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UTILITIES AND OFFSITES DESIGN BASELINE

MASTER

May 25, 1984
Date Revised

Work Performed Under Contract No. AC05-78OR03054

The Rust Engineering Company
Birmingham, Alabama

Technical Information Center
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United States Department of Energy

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International Coal Refining Company

UTILITIES AND OFFSITES DESIGN BASELINE

**OUTSIDE BATTERY LIMITS FACILITY
6000 TPD SRC-I
DEMONSTRATION PLANT**

FOR

U.S. DEPARTMENT OF ENERGY

VOLUME III

Prepared By

**The Rust Engineering Company
Birmingham, Alabama
REVISED MAY 25, 1984**

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Wastewater Treatment System and Solid Wastes Landfill for 6,000 TPD SRC-I
Demonstration Plant (DOE/OR/03054-71)

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3.0 OFFSITES

This section includes the following subsections:

3.1 WATER AND WASTE TREATMENT

3.2 SITE DEVELOPMENT

3.3 NON-PROCESS BUILDINGS

3.1 WATER AND WASTE TREATMENT

This subsection includes the following paragraphs:

- 3.1.1 Potable Water Treatment
- 3.1.2 Process Water Treatment
- 3.1.3 Waste Water Treatment
- 3.1.4 Waste Solids Handling

3.1.1 Potable Water Treatment

3.1.1.1 Process Description

3.1.1.1.1 Wells

The potable water treatment system will consist of two 128 foot deep gravel wall water wells, each equipped with a vertical turbine-type well pump (P-17201 A and B) and the necessary equipment to treat the well water to meet EPA drinking water standards.

3.1.1.1.2 Aeration and Filtration

From the wells, the water will be pumped to a well water aerator (A-17201) where iron in the water will be oxidized by contact with air. The aerated water will flow by gravity into the aerated water storage tank (TK-17201) located beneath the aerator. The aerated water pumps (P-17202 A and B) pump the water, which is then chlorinated, through the potable water filters (FL-17201 A and B) for removal of the suspended oxidized iron. The potable water filters will be automatically backwashed with potable water when a high pressure drop is detected.

3.1.1.1.3 Chlorination

The potable water chlorinator (X-17202) will feed chlorine, based on flowrate and residual control, to the aerated water prior to filtration and to the potable water prior to distribution.

3.1.1.1.4 Chemical Feed

The sodium hexametaphosphate feed system (X-17201) is provided for the dilution and feed of a phosphate based chemical to the potable water distribution system for corrosion inhibition.

3.1.1.2. Process Flow Diagrams

The following process flow diagram is included after this page.

00-17-01001D Potable Water System Process and Control Diagram

Refer to the following process flow diagrams included with Process Water Treatment (see Paragraph 3.1.2.2) for the chlorine and chemical feed systems.

00-17-01004D Chemical Feed Systems Process and Control Diagram

00-17-01005D Chlorination Systems Process and Control Diagram

A-17201
WELL WATER AERATOR

TK-17201
AERATED WATER TANK

FL-17201 A & B
POTABLE WATER FILTERS

TK-17202
POTABLE WATER STORAGE
TANK

00-17-01001

NOTE:

1. ALL INSTRUMENT NUMBERS ON THIS DRAWING ARE PREFIXED BY 17.
2. FOR CHLORINATION SYSTEM REFER TO DWG. 00-17-01005D.
3. FOR SODIUM HEXAMETA-PHOSPHATE SYSTEM REFER TO DWG. 00-17-01004D.
4. BATTERY LIMIT SUPPLY PRESSURE IS 30 PSIG.

LEGEND:

REFER TO DWG. 00-10-02004D FOR FLOW DATA SYMBOLS.

P-17201 A & B
WELL PUMPS

P-17202 A & B
AERATED WATER PUMPS

P-17205
FILTER BACKWASH
PUMP

P-17203
POTABLE WATER
BOOSTER PUMP

P-17204 A & B
POTABLE WATER
SUPPLY PUMPS

REV.	CHANGE NOTICE	REVISION DESCRIPTION	DATE	BY	CHK'D	APP'D	APPROVED	ADD	DATE	6,000 TPD SPC-1 DEMONSTRATION PLANT HEMAN, KENTUCKY FOR UNITED STATES DEPARTMENT OF ENERGY	TITLE	THE RUST ENGINEERING COMPANY ALLENTOWN, PA.
2		BASELINE UPDATE	3-84	MWH					9/24/81		PROCESS & CONTROL DIAGRAM POTABLE WATER SYSTEM	
1		BASELINE UPDATE	3-82									
1		REVISION DESCRIPTION										

00-17-010010

3.1.1.3 Utility Summary

The Utility Summary for the Potable and Process Water Treatment Areas follows this page.

CONTRACT NO. 21-2548C
AREA PROCESS & POTABLE WATER TREATMENT
BY BSY DATE 5-10-84
SHEET 1 OF 1

EQUIPMENT OR AREA NUMBER	DESCRIPTION	PROC. DUTY MM BTU HR	PROCESS COOLING WATER INLET @ $\frac{GPM}{\Delta F}$	HEAT TRANSFER FLUID INLET @ $\frac{GPM}{\Delta F}$	FUELED DUTY FUEL GAS LHV = FUEL OIL LHV =	INST. HP	OPER. BHP	OPER. KW	BOILER FEEDWATER PSIG °f PSIG °f M LBS/HR	STEAM IMPORT (EXPORT) PSIG °f PSIG °f PSIG °f PSIG °f PSIG °f PSIG °f M LBS/HR	COND. RETURN (REQ'D) PSIG °f	BLOW DOWN PSIG	UTIL. # PSIG =	PLANT AIR PSIG =	INSTRUMENT AIR PSIG =	PROC. WATER PSIG = GPM	POT. WATER PSIG = GPM	
P-17204 A,B	Potable Water Supply Pump					SEE											(899)	
—	Miscell.					MOTOR											45	
								LIST										
TOTAL						1931		877									10 45 (6572)(853)	

FORM 44-157 (8/82)

3.1.1.4 Motor List

The Motor List for the Potable Water Treatment Area follows this page.

Potable Water Treatment Area

Motor List

<u>Item No.</u>	<u>Description</u>	<u>Installed HP</u>	<u>Operating KW</u>	<u>Hr/Day</u>	<u>KWH/Day</u>
P-17201A	Well Water Supply Pump	5	3	24	72
P-17201B	Well Water Supply Pump	5	0	0	0
P-17202A	Aerated Water Pump	1	0.5	24	12
P-17202B	Aerated Water Pump	1	0	0	0
P-17203	Potable Water Booster Pump	5	3.5	24	84
P-17204A	Potable Water Supply Pump	30	24	24	576
P-17204B	Potable Water Supply Pump	30	0	0	0
P-17205	Filter Backwash Pump	7.5	5	24	120
X-17201	Chemical Feed System Agitator	1	0.5	24	12
X-17201	Chemical Feed System Pump	<u>1</u>	<u>0.5</u>	24	<u>12</u>
		87	37		888

3.1.1.5 Layout Drawing

The following layout drawing is included after this page:

00-17-40011D Process and Potable Water Treatment Area Layout

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3.1.1.6 Equipment List/Summary

The equipment list/summary for the potable water system follows this page.

EQUIPMENT LIST/SUMMARY

REV. 4

03-26-82

WBS ELEMENT: 1.4.1.2.1 ICRC AREA: 17

WATER AND WASTE TREATMENT--POTABLE WATER

PAGE 1 OF 2

REV.	ICRC/RUST EQUIP NO	QTY	EQUIPMENT DESCRIPTION	P.O. NUMBER	SIZE/ WEIGHT	P.O. DATE	VENDOR ENG		DELV DATE	EQUIP COST	PURCH BY	TYPE EQUIP
							NEED DATE	COST				
	A-17201	1	Aerator, well water, tray type, 100 gpm			S 10-82 P A	S 11-82 P A	0.7	S 5-83 P A	5.6	CMC	SF
	FL-17201 A and B	2	Filter, potable water, tank dimension 7' dia x 4' TT, vertical, filter rate 35 gpm, 24" sand bed, 125 psig, ASME code			S 10-82 P A	S 11-82 P A	2.7 ea	S 2-83 P A	23.5 ea	RUST	SF
	J-17202	1	Ejector, chlorine (included with chlorinator X-17202)			S 10-82 P A	S 11-82 P A	inc with X-17202	S 1-83 P A	inc with X-17202	RUST	SF
	P-17201 A and B	2	Pump, well, vertical turbine, bronze, 70°F, 100 gpm, 155 tdk, with motor			S 10-82 P A	S 11-82 P A	0.4 ea	S 4-83 P A	3.6 ea	CMC	SF
	P-17202 A and B	2	Pump, aerated water, general service, 90°F, sp gr 1.0, centrifugal, 35 gpm, 50 tdk, with motor		1 hp 1,800 rpm	S 10-82 P A	S 11-82 P A	0.2 ea	S 2-83 P A	1.6 ea	CMC	SF
	P-17203	1	Pump, supply, potable water, CI, inline, 90°F, sp gr 1.0, 50 gpm, 150 tdk, with motor		5 hp 1,800 rpm	S 10-82 P A	S 11-82 P A	0.2	S 2-83 P A	1.4	CMC	SF
	P-17204 A and B	2	Pump, booster, potable water, CI, general service, centrifugal, 90°F, sp gr 1.0, 450 gpm, 150 tdk, with motor		30 hp 1,800 rpm	S 10-82 P A	S 11-82 P A	0.4 ea	S 2-83 P A	1.3 ea	CMC	SF

NOTES:

- All costs 1st Quarter Fiscal Year 1982 in thousand dollars.
- Equipment costs are FOB jobsite with shipping & vendor field support less vendor engineering.
- This equipment is Appendix C Bulks.

RUST: Rust Engineering
CMC: Stone & Webster

S: Scheduled
P: Projected
A: Actual

FL: Field Labor N/A: Not Applicable
M: Material for field lab equipment
SF: Shop Fabricated FF: Field Fabricated

EQUIPMENT LIST/SUMMARY

REV. 4

03-26-82

WBS ELEMENT: 1.4.1.2.1 ICRC AREA: 17

WATER AND WASTE TREATMENT--POTABLE WATER

PAGE 2 OF 2

REV.	ICRC/RUST EQUIP NO	QTY	EQUIPMENT DESCRIPTION	P.O. NUMBER	SIZE/ WEIGHT	P.O. DATE	VENDOR ENG		DELV DATE	EQUIP COST	PURCH BY	TYPE EQUIP
							NEED DATE	COST				
	P-17205	1	Pump, filter backwash, CI, general service, 90°F, sp gr 1.0, 400 gpm, 40 tdh, with motor		7.5 hp 1,800 rpm	S 10-82 P A	S 11-82 P A	0.2	S 2-83 P A	2.0	CMC	SF
	TK-17201	1	Tank, aerated water, integral part of aerator, 10,000 gallons, fiberglass		12' dia x 12' high	S 10-82 P A	S 11-82 P A	1.3	S 1-83 P A	11.3	CMC	SF
3	TK-17202	1	Tank, potable water, cs, 25,000 gallons, vertical, epoxy lined, 0 psig, 90°F, coned roof		17' dia x 15' high	S 10-82 P A	S 11-82 P A	3.2	S 1-83 P A	26.9 M = 16.9 L = 10.0	CMC	FF
14	X-17201	1	Chemical feed system, sodium hexametaphosphate, 500 gallon tank, 316 ss, coned bottom, 90°F max		4.13' dia x 5.83'	S 10-82 P A	S 11-82 P A	1.2	S 4-83 P A	10.4	RUST	SF
	X-17201 con't.	1	Agitator, 316 ss, direct drive, with motor		1 hp 1,200 rpm	S 10-82 P A	S 11-82 P A	inc with X-17201	S 4-83 P A	inc with X-17201	RUST	SF
	X-17201 con't.	1	Pump, diaphragm, 316 ss, 90°F, sp gr 1.5, 0.25 gpm, 100 tdh, with motor		1 hp 1,800 rpm	S 10-82 P A	S 11-82 P A	inc with X-17201	S 4-83 P A	inc with X-17201	RUST	SF
	X-17202	1	Chlorinator, potable water, 20 lb/day			S 10-82 P A	S 11-82 P A	0.6	S 1-83 P A	0.9	RUST	SF

NOTES:

1. All costs 1st Quarter Fiscal Year 1982 in thousand dollars.

RUST: Rust Engineering

S: Scheduled

FL: Field Labor N/A: Not Applicable

2. Equipment costs are FOB jobsite with shipping & vendor field

CMC: Stone & Webster

P: Projected

M: Material for field fab equipment

support less vendor engineering. 3. This equipment is Appendix C Bulks.

A: Actual

SF: Shop Fabricated FF: Field Fabricated

3.1.1.7 Equipment Data Sheets

The equipment data sheets for the potable water system follows this page.

The Rust Engineering Company
A Subsidiary of Wheelabrator Frye Inc.

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-1197-F

EQUIPMENT NO. A-17201

NO REQUIRED

SHEET 1 OF 1

CLIENT

INTERNATIONAL COAL REFINING COMPANY

PROJECT 8000 TPSD SRC-I DEMONSTRATION PLANT

PLANT LOCATION NEWMAN, KENTUCKY

SERVICE Well Water Aerator

VENDOR

P.D. NO.

The well water aerator will be a fiberglass tray type and of single unit construction. The unit will be mounted on top of the Aerated Water Tank (TK-17210). The unit flow rate is 100 gpm.

lm

PREPARED BY O.E. Mitchell

DATE 10/14/81

APPROVED BY

DATE

REVISION

REVISION

REVISION

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BY

DATE

BY

DATE

BY

DATE

APP'D

DATE

APP'D

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DATE

The Rust Engineering Company
A Subsidiary of Wheelabrator-Frye Inc.

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-1997-F
EQUIPMENT NO. FL-17201 A & B
NO. REQUIRED 1
SHEET 1 OF 1

CLIENT INTERNATIONAL COAL REFINING COMPANY
PROJECT 8000 TPSD SRC-I DEMONSTRATION PLANT PLANT LOCATION NEWMAN, KENTUCKY
SERVICE Potable Water Filters
VENDOR _____ P.O. NO. _____

There will be two(2) potable water filters each designed for a 35 gpm flowrate. The units will be of the vertical pressure type and contain a 24" sand bed. The vessels will be designed for 125 psig, ASME coded and stamped. The vessel dimensions are 7' diameter by 4' T-T.

1m

PREPARED BY O.E. Mitchell

DATE 10/14/81

APPROVED BY _____

DATE _____

REVISION △

BY _____ DATE _____
APP'D _____ DATE _____

REVISION △

BY _____ DATE _____
APP'D _____ DATE _____

REVISION △ 2

BY _____ DATE _____
APP'D _____ DATE _____

**CENTRIFUGAL PUMP
DATA SHEET**

CONTRACT NO. 21-1997F
EQUIPMENT NO. P-17201A1B
NO REQUIRED 2
SHEET 1 OF 1

1 CLIENT INTERNATIONAL COAL REFINING COMPANY	
2 PROJECT 6000 TPSD SRC-I DEMONSTRATION PLANT	PLANT LOCATION NEWMAN, KENTUCKY
3 SERVICE WELL WATER SUPPLY	
4 VENDOR	P.O. NO.
5 TYPE VERTICAL TURBINE	MODEL SERIAL NO.
6 NO. OF MOTORS REQ'D 2	ITEM NO. FURN. BY MFR BY
7 NO OF TURBINES REQ'D	ITEM NO. FURN BY MFR BY
8 NOTE ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER	
9 ☐ OPERATING CONDITIONS (EACH PUMP) ☐ PERFORMANCE	
10 LIQUID _____ US GPM AT PT NOR _____ RATED 100	PROPOSAL CURVE NO _____
11 _____ DISCHARGE PSIG 40	RPM _____ NO OF STAGES _____
12 PT F NOR _____ MAX 80 SUCTION PSIG MAX 5 RATED 2	NPSHR FT & IMPELLER _____ T OF _____
13 SP GR AT PT 1.0 DIFF PRESS PSI 38	EFF _____ BHP RATED _____
14 VAP PRESS AT PT PSIA _____ DIFF HEAD FT 88	MAX BHP RATED IMP _____
15 VIS. AT PT LB/M/FT-HR _____ NPSHA FT 35	MAX HEAD RATED IMP _____
16 CORR/EROS CAUSED BY _____	MIN CONTINUOUS GPM _____
17 CONSTRUCTION	
18 NOZZLES SIZE (IN) RATING FACING LOCATION	☐ INSPECTION AND TESTS
19 SUCTION	SHOP INSPECTION ☒ REQ'D
20 DISCHARGE	HYDROSTATIC TEST ☒ REQ'D ☐ WITNESS
21 CASE MT ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☒ VERT. (TYPE) TURBINE	PERFORMANCE TEST ☒ REQ'D ☐ WITNESS
22 SPLIT ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER	NPSH TEST ☐ REQ'D ☐ WITNESS
23 PRESS : MAX ALLOW _____ PSIG _____ F ☐ HYDRO TEST _____ PSIG	INT INSP AFTER _____ ☐ REQ'D ☐ WITNESS
24 CONNECT ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET	TEST _____ ☐ REQ'D ☐ WITNESS
25 IMPELLER DIA _____ RATED _____ ☐ MAX _____ ☐ TYPE _____	☐ INT. WEAR PARTS
26 MOUNT ☐ BETWEEN BRGS ☐ OVERHUNG	WEAR RINGS ☐ CASE ☐ IMP
27 BEARINGS TYPE ☐ RADIAL _____ ☐ THRUST _____	DIA _____ IN CLEARANCE _____ IN
28 LUBE ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE	INTERSTAGE BUSHINGS
29 COUPLING ☐ MFR _____ ☐ MODEL _____	DIA _____ IN CLEARANCE _____ IN
30 DRIVER HALF MTD BY ☐ PUMP MFR ☐ DRIVER MFR	VERTICAL PUMPS
31 ☒ MECH SEAL ☐ PACKING ☐ AUX SEAL/PACKING	PIT OR SUMP DEPTH ☒ 12B
32 MFR TYPE MODEL _____	PUMP LENGTH _____
33 MFR CODE _____ API CODE _____	MIN SUBMERGENCE REQ'D _____
34 AUXILIARY PIPING	COLUMN PIPE ☐ FLANGED ☐ THREADED
35 ☐ C.W. PIPE PLAN ☐ C.O. CROSS ☐ TUBING ☐ PIPE	LINE SHAFT ☐ OPEN ☒ ENCLOSED
36 TOTAL COOLING WATER REQ'D GPM _____ ☐ SIGHT FL REQ'D	BRGS ☐ BOWL _____ ☐ LINE SHAFT _____
37 ☐ PACKING COIL INJECTION REQ'D TOTAL GPM _____ ☐ PSIG	BRG LUB ☐ WATER ☐ OIL ☐ GREASE
38 ☒ SEAL FLUSH PIPE PLAN 11 ☐ C.S. ☒ S.S. ☐ TUBING ☒ PIPE	FLOAT & ROD ☐ C.S. ☐ S.S. ☐ BRZ ☐ NONE
39 ☐ EXTERNAL SEAL FLUSH FLUID _____ ☐ GPM _____ ☐ PSIG	FLOAT SWITCH _____
40 ☐ AUXILIARY SEAL PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE	PUMP THRUST LB ☐ UP _____ ☐ DOWN _____
41 ☐ AUX SEAL FLUSH/QUENCH FLUID _____	MOUNTING PLATE REQ'D ☐
42 MATERIALS	☐ WEIGHTS AND DIMENSIONS
43 ☐ PUMP CASE/TRIM API CLASS _____	APPROX WT PUMP & BASE _____ LB
44 CASING CAST IRON CORR ALL _____ IN.	MOTOR _____ LB TURBINE _____ LB
45 IMPELLER 1/2 RESIST WEAR RINGS _____	BASE PLATE DIMENSIONS _____
46 SHAFT 416SS SLEEVE(S) 416SS	APPLICABLE SPECIFICATIONS
47 CASE INT COATING/LINING _____ GLAND _____	☐ API 610 ☐ ANSI B73.1 B73.2
48 ☐ BASEPLATE _____ DRIP PAN _____	☐ PROJECT SPECIFICATIONS
49 ☐ SITE CONDITIONS	
50 ELEVATION FT _____ DUST/FUMES _____	
51 AMB TEMP _____ MAX _____ MIN _____ AREA ELECT CL _____ GR _____ DIV _____	
52 COOLING WATER SUPPLY _____ PSIG _____ F. RETURN _____ PSIG _____ °F	
53 REMARKS _____	
54	
55 PREPARED BY DEM	REVISION ☐ 3
56 DATE 10-23-81	
57 APPROVED BY _____	BY _____ DATE _____
58 DATE _____	APP'D _____ DATE _____

**CENTRIFUGAL PUMP
DATA SHEET**

CONTRACT NO. 21-1997F
EQUIPMENT NO. P 17202A/B
NO. REQUIRED _____
SHEET 1 OF 1

1 CLIENT INTERNATIONAL COAL REFINING COMPANY	
2 PROJECT 6000 TPSD SRC-I DEMONSTRATION PLANT	PLANT LOCATION NEWMAN, KENTUCKY
3 SERVICE Aerated Water Pumps	
4 VENDOR _____	P.O. NO. _____
5 TYPE _____	MODEL _____
6 NO. OF MOTORS REQ'D <u>2</u>	ITEM NO. _____
7 NO. OF TURBINES REQ'D _____	ITEM NO. _____
8 NOTE ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER	
9 ☐ OPERATING CONDITIONS (EACH PUMP) ☐ PERFORMANCE	
10 LIQUID <u>Water</u> US GPM AT PT. NOR _____ RATED <u>35</u>	PROPOSAL CURVE NO. _____
11 _____ DISCHARGE PSIG <u>23.5</u>	RPM _____ NO. OF STAGES _____
12 PT. F. NOR <u>90</u> MAX _____ SUCTION PSIG MAX <u>5</u> RATED <u>2</u>	NPSHR FT. & IMPELLER _____ T.O.F. _____
13 SP. GR. AT PT. <u>1.0</u> DIFF. PRESS. PSI <u>21.5</u>	EFF. _____ BHP RATED _____
14 VAP. PRESS. AT PT. PSIA _____ DIFF. HEAD FT. <u>50</u>	MAX. BHP RATED IMP. _____
15 VIS. AT PT. LB/IMP. FT. HR. _____ NPSHA FT. <u>30+</u>	MAX. HEAD RATED IMP. _____
16 CORR./EROS. CAUSED BY _____	MIN. CONTINUOUS GPM _____
17 CONSTRUCTION	
18 NOZZLES _____ SIZE IN _____ RATING _____ FACING _____ LOCATION _____	19 SUCCTION _____
20 DISCHARGE _____	21 CASE MT. ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE) _____
22 SPLIT ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER	23 PRESS. ☐ MAX. ALLOW _____ PSIG ☐ F ☐ HYDRO TEST _____ PSIG
24 CONNECT. ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET	25 IMPELLER DIA. RATED _____ MAX _____ TYPE _____
26 MOUNT ☐ BETWEEN BRGS ☐ OVERHUNG	27 BEARINGS TYPE ☐ RADIAL ☐ THRUST _____
28 LUBE ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE	29 COUPLING ☐ MFR _____ MODEL _____
30 DRIVER HALF MTD BY ☐ PUMP MFR ☐ DRIVER MFR	31 ☒ MECH SEAL ☐ PACKING ☐ AUX. SEAL/PACKING
32 MFR TYPE MODEL _____	33 MFR CODE _____ API CODE _____
34 AUXILIARY PIPING	
35 ☐ C.W. PIPE PLAN ☐ C.S. ☐ TUBING ☐ PIPE	36 TOTAL COOLING WATER REQ'D GPM _____ SIGHT FL. REQ'D _____
37 ☐ PACKING COOL. INJECTION REQ'D _____ TOTAL GPM _____ PSIG _____	38 ☒ SEAL FLUSH PIPE PLAN <u>11</u> ☒ C.S. ☐ S.S. ☐ TUBING ☒ PIPE
39 ☐ EXTERNAL SEAL FLUSH FLUID _____ GPM _____ PSIG _____	40 ☐ AUXILIARY SEAL PLAN _____ C.S. ☐ S.S. ☐ TUBING ☐ PIPE
41 ☐ AUX. SEAL FLUSH/QUENCH FLUID _____	42 MATERIALS
43 ☐ PUMP CASE TRIM API CLASS _____	44 CASING <u>Ductile Iron</u> CORR. ALL _____ IN
45 IMPELLER <u>Cast Iron</u> WEAR RINGS _____	46 SHAFT <u>Steel</u> SLEEVE(S) <u>316SS</u>
47 CASE INT. COATING/LINING _____ GLAND _____	48 BASEPLATE _____ DRIP PAN _____
49 ☐ SITE CONDITIONS	
50 ELEVATION FT. _____ DUST/FUMES _____	51 AMB. TEMP. F. _____ MAX _____ MIN _____ AREA ELECT. CL. _____ GR. _____ DIV. _____
52 COOLING WATER SUPPLY _____ PSIG _____ F. RETURN _____ PSIG _____ F.	53 REMARKS:
54	
55 PREPARED BY <u>R. Sciascia</u>	REVISION <u>1</u>
56 DATE <u>10-14-81</u>	REVISION <u>2</u>
57 APPROVED BY _____	REVISION <u>3</u>
58 DATE _____	REVISION <u>4</u>

The Rust Engineering Company
A Subsidiary of Wheelabrator-Frye Inc.

CENTRIFUGAL PUMP DATA SHEET

CONTRACT NO. 21-1997F
EQUIPMENT NO. P17203
NO. REQUIRED 1
SHEET 1 OF 1

1	CLIENT	INTERNATIONAL COAL REFINING COMPANY			
2	PROJECT	6000 TPSD SRC-1 DEMONSTRATION PLANT		PLANT LOCATION NEWMAN, KENTUCKY	
3	SERVICE	Potable Water Booster Pump			
4	VENDOR	P.O. NO.			
5	TYPE	MODEL		SERIAL NO.	
6	NO. OF MOTORS REQ'D	<u>1</u>	ITEM NO.	FURN. BY <u>Purchaser</u>	MFR BY
7	NO OF TURBINES REQ'D		ITEM NO.	FURN BY	MFR BY
8	NOTE	☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER			
9		☐ OPERATING CONDITIONS (EACH PUMP)		☐ PERFORMANCE	
10	LIQUID	<u>Water</u>	US GPM AT PT. NOR	<u>50</u>	PROPOSAL CURVE NO
11			DISCHARGE PSIG	<u>67</u>	RPM NO OF STAGES
12	PT. F. NOR	<u>90</u>	MAX SUCTION PSIG	<u>6</u>	RATED <u>2</u>
13	SP. GR. AT PT.	<u>1.0</u>	DIFF. PRESS. PSI	<u>65</u>	NPSHR. FT. & IMPELLER TO F
14	VAP. PRESS. AT PT.	PSIA	DIFF. HEAD FT.	<u>150</u>	EFF. BHP RATED
15	VIS. AT PT.	LDIM/FT-HR	NPSHA FT.	<u>30+</u>	MAX BHP RATED IMP.
16	CORR/EROS. CAUSED BY				MAX HEAD RATED IMP.
17		CONSTRUCTION		MIN. CONTINUOUS GPM	
18	NOZZLES	SIZE (IN.)	RATING	FACING	LOCATION
19	SUCTION				
20	DISCHARGE				
21	CASE MT.	CENTERLINE	FOOT	BRACKET	VERT. (TYPE) <u>In line</u>
22		SPLIT	AXIAL	RAD. TYPE	VOLUTE
23		PRESS.	MAX. ALLOW	PSIG	F. HYDRO TEST
24		CONNECT	VENT	DRAIN	GAUGE
25		IMPELLER DIA.	RATED	MAX	TYPE
26		MOUNT	BETWEEN BRGS	OVERHUNG	
27		BEARINGS TYPE	RADIAL	THRUST	
28		LUBE	RING OIL	FLOOD	OIL MIST
29		COUPLING	MFR	MODEL	
30		DR. VER. HALF MTD BY	PUMP MFR	DRIVER MFR	
31		MECH. SEAL	PACKING	AUX. SEAL/PACKING	
32		MFR TYPE	MODEL		
33		MFR CODE	API CODE		
34		AUXILIARY PIPING			
35		CW PIPE PLAN	Cu	SS	TUBING
36		TOTAL COOLING WATER REQ'D	GPM	SIGHT F.I. REQ'D	
37		PACKING COOL. INJECTION REQ'D	TOTAL GPM	PSIG	
38		SEAL FLUSH PIPE PLAN	<u>11</u>	CS	SS
39		EXTERNAL SEAL FLUSH FLUID	GPM	PSIG	
40		AUXILIARY SEAL PLAN	CS	SS	TUBING
41		AUX. SEAL FLUSH/QUENCH FLUID			
42		MATERIALS			
43		PUMP CASE TRIM	API GLASS		
44		CASING	Ductile Iron	WEAR RINGS	
45		IMPELLER	Cast Iron	WEAR RINGS	
46		SHAFT	Steel	SLEEVES	<u>316SS</u>
47		CASE INT. COATING/LINING		GLAND	
48		BASEPLATE		DRIP PAN	
49		SITE CONDITIONS			
50		ELEVATION FT.		DUST/FUMES	
51		AMB. TEMP. F.	MAX	MIN	AREA ELECT. CL.
52		COOLING WATER SUPPLY	PSIG	F. RETURN	PSIG
53		REMARKS			
54					
55	PREPARED BY	R. Sciascia		REVISION	
56	DATE	10-14-81		REVISION	
57	APPROVED BY	BY	DATE	BY	DATE
58	DATE	APP'D	DATE	APP'D	DATE

The Rust Engineering Company
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CENTRIFUGAL PUMP DATA SHEET

CONTRACT NO. 21-1997F
EQUIPMENT NO. P17204A/B
NO. REQUIRED 1
SHEET 1 OF 1

1	CLIENT	INTERNATIONAL COAL REFINING COMPANY			
2	PROJECT	6000 TPSD SRC-I DEMONSTRATION PLANT		PLANT LOCATION NEWMAN, KENTUCKY	
3	SERVICE	Potable Water Supply Pumps			
4	VENDOR	P.O. NO.			
5	TYPE	MODEL		SERIAL NO.	
6	NO. OF MOTORS REQ'D	2	ITEM NO.	FURN BY	Purchaser MFR BY
7	NO OF TURBINES REQ'D		ITEM NO.	FURN BY	MFR BY
8	NOTE	☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER			
9	☐ OPERATING CONDITIONS (EACH PUMP)			☐ PERFORMANCE	
10	LIQUID	Water		US GPM AT PT. NOR	RATED 450
11				DISCHARGE PSIG	67
12	PT. 1. NOR	80. MAX	SUCTION PSIG MAX	6	RATED 2
13	SP. GR. AT PT.	1.0	DIFF. PRESS. PSI	65	
14	VAP. PRESS. AT PT.	PSIA	DIFF. HEAD FT.	150	
15	VIS. AT PT.	LB/MIN. FT.-HR.	NPSHA FT.	30+	
16	CORR./EROS. CAUSED BY				
17	CONSTRUCTION				
18	NOZZLES	SIZE IN.	RATING	FACING	LOCATION
19	SUCTION				
20	DISCHARGE				
21	CASE MT.	CENTERLINE	FOOT	BRACKET	VERT. (TYPE)
22		SPLIT	AXIAL	RAD. TYPE	VOLUTE SGL DBL DIFFUSER
23	PRESS.	MAX. ALLOW.	PSIG	F	HYDRO TEST PSIG
24	CONNECT.	VENT	DRAIN	GAUGE	STEAM JACKET
25	IMPELLER DIA.	RATED	MAX		TYPE
26	MOUNT	BETWEEN BRGS.	OVERHUNG		
27	BEARINGS TYPE	RADIAL	THRUST		
28	LUBE	RING OIL	FLOOD	OIL MIST	FLINGER PRESSURE
29	COUPLING	MFR	MODEL		
30	DRIVER HALF MTD BY	PUMP MFR	DRIVER MFR		
31	MECH. SEAL	PACKING	AUX. SEAL/PACKING		
32	MFR. TYPE	MODEL			
33	MFR. CODE	API CODE			
34	AUXILIARY PIPING				
35	C/W PIPE PLAN	C/S	TUBING	PIPE	
36	TOTAL COOLING WATER REQ'D	GPM	SIGHT F.I.	REQ'D	
37	PACKING COOL. INJECTION REQ'D	TOTAL GPM	PSIG		
38	SEAL FLUSH PIPE PLAN	11	C/S	TUBING	PIPE
39	EXTERNAL SEAL FLUSH FLUID	GPM	PSIG		
40	AUXILIARY SEAL PLAN	C/S	TUBING	PIPE	
41	AUX. SEAL FLUSH/QUENCH FLUID				
42	MATERIALS				
43	PUMP CASE TRIM API CLASS				
44	CASING	Ductile Iron	CORR. ALL	IN	
45	IMPELLER	Cast Iron	WEAR RINGS		
46	SHAFT	Steel	SLEEVE(S)	316SS	
47	CASE INT. COATING/LINING		GLAND		
48	BASEPLATE		DRIP PAN		
49	SITE CONDITIONS				
50	ELEVATION FT.		DUST/FUMES		
51	AMB. TEMP.	F	MAX	MIN	AREA ELECT. CL. GR. DIV.
52	COOLING WATER SUPPLY	PSIG	F	RETURN	PSIG °F
53	REMARKS				
54					
55	PREPARED BY	R. Sciascia	REVISION	△	
56	DATE	10-14-81	REVISION	△	6
57	APPROVED BY		BY	DATE	
58	DATE		APP'D	DATE

The Rust Engineering Company
A Subsidiary of Wheelabrator-Frye Inc.

CENTRIFUGAL PUMP DATA SHEET

CONTRACT NO. 21-1997F
EQUIPMENT NO. P17205
NO. REQUIRED 1
SHEET 1 OF 1

1	CLIENT	INTERNATIONAL COAL REFINING COMPANY			
2	PROJECT	6000 TPSD SRC-1 DEMONSTRATION PLANT		PLANT LOCATION NEWMAN, KENTUCKY	
3	SERVICE	Filter Backwash Pump			
4	VENDOR	P.O. NO.			
5	TYPE	MODEL		SERIAL NO.	
6	NO. OF MOTORS REQ'D	1	ITEM NO.	FURN. BY	Purchaser MFR BY
7	NO OF TURBINES REQ'D		ITEM NO.	FURN BY	MFR BY
8	NOTE	☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER			
9	☐ OPERATING CONDITIONS (EACH PUMP)		☐ PERFORMANCE		
10	LIQUID	Water	US GPM AT PT NOR	RATED	400
11			DISCHARGE PSIG		19.3
12	PT F NOR	80	MAX SUCTION PSIG MAX	6	RATED 2
13	SP GR AT PT	1.0	DIFF PRESS PSI		17.3
14	VAP PRESS AT PT	PSIA	DIFF HEAD FT		40
15	VIS AT PT	1.0	FT-MR	NPSHA FT	30+
16	CORR/PROS CAUSED BY				
17	CONSTRUCTION				
18	NOZZLES	SIZE IN	RATING	FACING	LOCATION
19	SUCTION				
20	DISCHARGE				
21	CASE MT	CENTERLINE ☒	FOOT ☐	BRACKET ☐	VERT (TYPE)
22		SPLIT ☐	AXIAL ☐	RAD TYPE	VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER
23	PRESS	MAX ALLOW	PSIG	F	HYDRO TEST PSIG
24	CONNECT	VENT ☐	DRAIN ☐	GAUGE ☐	STEAM JACKET
25	IMPELLER DIA	RATED		MAX	☐ TYPE
26	MOUNT	BETWEEN BRGS ☐	OVERHUNG		
27	BEARINGS TYPE	RADIAL		THRUST	
28	LUBE	RING OIL ☐	FLOOD ☐	OIL MIST ☐	FLINGER ☐ PRESSURE
29	COUPLING	MFR		MODEL	
30	DRIVER HALF MTD BY	PUMP MFR	DRIVER MFR		
31	☒ MICH SEAL	☐ PACKING	☐ AUX SEAL/PACKING		
32	MFR TYPE MODEL				
33	MFR CODE		API CODE		
34	AUXILIARY PIPING				
35	☐ C.W. PIPE PLAN	☐ C.O. S.S.	TUBING	☐ PIPE	
36	TOTAL COOLING WATER REQ'D	GPM	☐ SIGHT FL	REQ'D	
37	PACKING COOL INJECTION REQ'D	TOTAL GPM		PSIG	
38	☒ SEAL FLUSH PIPE PLAN	11	☒ C.S.	☐ S.S.	☐ TUBING ☒ PIPE
39	☐ EXTERNAL SEAL FLUSH FLUID		GPM		PSIG
40	☐ AUXILIARY SEAL PLAN		C.S.	☐ S.S.	☐ TUBING ☐ PIPE
41	☐ AUX SEAL FLUSH/QUENCH FLUID				
42	MATERIALS				
43	PUMP CASE/TRIM API CLASS				
44	CASING	Ductile Iron	CORR. ALL		IN
45	IMPELLER	Cast Iron	WEAR RINGS		
46	SHAFT	Steel	SLEEVE(S)	316SS	
47	CASE INT. COATING/LINING		GLAND		
48	BASEPLATE		DRIP PAN		
49	☐ SITE CONDITIONS				
50	ELEVATION FT		DUST/FUMES		
51	AMB TEMP	F	MAX	MIN	AREA ELECT CL GR DIV
52	COOLING WATER SUPPLY		PSIG		RETURN PSIG
53	REMARKS				
54					
55	PREPARED BY	R. Sciascia	REVISION	☐	
56	DATE	10-14-81	REVISION	☐	7
57	APPROVED BY		BY	DATE	
58	DATE		APP'D	DATE

The Rust Engineering Company
A Subsidiary of Wheelabrator-Frye Inc

STORAGE TANK DATA SHEET

CONTRACT NO. 21-1997-F
EQUIPMENT NO. TK-17201
NO. REQUIRED _____
SHEET _____ OF _____

CLIENT INTERNATIONAL COAL REFINING COMPANY
PROJECT 6000 TPSD SRC-1 DEMONSTRATION PLANT PLANT LOCATION NEWMAN, KENTUCKY
SERVICE Water, Integral part of Aerator
VENDOR _____ P.O. NO. _____

DIAMETER	12'	HEIGHT	12'	FT.	MATERIAL			
CAPACITY NORMAL	16,000	GAL	SHELL	Fiberglass	THICK.	IN.		
NET WORKING		GAL	ROOF		THICK.	IN.		
OPERATING CONDITIONS				BOTTOM Fiberglass THICK.				IN.
SPECIFIC GRAVITY	LIO	AT TEMP	°F	STRUCTURALS Fiberglass				
PUMPING RATES	IN	OUT	GPM	NOZZLE: NECK				FLANGE
VAPOR PRESS	IN WATER			COUPLINGS				
MAX. OPER. TEMP	°F			INTERNALS: FIXED				
DESIGN CONDITIONS				REMOVABLE				
CODE: API	APPENDIX			GASKETS				
DESIGN METAL TEMP	°F			BOLTING				
DESIGN PRESS	IN WATER			EST. ERECTION WT (LB)				
CORROSION ALLOW: SHELL	ROOF			NOZZLES				
	BOTTOM			INTERNAL				
ROOF TYPE	OPEN TOP			FLANGE RATING				COUPLING RATING
ROOF LIVE LOADS	PSF			MARK NO.	NO. REQ'D.	SIZE IN	FACING	SERVICE
WIND PRESS	PSF			N-1				INLET
EARTHQUAKE CODE	ZONE			N-2				OUTLET
FOUNDATION TYPE				N-3				DRAIN
RADIOGRAPHY EXTENT				N-4				RELIEF/VENT
STRESS RELIEF YES/NO	EXTENT			N-5				INLET
INSULATION YES/NO	THICK: IN.			N-6				OUTLET
LEAK TESTING: BOTTOM	SHELL ROOF			N-7				
MILL TEST REPORTS YES/NO				M-1				MAN WAY
PAINTING YES/NO SPEC								

SKETCH

PREPARED BY <u>Robert Thompson</u>	REVISION <u>△</u>	REVISION <u>△</u>	REVISION <u>△</u> <u>8</u>
DATE	BY	DATE	BY
DATE	APP'D	DATE	APP'D

The Rust Engineering Company
A Subsidiary of Wheelabrator-Fine Inc.

