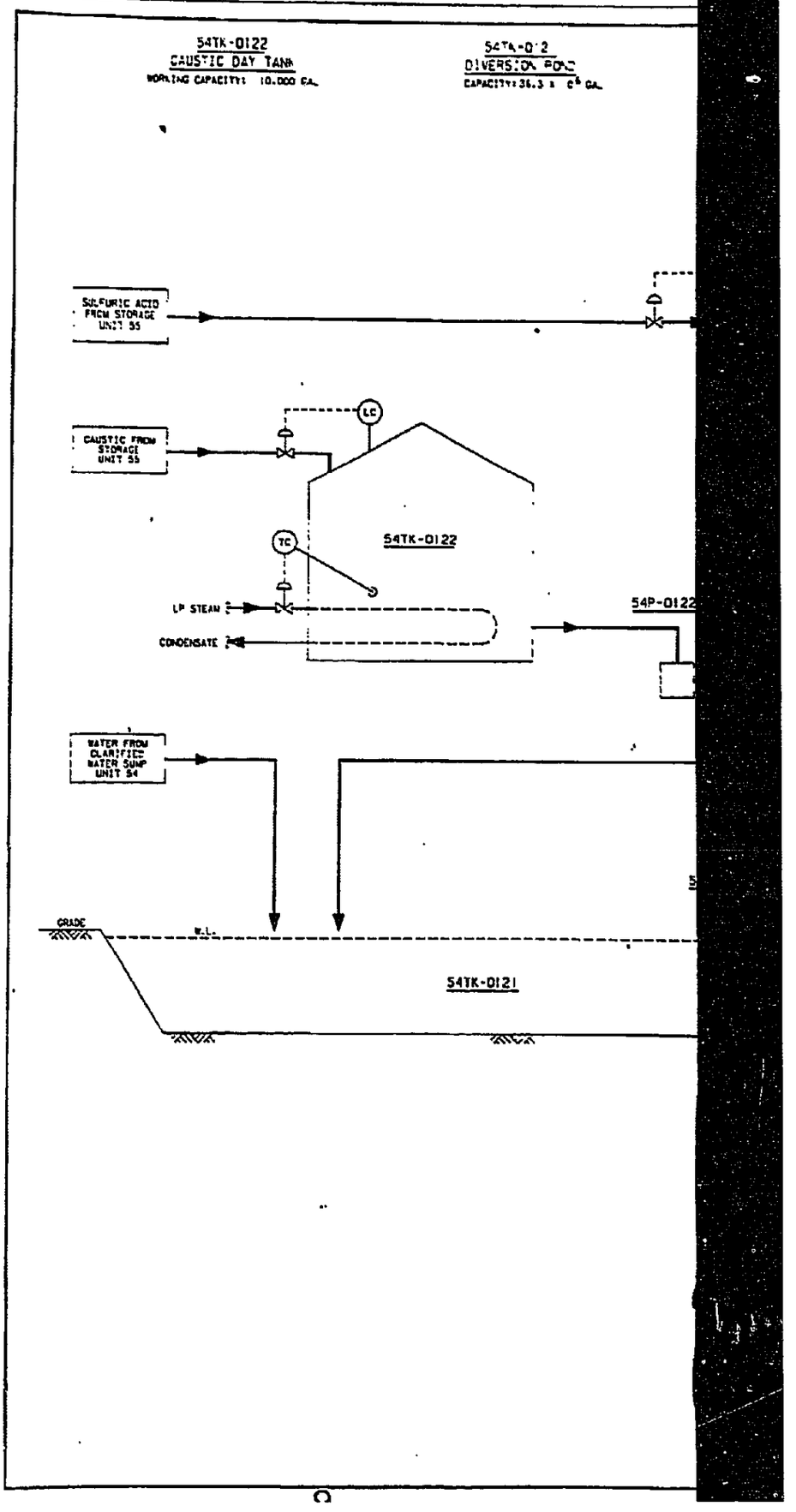
NONE

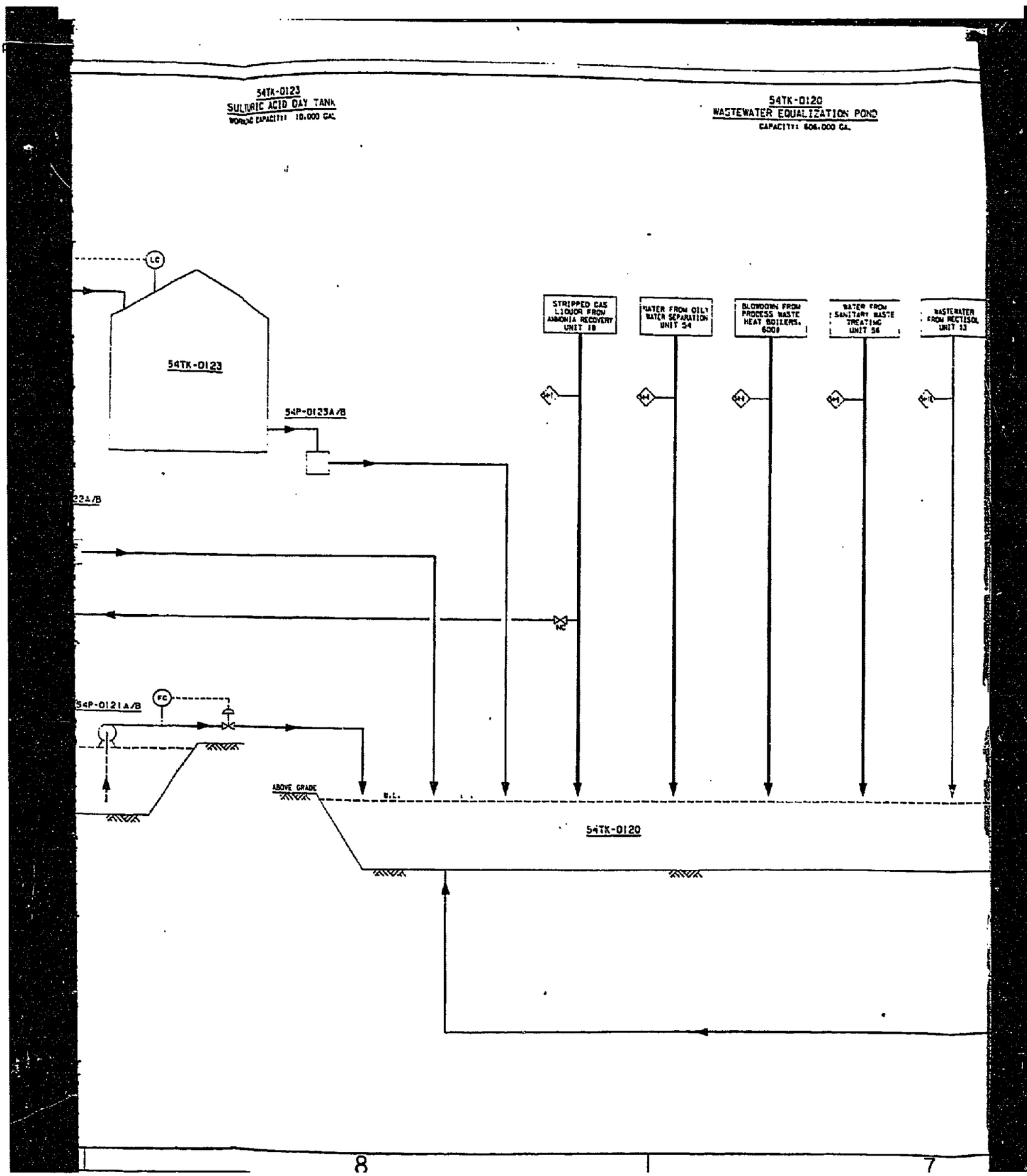
835704-54-R-101

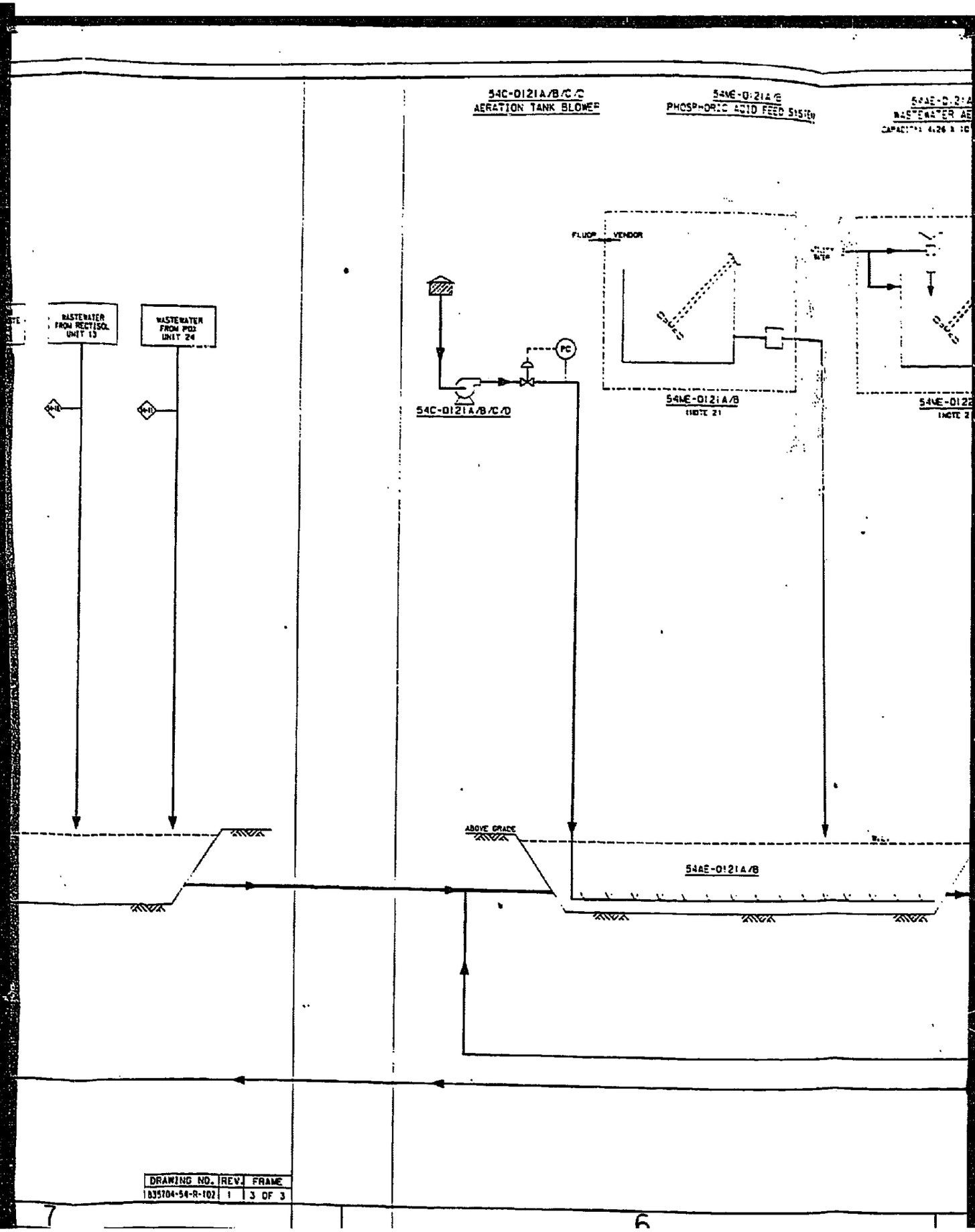
MICROFILM FRAME NO. 1 OF 2

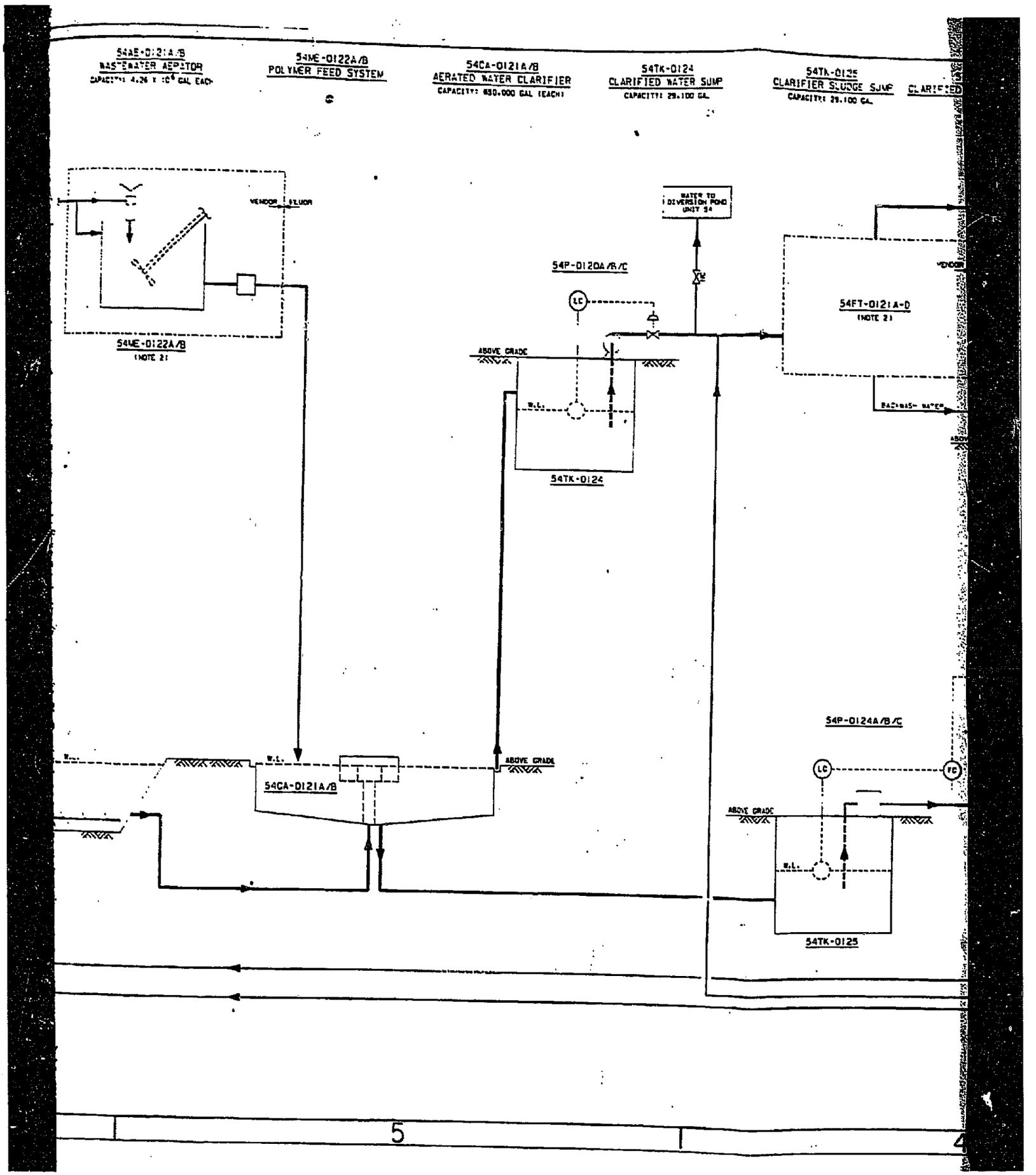
1

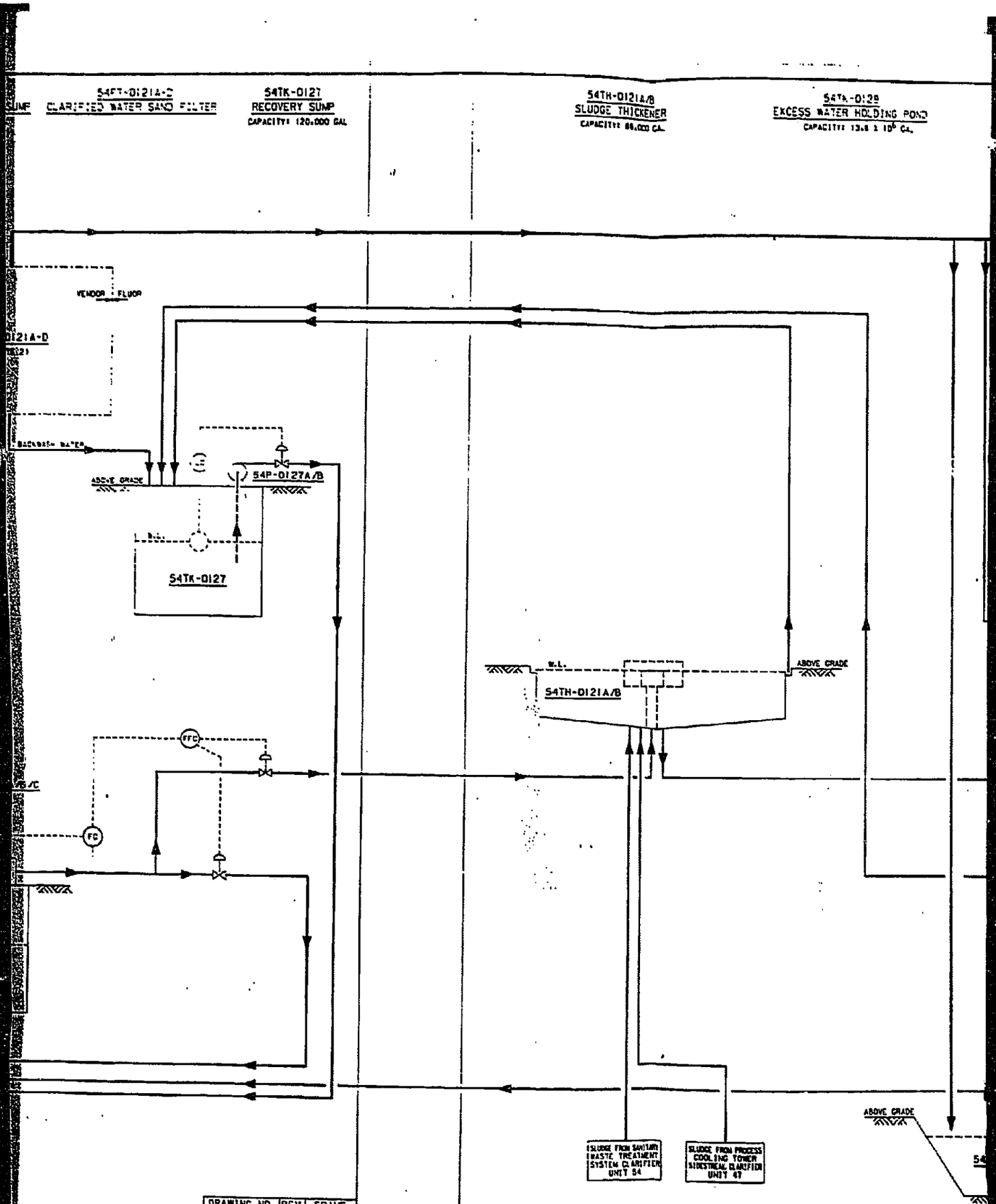
003 35754101


54TK-0122
CAUSTIC DAY TANK
WORKING CAPACITY: 10,000 GAL.
54TK-012
DIVERSION POND
CAPACITY: 36.3 x 6 GAL.
SULFURIC ACID FROM STORAGE UNIT 55
CAUSTIC FROM STORAGE UNIT 55
LC
TC
54TK-0122
LP STEAM
CONDENSATE
54P-0122
WATER FROM CLARIFIED WATER SUMP UNIT 54
GRADE
W.L.
54TK-0121