STORAGE TANK DATA SHEET

CONTRACT NO. 21-194-F
EQUIPMENT NO. TK-17852
NO. REQUIRED 1
SHEET 1 OF 1

1	CLIENT	INTERNATIONAL COAL REFINING COMPANY				
2	PROJECT	6000 TPSD SRC-I DEMONSTRATION PLANT			PLANT LOCATION NEWMAN, KENTUCKY	
3	SERVICE	P.T.O. WALK STEPPER				
4	VENDOR	P.O. NO.				
5	DIAMETER	17	HEIGHT	15	FT.	MATERIAL
6	CAPACITY: NORMAL	25000			GAL	SHELL C.S. THICK IN
7	NET WORKING				GAL	ROOF THICK IN
8	OPERATING CONDITIONS				BOTTOM THICK IN	
9	SPECIFIC GRAVITY, LIQ	1.0	AT TEMP		°F	STRUCTURALS
10	PUMPING RATES: IN		OUT	900 max.	GPM	NOZZLE: NECK FLANGE
11	VAPOR PRESS				IN WATER	COUPLINGS
12	MAX OPER TEMP	300°F			°F	INTERNALS: FIXED
13	DESIGN CONDITIONS				REMOVABLE	
14	CODE API	APPENDIX			GASKETS	
15	DESIGN METAL TEMP				°F	BOLTING
16	DESIGN PRESS				IN WATER	EST. REACTION WT (LB)
17	CORROSION ALLOW	SHELL	ROOF	IN.	NOZZLES	
18		BOTTOM	INTERNALS	IN.	FLANGE RATING	
19	ROOF TYPE	C-12			COUPLING RATING	
20	ROOF LIVE LOADS	PSF			MARK NO.	NO. REQ'D
21	WIND PRESS	PSF			N-1	6
22	EARTHQUAKE CODE	ZONE			N-2	10
23	FOUNDATION TYPE				N-3	10
24	RADIOGRAPHY: EXTENT				N-4	2
25	STRESS RELIEF YES/NO	EXTENT			N-5	6
26	INSULATION YES/NO	THICK: IN.			N-6	10
27	LEAK TESTING: BOTTOM	SHELL ROOF			N-7	
28	MILL TEST REPORTS: YES/NO				M-1	24
29	PAINTING YES/NO	SPEC SHOP COAT

55	PREPARED BY	REVISION		REVISION		REVISION		9
56	DATE	BY	DATE	BY	DATE	BY	DATE	
57	APPROVED BY	APP'D	DATE	APP'D	DATE	APP'D	DATE	
58	DATE

**The Rust
Engineering Company**
A Subsidiary of Wheelabrator-Fry Inc.

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-1997-F

EQUIPMENT NO. X-17201

NO. REQUIRED 1

SHEET 1 OF 1

CLIENT INTERNATIONAL COAL REFINING COMPANY

PROJECT 6000 TPSD SRC-1 DEMONSTRATION PLANT

PLANT LOCATION NEWMAN, KENTUCKY

SERVICE Potable Water Chemical Feed System

VENDOR

P.O. NO.

This feed system will consist of a 500 gallon, 316 SS mix tank with a 1 HP agitator and a positive displacement type metering pump. The chemical to be mixed and fed will be sodium hexametaphosphate.

PREPARED BY O.E. Mitchell

DATE 10-14-81

REVISION △

REVISION △

REVISION △

10

APPROVED BY

BY

DATE

BY

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BY

DATE

DATE

APP'D

DATE

APP'D

DATE

APP'D

DATE

The Rust Engineering Company
A Subsidiary of Wheelabrator-Frye Inc.

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-1997F

EQUIPMENT NO. X-17202

NO. REQUIRED 1

SHEET 1 OF 1

CLIENT INTERNATIONAL COAL REFINING COMPANY

PROJECT 6000 TPSD SRC-1 DEMONSTRATION PLANT

PLANT LOCATION NEWMAN, KENTUCKY

SERVICE Potable Water Chlorination

P.O. NO.

VENDOR

A chlorine feed system with a capacity of 20 lb/day. The chlorination equipment shall consist of a vacuum type chlorinator, chlorine solution eductor (J-17202), vacuum regulator, pressure reducing valve, flow meter, instruments and controls as required for feeding chlorine from a battery of ton chlorine containers. Weighing scales are included.

PREPARED BY O.E. Mitchell

DATE 10/14/81

APPROVED BY

DATE

REVISION

BY

DATE

APP'D

DATE

REVISION

BY

DATE

APP'D

DATE

REVISION 11

BY

DATE

APP'D

DATE

3.1.2 Process Water Treatment

3.1.2.1 Process Description

3.1.2.1.1 General

The process water treatment system consists of several unit operations, each of which is common practice in the water treatment field.

3.1.2.1.2 Intake System

3.1.2.1.2.1 The river water intake screen (FL-17101) is of the vertical travelling type. This is a mechanical screen, requiring minimum maintenance, and having a high capacity and low velocity, thus reducing the entrainment of aquatic life. The intake structure will be a vertical concrete structure and will be located on the bank of the Green River, near the water treatment facility. Screenings will be sent to the non-hazardous waste landfill.

3.1.2.1.2.2 Two intake pumps (P-17101 A and B), will be provided in the intake structure for pumping river water to the river water clarifier (X-17101).

3.1.2.1.3 Chemical Feed System

3.1.2.1.3.1 General

Chemical feed systems will be provided to supply specific chemicals for use in the clarification of the river water.

3.1.2.1.3.2 Coagulant

Liquid alum will be received by tank truck and unloaded into an alum storage tank (TK-17101). One of the two alum feed pumps (P-17104 A

and B) receiving a signal from the inlet flow meter to the clarifier, will meter the liquid alum to the inlet of the clarifier, where it will be diluted with clarified water.

3.1.2.1.3.3 Coagulant Aid

A coagulant aid will be received in bags as a dry powder and will be processed through a coagulant aid feed system, (X-17103). This system will dilute the coagulant aid to about one-half percent and deliver it to a point ahead of the river water clarifier, where it will be further diluted prior to injection.

3.1.2.1.3.4 pH Control

A 10 percent milk-of-lime solution will be pumped from the wastewater treatment facility to the lime feed system, (X-17102), in the water treatment facility. The lime feed pumps (P-17105 A and B) deliver the milk-of-lime to a point ahead of the river water clarifier, where it will be added to control pH. A recirculating line will be provided for the milk-of-lime solution to prevent settling out of the lime and the possibility of plugging.

3.1.2.1.4 River Water Clarifier

The river water clarifier will be of the solids-contact reactor type. This clarifier has a center column drive from which the turbine mixer and the rake are driven through variable speed reducers. The clarifier mechanism will be installed in a concrete basin with a sloping bottom to aid in sludge removal. Radial collection launders will collect the clarified water and convey it through an effluent trough to an adjacent collection sump. The clarified water pumps (P-17103 A and B) deliver the clarified water through the process water filters (FL-17102 A-F) to the process water/fire water storage tank (TK-16303). The sludge will be drained to the process sewer.

3.1.2.1.5 Filtration System

The process water filters will be multi-media horizontal pressure design. These filters will be automatically backwashed when a high pressure drop is detected. Backwash will be sent to a process sewer.

3.1.2.1.6 Chlorination

The river water chlorinator (X-17105) will feed chlorine to the river water intake pump suction to control biological growth in the piping to the clarifier. The process water chlorinator (X-17104) will feed chlorine based on flow and residual control to the process water distribution header.

3.1.2.2 Process Flow Diagrams

The following process flow diagrams are included after this page.

- 00-17-01002D Process Water Treatment Process and Control Diagram (Sheet 1)
- 00-17-01003D Process Water Treatment Process and Control Diagram (Sheet 2)
- 00-17-01004D Chemical Feed Systems Process and Control Diagram
- 00-17-01005D Chlorination Systems Process and Control Diagram

[illegible]

NOTE:

1. PROCESS WATER FLOWS DIFFER FROM DBM NORMAL AND MAX. RATES DUE TO THE USE OF CALCULATED RATHER THAN ESTIMATED FLOWS ARE FOR AREA 16 & 17.
2. ALL INSTRUMENT NUMBERS ON THIS DRAWING ARE PREFIXED BY 17.
3. NORMAL PROCESS WATER FLOW SHOWN IS FOR ZERO DISCHARGE CONDITION. WHEN DISCHARGING TO RIVER THIS NORMAL FLOW BECOMES 3909 GPM.

LEGEND:

REFER TO DWG. 00-10-02004D
FOR FLOW DATA SYMBOLS.

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050010-Z1-00

DWG. NO.

H-17101
SCALEX-17202
POTABLE WATER
CHLORINATORX-17104
PROCESS WATER
CHLORINATORX-17105
RIVER WATER
CHLORINATORJ-17202
POTABLE WATER
CHLORINATOR
EJECTORJ-17102
PROCESS WATER
CHLORINATOR
EJECTORJ-17103
RIVER WATER
CHLORINATOR
EJECTOR 00-17-010050
D

NOTES:

1. ALL INSTRUMENT NUMBERS ON THIS
DRAWING ARE PREFIXED BY 17.

LEGEND:

REFER TO DWG. 00-10-0-020040
FOR FLOW DATA SYMBOLS.

REV.	CHANGE NOTICE	REVISION DESCRIPTION	DATE	BY	CHK'D	APP'D	ADD	DATE	6,000 TPD SRC-1 DEMONSTRATION PLANT NEWMAN, KENTUCKY	INTERNATIONAL COAL REFINING COMPANY ALLENTOWN, PA.
							CRAFTSMAN	9-25-81	FOR UNITED STATES DEPARTMENT OF ENERGY	
							CHECKED			
							ENGINEER			
							APPROVED		PROCESS & CONTROL DIAGRAM CHLORINATION SYSTEMS	THE RUST ENGINEERING COMPANY BIRMINGHAM, ALABAMA CONTRACT 91-1997F
							SCALE		DWG. NO.	00-17-010050
									REV.	

3.1.2.3 Utility Summary

The Utility Summary for the Process Water Treatment Area is included in Section 3.1.1.3.

3.1.2.4 Motor List

The Motor List for the Process Water Treatment Area follows this page.

Process Water Treatment Area

Motor List

<u>Item No.</u>	<u>Description</u>	<u>Installed HP</u>	<u>Operating KW</u>	<u>Hr/Day</u>	<u>KWH/Day</u>
FL-17101	Intake Screen	2	1½	24	36
M-17101	Turbine Mixer Motor	5	3	24	72
M-17102	Rake Motor	7.5	6	24	144
P-17101A	River Intake Pump	200	150	24	3,600
P-17101B	River Intake Pump	200	0	0	0
P-17102	Screen Spray Booster Pump	7.5	5	24	120
P-17103A	Clarified Water Pump	200	150	24	3,600
P-17103B	Clarified Water Pump	200	0	0	0
P-17104A	Alum Feed Pump	1	0.5	24	12
P-17104B	Alum Feed Pump	1	0	0	0
P-17105A	Lime Feed Pump	2	1.5	24	36
P-17105B	Lime Feed Pump	2	0	0	0
P-17106A	Backwash Recycle Pump	7.5	6	24	144
P-17106B	Backwash Recycle Pump	7.5	0	0	0
P-17107	Filter Backwash Pump	100	75	24	1,800
P-17108A	Process Water Pump	300	220	24	5,280
P-17108B	Process Water Pump	300	220	24	5,280
P-17108C	Process Water Pump	300	0	0	0
X-17102	Lime Feed System Pump	1	0.5	24	12
X-17103	Coagulant Feed System Agitator	0.5	0.3	24	7.2
X-17103	Coagulant Feed System Pump	<u>1</u>	<u>0.5</u>	24	<u>12</u>
		1,844	840		20,155.2

3.1.2.5 Layout Drawing

See layout drawing 00-17-40011D included with potable water system. Refer to Section 3.1.1.5.

3.1.2.6 Equipment List/Summary

The equipment list/summary for the process water treatment follows this page.

EQUIPMENT LIST/SUMMARY

REV. 4

03-26-82

WBS ELEMENT: 1.4.1.2.1 ICRC AREA: 17

WATER AND WASTE TREATMENT--PROCESS WATER

PAGE 1 OF 4

REV.	ICRC/RUST EQUIP NO	QTY	EQUIPMENT DESCRIPTION	P.O. NUMBER	SIZE/ WEIGHT	P.O. DATE	VENDOR ENG		DELV DATE	EQUIP COST	PURCH BY	TYPE EQUIP
							NEED DATE	COST				
	FL-17101	1	Screen, intake, rotating with motor		6' wide 57' long 2 hp 1,800 rpm	S 10-82 P A	S 1-83 P A	8.3	S 6-83 P A	69.8	RUST	SF
	FL-17102 A thru F	6	Filter, tank size 8' dia x 18' TT, 2' coal and 1' sand filter media, cs, 7,181 gallons, ASME code, 125 psig		Tank 8' dia x 18' TT	S 10-82 P A	S 12-82 P A	2.7 ea	S 5-83 P A	28.3 ea	CMC	SF
	J-17102	1	Ejector (included with chlorinator)			S 10-82 P A	S 12-82 P A	inc with X-17104	S 5-83 P A	inc with X-17104	RUST	SF
	J-17103	1	Ejector (included with chlorinator)			S 10-82 P A	S 12-82 P A	inc with X-17105	S 5-83 P A	inc with X-17105	RUST	SF
	M-17101	1	Motor, turbine mixer (included with clarifier)		5 hp 1,800 rpm	S 10-82 P A	S 12-82 P A	inc with X-17101	S 5-83 P A	inc with X-17101	RUST	SF
	M-17102	1	Motor, rake (included with clarifier)		7.5 hp 1,800 rpm	S 10-82 P A	S 12-82 P A	inc with X-17101	S 5-83 P A	inc with X-17101	RUST	SF
	P-17101 A and B	2	Pump, intake, vertical turbine, cs, 100°F, sp gr 1.0, 4,000 gpm, 128 tdb, with motor		200 hp 1,200 rpm	S 10-82 P A	S 11-82 P A	4.0 ea	S 2-83 P A	33.5 ea	CMC	SF

NOTES:

1. All costs 1st Quarter Fiscal Year 1982 in thousand dollars.

RUST: Rust Engineering

S: Scheduled

FL: Field Labor N/A: Not Applicable

2. Equipment costs are FOB jobsite with shipping & vendor field

CMC: Stone & Webster

P: Projected

M: Material for field fab equipment

support less vendor engineering. 3. This equipment is Appendix C Bulks.

A: Actual

SF: Shop Fabricated FF: Field Fabricated

EQUIPMENT LIST/SUMMARY

REV. 4

03-26-82

WBS ELEMENT: 1.4.1.2.1 ICRC AREA: 17

WATER AND WASTE TREATMENT--PROCESS WATER

PAGE 2 OF 4

REV.	ICRC/RUST EQUIP NO	QTY	EQUIPMENT DESCRIPTION	P.C. NUMBER	SIZE/ WEIGHT	P.O. DATE	VENDOR ENG		DELV DATE	EQUIP COST	PURCH BY	TYPE EQUIP
							NEED DATE	COST				
	P-17102	1	Pump, booster, screen spray, centrifugal, general service--high, CI, 100°F, sp gr 1.0, 140 gpm, 102 tdh, with motor		7.5 hp 3,600 rpm	S 10-82 P A	S 11-82 P A	0.3	S 2-83 P A	2.9	CMC	SF
	P-17103 A and B	2	Pump, clarified water, cs, centrif-m, 100°F, sp gr 1.0, 4,000 gpm, 136 tdh, with motor		200 hp 1,800 rpm	S 10-82 P A	S 11-82 P A	2.8 ea	S 2-83 P A	23.9 ea	CMC	SF
	P-17104 A and B	2	Pump, feed, alum, diaphragm, 316 ss, 90°F max, sp gr 1.2, 0.35 gpm, 200 tdh, with motor		1 hp 1,200 rpm	S 10-82 P A	S 11-82 P A	0.2 ea	S 2-83 P A	1.3 ea	CMC	SF
40	P-17105 A and B	2	Pump, feed, lime slurry, 316 ss, 110°F max, sp gr 1.1, 5 gpm, 200 tdh, with motor		2 hp 1,200 rpm	S 10-82 P A	S 11-82 P A	0.4 ea	S 2-83 P A	3.3 ea	CMC	SF
	P-17106 A and B	2	Pump, backwash recycle, CI, general service, 90°F, sp gr 1.0, 200 gpm, 68 tdh, with motor		7.5 hp 1,800 rpm	S 10-82 P A	S 11-82 P A	0.6 ea	S 2-83 P A	4.8 ea	CMC	SF
	P-17107	1	Pump, filter backwash, cs, centrif-m, 90°F, sp gr 1.0, 2,160 gpm, 124 tdh, with motor		100 hp 1,800 rpm	S 10-82 P A	S 11-82 P A	1.7	S 2-83 P A	14.5	CMC	SF
	P-17108 A thru C	3	Pump, process water, cs, centrif-m, 90°F, sp gr 1.0, 4,000 gpm, 210 tdh, with motor		300 hp 1,800 rpm	S 10-82 P A	S 11-82 P A	3.1 ea	S 2-83 P A	26.6 ea	CMC	SF

NOTES:

1. All costs 1st Quarter Fiscal Year 1982 in thousand dollars.
2. Equipment costs are FOB jobsite with shipping & vendor field support less vendor engineering.
3. This equipment is Appendix C Bulks.

RUST: Rust Engineering
CMC: Stone & Webster

S: Scheduled
P: Projected
A: Actual

FL: Field Labor
M: Material for field fab equipment
SF: Shop Fabricated
FF: Field Fabricated

N/A: Not Applicable

EQUIPMENT LIST/SUMMARY

REV. 4

03-26-82

WBS ELEMENT: 1.4.1.2.1 ICRC AREA: 17

WATER AND WASTE TREATMENT--PROCESS WATER

PAGE 3 OF 4

REV.	ICRC/RUST EQUIP NC	QTY	EQUIPMENT DESCRIPTION	P.O. NUMBER	SIZE/ WEIGHT	P.O. DATE	VENDOR ENG		DELV DATE	EQUIP COST	PURCH BY	TYPE EQUIP
							NEED DATE	COST				
	TK-17101	1	Tank, storage, alum, vertical, cone roof, 10,000 gallons, 0 psig, 90°F max, FRP		12' dia x 12' side	S 10-82 P A	S 12-82 P A	1.6	S 5-83 P A	13.5	CMC	SF
3	TK-17102	1	Tank, backwash recycle, 200,000 gallons, cs, open top, 90°F		32' dia x 33.5' high	S 10-82 P A	S 11-82 P A	20.8	S 4-83 P A	175.8 M = 156.8 L = 19.0	CMC	FF
	W-17101	1	Scale, chlorine, ton cylinder, 3,600 lb load		2.5' dia x 6.67' cyl size	S 10-82 P A	S 12-82 P A	0.7	S 5-83 P A	6.0	CMC	SF
3	X-17101	1	Clarifier, river water, 90' diameter, requires concrete tank, 6,000 gpm			S 10-82 P A	S 3-83 P A	39.1	S 3-84 P A	335.5 M = 278.3 L = 57.2	CMC	FF
	X-17102	1	Lime feed system, 500 gallon tank, open top, cs, cone bottom, 140°F max		4.13' dia x 5.83' sides	S 10-82 P A	S 11-82 P A	0.7	S 4-83 P A	6.2	RUST	SF
	X-17102 con't.	1	Agitator, 316 ss, direct drive, 1,150 rpm, with motor		1 hp 1,200 rpm	S 10-82 P A	S 11-82 P A	inc with X-17102	S 4-83 P A	inc with X-17102	RUST	SF
	X-17103	1	Coagulant feed system, dry chemical feeder, FRP, 8 cu ft capacity, tank capacity 25 gallons.		2.71' dia x 0.63' high	S 10-82 P A	S 11-82 P A	0.9	S 4-83 P A	7.4	RUST	SF

NOTES:

1. All costs 1st Quarter Fiscal Year 1982 in thousand dollars. RUST: Rust Engineering S: Scheduled FL: Field Labor N/A: Not Applicable
 2. Equipment costs are FOB jobsite with shipping & vendor field support less vendor engineering. CMC: Stone & Webster P: Projected M: Material for field fab equipment
 3. This equipment is Appendix C Bulks. A: Actual SF: Shop Fabricated FF: Field Fabricated

EQUIPMENT LIST/SUMMARY

REV. 4

03-26-82

WBS ELEMENT: 1.4.1.2.1 ICRC AREA: 17

WATER AND WASTE TREATMENT--PROCESS WATER

PAGE 4 OF 4

REV.	ICRC/RUST EQUIP NO	QTY	EQUIPMENT DESCRIPTION	P.O. NUMBER	SIZE/ WEIGHT	P.O. DATE	VENDOR ENG		DELV DATE	EQUIP COST	PURCH BY	TYPE EQUIP
							NEED DATE	COST				
	X-17103 con't.	1	Agitator, 316 ss, direct drive, with motor		0.5 hp 1,800 rpm	S 10-82 P A	S 11-82 P A	inc with K-17103	S 4-83 P A	inc with X-17103	RUST	SF
	X-17103 con't.	1	Pump, diaphragm, 316 ss, 90°F, sp gr 1.0, 0.8 gpm, 200 tdh, with motor		1 hp 1,800 rpm	S 10-82 P A	S 11-82 P A	inc with K-17103	S 4-83 P A	inc with X-17103	RUST	SF
	X-17104	1	Chlorinator, process water 192 lb/day			S 10-82 P A	S 12-82 P A	0.6	S 5-83 P A	6.3	RUST	SF
42	X-17105	1	Chlorinator, river water, 480 lb/day			S 10-82 P A	S 12-82 P A	0.8	S 5-83 P A	8.6	RUST	SF

NOTES:

1. All costs 1st Quarter Fiscal Year 1982 in thousand dollars.

RUST: Rust Engineering

S: Scheduled

FL: Field Labor N/A: Not Applicable

2. Equipment costs are FOB jobsite with shipping & vendor field

CHC: Stone & Webster

P: Projected

M: Material for field fab equipment

support less vendor engineering. 3. This equipment is Appendix C Bulks.

A: Actual

SF: Shop Fabricated FF: Field Fabricated

3.1.2.7 Equipment Data Sheets

The equipment data sheets for the process water treatment follow this page.

CLIENT

INTERNATIONAL COAL REFINING COMPANY

PROJECT 6000 TPD SRC-1 DEMONSTRATION PLANT

PLANT LOCATION NEWMAN, KENTUCKY

SERVICE INTAKE SCREEN

VENDOR

P.O. NO.

The intake screen will be the travelling basket type. The screen will be 6 feet wide and 57 feet long. Maximum intake velocity at low water level is 1 ft/sec. The screen will be mounted in a concrete intake structure on the bank of the Green River. The basket material will be 316 SS and a motor for the screen drive will be included.

PREPARED BY O.E. MITCHELL

DATE 10-14-81

REVISION

REVISION

REVISION 1

APPROVED BY

BY

DATE 3-26-82

BY

DATE

BY

DATE

DATE

APP'D

DATE

APP'D

DATE

APP'D

DATE

The Rust Engineering Company
A Subsidiary of Wheelabrator-Frye Inc.

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-1997-F
EQUIPMENT NO. FL-17102A-F
NO. REQUIRED 6
SHEET 1 OF 1

CLIENT INTERNATIONAL COAL REFINING COMPANY

PROJECT 6000 TPSD SRC-I DEMONSTRATION PLANT

PLANT LOCATION NEWMAN, KENTUCKY

SERVICE Clarified Water Filters

VENDOR

P.O. NO.

Six (6) horizontal pressure filters each 8' diameter, 18' T-T will be supplied. Each filter will be furnished with internals, underdrain, distributors, nozzles, filtering media, main piping, and valves. The filters will have automatic controls for backwashing.

The vessels will be designed for 125 PSIG, ASME coded and stamped.

PREPARED BY O.E. Mitchell

DATE 10/14/81

REVISION

REVISION

REVISION 2

APPROVED BY

BY

DATE

BY

DATE

BY

DATE

DATE

APP'D

DATE

APP'D

DATE

APP'D

DATE

The Rust Engineering Company
A Subsidiary of Wheelabrator-Frye Inc

**CENTRIFUGAL PUMP
DATA SHEET**

CONTRACT NO. 21-1997F
EQUIPMENT NO. P17101A/B
NO. REQUIRED 2
SHEET _____ OF _____

1 CLIENT		INTERNATIONAL COAL REFINING COMPANY	
2 PROJECT		8000 TPSD SRC-I DEMONSTRATION PLANT	
3 SERVICE		River Intake Pumps	
4 VENDOR		P.O. NO.	
5 TYPE		MODEL	
6 NO. OF MOTORS REQ'D		2	
7 NO OF TURBINES REQ'D		2	
8 NOTE		O INDICATES INFORMATION TO BE COMPLETED BY PURCHASER O BY MANUFACTURER	
9 O OPERATING CONDITIONS (EACH PUMP)		O PERFORMANCE	
10 LIQUID		River Water	
11 DISCHARGE		PSIG	
12 PT. F. NOR		80	
13 SP GR AT PT		1.0	
14 VAP PRESS AT PT		PSIA	
15 VIS AT PT		LBIM/FT-HR	
16 CORR/EROS. CAUSED BY			
17 CONSTRUCTION		PROPOSAL CURVE NO	
18 NOZZLES		SIZE (IN)	
19 SUCTION		RATING	
20 DISCHARGE		FACING	
21 CASE MT		CENTERLINE	
22 SPLIT		AXIAL	
23 PRESS		MAX ALLOW	
24 CONNECT		VENT	
25 IMPELLER DIA		RATED	
26 MOUNT		BETWEEN BRGS	
27 BEARINGS TYPE		RADIAL	
28 LUBE		RING OIL	
29 COUPLING		MFR	
30 DRIVER HALF MTD BY		PUMP MFR	
31 MECH SEAL		PACKING	
32 MFR TYPE MODEL			
33 MFR CODE		API CODE	
34 AUXILIARY PIPING		O C W PIPE PLAN	
35 O TOTAL COOLING WATER REQ'D GPM		O SIGHT F.I. REQ'D	
36 O PACKING COOL INJECTION REQ'D		O TOTAL GPM	
37 O SEAL FLUSH PIPE PLAN		11	
38 O EXTERNAL SEAL FLUSH FLUID		O GPM	
39 O AUXILIARY SEAL PLAN		O C.S.	
40 O AUX SEAL FLUSH/QUENCH FLUID			
41 MATERIALS		O PUMP CASE TRIM API CLASS	
42 CASING		Cast Iron	
43 IMPELLER		Cast Iron	
44 SHAFT		416SS	
45 CASE INT COATING/LINING		GLAND	
46 BASEPLATE		DRIIP PAN	
47 O SITE CONDITIONS			
48 ELEVATION		FT	
49 AMB TEMP		F	
50 COOLING WATER SUPPLY		PSIG	
51 REMARKS:			
52 PREPARED BY		R. Sciascia	
53 DATE		10/15/81	
54 APPROVED BY			
55 DATE			
56 REVISION		3	
57 BY		DATE	
58 APP'D		DATE

The Rust Company
A Division of Wheelabrator-Frye Inc.

CENTRIFUGAL PUMP DATA SHEET

CONTRACT NO. 21-1997F
EQUIPMENT NO. P-17102
NO. REQUIRED 1
SHEET 1 OF 1

1	CLIENT	INTERNATIONAL COAL REFINING COMPANY			
2	PROJECT	6000 TPSD SRC-I DEMONSTRATION PLANT		PLANT LOCATION NEWMAN, KENTUCKY	
3	SERVICE	Screen Spray Booster Pump			
4	VENOR	P.O. NO.			
5	TYPE	MODEL		SERIAL NO.	
6	NO. OF MOTORS REQ'D	1	ITEM NO.	FURN. BY	Purchaser MFR BY
7	NO. OF TURBINES REQ'D		ITEM NO.	FURN. BY	MFR BY
8	NOTE	☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER			
9	☐ OPERATING CONDITIONS (EACH PUMP)		☐ PERFORMANCE		
10	LIQUID	Water	US GPM AT PT. NOR	RATED	140
11			DISCHARGE, PSIG		99.2
12	PT. F. NOR	80	MAX	100	SUCTION PSIG, MAX
13	SP. GR. AT PT.	1.0	DIFF. PRESS. PSI		44.2
14	VAP. PRESS. AT PT.	PSIA	DIFF. HEAD FT.		102
15	VIS. AT PT.	LB/M ³ /FT-HR	NPSHA FT.		30+
16	CORR./EROS. CAUSED BY				
17	CONSTRUCTION				
18	NOZZLES	SIZE (IN.)	RATING	FACING	LOCATION
19	SUCTION				
20	DISCHARGE				
21	CASE MT.	☒ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE)			
22		☐ SPLIT ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER			
23	PRESS.	MAX. ALLOW.	PSIG	F.	HYDRO TEST PSIG
24	CONNECT	☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET			
25	IMPELLER DIA.	RATED		MAX	
26					TYPE
27	MOUNT	☐ BETWEEN BRGS ☐ OVERHUNG			
28	BEARINGS TYPE	☐ RADIAL ☐ THRUST			
29	LUBE	☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE			
30	COUPLING	☐ MFR ☐ MODEL			
31	DRIVER HALF MTD BY	☐ PUMP MFR ☐ DRIVER MFR			
32	MECH. SEAL	☐ PACKING ☐ AUX. SEAL/PACKING			
33	MFR. TYPE	MODEL			
34	MFR. CODE	API CODE			
35	AUXILIARY PIPING				
36	COOL. W. PIPE PLAN	☐ C.O.S.S. ☐ TUBING ☐ PIPE			
37	TOTAL COOLING WATER REQ'D	GPM ☐ SIGHT FL. REQ'D			
38	PACKING COOL. INJECTION REQ'D	TOTAL GPM ☐ PSIG			
39	SEAL FLUSH PIPE PLAN	☒ 11 ☐ C.S. ☐ S.S. ☐ TUBING ☒ PIPE			
40	EXTERNAL SEAL FLUSH FLUID	GPM ☐ PSIG			
41	AUXILIARY SEAL PLAN	☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE			
42	AUX. SEAL FLUSH/QUENCH FLUID				
43	MATERIALS				
44	PUMP CASE TRIM	API CLASS			
45	CASING	Ductile Iron CORR. ALL IN			
46	IMPELLER	Cast Iron WEAR RINGS			
47	SHAFT	Steel SLEEVE(S) 316SS			
48	CASE INT. COATING/LINING	GLAND			
49	BASE PLATE	DRIP PAN			
50	SITE CONDITIONS				
51	ELEVATION FT.	DUST/FUMES			
52	AMB. TEMP.	F. MAX MIN AREA ELECT. CL. GR. DIV.			
53	COOLING WATER SUPPLY	PSIG F. RETURN PSIG °F			
54	REMARKS				

PROPOSAL CURVE NO. _____
RPM _____ NO. OF STAGES _____
NPSHR. FT. & IMPELLER _____ T.O.F. _____
EFF. _____ BHP RATED _____
MAX BHP RATED IMP _____
MAX HEAD RATED IMP _____
MIN. CONTINUOUS GPM _____
ROTATION (VIEWED FROM CPLG. END) _____

☐ INSPECTION AND TESTS

SHOP INSPECTION ☒ REQ'D ☐ WITNESS
HYDROSTATIC TEST ☒ REQ'D ☐ WITNESS
PERFORMANCE TEST ☐ REQ'D ☐ WITNESS
NPSH TEST ☐ REQ'D ☐ WITNESS
INT. INSP. AFTER TEST ☐ REQ'D ☐ WITNESS

☐ INT. WEAR PARTS

WEAR RINGS ☐ CASE ☐ IMP
DIA. _____ IN CLEARANCE _____ IN
INTERSTAGE BUSHINGS
DIA. _____ IN CLEARANCE _____ IN

VERTICAL PUMPS

PIT OR SUMP DEPTH ☐ _____
PUMP LENGTH ☐ _____
MIN. SUBMERGENCE REQ'D ☐ _____
COLUMN PIPE ☐ FLANGED ☐ THREADED
LINE SHAFT ☐ OPEN ☐ ENCLOSED
BRGS ☐ BOWL ☐ LINE SHAFT
BRG. LUB. ☐ WATER ☐ OIL ☐ GREASE
FLOAT & ROD ☐ C.S. ☐ S.S. ☐ BRG. ☐ NONE
FLOAT SWITCH ☐ _____
PUMP THRUST LB ☐ UP ☐ DOWN
MOUNTING PLATE REQ'D ☐ _____

☐ WEIGHTS AND DIMENSIONS

APPROX. WT. PUMP & BASE _____ LB
MOTOR _____ LB TURBINE _____ LB
BASE PLATE DIMENSIONS _____

APPLICABLE SPECIFICATIONS

☐ API 610 ☒ ANSI B73.1 B73.2
☒ PROJECT SPECIFICATIONS

55	PREPARED BY	R. Sciascia		REVISION	△	
56	DATE	10-15-81		REVISION	△	
57	APPROVED BY	BY	DATE	BY	DATE	BY
58	DATE	APP'D	DATE	APP'D	DATE	APP'D

CENTRIFUGAL PUMP DATA SHEET

CONTRACT NO. 21-1997F
EQUIPMENT NO. P17103A/R
NO. REQUIRED 2
SHEET OF

1	CLIENT	INTERNATIONAL COAL REFINING COMPANY			
2	PROJECT	6000 TPSD SRC-I DEMONSTRATION PLANT		PLANT LOCATION NEWMAN, KENTUCKY	
3	SERVICE	Clarified Water Pumps			
4	VENDOR	P.O. NO.			
5	TYPE	MODEL		SERIAL NO.	
6	NO. OF MOTORS REQ'D	2	ITEM NO.	FURN. BY	Purchaser MFR BY
7	NO. OF TURBINES REQ'D		ITEM NO.	FURN BY	MFR BY
8	NOTE	☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER			
9	☐ OPERATING CONDITIONS (EACH PUMP)		☐ PERFORMANCE		
10	LIQUID <u>clarified water</u> US GPM AT PT. NOR <u>4000</u> RATED <u>4000</u>		PROPOSAL CURVE NO.		
11	DISCHARGE, PSIG <u>63.9</u>		RPM <u> </u> NO. OF STAGES <u> </u>		
12	PT. F. NOR <u> </u> MAX. <u>100</u> SUCTION, PSIG, MAX <u>5</u> RATED <u>2</u>	NPSHR. FT. & IMPELLER <u> </u> T.O.F. <u> </u>			
13	SP. GR. AT PT. <u>1.0</u> DIFF. PRESS., PSI <u>58.9</u>	EFF. <u> </u> BHP RATED <u> </u>			
14	VAP. PRESS. AT PT. PSIA <u> </u> DIFF. HEAD, FT. <u>136</u>	MAX. BHP RATED IMP <u> </u>			
15	VIS. AT PT. LB/M/FT-HR <u> </u> NPSHA, FT. <u>30+</u>	MAX. HEAD RATED IMP <u> </u>			
16	CORR/EROS. CAUSED BY <u> </u>		MIN. CONTINUOUS GPM <u> </u>		
17	CONSTRUCTION		ROTATION (VIEWED FROM CPLG END) <u> </u>		
18	NOZZLES	SIZE (IN)	RATING	FACING	LOCATION
19	SUCTION				
20	DISCHARGE				
21	CASE MT. ☐ CENTERLINE ☒ FOOT ☐ BRACKET ☐ VERT (TYPE) <u> </u>				
22	SPLIT ☐ AXIAL ☐ RAD: TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER				
23	PRESS. ☐ MAX ALLOW <u> </u> PSIG <u> </u> F ☐ HYDRO TEST <u> </u> PSIG				
24	CONNECT ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET				
25	IMPELLER DIA. ☐ RATED <u> </u> ☐ MAX <u> </u> ☐ TYPE <u> </u>				
26	MOUNT ☐ BETWEEN BRGS ☐ OVERHUNG				
27	BEARINGS TYPE ☐ RADIAL <u> </u> ☐ THRUST <u> </u>				
28	LUBE ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE				
29	COUPLING ☐ MFR <u> </u> ☐ MODEL <u> </u>				
30	DRIVER HALF MTD BY ☐ PUMP MFR ☐ DRIVER MFR				
31	☒ MECH SEAL ☐ PACKING ☐ AUX SEAL/PACKING				
32	MFR TYPE MODEL <u> </u>				
33	MFR CODE <u> </u> API CODE <u> </u>				
34	AUXILIARY PIPING				
35	☐ C.W. PIPE PLAN ☐ C.O. SS. ☐ TUBING ☐ PIPE				
36	☐ TOTAL COOLING WATER REQ'D GPM <u> </u> ☐ SIGHT F.I. REQ'D				
37	☐ PACKING COOL INJECTION REQ'D ☐ TOTAL GPM <u> </u> ☐ PSIG				
38	☒ SEAL FLUSH PIPE PLAN <u>11</u> ☐ C.S. ☐ S.S. ☐ TUBING ☒ PIPE				
39	☐ EXTERNAL SEAL FLUSH FLUID <u> </u> ☐ GPM <u> </u> ☐ PSIG				
40	☐ AUXILIARY SEAL PLAN <u> </u> ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE				
41	☐ AUX SEAL FLUSH/QUENCH FLUID <u> </u>				
42	MATERIALS				
43	☐ PUMP CASE: TRIM API CLASS <u> </u>				
44	CASING <u>Cast Iron</u> CORR ALL <u> </u> IN				
45	IMPELLER <u>Cast Iron</u> WEAR RINGS <u> </u>				
46	SHAFT <u>Steel</u> SLEEVES <u>316SS</u>				
47	CASE INT COATING/LINING <u> </u> GLAND <u> </u>				
48	☐ BASEPLATE <u> </u> DRIP PAN <u> </u>				
49	☐ SITE CONDITIONS				
50	ELEVATION FT <u> </u> DUST/FUMES <u> </u>				
51	AMB TEMP F <u> </u> MAX <u> </u> MIN <u> </u> AREA ELECT CL <u> </u> GR. DIV. <u> </u>				
52	COOLING WATER SUPPLY <u> </u> PSIG <u> </u> F. RETURN <u> </u> PSIG <u> </u> F				
53	REMARKS:				
54					
55	PREPARED BY R. Sciascia		REVISION <u>△</u>		REVISION <u>△</u>
56	DATE 10-15-81				REVISION <u>△</u> 5
57	APPROVED BY		BY	DATE	BY
58	DATE		APP'D	DATE	APP'D

POSITIVE DISPLACEMENT PUMP DATA SHEET

CONTRACT NO. 21-1997F
EQUIPMENT NO. P17104A/B
NO. REQUIRED 2
SHEET OF

1 CLIENT		INTERNATIONAL COAL REFINING COMPANY	
2 PROJECT		0000 TP80 SRC-I DEMONSTRATION PLANT	
3 SERVICE		Alum Feed Pumps	
4 VENDOR		P.O. NO.	
5 MODEL		SERIAL NO.	
6 PUMP TYPE		☐ PISTON ☐ PLUNGER ☐ METERING ☒ DIAPHRAGM ☐	
7		☐ ROTARY ☐ GEAR ☐ SCREW ☐ DIRECT ACTING	
8 DRIVERS:		NO. MOTORS: 2 ITEM NO. NO. TURBINE ITEM NO.	
9 NOTE*		INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER	
10		☐ OPERATING CONDITIONS (EACH PUMP) ☐ MANUFACTURER'S DATA	
11 LIQUID		Liquid Alum SP. GR. @ P.T. 1.2	
12 PUMPING TEMP., °F		NORM. MAX. 90	
13 VISCOSITY @ P.T., LB(M)/FT-HR		MIN. NORM. MAX.	
14 VAP. PRESS. @ P.T., PSIA		NPSH AVAIL. FT. 30	
15 RATED CAPACITY,		GPM 21 GPH	
16 DISCH. PRESS., PSIG		NORMAL 115 MAX.	
17 SUCTION PRESS., PSIG		2	
18 CORR./EROS. CAUSED BY			
19 MATERIALS			
20 CASING/BODY		316SS LINER	
21 HEAD		316SS DIAPHRAGM Teflon	
22 PISTON/PLUNGER		Steel ROTOR	
23 VALVE BALL/CONE		316SS VALVE SEATS 316SS	
24 VALVE BODY		316SS VALVE SPRINGS 316SS	
25 SHAFT		PISTON ROD	
26 GLAND		LANTERN RING	
27 BEARINGS: TYPE		☐ INT. ☐ EXT.	
28 LUBRICATION			
29 ☐ PACKING ☐ MECH. SEAL			
30 PACKING MAT'L.		NO. RINGS/SIZE	
31 SEAL MFR.		MODEL/SIZE	
32 SEAL MATERIAL CODE			
33 ☐ SELF FLUSHED ☐ EXT. FLUSHED			
34 ☐ MECH. LUBRICATOR DRIVEN BY		☐ MOTOR ☐ SHAFT	
35 ☐ CAPACITY CONTROL			
36 CAPACITY RANGE (USGPM) (USGPH)		10 MIN. 21 MAX.	
37 ☐ EXTERNAL BYPASS ☐ SPEED VARIATION			
38 ☒ STROKE ADJUSTMENT			
39 ☐ MANUAL CONTROL ☐ REMOTE CONTROL			
40 CONTROL SIGNAL RANGE		TO (PSIG) (MA)	
41 ACCURACY %			
42 ☐ INSPECTION AND TESTS			
43		REQ'D. WITNESSED	
44 SHOP INSPECTION		☒	
45 HYDROSTATIC		☒	
46 RUNNING		☐	
47 PERFORMANCE		☐	
48 ☐ SITE CONDITIONS			
49 ELEVATION		FT	
50 AMB. TEMP., °F		MAX. MIN.	
51 ☐ APPLICABLE SPECIFICATIONS			
52			
53 REMARKS:			
54			
55 PREPARED BY R. Sciascia		REVISION ☐	
56 DATE 10-15-81		REVISION ☐	
57 APPROVED BY		REVISION ☐	
58 DATE		REVISION ☐

The Rust Engineering Company
A Subsidiary of Wheelabrator-Frye Inc.