54TK-0123
SULFURIC ACID DAY TANK
WORKING CAPACITY: 10,000 GAL
54TK-0120
WASTEWATER EQUALIZATION POND
CAPACITY: 606,000 GAL
LC
54TK-0123
54P-0123A/B
STRIPPED GAS LIQUOR FROM AMMONIA RECOVERY UNIT 18
WATER FROM OILY WATER SEPARATION UNIT 54
BLOWDOWN FROM PROCESS WASTE HEAT BOILERS, 6309
WATER FROM SANITARY WASTE TREATING UNIT 56
WASTEWATER FROM RECTISOL UNIT 13
NC
FC
54P-0121A/B
ABOVE GRADE
54TK-0120


54C-0121A/B/C/D
AERATION TANK BLOWER
54ME-0121A/B
PHOSPHORIC ACID FEED SYSTEM
WASTEWATER FROM RECTISOL UNIT 13
WASTEWATER FROM PDU UNIT 24
FLUOR VENDOR
PC
54C-0121A/B/C/D
54ME-0121A/B
54AE-0121A/B
ABOVE GRADE
DRAWING NO. 835704-54-R-102
REV. 1
FRAME 3 OF 3


54AE-0121A/B
WASTEWATER AERATOR
54ME-0122A/B
POLYMER FEED SYSTEM
54CA-0121A/B
AERATED WATER CLARIFIER
CAPACITY: 650,000 GAL (EACH)
54TK-0124
CLARIFIED WATER SUMP
CAPACITY: 29,100 GAL.
54TK-0125
CLARIFIER SLUDGE SUMP
CAPACITY: 29,100 GAL.
VENDOR SUPPLIED
54ME-0122A/B
(NOTE 2)
WATER TO DIVERSION POND UNIT 34
54P-0120A/B/C
LC
54FT-0121A-D
(NOTE 2)
ABOVE GRADE
W.L.
54TK-0124
54CA-0121A/B
54P-0124A/B/C
FC
54TK-0125



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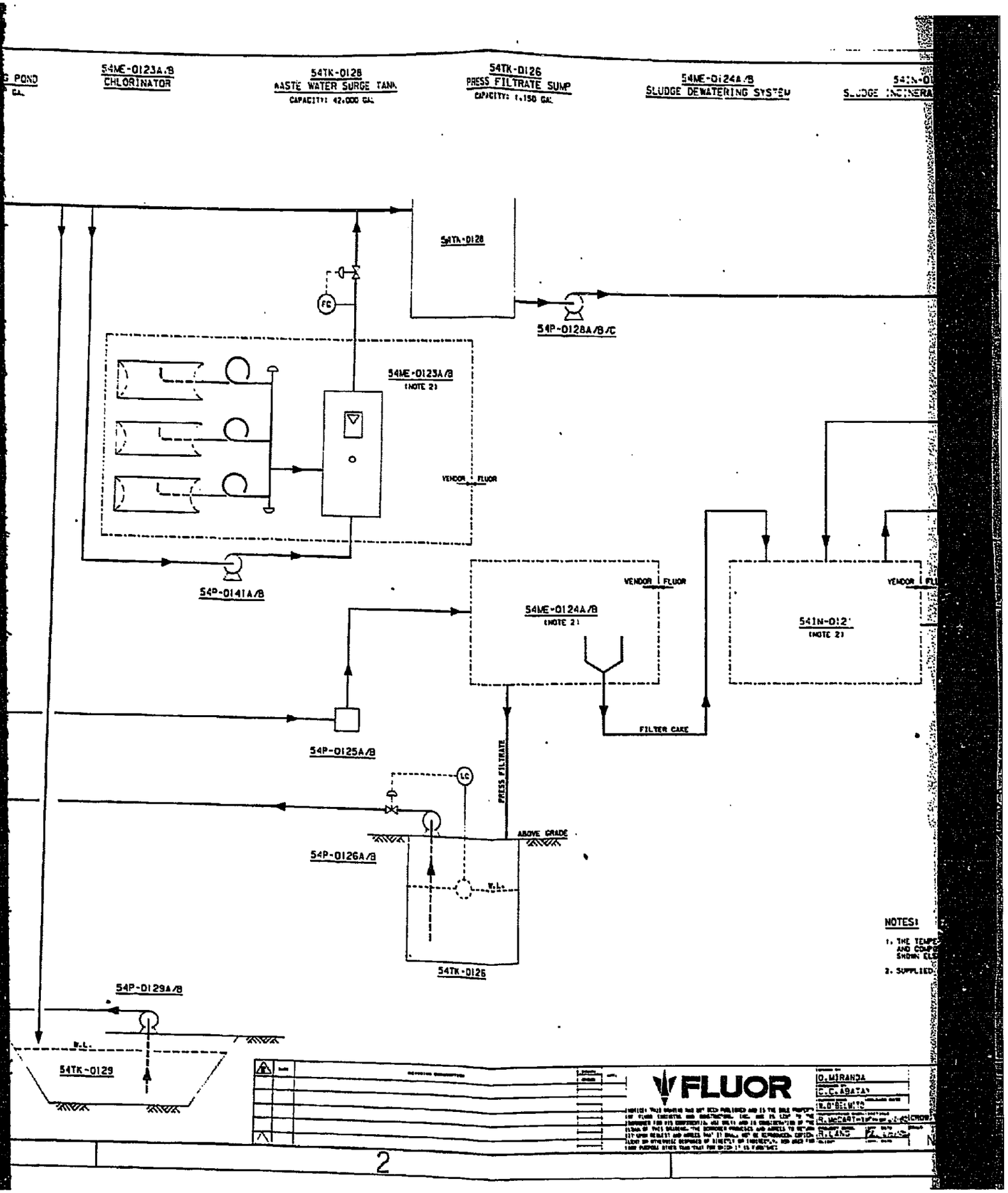
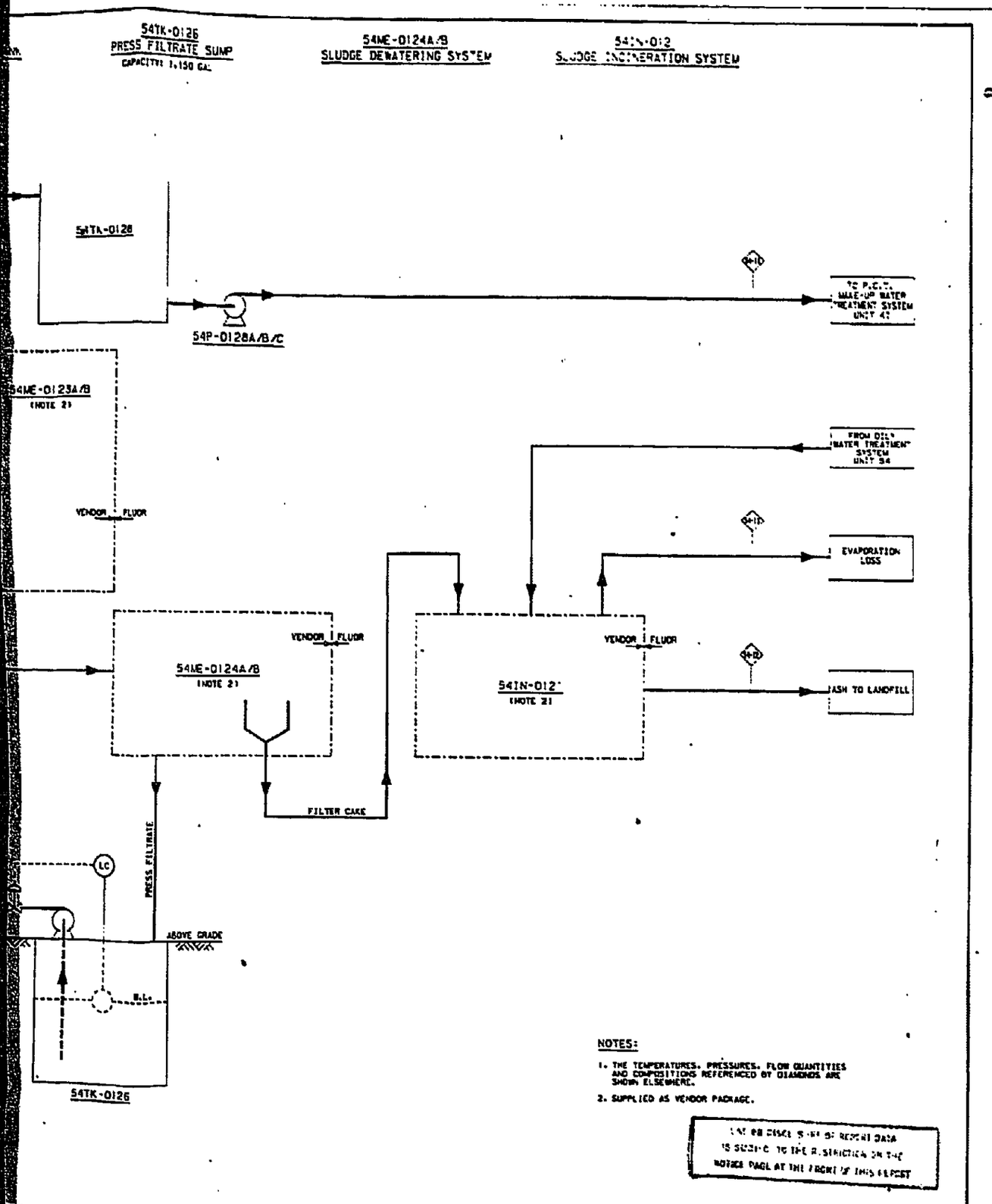

54ME-0123A/B
CHLORINATOR
54TK-0128
WASTE WATER SURGE TANK
CAPACITY: 42,000 GAL
54TK-0126
PRESS FILTRATE SUMP
CAPACITY: 1,150 GAL
54ME-0124A/B
SLUDGE DEWATERING SYSTEM
54TK-0128
54P-0128A/B/C
FC
54ME-0123A/B
(NOTE 2)
VENDOR FLUOR
54P-0141A/B
VENDOR FLUOR
54ME-0124A/B
(NOTE 2)
541N-012
(NOTE 2)
FILTER CAKE
54P-0125A/B
PRESS FILTRATE
LC
ABOVE GRADE
54P-0126A/B
54TK-0126
54P-0129A/B
54TK-0129
NOTES:
1. THE TEMPE
AND COMP
SHOWN EL
2. SUPPLIED
FLUOR
D. MIRANDA
C. C. ABATAY
W. O'BELMITE
R. LAND



NOTES:

1. THE TEMPERATURES, PRESSURES, FLOW QUANTITIES AND COMPOSITIONS REFERENCED BY DIAMONDS ARE SHOWN ELSEWHERE.
2. SUPPLIED AS VENDOR PACKAGE.

FLUOR

M. MIRANDA
W. P. ABATAY
W. D'BELMOTO
R. McCARTHY
R. LANG

PROCESS FLOW DIAGRAM
WASTEWATER TREATMENT
BIOLOGICAL TREATMENT SECTION
UNIT 54

UTE TRIBE OF INDIANS SYNFUELS FEASIBILITY STUDY

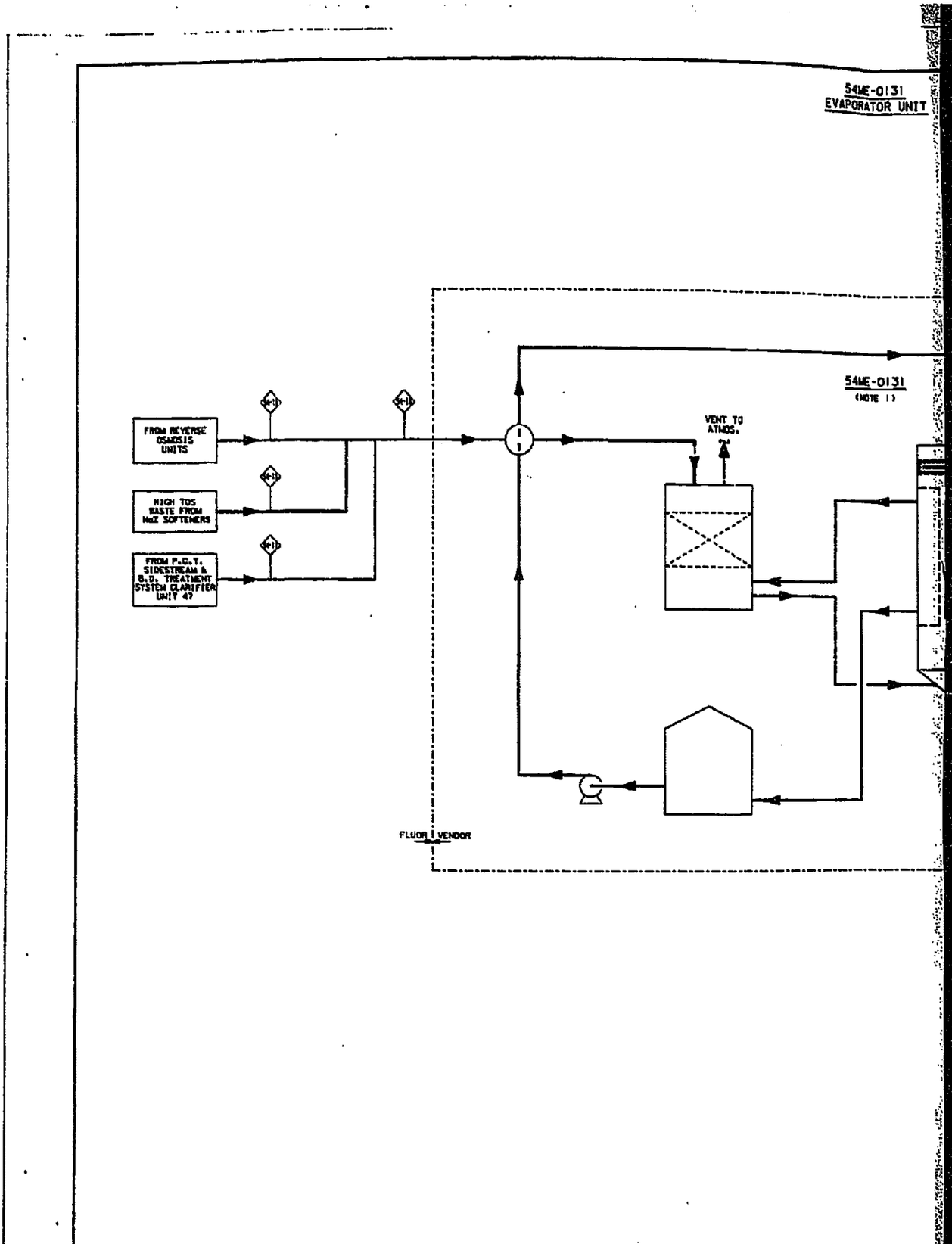
NONE

835704-54-R-102

MICROFILM FRAME 1 OF 3

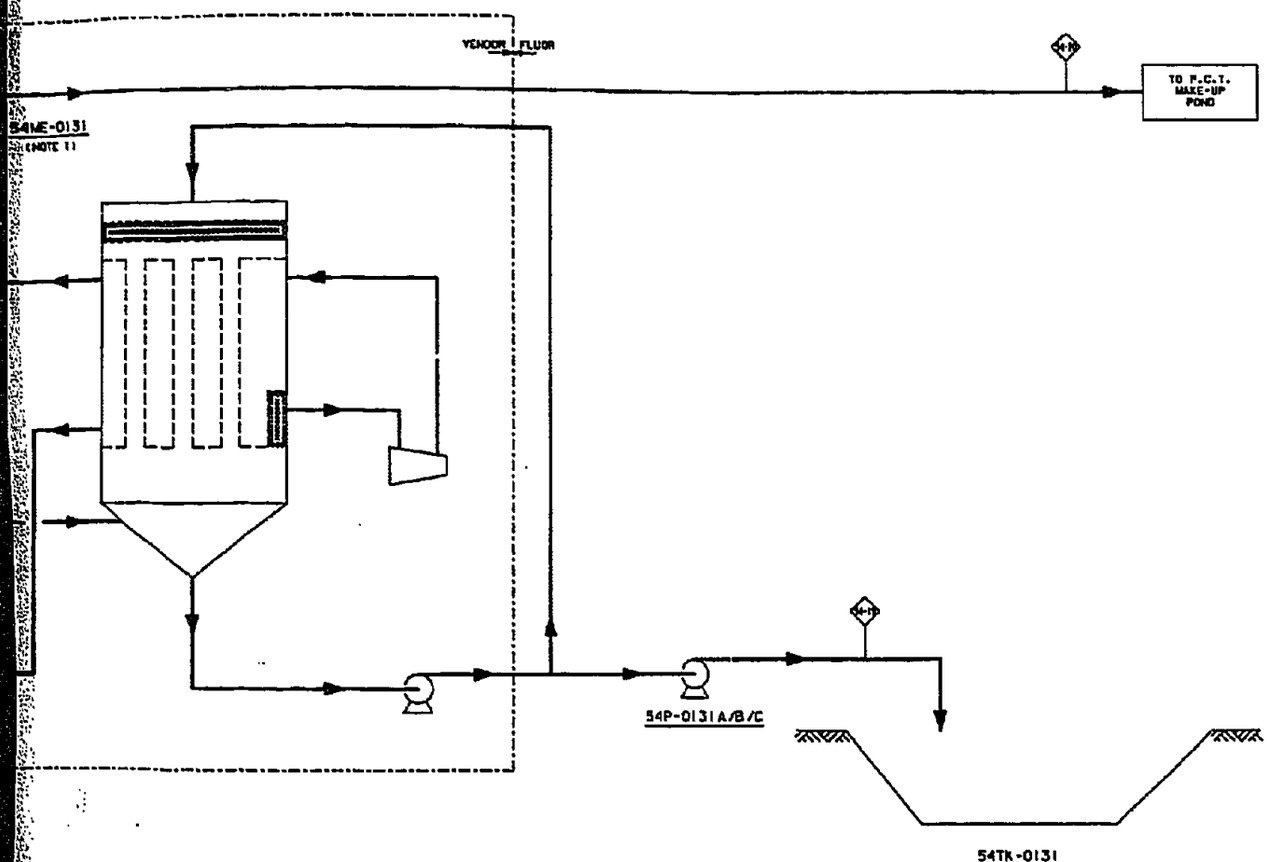
1

003 35754102


54ME-0131
EVAPORATOR UNIT
54ME-0131
(NOTE 1)
FROM REVERSE OSMOSIS UNITS
HIGH TDS WASTE FROM MxZ SOFTENERS
FROM P.C.T. SIDESTREAM & S.D. TREATMENT SYSTEM CLARIFIER UNIT 47
VENT TO ATMOS.
FLUOR VENDOR

54ME-0131
PORATOR UNIT

54TK-0131
SOLAR EVAPORATION POND
CAPACITY: 198 x 10^6 GAL



NOTES:

1. SUPPLIED AS VENDOR PACKAGE.
2. THE TEMPERATURES, PRESSURES, FLOW QUANTITIES, AND COMPOSITIONS REFERENCED BY DIAMONDS ARE SHOWN ELSEWHERE.

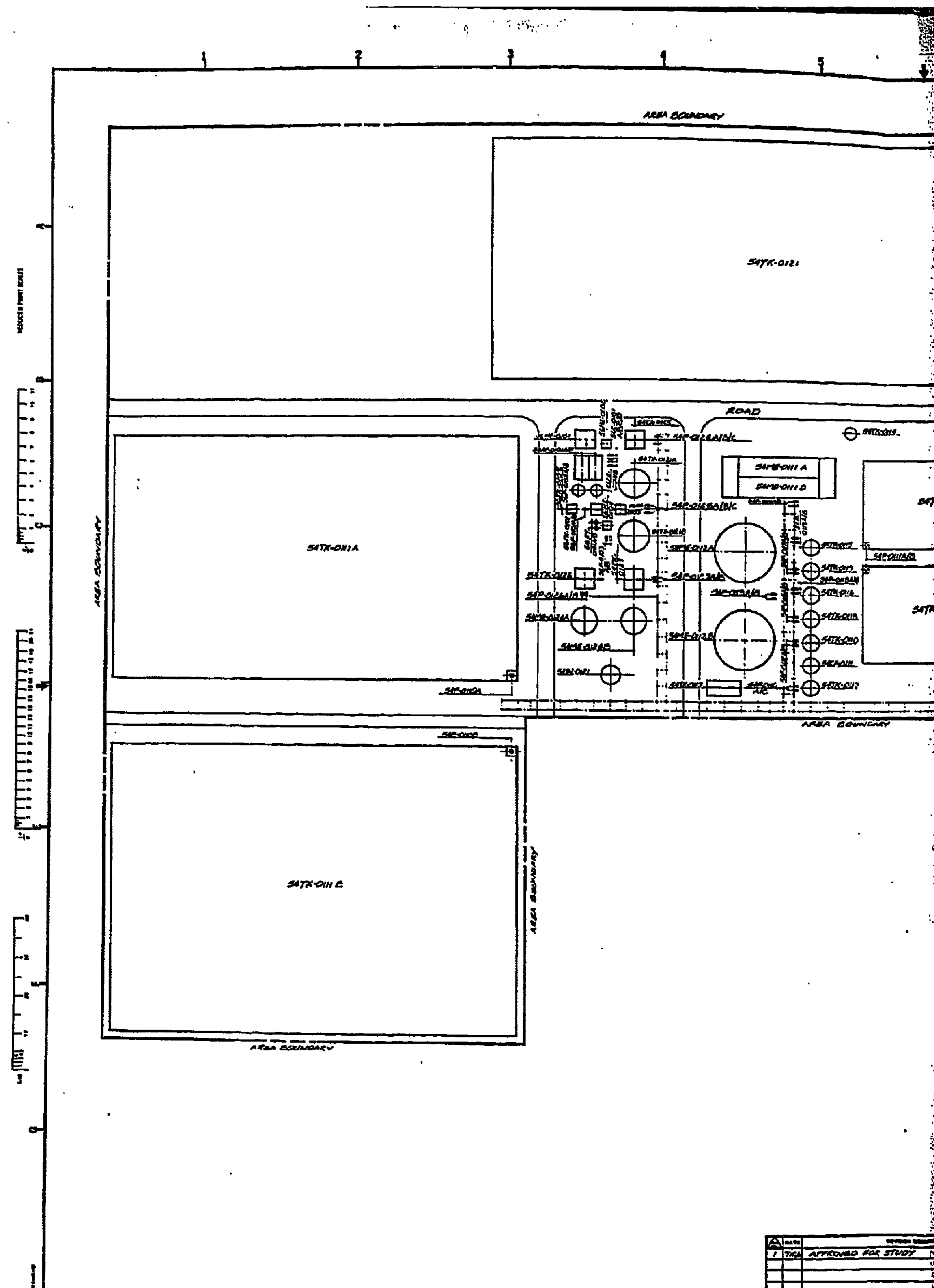
FLUOR

DRAWN BY	R. WHITE
	C.C. ABATAY
	W.O. DELMITO
APPROVED	R. McCARTHY
	R. LANG

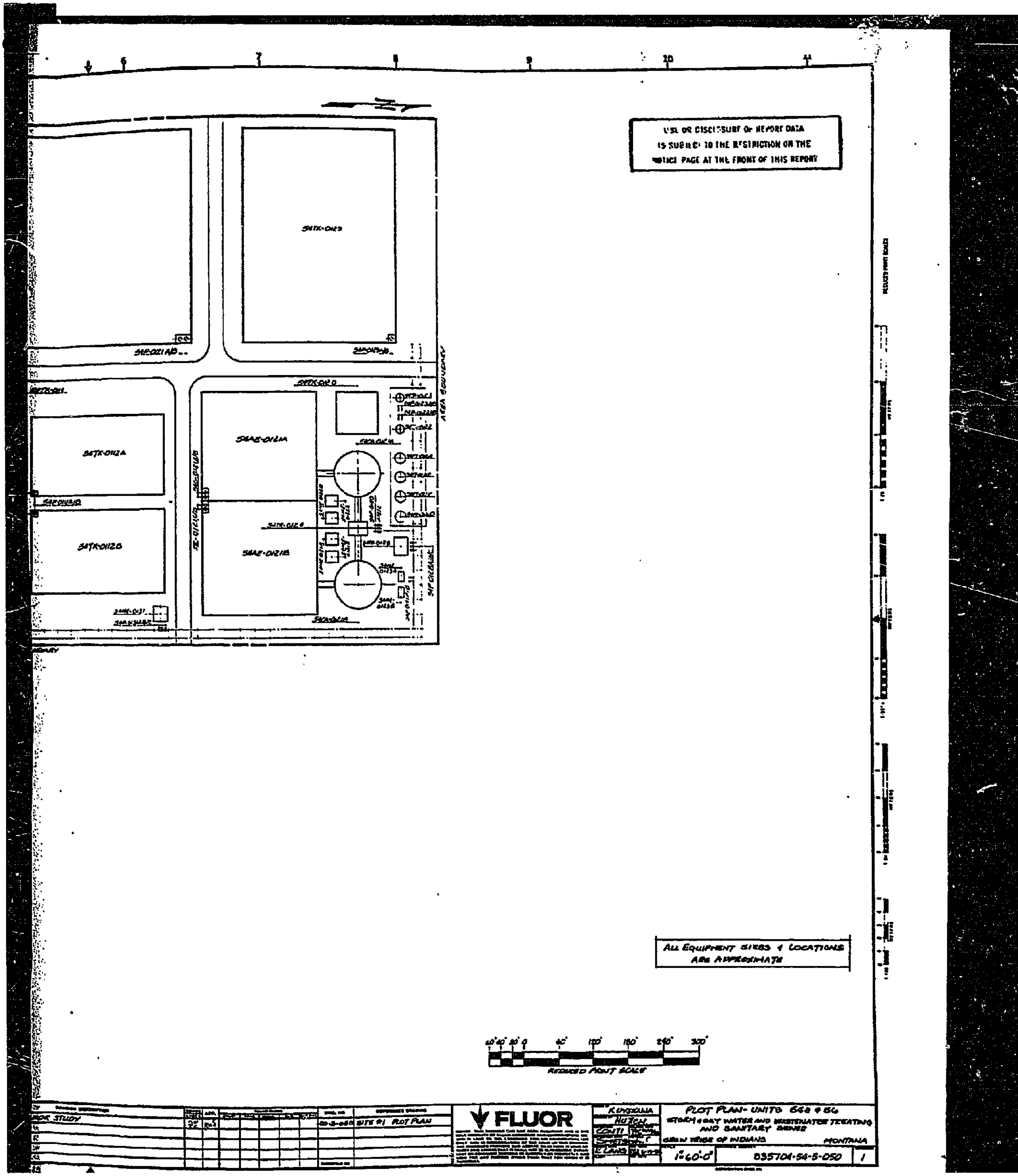
PROCESS FLOW DIAGRAM
WASTEWATER TREATMENT - WASTEWATER EVAPORATION SECTION
UNIT 54
CROW TRIBE OF INDIANS — SYNFUELS FEASIBILITY STUDY

NONE	835704-54-4-103	1

003 35754103



1
2
3
4
5
AREA BOUNDARY
54TK-0121
ROAD
54TK-0111A
54TK-0111B
AREA BOUNDARY
AREA BOUNDARY
AREA BOUNDARY
APPROVED FOR STUDY



USE OR DISCLOSURE OF REPORT DATA IS SUBJECT TO THE RESTRICTION ON THE NOTICE PAGE AT THE FRONT OF THIS REPORT
ALL EQUIPMENT SIZES & LOCATIONS ARE APPROXIMATE
REDUCED PRINT SCALE
FLUOR
PLOT PLAN - UNITS 64 & 66
AND SANITARY SEWER
MONTANA
1" = 60'-0"
835704-54-5-050
1

TABLE 6.3.15-2

EQUIPMENT LIST

WASTEWATER TREATING - UNIT 54

Item No.	Equipment Name	Number Required Oper.	Spare
Storm & Oily Water Collection System			
54TK-0113	Storm Water Diversion and Trash Removal Sump	1	0
54TK-0114	Oily Water Diversion and Trash Removal Sump	1	0
54TK-0111 A/B	Clean Storm Water Impoundment Ponds	1	1
54TK-0112 A/B	Oily Water Impoundment Ponds	1	1
54TK-0111	Slop Oil Tank	1	0
54TK-0115	Sludge Tank	1	0
54TK-0116	Skimmed Oil Tank	1	0
54TK-0118	Sludge Sump	1	0
54TK-0117	Clear Water Sump	1	0
54TK-0119	Skimmed Oil Sump	1	0
54P-0110 A/B	Clean Storm Water Pump	1	1
54P-0111 A/B	Clean Oily Water Pump	1	1
54P-0112 A/B	Slop Oil Pump	1	1
54P-0113 A/B	D.A.F. Sludge Pump	1	1
54P-0113 A/B	Oil Separator Sludge Pump	1	1
54P-0115 A/B	Sludge Sump Pump	1	1

TABLE 6.3.15-2 (Continued)

EQUIPMENT LIST

WASTEWATER TREATING - UNIT 54

Item No.	Equipment Name	Number Required Oper.	Spare
Storm & Oily Water Collection System			
54P-0116 A/B	Clear Water Sump Pump	1	1
54P-0117 A/B	Skimmed Oil Sump Pump	1	1
54P-0118 A/B	Skimmed Oil Pump	1	1
54P-0119 A/B	Skimmed Oil Tank Pump	1	1
54CF-0111	Sludge Centrifuge	1	0
54ME-0111 A/B	Oil Recovering Unit	1	1
54ME-0112 A/B	Air Flotation Unit	1	1
Biological Treatment Section			
54TK-0120	Wastewater Equalization Pond	1	0
54TK-0121	Diversion Pond	1	0
54TK-0122	Caustic (50%) Storage Tank	1	0
54TK-0123	Sulfuric Acid Tank	1	0
54TK-0124	Clarified Water Sump	1	0
54TK-0125	Clarifier Sludge Sump	1	0
54TK-0126	Press Filtrate Sump	1	0
54TK-0127	Recovery Sump	1	0
54TK-0128	Wastewater Surge Tank	1	0

TABLE 6.3.15-2 (Continued)

EQUIPMENT LIST

WASTEWATER TREATING - UNIT 54

Item No.	Equipment Name	Number Required Oper.	Spare
Biological Treatment Section			
54TK-0129	Treated Effluent Pond		
54AE-0121 A/B	Wastewater Aeration	1	1
54CA-0121 A/B	Aerated Water Clarifier	1	1
54TH-0121 A/B	Sludge Thickener	1	1
54P-0120 A/B/C	Clarified Water Sump Pump	2	1
54P-0121 A/B	Diversion Pond Pump	1	1
54P-0122 A/B	Caustic Injection Pump	1	1
54P-0123 A/B	Sulfuric Acid Injection Pump	1	1
54P-0124 A/B/C	Clarifier Sludge Sump Pump	2	1
54P-0125 A/B	Sludge Thickener Pump	1	1
54P-0126 A/B	Press Filtrate Sump Pump	1	1
54P-0127 A/B	Recovery Sump Pump	1	1
54P-0128 A/B/C	Treated Wastewater Pump	2	1
54P-0129 A/B	Treated Effluent Pump	1	1
54P-0141 A/B	Chlorination Pump	1	1
54C-0121 A-D	Aeration Tank Blower	2	2

TABLE 6.3.15-2 (Continued)

EQUIPMENT LIST

WASTEWATER TREATING - UNIT 54

Item No.	Equipment Name	Number Required Oper.	Spare
Biological Treatment Section			
54ME-0112 A/B	Phosphorus Feed System	1	1
54ME-0122 A/B	Polymer Feed System	1	1
54ME-0123 A/B	Chlorinator	1	1
54ME-0124 A/B	Sludge Dewatering System	1	1
54FT-0121 A-D	Clarified Water Sand Filter	3	1
54IN-0121	Sludge Incineration System	1	0

TABLE 6.3.15-2 (Continued)

EQUIPMENT LIST

WASTEWATER TREATING - UNIT 54

Item No.	Equipment Name	Number Required Oper.	Spare
Wastewater Evaporation Section			
54TK-0131	Solar Evaporation Pond	1	0
54ME-0131	Evaporator Unit	1	0
54P-0131 A/B/C	Solar Evaporation Pond Pump	2	1

6.3.16 TANK FARM AND DISPATCH - UNIT 55

6.3.16.1 DESIGN BASIS

Purpose of Unit

Unit 55, Tank Farm and Dispatch, is to provide storage and loading facilities for raw materials delivered to the plant and finished products leaving the plant, and storage for intermediate process products.

Scope of Unit

The raw material storage area includes tankage for isopropyl ether, propylene, sulfuric acid, caustic, and sodium chloride brine.

The finished product storage area includes tankage and loading equipment for ammonia, molten sulfur, and hydrotreated naphtha. This area includes an emergency flare for the ammonia and propylene pressurized storage equipment.

The intermediate products storage area includes storage for such process streams as methanol, naphtha hydrotreater feed, tar distillation feed, partial oxidation unit feed, and light and heavy slops collection.

General Design Criteria

Each storage area has individual design considerations. These are presented in summary form in Table 6.3.16-1.

6.3.16.1 (Continued)

Each storage area has requirements for safety and emission devices. These requirements include:

For low boiling highly volatile liquids: e.g., IPE, a dome roof tank with nitrogen blanketing,

For ammonia: insulation, refrigeration for atmospheric pressure storage, and vapor recovery,

For propylene: insulation, pressurized storage and vapor recovery,

For methanol: atmospheric pressure storage and vapor recovery,

For molten sulfur: steam coils to maintain temperature, insulation, and a nitrogen blanket,

For light oils: agitation and a double sealed, floating roof tank,

For heavy oils: circulation heaters, agitation, insulation, and a nitrogen blanket,

For water/oil mix tanks: agitation, steam coils for winterization,

For aqueous raw materials tanks: steam coils for winterization, with insulation, and agitation if necessary.

All agitators and pumps are motor driven and spared.

6.3.16.1 (Continued)

Storage and Battery Limit Conditions

Product	Temperature, °F	Vapor Pressure, psia @ Corresponding Temperature
Ammonia	-30	13.5
Naphtha	100	4.0
Molten Sulfur	290	-
Intermediate Storage		
Methanol	100	3.6
Naphtha HTR Feed	120	4.0
Crude Tars Feed	150	0.2
POX Feed	140	0.2
Water/Oil Mixtures	100	1.0
Raw Materials		
IPE	100	5.4
Propylene	100	250.0
Sodium Hydroxide	100	1.0
Sulfuric Acid	100	1.0

Utility Requirements

Power	550 kW
Steam 100 psig	21,800 lb/hr
CW	75 gpm
Condensate Produced	19,000 lb/hr

6.3.16.? UNIT DESCRIPTION

Tank Farm and Dispatch areas consist of systems to provide storage, transfer and dispatch of various liquid products produced in the plant. The flow diagrams of the tank farm areas are Drawing Nos. 835704-55-R-101, 835704-55-4-102, 835704-55-4-103, 835704-55-4-104, 835704-55-R-105, 835704-55-4-106, and 835704-55-4-107. The unit material balance (Table 6.3.16-2) follows the drawings. The plot plan is on Drawing No. 835704-55-5-050; the equipment list is given in Table 6.3.16-3.

The following systems are included in the Tank Farm and Dispatch areas:

Methanol Storage and Handling
Tar and Oil Storage and Handling
Pressurized Propylene Storage and Handling
Ammonia Storage and Handling
Molten Sulfur Storage and Handling
Miscellaneous Chemicals Storage and Handling
Product Dispatch and Chemical Unloading
Propylene and Ammonia Flare

Tankage design criteria are tabulated in Table 6.3.16-1 for the above systems. Additional parameters considered in the design include the following:

Ammonia Refrigeration
Liquid ammonia storage at -30°F
Ammonia rundown from process unit of 6400 lb/hr at 68°F, 200 psig.
Propylene storage tank refrigeration equivalent to vaporizing 180 lb/hr of ammonia at 34°F.
Vapor recovery from ammonia loading equivalent to 70 lb/hr at 40°F.
Two parallel 100 percent capacity reciprocating compressors are provided for the refrigeration system.

6.3.16.2 (Continued)

METHANOL STORAGE AND TRANSFER

This system provides 60 days storage for makeup methanol for the Rectisol Unit 13 flowing from the Methanol Synthesis Unit 21. The cone roof tank has 5000 bbl capacity with a package vapor compression recovery unit mounted above the cone to recover the vapor generated during hot weather.

The flow into the tank is variable from 0 to 7 gpm; the rate at which makeup methanol is used in Rectisol is 2 gpm.

TAR AND OIL WORKUP - STORAGE AND TRANSFER

This system provides rundown/intermediate storage and handling facilities for:

Crude Tar Feed to the Tar Distillation Unit 15
Mixed Naphtha Feed to the Naphtha Hydrotreating Unit 16
Tar/Oil and Phenol Feed to the Partial Oxidation Unit 24

Crude Tar Tankage

The crude tar feed tank provides 14 days storage for feed to the Tar Distillation Unit 15. This capacity is based on operating experience. One API-650 tank is insulated and equipped with a mechanical agitator and a mixing eductor to keep coal fines and other particulate matter in suspension, and to mix the feed components prior to pumping to the Tar Distillation Unit. A pump and circulating heat exchanger is provided to circulate and heat the tank contents to 150°F; heater discharge enters the tank through a mixing eductor. Cleanout doors are provided to facilitate periodic removal of sludge. Nitrogen blanketing is utilized to prevent air

6.3.16.2 (Continued)

intrusion. This tank is operated half full to provide surge when the Tar Distillation unit is down.