**CENTRIFUGAL PUMP
DATA SHEET**

CONTRACT NO. 21-1997F
EQUIPMENT NO. P171054/B
NO. REQUIRED 2
SHEET 1 OF 1

1	CLIENT	INTERNATIONAL COAL REFINING COMPANY			
2	PROJECT	6000 TPSD SRC-I DEMONSTRATION PLANT		PLANT LOCATION NEWMAN, KENTUCKY	
3	SERVICE	Lime Feed Pumps			
4	VENDOR	P.O. NO.			
5	TYPE	MODEL		SERIAL NO.	
6	NO. OF MOTORS REQ'D	2	ITEM NO.	FURN. BY	Purchaser MFR BY
7	NO OF TURBINES REQ'D		ITEM NO.	FURN BY	MFR BY
8	NOTE	☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER			
9	☐ OPERATING CONDITIONS (EACH PUMP)		☐ PERFORMANCE		
10	LIQUID	10% Calcium	US GPM AT PT. NOR	RATED	5
11	Hydroxide in Suspens	DISCHARGE	PSIG		
12	PT F NOR	MAX. 110	SUCTION	PSIG	MAX
13	SP GR AT PT	1.1	DIFF PRESS	PSI	95
14	VAP PRESS AT PT	PSIA	DIFF HEAD	FT	200
15	VIS. AT PT	LB/M/FT-HR	NPSHA	FT	30+
16	CORR/EROS CAUSED BY				
17	CONSTRUCTION				
18	NOZZLES	SIZE (IN)	RATING	FACING	LOCATION
19	SUCTION				
20	DISCHARGE				
21	CASE MT	☐ CENTERLINE ☒ FOOT ☐ BRACKET ☐ VERT. (TYPE)			
22	SPLIT	☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER			
23	PRESS	MAX ALLOW	PSIG	F	☐ HYDRO TEST ☐ PSIG
24	CONNECT	☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET			
25	IMPELLER DIA	RATED		MAX	TYPE
26	MOUNT	☐ BETWEEN BRGS ☐ OVERHUNG			
27	BEARINGS TYPE	☐ RADIAL ☐ THRUST			
28	LUBE	☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE			
29	COUPLING	☐ MFR ☐ MODEL			
30	DRIVER HALF MTD BY	☐ PUMP MFR ☐ DRIVER MFR			
31	☒ MECH SEAL	☐ PACKING ☐ AUX SEAL/PACKING			
32	MFR TYPE MODEL				
33	MFR CODE	API CODE			
34	AUXILIARY PIPING				
35	☐ C W PIPE PLAN ☐ Cu. ☐ SS ☐ TUBING ☐ PIPE				
36	☐ TOTAL COOLING WATER REQ'D GPM ☐ SIGHT F.I. REQ'D				
37	☐ PACKING COOL INJECTION REQ'D ☐ TOTAL GPM ☐ PSIG				
38	☒ SEAL FLUSH PIPE PLAN	32	☐ C S	☒ S S	☐ TUBING ☒ PIPE
39	☐ EXTERNAL SEAL FLUSH FLUID ☐ GPM ☐ PSIG				
40	☐ AUXILIARY SEAL PLAN ☐ C.S. ☐ S S ☐ TUBING ☐ PIPE				
41	☐ AUX SEAL FLUSH/QUENCH FLUID				
42	MATERIALS				
43	☐ PUMP CASE/TRIM API CLASS				
44	CASING	Alloy 20	CORR ALL	IN.	
45	IMPELLER	Alloy 20	WEAR RINGS		
46	SHAFT	Alloy 20	SLEEVE(S)	Alloy 20	
47	CASE INT COATING/LINING	GLAND			
48	BASEPLATE	DRIP PAN			
49	☐ SITE CONDITIONS				
50	ELEVATION FT	DUST/FUMES			
51	AMB TEMP	F	MAX	MIN	AREA ELECT CL GR. DIV
52	COOLING WATER SUPPLY	PSIG	F RETURN	PSIG	F
53	REMARKS				
54					

PROPOSAL CURVE NO _____
RPM _____ NO OF STAGES _____
NPSHR. FT & IMPELLER _____ T.O F _____
EFF. _____ BHP RATED _____
MAX. BHP RATED IMP _____
MAX HEAD RATED IMP _____
MIN CONTINUOUS GPM _____
ROTATION (VIEWED FROM CPLG END) _____

☐ INSPECTION AND TESTS

SHOP INSPECTION	☒ REQ'D
HYDROSTATIC TEST	☒ REQ'D ☐ WITNESS
PERFORMANCE TEST	☐ REQ'D ☐ WITNESS
NPSH TEST	☐ REQ'D ☐ WITNESS
INT INSP AFTER TEST	☐ REQ'D ☐ WITNESS

☐ INT. WEAR PARTS

WEAR RINGS ☐ CASE ☐ IMP
DIA _____ IN CLEARANCE _____ IN

INTERSTAGE BUSHINGS
DIA _____ IN CLEARANCE _____ IN

VERTICAL PUMPS

PIT OR SUMP DEPTH ☐ _____
PUMP LENGTH ☐ _____
MIN SUBMERGENCE REQ'D ☐ _____

COLUMN PIPE ☐ FLANGED ☐ THREADED
LINE SHAFT ☐ OPEN ☐ ENCLOSED
BRGS ☐ BOWL ☐ LINE SHAFT

BRG LUB ☐ WATER ☐ OIL ☐ GREASE
FLOAT & ROD ☐ C S ☐ S S ☐ BRZ ☐ NONE
FLOAT SWITCH ☐ _____

PUMP THRUST LB ☐ UP ☐ DOWN

MOUNTING PLATE REQ'D ☐ _____

☐ WEIGHTS AND DIMENSIONS

APPROX WT PUMP & BASE _____ LB
MOTOR _____ LB TURBINE _____ LB
BASE PLATE DIMENSIONS _____

APPLICABLE SPECIFICATIONS

☐ API 610 ☒ ANSI B73.1 B73.2
☒ PROJECT SPECIFICATIONS

55	PREPARED BY	R. Sciascia	REVISION	△	REVISION	△	REVISION	△	7
56	DATE	10-15-81	BY		DATE		BY		DATE
57	APPROVED BY		APP'D		DATE		APP'D		DATE
58	DATE		APP'D		DATE		APP'D		DATE

CENTRIFUGAL PUMP DATA SHEET

CONTRACT NO. 21-1997F
EQUIPMENT NO. P17106A/R
NO. REQUIRED 2
SHEET 1 OF 1

1 CLIENT <u>INTERNATIONAL COAL REFINING COMPANY</u>	
2 PROJECT <u>6000 TPSD SRC-I DEMONSTRATION PLANT</u>	PLANT LOCATION <u>NEWMAN, KENTUCKY</u>
3 SERVICE <u>Backwash Recycle Pump</u>	
4 VENDOR	P.O. NO.
5 TYPE	MODEL
6 NO. OF MOTORS REQ'D <u>2</u>	ITEM NO.
7 NO. OF TURBINES REQ'D	ITEM NO.
8 NOTE ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER	☐ BY MANUFACTURER
9 ☐ OPERATING CONDITIONS (EACH PUMP)	
10 LIQUID <u>Water</u> US GPM AT PT. NOR <u> </u> RATED <u>200</u>	
11 DISCHARGE PSIG <u>31.4</u>	
12 PT. F. NOR <u> </u> MAX. <u>90</u> SUCTION PSIG. MAX <u>10</u> RATED <u>2</u>	
13 SP. GR. AT PT. <u>1.0</u> DIFF. PRESS. PSI <u>29.4</u>	
14 VAP. PRESS. AT PT. PSIA <u> </u> DIFF. HEAD. FT. <u>68</u>	
15 VIS. AT PT. LB/M ³ /FT-HR <u> </u> NPSHA. FT. <u>30+</u>	
16 CORR/EROS. CAUSED BY <u> </u>	
17 CONSTRUCTION	
18 NOZZLES	SIZE (IN)
19 SUCTION	RATING
20 DISCHARGE	FACING
21 CASE MT. ☐ CENTERLINE ☒ FOOT ☐ BRACKET ☐ VERT. (TYPE)	LOCATION
22 SPLIT ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER	
23 PRESS. ☐ MAX. ALLOW <u> </u> PSIG <u> </u> F ☐ HYDRO TEST <u> </u> PSIG	
24 CONNECT. ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET	
25 IMPELLER DIA. ☐ RATED <u> </u> ☐ MAX <u> </u> ☐ TYPE <u> </u>	
26 MOUNT ☐ BETWEEN BRGS ☐ OVERHUNG	
27 BEARINGS TYPE ☐ RADIAL <u> </u> ☐ THRUST <u> </u>	
28 LUBE ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE	
29 COUPLING ☐ MFR <u> </u> ☐ MODEL <u> </u>	
30 DRIVER HALF MTD BY ☐ PUMP MFR ☐ DRIVER MFR	
31 ☒ MECH SEAL ☐ PACKING ☐ AUX SEAL/PACKING	
32 MFR TYPE, MODEL <u> </u>	
33 MFR CODE <u> </u> API CODE <u> </u>	
34 AUXILIARY PIPING	
35 ☐ C.W. PIPE PLAN ☐ C.O. SS ☐ TUBING ☐ PIPE	
36 TOTAL COOLING WATER REQ'D GPM <u> </u> ☐ SIGHT F.I. REQ'D	
37 ☐ PACKING COOL. INJECTION REQ'D <u> </u> TOTAL GPM <u> </u> ☐ PSIG	
38 ☒ SEAL FLUSH PIPE PLAN <u>11</u> ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE	
39 ☐ EXTERNAL SEAL FLUSH FLUID <u> </u> ☐ GPM <u> </u> ☐ PSIG	
40 ☐ AUXILIARY SEAL PLAN <u> </u> ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE	
41 ☐ AUX. SEAL FLUSH/QUENCH FLUID <u> </u>	
42 MATERIALS	
43 ☐ PUMP CASE/TRIM API CLASS <u> </u>	
44 CASING <u>Ductile Iron</u> CORR. ALL <u> </u> IN	
45 IMPELLER <u>Cast Iron</u> WEAR RINGS <u> </u>	
46 SHAFT <u>Steel</u> SLEEVE(S) <u>316SS</u>	
47 CASE INT. COATING/LINING <u> </u> GLAND <u> </u>	
48 BASEPLATE <u> </u> DRIP PAN <u> </u>	
49 ☐ SITE CONDITIONS	
50 ELEVATION FT. <u> </u> DUST/FUMES <u> </u>	
51 AMB. TEMP. F <u> </u> MAX <u> </u> MIN <u> </u> AREA ELECT. CL. <u> </u> GR. <u> </u> DIV. <u> </u>	
52 COOLING WATER SUPPLY <u> </u> PSIG <u> </u> F. RETURN <u> </u> PSIG <u> </u> F	
53 REMARKS	
54	
55 PREPARED BY <u>R. Sciascia</u>	REVISION <u>△</u>
56 DATE <u>10-15-81</u>	REVISION <u>△</u>
57 APPROVED BY <u> </u>	REVISION <u>△</u> 8
58 DATE <u> </u>	DATE <u> </u>

10 PROPOSAL CURVE NO. <u> </u>	
11 RPM <u> </u> NO. OF STAGES <u> </u>	
12 NPSHR. FT. & IMPELLER <u> </u> T.O.F. <u> </u>	
13 EFF. <u> </u> BHP RATED <u> </u>	
14 MAX. BHP RATED IMP. <u> </u>	
15 MAX. HEAD RATED IMP. <u> </u>	
16 MIN. CONTINUOUS GPM <u> </u>	
17 ROTATION (VIEWED FROM CPLG. END) <u> </u>	
18 ☐ INSPECTION AND TESTS	
19 SHOP INSPECTION ☒ REQ'D ☐ WITNESS	
20 HYDROSTATIC TEST ☒ REQ'D ☐ WITNESS	
21 PERFORMANCE TEST ☐ REQ'D ☐ WITNESS	
22 NPSH TEST ☐ REQ'D ☐ WITNESS	
23 INT. INSP. AFTER TEST ☐ REQ'D ☐ WITNESS	
24 ☐ INT. WEAR PARTS	
25 WEAR RINGS ☐ CASE ☐ IMP	
26 DIA. <u> </u> IN CLEARANCE <u> </u> IN	
27 INTERSTAGE BUSHINGS	
28 DIA. <u> </u> IN CLEARANCE <u> </u> IN	
29 VERTICAL PUMPS	
30 PIT OR SUMP DEPTH <u> </u>	
31 PUMP LENGTH <u> </u>	
32 MIN. SUBMERGENCE REQ'D ☐ <u> </u>	
33 COLUMN PIPE ☐ FLANGED ☐ THREADED	
34 LINE SHAFT ☐ OPEN ☐ ENCLOSED	
35 BRGS. ☐ BOWL ☐ LINE SHAFT <u> </u>	
36 BRG. LUB. ☐ WATER ☐ OIL ☐ GREASE	
37 FLOAT & ROD ☐ C.S. ☐ S.S. ☐ BRZ ☐ NONE	
38 FLOAT SWITCH ☐ <u> </u>	
39 PUMP THRUST LB. ☐ UP <u> </u> ☐ DOWN <u> </u>	
40 MOUNTING PLATE REQ'D ☐ <u> </u>	
41 WEIGHTS AND DIMENSIONS	
42 APPROX. WT. PUMP & BASE <u> </u> LB	
43 MOTOR <u> </u> LB TURBINE <u> </u> LB	
44 BASE PLATE DIMENSIONS <u> </u>	
45 APPLICABLE SPECIFICATIONS	
46 ☐ API 610 ☒ ANSI B73.1 B73.2	
47 ☒ PROJECT SPECIFICATIONS <u> </u>

The Rust Engineering Company
A Subsidiary of Wheelabrator-Frye Inc.

STORAGE TANK DATA SHEET

CONTRACT NO. 21-19-77E
EQUIPMENT NO. TK-17101
NO. REQUIRED 1
SHEET 1 OF 1

CLIENT INTERNATIONAL COAL REFINING COMPANY

PROJECT 6000 TPSD SRC-I DEMONSTRATION PLANT

PLANT LOCATION NEWMAN, KENTUCKY

SERVICE Alum. Storage

VENDOR

P.O. NO.

DIAMETER	12'	HEIGHT	12	FT.	MATERIAL		
CAPACITY: NORMAL	10000	GAL	SHELL	FRP	THICK.	IN.	
NET WORKING	GAL	ROOF	THICK.	IN.			
OPERATING CONDITIONS				BOTTOM	THICK.	IN.	

SPECIFIC GRAVITY, LIQ	1.33	AT TEMP	°F	STRUCTURALS	
PUMPING RATES: IN	OUT	0.35	GPM	NOZZLE: NECK	FLANGE
VAPOR PRESS	IN. WATER	COUPLINGS			
MAX. OPER TEMP	90°	°F	INTERNALS: FIXED		

DESIGN CONDITIONS				REMOVABLE		
CODE: API	APPENDIX	GASKETS				
DESIGN METAL TEMP	°F	BOLTING				
DESIGN PRESS	IN. WATER	EST. ERECTION WT (LB)				

CORROSION ALLOW: SHELL	ROOF	IN.	NOZZLES		
BOTTOM	INTERNALS	IN.	FLANGE RATING	COUPLING RATING	

ROOF TYPE	Conc	MARK NO.	NO. REQ'D.	SIZE IN	FACING	SERVICE
ROOF LIVE LOADS	PSF	N-1		3		INLET
WIND PRESS	PSF	N-2		3		OUTLET
EARTHQUAKE CODE	ZONE	N-3		3		DRAIN
FOUNDATION TYPE		N-4		2		RELIEF/VENT
RADIOGRAPHY: EXTENT		N-5		2		INLET
STRESS RELIEF: YES/NO	EXTENT	N-6		2		OUTLET
INSULATION: YES/NO	THICK: 1"	IN.	N-7			
LEAK TESTING: BOTTOM	SHELL	ROOF	N-7			
MILL TEST REPORTS: YES/NO		M-1		24		MAN WAY

PAINTING NO SPEC

SKETCH

PREPARED BY <u>W.A.S.</u>	REVISION <u>△</u>	REVISION <u>△</u>	REVISION <u>△</u> 9
DATE <u>11-1-77</u>	BY	DATE	BY
APPROVED BY	DATE	DATE	DATE
DATE	APP'D	DATE	APP'D

The Rust Engineering Company
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STORAGE TANK DATA SHEET

CONTRACT NO. 31-1997F
EQUIPMENT NO. TR-17102
NO. REQUIRED 1 OF 1
SHEET

CLIENT INTERNATIONAL COAL REFINING COMPANY

PROJECT 6000 TPSO SRC-I DEMONSTRATION PLANT

PLANT LOCATION NEWMAN, KENTUCKY

SERVICE Backwash recycle

VENDOR

P.O. NO.

DIAMETER 32' HEIGHT 33.5' FT.

MATERIAL

CAPACITY: NORMAL 200,000 GAL

SHELL CS

THICK.

IN.

NET WORKING

GAL

ROOF

THICK.

IN.

OPERATING CONDITIONS

BOTTOM CS

THICK.

IN.

SPECIFIC GRAVITY. LIQ AT TEMP °F

STRUCTURALS CS

PUMPING RATES: IN OUT GPM

NOZZLE: NECK

FLANGE

VAPOR PRESS

IN. WATER

COUPLINGS

MAX. OPER. TEMP. °F

INTERNALS: FIXED

DESIGN CONDITIONS

REMOVABLE

CODE: API

APPENDIX

GASKETS

DESIGN METAL TEMP

90 °F

BOLTING

DESIGN PRESS

IN. WATER

EST. ERECTION WT (LB)

CORROSION ALLOW: SHELL

ROOF

IN.

NOZZLES

BOTTOM

INTERNALS

IN.

FLANGE RATING

COUPLING RATING

ROOF TYPE

OPEN TOP

MARK NO.

NO. REQ'D.

SIZE IN

FACING

SERVICE

ROOF LIVE LOADS

PSF

WIND PRESS

PSF

EARTHQUAKE CODE

ZONE

FOUNDATION TYPE

RADIOGRAPHY: EXTENT

STRESS RELIEF: YES/NO

EXTENT

INSULATION: YES/NO

THICK: 1

IN.

LEAK TESTING: BOTTOM

SHELL

ROOF

MILL TEST REPORTS YES/NO

PAINTING YES/NO SPEC

SKETCH

PREPARED BY John J. Thompson

REVISION △

REVISION △

REVISION △ 10

DATE

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APPROVED BY

BY

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CENTRIFUGAL PUMP DATA SHEET

CONTRACT NO. 21-1997F
EQUIPMENT NO. P17107
NO. REQUIRED 1
SHEET 1 OF 1

1	CLIENT	INTERNATIONAL COAL REFINING COMPANY			
2	PROJECT	6000 TP80 SRC-I DEMONSTRATION PLANT		PLANT LOCATION NEWMAN, KENTUCKY	
3	SERVICE	Filter Backwash Pump			
4	VENDOR	P.O. NO.			
5	TYPE	MODEL		SERIAL NO.	
6	NO. OF MOTORS REQ'D	1	ITEM NO.	FURN. BY	Purchaser MFR BY
7	NO OF TURBINES REQ'D		ITEM NO.	FURN BY	MFR BY
8	NOTE	☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER			
9	☐ OPERATING CONDITIONS (EACH PUMP)		☐ PERFORMANCE		
10	LIQUID	Water	US GPM AT PT. NOR	RATED 2160	
11			DISCHARGE, PSIG	55.6	
12	PT. F. NOR.	MAX 90	SUCTION, PSIG, MAX.	RATED 2	
13	SP GR AT PT	1.0	DIFF PRESS., PSI	53.6	
14	VAP PRESS AT PT, PSIA		DIFF HEAD, FT	124	
15	VIS. AT PT, LB/M ³ /FT-HR		NPSHA, FT	30	
16	CORR/EROS CAUSED BY				
17	CONSTRUCTION				
18	NOZZLES	SIZE (IN)	RATING	FACING	LOCATION
19	SUCTION				
20	DISCHARGE				
21	CASE MT ☐ CENTERLINE ☒ FOOT ☐ BRACKET ☐ VERT (TYPE)				
22	SPLIT ☐ AXIAL ☐ RAD: TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER				
23	PRESS ☐ MAX ALLOW _____ PSIG ☐ F ☐ HYDRO TEST _____ PSIG				
24	CONNECT ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET				
25	IMPELLER DIA ☐ RATED _____ ☐ MAX _____ ☐ TYPE _____				
26	MOUNT ☐ BETWEEN BRGS ☐ OVERHUNG				
27	BEARINGS TYPE ☐ RADIAL _____ ☐ THRUST _____				
28	LUBE ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE				
29	COUPLING ☐ MFR _____ ☐ MODEL _____				
30	DRIVER HALF MTD BY ☐ PUMP MFR ☐ DRIVER MFR				
31	☒ MECH SEAL ☐ PACKING ☐ AUX SEAL/PACKING				
32	MFR TYPE MODEL _____				
33	MFR CODE _____ API CODE _____				
34	AUXILIARY PIPING				
35	☐ C W PIPE PLAN ☐ Cu: ☐ SS: ☐ TUBING: ☐ PIPE				
36	☐ TOTAL COOLING WATER REQ'D GPM _____ ☐ SIGHT F.I. REQ'D.				
37	☐ PACKING COOL INJECTION REQ'D ☐ TOTAL GPM _____ ☐ PSIG _____				
38	☒ SEAL FLUSH PIPE PLAN <u>11</u> ☒ CS ☐ SS ☐ TUBING ☒ PIPE				
39	☐ EXTERNAL SEAL FLUSH FLUID _____ ☐ GPM _____ ☐ PSIG _____				
40	☐ AUXILIARY SEAL PLAN _____ ☐ CS ☐ SS ☐ TUBING ☐ PIPE				
41	☐ AUX SEAL FLUSH/QUENCH FLUID _____				
42	MATERIALS				
43	☐ PUMP CASE: TRIM API CLASS _____				
44	CASING <u>Ductile Iron</u> CORR ALL _____ IN				
45	IMPELLER <u>Cast Iron</u> WEAR RINGS _____				
46	SHAFT <u>Steel</u> SLEEVE(S) <u>316SS</u>				
47	CASE INT COATING/LINING _____ GLAND _____				
48	☐ BASEPLATE _____ DRIP PAN _____				
49	☐ SITE CONDITIONS				
50	ELEVATION FT _____ DUST/FUMES _____				
51	AMB TEMP F _____ MAX _____ MIN _____ AREA ELECT CL _____ GR _____ DIV _____				
52	COOLING WATER SUPPLY _____ PSIG _____ F RETURN _____ PSIG _____ °F				
53	REMARKS:				
54					
55	PREPARED BY	R. Sciascia		REVISION	△
56	DATE	10-15-81		REVISION	△ 11
57	APPROVED BY	BY	DATE	BY	DATE
58	DATE	APP'D	DATE	APP'D	DATE

CENTRIFUGAL PUMP DATA SHEET

CONTRACT NO. 21-1997F
EQUIPMENT NO. P17108A/B/C
NO. REQUIRED 3
SHEET 1 OF 1

1	CLIENT	INTERNATIONAL COAL REFINING COMPANY			
2	PROJECT	6000 TPSD SRC-1 DEMONSTRATION PLANT		PLANT LOCATION NEWMAN, KENTUCKY	
3	SERVICE	Process Water Pump			
4	VENDOR	P.O. NO.			
5	TYPE	MODEL		SERIAL NO.	
6	NO. OF MOTORS REQ'D	3		FURN. BY	Purchaser
7	NO. OF TURBINES REQ'D	ITEM NO.		FURN. BY	MFR BY
8	NOTE	☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER			
9	☐ OPERATING CONDITIONS (EACH PUMP)		☐ PERFORMANCE		
10	LIQUID	Water		US GPM AT PT. NOR	RATED 4000
11	DISCHARGE. PSIG		92.9		
12	PT. F. NOR	MAX	90	SUCTION. PSIG	MAX
13	SP. GR. AT PT.	1.0	DIFF. PRESS. PSI	90.9	
14	VAP. PRESS. AT PT.	PSIA	DIFF. HEAD FT.	210	
15	VIS. AT PT.	LB/M/FT-HR	NPSHA FT.	30	
16	CORR./EROS. CAUSED BY				
17	CONSTRUCTION				
18	NOZZLES	SIZE (IN.)	RATING	FACING	LOCATION
19	SUCTION				
20	DISCHARGE				
21	CASE MT.	☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE)			
22	SPLIT ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER				
23	PRESS.	MAX. ALLOW.	PSIG	F.	HYDRO TEST
24	CONNECT.	VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET			
25	IMPELLER DIA.	RATED	MAX	TYPE	
26	MOUNT	☐ BETWEEN BRGS ☐ OVERHUNG			
27	BEARINGS TYPE	☐ RADIAL ☐ THRUST			
28	LUBE	☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE			
29	COUPLING	☐ MFR ☐ MODEL			
30	DRIVER HALF MTD BY	☐ PUMP MFR ☐ DRIVER MFR			
31	☒ MECH SEAL	☐ PACKING ☐ AUX. SEAL/PACKING			
32	MFR TYPE MODEL				
33	MFR CODE	API CODE			
34	AUXILIARY PIPING				
35	☐ C.W. PIPE PLAN ☐ Cu. ☐ SS ☐ TUBING ☐ PIPE				
36	TOTAL COOLING WATER REQ'D GPM ☐ SIGHT FL. REQ'D				
37	☐ PACKING COOL. INJECTION REQ'D ☐ TOTAL GPM ☐ PSIG				
38	☒ SEAL FLUSH PIPE PLAN ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE				
39	☐ EXTERNAL SEAL FLUSH FLUID ☐ GPM ☐ PSIG				
40	☐ AUXILIARY SEAL PLAN ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE				
41	☐ AUX. SEAL FLUSH/QUENCH FLUID				
42	MATERIALS				
43	PUMP CASE/TRIM API CLASS				
44	CASING <u>Ductile Iron</u> CORR. ALL ☐ IN				
45	IMPELLER <u>Cast Iron</u> WEAR RINGS				
46	SHAFT <u>Steel</u> SLEEVE(S) <u>316SS</u>				
47	CASE INT. COATING/LINING ☐ GLAND				
48	BASEPLATE ☐ DRIP PAN				
49	☐ SITE CONDITIONS				
50	ELEVATION FT. ☐ DUST/FUMES				
51	AMB. TEMP. F. ☐ MAX ☐ MIN ☐ AREA ELECT. CL. ☐ GR. ☐ DIV.				
52	COOLING WATER SUPPLY ☐ PSIG ☐ F. RETURN ☐ PSIG ☐ F.				
53	REMARKS:				
54					
55	PREPARED BY	REVISION ☐		REVISION ☐	
56	DATE	DATE		DATE	
57	APPROVED BY	BY		BY	
58	DATE	DATE		DATE

The Rust Engineering Company
A Subsidiary of Wheelabrator-Frye Inc.

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-1997-F

EQUIPMENT NO. X-17101

NO. REQUIRED

SHEET 1 OF 1

1 CLIENT

INTERNATIONAL COAL REFINING COMPANY

2 PROJECT 6000 TPSD SRC-1 DEMONSTRATION PLANT

PLANT LOCATION NEWMAN, KENTUCKY

3 SERVICE Clarifier

4 VENDOR

P.O. NO.

The river water clarifier will be a solids contact type and have the capability of coagulation, flocculation, sedimentation and sludge removal in a single vessel. The unit will be designed for a maximum flowrate of 8000 gpm and be mounted in a concrete tank. The unit will be complete with internals, recirculator and scraper mechanisms, drives and motors (M-17101, M-17102).

1m

55 PREPARED BY O.E. Mitchell

56 DATE 10/14/81

57 APPROVED BY

58 DATE

REVISION

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**The Rust
Engineering Company**
A Subsidiary of Wheelabrator-Frye Inc.

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-1997-F
EQUIPMENT NO. X-17102
NO. REQUIRED 1
SHEET 1 OF 1

CLIENT INTERNATIONAL COAL REFINING COMPANY

PROJECT 6000 TPSD SRC-1 DEMONSTRATION PLANT

PLANT LOCATION NEWMAN, KENTUCKY

SERVICE Lime Feed System

VENDOR

P.O. NO.

A milk of lime mix and feed system consisting of a 500 gallon carbon steel tank and a 1 HP, 316SS agitator. A prepiped package system will be used.

PREPARED BY O.E. Mitchell

DATE 10/14/81

REVISION △

REVISION △

REVISION △ **14**

APPROVED BY

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The Rust Engineering Company
A Subsidiary of Wheelabrator-Frye Inc.

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-1997F

EQUIPMENT NO. X-17103

NO. REQUIRED 1

SHEET 1 OF 1

1 CLIENT INTERNATIONAL COAL REFINING COMPANY
2 PROJECT 6000 TPSD SRC-1 DEMONSTRATION PLANT PLANT LOCATION NEWMAN, KENTUCKY
3 SERVICE Coagulant Feed System
4 VENDOR P.O. NO.

A coagulant aid mix and feed system consisting of a dry chemical feeder, a 250 gallon tank, a 1/2 HP, 316 SS agitator, and a positive displacement type metering pump. A prepiped package system will be used.

55 PREPARED BY O.F. Mitchell	REVISION	REVISION	REVISION 15
56 DATE 10-14-81	BY DATE	BY DATE	BY DATE
57 APPROVED BY	APP'D DATE	APP'D DATE	APP'D DATE

The Rust Engineering Company
A Subsidiary of Wheelabrator-Frye Inc.

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-1997F

EQUIPMENT NO. X-17104

NO. REQUIRED 1

SHEET 1 OF 1

CLIENT INTERNATIONAL COAL REFINING COMPANY

PROJECT 8000 TPSD SRC-I DEMONSTRATION PLANT

PLANT LOCATION NEWMAN, KENTUCKY

SERVICE Process Water Chlorination

P.O. NO.

VENDOR

A chlorine feed system with a capacity of 200 lb/day. The chlorination equipment shall consist of a vacuum type chlorinator chlorine solution eductor (J-17102), vacuum regulator, pressure reducing valve, flow meter, instruments and controls as required for feeding chlorine from a battery of ton chlorine containers. Weighing scales are included. (W-17101).

PREPARED BY Q.E. Mitchell

DATE 10/14/81

APPROVED BY

DATE

REVISION

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The Rust Engineering Company
A Subsidiary of Wheelabrator-Frye Inc.

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-1997F

EQUIPMENT NO. X-17105

NO. REQUIRED 1

SHEET 1 OF 1

1 CLIENT INTERNATIONAL COAL REFINING COMPANY
2 PROJECT 6000 TPSD SRC-I DEMONSTRATION PLANT PLANT LOCATION NEWMAN, KENTUCKY
3 SERVICE River Water Chlorination
4 VENDOR P.O. NO.

A chlorine feed system with a capacity of 500 lb/day. The chlorination equipment shall consist of a vacuum type chlorinator, chlorine solution eductor (J-17103), vacuum regulator, pressure reducing valve, flow meter, instruments and controls as required for feeding chlorine from a battery of ton chlorine containers. Weighing scales are included.

PREPARED BY	REVISION	REVISION	REVISION
DATE	△	△	△ 17
APPROVED BY	BY DATE	BY DATE	BY DATE
DATE	APP'D DATE	APP'D DATE	APP'D DATE

3.1.3 Wastewater Treatment

3.1.3.1 Process Description

3.1.3.1.1 General

Wastewater treatment will encompass collection, treatment, and recycling to the plant. Total recycle of the treated waters is known as "zero discharge."

The treatment facilities are subdivided into four areas and are defined as Primary, Secondary, Tertiary, and Sludge.

3.1.3.1.2 Primary Area (Dwgs 00-19-01014D to 00-19-01018D)

In the primary area, waste streams from various sources receive segregated treatment prior to being combined in the main equalization basin. All waste streams enter the primary area, with two exceptions: sanitary sewage is sent directly to secondary treatment, and plant refuse is taken directly to the non-hazardous landfill. The primary area contains the largest number of unit processes, although some of them may be quite small due to the volume of their flows.

There are two types of waste streams. First, there are the normal process waste streams, which are received on a continual basis and account for most of the organic loading. Second, there is storm water runoff, which may be contaminated or non-contaminated. Runoff is a major flow contributor and requires equalization. It is also a major source of heavy metals and free oil (resulting from spills).

The unit processes in the primary area are described in detail in Catalytic's Design Baseline Revision Vol. 1 report. (DOE/OR/03054-71 Vol 1).

3.1.3.1.3 Secondary Area (Dwgs 00-19-01111D to 00-19-01113D)

Secondary treatment consists of a two-stage activated sludge system. The first-stage removes soluble COD; the second-stage either provides nitrification

(if required) or serves as a polishing system for further COD removal. Waste activated sludge is gravity thickened and aerobically digested.

A detailed process description of the secondary treatment is described in Catalytic's Design Baseline Revision Vol. 2 report. (DOE/OR/03054-71 Vol 2).

3.1.3.1.4 Tertiary Area

Additional organics, color, suspended and dissolved solids are removed prior to recycle.

3.1.3.1.4.1 Coagulation/Clarification (Dwg. 19-01211D)

The effluent from the secondary treatment system requires additional TOC and suspended solids removal, prior to treatment by the other tertiary processes. The first tertiary step is coagulation. Ferric chloride is added to the main flow in an agitated tank. This depresses the pH. The water then overflows into an adjacent tank where lime is added as required to maintain a Neutral pH. This causes a precipitation of ferric hydroxide. A polymer is also added, helping to coagulate small particle size solids. The wastewater flows to a splitter box, and then to two parallel clarifiers. The underflow is transferred by centrifugal pumps (two operating, one spare) to a thickener in the Sludge Treatment Area (Section 5.0, Catalytic's Design Baseline Revision, Vol. 2). The effluent suspended solids from the clarifiers is consistently low in suspended solids, even during upset conditions in the secondary treatment system.

The effluent from the coagulation clarifiers overflows to a pumping station. This station contains three vertical centrifugal pumps (two operating, one spare). The water is pumped to the Flash Mix Tank (TK-17351).

3.1.3.1.4.2 Softening (Dwg. 00-17-02001D)

Softening is a prerequisite prior to the reverse osmosis step. Its purpose is the removal of scale forming components from the wastewater by the addition of Na_2CO_3 and lime in the agitated Flash Mix Tank. The flocculation of

the formed precipitate (CaCO_3 and $\text{Mg}(\text{OH})_2$) is enhanced by polyelectrolite addition.

The content of the flash mix tank overflows to the softener clarifiers via a splitter box. Two clarifier trains are provided each having 75% capacity. The pH of the overflow is adjusted to 7.5-8.5 by H_2SO_4 in the pH adjustment tank prior to overflowing to the degasifier. Here, the formed CO_2 is removed and the degasified liquid is pumped to granular filtration vessel.

The clarifier underflow is pumped to the softening sludge area (Dwg. 00-17-02002D).

3.1.3.1.4.3 Activated Carbon Treatment and Ozonation (Dwg. 00-19-01212D)

The granular filter effluent, still under pressure, is fed directly to the carbon columns. There are seven columns, operating in parallel to the down-flow mode. One column is normally empty. This is not a spare column, per se. It is used to receive a shipment of carbon, which is regenerated off-site. It is removed pneumatically, directly from a column to the transport truck (and vice versa). Therefore, one column must always be empty to receive the carbon; the column which requires regeneration then remains empty until the next carbon shipment.

The effluent from all columns discharges to a single tank, which serves as a pumping station. Three horizontal centrifugal pumps (two operating, one spare) transfer the water to the Reverse Osmosis unit through an ozonation unit. The pumping station also serves as an effluent holding tank, with a working volume sufficient to supply the backwash pumps. Columns are backwashed individually.

The ozonation is used primarily for avoiding slim formation on Reverse Osmosis membranes. These are two ozone contact chambers, operating in parallel. These are covered concrete tanks. Internal baffles in each provide a vertical serpentine flow.

Four water cooled ozone generators (three operating, one spare) produce ozone from a recycled gas stream. The gaseous feed stream to the contact chambers contains about four percent ozone. It is introduced through diffusers.

at multiple points throughout the contact chambers. The off-gas passes through a mist eliminator (one percent contact tank), followed by an ozone destruct catalyst bed (one operating, one spare). The gas is then compressed and recycled. Moisture is removed by a knock-out drum and desiccant dryer. A portion of the recycled stream is vented to the atmosphere, and oxygen is added as required for make-up.

3.1.3.1.4.4 Reverse Osmosis (R.O.) (Dwg. 00-17-02004D)

The waste water from the above mentioned ozonation unit is transferred via a heat exchanger through a static mixer to the cartridge filter. The heat exchanger maintains the waste water temperature at about 65°F during the cold months. The final pH adjustment to 6.0-6.5, which is the optimum pH for the R.O. unit, is performed in the static mixer with the addition of H_2SO_4 . The purpose of the cartridge filtration is to remove the > 5 micron particles from the waste water to protect the R.O. unit.

The R.O. train consists of two stages. The first stage operates at 400 psi using cellulose acetate membrane. The reject stream from it is pumped to the second stage which operates at 800 psi using polyether urea membrane. The reject stream from the second stage flows through a pressure control valve to the evaporator feed tank while the permeates from both stages via a reclaimed water tank are pumped to the cooling tower. The average flow ratio of permeates to reject stream is about 3 to 1.

3.1.3.1.4.5 Evaporation and Crystallization (Dwg. 00-17-02005D)

Description for Evaporator and Crystallizer is confidential.

This section is in Volume VI.

3.1.3.1.5 Sludge Area

Byproduct sludges generated from various treatment processes require dewatering prior to ultimate disposal in an on-site landfill. The water which is separated is then recycled to the wastewater facilities. The types of sludges generated are: chemical, waste biological, tar acid, softening, fly dust, and 50% salt-sludges.

The treatment of chemical sludges (Dwg. 00-19-01311D) waste biological (Dwg. 00-19-91312D) and tar acid sludges (Dwg. 00-19-01312D) is described in detail in Catalytic's Design Baseline Revision Vol. 2 report (DOE/OR 03054-71 Vol. 2).

3.1.3.1.5.1 Softening Sludge Dewatering (Dwg. 00-17-02002D)

Two trains are provided for softening sludge thickening and dewatering. The softening clarifier underflow is pumped to the thickeners via a splitter box. The thickener overflow is pumped back to the softening step while the underflow (containing about 15% solids) is pumped to a drum filter (rotary vacuum type) for dewatering. The dewatered sludge (containing about 60% solids) is collected in solid waste containers and trucked to a separate landfill (Dwg. 00-17-02003D)

3.1.3.1.5.2 Fly Dust Dewatering (Dwg. 00-17-02006D)

Under the baseline design, fly dust is hydraulically conveyed to settling ponds, from which the water is decanted and returned to the plant, and the solids accumulate. This fly dust is similar to fly ash, and can be used to stabilize the brine, such that it can be landfilled. The fly dust is pumped to the disposal ponds at a solids concentration of about 20 percent, which is too wet to be used for stabilization. Therefore, it must first be thickened and dewatered by using a side stream of this flow. Two thickeners will be provided, each with a capacity to handle 100 percent of the total solids loading. Both thickeners will normally run, since this will maximize their efficiency. The design underflow concentration will be 40 percent solids. Three underflow pumps will be provided. Two will normally operate, one is a spare. The thickened sludge will be pumped to rotary drum vacuum filters, where it will be dewatered to an 80 percent solids concentration. There will be three vacuum filters, each sized for 50 percent of the solids loading. Two filters will normally operate; one is a spare. The filters will discharge onto belt conveyors, which will feed the dewatered fly dust to the fly dust silo.

3.1.3.1.5.3 Stabilization of 50% Salt Sludge (Dwg. 00-17-02007D)

The stabilization facilities are designed to process the 50% brine stream with the dewatered sludge and cement on a batch basis, one shift per day, seven days per week. Because the material sets rather quickly (due to the presence of cement) it cannot be stored overnight. It must be placed in the landfill shortly after being processed. Since landfilling operations are generally restricted to the day shift, the plant operation is likewise limited to this period. Five concrete mix trucks with one spare are used for mixing and delivery to landfill.

At first the 50% brine stream is pumped into the truck by weight. Then the dewatered sludge is added to it from the batching hopper. The feed to the batching hopper which is on a weigh scale, is provided from the silo by a screw conveyor.

The last step is the cement addition from the batching hopper which is also on a weigh scale. The cement feed from the cement silo is transferred to the batching hopper by a screw conveyor. The cement to the silo will be delivered by truck. Because such trucks are commonly equipped with blowers for unloading, no conveying system will be required at the plant. Two trains (each having 100% capacity) are provided for the batching operations. When the truck is filled with the above mentioned three components, then it is transported to the landfill. (Dwg. 00-17-02003D).

3.1.3.1.6 References

In developing the zero discharge wastewater treatment system design, the following documents were used as references:

DOE/OR/03054-55	Reverse Osmosis and Pretreatment, by Catalytic, Inc., Philadelphia, Pennsylvania.
DOE/OR/03054-68	Vapor Compression Evaporation System Design for the SRC-I Coal Refinery, by Resources Conservation Company, Seattle, Washington, February 1984.
DOE/OR/03054-65	Solid Waste Stabilization Design Options, by Catalytic, Inc., Philadelphia, Pennsylvania, July 1983.

3.1.3.2 Process Flow Diagrams

The following process flow diagrams are included after this page:

00-17-02000D	Block Flow Diagram, Zero Discharge Unit Processes
00-17-02001D	Process Flow Diagram, Softening, Clarification and pH Adjustment
00-17-02002D	Process Flow Diagram, Softener Sludge Thickening and Dewatering
00-17-02004D	Process Flow Diagram, Reverse Osmosis System
00-17-02005D	Process Flow Diagram, Evaporator and Crystallizer
00-17-02006D	Fly Dust Thickening and Dewatering
00-17-02007D	Process Flow Diagram, Material Stabilization for Landfill
00-19-01014D	Process Flow Diagram, Primary Treatment Area Sheet #1 of 5, Rev. 2.
00-19-01015D	Process Flow Diagram, Primary Treatment Area Sheet #2 of 5, Rev. 1
00-19-01016D	Process Flow Diagram, Primary Treatment Area Sheet #3 of 5, Rev. 2
00-19-01017D	Process Flow Diagram, Primary Treatment Area Sheet #4 of 5, Rev. 2
00-19-01018D	Process Flow Diagram, Primary Treatment Area Sheet #5 of 5, Rev. 2
00-19-01111D	Process Flow Diagram, Secondary Treatment Area Sheet #1 of 3, Rev. 2
00-19-01112D	Process Flow Diagram, Secondary Treatment Area Sheet #2 of 3, Rev. 2
00-19-01113D	Process Flow Diagram, Secondary Treatment Area Sheet #3 of 3, Rev. 1
00-19-01211D	Process Flow Diagram, Tertiary Treatment Area Sheet #1 of 2, Rev. 2
00-19-01212D	Process Flow Diagram, Tertiary Treatment Area Sheet #2 of 2, Rev. 2

A	B	C	D	E	F	G	H	I	J	K
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SP-17351
SPLITTER BOX
5'x5'

TK-17354
THICKENER OVERFLOW
SUMP
6'x9'x6'H

CL-17352 A,B
SOFTENING SLUDGE
THICKENER
8'0" x 4'5" SWH

FL-17351 A,B
DRUM FILTER
2 METER Ø x 3 METER
AREA: 203 SQ. FT.

BH-17352 A,B,C,D
SOLID WASTE
CONTAINER
CAP. 15 CU. YARD

X-17355
VACUUM SYSTEM

X-17354 A,B
DUMP TRUCK

P-17354 A,B
THICKENER OVERFLOW
SUMP PUMP
CAP. 240 GPM
TDH. 60 FT

P-17355 A,B,C
THICKENER UNDERFLOW
PUMP
CAP. 20 GPM
TDH. 60 FT

6000 TPD SRC-1 DEMONSTRATION PLANT NEWMAN, KENTUCKY FOR UNITED STATES DEPARTMENT OF ENERGY PROCESS FLOW DIAGRAM SOFTENER SLUDGE THICKENING & DEWATERING										The Rust Engineering Company CONTRACT 21-254B BIRMINGHAM, ALABAMA 00-17-02002D									
REVISIONS NO. MADE C.D. DATE NO. MADE C.D. DATE DRAWING NO.										REFERENCES									

00-17-02004D

TK-17501
SULFURIC ACID TANK
CAP. 250 GAL
3'-5" Ø X 4'-3" H

A-17501
STATIC MIXER
FL-17501 A-E
MICRO FILTER
FLOW: 513 GPM
DESIGN: 45 PSIG
Ø 55" F

E-17501
1.0. INFLUENT
HEAT EXCHANGER
TYPE: BEU
SHELL: 100 PSIG, C.S.
TUBE: 100 PSIG, S.S. 304

X-17501A&B
REVERSE OSMOSIS (R.O.)
SYSTEM
CAP. 2,050 GPM

V-17501
CONDENSATE DRUM
CAP. 5200 GAL
8' Ø X 14' H

TK-17502
RECLAIMED WATER
TANK
18' Ø X 32' H
CAP. 61,000 GAL

P-17501A&B
SULFURIC ACID
METERING PUMPS
CAP. 0.2 GPM
HASTELLOY C
MOTOR: 1/4 HP

P-17502A-P
R.O. FEED PUMPS
CAP. 150 GPM
TDH: 832 FT
MOTOR: 75 HP

P-17505A,B,C
CONDENSATE PUMP
CAP. 200 GPM
TDH: 190.1 FT
MOTOR: 20 HP

P-17503A-H
R.O. BOOSTER PUMP
CAP. 150 GPM
TDH: 924 FT
MOTOR: 75 HP

P-17504A,B
R.O. EFFL. PUMPS
CAP. 2000 GPM
TDH: 180 FT
MOTOR: 200 HP

LEGEND
① SEE ENGINEERING STANDARDS
DNO. 00-10-02004D
② GALLONS PER MINUTE UNLESS
OTHERWISE SPECIFIED

GPM

REV.	DATE	BY	CHK'D	APPROV'D	DESCRIPTION
0					BASELINE UPDATE
1	3-84				REVISION DESCRIPTION

8,000 TPD SRC-1 DEMONSTRATION PLANT
NEWARK, KENTUCKY
FOR UNITED STATES
DEPARTMENT OF ENERGY

TITLE
PROCESS FLOW DIAGRAM
REVERSE OSMOSIS SYSTEM
AREA-17

THE RUST ENGINEERING COMPANY
21011 DOWNS, ALABAMA
CONTRACT 81-2540

00-17-02004D

REV. 0

EVAPORATOR/CRYSTALLIZER

PROCESS FLOW DIAGRAM

PROCESS FLOW DIAGRAM, EVAPORATOR AND CRYSTALLIZER, DWG. NO. 00-17-02005D

IS CONFIDENTIAL, AND IS INCLUDED IN VOLUME VI OF DESIGN BASELINE

P-19028 A.B.
FERRIC CHLORIDE
METERING PUMP
4 GPM @ 30 FT. TDH

P-19017A.B
SURGE TANK
STORM PUMPS
210 GPM @ 40 FT. TDH

P-19018A,B
SURGE TANK
PROCESS PUMPS
70 GPM @ 30 FT. TDH

P-19022A.B
POLYMER METERING
PUMPS
7 GPH @ 30 FT. TDH

P-19021A.B
SLOP OIL
TANK PUMPS
0 GPM @ 30 FT. 1

P-19015-1.2
DAF OVERFLOW
TANK PUMP
3 GPM @ 30 FT. TDH

P-19016A.B
DAF SLOP OIL
TANK PUMP
20 GPM @ 30 FT. TDH

P-19019-1.2
DAF SLUDGE
PUMPS
45 GPM @ 50 FT. TDH

P-19020A,B,C
DAF DISCHARGE
PUMPS
105 GPM @ 30 FT. TDH

AREA 19
BATTERY
LIMIT

SLOP OIL
TRUCKED TO
INCINERATOR

SLOP OIL
TRUCKED TO
INCINERATOR

EQUIPMENT LIST

A-19019-1.2
A-19027-1.2
P-19015-1.2
P-19016A.8
P-19017A.8
P-19018A.8
P-19019-1.2
P-19020A.8.C
P-19021A.8
P-19022A.8
P-19028
TK-19015
TK-19016-1.2
TK-19017
TK-19018
TK-19019-1.2
TK-19020
TK-19021
TK-19027
X-19016-1.2
X-19020 1.2
X-19022

									CAD DRAFTSMAN	DATE	6,000 TPD SRC-1 DEMONSTRATION PLANT NEWBARK, KENTUCKY	International Coal Refining Company Albemarle, PA
									CHECKED		FOR UNITED STATES DEPARTMENT OF ENERGY	
									ENGINEER	TITLE	PROCESS FLOW DIAGRAM PRIMARY TREATMENT AREA SHEET #2 OF 5	
1		APPROVED / REVISED PER DOE COMMENTS	3/7/84	CAD	HVS							
0		APPROVED	8-10-85	CAD	NO							
REV.	CHANGE NOTICE	REVISION DESCRIPTION	DATE	BY	CHK'D	APP'D	HVS APPROVE	SCALE	DATE	NOTE	DWG. NO.	REV
									3/9/84	NONE	00-19-010150	1

091010-6T-00

TK-19022
SCRUBBER PURGE
OXIDATION TANK
500 GAL. NET CAPACITY
3'-6" DIA. X 10'-0" TT

A-19022
SCRUBBER PURGE
AERATOR
1.5 HP

TK-19023
SCRUBBER PURGE
SPLITTER BOX
24 GAL. NET CAPACITY
3'-0" X 2'-0" L X 1'-6" H

TK-19024-1.2
SULFATE PRECIPITATION
TANKS
490 GAL. NET CAPACITY
4'-8" DIA. X 5'-6" TT

A-19024-1.2
PRECIPITATION TANK
AGITATORS
1.5 HP

CL-19025-1.2
CALCIUM SULFATE
THICKENERS
15'-0" DIA. X 10'-0" H

TK-19026
SULFATE THICKENER
OVERFLOW TANK
184 GAL. NET CAPACITY
3'-0" DIA. X 4'-0" TT

C-19022A.B
SCRUBBER PURGE
OXIDATION BLOWERS
375 SCFM
DISCH. PRESS. 5 PSIG

EQUIPMENT LIST:

A-19022
A-19024-1.2
C-19022A.B
CL-19025-1.2
P-19025A.B.C
P-19026A.B
TK-19022
TK-19023
TK-19024-1.2
TK-19026

REV.	CHARGE NOTICE	REVISION DESCRIPTION	DATE	BY	CHK'D	APP'D	CAD DRAFTSMAN	DATE	6,800 TPD SRC-1 DEMONSTRATION PLANT NEWBORN, KENTUCKY FOR UNITED STATES DEPARTMENT OF ENERGY	PROCESS FLOW DIAGRAM PRIMARY TREATMENT AREA SHEET #3 OF 8	PREPARED BY ANALYTIC	DATE 00-19-01016D	REV. 2
2		BASELINE UPDATE BY RUST	3/22/84	BSY									
1		APPROVED/REVISED PER DOE COMMENTS	3/1/84	CAD	NSV								
0		APPROVED	8/18/83	CAD	NSV								
REV. 1	CHARGE NOTICE	REVISION DESCRIPTION	DATE	BY	CHK'D	APP'D	CAD DRAFTSMAN	DATE	6,800 TPD SRC-1 DEMONSTRATION PLANT NEWBORN, KENTUCKY FOR UNITED STATES DEPARTMENT OF ENERGY	PROCESS FLOW DIAGRAM PRIMARY TREATMENT AREA SHEET #3 OF 8	PREPARED BY ANALYTIC	DATE 00-19-01016D	REV. 2

00-19-01017D

TK-19030
SPENT ACID
STORAGE TANK
12,000 GAL NET CAPACITY
12'-0" DIA. X 18'-0" T-T

TK-19032
SULFURIC ACID
STORAGE TANK
27,500 GAL NET CAPACITY
18'-0" DIA. X 20'-0" T-T

TK-19031
SPENT CAUSTIC
STORAGE TANK
9,400 GAL NET CAPACITY
11'-6" DIA. X 15'-0" T-T

TK-19033
CAUSTIC
STORAGE TANK
1740 GAL NET CAPACITY
8'-0" DIA. X 12'-0" T-T

TK-19034
FIRST STAGE
NEUTRALIZATION TANK
2025 GAL NET CAPACITY
7'-8" DIA. X 8'-0" T-T
A-19034
FIRST STAGE
NEUTRALIZATION AGITATOR
5.0 HP

TK-19035
SECOND STAGE
NEUTRALIZATION TANK
2025 GAL NET CAPACITY
7'-8" DIA. X 8'-0" T-T
A-19035
SECOND STAGE
NEUTRALIZATION AGITATOR
5.0 HP

TK-19036
SEDIMENTATION BASIN
SPLITTER BOX
1500 GAL NET CAPACITY
7'-0" H X 6'-0" L X 6'-0" DEEP
TK-19037-1.2
SEDIMENTATION BASINS
3.77 MM GAL NET CAPACITY EACH
222'-0" H X 445'-0" L X 18'-0" DEEP

EQUIPMENT LIST

A-19034
A-19035
P-19030A.B
P-19031A.B
P-19032A.B
P-19033A.B
P-19034A.B
TK-19030
TK-19031
TK-19032
TK-19033
TK-19034
TK-19035
TK-19036
TK-19037-1.2

P-19034A.B
SULFURIC ACID
UNLOADING PUMP
70 GPM @ 30 FT. TDH

P-19030A.B
SPENT ACID PUMPS
65 GPM @ 40 FT. TDH

P-19032A.B
SULFURIC ACID PUMPS
6 GPM @ 40 FT. TDH

P-19031A.B
SPENT CAUSTIC PUMPS
25 GPM @ 40 FT. TDH

P-19033A.B
CAUSTIC PUMPS
50 GPM @ 40 FT. TDH

REV.	CHANGE NOTICE	REVISION DESCRIPTION	DATE	BY	CHKD	APPROVED
2		BASELINE UPDATE BY RUST	3/19/84	BSY		
1		APPROVED/REVISED PER DOE COMMENTS	3/19/84	CAD	HSV	
0		APPROVED	8-18-83	CAD	DA	

C.A.D.

DRAFTSMAN

CHECKED

ENGINEER

HVS

APPROVED

DATE

BY

CHKD

APPROVED

DATE

6,000 TPD SRC-1 DEMONSTRATION PLANT
NEWBORN, KENTUCKY
FOR UNITED STATES
DEPARTMENT OF ENERGY

PROCESS FLOW DIAGRAM
PRIMARY TREATMENT AREA
SHEET 24 OF 25

SCALE

NONE

REV.

2

DWG. NO.

International Coal
Refining Company
Allentown, PA.

PREPARED BY
Catalytic

00-19-01017D

REV.

2

- EQUIPMENT LIST**
- A-19040
 - A-19043
 - A-19047
 - A-19048
 - A-19049
 - CL-19042-1.2
 - P-19040A,B
 - P-19041
 - P-19042A,B,C
 - P-19044A,B
 - P-19045A,B
 - P-19050A,B,C
 - TK-19040
 - TK-19041
 - TK-19043
 - TK-19044
 - TK-19045
 - TK-19046-1.2
 - TK-19047
 - TK-19048
 - TK-19049
 - TK-19050
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001910-61-00

G-19101
SANITARY SEWER
COMMINUTOR
1 HP

TK-19107
PHOSPHORIC ACID
STORAGE TANK
7000 GAL NET CAPACITY
12' DIA. X 8'-6" T

TK-19102
FIRST STAGE
AERATION BASIN
SPLITTER BOX
8'-0" W X 12'-0" L X 4'-0" H

TK-19103-1.2
FIRST STAGE
AERATION TANKS
4,047 MH GAL NET CAPACITY EACH
145'-0" W X 145'-0" L X 20'-0" H

A-19103-1A,B,C,D,E
A-19103-2A,B,C,D,E
FIRST STAGE AERATORS
OXYGEN REQUIREMENTS - 3440 LBS/H
100 HP

TK-19104
FIRST STAGE
AERATION BASIN
CLASSIFIER SPLITTER BOX
8'-0" W X 12'-0" L X 4'-0" H

TK-19105-1.2
FIRST STAGE
CLARIFIER
85' DIA. X 12'-0" SHD

TK-19101
SANITARY SEWAGE
LIFT STATION
1466 GAL NET CAPACITY
7'-0" W X 4'-0" L X 9'-0" H

TK-19105
SECONDARY NEUTRALIZATION
TANK
33,660 GAL NET CAPACITY
30'-0" W X 30'-0" L X 7'-0" H

A-19105A,B
SECONDARY NEUTRALIZATION
TANK AGITATOR
40.0 HP

TK-19106-1.2
FIRST STAGE
SCUM TANKS
500 GAL NET CAPACITY EACH
4'-4" DIA. X 5'-0" SHD

EQUIPMENT LIST

A-19103-1A,B,C,D,E
A-19103-2A,B,C,D,E
A-19105A,B
C-19103A,B,C
CL-19103-1.2
G-19101
P-19101A,B
P-19103A,B,C
P-19106-1.2
P-19107A,B
P-19108A,B
P-19109A,B
TK-19101
TK-19102
TK-19103-1.2
TK-19104
TK-19105
TK-19106-1.2
TK-19107

REV.	CHANGE NOTICE	REVISION DESCRIPTION	DATE	BY	CHKD	APPR	C.A.D.	DATE	SCALE	NOTES
2		BASELINE UPDATE BY RUST	3/20/84	BSY						
1		APPROVED/REVISED PER DOE COMMENTS	3/7/84	CAB	HSV					
0		APPROVED	8-8-83	CAB	AA					
							HSV	3/1/84	NONE

00-19-011110 12

021110-61-00

EQUIPMENT LIST

A-19111-1 A.B.
A-19111-2 A.B.
A-19111 A.B.C.D.
C-19111 A.B.C.
C-19116 A.B.
CL-19112-1.2
CL-19115-1.2
P-19110 A.B.
P-19112 A.B.C.
P-19113-1.2
P-19114 A.B.
P-19115 A.B.C.
P-19116 A.B.
P-19118 A.B.
TK-19110
TK-19111-1.2
TK-19112
TK-19113-1.2
TK-19114
TK-19115
TK-19117

REV.	CHANGES	NOTES	REVISION DESCRIPTION	DATE	BY	CHK'D	APPROVED	CAD	DATE	6000 TPD SRC-1 DEMONSTRATION PLANT NEWBARK, KENTUCKY FOR UNITED STATES DEPARTMENT OF ENERGY	PROCESS FLOW DIAGRAM SECONDARY TREATMENT AREA SHEET 2 OF 3	DATE	SCALE	NONE	REV.	00-19-01	2D	2
2			BASELINE UPDATE BY RUST	3/20/84	BSY													
1			APPROVED / REVISED PER DOE COMMENTS	3/9/84	CAD	HSV												
0			APPROVED	8-18-83	CAD	AD												

DC-19118
PAC DUST COLLECTOR
750 SCFM CAPACITY
CLOTH AREA-150 SQ.FT.

BH-19118
PAC STORAGE SILO
58 TONS NET CAPACITY
12'-0" DIA. X 33'-0" SS

CV-19118 A.B
PAC FEEDERS
6" DIA. X 12'-0" LONG
1.5 TPH

TK-19119
PAC SLURRY
TANK
3000 GAL NET CAPACITY
8'-0" DIA. X 8'-0" TT

A-19119
PAC SLURRY
AGITATOR
5.0 HP

EFFLUENT FROM
RAIN EQUALIZATION
BASIN

00-19-01113D

FIRST
STAGE
AERATION
SPLITTER BOX

SECOND STAGE
AERATION
SPLITTER BOX

EQUIPMENT LIST

- A-19119
- BH-19118
- CV-19118A.B
- DC-19118
- P-19119A.B
- P-19120A.B
- TK-19119

P-19119 A.B
FIRST STAGE
PAC SLURRY PUMPS
150 GPM @ 50 FT.TDH

P-19120 A.B
SECOND STAGE
PAC SLURRY PUMPS
30 GPM @ 50 FT.TDH

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00-19-01211D

TK-19205
FERRIC CHLORIDE
STORAGE TANK
18,000 GAL. NET CAPACITY
12'-0" DIA. X 28'-0" T-T

TK-19204
SPLITTER BOX
12'-0" H X 12'-0" L X 3'-6" H

CL-19205-1.2
COAGULATION
CLARIFIERS
70'-0" DIA. X 12'-0" SHD

TK-19203
COAGULATION TANK
10,500 GAL. NET CAPACITY
12'-0" DIA. X 18'-0" H

A-19203
COAGULATION
TANK AGITATOR
20 HP

TK-19210
NEUTRALIZATION
TANK
10,500 GAL. NET CAPACITY
12'-0" DIA. X 18'-0" H

A-19210
NEUTRALIZATION
TANK AGITATOR
20 HP

TK-19209
BACKWASH
HOLDING TANK
21,000 GAL. NET CAPACITY
18'-0" DIA. X 18'-0" H

A-19209
HOLDING TANK
AGITATOR
30 HP

TK-19208
CLARIFIER
OVERFLOW TANK
10,500 GAL. NET CAPACITY
8'-0" H X 16'-0" L X 14'-0" H

FL-19208-1.2.3
DUAL MEDIA
FILTER
12'-0" DIA. X 30'-0" T-T

CARBON COLUMN
BACKWASH

00-19-012120

RECIRCULATING
LIME SLURRY

00-19-010140

LIME SLURRY

00-19-010140

BIO-SYSTEM
EFFLUENT

00-19-011120

POLYMER SYSTEM

00-19-010180

PLANT AREA 19
BATTERY LIMIT

TRUCK
DELIVERY
OF FERRIC
CHLORIDE

P-19205 R.B.

FERRIC CHLORIDE
METERING PUMP

00-19-010150

DEGASIFIER

00-17-02001D

EFFLUENT PUMP

TK-19205

P-19206 R.B.

P-19205 R.B.
FERRIC CHLORIDE
UNLOADING PUMPS
155 GPM @ 50 FT. TDH

P-19204 R.B.
POLYMER
METERING PUMPS
0.69 GPM @ 30 FT. TDH

P-19206 R.B.
FERRIC CHLORIDE
METERING PUMPS
3.12 GPM @ 30 FT. TDH

P-19207 R.B.C
COAGULATION
SLUDGE PUMPS
115 GPM @ 40 FT. TDH

P-19208 R.B.C
FILTER FEED
PUMPS
2,055 GPM @ 98 FT. TDH

P-19209 R.B.
BACKWASH RETURN
PUMPS
70 GPM @ 40 FT. TDH

EQUIPMENT LIST

A-19203
A-19209
A-19210
CL-19205-1.2
FL-19208-1.2.3
P-19204A.B
P-19205A.B
P-19206A.B
P-19207A.B
P-19208A.B
P-19209A.B
TK-19203
TK-19204
TK-19205
TK-19208
TK-19209
TK-19210

TO ACTIVATED
CARBON

00-19-012120

TO SLUDGE
HANDLING

00-19-01311D

REV.	CHANGE NOTICE	REVISION DESCRIPTION	DATE	BY	CHKD	APPD	CAD DRAFTER	DATE	6,000 TPD BIC-4 DEMONSTRATION PLANT NEWARK, KENTUCKY FOR UNITED STATES DEPARTMENT OF ENERGY	TITLE	00-19-01211D F.2
2		BASELINE UPDATE BY RUST	3/20/84	BSY						PROCESS FLOW DIAGRAM TERTIARY TREATMENT AREA SHEET 1 OF 2	
1		APPROVED/REVISED PER DOE COMMENTS	3/19/84	CAD	HSV						
0		APPROVED	8-18-83	CAD	AL						
							HSV	3/19/84	NONE

TK-19221-1.2
OZONE CONTACT
TANKS
44,800 GAL. NET CAPACITY
10'-0" W X 30'-0" L X 22'-0" H

**C-19219 A.B
OXYGEN RECYCLE
BLOWERS
(W/ COOLER)
1.394 SCFM CAPACITY
DISCH. PRESS: 15 PSIG**

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3.1.3.3 Material Balance

The material balance of the zero discharge water processing system is shown in the following Material Balance Summary sheets. The quantities represent normal, not design conditions. Therefore, these rates are not the basis for equipment sizing.

The detailed material balance for the evaporator and crystallizer system, which contains proprietary information of RCC, is included in Volume VI of Design Baseline.

The material balances for the primary, secondary, tertiary and sludge treatment areas are included in sections 2.4, 3.4, 4.4 and 5.4 of Volume V, which contains Catalytic's Design Baseline Revision (DOE/OR/03054-71).

MATERIAL BALANCE SUMMARY

STREAM NUMBER/NAME		310 Input Flow to Softener		351 Lime Slurry to Softener		352 Soda Ash		353 Clarifier Underflow to Thickener		354 Thickener Overflow to Clarifier				
CONTRACT NO. 21-2548		PHASE		Liquid		Slurry		Solid		Slurry		Liquid				
PROJECT: 6000 T/D SRC-I DEMONSTRATION PLANT		TEMPERATURE, °F		60												
PLANT LOCATION: NEWMAN, KENTUCKY		PRESSURE, PSIA		55												
CLIENT: ICRC		COMPONENTS	MOLE WT.	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	
PREPARED BY MWH DATE 3-5-84 APPROVED BY DATE	1	Na ⁺	22.990	1.045	0.108					2,517	43.38		436	0.356		
	2	Ca ⁺⁺	40.08	774	0.080		346	7.15					1	0.001		
	3	Mg ⁺⁺	24.312	24	0.003											
	4	SO ₄	96.062	2,516	0.260								308	0.252	306	0.258
	5	Cl ⁻	35.453	1,026	0.106								126	0.103	125	0.105
	6	NO ₃ ⁻	62.005	194	0.020								24	0.020	24	0.020
	7	HCO ₃ ⁻	61.017	97	0.010								12	0.010	12	0.010
	8	CO ₃ ⁼⁼	60.009						3,285	56.62			192	0.157	191	0.160
	9	H ⁺	1.008													
	10	OH ⁻	17.007				294	6.07					36	0.029	36	0.030
	11	CaCO ₃	100.089										2,782	2.272		
	12	MgCO ₃	84.321										73	0.062		
	13															
	14															
	15															
	16															
	17															
	18															
	19															
20																
21	TOTAL (DRY)			5,676	0.587		640	13.22		5,802	100.00		3,990	3.26	1,128	0.94
22	WATER H ₂ O		18.016	962,124	99.413		4,200	86.78					118,434	96.74	117,708	99.0
23	TOTAL (WET)			967,800	100.000		4,840	100.00		5,802	100.00		122,424	100.00	118,836	
24	TOTAL															
25	MMSCFD															
26	GPM @ FTP			1,933			9.7						241		235	
27	ACFM															
28	MOLECULAR WEIGHT															
29	DENSITY @ FTP LB/FT ³															
30	VISCOSITY LBM/FT-HR															
31	HEAT CAPACITY BTU/LB-°F															
32	THERM. COND BTU/HR-FT-°F															
33	ENTHALPY															
R E M A R K S	34															
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00-17-02000D
00-17-02001D
00-17-02002D

FOR PROCESS FLOW DIAGRAM NO.

MATERIAL BALANCE SUMMARY

SHEET 2 OF 7

STREAM NUMBER/NAME		355 Thickener Underflow to Dewatering			356 Filtrate from Dewatering			357 Dewatered Sludge to Container			358 Clarifier Overflow			359 93% Sulfuric Acid		
CONTRACT NO. 21-2548		PHASE		Slurry			Liquid			Solid			Liquid			Liquid		
PROJECT: 6000 T/D SRC-I DEMONSTRATION PLANT		TEMPERATURE, °F																
PLANT LOCATION: NEWMAN, KENTUCKY		PRESSURE, PSIA																
CLIENT: ICRC		COMPONENTS	MOLE WT.	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %
		1 Na+	22.990	48	0.30		41	0.365		7	0.15		3.555	0.365				
		2 Ca++	40.08					0.001					6	0.001				
		3 Mg++	24.312										3					
		4 SO4--	96.062	34	0.21		29	0.258		5	0.10		2.511	0.258		3.410	91.10	
		5 Cl-	35.453	14	0.09		12	0.105		2	0.04		1.024	0.105				
		6 NO3-	62.005	3	0.02		3	0.020					194	0.020				
		7 HCO3-	61.017	1	0.01		1	0.010					97	0.010				
		8 CO3--	60.009	21	0.13		18	0.160		3	0.06		1.562	0.160				
		9 H+	1.008													72	1.90	
		10 OH+	17.007	4	0.03		4	0.030					294	0.030				
		11 CaCO3	100.089	2,782	17.48					2,782	58.47							
		12 MgCO3	84.321	73	0.46					73	1.53							
		13																
		14																
		15																
		16																
		17																
		18																
		19																
		20																
		21 TOTAL (DRY)		2,980	18.73		108	0.949		2,872	60.36		9,246	0.949		3,482	93.00	
		22 WATER H2O	18.016	12,934	81.27		11,048	99.051		1,886	39.64		964,438	99.051		262	7.00	
		23 TOTAL (WET)		15,914	100.00		11,156	100.00		4,758	100.00		973,684	100.00		3,744	100.00	
		24 TOTAL																
		25 MMSCFD																
		26 GPM @ FTP		30			22.3						1,947			4		
		27 ACFM																
		28 MOLECULAR WEIGHT																
		29 DENSITY @ FTP LB/FT³																
		30 VISCOSITY LBM/FT-HR																
		31 HEAT CAPACITY BTU/LB-°F																
		32 THERM. COND BTU/HR-FT-°F																
		33 ENTHALPY																
		34																
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MATERIAL BALANCE SUMMARY

STREAM NUMBER/NAME		360 Flow to Granular Filter			361 Back Wash to Filter			362 Flow to Activated Carbon			363 Flow to Cartridge Filter			364 CO2 Vent		
	PHASE		Liquid			Liquid			Liquid			Liquid			Gas		
	TEMPERATURE, °F																
	PRESSURE, PSIA																
CONTRACT NO. 21-2548			COMPONENTS	MOLE WT.	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	
PROJECT: 6000 T/D SRC-I			1	Na ⁺	22.990	3,555	0.36				137	0.36		3,418	0.364		1
DEMONSTRATION PLANT			2	Ca ⁺⁺	40.08	6	0.00				6	0.001		6	0.001		2
PLANT LOCATION: NEWMAN, KENTUCKY			3	Mg ⁺⁺	24.312	3	0.00				3	0.000		3	0.000		3
CLIENT: ICRC			4	SO ₄ ⁻⁻	96.062	5,921	0.61				227	0.61		5,694	0.607		4
			5	Cl ⁻	35.453	1,024	0.11				39	0.11		985	0.105		5
			6	NO ₃ ⁻	62.005	194	0.02				7	0.02		187	0.020		6
PREPARED BY MWH			7	HCO ₃ ⁻	61.017												7
DATE 3-5-84			8	CO ₃ ⁻⁻	60.009												8
APPROVED BY			9	H ⁺	1.008												9
DATE			10	OH ⁻	17.009												10
			11	CO ₂	44.010											1.216	11
			12														12
			13														13
			14														14
			15														15
			16														16
			17														17
			18														18
			19														19
			20														20
			21	TOTAL (DRY)		10,703	1.10				410	1.10		10,293	1.097		21
			22	WATER H ₂ O	18.016	965,509	98.90				37,090	98.90		928,419	98.903		22
			23	TOTAL (WET)		967,212	100.00				37,500	100.00		938,712	100.00		23
			24	TOTAL													24
			25	MMSCFD													25
			26	GPM @ FTP		1,952					75			1,877			26
			27	ACFM													27
			28	MOLECULAR WEIGHT													28
			29	DENSITY @ FTP LB/FT ³													29
			30	VISCOSITY LBM/FT-HR													30
			31	HEAT CAPACITY BTU/LB °F													31
			32	THERM. COND BTU/HR-FT °F													32
			33	ENTHALPY													33
			34														34
			35														35
			36														36
			37														37
			38														38
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MATERIAL BALANCE SUMMARY

STREAM NUMBER/NAME	450 Reverse Osmosis Feed	451 Reverse Osmosis Reject	542 Permeate from Reverse Osmosis	453 Combined Permeate & Condensate to Cooling Tower	550 Leachate from Landfill (Intermittent)											
CONTRACT NO. 21-2548	PHASE	Liquid	Liquid	Liquid	Liquid	Liquid											
PROJECT: 6000 T/D SRC-I DEMONSTRATION PLANT	TEMPERATURE, °F																
PLANT LOCATION: NEWMAN, KENTUCKY	PRESSURE, PSIA																
CLIENT: ICRC	COMPONENTS	MOLE WT.	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %
	1 Na ⁺	22.990	3,418	0.364		3,418	1.46										
	2 Ca ⁺⁺	40.08	6	0.001		6											
	3 Mg ⁺⁺	24.312	3	0.000		3											
	4 SO ₄ ⁻⁻	96.062	5,694	0.607		5,694	2.43										
	5 Cl ⁻	35.453	985	0.105		985	0.42										
	6 NO ₃ ⁻	62.005	187	0.020		187	0.08										
	7																
	8																
	9																
	10																
	11																
	12																
	13																
	14																
	15																
	16																
	17																
	18																
	19																
	20																
	21 TOTAL (DRY)		10,293	1.097		10,293	4.39										
	22 WATER H ₂ O	18.016	928,419	98.903		224,419	95.61		704,000	100.00		916,530	100.00		2,500	100.00	
	23 TOTAL (WET)		938,712	100.00		234,712	100.00		704,000	100.00		916,530	100.00		2,500	100.00	
	24 TOTAL																
	25 MMSCFD																
	26 GPM @ FTP		1,877			455			1,408			1,833			5		
	27 ACFM																
	28 MOLECULAR WEIGHT																
	29 DENSITY @ FTP LB/FT ³																
	30 VISCOSITY LBM/FT-HR																
	31 HEAT CAPACITY BTU/LB-°F																
	32 THERM. COND BTU/HR-FT-°F																
	33 ENTHALPY																
	34																
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	47																
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MATERIAL BALANCE SUMMARY

STREAM NUMBER/NAME		Feed to Evap./Cryst.			Condensate from Evap./Cryst.			50% Salt to Hold Tank			50% Salt to Mixer			Stabilized Material to Landfill		
CONTRACT NO. 21-2548		PHASE		Liquid			Liquid			Slurry			Slurry			Slurry		
PROJECT: 6,000 T/D SRC-I Demonstration Plant		TEMPERATURE, °F		202			64			229								
		PRESSURE, PSIA		50			25			45								
PLANT LOCATION: Newman, KY		COMPONENTS	MOLE WT.	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %
CLIENT: ICRC		1 H2O		230,419	95.72		212,530	100.00		10,693	50.00		34,437	50.00		47,592	31.50	
		2 TS		10,293	4.28					10,693	50.00		34,437	50.00		103,502	68.50	
		3																
		4																
		5																
		6																
		7																
		8																
		9																
		10																
		11																
		12																
		13																
		14																
		15																
		16																
		17																
		18																
		19																
		20																
		21 TOTAL (DRY)																
		22 WATER																
		23 TOTAL (WET)																
		24 TOTAL lb/hr		240,712			212,530			21,386			68,874 (For 7 hr oper. per day)			151,094 (For 7 hr oper. per day)		
		25 MMSCFD																
		26 GPM @ FTP		466			425			29.8			96.3					
		27 ACFM																
		28 MOLECULAR WEIGHT																
		29 DENSITY @ FTP LB/FT³		64.32			62.4			89.5			89.5			~110		
		30 VISCOSITY LBM/FT-HR																
		31 HEAT CAPACITY BTU/LB-°F																
		32 THERM. COND BTU/HR-FT-°F																
		33 ENTHALPY																
REMARKS	34																	
	35																	
	36																	
	37																	
	38																	
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	42																	
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	47																	
	48																	
	49																	

*ENTHALPY DATUM
FORM 44-150 (8/82)

MATERIAL BALANCE SUMMARY

STREAM NUMBER/NAME		860 Cement from Batching Hopper to Mixer		875 20% Fly Dust Slurry to Thickener			876 Thickener Overflow to Fly Dust Impoundment			877 Thickener Underflow to Vacuum Filters			878 Filtrate Return to Thickener			
CONTRACT NO. 21-2548 PROJECT: 6,000 T/D SRC-I Demonstration Plant		PHASE		Solid			Slurry			Liquid			Slurry			Liquid		
PLANT LOCATION: Newman, KY		TEMPERATURE, °F																
CLIENT: ICRC		PRESSURE, PSIA																
PREPARED BY C. P. DATE 2/23/84		COMPONENTS	MOLE WT.	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %
APPROVED BY DATE		1 H2O					61.404	80.00		57,567			23,027	60.00		19,190		
		2 TS					15,351	20.00					15,351	40.00				
		3 Cement		16,433	100													
		4																
		5																
		6																
		7																
		8																
		9																
		10																
		11																
		12																
		13																
		14																
		15																
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		17																
		18																
		19																
		20																
		21 TOTAL (DRY)																
		22 WATER																
		23 TOTAL (WET)																
		24 TOTAL lb/hr		16,433 (For 7 hr oper. per day)			76,755			57,567			38,378			19,190		
		25 MMSCFD																
		26 GPM @ FTP					135.9			115.3			58.1			38.5		
		27 ACFM																
		28 MOLECULAR WEIGHT																
		29 DENSITY @ FTP LB/FT³					70.5			62.4			82.57			62.4		
		30 VISCOSITY LBM/FT-HR																
		31 HEAT CAPACITY BTU/LB-°F																
		32 THERM. COND BTU/HR-FT-°F																
		33 ENTHALPY																
		34 Bulk Density lbs/CF		90.00														
		35																
		36																
		37																
		38																
		39																
		40																
		41																
		42																
		43																
		44																
		45																
		46																
		47																
		48																

MATERIAL BALANCE SUMMARY

STREAM NUMBER/NAME		<div>879</div> 80% Fly Dust Cake to Batching Hopper		<div>880</div> 80% Fly Dust Cake from Batching Hopper to Mixer									
CONTRACT NO. 21-2548 PROJECT: 6,000 T/D SRC-I Demonstration Plant		PHASE		Solid		Solid									
PLANT LOCATION: Newman, KY		TEMPERATURE, °F													
CLIENT: ICRC		PRESSURE, PSIA													
		COMPONENTS	MOLE WT.	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %	LB/HR	WT. %	MOL %
		1 H2O		3,837	20.00		13,155	20.00							
		2 TS		15,351	80.00		52,632	80.00							
		3													
		4													
		5													
		6													
		7													
		8													
		9													
		10													
		11													
		12													
		13													
		14													
		15													
		16													
		17													
		18													
		19													
		20													
		21 TOTAL (DRY)													
		22 WATER													
		23 TOTAL (WET)													
		24 TOTAL lb/hr		19,188			65,787 (For 7 hr oper. per day)								
		25 MMSCFD													
		26 GPM @ FTP													
		27 ACFM													
		28 MOLECULAR WEIGHT													
		29 DENSITY @ FTP LB/FT³													
		30 VISCOSITY LBM/FT-HR													
		31 HEAT CAPACITY BTU/LB °F													
		32 THERM. COND BTU/HR-FT. °F													
		33 ENTHALPY													
		34 Bulk Density, lbs/CF		56.50			56.50								
		35													
		36													
		37													
		38													
		39													
		40													
		41													
		42													
		43													
		44													
		45													
		46													
		47													
		48													

*ENTHALPY DATUM
FORM 44-150 (8/82)

3.1.3.4 Utilities Summary

The utilities summary for the zero discharge water processing system follows this page.