Naphtha HDT Feed Tankage

The Tar Distillation naphtha/Recitsol naphtha feed tank provides storage for mixed naphtha feed to the Naphtha Hydrotreating Unit 16. The API-650 tank with floating roof has a nominal capacity of 20,000 barrels, based on a 14-day feed storage.

Partial Oxidation

One API-650 tank is provided to store Partial Oxidation (POX) Unit 24 feed. The feed material is a blend of tar/oil from Tar Distillation and crude phenol from Phenosolvan. The tank has a nominal capacity of 30,000 barrels, based on a 14-day storage. Under normal operating conditions, material in the tank is maintained at a low level to provide surge for the upstream units. The tank is equipped with mechanical agitators to keep particulate matter in suspension and minimize component separation. Steam coils are provided to maintain a minimum storage temperature of 140°F The tank is insulated and nitrogen blanketed.

The short residence time and nitrogen blanketing are desirable from the standpoint that the feed degrades in storage. Provision is made to transfer the degraded feed to the crude tar feed tank for eventual reprocessing in the Tar Distillation unit.

Clean Slop Tankage

Two tanks are provided to store oil slops recovered from the oil/water separation units, one for heavy slop and one for light slop. This slop oil

6.3.16.2 (Continued)

is recycled to the Tar Distillation unit for reprocessing or to the boilers for use as fuel.

The tanks are API-650 floating roof type with a nominal capacity of 5,000 barrels. The heavy slop tank is insulated and has steam coil heating.

PROPYLENE STORAGE

A 1300 bbl bullet provides storage for makeup propylene refrigerant. The size of the 100°F, 250 psig storage vessel is based on a one year use of propylene totaling 258,000 lb. A vapor recovery heat exchanger with ammonia refrigeration condenses propylene vapor for return to storage. The propylene tank relieves to the tank farm flare.

Proyplene is loaded to the tank from rail cars by a pump with propylene vapor vented during loading to the rail car.

The propylene refrigerant is pumped from the tank to the Rectisol Unit 13 as needed.

AMMONIA-STORAGE, REFRIGERATION AND TRANSFER

The ammonia storage and loading facility receives liquid ammonia from the Ammonia Recovery unit. The facility includes an atmospheric refrigerated storage tank, a refrigeration system, and an ammonia loading and vapor recovery system.

Ammonia Storage

Liquid ammonia product from the Ammonia Recovery unit flows through the refrigeration system to an atmospheric storage tank. The tank has a

6.3.16.2 (Continued)

nonminal capacity of 32,300 barrels based on 60 days of ammonia storage at a production rate of 76.7 T/D. The tank operates at -30°F with a corresponding pressure of 1 psig to 2 inches of H_2O vacuum. The tank is a single wall construction with single layer cold insulation on the shell and an integral insulated suspended deck. To prevent frost heaving, an electric heater is provided under the tank to maintain a constant 40°F ground temperature.

Ammonia Refrigeration

A conventional vapor-compression refrigeration system is provided to maintain the ammonia atmospheric storage at the corresponding liquid temperatures.

ISOPROPYL ETHER STORAGE AND TRANSFER

This system receives isopropyl ether from sources outside the plant, through rail tanker off-loading facilities. The system consists of tanks for bulk storage of IPE and pumps to transfer IPE to the plant users.

IPE Storage

One bulk storage tank with a nominal capacity of 5,480 barrels is provided. The storage capacity is based on containing the IPE inventory of the Phenosolvan unit.

The IPE storage tanks are insulated to reduce vapor losses and degradation of material due to heating by solar radiation.

6.3.16.2 (Continued)

SULFUR STORAGE AND DISPATCH

The sulfur storage area consists of systems to provide molten sulfur storage and product dispatch.

Major design parameters of the system consist of the following:

Continuous molten sulfur rundown rate from Unit 19 of 7,270 lb/hr.

Molten sulfur storage capacity equivalent to 30 days production.

Rail loading facilities for loading of molten sulfur product on an eight-hour per day, five days per week loading schedule.

The sulfur storage and dispatch system consists of the following units:

Molten Sulfur Storage

Molten Sulfur Dispatch

Molten Sulfur Storage

Molten sulfur rundown is stored in a cone roof tank with a gross capacity of 8,600 barrels. The tank is insulated. A storage temperature of 290°F is maintained by steam heating the tank both internally and externally.

Molten sulfur is pumped to rail cars for shipment.

6.3.16.2 (Continued)

BULK CHEMICAL STORAGE AND HANDLING

Chemical storage includes tanks for:

Sulfuric Acid	96% - 98%	solution
Caustic Soda	50%	solution
Sodium Chloride Brine	Saturated	Solution

The caustic soda and sulfuric acid tanks are cone roof and of carbon steel construction since high concentrations of these chemical do not attack carbon steel. The sulfuric acid is nitrogen blanketed to exclude water vapor from the tank. Each chemical is pumped from the tank, as needed, to the water treatment and cooling water day-tanks.

Sodium chloride brine is used for regeneration of sodium zeolite softeners in the water treatment units of the plant. Trucked in as solid salt, the sodium chloride is dissolved in the brine tank within Unit 55 and pumped as saturated solution to be diluted to 10 percent in the user units. The rate of use of brine is 1,530 gallons per day representing 31,987 lb NaCl/day.

NITROGEN BLANKETING

The IPE storage tanks are nitrogen blanketed. The tank pressure varies according to temperature changes of the tank contents. However, a minimum pressure of 1.0 psig is maintained by the nitrogen blanketing system. Vapor in the tanks is vented to the atmosphere whenever the internal pressure reaches 2.0 psig.

6.3.16.2 (Continued)

The nitrogen blanketing system is designed for the maximum inbreathing requirement based on the liquid pumpout rate and thermally induced inbreathing.

A backup nitrogen system is supplied for the tank farm. The system is designed for operation with bottled nitrogen when the plant nitrogen system is not operating.

PRODUCT DISPATCH AND CHEMICALS RECEIVING

The primary functions of the dispatch and receiving areas are the dispatch of finished products and the receiving of commodities imported for consumption in the process units. All chemicals receiving facilities are located in this area.

Ammonia Dispatch

Liquid ammonia is dispatched by truck or rail tankers. Ammonia is transferred from storage at -30°F by the ammonia loading pumps. Two 100 percent capacity pumps are provided for the atmospheric ammonia storage tank.

Due to the material limitations of the trucks and rail tankers, the ammonia is heated to 40°F in a series of heat exchangers, and the water content is adjusted by condensate water addition to 0.2 to 0.5 weight percent. One loading station is provided for ammonia dispatch.

Substitute Natural Gas (SNG) Dispatch

SNG is dispatched by pipeline. It is delivered to the plant boundary at a pressure of 1430 psig and a temperature of 100°F.

6.3.16.2 (Continued)

Isopropyl Ether Unloading

IPE is delivered by rail to the plant and is pumped to the IPE storage tanks. While IPE is in the tanks, it is analyzed for peroxide content and treated with reducing agents to destroy peroxides. The IPE has stabilizers added to retard oxidation as required.

OFFSITE AMMONIA AND PROPYLENE FLARE AND RELIEF SYSTEM

An offsite ammonia and propane flare and relief system is provided. The system is provided to protect the Unit 55 ammonia and propylene tanks and equipment form overpressure conditions and to relieve and dispose of the vapors generated when these conditions occur.

The system consists of safety pressure relief valves, automatically operated pressure control valves, piping system (to gather and dispose of the vapors relieved through these valves), and a flare (to incinerate the vapors).

Relief and Gathering System

A relief and gathering system is provided. The system includes a closed subsystem to collect and transfer the relieved vapors to the offsite flare for elevated burning. The propylene tanks are equipped with relief valves open to the atmosphere to relieve vapors generated if a fire occurs and/or to back up the closed subsystem to protect the equipment if the closed subsystem fails.

The relief and gathering system has a low pressure/low temperature header for ammonia and a moderate pressure/very low temperature header for propylene. The headers are continuously purged with nitrogen to keep air out of the system and to prevent an internal explosion.

6.3.16.2 (Continued)

An in-line steam heater is provided in the propylene header to warm vapors so that more economical materials can be used for the construction of knockout drum, flare stacks and piping.

A liquid knockout drum is provided in the system to separate any liquid which might be released. Liquid streams could be released in small amounts only from pump vents or equipment drains. Liquid from overfilling of tanks is an unlikely occurrence and has not been considered in the design of the flare system.

The liquid knockout drum is located at the base of the flare stack. The drum is provided with jacket steam heating to vaporize any liquid accumulated for disposal, and to protect the vessel from exposure to low temperatures. The drum and associated piping is constructed of killed carbon steel to provide the notch toughness required in the event of steam jacket failure.

Design Loads

The controlling case in the design of the flare is a general power failure. Under this condition, the ammonia refrigeration compressor shuts down, and vapors are generated form the propylene and ammonia storage systems.

The maximum simultaneous loads controlling the design of the flare are tabulated below:

Ammonia at -30°F: 2,000 lb/hr

Propane at -40°F: 750 lb/hr

6.3.16.2 (Continued)

Flare Stack and Incineration Considerations

One stack is provided to incinerate vapor from the ammonia and hydrocarbon flare headers. Because of the low heating value of the ammonia vapor, propylene is used as an assist gas to maintain the combustion of these vapors. A flow switch located in the ammonia flare header automatically opens the propylene supply to the flare. This valve can be subsequently controlled by the operator to regulate the amount of propylene needed for proper combustion.

Smokeless flaring is not considered in the design of the flare. However, a permanent steam connection to the assist gas supply line is provided to manually inject steam for cooling or smoke control as is required.

A flame front generator is provided to light the pilots for the flare. Propylene and instrument air are used to produce the combustible mixture to generate the flame. Duplicate ignitors are provided for the flare to improve system reliability.

Limitations

1. No liquid relief loads have been considered other than small amounts generated by venting or draining of pumps and similar equipment, or by unexpected overfilling of equipment not coincidental with vapor discharges.

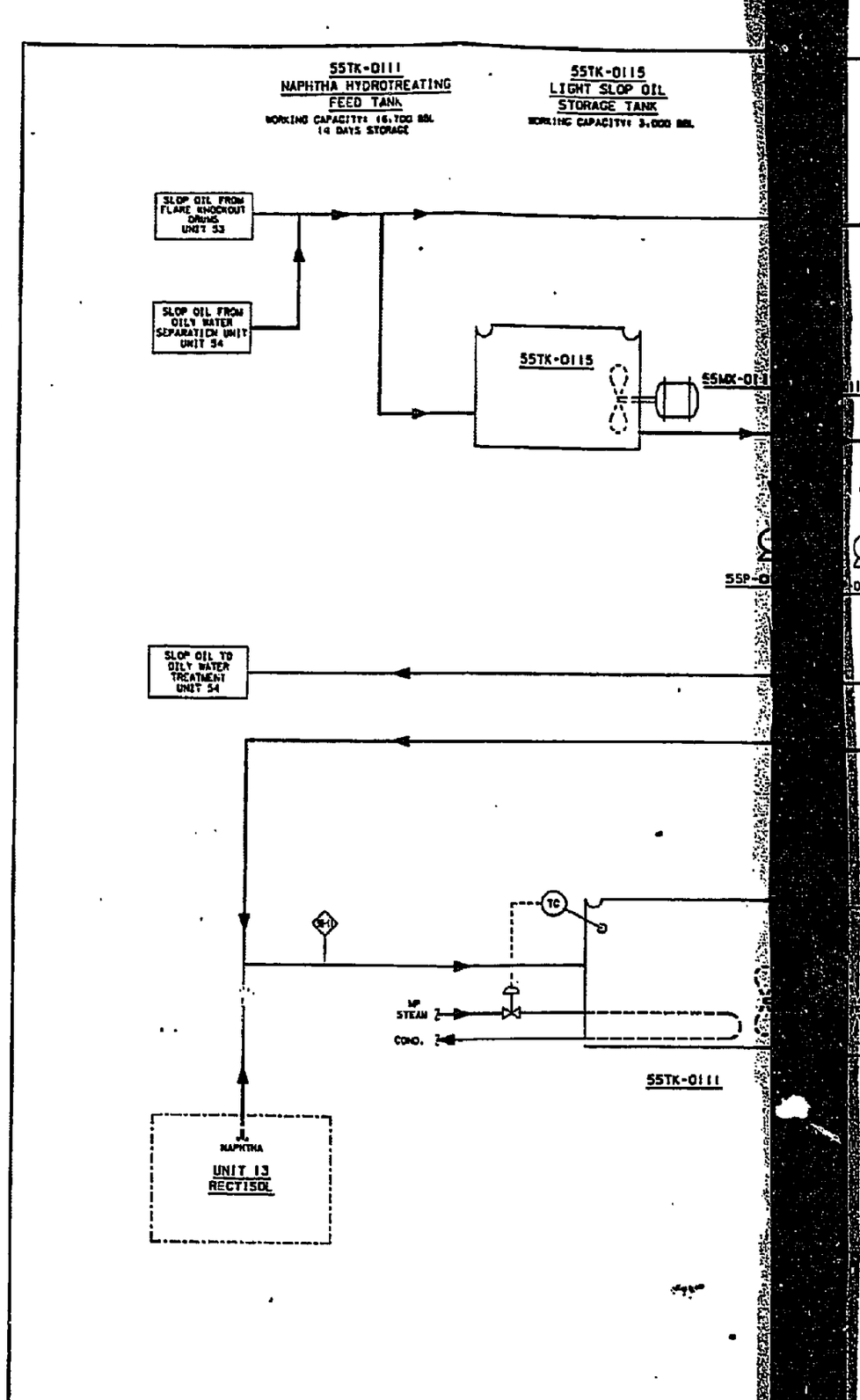
2. The system is not designed to collect and flare rundown streams. These streams should be collected and relieved or disposed of onsite.

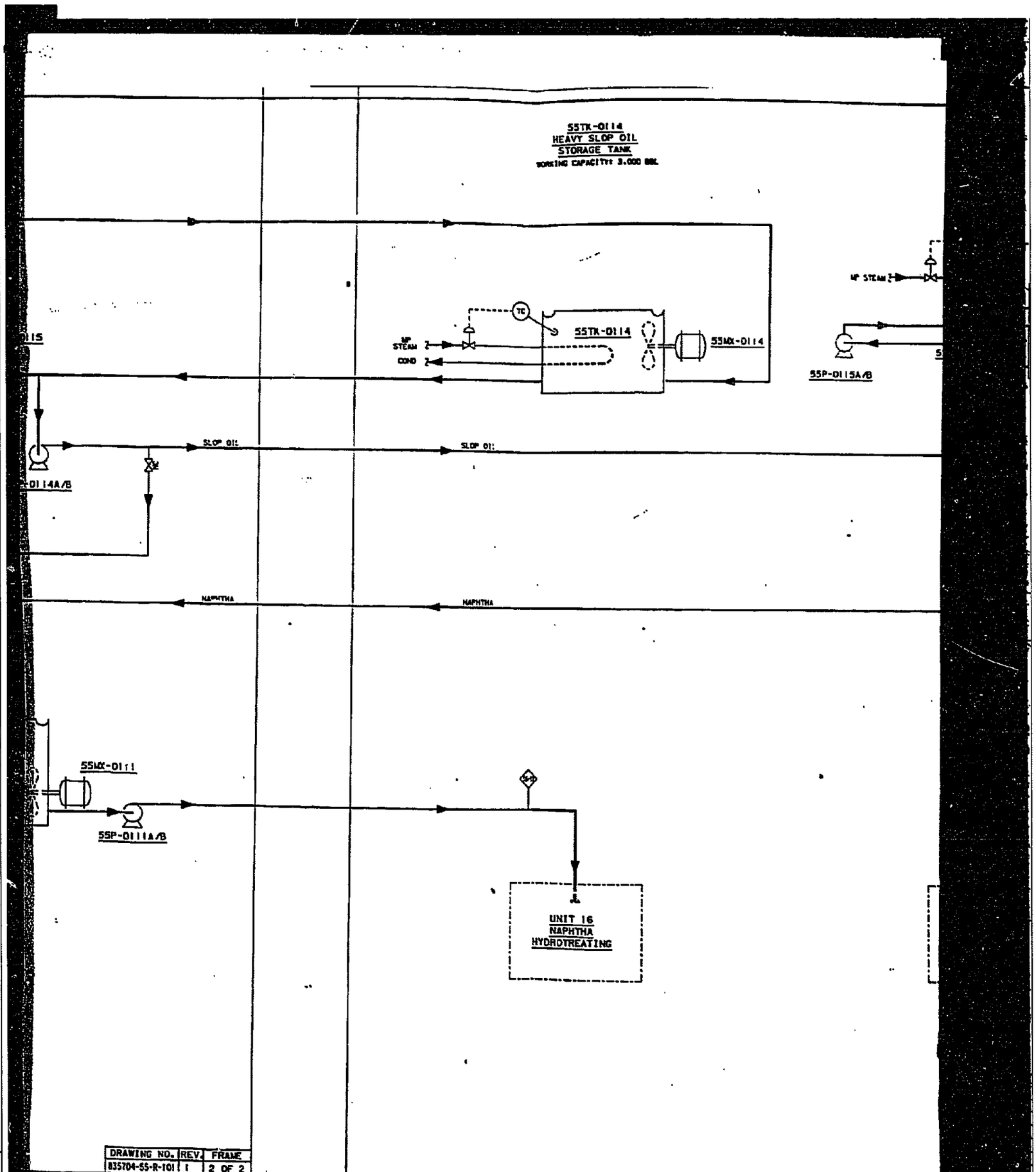
TABLE 6.3.16-1

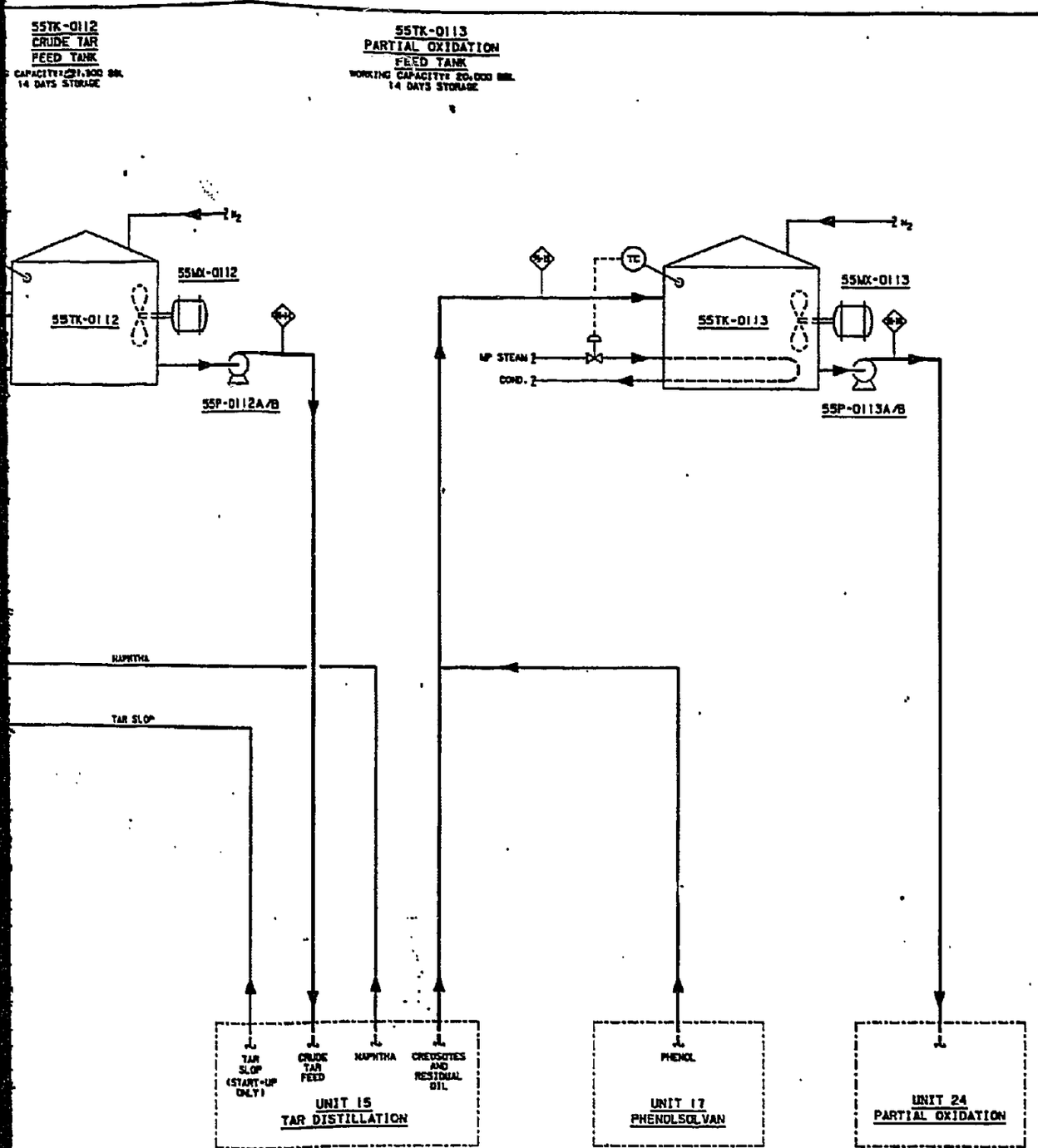
TANKAGE DESIGN CRITERIA

Service	Throughput BPSD	Days Storage	Working Capacity, BBL	Operating Temp., °F	Vapor Press., psia	Dispatch
Finished Product Storage						
Ammonia Product	490	60	29,400	-30	13.5	Rail/Truck
Naphtha Product	1,370	30	41,200	100	4.0	Rail/Truck
Molten Sulfur Product	260	30	5,000	290	-	Rail/Truck
Intermediate Storage						
Methanol Storage	60	90	5,000	100	3.6	
Naphtha HT Feed	1,190	14	16,700	120	4.0	
Crude Tar Feed	1,820	14	25,400	150	0.2	
POX Feeds	1,430	14	20,000	140	0.2	
Light Slop Wastes	220	14	3,000	100	-	
Heavy Slop Wastes	220	14	3,000	100	-	
Raw Material Storage						
Isopropyl Ether	(1)	(1)	4,600	100	5.4	Rail/Truck
Propylene	(1)	(1)	1,300	(bullet) 100	250.0	Rail/Truck
Sodium Hydroxide	190	30	5,600	100	0.4	Rail/Truck
Sulfuric Acid	120	30	3,800	100	0.3	Rail/Truck
Sodium Chloride	40	14	560	100	0.3	Truck(Solid)

(1) Capacity determined by initial charge plus ½ year usage.


55TK-0111
NAPHTHA HYDROTREATING
FEED TANK
WORKING CAPACITY: 46,700 BBL
14 DAYS STORAGE
55TK-0115
LIGHT SLOP OIL
STORAGE TANK
WORKING CAPACITY: 3,000 BBL
SLOP OIL FROM FLARE KNOCKOUT DRUMS UNIT 53
SLOP OIL FROM OILY WATER SEPARATION UNIT UNIT 54
55TK-0115
55MIX-01
55P-0
SLOP OIL TO OILY WATER TREATMENT UNIT 54
TC
MP STEAM
COND.
55TK-0111
NAPHTHA
UNIT 13
RECTISOL


55TK-0114
HEAVY SLOP OIL
STORAGE TANK
55TK-0114
55MX-0114
MP STEAM
COND
55P-0115A/B
SLOP OIL
SLOP OIL
NAPHTHA
NAPHTHA
55MX-0111
55P-0111A/B
UNIT 16
NAPHTHA
HYDROTREATING
DRAWING NO.
835704-55-R-101
REV.
1
FRAME
2 OF 2



NOTES:

1. THE TEMPERATURES, PRESSURES, FLOW QUANTITIES AND COMPOSITIONS REFERENCED BY DIAMONDS ARE SHOWN ELSEWHERE.

FLUOR

D.P. HALVERSON
C.C. ABATAY
R.D. BELMITO
R. McCARTHY
R. LANG

PROCESS FLOW DIAGRAM
TANK FARM AND DISPATCH
INTERMEDIATE TANK SECTION
UNIT 55

CROW TRIBE OF INDIANS — SYNFUELS FEASIBILITY STUDY

NONE

835704-55-R-101

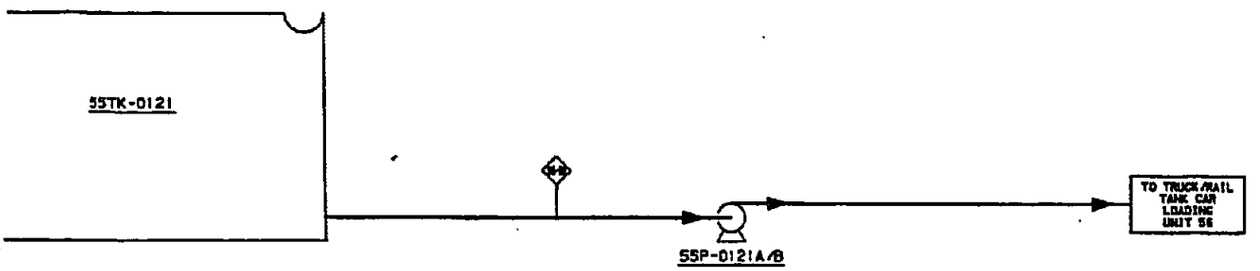
MICROFILM FRAME NO. 1 OF 2

1

003 357351 01


FROM NAPHTHA
HYDROTREATING
UNIT 18

55TK-0121
NAPHTHA PRODUCT
TANK
WORKING CAPACITY: 41,200 BBL.
30 DAYS STORAGE



NOTE:

1. THE TEMPERATURES, PRESSURES, FLOW QUANTITIES AND COMPOSITIONS REFERENCED BY DIAMONDS ARE SHOWN ELSEWHERE.

USE OR DISCLOSURE OF REPORT DATA
IS SUBJECT TO THE RESTRICTION ON THE
NOTICE PAGE AT THE FRONT OF THIS REPORT

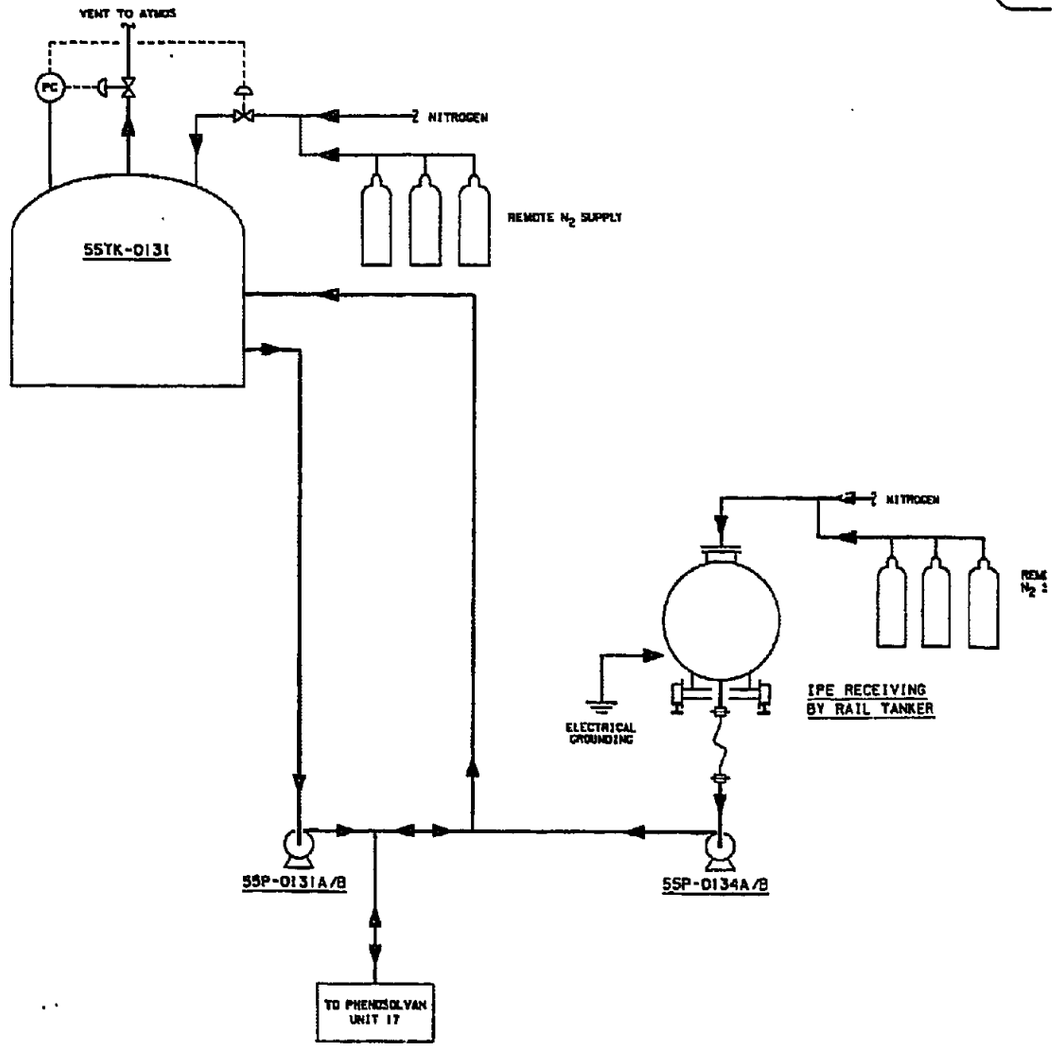
			FLUOR	R. WHITE	PROCESS FLOW DIAGRAM TANK FARM AND DISPATCH NAPHTHA STORAGE SECTION UNIT 55		357551102
				C.G. ABATAY			
				W.O. DELMITO			
				R.A. McCARTHY 6-2-82	CROW TRIBE OF INDIANS SYNFUELS FEASIBILITY STUDY		
				R. LANG	NONE	835704-55-4-102	1

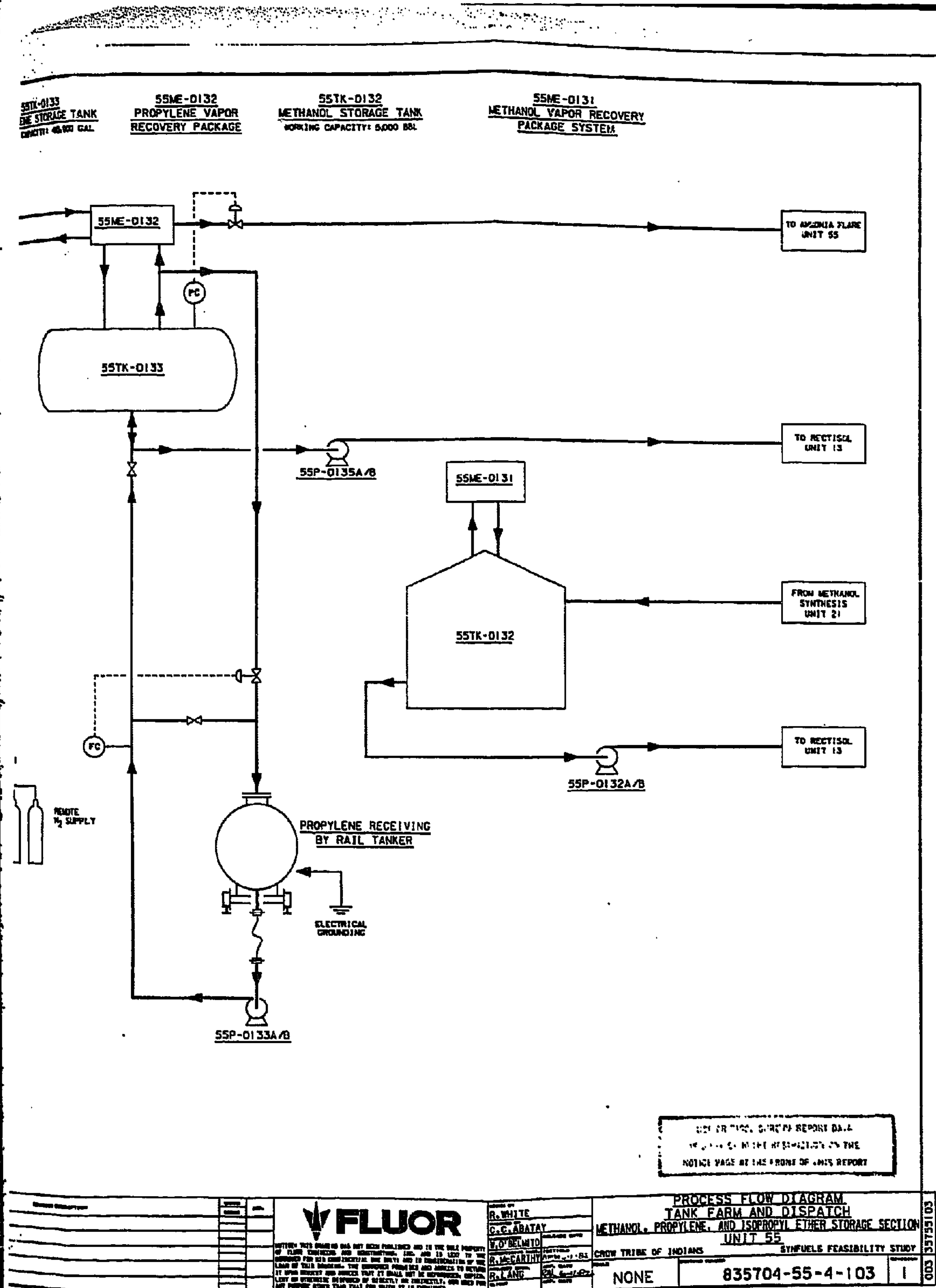
003

55TK-0131
IPE STORAGE TANK
WORKING CAPACITY: 4,600 BBL

55TK-0133
PROPYLENE STORAGE
WORKING CAPACITY: 40,000

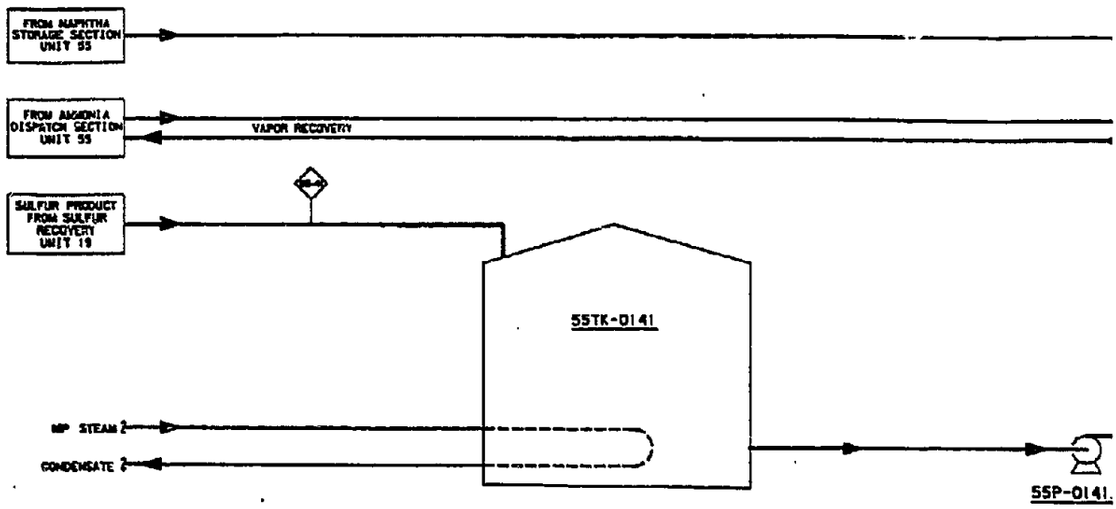
AMMONIA STORAGE UNIT 55





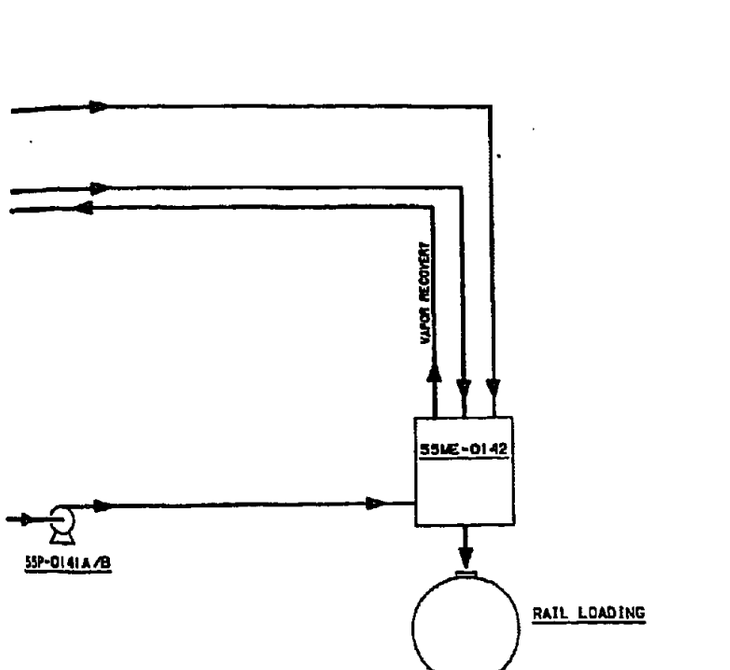
55TK-0133
STORAGE TANK
55ME-0132
PROPYLENE VAPOR
RECOVERY PACKAGE
55TK-0132
METHANOL STORAGE TANK
WORKING CAPACITY: 5,000 BBL
55ME-0131
METHANOL VAPOR RECOVERY
PACKAGE SYSTEM
55ME-0132
TO AMMONIA FLARE
UNIT 55
PC
55TK-0133
TO RECTISOL
UNIT 13
55P-0135A/B
55ME-0131
FROM METHANOL
SYNTHESIS
UNIT 21
55TK-0132
FC
TO RECTISOL
UNIT 13
55P-0132A/B
REMOTE
N_2 SUPPLY
PROPYLENE RECEIVING
BY RAIL TANKER
ELECTRICAL
GROUNDING
55P-0133A/B
NOTICE PAGE AT THE FRONT OF THIS REPORT
FLUOR
R. WHITE
C.C. ABATAY
V. O'BELMITO
R. McCARTHY
R. LANG
PROCESS FLOW DIAGRAM
TANK FARM AND DISPATCH
METHANOL, PROPYLENE, AND ISOPROPYL ETHER STORAGE SECTION
UNIT 55
CROW TRIBE OF INDIANS
SYNFUELS FEASIBILITY STUDY
NONE
835704-55-4-103
1