The utility summary for the primary, secondary and tertiary treatment areas are included in sections 2.5, 3.5, 4.5 and 5.5. of Volume V, which contains Catalytic's Design Baseline Revision (DOE/OR/03054-71).

CONTRACT NO. 21-254B
AREA WASTEWATER TREATMENT
BY CATALYTIC * DATE _____
SHEET 1 OF 1

[illegible]

SHEET 1 OF 1

PLANT LOCATION: NEWMAN, KENTUCKY

53	PREPARED BY <u>B. Shah</u>	REVISION		REVISION		REVISION		NOTES:
54	DATE <u>3/19/84</u>							
55	APPROVED BY	BY	DATE	BY	DATE	BY	DATE	
56	DATE	APP'D	DATE	APP'D	DATE	APP'D	DATE	

3.1.3.5 Motor List

The motor list for the water softening, ~~sludge~~ dewatering, ph adjusting and reverse osmosis area of zero discharge water processing system follows this page.

The motor list for the evaporator/crystallizer, fly dust dewatering and sludge stabilization area, which contains proprietary information of RCC, is included in Volume VI of Design Baseline.

The motor lists for the primary, secondary, tertiary and sludge treatment areas are included in sections 2.8, 3.8, 4.8 and 5.8 of Volume V, which contains Catalytic's Design Baseline Revision (DOE/OR/03054-71).

ZERO DISCHARGE WATER PROCESSING SYSTEM

Motor List

Water Softening, Sludge Dewatering pH Adjusting & Reverse Osmosis Area

		<u>Installed Hp</u>	<u>Operating KW</u>	<u>Hr Day</u>	<u>KWH Day</u>
A-175351	Flash Mix Tank Agitator	7½	5	24	120
A-17352	pH Adjustment Tank Agitator	1½	1	24	24
AL-17351	Soda Ash Storage Air Lock	1	0.5	24	12
CL-17351A	Lime Softener/Clarifier				
	Scraper	3	2	24	48
	Mixer	3	2	24	48
	Mixer	3	2	24	48
	Sludge Recirc. Pump	10	7	24	168
CL-17351B	Lime Softener/Clarifier				
	Scraper	3	2	24	48
	Mixer	3	2	24	48
	Mixer	3	2	24	48
	Sludge Recirc. Pump	10	7	24	168
CL-17352A	Softening Sludge Thickener Rake	½	0.2	24	5
CL-17352B	Softening Sludge Thickener Rake	½	0.2	24	5
CV-17351	Soda Ash Feed Conveyor	15	10	24	240
DC-17351	Soda Ash Storage Dust Collector	1½	1	24	24
FL-17351A	Drum Filter	3	2	24	48
FL-17351B	Drum Filter	3	2	24	48
P-17351A	Polymer Metering Pump	3/4	0.5	24	12
P-17351B	Polymer Metering Pump	3/4	0	0	
P-17352A	Lime Softener Sludge Pump	10	7	24	168
P-17352B	Lime Softener Sludge Pump	10	7	24	168
P-17352C	Lime Softener Sludge Pump	10	0	0	
P-17353A	Degasifier Effluent Pump	150	100	24	2,400
P-17353B	Degasifier Effluent Pump	150	0	0	
P-17354A	Thickener Overflow Sump Pump	7½	5	24	120
P-17354B	Thickener Overflow Sump Pump	7½	0	0	
P-17355A	Thickener Underflow Pump	2	1½	24	36
P-17355B	Thickener Underflow Pump	2	1½	24	36
P-17355C	Thickener Underflow Pump	2	0	0	

		<u>Installed Hp</u>	<u>Operating KW</u>	<u>Hr Day</u>	<u>KWH Day</u>
P-17501A	Sulfuric Acid Metering Pump	1/4	0.2	24	4.8
P-17501B	Sulfuric Acid Metering Pump	1/4	0	0	
P-17502A	Reverse Osmosis Feed Pump	75	40	24	960
P-17502B	Reverse Osmosis Feed Pump	75	40	24	960
P-17502C	Reverse Osmosis Feed Pump	75	40	24	960
P-17502D	Reverse Osmosis Feed Pump	75	40	24	960
P-17502E	Reverse Osmosis Feed Pump	75	40	24	960
P-17502F	Reverse Osmosis Feed Pump	75	40	24	960
P-17502G	Reverse Osmosis Feed Pump	75	40	24	960
P-17502H	Reverse Osmosis Feed Pump	75	40	24	960
P-17502I	Reverse Osmosis Feed Pump	75	40	24	960
P-17502J	Reverse Osmosis Feed Pump	75	40	24	960
P-17502K	Reverse Osmosis Feed Pump	75	40	24	960
P-17502L	Reverse Osmosis Feed Pump	75	40	24	960
P-17502M	Reverse Osmosis Feed Pump	75	40	24	960
P-17502N	Reverse Osmosis Feed Pump	75	40	24	960
P-17502O	Reverse Osmosis Feed Pump	75	0	0	0
P-17502P	Reverse Osmosis Feed Pump	75	0	0	0
P-17503A	Reverse Osmosis Booster Pump	75	40	24	960
P-17503B	Reverse Osmosis Booster Pump	75	40	24	960
P-17503C	Reverse Osmosis Booster Pump	75	40	24	960
P-17503D	Reverse Osmosis Booster Pump	75	40	24	960
P-17503E	Reverse Osmosis Booster Pump	75	40	24	960
P-17503F	Reverse Osmosis Booster Pump	75	40	24	960
P-17503G	Reverse Osmosis Booster Pump	75	0	0	0
P-17503H	Reverse Osmosis Booster Pump	75	0	0	0
P-17504A	R.O. Effluent Pump	200	100	24	2,400
P-17504B	R.O. Effluent Pump	200	0	0	0
P-17505A	Condensate Pump	20	12	24	288
P-17505B	Condensate Pump	20	12	24	288
P-17505C	Condensate Pump	20	0	0	0
X-17352	Soda Ash Storage Vibrator	5	3	8	24
X-17351	Polymer Feed System				
	Agitator	3/4	0.5	24	12
	Agitator	3/4	0	0	0
	Transfer Pump	1 1/2	1	8	8
	Feeder	1/2	0.3	24	7.2
	Feeder	3/4	0.5	24	12
X-17355	Vacuum System				
	Pump	5	3	24	72
	Pump	5	0	0	0
	Vacuum Pump	60	45	24	1,080
	Vacuum Pump	60	0	0	0
TOTAL		2,823 3/4	1,148		28,926

3.1.3.6 Layout Drawings

The following equipment layout drawings are included after this page:

- 00-17-02501 Equipment Layout, Area 17
 Softening, Sludge Dewatering and Reverse Osmosis
- 00-17-02502 Equipment Layout, Area 17
 Evaporation/Crystallization and Sludge Fixation
- 00-19-10000D Overall Plot Plan, Rev. 2

RUST, BIRMINGHAM, ALABAMA

PROPOSAL
OR JOB NO. 21-2548

FOR 6,000 T/D SRC-1 DEMONSTRATION PLANT
 AT NEWMAN, KENTUCKY
 DESCRIPTION EQUIPMENT LAYOUT AREA 17: SOFTENING,
 SLUDGE DEWATERING AND REVERSE OSMOSIS

DATE 3/8/84
 BY MWH CKD.
 DWG. 00-17-02501
 SCALE: 1" = 50'

RUST, BIRMINGHAM, ALABAMA

PROPOSAL
OR JOB NO. 21-2548

FOR 6000 T/D SRC-1 DEMONSTRATION PLANT

AT NEWMAN, KENTUCKY

DATE 3/13/84

BY MWH CKD.

DESCRIPTION EQUIPMENT LAYOUT AREA 17:
EVAPORATION/CRYSTALLIZATION & SLUDGE FIXATION

DWG. 00-17-02502

SCALE: 1" = 50'

N3200

RACK

N3100

N3000

N2900

N2800

000001-61-00

ON DMC

N2000.00

NEW ROAD

EXIST. RACK
N2040.00

CONTROL ROOM

DRUM ANTIFOAM
P-19110A&BP-19117A&B
TK-19117
CV-19117A&B
BH-19117
P-19118A&B
TK-19101
P-19101A&B

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TK-19113-1
P-19113-1
CL-19112-1
TK-19114
P-19114A&B
TK-19112
P-19112
A,B,C
TK-19113-2
P-19113-2
CL-19112-2
TK-19111-1A
TK-19111-1
1B
1C
1D
TK-19111-2A
TK-19111-2
2B
2C
2D
C-19111
A,B,CTK-19106-1
P-19106-1
CL-19103-1
TK-19110
TK-19105
TK-19103
A,B,C
TK-19106-2
P-19106-2
CL-19103-2A-19103-1A
1B
TK-19103-1
1C
1D
A-19103-2A
2B
TK-19103-2
2C
2DCL-19115-1
TK-19117
CL-19115-2
TK-19118
P-19115
A,B,C
TK-19116
TK-19116A
TK-19116B
TK-19116C
TK-19116D
TK-19116E
TK-19116F
TK-19116G
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TK-19116W
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TK-19116ZCL-19115-1
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CL-19115-2
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P-19115
A,B,C
TK-19116
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CL-19115-2
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TK-19116ZCL-19115-1
TK-19117
CL-19115-2
TK-19118
P-19115
A,B,C
TK-19116
TK-19116A
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TK-19116Y
TK-19116Z

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E13230.00

E14710.00

REV.	CHANGE NOTICE	REVISION DESCRIPTION	DATE	BY	CHK'D	APP'D	C.A.D.	DATE	8,000 TPD SRC I DEMONSTRATION PLANT NEWMAN, KENTUCKY FOR UNITED STATES DEPARTMENT OF ENERGY	TITLE	SCALE	DWG. NO.
2		ADDITION OF SOFTENER & R.O. SYSTEMS BY RUST	3/20/84	M.H.			CHIEF			OVERALL PLOT PLAN	1"=50'-0"	00-19-10000
1		APPROVED/REVISED PER DOE COMMENTS	2/1/84	CAD	HSV		ENGINEER					
0		APPROVED	8/22/83	CAD	DO		HSV	2/1/84

3.1.3.7 Equipment List/Summary

The equipment list/summary for the zero discharge water processing system, except that for the evaporator and crystallizer system, follows this page.

The equipment list/summary for the evaporator and crystallizer system which contains proprietary information of RCC is included in Volume VI of Design Baseline.

EQUIPMENT LIST

CONTRACT NO. 21-2548

CLIENT ICRC

LOCATION NEWMAN, KY.

DESCRIPTION

AREA WASTE WATER TREATMENT

SECTION Softening, Clarification & PH Adj.

SECTION _____
SHEET 2 OF 3

PROPOSAL NO. _____

ENGINEER _____ EQUIPMENT PRICED FOR PURCHASE BY: (DATE) _____

ESTIMATOR _____ DATE 3-13-84 REVISED _____

***MOTORS A.C. UNLESS OTHERWISE STATED**

[illegible]

TOTAL HP

[illegible]

EQUIPMENT LIST

CONTRACT NO. 21-2548

CLIENT ICRC

LOCATION NEWMAN. KY.

DESCRIPTION

AREA WASTE WATER TREATMENT
SECTION Softening Clarification & PH Adj
SHEET 3 OF 3

SHEET 3 OF 3

PROPOSAL NO. _____

ENGINEER _____ EQUIPMENT PRICED FOR PURCHASE BY: (DATE) _____

ESTIMATOR _____ DATE 3-13-84 REVISED _____

*MOTORS A.C. UNLESS OTHERWISE STATED

[illegible]

TOTAL WD	
----------	--

[illegible]

EQUIPMENT LIST

CONTRACT NO. 21-2548
 CLIENT International Coal Refining Co. AREA 17: Wastewater Treatment
 LOCATION Newman, Kentucky SECTION Softening Sludge Thickening
 DESCRIPTION 6000 TSPD SRC-1 SHEET 1 OF 1
 Demonstration Plant & Dewatering

ACCOUNT NO.	EQUIPMENT NO.	DESCRIPTION	QUANTITY	PUMPS		MOTORS*	
				(ea.) G.P.M.	T.D.H.	(ea.) H.P.	R.P.M.
	BH-17352	Solid Waste Container, 15 cubic yard capacity, c.s. open top	4				
	A-D						
	CL-17352	Softening Sludge Thickener	2				
	A,B	8' diam x 14' SWH, c.s.					
		Epoxy lined					
		Rake mechanism					
		Motor				1/2	
	FL-17351	Drum Filter (Rotary Vacuum)	2				
	A,B	2 meter diam x 3 meter wide					
		Filter area 203 sq. ft.					
		Motor for drum rotation				3	
	P-17354	Thickener Overflow Sump Pump	2	240	60'		
	A,B	Vertical, Centrifugal					
		Motor				7.5	
	P-17355	Thickener Underflow Pump	3	20	60'		
	A,B,C	(Gallagher), Centrifugal					
		Motor				2	
	TK-17354	Splitter box, c.s.	1				
		5' x 5' x 5', Epoxy lined					
	TK-17355	Thickener Overflow Sump	1				
		6' x 9' x 6'H					
		4" thick concrete walls					
	X-17354	Dump Truck	2				
	A,B	(moving 15 cubic yard capacity waste container to landfill)					
	X-17355	Vacuum System for Drum Filter	1				
		equipped with 200 gal filtrate receiver with 30 GPM filtrate pump					
		Pump motor				5	
		1,000 CFM Vacuum Pump					
		Motor for pump				60	

PROPOSAL NO. _____

ENGINEER _____ EQUIPMENT PRICED FOR PURCHASE BY: (DATE) March
 ESTIMATOR _____ DATE _____ REVISED _____
 *MOTORS A.C. UNLESS OTHERWISE STATED

FGT	TOTAL MATERIAL	LABOR	SUB CONTRACT	INSUL	PAINT	M.H.	TOTAL COST	VENDOR PRICE OR SOURCE
	32,400							RUST, B'ham
	41,000							Eimco, B'ham
	INCL							
	INCL							
	INCL							
	120,000							Ed Pickett Co. B'ha
	INCL							
	6,308							Rittelmeyer Co.
	INCL							
	7,000							Rittelmeyer Co. La
	INCL							
	6,500							Catalytic
			2,000				2,000	RUST, B'ham
	340,000							Catalytic
	30,000							Ed Picket Co. B'ha
	INCL							
	INCL							
	INCL							
	INCL							
	INCL							

EQUIPMENT LIST

CONTRACT NO. 21-2548

CLIENT International Coal Refining Co.

LOCATION Newman, Kentucky

DESCRIPTION 6000 TSPD SRC-1
Demonstration Plant

AREA 17: Wastewater Treatment

SECTION Softening Sludge Thickening
& Dewatering

SHEET 1 OF 1

ACCOUNT NO.	EQUIPMENT NO.	DESCRIPTION	QUANTITY	PUMPS		MOTORS*	
				(ea.) G.P.M.	(ea.) T.D.H.	(ea.) H.P.	(ea.) R.P.M.
	BH-17352 A-D	Solid Waste Container, 15 cubic yard capacity, c.s. open top	4				
	CL-17352 A,B	Softening Sludge Thickener 8' diam x 14' SWH, c.s. Epoxy lined Rake mechanism Motor	2			1/2	
	FL-17351 A,B	Drum Filter (Rotary Vacuum) 2 meter diam x 3 meter wide Filter area 203 sq. ft. Motor for drum rotation	2			3	
	P-17354 A,B	Thickener Overflow Sump Pump Vertical, Centrifugal Motor	2	240	60'	7.5	
	P-17355 A,B,C	Thickener Underflow Pump (Gallagher), Centrifugal Motor	3	20	60'	2	
	TK-17354	Splitter box, c.s. 5' x 5' x 5', Epoxy lined	1				
	TK-17355	Thickener Overflow Sump 6' x 9' x 6'H 4" thick concrete walls	1				
	X-17354 A,B	Dump Truck (moving 15 cubic yard capacity waste container to landfill)	2				
	X-17355	Vacuum System for Drum Filter equipped with 200 gal filtrate receiver with 50 GPM filtrate pump Pump motor 1,000 CFM Vacuum Pump Motor for pump	1			5 60	

PROPOSAL NO. _____

ENGINEER _____ EQUIPMENT PRICED FOR PURCHASE BY (DATE) March

ESTIMATOR _____ DATE _____ REVISED _____

*MOTORS A.C. UNLESS OTHERWISE STATED

FGT	TOTAL MATERIAL	LABOR	SUB CONTRACT	INSUL	PAINT	M.H.	TOTAL COST	VENDOR PRICE OR SOURCE
	32,400							RUST, B'ham
	41,000							Emco, B'ham
	INCL							
	INCL							
	INCL							
	120,000							Ed Pickett Co. B'
	INCL							
	6,308							Rittelmeyer Co. L
	INCL							
	7,000							Rittelmeyer Co. L
	INCL							
	6,500							Catalytic
			2,000				2,000	RUST, B'ham
	340,000							Catalytic
	30,000							Ed Picket Co. B'h
	INCL							
	INCL							
	INCL							
	INCL							
	INCL							

EQUIPMENT LIST

CONTRACT NO. 21-2548

CLIENT ICRC

LOCATION NEWMAN KY.

DESCRIPTION

AREA WASTE WATER TREATMENT
SECTION REVERSE OSMOSIS SYSTEM
SHEET 1 OF 2

SECTION

SHEET

OF

2

PROPOSAL NO. _____

ENGINEER _____ EQUIPMENT PRICED FOR PURCHASE BY: (DATE) _____

ESTIMATOR _____ DATE 3-12-84 REVISED _____

*MOTORS A.C. UNLESS OTHERWISE STATED

[illegible][illegible]

EQUIPMENT LIST

CONTRACT NO. 21-2548

CLIENT ICRC

LOCATION NEWMAN, KY.

DESCRIPTION

AREA WASTE WATER TREATMENT
SECTION REVERSE OSMOSIS SYSTEM
SHEET 2 OF 2

SHEET

2

0

2

ACCOUNT NO.	EQUIPMENT NO.	DESCRIPTION	QUANTITY	PUMPS		MOTORS*	
				G.P.M.	T.D.H.	H.P.	R.P.M.
	X-17501 A/B	Reverse Osmosis System 2 Trains at 2050 GPM Cap Each w/ Each Train Skid Mounted — System Includes: Pretreatment System Cleaning System 5 μ Cartridge Filters Spiral Wound R.O. Membraners — Cellulose Acetate (400 psi) Polyether Urea (800 psi) Piping on Skids Only Instrumentation and Controls Motors Valves (Also Includes P-17502, P-17503)					

TOTAL HP

PROPOSAL NO.

ENGINEER.

EQUIPMENT PRICED FOR PURCHASE BY: (DATE)

ESTIMATOR

DATE _____

3-12-84

- REVISED

***MOTORS A.C. UNLESS OTHERWISE STATED**

[illegible]

EQUIPMENT LIST

CONTRACT NO. 21-2548 Dwg. No. 00-17-02006D
CLIENT International Coal Refining Co. AREA 17: Wastewater Treatment
LOCATION Newman, Kentucky SECTION Fly Dust Thickening and Dewatering
DESCRIPTION 6000 TSPD SRC-1 Demonstration Plant SHEET 1 OF 2

ACCOUNT NO.	EQUIPMENT NO.	DESCRIPTION	QUANTITY	PUMPS		MOTORS*	
				(ea) G.P.M.	T.D.H.	(ea) H.P.	R.P.M.
	CL-17875	Fly Dust Thickener	2				
	A,B	18 ft diameter x 12 ft SWH with rake mechanism and motor				1	
		Walk-way on top					
		Coal Tar Epoxy Lining					
	CV-17875	Fly dust cake discharge Conveyor	3				
	A,B,C	24" wide, 33' long motor				5	
	CV-17876	Fly Dust Cake Transfer Conveyor	1				
		24" wide, 25' long motor				20	
	FL-17875	Drum Filter	3				
	A,B,C	Rotary Vacuum Type c.s. 9.9' diam, 14.9" wide 434 sq ft filter area equipped with slurry tank agitator motor				5	
		cont. belt discharge motor				3	
	P-17875	Thickener Underflow Pump	3	60	79'		
	A,B,C	Centrifugal, Gallagher motor				5	1,800
	P-17876	Thickener Overflow Sump Pump	2	140	231'		
	A,B	Vertical, Centrifugal motor				25	1,800
	P-17877	Filtrate Sump Pump	2	46	69'		
	A,B	Vertical, Centrifugal motor				5	1,800
	TK-17874	Splitter Box	1				
		Epoxy coated, c.s. 5' x 5' x 5'					

PROPOSAL NO. _____

ENGINEER _____ EQUIPMENT PRICED FOR PURCHASE BY: (DATE) March

ESTIMATOR _____ DATE _____ REVISED _____

*MOTORS A.C. UNLESS OTHERWISE STATED

FGT	TOTAL MATERIAL	LABOR	SUB CONTRACT	INSUL	PAINT	M.H.	TOTAL COST	VENDOR PRICE OR SOURCE
	96,000							EIMCO, B'ham
	INCL							
	INCL							
	INCL							
	INCL							
	59,748							RUST, B'ham
	INCL							
	100,000							RUST, B'ham
	INCL							
	330,000							Ed Pickett Co
	INCL							
	INCL							
	INCL							
	INCL							
	INCL							
	9,462							Rittelmeyer Co. L
	INCL							
	17,636							Rittelmeyer Co. L
	INCL							
	8,828							Rittelmeyer Co. L
	INCL							
	6,500							Catalytic

EQUIPMENT LIST

CONTRACT NO. 21-2548

CLIENT International Coal Refining Co.

LOCATION Newman, Kentucky

DESCRIPTION	6000 TSPD SRC-1 Demonstration Plant
-------------	--

Dwg. No. 00-17-02006D

AREA 17: Wastewater Treatment

AREA Fly Dust Thickening and
SECTION Dewatering

SHEET 2 **OF** 2

[illegible]

PROPOSAL NO. _____

ENGINEER _____ EQUIPMENT PRICED FOR PURCHASE BY: (DATE) March

ESTIMATOR _____ DATE _____ REVISED _____

*MOTORS A.C. UNLESS OTHERWISE STATED

[illegible]

EQUIPMENT LIST

CONTRACT NO. 21-2548

CLIENT International Coal Refining Co.

LOCATION Newman, Kentucky

DESCRIPTION 6000 TSPD SRC-1
Demonstration Plant

Dwg. No. 00-17-02007D

AREA 17: Wastewater Treatment
Material Stabilization for
Landfill

SECTION

SHEET 1 OF 2

ACCOUNT NO.	EQUIPMENT NO.	DESCRIPTION	QUANTITY	PUMPS		MOTORS*	
				(ea) G.P.M.	T.D.H.	(ea) H.P.	R.P.M.
	AL-17875	Cement Rotary Feed Valve	2				
	A,B	12" diam. c.s. 19 RPM motor				2	
	BH-17875	Fly dust batching hopper	2				
	A,B	280 CF capacity, c.s. 1 HP activator					
	BH-17876	Cement Batching Hopper	2				
	A,B	45 CF capacity, c.s. 1 HP activator					
	CV-17877	Screw Conveyor to Charging Hopper	2				
	A,B	65 TPD capacity 24" diam screw, 42 RPM motor				15	
	CV-17878	Cement Screw Conveyor to Hopper	2				
	A,B	20 TPH Capacity 16" diam screw, 30 RPM motor				5	
	DC-17875	Cement Silo Dust Collector	1				
		Cloth area: 150 sq. ft. c.s. motor				5	
	P17-879	Salt slurry pump	3				
	A,B,C	Centrifugal 316 ss. 300 GPM at 40 psig disch. motor				15	1,800
	SH-17875	Fly Dust Silo	1				
		22' TD x 22' T-T, C.S. With dual bottom outlet					
	SH-17876	Cement Silo	1				
		22' ID x 22' T-T, c.s With dual outlet					

PROPOSAL NO.

ENGINEER

EQUIPMENT PRICED FOR PURCHASE BY: (DATE) March

ESTIMATOR

DATE

REVISED

*MOTORS A.C. UNLESS OTHERWISE STATED

FGT	MATERIAL	LABOR	SUB CONTRACT	INSUL	PAINT	MLH.	TOTAL COST	VENDOR PRICE OR SOURCE
	12,000							Catalytic
	20,000							Catalytic
	INCL							
	16,000							Catalytic
	INCL							
	19,400							Jeffrey Co. B'har
	INCL							
	14,200							Jeffrey Co. B'har
	INCL							
	3,000							Catalytic
	INCL							
	13,889							Rittelmeyer Co. I
	INCL							
	60,000							Catalytic
	INCL							
	60,000							Catalytic
	INCL							

3.1.3.8 Equipment Data Sheets

The equipment data sheets for the zero discharge water processing system except those for the evaporator and crystallizer system follows this page.

The equipment data sheets for the evaporator and crystallizer system, which contain proprietary information of RCC, are included in Volume VI of Design Baseline.

The equipment data sheets for the primary, secondary, tertiary and sludge treatment areas are included in sections 2.7, 3.7, 4.7 and 5.7 of Volume V, which contains Catalytic's Design Baseline Revision (DOE/OR/03054-71).

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International Corporation

**AGITATOR
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. A-17351
NO. REQUIRED ONE
SHEET 1 OF 1

1	CLIENT	<u>ICRC</u>				
2	PROJECT	<u>6000 TPD SRC-1 DEMONSTRATION PLANT</u>				
3	SERVICE	<u>FLASH MIX TANK AGITATOR</u>				
4	VENDOR	P.O. NO.				
5	TYPE	MODEL			SERIAL NO.	
6	PROCESS DATA					
7	FUNCTION OF AGITATION	TEMPERATURE, °F			PRESSURE, PSIG	
8	☒ SUSPEND SOLIDS	☐ BLEND LIQUIDS	☐ GAS DISPERSION	GAS VELOCITY °F/SEC.		
9	☐ EMULSIFICATION	☒ DISSOLUTION	☐ OTHER	FOAMING ☐ YES ☐ NO		
10	TYPE OF AGITATION	☐ VIGOROUS	☐ MODERATE	☐ MILD		
11	MATERIALS TO BE MIXED					
12	STREAM	VOLUME %	WEIGHT %	SPECIFIC GRAVITY	VISCOSITY LB/IN/FT-HR	TEMP °F
13						
14						
15						
16						
17						
18						
19	FINISHED MIX					
20	SOLIDS IN FINISHED MIX					
21	☐ VESSEL DATA			☐ MANUFACTURER'S DATA		
22	LOCATION	POSITION		TYPE		
23	MATERIAL	<u>C.S.</u>		AGITATOR RPM		
24	DIAMETER	<u>12</u> FT <u>0</u> IN	T/T	<u>15</u> FT <u>0</u> IN	BRAKE H P	
25	CAPACITY			IMPELLERS: TYPE		
26	PRESSURE: OPERATING	<u>0</u> PSIG	DESIGN	DIA. IN.		
27	TEMPERATURE: OPERATING		F: DESIGN	NO. REQ'D.		
28	HEADS: TOP		FT: BOTTOM	SPACING		
29	OBSTRUCTION IN TANK			SHAFT: DIA. IN.		
30				EXTENSION		
31				COUPLING		
32				FLANGE: SIZE		
33				RATING		
34				FACING		
35				STEADY BEARING		
36				BAFFLES: SIZE		
37				NO. REQ'D.		
38				TYPE		
39						
40						
41						
42						
43						
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46						
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49	REMARKS:					
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55	PREPARED BY	REVISION		REVISION		REVISION
56	DATE	BY		DATE		BY
57	APPROVED BY	DATE		DATE		DATE
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**AGITATOR
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. A-17352
NO. REQUIRED ONE
SHEET 1 OF 1

1	CLIENT	ICRC				
2	PROJECT	6000 TPD SRC-1 DEMONSTRATION PLANT PLANT LOCATION NEWMAN, KENTUCKY				
3	SERVICE	PH ADJUSTMENT TANK AGITATOR				
4	VENDOR	P.O. NO.				
5	TYPE	MODEL			SERIAL NO.	
6	PROCESS DATA					
7	FUNCTION OF AGITATION	TEMPERATURE, °F			PRESSURE, PSIG	
8	☐ SUSPEND SOLIDS	☒ BLEND LIQUIDS	☐ GAS DISPERSION	GAS VELOCITY FT/SEC:		
9	☐ EMULSIFICATION	☐ DISSOLUTION	☐ OTHER	FOAMING ☐ YES ☐ NO		
10	TYPE OF AGITATION	☐ VIGOROUS	☐ MODERATE	☐ MILD		
11	MATERIALS TO BE MIXED					
12	STREAM	VOLUME %	WEIGHT %	SPECIFIC GRAVITY	VISCOSITY LB/IN/FT-HR	TEMP °F
13						
14						
15						
16						
17						
18						
19	FINISHED MIX					
20	SOLIDS IN FINISHED MIX					
21	☐ VESSEL DATA			☐ MANUFACTURER'S DATA		
22	LOCATION	POSITION		TYPE		
23	MATERIAL	C.S. EPOXY LINED		AGITATOR RPM		
24	DIAMETER	1 FT 7 IN	T/T 20 FT 7 IN	BRAKE H P		
25	CAPACITY			IMPELLERS: TYPE		
26	PRESSURE: OPERATING	PSIG: DESIGN		DIA. IN.		
27	TEMPERATURE: OPERATING	°F: DESIGN		NO. REQ'D.		
28	HEADS: TOP	FT: BOTTOM		SPACING		
29	OBSTRUCTION IN TANK			SHAFT: DIA. IN.		
30				EXTENSION		
31				COUPLING		
32				FLANGE: SIZE		
33				RATING		
34				FACING		
35				STEADY BEARING		
36				BAFFLES: SIZE		
37				NO. REQ'D.		
38				TYPE		
39						
40						
41						
42						
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49	REMARKS:					
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54						
55	PREPARED BY	13 shok				
56	DATE	2/27/84				
57	APPROVED BY					
58	DATE					

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SODA ASH STORAGE
AIR LOCK

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548EQUIPMENT NO. AL-17351NO. REQUIRED ONESHEET 1 OF 2

CAPACITY : 5 T/HR.

DIAMETER

RPM : 5

HP : 1

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**STORAGE TANK
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. BH-17351
NO. REQUIRED ONE
SHEET 1 OF 1

1	CLIENT	<u>ICRC</u>						
2	PROJECT	<u>6000 TPD SRC-1 DEMONSTRATION PLANT PLANT LOCATION NEWMAN, KENTUCKY</u>						
3	SERVICE	<u>SODA ASH STORAGE SILO</u>						
4	VENDOR	P.O. NO.						
5	DIAMETER	<u>20'</u>	HEIGHT	<u>85'</u> FT.				
6	CAPACITY: NORMAL	<u>500 T.</u>	GAL	SHELL THICK. IN.				
7	NET WORKING		GAL	ROOF THICK. IN.				
8	OPERATING CONDITIONS			BOTTOM THICK. IN.				
9	SPECIFIC GRAVITY, LIO		AT TEMP	°F STRUCTURALS				
10	PUMPING RATES: IN		OUT	GPM NOZZLE: NECK FLANGE				
11	VAPOR PRESS		IN. WATER	COUPLINGS				
12	MAX. OPER. TEMP.		°F	INTERNALS: FIXED				
13	DESIGN CONDITIONS			REMOVABLE				
14	CODE: API		APPENDIX	GASKETS				
15	DESIGN METAL TEMP		°F	BOLTING				
16	DESIGN PRESS		IN. WATER	EST. ERECTION WT (LB)				
17	CORROSION ALLOW: SHELL		ROOF	IN. NOZZLES				
18	BOTTOM		INTERNALS	IN. COUPLING RATING				
19	ROOF TYPE			MARK NO. NO. REQ'D. SIZE IN. FACING SERVICE				
20	ROOF LIVE LOADS		PSF	N-1				INLET
21	WIND PRESS		PSF	N-2				OUTLET
22	EARTHQUAKE: CODE		ZONE	N-3				DRAIN
23	FOUNDATION TYPE			N-4				RELIEF/VENT
24	RADIOGRAPHY: EXTENT			N-5				
25	STRESS RELIEF: YES/NO		EXTENT	N-6				
26	INSULATION: YES/NO		THICK:	IN. N-7				
27	LEAK TESTING: BOTTOM		SHELL	ROOF				
28	MILL TEST REPORTS: YES/NO			M-1				MAN WAY
29	PAINTING YES/NO SPEC:

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55	PREPARED BY		REVISION	△		REVISION	△		REVISION	△	
56	DATE		BY	DATE		BY	DATE		BY	DATE	
57	APPROVED BY		APP'D	DATE		APP'D	DATE		APP'D	DATE	
58	DATE		APP'D	DATE		APP'D	DATE		APP'D	DATE

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LIME SOFTENER/CLARIFIER
(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548
EQUIPMENT NO. CL-17351 A & B
NO. REQUIRED TWO
SHEET 1 OF 1

A LIME SOFTENER/CLARIFIER SHALL BE PROVIDED THAT IS 30 FEET
IN DIAMETER WITH A SIDE WALL DEPTH OF 12 FEET. THE CLARIFIER
TANK SHALL BE OF S. STEEL. THE CLARIFIER SHALL BE FURNISHED
COMPLETE WITH SCUM RAKE AND TROUGH EFFLUENT WIER AND
TROUGH, SLUDGE RAKE ARM(S) INTERNAL PIPING, WIRING, AND
INSTRUMENTATION. AN ACCESS PLATFORM AND BRIDGE SHALL ALSO
BE PROVIDED.

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**SCREW CONVEYOR
DATA SHEET**
PAGE 1 OF 3

CONTRACT NO. 21-2548
EQUIPMENT NO. CV-17351
NO. REQUIRED ONE
SHEET 1 OF 1

1 CLIENT ICRC
2 PROJECT 6000 TPD SRC-1 DEMONSTRATION PLANT PLANT LOCATION NEWMAN, KENTUCKY
3 SERVICE SODA ASH FEED CONVEYOR
4 VENDOR _____ P.O. NO. _____

5 APPLICABLE SPECIFICATIONS AND CODES
6 _____
7 _____
8 _____
9 _____

PURCHASER'S DATA

MATERIAL TO BE HANDLED		OPERATING CONDITIONS	
12 MATERIAL <u>SODA ASH</u>		CAPACITY NORMAL <u>3.0</u> TPH	
		DESIGN _____ TPH	
14 PHYSICAL PROPERTIES		OPERATION: ☐ CONTINUOUS	
15 BULK DENSITY _____ LB/FT ³		☐ INTERMITTENT _____ HR/DAY	
16 ANGLE OF REPOSE _____ °		LOCATION: ☐ OUTDOOR	
17 MOISTURE CONTENT _____ %		☐ INDOOR	
18 CHARACTERISTICS: ☐ STICKY ☐ TOXIC		AMBIENT TEMPERATURE RANGE _____ / _____ °F	
19 ☐ ABRASIVE ☐ CORROSIVE ☐ EXPLOSIVE		DISTANCE TO BE CONVEYED: _____ FT _____ IN.	
20 ☐ HYGROSCOPIC ☐ DEGRADABLE		☐ OR SEE SKETCH	
21 ☐ FLUIDIZING ☐ OTHER _____		ELECT. AREA CLASS. _____ GROUP _____ DIV _____	
22		CONVEYOR LOADING:	
23 PARTICLE SIZE DISTRIBUTION *		☐ FROM REGULATED FEEDING DEVICE	
24 SIZE _____ %		☐ FROM STATIC STORAGE	
25		NUMBER OF LOADING INLETS	
26		☐ SINGLE ☐ MULTIPLE _____ (NUMBER)	
27		CONVEYOR DISCHARGE:	
28		☐ STANDARD DISCHARGE SPOUT	
29 MAX. SIZE LUMPS _____ IN		☐ MECHANICALLY OPERATED GATE	
30 % OF MAX LUMPS _____		☐ OTHER	
31 MATERIAL TEMPERATURE _____ °F		NUMBER OF DISCHARGE:	
32 OTHERS _____		☐ SINGLE ☐ MULTIPLE _____ (NUMBER)	
33		OTHERS	
34 *ATTACH PARTICLE SIZE DISTRIBUTION GRAPH			
35			

VENDORS DATA

(VENDOR TO COMPLETE ALL DATA BELOW UNLESS OTHERWISE FILLED BY PURCHASER)

EQUIPMENT DATA		OTHERS	
39 TYPE OF CONVEYOR:			
40 ☐ HORIZONTAL ☐ VERTICAL ☐ INCLINED			
41 MFG'S MODEL NO. _____			
42 SIZE: DIAMETER _____ IN., LENGTH _____ FT _____ IN.			
43 OPERATING SPEED AT DESIGNED CAP. _____			
44 % LOADING OF TROUGH VOLUME _____			
45 MOTOR DATA (SEE ATTACHED SHEET)			
46 POWER REQUIRED AT DESIGNED CAPACITY _____ HP			
47 RECOMMENDED MOTOR <u>15</u> HP			
48			
49			
50			
51			
52			
53			
54			

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57 APPROVED BY	BY	BY	BY
58 DATE	DATE	DATE	DATE
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	DATE	DATE	DATE

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**DUST COLLECTOR
DATA SHEET**

CONTRACT NO. 21-2848
EQUIPMENT NO. DC-17351
NO. REQUIRED ONE
SHEET 1 OF 1

1	CLIENT	<u>ICRC</u>		
2	PROJECT	<u>6000 TPD SRC-1 DEMONSTRATION PLANT</u>		PLANT LOCATION <u>NEWMAN KENTUCKY</u>
3	SERVICE	<u>SODA ASH STORAGE DUST COLLECTOR</u>		
4	VENDOR	P.O. NO.		
5	SERVICE CONDITIONS	☐ INDOOR ☐ OUTDOOR ☐ CONTINUOUS ☐ INTERMITTENT		
6	PROCESS			
8	FLOW MEDIUM	DUST MATERIAL		
9	VOLUME (CFM)	INLET TEMP.	°F	
10	MOISTURE %	DUST PARTICLE DISTRIBUTION % BY WEIGHT AS FOLLOWS.		
11	DUST LOADING (GRAMS/FT ³)	— MICRON %		
12	DUST QUANTITY (LB/HR)	— MICRON %		
13	APPARENT DENSITY	TRUE DENSITY	— MICRON %	
14	ABRASIVENESS	— MICRON %		
15	DESIGN PRESSURE (INCHES WATER)	— MICRON %		
16	PRESSURE DROP (INCHES WATER) ALLOW	ACTUAL	— MICRON %	
17	INDEX OF EXPLOSIBILITY			
18	MINIMUM EXPLOSIVE CONCENTRATION			
19	LIMITING OXYGEN CONCENTRATION	COLLECTING EFFICIENCY	% BY WEIGHT	
20	MECHANICAL			
22	MANUFACTURER	MODEL OR TYPE	SIZE	
23	FILTER HOUSING	MATERIAL	GAGE	NO OF COMPARTMENTS
24	ACCESS DOOR SIZE	ASSEMBLY	☐ ALL WELDED ☒ BOLTED PANELS ☐ UNITIZED COMPARTMENTS	
25	FILTER CLOTH	MATERIAL	WEAVE	
26	TUBULAR	DIAMETER	OTHER	AIR PERMEABILITY (FRAZIER)
27	CLEANED BY	REVERSE AIR FLOW	CFM	☐ MECHANICAL SHAKERS ☒ OTHERS
28	TOTAL FILTER AREA	GROSS	SQ FT	NET
29	PLENUM CHAMBER	MATERIAL	INLET SIZE	EXPLOSION DOORS
30	DUST HOPPER(S)	MATERIAL	GAGE	SQ FT PER COMPARTMENT
31	MIN 1/2 HP COMPARTMENTS PER HOPPER	VOLUME	SHAPE ☐ INVERTED CONE ☒ INVERTED PYRAMID	ANGLE OF SLOPE SHEET
32	MINIMUM VALVE ANGLE	ACCESS DOOR SIZE	SIZE OF DISCHARGE CONNECTION	FLANGED OTHER
33	DUST DISCHARGE VALVE TYPE	FURNISHED BY	HAPPERS	☐ REQUIRED ☒ NOT REQUIRED
34	GAS DISCHARGE CONNECTION			
35	HIGH LEVEL INDICATOR			
36	NUMBER OF BAGS	BAG DIMENSION		
37	INSULATION	☐ REQUIRED ☒ NOT REQUIRED	FOR SPECIAL REQUIREMENTS SEE REMARKS	
38	FAN	FURNISHED BY	WITH COLLECTOR ☒ SEE FAN DATA SHEET ATTACHED	TYPE OF HOUSING
39	ACCESS PLATFORMS	☐ REQUIRED ☒ NOT REQUIRED	FURNISHED BY	FOR SPECIAL REQUIREMENTS SEE REMARKS
40	STRUCTURAL SUPPORTS	☐ REQUIRED ☒ NOT REQUIRED	FURNISHED BY	CO DWG NO
41	PAINTING	NOT REQUIRED	☒ SHOP COAT	☐ OTHER (SEE REMARKS)
42	ELECTRICAL			
44	AREA CLASS	GROUP	DIV	
45	REMARKS <u>1.5 HP motor</u>			
46				
47				
48				
49				
50				
51				
52				
53				
54				
55	PREPARED BY	Rev. 5-25-84		
56	DATE	REVISION <u>△</u>	REVISION <u>△</u>	REVISION <u>△</u>
57	APPROVED BY	BY	DATE	BY
58	DATE	APP'D	DATE	APP'D

Rust
International Corporation

**POSITIVE DISPLACEMENT
PUMP DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. P-17351 A & B
NO. REQUIRED TWO
SHEET 1 OF 1

1 CLIENT <u>ICRC</u>	
2 PROJECT <u>6000 TPD SRC-1 DEMONSTRATION PLANT</u> PLANT LOCATION <u>NEWMAN, KENTUCKY</u>	
3 SERVICE <u>POLYMER METERING PUMPS</u>	
4 VENDOR _____ P.O. NO. _____	
5 MODEL _____ SERIAL NO. _____	
6 PUMP TYPE ☐ PISTON ☐ PLUNGER ☒ METERING ☐ DIAPHRAGM ☐	
7 ☐ ROTARY ☐ GEAR ☐ SCREW ☐ DIRECT ACTING	
8 DRIVERS ☐ NO MOTORS ☐ ITEM NO _____ NO. TURBINE _____ ITEM NO _____	
9 NOTE: ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER	
10 ☐ OPERATING CONDITIONS (EACH PUMP) ☐ MANUFACTURER'S DATA	
11 LIQUID <u>Polymer Solution</u> SP GR @ PT <u>1.0</u>	
12 PUMPING TEMP <u>F 60</u> NORM <u>100</u> MAX. _____	
13 VISCOSITY @ PT <u>1.0</u> MIN _____ NORM _____ MAX _____	
14 VAP PRESS @ PT <u>PSIA</u> NPSH AVAIL <u>FT</u>	
15 HATED CAPACITY <u>1</u> GPM _____ GPH _____	
16 DISCH PRESS <u>PSIG</u> <u>13</u> NORMAL <u>13</u> MAX. _____	
17 SUCTION PRESS <u>PSIG</u> <u>0</u>	
18 CORR EROS CAUSED BY _____	
19 MATERIALS	
20 CASING/BODY <u>CS/CI/PLASTIC</u> LINER _____	
21 HEAD _____ DIAPHRAGM _____	
22 PISTON/PLUNGER <u>C.S</u> ROTOR _____	
23 VALVE BALL/CONE _____ VALVE SEATS _____	
24 VALVE BODY _____ VALVE SPRINGS _____	
25 SHAFT _____ PISTON ROD _____	
26 GLAND _____ LANTERN RING _____	
27 BEARINGS: TYPE _____ ☐ INT. ☐ EXT	
28 LUBRICATION	
29 ☐ PACKING ☐ MECH. SEAL	
30 PACKING MAT'L _____ NO RINGS/SIZE _____	
31 SEAL MFR _____ MODEL/SIZE _____	
32 SEAL MATERIAL CODE _____	
33 ☐ SELF FLUSHED ☐ EXT FLUSHED	
34 ☐ MECH LUBRICATOR DRIVEN BY ☐ MOTOR ☐ SHAFT	
35 ☐ CAPACITY CONTROL	
36 CAPACITY RANGE (USGPM) (USGPH) _____ MIN _____ MAX.	
37 ☐ EXTERNAL BYPASS ☐ SPEED VARIATION	
38 ☐ STROKE ADJUSTMENT	
39 ☐ MANUAL CONTROL ☐ REMOTE CONTROL	
40 CONTROL SIGNAL RANGE _____ TO _____ (PSIG) (MA)	
41 ACCURACY % _____	
42 ☐ INSPECTION AND TESTS	
43 _____ REQ'D. _____ WITNESSED _____	
44 SHOP INSPECTION ☐	
45 HYDROSTATIC ☐	
46 RUNNING ☐	
47 PERFORMANCE ☐	
48 ☐ SITE CONDITIONS	
49 ELEVATION _____ FT	
50 AMB TEMP <u>F</u> _____ MAX _____ MIN.	
51 APPLICABLE SPECIFICATIONS _____	
52	
53 REMARKS: _____	
54	
55 PREPARED BY <u>15 Shoh</u> _____	
56 DATE <u>2/29/84</u> _____	
57 APPROVED BY _____	
58 DATE _____	

REVISION <u>△</u>		REVISION <u>△</u>		REVISION <u>△</u>	
BY _____	DATE _____	BY _____	DATE _____	BY _____	DATE _____
APP'D _____	DATE _____	APP'D _____	DATE _____	APP'D _____	DATE _____

Rust
International Corporation

**CENTRIFUGAL PUMP
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. F-11552 A.R.C
NO. REQUIRED THREE
SHEET 1 OF 1

1 CLIENT ICRC
2 PROJECT 6000 TPD SRC-1 DEMONSTRATION PLANT PLANT LOCATION NEWMAN, KENTUCKY
3 SERVICE LIME SOFTENER SLUDGE PUMP

4 VENDOR _____ P.O. NO. _____

5 TYPE _____ MODEL _____ SERIAL NO. _____

6 NO. OF MOTORS REQ'D _____ ITEM NO. _____ FURN. BY _____ MFR BY _____

7 NO. OF TURBINES REQ'D _____ ITEM NO. _____ FURN BY _____ MFR BY _____

8 NOTE ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER

9 ☐ OPERATING CONDITIONS (EACH PUMP) ☐ PERFORMANCE

10 LIQUID SLUDGE US GPM AT PT. NOR 250 RATED _____

11 _____ DISCHARGE PSIG _____ PROPOSAL CURVE NO. _____

12 PT. F. NOR 60 MAX. 100 SUCTION PSIG MAX 5 RATED _____ RPM 720 NO OF STAGES _____

13 SP. GR. AT PT. 1.05 DIFF. PRESS. PSI _____ NPSHR. FT. 9 IMPELLER _____ T.O.F. _____

14 VAP. PRESS. AT PT. PSIA _____ DIFF. HEAD. FT. 60 EFF. _____ BHP RATED _____

15 VIS. AT PT. LB(M)/FT.-HR. _____ NPSHA FT. _____ MAX BHP RATED IMP. _____

16 CORROSION CAUSED BY _____ MIN. CONTINUOUS GPM _____

17 _____ ROTATION (VIEWED FROM CPLG. END) _____

18 _____ ☐ INSPECTION AND TESTS

19 NOZZLES _____ SIZE (IN.) _____ RATING _____ FACING _____ LOCATION _____

20 SUCCTION _____ SHOP INSPECTION ☐ REQ'D ☐ WITNESS

21 DISCHARGE _____ HYDROSTATIC TEST ☐ REQ'D ☐ WITNESS

22 CASE MT. ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE) _____ PERFORMANCE TEST ☐ REQ'D ☐ WITNESS

23 SPLIT ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER NPSH TEST ☐ REQ'D ☐ WITNESS

24 PRESS ☐ MAX. ALLOW. _____ PSIG _____ °F. ☐ HYDRO TEST _____ PSIG INT. INSP. AFTER _____

25 CONNECT ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET TEST ☐ REQ'D ☐ WITNESS

26 IMPELLER DIA. ☐ RATED _____ ☐ MAX. _____ ☐ TYPE _____ ☐ INT. WEAR PARTS

27 MOUNT ☐ BETWEEN BRGS. ☐ OVERHUNG WEAR RINGS ☐ CASE ☐ IMP

28 BEARINGS TYPE ☐ RADIAL _____ ☐ THRUST _____ DIA. _____ IN. CLEARANCE _____ IN.

29 LUBE ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE INTERSTAGE BUSHINGS: _____

30 COUPLING ☐ MFR _____ ☐ MODEL _____ DIA. _____ IN. CLEARANCE _____ IN.

31 DRIVER HALF MTD BY: ☐ PUMP MFR ☐ DRIVER MFR

32 ☐ MECH. SEAL ☐ PACKING ☐ AUX. SEAL/PACKING

33 MFR TYPE MODEL _____

34 MFR CODE _____ API CODE _____

35 _____ VERTICAL PUMPS

36 ☐ C.W. PIPE PLAN ☐ C.W. ☐ S.S. ☐ TUBING ☐ PIPE

37 ☐ TOTAL COOLING WATER REQ'D GPM _____ ☐ SIGHT F.I. REQ'D _____

38 ☐ PACKING COOL. INJECTION REQ'D ☐ TOTAL GPM _____ ☐ PSIG _____

39 ☐ SEAL FLUSH PIPE PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE

40 ☐ EXTERNAL SEAL FLUSH FLUID _____ ☐ GPM _____ ☐ PSIG _____

41 ☐ AUXILIARY SEAL PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE

42 ☐ AUX. SEAL FLUSH/QUENCH FLUID _____

43 _____ PUMP THRUST. LB ☐ UP _____ ☐ DOWN _____

44 _____ MOUNTING PLATE REQ'D ☐ _____

45 _____ ☐ WEIGHTS AND DIMENSIONS

46 ☐ PUMP CASE/TRIM API CLASS _____

47 CASING C.S. CORR. ALL _____ IN. APPROX. WT. PUMP & BASE _____ LB

48 IMPELLER SS 316 WEAR RINGS _____ MOTOR _____ LB TURBINE _____ LB

49 SHAFT SS 316 SLEEVE(S) _____ BASE PLATE DIMENSIONS _____

50 CASE INT. COATING/LINING _____ GLAND _____

51 ☐ BASEPLATE _____ DRIP PAN _____

52 ☐ SITE CONDITIONS

53 ELEVATION FT. _____ DUST/FUMES _____

54 AMB. TEMP. F. _____ MAX. _____ MIN. _____ AREA ELECT. CL. _____ GR. _____ DIV. _____

55 COOLING WATER SUPPLY _____ PSIG _____ F. RETURN: _____ PSIG _____ °F.

56 REMARKS: MOTOR: 10 HP

Rev. 5-25-84

57 PREPARED BY _____

58 DATE _____

REVISION ☐

REVISION ☐

REVISION ☐

59 APPROVED BY _____ BY _____ DATE _____

60 DATE _____ APP'D _____ DATE _____

Rust

International Corporation

**CENTRIFUGAL PUMP
DATA SHEET**CONTRACT NO. 21-2545
EQUIPMENT NO. P-17353 AGR
NO. REQUIRED TWO
SHEET 1 OF 1

1	CLIENT	<u>TCRC</u>				
2	PROJECT	<u>6000 TPD SRC-1 DEMONSTRATION PLANT</u>		PLANT LOCATION <u>NEWMAN, KENTUCKY</u>		
3	SERVICE	<u>DEGASIFIER EFFLUENT PUMP</u>				
4	VENDOR	P.O. NO.				
5	TYPE	MODEL		SERIAL NO.		
6	NO. OF MOTORS REQ'D	ITEM NO.		FURN. BY	MFR BY	
7	NO. OF TURBINES REQ'D	ITEM NO.		FURN BY	MFR BY	
8	NOTE	☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER				
9	☐ OPERATING CONDITIONS (EACH PUMP)		☐ PERFORMANCE			
10	LIQUID	<u>WATER</u>		US GPM AT PT. NOR <u>2150</u> RATED		
11		DISCHARGE		PROPOSAL CURVE NO.		
12	PT. F. NOR	<u>60</u>	MAX. <u>100</u>	SUCTION. PSIG. MAX. <u>5</u>	RATED	
13	SP. GR. AT PT.	<u>1.0</u>	DIFF. PRESS. PSI		RPM <u>1,800</u> NO. OF STAGES	
14	VAP. PRESS. AT PT.	PSIA	DIFF. HEAD. FT. <u>150</u>		NPSHR. FT. & IMPELLER TO F	
15	VIS. AT PT.	LB/M/FT-HR	NPSHA. FT.		EFF. BHP RATED	
16	CORR./EROS. CAUSED BY			MAX. BHP RATED IMP.		
17	CONSTRUCTION		MIN. CONTINUOUS GPM			
18	NOZZLES	SIZE (IN.)	RATING	FACING	ROTATION (VIEWED FROM CPLG. END)	
19	SUCTION				☐ INSPECTION AND TESTS	
20	DISCHARGE				SHOP INSPECTION ☐ REQ'D	
21	CASE MT.	☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE)		HYDROSTATIC TEST ☐ REQ'D ☐ WITNESS		
22	SPLIT	☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER		PERFORMANCE TEST ☐ REQ'D ☐ WITNESS		
23	PRESS.	☐ MAX. ALLOW. PSIG <u>5</u> ☐ F. ☐ HYDRO TEST PSIG		NPSH TEST ☐ REQ'D ☐ WITNESS		
24	CONNECT.	☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET		INT. INSP. AFTER TEST ☐ REQ'D ☐ WITNESS		
25	IMPELLER DIA.	☐ RATED ☐ MAX. ☐ TYPE				
26	MOUNT	☐ BETWEEN BRGS ☐ OVERHUNG		☐ INT. WEAR PARTS		
27	BEARINGS TYPE	☐ RADIAL ☐ THRUST		WEAR RINGS ☐ CASE ☐ IMP		
28	LUBE	☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE		DIA. IN. CLEARANCE IN		
29	COUPLING	☐ MFR ☐ MODEL		INTERSTAGE BUSHINGS		
30	DRIVER HALF MTD BY	☐ PUMP MFR ☐ DRIVER MFR		DIA. IN. CLEARANCE IN		
31	☐ MECH. SEAL ☐ PACKING ☐ AUX. SEAL/PACKING			VERTICAL PUMPS		
32	MFR TYPE MODEL			PIT OR SUMP DEPTH ☐		
33	MFR CODE	API CODE		PUMP LENGTH ☐		
34	AUXILIARY PIPING		MIN. SUBMERGENCE REQ'D. ☐			
35	☐ C.W. PIPE PLAN ☐ Cu. ☐ SS. ☐ TUBING ☐ PIPE		COLUMN PIPE ☐ FLANGED ☐ THREADED			
36	TOTAL COOLING WATER REQ'D GPM		SIGHT F.I. REQ'D.			
37	☐ PACKING COOL. INJECTION REQ'D ☐ TOTAL GPM		LINE SHAFT: ☐ OPEN ☐ ENCLOSED			
38	☐ SEAL FLUSH PIPE PLAN ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE		BRGS. ☐ BOWL ☐ LINE SHAFT			
39	☐ EXTERNAL SEAL FLUSH FLUID ☐ GPM ☐ PSIG		BRG. LUB. ☐ WATER ☐ OIL ☐ GREASE			
40	☐ AUXILIARY SEAL PLAN ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE		FLOAT & ROD ☐ C.S. ☐ S.S. ☐ BRZ. ☐ NONE			
41	☐ AUX. SEAL FLUSH/QUENCH FLUID		FLOAT SWITCH ☐			
42	MATERIALS		PUMP THRUST. LB. ☐ UP ☐ DOWN			
43	☐ PUMP CASE/TRIM API CLASS		MOUNTING PLATE REQ'D ☐			
44	CASING	<u>C.S.</u>	CORR. ALL	☐ WEIGHTS AND DIMENSIONS		
45	IMPELLER	<u>SS 316</u>	WEAR RINGS	APPROX. WT. PUMP & BASE <u>LB</u>		
46	SHAFT	<u>C.S.</u>	SLEEVE(S) <u>SS 316</u>	MOTOR <u>LB</u> TURBINE <u>LB</u>		
47	CASE INT. COATING/LINING	GLAND		BASE PLATE DIMENSIONS		
48	BASEPLATE	DRIP PAN		APPLICABLE SPECIFICATIONS		
49	☐ SITE CONDITIONS		☐ API 610 ☐ ANSI B73.1. B73.2			
50	ELEVATION FT.	DUST/FUMES		☐ PROJECT SPECIFICATIONS		
51	AMB. TEMP. F.	MAX.	MIN.	AREA ELECT. CL.	GR. DIV.	
52	COOLING WATER SUPPLY	PSIG		°F. RETURN: PSIG		°F.
53	REMARKS:	<u>MOTOR: 150 HP</u>				
54						Rev. 5-25-84
55	PREPARED BY	REVISION ☐		REVISION ☐		REVISION ☐
56	DATE	DATE		DATE		DATE
57	APPROVED BY	BY DATE		BY DATE		BY DATE
58	DATE	APP'D DATE		APP'D DATE		APP'D DATE

Rust
International Corporation

**STORAGE TANK
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. TK-17351
NO. REQUIRED ONE
SHEET 1 OF 1

1	CLIENT	<u>ICRC</u>			
2	PROJECT	<u>6000 TPD SRC-1 DEMONSTRATION PLANT</u>		PLANT LOCATION <u>NEWMAN, KENTUCKY</u>	
3	SERVICE	<u>FLASH MIX TANK</u>			
4	VENDOR	P.O. NO.			
5	DIAMETER	<u>12 FT</u>	HEIGHT	<u>15</u>	FT.
6	CAPACITY: NORMAL			GAL	SHELL <u>C.S.</u> THICK. <u>IN.</u>
7	NET WORKING			GAL	ROOF <u>THICK.</u> <u>IN.</u>
8	OPERATING CONDITIONS			BOTTOM <u>C.S.</u> THICK. <u>IN.</u>	
9	SPECIFIC GRAVITY: LIQ	<u>1.0</u>	AT TEMP	<u>50 °F</u>	STRUCTURALS
10	PUMPING RATES: IN		OUT	GPM	NOZZLE: NECK FLANGE
11	VAPOR PRESS			IN. WATER	COUPLINGS
12	MAX. OPER. TEMP.			<u>100 °F</u>	INTERNALS: FIXED
13	DESIGN CONDITIONS			REMOVABLE	
14	CODE: API	APPENDIX		GASKETS	
15	DESIGN METAL TEMP			°F	BOLTING
16	DESIGN PRESS			IN. WATER	EST. CRECTION WT (LB)
17	CORROSION ALLOW: SHELL	ROOF	IN.	NOZZLES	
18	BOTTOM	INTERNALS	IN.	FLANGE RATING	COUPLING RATING
19	ROOF TYPE			MARK NO.	NO. REQ'D.
20	ROOF LIVE LOADS	PSF		SIZE IN	FACING
21	WIND PRESS	PSF		N-1	INLET
22	EARTHQUAKE CODE	ZONE		N-2	OUTLET
23	FOUNDATION TYPE			N-3	DRAIN
24	RADIOGRAPHY: EXTENT			N-4	RELIEF/VENT
25	STRESS RELIEF: YES/NO	EXTENT		N-5	
26	INSULATION: YES/NO	THICK: IN.		N-6	
27	LEAK TESTING: BOTTOM	SHELL ROOF		N-7	
28	MILL TEST REPORTS: YES/NO			M-1	MAN WAY
29	PAINTING: YES/NO SPEC:				

30 SKETCH

Rev. 5-25-84

55	PREPARED BY /	REVISION <u>△</u>		REVISION <u>△</u>		REVISION <u>△</u>	
56	DATE						
57	APPROVED BY	BY	DATE	BY	DATE	BY	DATE
58	DATE	APP'D	DATE	APP'D	DATE	APP'D	DATE

Rust

International Corporation

SPLITTER BOX

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548
EQUIPMENT NO. TK-17352
NO. REQUIRED ONE
SHEET 4 OF 4

CLIENT ICRC

PROJECT 6000 TPD SRC-1 DEMONSTRATION PLANT

PLANT LOCATION NEWMAN, KENTUCKY

SERVICE SPLITTER BOX

VENDOR

P.O. NO.

Size: 5' X 5' X 5' H

Rev. 5-25-84

PREPARED BY

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REVISION

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APPROVED BY

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Rust
International Corporation

**STORAGE TANK
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. TK-17353
NO. REQUIRED ONE
SHEET 1 OF 1

1	CLIENT	<u>ICRC</u>				
2	PROJECT	<u>6000 TPD SRC-1 DEMONSTRATION PLANT</u>			PLANT LOCATION <u>NEWMAN, KENTUCKY</u>	
3	SERVICE	<u>PP ADJUSTMENT TANK</u>				
4	VENDOR	P.O. NO.				
5	DIAMETER	<u>12 FT</u>	HEIGHT	<u>10</u>	FT.	MATERIAL
6	CAPACITY: NORMAL				GAL	<u>SHELL C.S. Epoxy Lined</u> THICK. <u>IN.</u>
7	NET WORKING				GAL	<u>ROOF</u> THICK. <u>IN.</u>
8	OPERATING CONDITIONS				<u>BOTTOM C.S. Epoxy Lined</u> THICK. <u>IN.</u>	
9	SPECIFIC GRAVITY, LIQ	<u>1.0</u>	AT TEMP	<u>60</u>	°F	STRUCTURALS
10	PUMPING RATES: IN		OUT		GPM	NOZZLE: NECK FLANGE
11	VAPOR PRESS		IN. WATER			COUPLINGS
12	MAX. OPER. TEMP				°F	INTERNALS: FIXED
13	DESIGN CONDITIONS				REMOVABLE	
14	CODE: API	APPENDIX			GASKETS	
15	DESIGN METAL TEMP				°F	BOLTING
16	DESIGN PRESS		IN. WATER			EQT. CRECTION WT (LB)
17	CORROSION ALLOW: SHELL		ROOF		IN.	NOZZLES
18	BOTTOM		INTERNALS		IN.	FLANGE RATING
19	ROOF TYPE					COUPLING RATING
20	ROOF LIVE LOADS		PSF			
21	WIND PRESS		PSF			
22	EARTHQUAKE: CODE		ZONE			
23	FOUNDATION TYPE					
24	RADIOGRAPHY: EXTENT					
25	STRESS RELIEF: YES/NO		EXTENT			
26	INSULATION: YES/NO		THICK:		IN.	
27	LEAK TESTING: BOTTOM		SHELL		ROOF	
28	MILL TEST REPORTS: YES/NO					
29	PAINTING: YES/NO SPEC.					

30 SKETCH

Rev. 5-25-84

55	PREPARED BY	REVISION		REVISION		REVISION	
56	DATE						
57	APPROVED BY	BY	DATE	BY	DATE	BY	DATE
58	DATE	APP'D	DATE	APP'D	DATE	APP'D	DATE

Rust
International Corporation

Polymer Feed System

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548

EQUIPMENT NO. X-17-5

NO. REQUIRED

SHEET

OF

1 CLIENT International Coal Refining Company

2 PROJECT 6000 TPSD SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

3 SERVICE Waste Water Treatment

4 VENDOR

P.O. NO.

The polymer feed system shall be complete with the following:

Two tanks of 52" p x 64". Two agitators with 3/4 Hp motor each, two feed pumps with 3/4 Hp DC motor each, one transfer pump with 1-1/2 Hp motor, one solid feeder with 1/2 Hp motor, and one liquid feeder with 3/4 Hp motor.

Rev. 5-25-84

55 PREPARED BY BSY

56 DATE 3-14-84

REVISION

REVISION

REVISION

57 APPROVED BY

BY

DATE

BY

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58 DATE

APP'D

DATE

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Rust

International Corporation

VIBRATOR

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548

EQUIPMENT NO. X-17352

NO. REQUIRED ONE

SHEET 1 OF 1

CLIENT ICRC

PROJECT 6000 TPD SRC-1 DEMONSTRATION PLANT

PLANT LOCATION NEWMAN, KENTUCKY

SERVICE VIBRATOR

VENDOR

P.O. NO.

CAPACITY: 5 T/HR

Rev. 5-25-84

PREPARED BY

DATE

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Rust
International Corporation

**STORAGE TANK
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. X-17353
NO. REQUIRED ONE
SHEET 1 OF 1

1	CLIENT	ICRC						
2	PROJECT	6000 TPD SRC-1 DEMONSTRATION PLANT			PLANT LOCATION	NEWMAN, KENTUCKY		
3	SERVICE	DEGASIFIER						
4	VENDOR					P.O. NO.		
5	DIAMETER	HEIGHT	FT.	MATERIAL				
6	CAPACITY: NORMAL		GAL	SHELL	THICK.	IN.		
7	NET WORKING		GAL	ROOF	THICK.	IN.		
8	OPERATING CONDITIONS			BOTTOM	THICK.	IN.		
9	SPECIFIC GRAVITY: LIQ	AT TEMP	°F	STRUCTURALS				
10	PUMPING RATES: IN	OUT	GPM	NOZZLE: NECK	FLANGE			
11	VAPOR PRESS	IN. WATER		COUPLINGS				
12	MAX. OPER. TEMP.		°F	INTERNALS: FIXED				
13	DESIGN CONDITIONS			REMOVABLE				
14	CODE: API	APPENDIX		GASKETS				
15	DESIGN METAL TEMP		°F	BOLTING				
16	DESIGN PRESS	IN. WATER		EST. ERECTION WT (LB)				
17	CORROSION ALLOW: SHELL	ROOF	IN.	NOZZLES				
18	BOTTOM	INTERNALS	IN.	FLANGE RATING			COUPLING RATING	
19	ROOF TYPE			MARK NO.	NO. REQ'D.	SIZE IN	FACING	SERVICE
20	ROOF LIVE LOADS	PSF		N-1				INLET
21	WIND PRESS	PSF		N-2				OUTLET
22	EARTHQUAKE: CODE	ZONE		N-3				DRAIN
23	FOUNDATION TYPE			N-4				RELIEF/VENT
24	RADIOGRAPHY: EXTENT			N-5				
25	STRESS RELIEF YES/NO	EXTENT		N-6				
26	INSULATION: YES/NO	THICK:	IN.	N-7				
27	LEAK TESTING: BOTTOM	SHELL	ROOF	M-1				MAN WAY
28	MILL TEST REPORTS: YES/NO							
29	PAINTING: YES/NO SPEC:							

30	SKETCH							
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Rev. 5-25-84

55	PREPARED BY	REVISION		REVISION		REVISION	
56	DATE	BY	DATE	BY	DATE	BY	DATE
57	APPROVED BY	BY	DATE	BY	DATE	BY	DATE
58	DATE	APP'D	DATE	APP'D	DATE	APP'D	DATE

Rust

International Corporation

SOLID WASTE CONTAINER

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548

EQUIPMENT NO. BU-17352 A.B.C.D

NO. REQUIRED 4

SHEET 1 OF 1

1 CLIENT International Coal Refining Company

2 PROJECT 6000 T/D SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

3 SERVICE Dewatered Sludge Collection

4 VENDOR P.O. NO.

Four 15 cubic yard capacity solid waste containers shall be supplied.
Each container is made of C.S. and has an open top.

Each container shall be designed to receive dewatered sludge from the
drum filter and to be picked up by a dump truck.

Rev. 5-25-84

55 PREPARED BY CP

56 DATE 3-1-84

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57 APPROVED BY

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International Corporation

SOFTENING SLUDGE
THICKENER

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548
EQUIPMENT NO. CL-17352 A,B
NO. REQUIRED 2
SHEET 1 OF 1

1	CLIENT	International Coal Refining Company	
2	PROJECT	6000 T/D SRC-I Demonstration Plant	PLANT LOCATION Newman, Kentucky
3	SERVICE	Softening Sludge Thickener	
4	VENDOR	P.O. NO.	

A sludge thickener shall be provided that is 8 feet in diameter with a side wall depth of 14 feet. The thickener tank shall be of carbon steel, coal tar epoxy coated inside. The thickener shall be furnished complete with scum rake and trough, effluent wier and trough, sludge rake arm(s), center well, drive mechanism and motor, automatic rise mechanism, all internal piping, wiring and instrumentation. Caged-in rung type ladder shall also be provided. 1/2 HP motor.

Rev. 5-25-84

55	PREPARED BY	CP	REVISION	△	REVISION	△	REVISION	△
56	DATE	3-1-84						
57	APPROVED BY		BY	DATE	BY	DATE	BY	DATE
58	DATE		APP'D	DATE	APP'D	DATE	APP'D	DATE

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International Corporation

**FILTER
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. FL-17351 A,B
NO. REQUIRED 2
SHEET 1 OF 1

1 CLIENT International Coal Refining Company
2 PROJECT 6000 T/D SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Softening Sludge Filtration

4 VENDOR P.O. NO.
5 MODEL SERIAL NO.

6 NOTE: ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER

BASIC DATA

☐ **OPERATING CONDITIONS**

9 RATED FLOW (LB/HR) (GPM) To filter 30 GPM normal, 40 GPM max
10 MOLECULAR WEIGHT From filter 24 GPM normal, 30 GPM max
11 SPECIFIC GRAVITY
12 VISCOSITY (LB-MASS/FT-HR)
13 INLET PRESSURE (PSIG)
14 INLET TEMP. (°F)
15 CORROSIVE CONTAMINANT pH 11
16 SUSPENDED SOLIDS
17 CHARACTERISTICS OF SOLID CaCO₃ - mg (OH)₂ mixture
18 PARTICLE SIZE (AVERAGE)
19 SOLIDS BY WT. (%) 15% for inlet and 60% for coke product

20 MAX. ALLOW. PRESSURE DROP CLEAN (PSI)

21 RETENTION (NOMINAL) %

22 ☐ **FILTER TYPE**

23 NO. OF ELEMENTS

24 TYPE OF ELEMENTS

25 MATERIAL OF ELEMENTS

26 MESH SIZE

27 ☐ **CONSTRUCTION OF FILTER**

28 FILTER DIA. BY LENGTH Rotary Drum Vacuum Filter
29 2 meter diam x 3 meter length

30 POSITION OF FILTER VERT. — HORIZ.

31 EFFECTIVE FILTER SURFACE AREA 203 ft²

32 WEIGHT (LB)

33 ☐ **DESIGN CONDITIONS**

34 DESIGN PRESSURE (PSIG)

35 DESIGN TEMPERATURE (°F)

36 CORROSION ALLOWANCE (IN)

37 MATERIALS—SHELL & HEADS

38 INSULATION—PAINT

39 ☐ ASME CODE DESIGN ☐ STAMPED

40 CONNECTIONS: QUAN. SIZE RATING-FACE REMARKS

41 ☐ INLET

42 ☐ OUTLET

43 ☐ VENT

44 ☐ DRAIN

45 ☐ RELIEF VALVE

46 ☐ PRESS INDICATOR

47 ☐ LEVEL GAUGE

48 ☐ QUICK OPENING COVER

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Rev. 5-25-84

55 PREPARED BY CP

56 DATE 3-1-84

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57 APPROVED BY

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International Corporation

**CENTRIFUGAL PUMP
DATA SHEET**CONTRACT NO. 21-2548
EQUIPMENT NO. P-17354 A.B
NO. REQUIRED 2
SHEET 1 OF 1

1 CLIENT International Coal Refining Company

2 PROJECT 6000 T/D SRC-I. Demonstration Plant

PLANT LOCATION Newman, Kentucky

3 SERVICE Thickener Overflow Sump Pump

4 VENDOR

P.O. NO.

5 TYPE Centrifugal

MODEL

SERIAL NO.

6 NO. OF MOTORS REQ'D

ITEM NO.

FURN. BY

MFR BY

7 NO OF TURBINES REQ'D

ITEM NO.

FURN BY

MFR BY

8 NOTE ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER☐ BY MANUFACTURER9 ☐ OPERATING CONDITIONS (EACH PUMP)☐ PERFORMANCE10 LIQUID Water US GPM AT PT. NOR 235 RATED 280

PROPOSAL CURVE NO

DISCHARGE PSIG 26

RPM NO OF STAGES

12 PT. F. NOR. 70 MAX SUCTION PSIG MAX 0 RATED

NPSHR FT & IMPELLER T.O.F

13 SP GR AT PT 1.0 DIFF PRESS. PSI 12

EFF BHP RATED

14 VAP PRESS AT PT. PSIA DIFF. HEAD. FT 60

MAX. BHP RATED IMP

15 VIS AT PT. LB(M)/FT-HR NPSHA. FT

MAX. HEAD RATED IMP

16 CORR/EROS CAUSED BY

MIN. CONTINUOUS GPM

ROTATION (VIEWED FROM CPLG END)

CONSTRUCTION

18 NOZZLES SIZE (IN) RATING FACING LOCATION

19 SUCTION

20 DISCHARGE

21 CASE MT ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☒ VERT. (TYPE)22 SPLIT ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER23 PRESS ☐ MAX ALLOW PSIG F. ☐ HYDRO TEST PSIG24 CONNECT ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET25 IMPELLER DIA ☐ RATED ☐ MAX ☐ TYPE26 MOUNT ☐ BETWEEN BRGS ☐ OVERHUNG27 BEARINGS TYPE ☐ RADIAL ☐ THRUST28 LUBE ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE29 COUPLING ☐ MFR ☐ MODEL30 DRIVER HALF MTD BY: ☐ PUMP MFR ☐ DRIVER MFR31 ☐ MECH SEAL ☐ PACKING ☐ AUX. SEAL/PACKING

32 MFR TYPE MODEL

33 MFR CODE API CODE

AUXILIARY PIPING35 ☐ C W PIPE PLAN ☐ Cu: ☐ SS. ☐ TUBING ☐ PIPE36 ☐ TOTAL COOLING WATER REQ'D GPM ☐ SIGHT F.I. REQ'D.37 ☐ PACKING COOL INJECTION REQ'D ☐ TOTAL GPM ☐ PSIG38 ☐ SEAL FLUSH PIPE PLAN ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE39 ☐ EXTERNAL SEAL FLUSH FLUID ☐ GPM ☐ PSIG40 ☐ AUXILIARY SEAL PLAN ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE41 ☐ AUX. SEAL FLUSH/QUENCH FLUID**MATERIALS**43 ☐ PUMP CASE/TRIM API CLASS44 CASING C.S. CORR ALL IN.45 IMPELLER SS 316 WEAR RINGS46 SHAFT SS 316 SLEEVE(S)

47 CASE INT. COATING/LINING GLAND

48 ☐ BASEPLATE ☐ DRIP PAN☐ **SITE CONDITIONS**

50 ELEVATION FT DUST/FUMES

51 AMB TEMP F MAX MIN AREA ELECT. CL GR. DIV.

52 COOLING WATER SUPPLY PSIG °F. RETURN: PSIG °F.

53 REMARKS: 7.5 HP motor

Rev. 5-25-84

55 PREPARED BY CP

56 DATE 3-1-84

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57 APPROVED BY

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International Corporation

**CENTRIFUGAL PUMP
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. P-17355 A,B,C
NO. REQUIRED 3
SHEET 1 OF 1

1 CLIENT International Coal Refining Company
2 PROJECT 6000 T/D SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Thickener Underflow Pump to Filter
4 VENDOR _____ P.O. NO. _____

5 TYPE Centrifugal MODEL _____ SERIAL NO. _____
6 NO. OF MOTORS REQ'D _____ ITEM NO. _____ FURN. BY _____ MFR BY _____
7 NO OF TURBINES REQ'D _____ ITEM NO. _____ FURN BY _____ MFR BY _____

8 NOTE ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER
9 ☐ OPERATING CONDITIONS (EACH PUMP) ☐ PERFORMANCE

10 LIQUID 15% sludge US GPM AT PT. NOR 30 RATED 40
11 _____ DISCHARGE PSIG 36
12 PT. °F. NOR _____ MAX. _____ SUCTION PSIG MAX 85 RATED 15
13 SP. GR. AT PT. 1.06 DIFF. PRESS. PSI 27.5
14 VAP. PRESS. AT PT. PSIA _____ DIFF. HEAD. FT. 60
15 VIS. AT PT. LB(M)/FT-HR _____ NPSHA. FT. _____
16 CORR/EROS. CAUSED BY _____

17 CONSTRUCTION
18 NOZZLES SIZE (IN.) RATING FACING LOCATION
19 SUCTION _____
20 DISCHARGE _____
21 CASE MT. ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE) _____
22 SPLIT. ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER
23 PRESS. ☐ MAX. ALLOW _____ PSIG _____ °F. ☐ HYDRO TEST _____ PSIG
24 CONNECT: ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET
25 IMPELLER DIA: ☐ RATED _____ ☐ MAX. _____ ☐ TYPE _____
26 MOUNT ☐ BETWEEN BRGS ☐ OVERHUNG
27 BEARINGS TYPE: ☐ RADIAL _____ ☐ THRUST _____
28 LUBE: ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE
29 COUPLING ☐ MFR. _____ ☐ MODEL _____
30 DRIVER HALF MTD BY: ☐ PUMP MFR ☐ DRIVER MFR
31 ☐ MECH SEAL ☐ PACKING ☐ AUX. SEAL/PACKING
32 MFR. TYPE. MODEL _____
33 MFR CODE _____ API CODE _____

34 AUXILIARY PIPING
35 ☐ C.W. PIPE PLAN ☐ Cu. ☐ SS: ☐ TUBING: ☐ PIPE
36 ☐ TOTAL COOLING WATER REQ'D. GPM _____ ☐ SIGHT F.I. REQ'D.
37 ☐ PACKING COOL. INJECTION REQ'D. ☐ TOTAL GPM _____ ☐ PSIG
38 ☐ SEAL FLUSH PIPE PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE
39 ☐ EXTERNAL SEAL FLUSH FLUID _____ ☐ GPM _____ ☐ PSIG
40 ☐ AUXILIARY SEAL PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE
41 ☐ AUX. SEAL FLUSH/QUENCH FLUID _____

42 MATERIALS
43 ☐ PUMP: CASE/TRIM API CLASS _____
44 CASING C.S. CORR. ALL. _____ IN.
45 IMPELLER SS 316 WEAR RINGS _____
46 SHAFT SS 316 SLEEVE(S) _____
47 CASE INT. COATING/LINING _____ GLAND _____
48 ☐ BASEPLATE _____ DRIP PAN _____

49 SITE CONDITIONS
50 ELEVATION. FT. _____ DUST/FUMES _____
51 AMB. TEMP. °F. _____ MAX. _____ MIN. _____ AREA ELECT. CL. _____ GR. _____ DIV. _____
52 COOLING WATER SUPPLY _____ PSIG _____ °F. RETURN: _____ PSIG _____ °F

53 REMARKS: motor 2.0 HP

Rev. 5-25-84

55 PREPARED BY	CP	REVISION	△	REVISION	△	REVISION	△
56 DATE	3-1-84						
57 APPROVED BY		BY	DATE	BY	DATE	BY	DATE
58 DATE		APP'D	DATE	APP'D	DATE	APP'D	DATE

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SPLITTER BOX

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548

EQUIPMENT NO. TK-17354

NO. REQUIRED 1

SHEET 1 OF 1

1 CLIENT International Coal Refining Company

2 PROJECT 6000 T/D SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

3 SERVICE Splitter Box to Divide Incoming Stream

4 VENDOR

P.O. NO.

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7 Size of splitter box is 5' x 5' x 5', C.S.
8 Coal tar epoxy coated.
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55 PREPARED BY CP

56 DATE 3-1-84

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57 APPROVED BY

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**THICKENER OVERFLOW
SUMP****(GENERAL EQUIPMENT DATA SHEET)**CONTRACT NO. 21-2548EQUIPMENT NO. TK-17355NO. REQUIRED 1SHEET 1 OF 11 CLIENT International Coal Refining Company2 PROJECT 6000 T/D SRC-I Demonstration PlantPLANT LOCATION Newman, Kentucky3 SERVICE Thickener Overflow Sump

4 VENDOR

P.O. NO.

6' x 9' x 6' high; 4" thick concrete

Rev. 5-25-84

55 PREPARED BY CP56 DATE 3-1-84

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57 APPROVED BY

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58 DATE

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DUMP TRUCK

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548
EQUIPMENT NO. x-17354 A.B.
NO. REQUIRED 2
SHEET 1 OF 1

1 CLIENT International Coal Refining Company

2 PROJECT 6000 T/D SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

3 SERVICE Moving Waste Containers to Landfill

4 VENDOR

P.O. NO.