55TK-0141
MOLTEN SULFUR STORAGE TANK
WORKING CAPACITY: 5,000 BBLS
30 DAYS STORAGE



55ME-0142
LOADING RACK

55ME-0141
LOADING SCALE



NOTE:

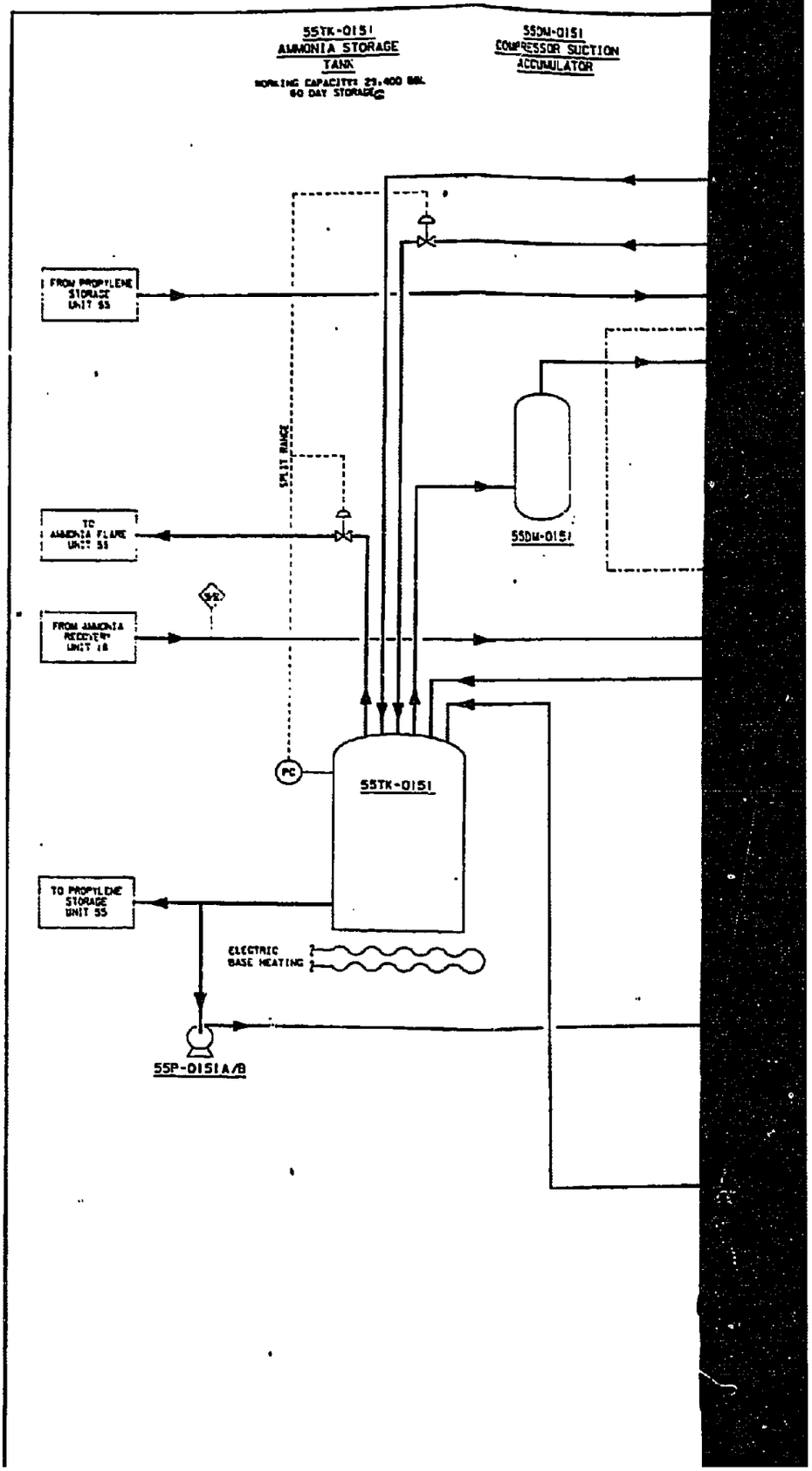
1. THE TEMPERATURES, PRESSURES, FLOW QUANTITIES AND COMPOSITIONS REFERENCED BY DIAMONDS ARE SHOWN ELSEWHERE.

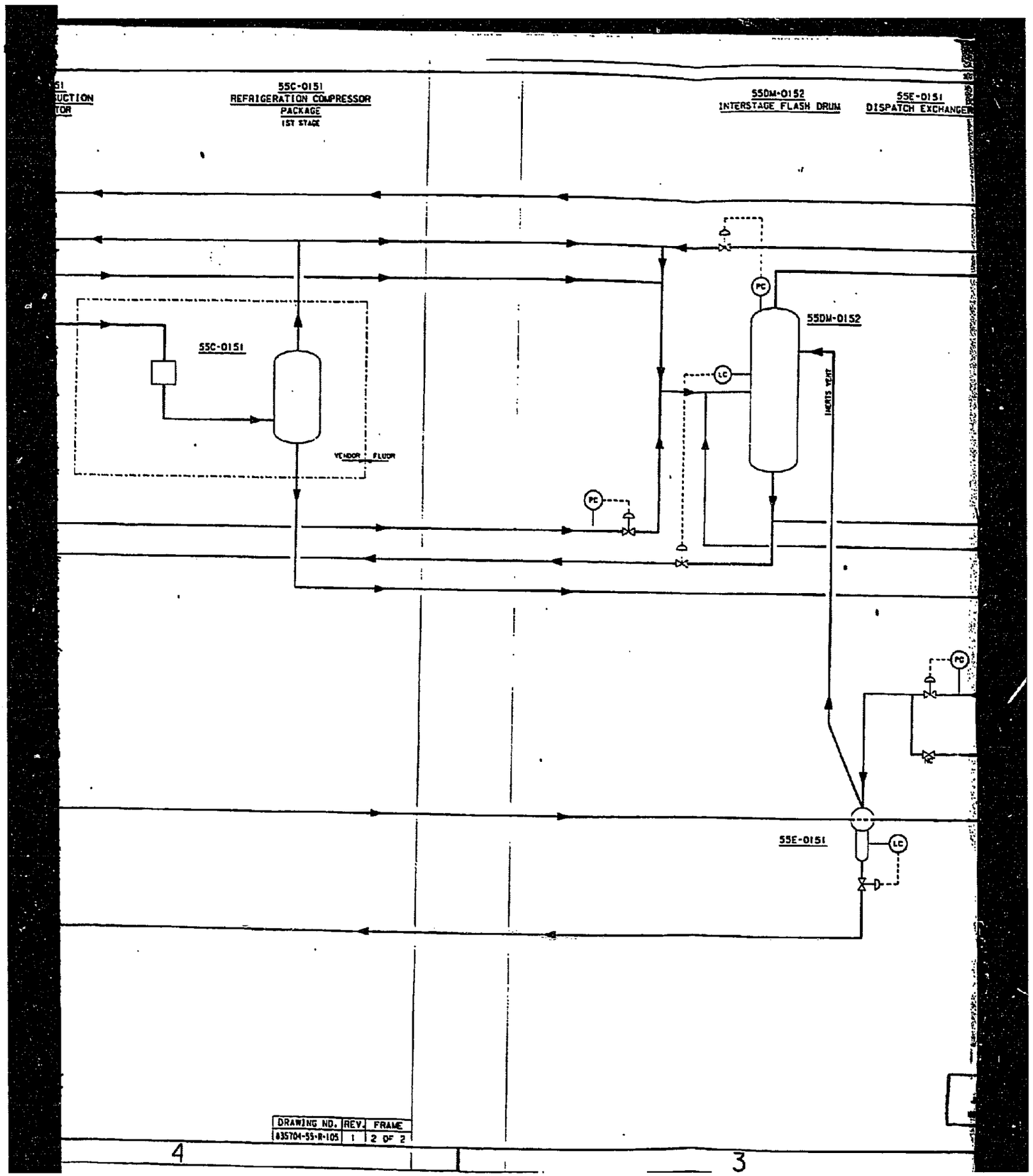
R. WHITE	
C.C. ABATAY	
K.D. BELWITC	
R. McCARTHY	
R. LANG	

PROCESS FLOW DIAGRAM
TANK FARM AND DISPATCH
MOLTEN SULFUR STORAGE & PRODUCTS DISPATCH SECTION
UNIT 55
CROW TRIBE OF INDIANS — SYNFUELS FEASIBILITY STUDY

NONE	835704-55-4-104	1

003 3575104


55TK-0151
AMMONIA STORAGE
TANK
55DM-0151
COMPRESSOR SUCTION
ACCUMULATOR
FROM PROPYLENE
STORAGE
UNIT 55
SPLIT RANGE
TO
AMMONIA FLARE
UNIT 55
55DM-0151
FROM AMMONIA
RECEIVER
UNIT 18
PC
55TK-0151
TO PROPYLENE
STORAGE
UNIT 55
ELECTRIC
BASE HEATING
55P-0151A/B



DRAWING NO.	REV.	FRAME
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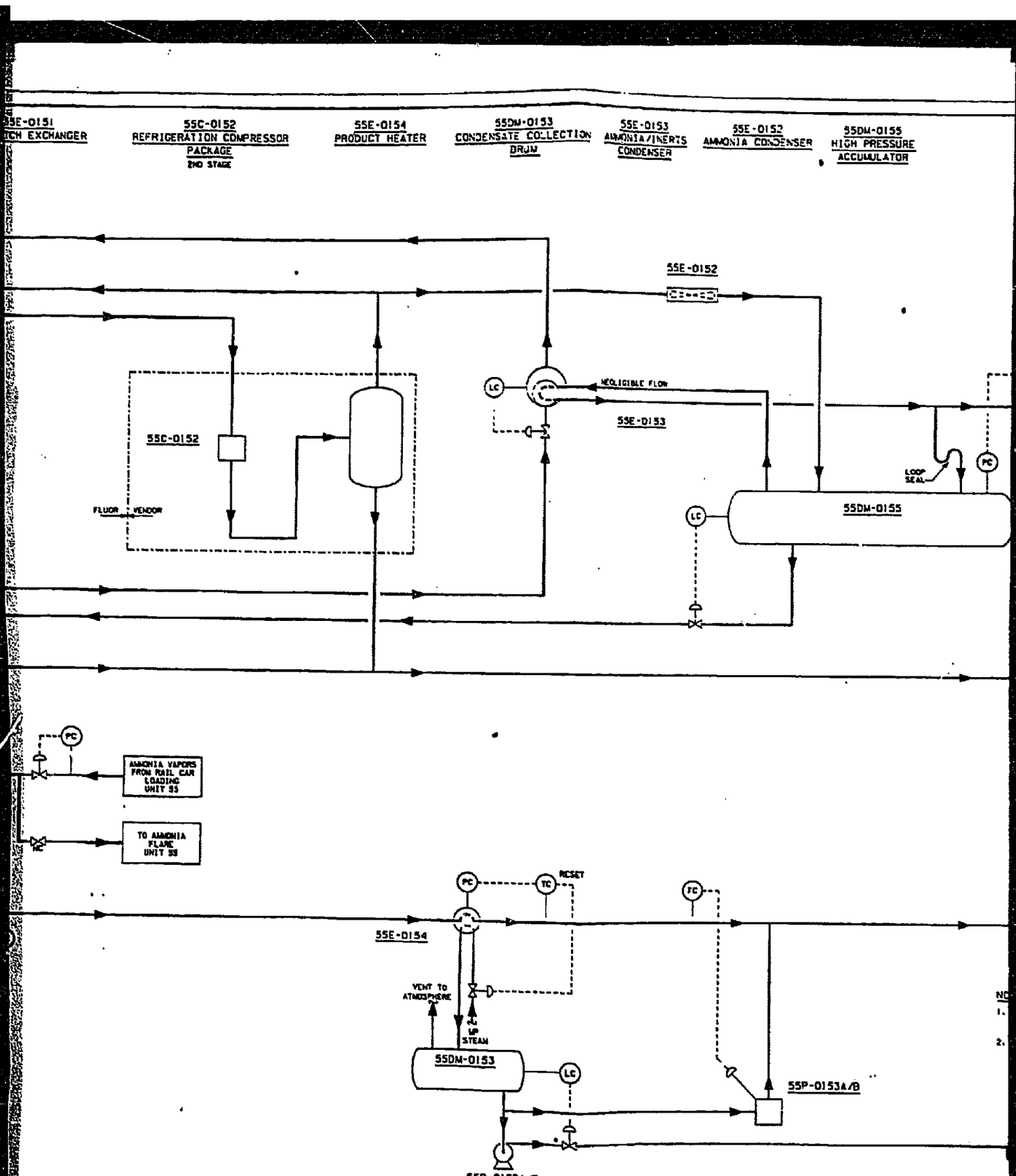
55E-0151
TCH EXCHANGER
55C-0152
REFRIGERATION COMPRESSOR
PACKAGE
2ND STAGE
55E-0154
PRODUCT HEATER
55DM-0153
CONDENSATE COLLECTION
DRUM
55E-0153
AMMONIA/INERTS
CONDENSER
55E-0152
AMMONIA CONDENSER
55DM-0155
HIGH PRESSURE
ACCUMULATOR
55E-0152
LC
NEGLIGIBLE FLOW
55E-0153
55C-0152
FLUOR VENDOR
LOOP SEAL
PC
55DM-0155
AMMONIA VAPORS FROM RAIL CAR LOADING UNIT 93
TO AMMONIA FLARE UNIT 93
NC
PC
TC
RESET
TC
55E-0154
VENT TO ATMOSPHERE
STEAM
55DM-0153
LC
55P-0153A/B
55P-0152A/B
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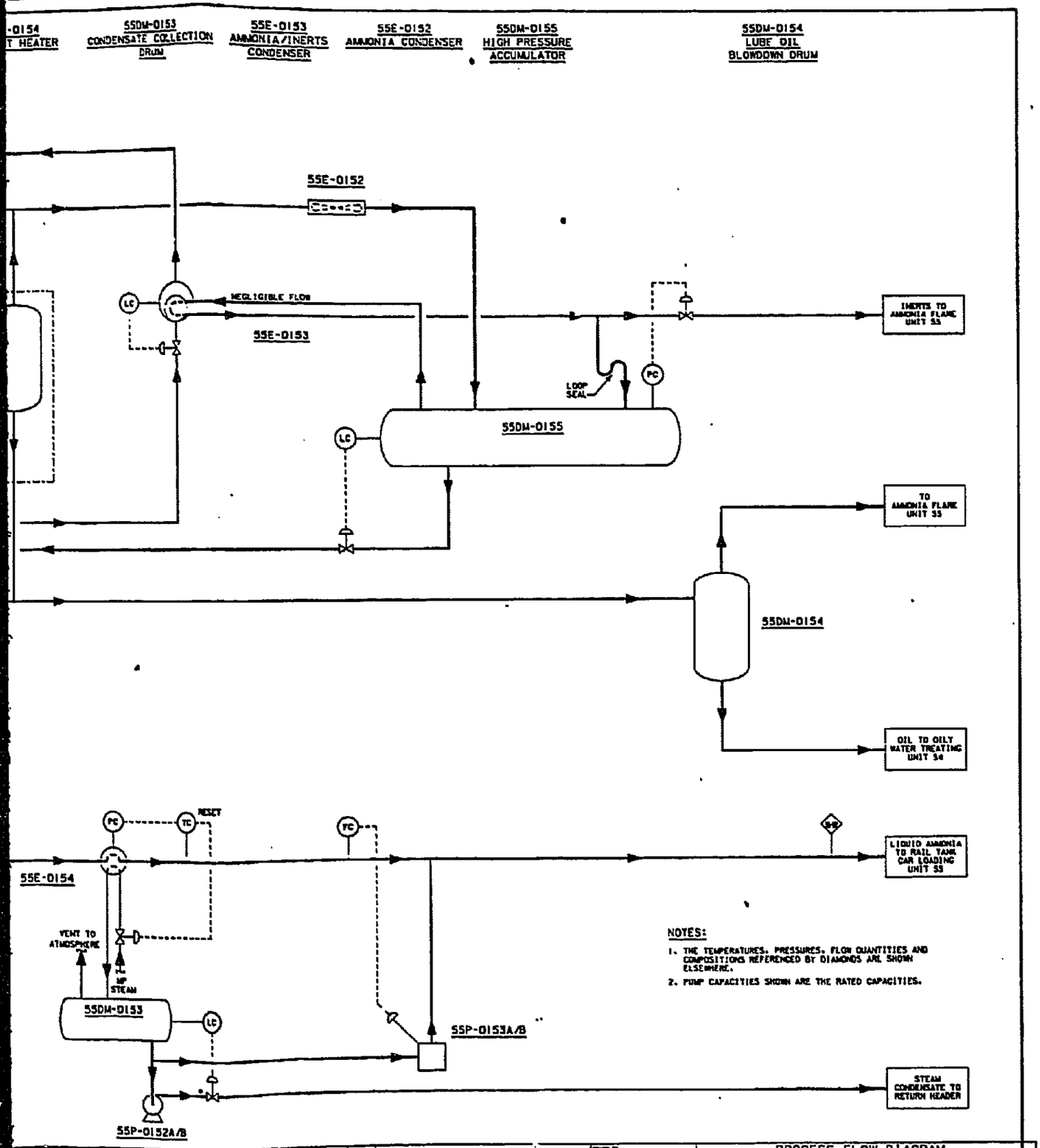
FLUOR
D. P. HALVERSON
C. C. ABATAY
R. O'BELLVILLE
R. McCARTHY
R. L. ANG



FLUOR

D. P. HALVERSON
C. C. ABATAY
W. O'BELMITO
R. McCARTHY
R. LANG

PROCESS FLOW DIAGRAM
TANK FARM AND DISPATCH
AMMONIA STORAGE AND REFRIGERATION SECTION
UNIT 55
CROW TRIBE OF INDIANS — SYNFUELS FEASIBILITY STUDY

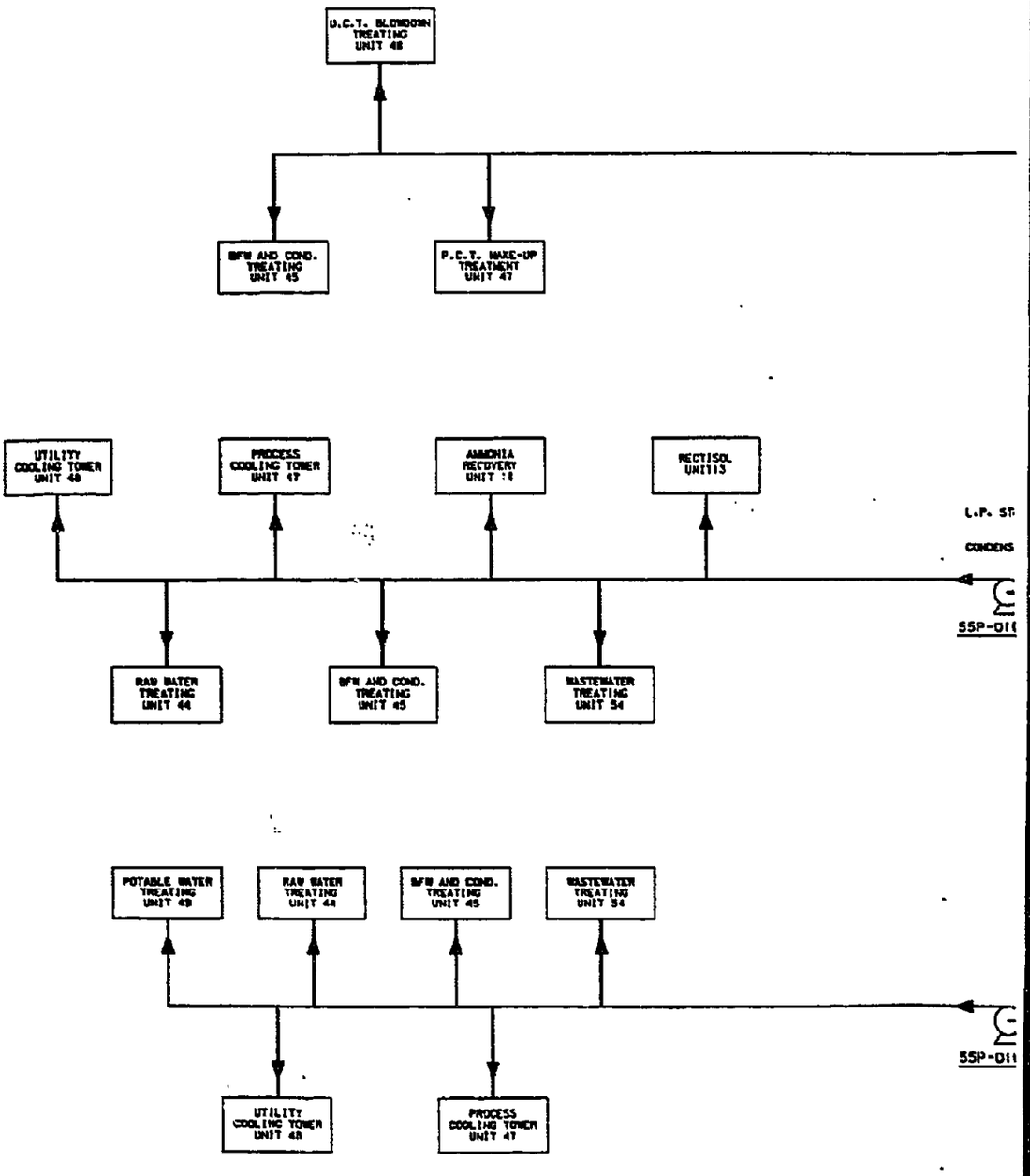
NONE

835704-55-R-105

MICROFILM FRAME NO. 1 OF 2

1

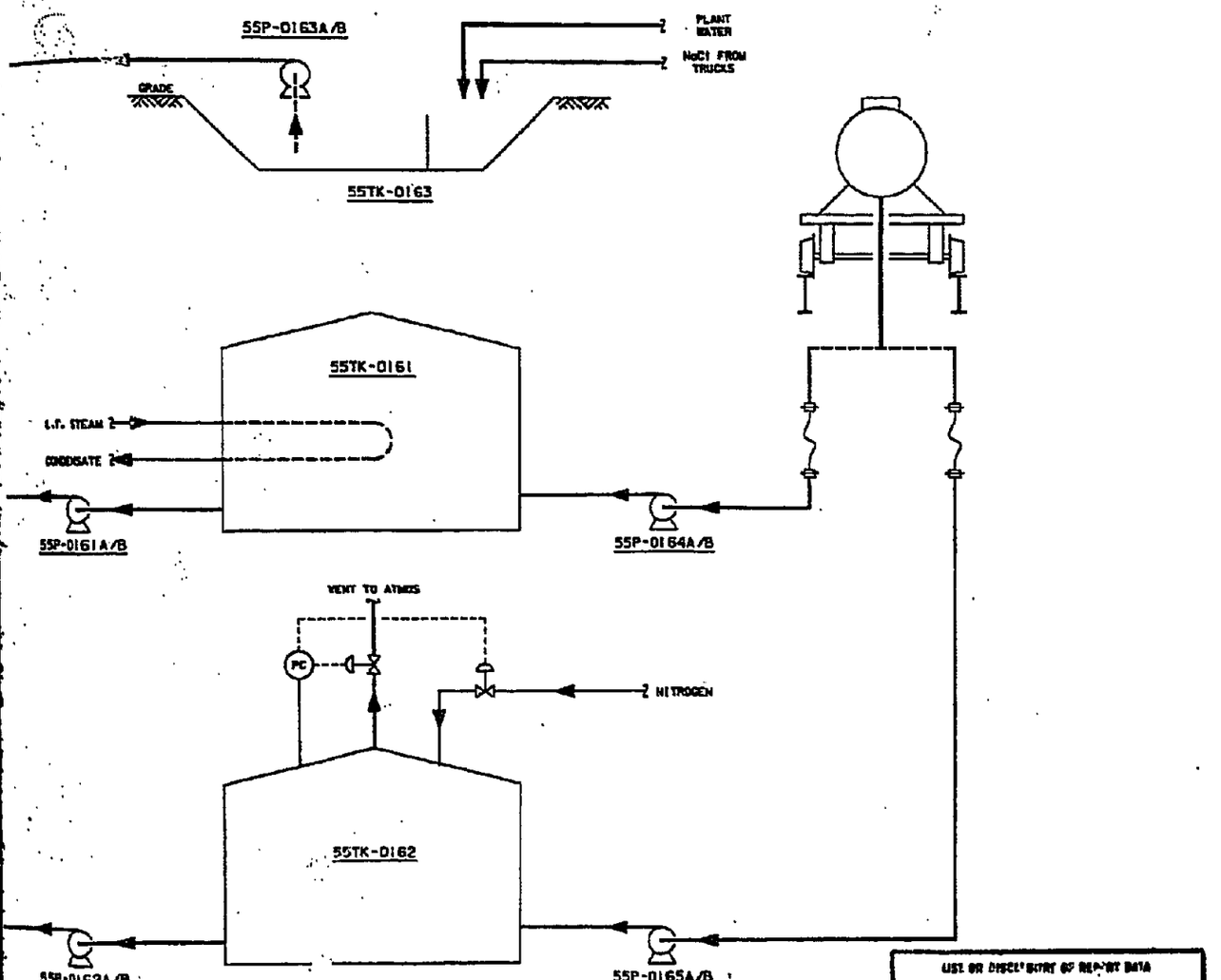
003 3575505


55T
NaC
STOR.
U.C.T. BLOWDOWN TREATING UNIT 48
BFW AND COND. TREATING UNIT 45
P.C.T. MAKE-UP TREATMENT UNIT 47
UTILITY COOLING TOWER UNIT 48
PROCESS COOLING TOWER UNIT 47
AMMONIA RECOVERY UNIT 18
RECTISOL UNIT 13
L.P. ST
CONDENS
55P-011
RAW WATER TREATING UNIT 44
BFW AND COND. TREATING UNIT 45
WASTEWATER TREATING UNIT 54
POTABLE WATER TREATING UNIT 49
RAW WATER TREATING UNIT 44
BFW AND COND. TREATING UNIT 45
WASTEWATER TREATING UNIT 54
55P-011
UTILITY COOLING TOWER UNIT 48
PROCESS COOLING TOWER UNIT 47

55TK-0163
NaCl BRINE
STORAGE TANK
WORKING CAPACITY: 750 BBL
14 DAYS STORAGE

55TK-0161
NaOH STORAGE
TANK
WORKING CAPACITY: 6,200 BBL 50% NaOH
30 DAYS STORAGE

55TK-0162
H_2SO_4 STORAGE
TANK
WORKING CAPACITY: 3,700 BBL 98% H_2SO_4
30 DAYS STORAGE



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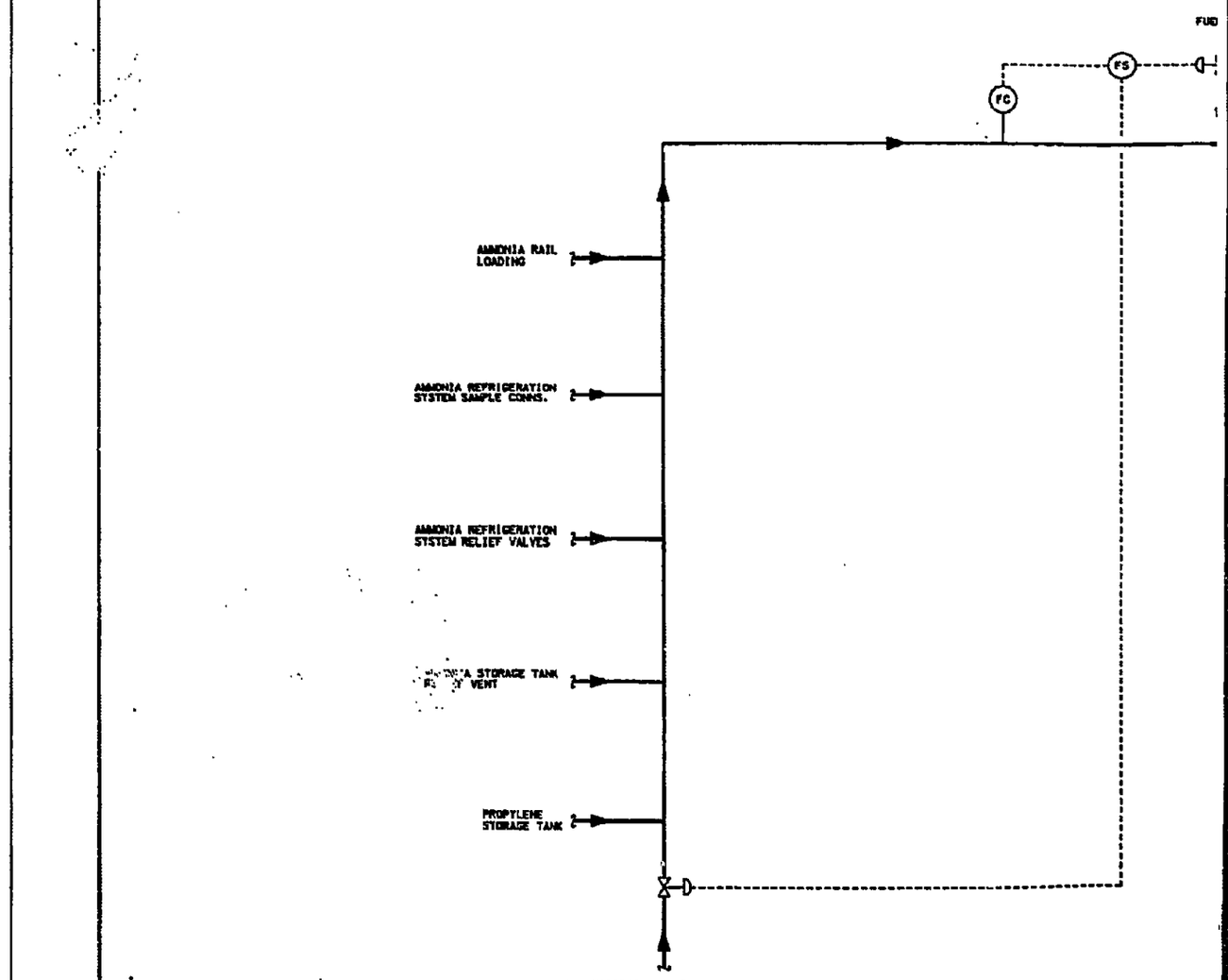
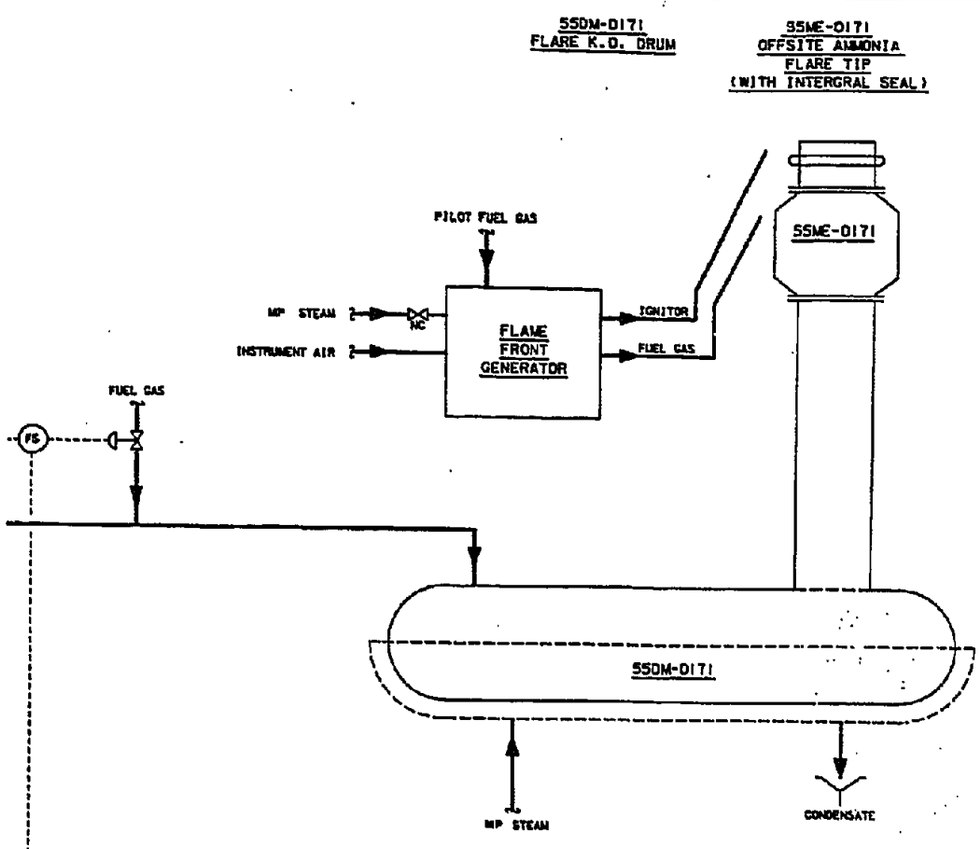
PROCESS FLOW DIAGRAM
TANK FARM AND DISPATCH
SULFUR ACID, CAUSTIC & SODIUM CHLORIDE STORAGE & DISPATCH
UNIT 55
CROW TRIBE OF INDIANS SYNFUELS FEASIBILITY STUDY

NONE | 835704-55-4-106 | 1

003 3575106


FUEL
FS
FC
AMMONIA RAIL LOADING
AMMONIA REFRIGERATION SYSTEM SAMPLE CONNS.
AMMONIA REFRIGERATION SYSTEM RELIEF VALVES
PROPYLENE STORAGE TANK
LP NITROGEN (CONTINUOUS PURGE)



NOTES:

1. THE MAXIMUM LOAD FOR THE FLARE DESIGN IS:
   AMMONIA AT -30°F: 12,000 LB/HR
   PROPYLENE AT 40°F: 750 LB/HR

FLUOR

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PROCESS FLOW DIAGRAM
TANK FARM AND DISPATCH
PROPYLENE AND AMMONIA FLARE SECTION
UNIT 55

CROW TRIBE OF INDIANS — SYNFUELS FEASIBILITY STUDY

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TABLE 6.3.16-2

MATERIAL BALANCE

TANK FARM AND DISPATCH - UNIT 55

Stream Number	55-11	55-12	55-13	55-14	55-15
Stream Name	Raw Naphtha Into Storage	Raw Naphtha To HDT Unit 16	Crude Tars To Storage	Crude Tars To To Tar Dist	Resids To Storage
H_2O					129
Tar					20,212
Oil			25,265	25,265	
Naphtha	16,359	16,359			
Phenols					3113
Fatty Acids					33
Organic Sulfur	21	21			
Ammonia					
HCl					
Total, lb/hr	16,380	16,380	25,265	25,265	23,487
Pressure, psia	40	63.7	90	88.7	50
Temperature, °F	127	120	104	150	308

NOTE: Flow quantities, pressures and temperatures shown are for the total unit on a stream-day basis, are to be used solely for process design purposes and are not necessarily the conditions which will be attained during actual operations.

TABLE 6.3.16-2 (Continued)

MATERIAL BALANCE

TANK FARM AND DISPATCH - UNIT 55

Stream Number	55-16	55-21	55-22	55-41	55-51
Stream Name	Resids To POX Unit 24	Naphtha To Storage	Product Naphtha Dispatch	Molten Sulfur Dispatch	Ammonia Product To Storage
H_2O	129				34
Tar	20,212				
Oil					
Naphtha		16,348	16,348		
Phenols	3113				
Fatty Acids	33				
Molten Sulfur				7267	
Ammonia					6364
HCl					
Total, lb/hr	23,487	16,348	16,348	7267	6398
Pressure, psia	88.7	50	63.7	88.7	220
Temperature, °F	200.0	108	100	300	63

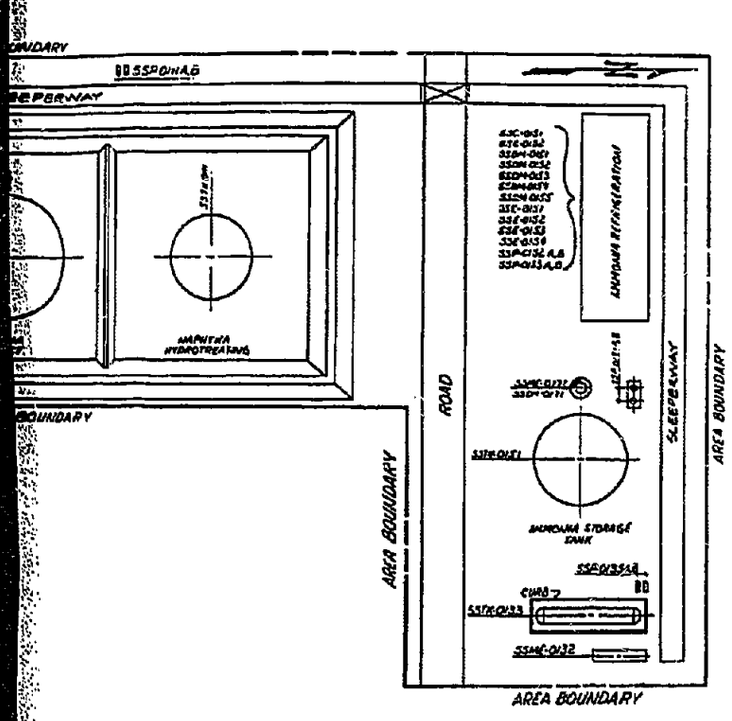
TABLE 6.3.16-2 (Continued)

MATERIAL BALANCE

TANK FARM AND DISPATCH - UNIT 55

Stream Number	55-52
Stream Name	Ammonia Product Dispatch
H_2O	825
Tar	
Oil	
Naphtha	
Phenols	
Fatty Acids	
Molten Sulfur	
Ammonia	6364
HCl	
Total, lb/hr	7189
Pressure, psia	210
Temperature, °F	100

AREA BOUNDARY
CRUDE TARS
PDU
ROAD
AREA BOUNDARY
SLEEPERWAY
LIGHT SLOP
HEAVY SLOP
METHANOL
SULFURIC ACID
SODIUM HYDROXIDE
LPG
ROAD
SLEEPERWAY
MOLTEN SULFUR
NAPHTHA PRODUCT
AREA BOUNDARY
AREA BOUNDARY
PIPE TUNNEL
ROAD
AREA BOUNDARY
AREA BOUNDARY
RAIL LOADING SCALES
RAILCAR LOADING RACKS
55ME-0141
55ME-0142
AREA BOUNDARY
APPROVED FOR STUDY



REDUCED PRINT SCALE

ALL EQUIPMENT SIZES AND LOCATIONS ARE APPROXIMATE.