Container Capacity: 15 Cubic Yard each

Rev. 5-25-84

55 PREPARED BY CP

56 DATE 3-1-84

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57 APPROVED BY

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58 DATE

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VACUUM SYSTEM

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548

EQUIPMENT NO. x-17355

NO. REQUIRED 1

SHEET 1 OF 1

1 CLIENT International Coal Refining Company

2 PROJECT 6000 T/D SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

3 SERVICE Vacuum System for Drum Filter

4 VENDOR

P.O. NO.

The system includes:

- a. a filtrate receiver vessel (200 gal)
- b. a vacuum pump - 60 HP x 5' TDH
- c. a filtrate pump, 30 GPM x 60' TDH, Hp Motor 5 HP

Rev. 5-25-84

55 PREPARED BY CP	REVISION		REVISION		REVISION
56 DATE 3-1-84						
57 APPROVED BY	BY	DATE	BY	DATE	BY	DATE
58 DATE	APP'D	DATE	APP'D	DATE	APP'D	DATE

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STATIC MIXER
(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548
EQUIPMENT NO. A-17501
NO. REQUIRED 1
SHEET 1 OF 1

1 CLIENT International Coal Refining Company
2 PROJECT 6000 TPSD SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Reverse Osmosis System - STATIC MIXER
4 VENDOR P.O. NO.

One in-line static mixer shall be provided to mix 0.2 gpm of a 93 percent sulfuric acid solution and 2,050 gpm of wastewater. The mixer shall be constructed of stainless steel and suitable for installation in a 14 inch line.

5-25-84

55 PREPARED BY BSY	REVISION	REVISION	REVISION
56 DATE 3-6-84	BY DATE	BY DATE	BY DATE
57 APPROVED BY	APP'D DATE	APP'D DATE	APP'D DATE
58 DATE	APP'D DATE	APP'D DATE	APP'D DATE

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**SHELL AND TUBE
EXCHANGER DATA SHEET**

PAGE 1 OF 2

CONTRACT NO. 21-2548

EQUIPMENT NO. E-17501

NO. REQUIRED Ont

SHEET 1 OF 2

1 CLIENT International Coal Refining Company
2 PROJECT 6000 TPSD SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE R.O. Influent Heat Exchanger
4 VENDOR P.O. NO.

PROCESS SPECIFICATIONS

TYPE BEU		ORIENTATION (HORIZONTAL) (VERTICAL) (INCLINED)				
SIZE		CONNECTED IN		PARALLEL		SERIES
SURFACE/UNIT (GROSS) (EFF.)		FT ²	SHELL/UNIT	SURFACE/SHELL (GROSS) (EFF.)		FT ²
PERFORMANCE OF ONE UNIT						
		IN	SHELL SIDE	OUT	IN	TUBE SIDE
						OUT
12	FLUID CIRCULATED		Steam - 75 psig			Water - 40 psig
13	FLUID QUANTITY TOTAL	LB/HR				
14	VAPOR	LB/HR				
15	LIQUID	LB/HR				
16	STEAM	LB/HR	23,000			
17	WATER	LB/HR		23,000	1025,000	1025,000
18	NONCONDENSABLE	LB/HR				
19	TEMPERATURE	°F	320	320	40	60
20	DENSITY VAPOR	LB/FT ³				
21	SPECIFIC GRAVITY LIQUID				1.0	1.0
22	VISCOSITY VAPOR	LB(M)/FT-HR				
23	VISCOSITY LIQUID	LB(M)/FT-HR				
24	MOLECULAR WEIGHT VAPOR					
25	MOL. WT NONCONDENSABLE					
26	THERMAL COND VAPOR	BTU-FT/HR FT ² °F				
27	THERMAL COND LIQUID	BTU-FT/HR FT ² °F				
28	SURFACE TENSION	DYNES/cm				
29	LATENT HEAT	BTU/LB @ °F				
30	SPECIFIC HEAT VAP	BTU/LB °F				
31	SPECIFIC HEAT LIO	BTU/LB °F				
32	DEW POINT	°F				
33	BUBBLE POINT	°F				
34	INLET PRESSURE	PSIA				
35	VELOCITY	FT/SEC				
36	PRESS DROP ALLOW./CALC.	PSI	1		1	
37	FOULING RESISTANCE (MIN)	HR FT ² °F/BTU	0.0005		0.001	
38	HEAT TRANSFER COEFF.	BTU/HR FT ² °F				
39	HEAT EXCHANGED BTU/HR					
40	TRANSFER RATE BTU/HR FT ² °F—SERVICE					
MTD CORRECTED °F						
CLEAN						

SKETCH (BUNDLE/NOZZLE ORIENTATION)

Rev. 5-25-84

PREPARED BY BSY	REVISION	REVISION	REVISION
DATE 3-6-84	△	△	△
APPROVED BY	BY DATE	BY DATE	BY DATE
DATE	APP'D DATE	APP'D DATE	APP'D DATE

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SHELL AND TUBE EXCHANGER DATA SHEET

PAGE 2 OF 2

CONTRACT NO. 21-2548

EQUIPMENT NO. E-17501

NO. REQUIRED 600

SHEET 2 OF 2

MECHANICAL SPECIFICATIONS (1.)

CONSTRUCTION OF ONE SHELL

		SHELL SIDE		TUBE SIDE						
DESIGN/TEST PRESSURE	PSIG	100 1 per C-DC		100 1 per C-DC						
DESIGN TEMPERATURE	F	400		400						
NO. PASSES PER SHELL										
CORROSION ALLOWANCE	IN	1/16" on C.S.		1/16"						
CONNECTIONS SIZE/RATING	IN			14"						
	OUT			14"						
	INTERMEDIATE									
	DRAIN									
	VENT									
TUBES NO	OD	1	IN	ID	IN	BWG	LENGTH	FT	PITCH	IN
LAYOUT ANGLE	30	60	90	45	TYPE	PLAIN	FINNED (2)	TUBE MATERIAL S.S. 304		
SHELL OD	IN	ID	IN	EXPANSION JOINT	YES (2)	NO				
TRANSVERSE BAFFLE	CUT ORIENTATION		HORIZ	VERT	INCL	PCT CUT (DIAM/AREA)				
TYPE	SEGMENTAL		DOUBLE SEGMENTAL		TRIPLE SEGMENTAL		NO. TUBES IN WINDOW			
BAFFLE SPACING	INLET	IN	CENTRAL	IN	OUTLET	IN				
NO CROSS PASSES/SHELL PASS										
BAFFLE MATERIAL	C.S.	FREE AREA	FT	THICKNESS	IN					
METHOD OF FASTENING BAFFLES (2)										
DIAMETRAL CLEARANCES	BAFFLE TO SHELL	IN	BUNDLE TO SHELL	IN	TUBE TO BAFFLE HOLE	IN				
NO PAIRS OF SEAL DEVICES										
LONGITUDINAL BAFFLE	YES (2)	NO	THICKNESS	IN	IMPINGEMENT BAFFLE	YES	NO			
SUPPORTS	TUBE	YES (2)	NO	U-BEND (2)	YES	NO				
TUBE SHEET	C.S.									
STATIONARY	MATERIAL	THICKNESS	IN	CORROSION ALLOWANCE	IN					
FLOATING	MATERIAL	THICKNESS	IN	CORROSION ALLOWANCE	IN					
DOUBLE										
TUBE-TUBE SHEET JOINTS	ROLLED									
SEAL STRENGTH	WELDED									
ITEM	MAT'L	THICKNESS	IN	SHELL NOZZLE INFORMATION		INLET	OUTLET			
SHELL	C.S.			NOZZLE PV: LB/FT-SEC						
SHELL COVER (REM) (INTEG)				BUNDLE PV: LB/FT-SEC						
CHANNEL OR BONNET	C.S.			BAFFLE SPACERS		MAT'L	SIZE			
CHAN COVER (REM) (INTEG)				TIE RODS		MAT'L	SIZE			
FLOATING HEAD COVER				GASKETS (3)		SHELL SIDE	TUBE SIDE			
TUBE SUPPORTS				FLOATING HEAD						
FABRICATED	CAST			ELBOW		CONE				
LIFT LUGS	PAINT									
CODE REQUIREMENTS	ASME SEC VIII DIV 1	STAMP (YES)		TEMA CLASS	C	NAT BOARD (YES) (NO)				
WEIGHT ESTIMATION SHELL	DRY	LBS	FILLED WITH WATER	LBS	BUNDLE	LBS				
EXCHANGER DWG NO										
NOTES	1. PROCESS SPECIFICATIONS ON PAGE 1									
	2. COMPLETE DETAILS REQUIRED									
	PROVIDE COMPLETE DESIGN FOR EACH GASKETED JOINT									
REMARKS	Rev. 5-25-84

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International Corporation

**FILTER
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. FL-17501 A-E
NO. REQUIRED 5
SHEET 1 OF 1

1 CLIENT International Coal Refining Company
2 PROJECT 6000 TPSD SRC-I DEMONSTRATION PLANT PLANT LOCATION Newman, Kentucky
3 SERVICE Micro Filter

4 VENDOR _____ P.O. NO. _____
5 MODEL _____ SERIAL NO. _____

6 NOTE: ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER

BASIC DATA

☐ **OPERATING CONDITIONS**

9 RATED FLOW, (LBS) (GPM) 513
10 MOLECULAR WEIGHT _____
11 SPECIFIC GRAVITY 1.01
12 VISCOSITY (LB-MASS/FT-HR) _____
13 INLET PRESSURE (PSIG) 40
14 INLET TEMP (°F) 550F min, 950F max.
15 CORROSIVE CONTAMINANT Chlorides
16 SUSPENDED SOLIDS 2
17 CHARACTERISTICS OF SOLID biological floc
18 PARTICLE SIZE (AVERAGE) _____
19 SOLIDS BY WT (%) _____
20 MAX. ALLOW. PRESSURE DROP CLEAN (PSI) 13
21 RETENTION (NOMINAL) % 90

☐ **FILTER TYPE**

23 NO. OF ELEMENTS _____
24 TYPE OF ELEMENTS _____
25 MATERIAL OF ELEMENTS _____
26 MESH SIZE _____

☐ **CONSTRUCTION OF FILTER**

28 FILTER DIA. BY LENGTH _____
29 POSITION OF FILTER VERT. — HORIZ. _____
30 EFFECTIVE FILTER SURFACE AREA _____
31 WEIGHT, (LB) _____

☐ **DESIGN CONDITIONS**

33 DESIGN PRESSURE (PSIG) 45
34 DESIGN TEMPERATURE (°F) 55
35 CORROSION ALLOWANCE (IN) _____
36 MATERIALS—SHELL & HEADS C.S.
37 INSULATION—PAINT shopcoat
38 ☒ ASME CODE DESIGN ☒ STAMPED 100 psig

39 CONNECTIONS: QUAN. SIZE RATING-FACE REMARKS

40 ☐ INLET 1 10" _____
41 ☐ OUTLET 1 10" _____
42 ☐ VENT _____
43 ☐ DRAIN _____
44 _____
45 ☐ RELIEF VALVE _____
46 ☐ PRESS. INDICATOR _____
47 ☐ LEVEL GAUGE _____
48 ☐ QUICK OPENING COVER _____

49 Five micron cotton filters shall be completed with replacable membranes
50 and suitable for installation in a 10 inch line.
51 _____
52 _____
53 _____

55 PREPARED BY BSY
56 DATE 3-7-84

REVISION △

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57 APPROVED BY _____ BY _____ DATE _____ BY _____ DATE _____
58 DATE _____ APP'D _____ DATE _____ APP'D _____ DATE _____

Rust
International Corporation

**POSITIVE DISPLACEMENT
PUMP DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. P-17501A/B
NO. REQUIRED TWO
SHEET 1 OF 1

1	CLIENT	International Coal Refining Company		
2	PROJECT	6000 TSPD SRC-I Demonstration Plant		PLANT LOCATION Newman, Kentucky
3	SERVICE	SULFURIC ACID METERING PUMPS		
4	VENDOR	P.O. NO.		
5	MODEL	SERIAL NO.		
6	PUMP TYPE	☐ PISTON ☐ PLUNGER ☒ METERING ☒ DIAPHRAGM ☐		
7		☐ ROTARY ☐ GEAR ☐ SCREW ☐ DIRECT ACTING		
8	DRIVERS	NO MOTORS ☐ ITEM NO. ☐ NO TURBINE ☐ ITEM NO. ☐		
9	NOTE	INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER ☐		
10		☐ OPERATING CONDITIONS (EACH PUMP) ☐ MANUFACTURER'S DATA		
11	LIQUID	Sulfuric Acid SP GR @ P.T. 1.8354		
12	PUMPING TEMP.	F. ☐ NORM. ☐ MAX. ☐		
13	VISCOSITY @ P.T.	LB/M/FT-HR. ☐ MIN. ☐ NORM. ☐ MAX. ☐		
14	VAP PRESS @ P.T.	PSIA ☐ NPSH AVAIL. FT. ☐		
15	RATED CAPACITY	0.2 GPM ☐ GPH ☐		
16	DISCH PRESS	PSIG 40 ☐ NORMAL ☐ MAX. ☐		
17	SUCTION PRESS	PSIG 1 ☐		
18	CORR/EROS CAUSED BY	Sulfuric Acid		
19	MATERIALS			
20	CASING/BODY	Hastelloy C LINER ☐		
21	HEAD	Hastelloy C DIAPHRAGM ☐		
22	PISTON/PLUNGER	Hastelloy C ROTOR ☐		
23	VALVE BALL/CONE	Hastelloy C VALVE SEATS Hastelloy C ☐		
24	VALVE BODY	Hastelloy C VALVE SPRINGS Hastelloy C ☐		
25	SHAFT	Hastelloy C PISTON ROD ☐		
26	GLAND	LANTERN RING ☐		
27	BEARINGS: TYPE	☐ INT. ☒ EXT.		
28	LUBRICATION			
29	☐ PACKING ☐ MECH. SEAL			
30	PACKING MAT'L	NO RINGS/SIZE ☐		
31	SEAL MFR	MODEL/SIZE ☐		
32	SEAL MATERIAL CODE			
33	☐ SELF FLUSHED ☐ EXT. FLUSHED			
34	☐ MECH LUBRICATOR DRIVEN BY ☐ MOTOR ☐ SHAFT			
35	☐ CAPACITY CONTROL			
36	CAPACITY RANGE (USGPM) (SEE P. 1)	0 MIN. 0.2 MAX. ☐		
37	☐ EXTERNAL BYPASS ☐ SPEED VARIATION			
38	☒ STROKE ADJUSTMENT			
39	☐ MANUAL CONTROL ☒ REMOTE CONTROL			
40	CONTROL SIGNAL RANGE	TO (PSIG) (MA) ☐		
41	ACCURACY %			
42	☐ INSPECTION AND TESTS			
43		REQ'D.	WITNESSED	
44	SHOP INSPECTION	☒	☐	
45	HYDROSTATIC	☒	☐	
46	RUNNING	☐	☐	
47	PERFORMANCE	☐	☐	
48	☐ SITE CONDITIONS			
49	ELEVATION	FT. ☐		
50	AMB TEMP	F. ☐ MAX. ☐ MIN. ☐		
51	APPLICABLE SPECIFICATIONS ANSI B73.1, B73.2			
52	REMARKS: 1/4" F. meter			
53	Rev. 5-25-84			
54				
55	PREPARED BY	BSY	REVISION ☐	REVISION ☐
56	DATE	3-7-84	REVISION ☐	REVISION ☐
57	APPROVED BY		BY	DATE
58	DATE		APP'D	DATE

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**CENTRIFUGAL PUMP
DATA SHEET**

CONTRACT NO. 21-254B
EQUIPMENT NO. P-17502A-P
NO. REQUIRED 16
SHEET 1 OF 1

1 CLIENT <u>International Coal Refining Company</u>		PLANT LOCATION <u>Newman, Kentucky</u>	
2 PROJECT <u>6000 TPSD SRC-1 Demonstration Plant</u>			
3 SERVICE <u>R.O. Feed Pumps</u>			
4 VENDOR		P.O. NO.	
5 TYPE	MODEL	SERIAL NO.	
6 NO. OF MOTORS REQ'D <u>16</u>	ITEM NO.	FURN. BY	MFR BY
7 NO. OF TURBINES REQ'D	ITEM NO.	FURN. BY	MFR BY
8 NOTE ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER		☐ BY MANUFACTURER	
9 ☐ OPERATING CONDITIONS (EACH PUMP)		☐ PERFORMANCE	
10 LIQUID <u>Water</u> US GPM AT PT. NOR <u>135</u> RATED <u>150</u>		PROPOSAL CURVE NO.	
11 DISCHARGE PSIG <u>400</u>		RPM NO. OF STAGES	
12 PT. F. NOR <u>65</u> MAX. SUCTION PSIG MAX RATED <u>40</u>		NPSHR FT. & IMPELLER T.O.F.	
13 SP GR AT PT <u>1.0</u> DIFF. PRESS. PSI <u>360</u>		EFF. BHP RATED	
14 VAP. PRESS. AT PT. PSIA DIFF. HEAD. FT. <u>832</u>		MAX BHP RATED IMP.	
15 VIS AT PT. LB/MI/FT-HR NPSHA. FT. <u>WHP: 31.5</u>		MAX HEAD RATED IMP.	
16 CORR/EROS. CAUSED BY		MIN. CONTINUOUS GPM	
17 CONSTRUCTION		ROTATION (VIEWED FROM CPLG. END)	
18 NOZZLES	SIZE (IN.)	RATING	FACING
19 SUCTION	<u>7</u>		
20 DISCHARGE	<u>8</u>		
21 CASE MT. ☐ CENTERLINE ☒ FOOT ☐ BRACKET ☐ VERT. (TYPE)			
22 SPLIT ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ OBL ☐ DIFFUSER			
23 PRESS. ☐ MAX. ALLOW. PSIG <u> </u> °F. ☐ HYDRO TEST PSIG			
24 CONNECT. ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET			
25 IMPELLER DIA. ☐ RATED ☐ MAX. ☐ TYPE			
26 MOUNT: ☐ BETWEEN BRGS ☐ OVERHUNG			
27 BEARINGS TYPE: ☐ RADIAL ☐ THRUST			
28 LUBE: ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE			
29 COUPLING: ☐ MFR ☐ MODEL			
30 DRIVER HALF MTD BY: ☐ PUMP MFR ☐ DRIVER MFR			
31 ☒ MECH SEAL ☐ PACKING ☐ AUX. SEAL/PACKING			
32 MFR. TYPE. MODEL			
33 MFR. CODE API CODE			
34 AUXILIARY PIPING			
35 ☐ C.W. PIPE PLAN ☐ CO. ☐ SS. ☐ TUBING: ☐ PIPE			
36 ☐ TOTAL COOLING WATER REQ'D. GPM ☐ SIGHT F.I. REQ'D.			
37 ☐ PACKING COOL. INJECTION REQ'D. ☐ TOTAL GPM ☐ PSIG			
38 ☒ SEAL FLUSH PIPE PLAN <u>11</u> ☒ C.S. ☐ S.S. ☐ TUBING ☒ PIPE			
39 ☐ EXTERNAL SEAL FLUSH FLUID ☐ GPM ☐ PSIG			
40 ☐ AUXILIARY SEAL PLAN ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE			
41 ☐ AUX. SEAL FLUSH/QUENCH FLUID			
42 MATERIALS			
43 ☐ PUMP CASE/TRIM API CLASS			
44 CASING <u>Ductile Iron</u> CORR. ALL. <u> </u> IN.			
45 IMPELLER <u>316 SS</u> WEAR RINGS			
46 SHAFT <u>Steel</u> SLEEVE(S) <u>316 SS</u>			
47 CASE INT. COATING/LINING GLAND			
48 ☐ BASEPLATE ☐ DRIP PAN			
49 ☐ SITE CONDITIONS			
50 ELEVATION FT. <u>385</u> DUST/FUMES			
51 AMB. TEMP. °F. MAX. MIN. AREA ELECT. CL. GR. DIV.			
52 COOLING WATER SUPPLY PSIG °F. RETURN: PSIG °F.			
53 REMARKS: <u>① Vendor specify 75 HP motor</u>			
54			
55 PREPARED BY <u>RSY</u>		REVISION <u>△</u>	
56 DATE <u>3-7-84</u>		REVISION <u>△</u>	
57 APPROVED BY		REVISION <u>△</u>	
58 DATE		REVISION <u>△</u>

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**CENTRIFUGAL PUMP
DATA SHEET**

CONTRACT NO. 21-25-84
EQUIPMENT NO. 1-1503 A-H
CDS. REQUIRED 6
SHEET 1 OF 1

1 **CLIENT** International Coal Refining Company
2 **PROJECT** 6000 TPSD SRC-1 Demonstration Plant
3 **SERVICE** R.O. Booster Pumps

PLANT LOCATION Newman, Kentucky

4 **VENDOR**

P.S. ED.

5 **TYPE** _____ **MODEL** _____ **SERIAL NO.** _____
6 **NO. OF MOTORS REQ'D** 6 **ITEM NO.** _____ **FURN. BY** _____ **MFR BY** _____
7 **NO. OF TURBINES REQ'D** _____ **ITEM NO.** _____ **FURN BY** _____ **MFR BY** _____

8 **NOTE:** ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER

9 ☐ OPERATING CONDITIONS (EACH PUMP)

☐ PERFORMANCE

10 **LIQUID** water **US GPM AT PT. NO.** 135 **RATED** 150
11 **DISCHARGE PSIG** 200
12 **PT. F. NO.** 1 **MAX.** _____ **SUCTION PSIG MAX** _____ **RATED** 400
13 **SP. GR. AT PT.** 1.0 **DIFF. PRESS. PSI** 400
14 **VAP. PRESS. AT PT. PSIA** _____ **DIFF. HEAD. FT.** 424
15 **VIS AT PT. LB/MI/FT-HR** _____ **NPSHA. FT.** _____
16 **CORR/EROS. CAUSED BY** WHP: 3100

PROPOSAL CURVE NO. _____
RPM _____ **NO OF STAGES** _____
NPSHR FT. & IMPELLER _____ **TO F** _____
EFF _____ **BHP RATED** _____
MAX BHP RATED IMP _____
MAX HEAD RATED IMP _____
MIN CONTINUOUS GPM _____
ROTATION (VIEWED FROM CPLG END) _____

17 **CONSTRUCTION**
18 **NOZZLES** **SIZE (IN.)** **RATING** **FACING** **LOCATION**
19 **SUCTION** 0 _____
20 **DISCHARGE** 0 _____
21 **CASE MT.** ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE) _____
22 **SPLIT:** ☐ AXIAL ☐ RAD: **TYPE** ☐ VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER
23 **PRESS:** ☐ MAX. ALLOW. _____ **PSIG** _____ **°F.** ☐ HYDRO TEST _____ **PSIG**
24 **CONNECT:** ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET
25 **IMPELLER DIA:** ☐ RATED _____ ☐ MAX. _____ ☐ TYPE _____
26 **MOUNT:** ☐ BETWEEN BRGS ☐ OVERHUNG
27 **BEARINGS TYPE:** ☐ RADIAL _____ ☐ THRUST _____
28 **LUBE:** ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE
29 **COUPLING:** ☐ MFR. _____ ☐ MODEL _____
30 **DRIVER HALF MTD BY:** ☐ PUMP MFR ☐ DRIVER MFR
31 ☒ MECH. SEAL ☐ PACKING ☐ AUX. SEAL/PACKING
32 **MFR. TYPE, MODEL** _____
33 **MFR. CODE** _____ **API CODE** _____

☐ INSPECTION AND TESTS
34 **SHOP INSPECTION** ☒ REQ'D
35 **HYDROSTATIC TEST** ☒ REQ'D ☐ WITNESS
36 **PERFORMANCE TEST** ☐ REQ'D ☐ WITNESS
37 **NPSH TEST** ☐ REQ'D ☐ WITNESS
38 **INT INSP AFTER TEST** ☐ REQ'D ☐ WITNESS

☐ INT. WEAR PARTS
39 **WEAR RINGS:** ☐ CASE ☐ IMP
40 **DIA.** _____ **IN.** **CLEARANCE** _____ **IN**
41 **INTERSTAGE BUSHINGS:** **DIA.** _____ **IN.** **CLEARANCE** _____ **IN**

VERTICAL PUMPS
42 **PIT OR SUMP DEPTH** ☐ _____
43 **PUMP LENGTH** ☐ _____
44 **MIN SUBMERGENCE REQ'D:** ☐ _____
45 **COLUMN PIPE:** ☐ FLANGED ☐ THREADED
46 **LINE SHAFT:** ☐ OPEN ☐ ENCLOSED
47 **BRGS:** ☐ BOWL _____ ☐ LINE SHAFT _____
48 **BRG. LUB** ☐ WATER ☐ OIL ☐ GREASE
49 **FLOAT & ROD** ☐ C.S. ☐ S.S. ☐ BRZ. ☐ NONE
50 **FLOAT SWITCH** ☐ _____
51 **PUMP THRUST, LB.** ☐ UP _____ ☐ DOWN _____
52 **MOUNTING PLATE REQ'D** ☐ _____

☐ WEIGHTS AND DIMENSIONS
53 **APPROX. WT. PUMP & BASE** _____ **LB**
54 **MOTOR** _____ **LB** **TURBINE** _____ **LB**
55 **BASE PLATE DIMENSIONS** _____

APPLICABLE SPECIFICATIONS
56 ☐ API 610 ☒ ANSI B73.1, B73.2
57 ☒ PROJECT SPECIFICATIONS

34 **AUXILIARY PIPING**
35 ☐ C.W. PIPE PLAN ☐ Cu: ☐ SS: ☐ TUBING: ☐ PIPE
36 ☐ TOTAL COOLING WATER REQ'D. GPM _____ ☐ SIGHT F.I. REQ'D.
37 ☐ PACKING COOL. INJECTION REQ'D. ☐ TOTAL GPM _____ ☐ PSIG
38 ☒ SEAL FLUSH PIPE PLAN 11 ☒ C.S. ☐ S.S. ☐ TUBING ☒ PIPE
39 ☐ EXTERNAL SEAL FLUSH FLUID _____ ☐ GPM _____ ☐ PSIG
40 ☐ AUXILIARY SEAL PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE
41 ☐ AUX. SEAL FLUSH/QUENCH FLUID _____

42 **MATERIALS**
43 ☐ PUMP CASE/TRIM API CLASS _____
44 **CASING** ductile iron **CORR. ALL.** _____ **IN.**
45 **IMPELLER** 316 SS **WEAR RINGS** _____
46 **SHAFT** steel **SLEEVE(S)** 316 SS
47 **CASE INT. COATING/LINING** _____ **GLAND** _____
48 ☐ BASEPLATE _____ **DRIP PAN** _____

☐ SITE CONDITIONS
49 **ELEVATION, FT.** _____ **DUST/FUMES** _____
50 **AMB. TEMP. °F** **MAX.** _____ **MIN.** _____ **AREA ELECT. CL** _____ **GR.** **DIV.** _____
51 **COOLING WATER SUPPLY** _____ **PSIG** _____ **°F.** **RETURN:** _____ **PSIG** _____ **°F.**

52 **REMARKS:** Vendor specify 75 HP motor

Rev. 5-25-84

55 PREPARED BY <u>RS</u>	REVISION <u>△</u>	REVISION <u>△</u>	REVISION <u>△</u>
56 DATE <u>3-7-84</u>	DATE	DATE	DATE
57 APPROVED BY	BY	BY	BY
DATE	DATE	DATE	DATE

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International Corporation

**CENTRIFUGAL PUMP
DATA SHEET**CONTRACT NO. 21-2548
EQUIPMENT NO. P-17524A-3
NO. REQUIRED 2
SHEET 1 OF 11 CLIENT International Coal Refining Company
2 PROJECT 6000 TPSD SRC-1 Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE R.O. Effluent Pumps

4 VENDOR _____ P.O. NO. _____

5 TYPE _____ MODEL _____ SERIAL NO. _____
6 NO. OF MOTORS REQ'D 2 ITEM NO. _____ FURN. BY _____ MFR BY _____
7 NO. OF TURBINES REQ'D _____ ITEM NO. _____ FURN BY _____ MFR BY _____8 NOTE: ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER
9 ☐ OPERATING CONDITIONS (EACH PUMP) ☐ PERFORMANCE10 LIQUID Water US GPM AT PT. NOR 1,408 RATED 2,222
11 _____ DISCHARGE PSIG 80
12 PT. F. NOR. 65 MAX. _____ SUCTION PSIG MAX _____ RATED 2
13 SP GR AT PT. 1.0 DIFF. PRESS. PSI 78
14 VAP PRESS AT PT. PSIA _____ DIFF. HEAD. FT. 130
15 VAP AT PT. LB(M)/FT-HR _____ NPSHA. FT. _____
16 CORR/PROS. CAUSED BY WHP - 91PROPOSAL CURVE NO. _____
RPM 1750 NO. OF STAGES _____
NPSHR FT. & IMPELLER _____ TO F. _____
EFF _____ BHP RATED _____
MAX BHP RATED IMP _____
MAX HEAD RATED IMP _____
MIN CONTINUOUS GPM _____
ROTATION (VIEWED FROM CPLG END) _____17 CONSTRUCTION
18 NOZZLES SIZE (IN.) RATING FACING LOCATION
19 SUCTION 0 150 # RF _____
20 DISCHARGE 0 150 # RF _____☐ INSPECTION AND TESTS
SHOP INSPECTION ☒ REQ'D
HYDROSTATIC TEST ☒ REQ'D ☐ WITNESS
PERFORMANCE TEST ☐ REQ'D ☐ WITNESS
NPSH TEST ☐ REQ'D ☐ WITNESS
INT INSP AFTER _____
TEST ☐ REQ'D ☐ WITNESS21 CASE MT ☐ CENTERLINE ☒ FOOT ☐ BRACKET ☐ VERT. (TYPE) _____
22 SPLIT ☐ AXIAL ☐ RAD: TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER
23 PRESS: ☐ MAX. ALLOW _____ PSIG _____ F. ☐ HYDRO TEST _____ PSIG
24 CONNECT: ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET
25 IMPELLER DIA: ☐ RATED _____ ☐ MAX. _____ ☐ TYPE _____☐ INT. WEAR PARTS
WEAR RINGS ☐ CASE ☐ IMP
DIA _____ IN. CLEARANCE _____ IN
INTERSTAGE BUSHINGS
DIA _____ IN. CLEARANCE _____ IN26 MOUNT: ☐ BETWEEN BRGS ☐ OVERHUNG
27 BEARINGS TYPE: ☐ RADIAL _____ ☐ THRUST _____
28 LUBE ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE
29 COUPLING: ☐ MFR. FAST ☐ MODEL _____
30 DRIVER HALF MTD BY: ☐ PUMP MFR ☐ DRIVER MFR
31 ☒ MECH. SEAL ☐ PACKING ☐ AUX SEAL/PACKING
32 MFR. TYPE MODEL _____
33 MFR. CODE _____ API CODE _____VERTICAL PUMPS
PIT OR SUMP DEPTH ☐ _____
PUMP LENGTH ☐ _____
MIN SUBMERGENCE REQ'D ☐ _____
COLUMN PIPE: ☐ FLANGED ☐ THREADED
LINE SHAFT: ☐ OPEN ☐ ENCLOSED
BRGS ☐ BOWL _____ ☐ LINE SHAFT _____
BRG. LUB. ☐ WATER ☐ OIL ☐ GREASE
FLOAT & ROD ☐ C.S. ☐ S.S. ☐ BRZ. ☐ NONE
FLOAT SWITCH ☐ _____
PUMP THRUST. LB ☐ UP _____ ☐ DOWN _____
MOUNTING PLATE REQ'D ☐ _____34 AUXILIARY PIPING
35 ☐ C W PIPE PLAN ☐ Cu ☐ SS: ☐ TUBING ☐ PIPE
36 ☐ TOTAL COOLING WATER REQ'D GPM _____ ☐ SIGHT F.I. REQ'D
37 ☐ PACKING COOL. INJECTION REQ'D ☐ TOTAL GPM _____ ☐ PSIG
38 ☒ SEAL FLUSH PIPE PLAN 1 ☒ C.S. ☐ S.S. ☐ TUBING ☒ PIPE
39 ☐ EXTERNAL SEAL FLUSH FLUID _____ GPM _____ PSIG
40 ☐ AUXILIARY SEAL PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE
41 ☐ AUX. SEAL FLUSH/QUENCH FLUID _____☐ WEIGHTS AND DIMENSIONS
APPROX. WT PUMP & BASE _____ LB
MOTOR _____ LB TURBINE _____ LB
BASE PLATE DIMENSIONS _____42 MATERIALS
43 ☒ PUMP CASE/TRIM API CLASS _____
44 CASING Ductile Iron CORR. ALL. _____ IN.
45 IMPELLER Cast Iron WEAR RINGS _____
46 SHAFT Steel SLEEVE(S) 316SS
47 CASE INT COATING/LINING _____ GLAND _____
48 ☐ BASEPLATE _____ DRIP PAN _____APPLICABLE SPECIFICATIONS
☐ API 610 ☒ ANSI B73.1 B73.2
☒ PROJECT SPECIFICATIONS49 SITE CONDITIONS
50 ELEVATION FT. 385 DUST/FUMES _____
51 AMB TEMP. F _____ MAX. _____ MIN. _____ AREA ELECT. CL _____ GR. DIV. _____
52 COOLING WATER SUPPLY _____ PSIG _____ F. RETURN: _____ PSIG _____ F53 REMARKS: 1) Vendor Specify. 200 HP motor Rev. 5-25-8455 PREPARED BY BSY REVISION △ REVISION △ REVISION △
56 DATE 3-7-84 BY _____ DATE _____ BY _____ DATE _____
57 APPROVED BY _____ BY _____ DATE _____ BY _____ DATE _____
58 DATE _____ APP'D _____ DATE _____ APP'D _____ DATE _____

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**CENTRIFUGAL PUMP
DATA SHEET**

CONTRACT NO. 21-2540
EQUIPMENT NO. P-1750-A-1-C
NO. REQUIRED THREE
SHEET 1 OF 1

1 CLIENT International Coal Refining Company
2 PROJECT 6000 TPSD SRC-1 Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Condensate Pumps
4 VENDOR _____ P.O. NO. _____

5 TYPE _____ MODEL _____ SERIAL NO. _____
6 NO. OF MOTORS REQ'D 3 ITEM NO. _____ FURN. BY _____ MFR BY _____
7 NO OF TURBINES REQ'D _____ ITEM NO. _____ FURN BY _____ MFR BY _____
8 NOTE ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER

9 ☐ OPERATING CONDITIONS (EACH PUMP) ☐ PERFORMANCE
10 LIQUID Condensate US GPM AT PT. NOR _____ RATED 200 PROPOSAL CURVE NO. _____
11 _____ DISCHARGE PSIG 80 RPM 1750 NO OF STAGES _____
12 PT. F. NOR 212 MAX. 300 SUCTION PSIG MAX _____ RATED 1 NPSHR FT & IMPELLER _____ T OF _____
13 SP GR AT PT 0.96 DIFF PRESS. PSI 79 EFF _____ BHP RATED _____
14 VAP PRESS AT PT. PSIA _____ DIFF. HEAD. FT 196.1 MAX BHP RATED IMP _____
15 VIS AT PT LB(M)/FT-HR _____ NPSHA FT _____ MAX HEAD RATED IMP _____
16 CORR/EROS CAUSED BY WHP: 9.2 MIN CONTINUOUS GPM _____
17 ROTATION (VIEWED FROM CPLG END) _____

18 CONSTRUCTION
19 NOZZLES SIZE (IN) RATING FACING LOCATION
20 SUCTION 0 150 # RF
21 DISCHARGE 0 150 # RF
22 CASE MT ☐ CENTERLINE ☒ FOOT ☐ BRACKET ☐ VERT. (TYPE) _____
23 SPLIT ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER
24 PRESS: ☐ MAX ALLOW. _____ PSIG _____ °F. ☐ HYDRO TEST _____ PSIG
25 CONNECT ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET
26 IMPELLER DIA: ☐ RATED _____ ☐ MAX. _____ ☐ TYPE _____
27 MOUNT ☐ BETWEEN BRGS ☐ OVERHUNG
28 BEARINGS TYPE: ☐ RADIAL _____ ☐ THRUST _____
29 LUBE ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE
30 COUPLING ☐ MFR. FAST ☐ MODEL _____
31 DRIVER HALF MTD BY: ☐ PUMP MFR ☐ DRIVER MFR
32 ☒ MECH. SEAL ☐ PACKING ☐ AUX. SEAL/PACKING
33 MFR. TYPE. MODEL _____
34 MFR. CODE _____ API CODE _____

35 ☐ INSPECTION AND TESTS
36 SHOP INSPECTION ☒ REQ'D
37 HYDROSTATIC TEST ☒ REQ'D ☐ WITNESS
38 PERFORMANCE TEST ☐ REQ'D ☐ WITNESS
39 NPSH TEST ☐ REQ'D ☐ WITNESS
40 INT INSP AFTER _____ ☐ REQ'D ☐ WITNESS
41 TEST _____ ☐ REQ'D ☐ WITNESS
42 ☐ INT. WEAR PARTS
43 WEAR RINGS: ☐ CASE ☐ IMP
44 DIA _____ IN CLEARANCE _____ IN
45 INTERSTAGE BUSHINGS:
46 DIA _____ IN CLEARANCE _____ IN
47 VERTICAL PUMPS
48 PIT OR SUMP DEPTH ☐ _____
49 PUMP LENGTH ☐ _____
50 MIN SUBMERGENCE REQ'D. ☐ _____
51 COLUMN PIPE: ☐ FLANGED ☐ THREADED
52 LINE SHAFT ☐ OPEN ☐ ENCLOSED
53 BRGS ☐ BOWL _____ ☐ LINE SHAFT _____
54 BRG LUB ☐ WATER ☐ OIL ☐ GREASE
55 FLOAT & ROD ☐ C.S. ☐ S.S. ☐ BRZ. ☐ NONE
56 FLOAT SWITCH ☐ _____
57 PUMP THRUST. LB ☐ UP _____ ☐ DOWN _____
58 MOUNTING PLATE REQ'D ☐ _____

59 AUXILIARY PIPING
60 ☐ C W PIPE PLAN ☐ Cu ☐ SS: ☐ TUBING ☐ PIPE
61 ☐ TOTAL COOLING WATER REQ'D GPM _____ ☐ SIGHT F.I. REQ'D
62 ☐ PACKING COOL. INJECTION REQ'D ☐ TOTAL GPM _____ ☐ PSIG
63 ☒ SEAL FLUSH PIPE PLAN 11 ☒ C.S. ☐ S.S. ☐ TUBING ☒ PIPE
64 ☐ EXTERNAL SEAL FLUSH FLUID _____ GPM _____ ☐ PSIG
65 ☐ AUXILIARY SEAL PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE
66 ☐ AUX. SEAL FLUSH/QUENCH FLUID _____

67 MATERIALS
68 ☒ PUMP CASE/TRIM API CLASS _____
69 CASING Ductile Iron CORR. ALL. _____ IN.
70 IMPELLER Cast Iron WEAR RINGS _____
71 SHAFT Steel SLEEVE(S) 316 SS
72 CASE INT COATING/LINING _____ GLAND _____
73 ☐ BASEPLATE _____ DRIP PAN _____

74 ☐ WEIGHTS AND DIMENSIONS
75 APPROX. WT. PUMP & BASE _____ LB
76 MOTOR _____ LB TURBINE _____ LB
77 BASE PLATE DIMENSIONS _____
78 APPLICABLE SPECIFICATIONS
79 ☐ API 610 ☒ ANSI B73.1, B73.2
80 ☒ PROJECT SPECIFICATIONS _____