FLUOR

PLOT PLAN-UNIT 55
TANK FARM & DISPATCH

TABLE 6.3.16-3

EQUIPMENT LIST

TANK FARM AND DISPATCH - UNIT 55

Item No.	Equipment Name	Number Required	
		Operating	Spare
55TK-0111	Naphtha Hydrotreating Feed Tank	1	0
55TK-0112	Crude Tars Feed Tank	1	0
55TK-0113	Partial Oxidation Feed Tank	1	0
55TK-0114	Heavy Slop Storage Tank	1	0
55TK-0115	Light Slop Storage Tank	1	0
55P-0111 A/B	Naphtha Hydrotreater Feed Pump	1	1
55P-0112 A/B	Crude Tar Feed Pump	1	1
55P-0113 A/B	POX Feed Pump	1	1
55P-0114 A/B	Slop Transfer Pump	1	1
55P-0115 A/B	Crude Tar Circulation Pump	1	1
55MX-0111	Naphtha HDT Feed Tank Mixer	1	0
55MX-0112	Crude Tar Feed Tank Mixer	1	0
55MX-0113	POX Feed Tank Mixer	1	0
55MX-0114	Heavy Slop Tank Mixer	1	0
55MX-0115	Light Slop Tank Mixer	1	0
55E-0112	Crude Tar Heater	1	0
55TK-0121	Naphtha Product Storage Tank	1	0
55P-0121 A/B	Naphtha Product Loading Pump	1	1

TABLE 6.3.16-3 (Continued)

EQUIPMENT LIST

TANK FARM AND DISPATCH - UNIT 55

Item No.	Equipment Name	Number Required	
		Operating	Spare
55TK-0131	Isopropyl Ether Storage Tank	1	0
55TK-0132	Methanol Storage Tank	1	0
55TK-0133	Propylene Storage	1	0
55P-0131 A/B	IPE Makeup Pump	1	1
55P-0132 A/B	Makeup Methanol Pump	1	1
55P-0133 A/B	Propylene Receiving Pump	1	1
55P-0134 A/B	IPE Rail Receiving Pump	1	1
55P-0135 A/B	Propylene Transfer Pump	1	1
55ME-0131	Methanol Vapor Recovery	1	0
55ME-0132	Propylene Vapor Recovery	1	0
55TK-0141	Molten Sulfur Product Storage Tank	1	0
55P-0141 A/B	Molten Sulfur Loading Pump	1	1
55ME-0141	Rail Loading Scales	1	0
55ME-0142	Railcar Loading Rack	1	0

TABLE 6.3.16-3 (Continued)

EQUIPMENT LIST

TANK FARM AND DISPATCH - UNIT 55

Item No.	Equipment Name	Number Required	
		Operating	Spare
55TK-0151	Ammonia Product Storage Tank	1	0
55DM-0151	NH_3 Vapor Recovery Compressor Suction	1	0
55DM-0152	NH_3 Vapor Recovery Interstage Flash Drum	1	0
55DM-0153	NH_3 Vapor Recovery Condensate Collection Drum	1	0
55DM-0154	NH_3 Vapor Recovery Lube Oil Blowdown Drum	1	0
55DM-0155	NH_3 Vapor Recovery High Pressure Accumulator	1	0
55P-0151 A/B	Ammonia Loading Pump	1	1
55P-0152 A/B	Condensate Return Pump	1	1
55P-0153 A/B	Ammonia Loading Water Injection Pump	1	1
55E-0151	Ammonia Dispatch Exch.	1	0
55E-0152	Ammonia Air Condenser	1	0
55E-0153	NH_3/Inerts Condenser	1	0
55E-0154	Ammonia Product Heater	1	0
55C-0151	NH_3 Refrig. Compressor Pkg. -STG 1	1	0

TABLE 6.3.16-3 (Continued)

EQUIPMENT LIST

TANK FARM AND DISPATCH - UNIT 55

Item No.	Equipment Name	Number Required Operating	Spare
55C-0152	NH_3 Refrig. Compressor Pkg. -STG 2	1	0
55TK-0161	Sodium Hydroxide	1	0
55TK-0162	Sulfuric Acid	1	0
55TK-0163	Brine Tank	1	0
55P-0161 A/B	NaOH Delivery Pump	1	1
55P-0162 A/B	H_2SO_4 Delivery Pump	1	1
55P-0163 A/B	Brine Pump	1	1
55P-0164 A/B	NaOH Unloading Pump	1	1
55P-0165 A/B	H_2SO_4 Unloading Pump	1	1
55DM-0171	Ammonia Flare Knock-Out Drum	1	0
55ME-0171	Ammonia Flare Tip	1	0

6.3.17 SANITARY WASTE TREATMENT SYSTEM - UNIT 56

6.3.17.1 DESIGN BASIS

Purpose of Unit

The Sanitary Waste Treatment System collects sanitary waste from the plant and processes it by biological treating. A clarified water stream is produced for addition to the Process Wastewater Biological Treaters and sludge stream is produced for addition to the Process Wastewater Sludge Dewatering and Incineration Section.

Scope of Unit

Unit 56 consists of collection piping terminating in trash screening, comminution, aeration, clarification, chlorination, and filtration.

General Design Criteria

The sanitary waste treatment system is a single train unit. The unit operates continuously 365 days per year. All equipment are motor driven.

Process Specifications

The sanitary waste treatment system is sized for a flow of 50 gpm based on a maximum plant population of 1250 and an approximate one-to-one ratio with potable water usage.

Feed

The feed to the unit is collected from the entire plant, administration buildings, and laboratories. The feed contains only sanitary and laboratory wastes.

6.3.17.1 (Continued)

Products

The sanitary waste treatment system unit produces filtered effluent water mainly containing soluble organics and TDS. The treated water flows to the biological treatment section of Unit 54. The effluent has been chlorinated to eliminate fecal coliform and leave a chlorine residual of less than 5 ppm.

Biological sludge from the unit is pumped to the sludge dewatering and incineration equipment in Unit 54 for disposal.

Utilities

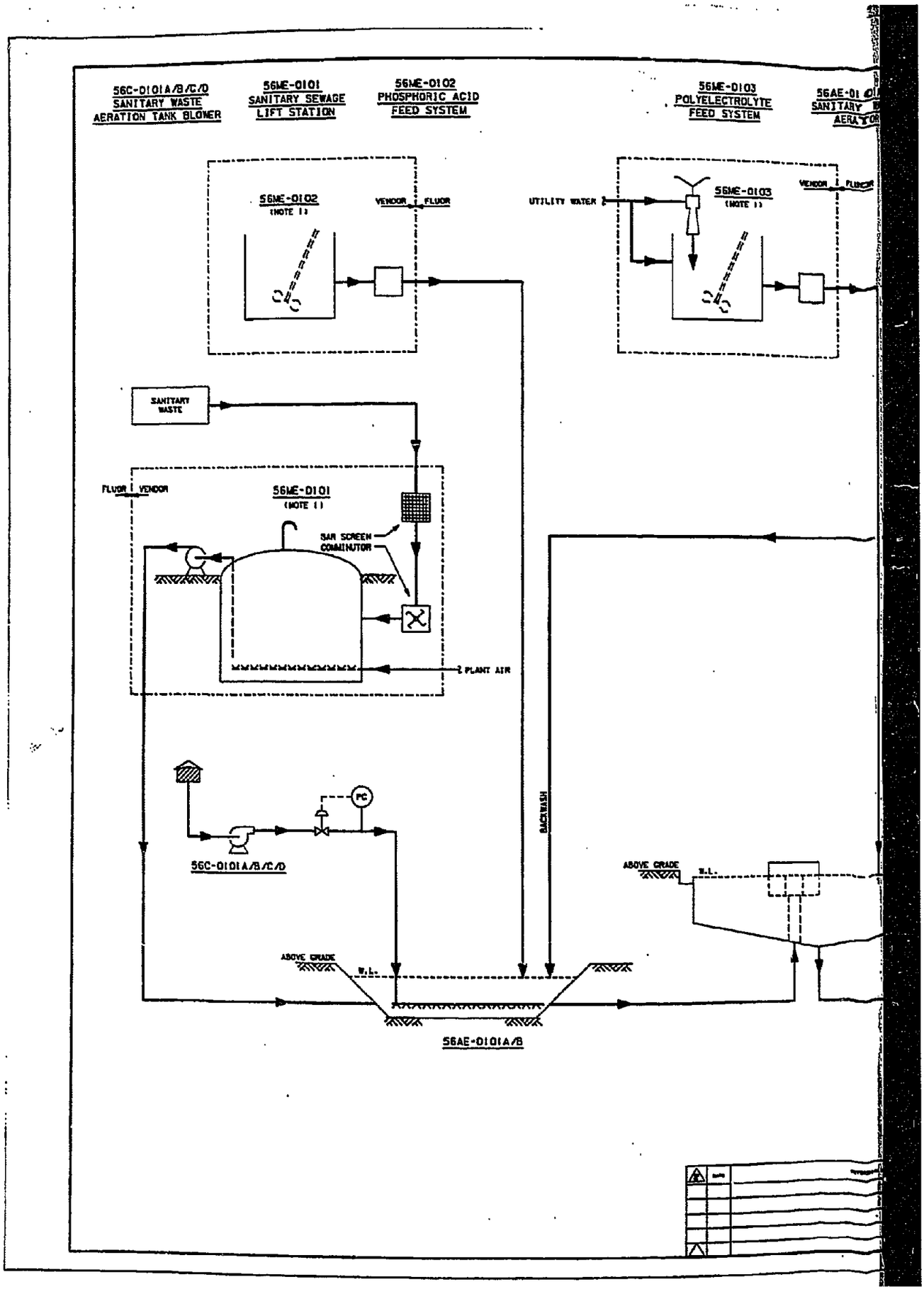
Power	120 kW

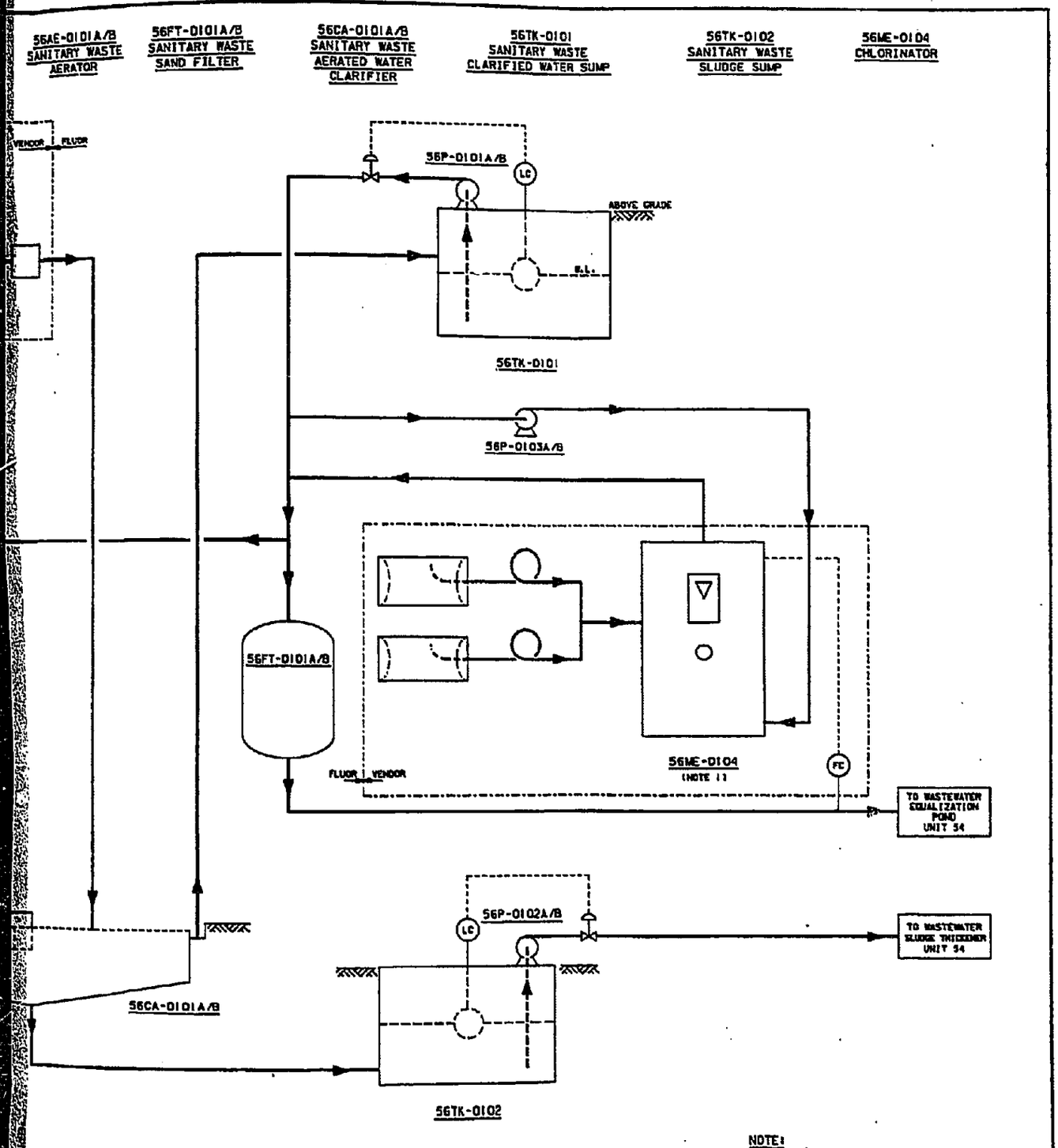
6.3.17.2 PROCESS DESCRIPTION

Drawing No. 835704-56-4-101 is the flow diagram for Unit 56 and Table 6.3.17-1 lists equipment.

The sanitary waste is collected in a separate sanitary sewer which terminates at the lift station within Unit 56. The stream is screened and treated by a comminutor and piped to an aerated tank which acts as surge in case of unit upset. From the tank the stream is pumped to an aeration/clarification system with solids recycle for biological digestion of the organics. Clarified effluent water is chlorinated for elimination of fecal coliform and sand filtered for clarity. It is piped to the equalization pond in Unit 54. Filter backwash is recycled to the Unit 56 aeration basin.

The sludge from the clarifier not returned to digestion is pumped to the sludge thickener in Unit 54 and is dewatered and incinerated.


56C-0101A/B/C/D
SANITARY WASTE
AERATION TANK BLOWER
56ME-0101
SANITARY SEWAGE
LIFT STATION
56ME-0102
PHOSPHORIC ACID
FEED SYSTEM
56ME-0103
POLYELECTROLYTE
FEED SYSTEM
56ME-0102
(NOTE 1)
VENDOR
FLUOR
UTILITY WATER
56ME-0103
(NOTE 1)
SANITARY WASTE
FLUOR
VENDOR
56ME-0101
(NOTE 1)
BAR SCREEN
COMMINUTOR
PLANT AIR
PC
56C-0101A/B/C/D
BACKWASH
ABOVE GRADE
W.L.
ABOVE GRADE
W.L.
56AE-0101A/B



NOTE:

1. SUPPLIED AS VENDOR PACKAGE.

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PROCESS FLOW DIAGRAM
SANITARY WASTE TREATMENT SYSTEM
UNIT 56

CROW TRIBE OF INDIANS — SYNFUELS FEASIBILITY STUDY

NONE | 835704-56-4-101 | 1

003 3575610

TABLE 6.3.17-1

EQUIPMENT LIST

SANITARY WASTE TREATMENT SYSTEM - UNIT 56

Item No.	Equipment Name	Number Required Operating	Spare
56AE-0101 A/B	Sanitary Waste Aeration Tank	1	1
56CA-0101 A/B	Sanitary Waste Aerated Water Clarifier Tank	1	1
56TK-0101	Sanitary Waste Clarified Water Sump	1	0
56TK-0102	Sanitary Waste Sludge Sump	1	0
56ME-0101	Sanitary Sewage Lift Station	1	0
56ME-0102	Phosphorus Feed System	1	0
56ME-0103	Polymer Feed System	1	0
56ME-0104	Chlorinator	1	0
56C-0101 A-D	Sanitary Waste Aeration Tank Blower	2	2
56FT-0101 A/B	Sanitary Waste Sand Filter	1	1
56P-0101 A/B	Sanitary Waste Clarified Water Sump Pump	1	1
56P-0102 A/B	Sanitary Waste Sludge Sump Pump	1	1
56P-0103 A/B	Chlorination Injection Pump	1	1

6.3.18 INTERCONNECTING PIPEWAY - UNIT 57

6.3.18.1 DESIGN BASIS

The Interconnecting Pipeway, Unit 57, includes all process and utility piping located between the battery limits of the various process, utility and offsite units.

The diameter, wall thickness, and material of the individual pipeways were determined according to the allowed line pressure drop, fluid pressure, and standard material selection practice for the fluid being transported. Standard schedule pipes were specified as much as possible.

All pipes are supported on overhead piperacks except utility water, firewater, portable water and cooling water lines and sewers which are located underground and the pipes within the tank farm which are carried on sleepers. Road crossings over the sleeperways are by road bridges.

6.3.18.2 PROCESS DESCRIPTION

The Interconnecting Pipeway serves to carry all process and utility fluids between various units in the plant. The pipes connecting equipment within the units are considered part of the unit and are not included in Interconnecting Pipeway System.

6.3.19 UNIT 61 - BUILDINGS

For a discussion of the buildings required for Site 1, see Section 6.8.7. A discussion of the buildings required for Site 23 is contained in Section 6.8.15.