81 REMARKS: Vendor Specify 2011P Rev. 5-25-84

82 PREPARED BY BSY
83 DATE 3-7-84
84 APPROVED BY _____ BY _____ DATE _____
85 DATE _____ APP'D _____ DATE _____

Rust

International Corporation

**STORAGE TANK
DATA SHEET**

CONTRACT NO. 21-2548

EQUIPMENT NO. TK-17501

NO. REQUIRED 1

SHEET 1 OF 1

1	CLIENT	International Coal Refining Company			
2	PROJECT	6000 TPSD SRC-I Demonstration Plant		PLANT LOCATION Newman, Kentucky	
3	SERVICE	Sulfuric Acid Tank			
4	VENDOR	P.O. NO.			
5	DIAMETER	3'-5"	HEIGHT	4'-1"	FT.
6	CAPACITY: NORMAL	250	GAL	SHELL	THICK. IN.
7	NET WORKING		GAL	ROOF	THICK. IN.
8	OPERATING CONDITIONS			BOTTOM	THICK. IN.
9	SPECIFIC GRAVITY: LIO	1.8354	AT TEMP	°F	STRUCTURALS
10	PUMPING RATES: IN		OUT	GPM	NOZZLE: NECK FLANGE
11	VAPOR PRESS		IN. WATER		COUPLINGS
12	MAX. OPER TEMP.		°F	INTERNALS: FIXED	
13	DESIGN CONDITIONS			REMOVABLE	
14	CODE: API	APPENDIX		GASKETS	
15	DESIGN METAL TEMP		°F	BOLTING	
16	DESIGN PRESS		IN. WATER	EST. ERECTION WT (LB)	
17	CORROSION ALLOW: SHELL	1/4"	ROOF	1/8"	IN.
18	BOTTOM	1/4"	INTERNALS	IN.	NOZZLES
19	ROOF TYPE		MARK NO.	NO. REQ'D	SIZE IN
20	ROOF LIVE LOADS	PSF	N-1	1	1
21	WIND PRESS	PSF	N-2	1	1/4
22	EARTHQUAKE: CODE	ZONE	N-3	1	1
23	FOUNDATION TYPE		N-4	1	1
24	RADIOGRAPHY: EXTENT		N-5	2	1/2
25	STRESS RELIEF: YES/NO	EXTENT	N-6	2	3
26	INSULATION: YES/NO	THICK:	N-7		
27	LEAK TESTING: BOTTOM	SHELL	ROOF		
28	MILL TEST REPORTS: YES/NO		M-1	Not	Not
29	PAINTING: YES/NO	SPEC:			

SKETCH

Rev. 5-25-84

55	PREPARED BY BSY	REVISION Δ		REVISION Δ		REVISION Δ	
56	DATE 3-8-84						
57	APPROVED BY	BY	DATE	BY	DATE	BY	DATE
58	DATE	APP'D	DATE	APP'D	DATE	APP'D	DATE

Rust
International Corporation

**STORAGE TANK
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. TK-17502
NO. REQUIRED 1
SHEET 1 OF 1

1	CLIENT	International Coal Refining Company			
2	PROJECT	6000 TPSD SRC-I Demonstration Plant		PLANT LOCATION Newman, Kentucky	
3	SERVICE	Recycled Water Tank			
4	VENDOR	P.O. NO.			
5	DIAMETER	18'	HEIGHT	32	FT.
6	CAPACITY, NORMAL	61,000		GAL	SHELL
7	NET WORKING			GAL	ROOF
8	OPERATING CONDITIONS				BOTTOM
9	SPECIFIC GRAVITY, LIQ	1.0	AT TEMP	°F	STRUCTURALS
10	PUMPING RATES: IN	1357 gpm	OUT	1367	GPM
11	VAPOR PRESS			IN. WATER	NOZZLE: NECK
12	MAX. OPER. TEMP.			°F	COUPLINGS
13	DESIGN CONDITIONS				INTERNALS: FIXED
14	CODE: API	APPENDIX		REMOVABLE	
15	DESIGN METAL TEMP			°F	GASKETS
16	DESIGN PRESS			IN. WATER	BOLTING
17	CORROSION ALLOW: SHELL	ROOF		IN.	EST. ERECTION WT (LB)
18	BOTTOM	INTERNALS		IN.	NOZZLES
19	ROOF TYPE	Cone		FLANGE RATING	
20	ROOF LIVE LOADS	PSF		MARK NO.	NO. REQ'D
21	WIND PRESS	PSF		N-1	1
22	EARTHQUAKE CODE	ZONE		N-2	1
23	FOUNDATION TYPE			N-3	1
24	RADIOGRAPHY: EXTENT			N-4	1
25	STRESS RELIEF: YES/NO	EXTENT		N-5	2
26	INSULATION: YES/NO	THICK: 1		IN.	N-6
27	LEAK TESTING: BOTTOM	SHELL		ROOF	N-7
28	MILL TEST REPORTS YES/NO			M-1	1
29	PAINTING: YES/NO SPEC:	Shop Coat			

SKETCH

Rev. 5-25-84

55	PREPARED BY BSY	REVISION		REVISION		REVISION	
56	DATE 3-6-84						
57	APPROVED BY	BY	DATE	BY	DATE	BY	DATE
58	DATE	APP'D	DATE	APP'D	DATE	APP'D	DATE

Rust
International Corporation

**STORAGE TANK
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. V-17501
NO. REQUIRED 1
SHEET 1 OF 1

1	CLIENT	International Coal Refining Company			
2	PROJECT	6000 TPSD SRC-I Demonstration Plant		PLANT LOCATION Newman, Kentucky	
3	SERVICE	Condensate Drum			
4	VENDOR	P.O. NO.			
5	DIAMETER	8'	HEIGHT	14	FT.
6	CAPACITY: NORMAL	5200		GAL	SHELL CS THICK. IN.
7	NET WORKING			GAL	ROOF THICK. IN.
8	OPERATING CONDITIONS			BOTTOM THICK. IN.	
9	SPECIFIC GRAVITY: LIQ	0.96	AT TEMP	212	°F
10	PUMPING RATES: IN	357	OUT	357	GPM
11	VAPOR PRESS	IN. WATER		COUPLINGS	
12	MAX. OPER. TEMP	350		°F	INTERNALS: FIXED
13	DESIGN CONDITIONS			REMOVABLE	
14	CODE: API	APPENDIX			GASKETS
15	DESIGN METAL TEMP	°F			BOLTING
16	DESIGN PRESS	20 PSIG		IN. WATER	EST. ERECTION WT (LB)
17	CORROSION ALLOW: SHELL	ROOF		IN.	NOZZLES
18	BOTTOM		INTERNALS		IN.
19	ROOF TYPE			MARK NO.	SIZE IN
20	ROOF LIVE LOADS	PSF		N-1	1
21	WIND PRESS	PSF		N-2	1
22	EARTHQUAKE CODE	ZONE		N-3	1
23	FOUNDATION TYPE			N-4	1
24	RADIOGRAPHY: EXTENT			N-5	2
25	STRESS RELIEF: YES/NO	EXTENT		N-6	2
26	INSULATION: YES/NO	THICK: 2		N-7	
27	LEAK TESTING BOTTOM	SHELL		M-1	1
28	MILL TEST REPORTS YES/NO				20
29	PAINTING: YES/NO	SPEC: show cut

Rev. 5-25-84

55	PREPARED BY BSY	REVISION		REVISION		REVISION	
56	DATE 3-8-84						
57	APPROVED BY	BY	DATE	BY	DATE	BY	DATE
58	DATE	APP'D	DATE	APP'D	DATE	APP'D	DATE

Rust

International Corporation

Reverse Osmosis System

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548

EQUIPMENT NO. X-17501 A & B

NO. REQUIRED Two

SHEET 1 OF 1

CLIENT International Coal Refining Company

PROJECT 6000 TPSD SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

SERVICE Reverse Osmosis (R.O.) System

VENDOR

P.O. NO.

A reverse osmosis system consisting of two trains @ 2,050 gpm capacity each shall be provided for handling 2,050 gpm of waste water. Each train should be skid mounted, and the system shall have the capability of producing at least 75 percent product water with an average ion rejection factor of 90 percent.

The system shall be complete with the following:

Pretreatment system, cleaning system, high-pressure pumps (400 psi and 800 psi), 5 μ m cartridge filters, spiral wound R.O. membranes (cellulose acetate, 400 psi, polyether urea, 800 psi), all internal piping, piping on skids only, instrumentation and controls, wiring, valves and motors.

High pressure pumps will be supplied by others.

Rev. 5-25-84

PREPARED BY BSY

DATE 3-7-84

REVISION Δ REVISION Δ REVISION Δ

APPROVED BY

BY DATE

BY DATE

BY DATE

DATE APP'D DATE

Rust

International Corporation

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548

EQUIPMENT NO. CI-17875 A & B

NO. REQUIRED 2

SHEET 1 OF 1

1 CLIENT International Coal Refining Company
2 PROJECT 6000 TPSD SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Fly Dust Thickener
4 VENDOR P.O. NO.

Thickener is equipped with:

1. 18 ft Ø x 12 ft high (side wall height) c.s. shell
2. Rake mechanism with 1 HP motor
3. Walk-way on top
4. Coal tar epoxy lining
5. Standard slope

Rev. 5-25-84

55 PREPARED BY C.P.	REVISION	REVISION	REVISION
56 DATE 2-27-84			
57 APPROVED BY	BY DATE	BY DATE	BY DATE
58 DATE	APP'D DATE	APP'D DATE	APP'D DATE

Rust

International Corporation

**BELT CONVEYOR
DATA SHEET**

PAGE 1 OF 3

CONTRACT NO. TI-2545EQUIPMENT NO. CV-17875 - B & CNO. REQUIRED 3SHEET 1 OF 31 CLIENT International Coal Refining Company2 PROJECT 6000 T/D SRC-1 Demonstration PlantPLANT LOCATION Newman, Kentucky3 SERVICE Fly Dust Cake Discharge Conveyor

4 VENDOR _____

P.O. NO. _____

5 APPLICABLE SPECIFICATIONS AND CODES

6 _____

7 _____

8 _____

9 _____

10 _____

PURCHASER'S DATA**MATERIAL TO BE HANDLED**12 MATERIAL Fly dust cake

13 _____

14 _____

PHYSICAL PROPERTIES16 BULK DENSITY 56.5 LB/FT³

17 ANGLE OF REPOSE _____

18 MOISTURE CONTENT 20 %19 CHARACTERISTICS ☐ STICKY ☐ TOXIC20 ☐ ABRASIVE ☐ CORROSIVE ☐ EXPLOSIVE21 ☐ HYGROSCOPIC ☐ DEGRADABLE22 ☐ FLUIDIZING ☐ OTHER _____

23 _____

PARTICLE SIZE DISTRIBUTION25 SIZE %

26 _____

27 _____

28 _____

29 _____

30 MAX. SIZE LUMPS _____ IN

31 OF MAX. LUMPS _____

32 MATERIAL TEMPERATURE Ambient °F

33 *ATTACH PARTICLE SIZE DISTRIBUTION GRAPH

OPERATING CONDITIONSCAPACITY NOMINAL 4.8 TPH

DESIGN _____ TPH

OPERATION ☒ CONTINUOUS☐ INTERMITTENTLOCATION ☐ INDOOR☐ OUTDOORPROTECTION ☐ COVERED☐ SEMI COVERED☐ UNCOVERED

AMBIENT TEMPERATURE RANGE _____ °F

DESIGN WIND PRESSURE _____ PSF

NO. OF FEED POINTS _____

MATERIAL FEED FROM _____

VERTICAL FALL OF MATERIAL _____ FT

DISCHARGED BY ☐ OVERHEAD PULLEY☐ TRIPPER☐ FLOW☐ OTHER**SKETCH**

35 _____

36 _____

37 _____

38 _____

39 _____

40 _____

41 _____

42 _____

43 _____

44 _____

45 _____

46 _____

47 _____

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49 _____

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52 _____

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54 _____

Rev. 5-25-84

55 PREPARED BY _____

56 DATE _____

REVISION

REVISION

REVISION

57 APPROVED BY _____

58 DATE _____

BY _____

DATE _____

BY _____

DATE _____

BY _____

DATE _____

APPRO'D _____

DATE _____

APPRO'D _____

DATE _____

APPRO'D _____

DATE _____

Rust
International Corporation

**BELT CONVEYOR
DATA SHEET**

PAGE 2 OF 3

CONTRACT NO. 21-2548

EQUIPMENT NO. CV-17875 A, B, & C

NO. REQUIRED 3

SHEET 2 OF 3

PURCHASER'S DATA (CONTINUED)

CONVEYOR AND COMPONENTS

TYPE ☒ HORIZONTAL ☐ INCLINED
☐ HORIZONTAL & INCLINED ☐ PORTABLE
☐ DECLINED ☐ REVERSIBLE
☐ SHUTTLE
☐ OTHER _____
CONVEYOR LENGTH _____ FT _____ IN.

IDLERS:

TYPE OF CARRYING IDLER ☐ TROUGHED
☐ FLAT

MAX SPACING OF CARRYING IDLER _____

MIN DIAMETER	IDLERS	DIAMETER
_____	_____	_____ IN.
_____	_____	_____ IN.
_____	_____	_____ IN.
_____	_____	_____ IN.

BELTING:

MIN NUMBER PLYS _____

MIN THICKNESS OF COVERS:

TOP _____ IN BOTTOM _____ IN.

SPLICE ☐ VULCANIZED
☐ MECHANICALLY FASTENED

MINIMUM BASE PULLEY DIA. _____ IN.

TRIPPERS:

NUMBER REQUIRED _____

TYPE ☐ STATIONARY

☐ MOVABLE

DISCHARGE ☐ ONE SIDE

☐ BOTH SIDES

SAFETY DEVICES

☐ HOLD BACKS AND BRAKES

☐ EMERGENCY STOP WITH PULL CORDS

☐ OTHER _____

SENSING DEVICES

☐ SPEED SENSORY DEVICES

☐ SIDE TRAVEL SWITCHES

☐ OTHER _____

BELT CLEANER

☐ RI AND SCRAPER

☐ ROTARY BRUSH

☐ ROTARY RUBBER RI AND

☐ RETURN BELT CLEANER PLOW

ELECTRIC MOTOR—

ELEC AREA CLASS _____ GROUP _____ DIV _____

5 HP

AUXILIARY EQUIPMENT REQUIRED:

☐ LOAD HOPPER
☐ FEED CHUTES
☐ DISCHARGE HOOD
☐ SKIRT BOARDS
☐ WALKWAYS
☐ PLATFORMS
☐ SUPPORTS
☐ ENCLOSED GALLERY
☐ SEMI-CIRCULAR BELT COVERS
☐ THREE-QUARTER BELT COVERS
☐ WIND BREAKS
☐ WIND HOOPS
☐ OTHERS _____

REMARKS

Rev. 5-25-84

Rust
International Corporation

**BELT CONVEYOR
DATA SHEET**

PAGE 3 OF 3

CONTRACT NO. 21-2548
EQUIPMENT NO. CV-17875 A, B, & C
NO REQUIRED 3
SHEET 3 OF 3

MANUFACTURER'S DATA

(VENDOR TO COMPLETE ALL DATA BELOW UNLESS OTHERWISE FILLED BY PURCHASER)

CONVEYOR DATA:

BELT WIDTH 24" IN.
BELT SPEED AT DESIGNED CAP _____ FPM
IDLER TROUGH ANGLE _____ °
ANGLE OF SURCHARGE _____ °
CONVEYOR TAKE-UP _____
TYPE _____
TRAVEL _____ % _____ FT _____ IN
LOCATION _____

IDLERS:

CARRYING IDLERS

MANUFACTURER _____
CEMA SERIES _____
DIAMETER _____
SPACING _____ FT _____ IN.

IMPACT IDLERS

MANUFACTURER _____
CEMA SERIES _____
STEEL ROLL DIAMETER _____ IN.
RUBBER DISC DIAMETER _____ IN.
SPACING _____ FT _____ IN.

TRANSITION IDLERS

MANUFACTURER _____
CEMA SERIES _____
DIAMETER _____ IN.
NUMBER REQUIRED _____

RETURN IDLERS

MANUFACTURER _____
CEMA SERIES _____
TYPE ☐ STEEL ☐ RUBBER DISC ☐ VEE-TROUGH
DIAMETER _____ IN.
SPACING _____ FT _____ IN.

TRAINING IDLERS

TROUGH TYPE _____ SPACING _____
RETURN TYPE _____ SPACING _____

BELTING:

BELT LENGTH
WITHOUT TAKE-UP 33 FT
TAKE-UP ALLOWANCE _____ FT
SPlice ALLOWANCE _____ FT
TOTAL BELT LENGTH _____ FT

COVERS

GRADE: RMA _____
THICKNESS: TOP _____ IN BOTTOM _____ IN

CARCASS

FABRIC _____
FABRIC RATING: RMA _____
NUMBER PLIES _____
BREAKER: TOP _____ BOTTOM _____
MAXIMUM WORKING TENSION _____ LB
ALLOWABLE BELT SAG _____ %
ULTIMATE STRENGTH _____ LB
BELT WEIGHT _____ LB/FT

DRIVES:

STARTING CHARACTERISTICS _____

TYPE OF BRAKE AND/OR BACKSTOP: _____

BRAKE RATING _____ LB-FT
BACKSTOP RATING _____ LB-FT

HP REQ'D AT DRIVE SHAFT _____
SPEED REDUCER TYPE _____ MODEL _____

RATIO _____ OUTPUT SPEED _____
COUPLING TYPE _____ MODEL _____

CHAIN DRIVE TYPE _____
V-BELT DRIVE, P.D. DRIVE _____ P.D. DRIVEN _____

NO. BELTS _____ BELT SIZE _____
GUARDS: COUPLINGS _____

CHAIN _____
V-BELT _____

PULLEYS

LOCATION	TYPE OF PULLEY*	SIZE (DIA. X FACE LENGTH)
		IN. X _____ FT _____ IN
		IN. X _____ FT _____ IN
		IN. X _____ FT _____ IN
		IN. X _____ FT _____ IN
		IN. X _____ FT _____ IN
		IN. X _____ FT _____ IN

*TYPE WELDED STEEL CROWN, LAGGING, GROOVED LAGGING, CAST IRON, ETC.

REMARKS:

Rev. 5-25-84

Rust

International Corporation

**BELT CONVEYOR
DATA SHEET**

PAGE 1 OF 3

CONTRACT NO. 21-2548

EQUIPMENT NO. CV-17876

NO. REQUIRED 1

SHEET 1 OF 3

1 CLIENT International Coal Refining Company

2 PROJECT 6000 T/D SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

3 SERVICE Fly Dust Cake Transfer Conveyor

4 VENDOR

P.O. NO.

5 APPLICABLE SPECIFICATIONS AND CODES

PURCHASER'S DATA**MATERIAL TO BE HANDLED****OPERATING CONDITIONS**

12 MATERIAL Fly Dust Cake

CAPACITY: NORMAL 9.6 TPH

DESIGN _____ TPH

OPERATION ☒ CONTINUOUS☐ INTERMITTENT**PHYSICAL PROPERTIES**16 BULK DENSITY 56.5 LB/FT³

HR/DAY

17 ANGLE OF REPOSE _____ °

LOCATION: ☐ INDOOR

18 MOISTURE CONTENT 20 %

☐ OUTDOOR19 CHARACTERISTICS ☐ STICKY ☐ TOXICPROTECTION: ☐ COVERED20 ☐ ADHESIVE ☐ CORROSIVE ☐ EXPLOSIVE☐ SEMI-COVERED21 ☐ HYGROSCOPIC ☐ DEGRADABLE☐ UN-COVERED22 ☐ FLUIDIZING ☐ OTHER _____

AMBIENT TEMPERATURE RANGE _____ / _____ °F.

PARTICLE SIZE DISTRIBUTION *

DESIGN WIND PRESSURE _____ PSF

25 SIZE %

NO. OF FEED POINTS _____

26 _____

MATERIAL FEED FROM _____

27 _____

VERTICAL FALL OF MATERIAL _____ FT

28 _____

DISCHARGED BY: ☐ OVERHEAD PULLEY

29 _____

☐ TRIPPER

30 MAX SIZE LUMPS _____ IN.

☐ PLOW

31 % OF MAX LUMPS _____

☐ OTHER

32 MATERIAL TEMPERATURE Ambient °F

*ATTACH PARTICLE SIZE DISTRIBUTION GRAPH

SKETCH

Rev. 5-25-84

55 PREPARED BY

REVISION

REVISION

REVISION

56 DATE

57 APPROVED BY

BY

DATE

BY

DATE

BY

DATE

58 DATE

APP'D

DATE

APP'D

DATE

APP'D

DATE

Rust
International Corporation

**BELT CONVEYOR
DATA SHEET**

PAGE 2 OF 3

CONTRACT NO. 21-2548
EQUIPMENT NO. CV-17876
NO. REQUIRED 1
SHEET 2 OF 3

PURCHASER'S DATA (CONTINUED)

CONVEYOR AND COMPONENTS

TYPE ☐ HORIZONTAL ☒ INCLINED
☐ HORIZONTAL & INCLINED ☐ PORTABLE
☐ DECLINED ☐ REVERSIBLE
☐ SHUTTLE
☐ OTHER _____
CONVEYOR LENGTH _____ FT _____ IN

IDLERS:

TYPE OF CARRYING IDLER ☐ TROUGHED
☐ FLAT
MAX. SPACING OF CARRYING IDLER _____
MIN DIAMETER IDLERS DIAMETER
_____ IN.
_____ IN.
_____ IN.
_____ IN.

BELTING:

MIN. NUMBER PLIES _____
MIN THICKNESS OF COVERS:
TOP _____ IN BOTTOM _____ IN.
SPICE ☐ VULCANIZED
☐ MECHANICALLY FASTENED
MINIMUM BASE PULLEY DIA. _____ IN.

TRIPPERS:

NUMBER REQUIRED _____
TYPE ☐ STATIONARY
☐ MOVABLE
DISCHARGE: ☐ ONE SIDE
☐ BOTH SIDES

SAFETY DEVICES

☐ HOLD BACKS AND BRAKES
☐ EMERGENCY STOP WITH PULL CORDS
☐ OTHER _____

SENSING DEVICES

☐ SPEED SENSORY DEVICES
☐ SIDE TRAVEL SWITCHES
☐ OTHER _____

BELT CLEANER

☐ BLADE SCRAPER
☐ ROTARY BRUSH
☐ ROTARY RUBBER BLADE
☐ RETURN BELT CLEANER PLOW

ELECTRIC MOTOR—

ELEC AREA CLASS _____ GROUP _____ DIV _____

1 C 25 HP

AUXILIARY EQUIPMENT REQUIRED:

☐ LOAD HOPPER
☐ FEED CHUTES
☐ DISCHARGE HOOD
☐ SKIRT BOARDS
☐ WALKWAYS
☐ PLATFORMS
☐ SUPPORTS
☐ ENCLOSED GALLERY
☐ SEMI-CIRCULAR BELT COVERS
☐ THREE-QUARTER BELT COVERS
☐ WIND BREAKS
☐ WIND HOOPS
☐ OTHERS _____

REMARKS

Rust
International Corporation

**BELT CONVEYOR
DATA SHEET**

PAGE 3 OF 3

CONTRACT NO. 21-2548
EQUIPMENT NO. CV-17876
NO. REQUIRED 1
SHEET 3 OF 3

MANUFACTURER'S DATA

(VENDOR TO COMPLETE ALL DATA BELOW UNLESS OTHERWISE FILLED BY PURCHASER)

CONVEYOR DATA:

BELT WIDTH 24" IN.
BELT SPEED AT DESIGNED CAP _____ FPM
IDLER TROUGH ANGLE _____ °
ANGLE OF SURCHARGE _____ °
CONVEYOR TAKE-UP _____
TYPE _____
TRAVEL % FT IN.
LOCATION _____

IDLERS:

CARRYING IDLERS
MANUFACTURER _____
CEMA SERIES _____
DIAMETER _____
SPACING _____ FT _____ IN

IMPACT IDLERS

MANUFACTURER _____
CEMA SERIES _____
STEEL ROLL DIAMETER _____ IN.
RUBBER DISC DIAMETER _____ IN.
SPACING _____ FT _____ IN.

TRANSITION IDLERS

MANUFACTURER _____
CEMA SERIES _____
DIAMETER _____ IN
NUMBER REQUIRED _____

RETURN IDLERS

MANUFACTURER _____
CEMA SERIES _____
TYPE ☐ STEEL ☐ RUBBER DISC ☐ VEE-TROUGH
DIAMETER _____ IN.
SPACING _____ FT _____ IN.

TRAINING IDLERS

TROUGH TYPE _____ SPACING _____
RETURN TYPE _____ SPACING _____

BELTING:

BELT LENGTH 75 FT
WITHOUT TAKE-UP _____ FT
TAKE-UP ALLOWANCE _____ FT
SPICE ALLOWANCE _____ FT
TOTAL BELT LENGTH 250 FT

COVERS

GRADE: RMA _____
THICKNESS: TOP _____ IN. BOTTOM _____ IN

CARCASS

FABRIC _____
FABRIC RATING RMA _____
NUMBER PLYS _____
BREAKER: TOP _____ BOTTOM _____
MAXIMUM WORKING TENSION _____ LB
ALLOWABLE BELT SAG _____ %
ULTIMATE STRENGTH _____ LB
BELT WEIGHT _____ LB/FT

DRIVES:

STARTING CHARACTERISTICS _____
TYPE OF BRAKE AND/OR BACKSTOP: _____
BRAKE RATING _____ LB-FT
BACKSTOP RATING _____ LB-FT
HP REQ'D AT DRIVE SHAFT _____
SPEED REDUCER TYPE _____ MODEL _____
RATIO _____ OUTPUT SPEED _____
COUPLING TYPE _____ MODEL _____
CHAIN DRIVE TYPE _____
V-BELT DRIVE, P.D. DRIVE _____ P.D. DRIVEN _____
NO. BELTS _____ BELT SIZE _____
GUARDS, COUPLINGS _____
CHAIN _____
V-BELT _____

PULLEYS

LOCATION	TYPE OF PULLEY*	SIZE (DIA. X FACE LENGTH)
		IN. X _____ FT _____ IN
		IN. X _____ FT _____ IN
		IN. X _____ FT _____ IN
		IN. X _____ FT _____ IN
		IN. X _____ FT _____ IN
		IN. X _____ FT _____ IN

*TYPE WELDED STEEL CROWN, LAGGING, GROOVED LAGGING, CAST IRON, ETC.

REMARKS:

Rust
International Corporation

**FILTER
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. FL-17875 A, B, & C
NO. REQUIRED 3
SHEET _____ OF _____

1 CLIENT International Coal Refining Company
2 PROJECT 6000 TPSD SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Drum Filter for Thickener Underflow
4 VENDOR _____ P.O. NO. _____
5 MODEL _____ SERIAL NO. _____

6 NOTE: ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER

7 **BASIC DATA**

8 ☐ OPERATING CONDITIONS

9 RATED FLOW. (LB/HR) (GPM) 19,189 lb/hr equiv. to ~29 GPM flow to filter
10 MOLECULAR WEIGHT _____
11 SPECIFIC GRAVITY _____
12 VISCOSITY (LB-MASS/FT-HR) _____
13 INLET PRESSURE (PSIG) _____
14 INLET TEMP. (°F) _____
15 CORROSIVE CONTAMINANT _____
16 SUSPENDED SOLIDS _____
17 CHARACTERISTICS OF SOLID _____
18 PARTICLE SIZE (AVERAGE) _____
19 SOLIDS BY WT (%) 40% to filter; 80% from filter
20 MAX. ALLOW PRESSURE DROP CLEAN (PSI) _____
21 RETENTION (NOMINAL) % _____

22 ☐ FILTER TYPE Drum Filter

23 NO. OF ELEMENTS _____
24 TYPE OF ELEMENTS _____
25 MATERIAL OF ELEMENTS _____
26 MESH SIZE _____

27 ☐ CONSTRUCTION OF FILTER

28 FILTER DIA. BY LENGTH 3 meter Ø x 4½ meter
29 POSITION OF FILTER VERT. — HORIZ. _____
30 EFFECTIVE FILTER SURFACE AREA 434 square ft
31 WEIGHT. (LB) _____

32 ☐ DESIGN CONDITIONS

33 DESIGN PRESSURE (PSIG) _____
34 DESIGN TEMPERATURE (°F) _____
35 CORROSION ALLOWANCE (IN) _____
36 MATERIALS—SHELL & HEADS _____
37 INSULATION—PAINT _____

38 ☐ ASME CODE DESIGN ☐ STAMPED

CONNECTIONS:	QUAN.	SIZE	RATING-FACE	REMARKS
☐ INLET				
☐ OUTLET				
☐ VENT				
☐ DRAIN				
☐ RELIEF VALVE				
☐ PRESS INDICATOR				
☐ LEVEL GAUGE				
☐ QUICK OPENING COVER				

49 _____
50 _____
51 _____
52 _____
53 _____
54 _____

55 PREPARED BY C.P.
56 DATE 2-27-84
57 APPROVED BY _____ BY _____ DATE _____
58 DATE _____ APP'D _____ DATE _____ APP'D 163 DATE _____ APP'D _____ DATE _____

Rust

International Corporation

**CENTRIFUGAL PUMP
DATA SHEET**CONTRACT NO. 21-2548EQUIPMENT NO. P-17875 A, B, & CNO. REQUIRED 3SHEET 1 OF 1

1	CLIENT	International Coal Refining Company			PLANT LOCATION			Newman, Kentucky			
2	PROJECT	6000 T/D SRC-I Demonstration Plant									
3	SERVICE	Thickener Underflow Pump (Gallagher)									
4	VENDOR				P.O. NO.						
5	TYPE	MODEL			SERIAL NO.						
6	NO. OF MOTORS REQ'D	3			ITEM NO.	FURN. BY			MFR BY		
7	NO OF TURBINES REQ'D				ITEM NO.	FURN BY			MFR BY		
8	NOTE:	☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER			☐ BY MANUFACTURER						
9		☐ OPERATING CONDITIONS (EACH PUMP)			☐ PERFORMANCE						
10	LIQUID	40 wt% US GPM AT PT. NOR 29 RATED 60			PROPOSAL CURVE NO.						
11		Slurry DISCHARGE. PSIG 50			RPM NO OF STAGES						
12	PT. F. NOR	70 MAX. SUCTION. PSIG. MAX. 5 RATED			NPSHR. FT & IMPELLER T OF						
13	SP GR AT PT	1.32 DIFF. PRESS. PSI 45			EFF BHP RATED						
14	VAP PRESS AT PT. PSIA	DIFF. HEAD. FT 79			MAX. BHP RATED IMP						
15	VIS AT PT. LB(M)/FT-HR	NPSHA. FT			MAX HEAD RATED IMP						
16	CORR/EROS. CAUSED BY				MIN. CONTINUOUS GPM						
17					ROTATION (VIEWED FROM CPLG END)						
18	CONSTRUCTION				☐ INSPECTION AND TESTS						
19	NOZZLES	SIZE (IN)	RATING	FACING	LOCATION	SHOP INSPECTION		☐ REQ'D			
20	SUCTION					HYDROSTATIC TEST		☐ REQ'D ☐ WITNESS			
21	DISCHARGE					PERFORMANCE TEST		☐ REQ'D ☐ WITNESS			
22	CASE MT	☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE)			NPSH TEST		☐ REQ'D ☐ WITNESS				
23		SPLIT ☐ AXIAL ☐ RAD: TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER			INT INSP AFTER		☐ REQ'D ☐ WITNESS				
24		PRESS ☐ MAX ALLOW. PSIG °F. ☐ HYDRO TEST PSIG			TEST		☐ REQ'D ☐ WITNESS				
25		CONNECT ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET									
26		IMPELLER DIA ☐ RATED ☐ MAX. ☐ TYPE									
27		MOUNT ☐ BETWEEN BRGS ☐ OVERHUNG									
28		BEARINGS TYPE ☐ RADIAL ☐ THRUST									
29		LUBE ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE									
30		COUPLING ☐ MFR. ☐ MODEL									
31		DRIVER HALF MTD BY: ☐ PUMP MFR ☐ DRIVER MFR									
32		☐ MECH SEAL ☐ PACKING ☐ AUX. SEAL/PACKING									
33		MFR TYPE. MODEL									
34		MFR CODE API CODE									
35	AUXILIARY PIPING				VERTICAL PUMPS						
36	☐ C.W. PIPE PLAN ☐ Cu. ☐ SS. ☐ TUBING ☐ PIPE				PIT OR SUMP DEPTH ☐						
37	TOTAL COOLING WATER REQ'D GPM ☐ SIGHT FL REQ'D				PUMP LENGTH ☐						
38	☐ PACKING COOL INJECTION REQ'D ☐ TOTAL GPM ☐ PSIG				MIN SUBMERGENCE HEAD						
39	☐ SEAL FLUSH PIPE PLAN ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE				COLUMN PIPE ☐ FLANGED ☐ THREADED						
40	☐ EXTERNAL SEAL FLUSH FLUID ☐ GPM ☐ PSIG				LINE SHAFT ☐ OPEN ☐ ENCLOSED						
41	☐ AUXILIARY SEAL PLAN ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE				BRGS ☐ BOWL ☐ LINE SHAFT						
42	☐ AUX. SEAL FLUSH/QUENCH FLUID				BRG LUB ☐ WATER ☐ OIL ☐ GREASE						
43	MATERIALS				FLOAT & ROD ☐ C.S. ☐ S.S. ☐ BRZ ☐ NONE						
44	☐ PUMP CASE/TRIM API CLASS				FLOAT SWITCH ☐						
45	CASING CS CORR ALL IN.				PUMP THRUST LB ☐ UP ☐ DOWN						
46	IMPELLER SS 316 WEAR RINGS SS 316				MOUNTING PLATE REQ'D ☐						
47	SHAFT SS 316 ULLVL(S)				☐ WEIGHTS AND DIMENSIONS						
48	CASE INT COATING/LINING GLAND				APPROX. WT PUMP & BASE LB						
49	BASEPLATE DRIP PAN				MOTOR LB TURBINE LB						
50	☐ SITE CONDITIONS				BASE PLAT DIMENSIONS						
51	ELEVATION FT DUST/FUMES				APPLICABLE SPECIFICATIONS						
52	AMB TEMP °F MAX MIN AREA ELECT CL GH DIV				☐ API 610 ☐ ANSI B73.1 B73.2						
53	COOLING WATER SUPPLY PSIG F RETURN PSIG F				☐ PROJECT SPECIFICATIONS						
54	REMARKS Pump equipped with 5 HP motor										
55	PREPARED BY CP				REVISION ☐						
56	DATE 2-27-84				REVISION ☐						
57	APPROVED BY				REVISION ☐						
58	DATE				DATE

Rust
International Corporation

**CENTRIFUGAL PUMP
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. P -1786 A & B
NO. REQUIRED 2
SHEET 1 OF 1

CLIENT International Coal Refining Company

PROJECT 6,000 T/D SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

SERVICE Thickener Overflow Sump Pump

VENDOR

P.O. NO.

TYPE

MODEL

SERIAL NO.

NO. OF MOTORS REQ'D 2

ITEM NO.

FURN. BY

MFR BY

NO OF TURBINES REQ'D

ITEM NO.

FURN BY

MFR BY

NOTE: ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER

☐ BY MANUFACTURER

☐ OPERATING CONDITIONS (EACH PUMP)

☐ PERFORMANCE

LIQUID Water US GPM AT PT. NOR 115 RATED 140

DISCHARGE PSIG 100

PT. F. NOR. 70 MAX. SUCTION PSIG MAX 0 RATED

SP GR AT PT 1.0 DIFF PRESS. PSI 100

VAP. PRESS. AT PT. PSIA DIFF. HEAD. FT 231

VIS AT PT. LB(M)/FT-HR NPSHA. FT

CORR/EROS. CAUSED BY

PROPOSAL CURVE NO.

RPM NO OF STAGES

NPSHR. FT. & IMPELLER T O F

EFF BHP RATED

MAX BHP RATED IMP

MAX HEAD RATED IMP

MIN. CONTINUOUS GPM

ROTATION (VIEWED FROM CPLG END)

CONSTRUCTION

NOZZLES SIZE (IN) RATING FACING LOCATION

SUCTION

DISCHARGE

CASE MT ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☒ VERT. (TYPE)

SPLIT ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER

PRESS ☐ MAX ALLOW. PSIG ☐ F. ☐ HYDRO TEST PSIG

CONNECT ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET

IMPELLER DIA ☐ RATED ☐ MAX. ☐ TYPE

MOUNT ☐ BETWEEN BRGS ☐ OVERHUNG

BEARINGS TYPE: ☐ RADIAL ☐ THRUST

LUBE ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE

COUPLING: ☐ MFR. ☐ MODEL

DRIVER HALF MTD BY: ☐ PUMP MFR ☐ DRIVER MFR

☐ MECH SEAL ☐ PACKING ☐ AUX. SEAL/PACKING

MFR TYPE. MODEL

MFR CODE API CODE

AUXILIARY PIPING

☐ C W PIPE PLAN ☐ Cu: ☐ SS: ☐ TUBING: ☐ PIPE.

☐ TOTAL COOLING WATER REQ'D GPM ☐ SIGHT F.I. REQ'D.

☐ PACKING COOL INJECTION REQ'D. ☐ TOTAL GPM ☐ PSIG

☐ SEAL FLUSH PIPE PLAN ☐ C S ☐ S S ☐ TUBING ☐ PIPE

☐ EXTERNAL SEAL FLUSH FLUID ☐ GPM ☐ PSIG

☐ AUXILIARY SEAL PLAN ☐ C S. ☐ S S ☐ TUBING ☐ PIPE

☐ AUX SEAL FLUSH/QUENCH FLUID

MATERIALS

☐ PUMP CASE/TRIM API CLASS

CASING C.S. CORR ALL. SS IN.

IMPELLER SS 316 WEAR RINGS SS 316

SHAFT SS 316 SLEEVE(S)

CASE INT COATING/LINING GLAND

☐ BASEPLATE ☐ DRIP PAN

☐ **SITE CONDITIONS**

ELEVATION FT DUST/FUMES

AMB TEMP F MAX MIN AREA FLECT CI GR DIV.

COOLING WATER SUPPLY PSIG F. RETURN: PSIG F

REMARKS: Pump equipped with 25 HP motor

☐ **INSPECTION AND TESTS**

SHOP INSPECTION

☐ REQD

HYDROSTATIC TEST

☐ REQD

☐ WITNESS

PERFORMANCE TEST

☐ REQD

☐ WITNESS

NPSH TEST

☐ REQD

☐ WITNESS

INT INSP. AFTER

☐ REQD

☐ WITNESS

TEST

☐ REQD

☐ WITNESS

☐ **INT WEAR PARTS**

WEAR RINGS ☐ CASE ☐ IMP

DIA. IN CLEARANCE IN

INTERSTAGE BUSHINGS

DIA. IN CLEARANCE IN.

VERTICAL PUMPS

PIT OR SUMP DEPTH 6'

PUMP LENGTH

MIN SUBMERGENCE REQ'D. ☐

COLUMN PIPE: ☐ FLANGED ☐ THREADED

LINE SHAFT: ☐ OPEN ☐ ENCLOSED

BRGS. ☐ BOWL ☐ LINE SHAFT

BRG LUB ☐ WATER ☐ OIL ☐ GREASE

FLOAT & ROD ☐ C.S. ☐ S.S. ☐ BRZ ☐ NONE

FLOAT SWITCH ☐

PUMP THRUST LB ☐ UP ☐ DOWN

MOUNTING PLATE REQ'D ☐

☐ **WEIGHTS AND DIMENSIONS**

APPROX WT PUMP & BASE LB

MOTOR LB TURBINE LB

BASE PLATE DIMENSIONS

APPLICABLE SPECIFICATIONS

☐ API 610 ☐ ANSI B73.1, B73.2

☐ PROJECT SPECIFICATIONS

Rust
International Corporation

**CENTRIFUGAL PUMP
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. P-17877 A & B
NO. REQUIRED 2
SHEET 1 OF 1

CLIENT International Coal Refining Company
PROJECT 6,000 T/D SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
SERVICE Filtrate Sump Pump
VENDOR _____ P.O. NO. _____

TYPE _____ MODEL _____ SERIAL NO. _____
NO. OF MOTORS REQ'D 2 ITEM NO. _____ FURN. BY _____ MFR BY _____
NO OF TURBINES REQ'D _____ ITEM NO. _____ FURN BY _____ MFR BY _____
NOTE ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER

☐ OPERATING CONDITIONS (EACH PUMP)
LIQUID Water US GPM AT PT. NOR 38.5 RATED 46
DISCHARGE. PSIG 30
PT. F. NOR. 70 MAX. _____ SUCTION. PSIG. MAX 0 RATED _____
SP. GR. AT PT. 1.0 DIFF. PRESS. PSI 30
VAP. PRESS. AT PT. PSIA _____ DIFF. HEAD. FT. 69
VIS. AT PT. LB(M)/FT.-HR. _____ NPSHA. FT. _____
CORR./EROS. CAUSED BY _____

CONSTRUCTION
NOZZLES _____ SIZE (IN.) _____ RATING _____ FACING _____ LOCATION _____
SUCTION _____
DISCHARGE _____
CASE MT. ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE) _____
SPLIT ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER
PRESS. ☐ MAX. ALLOW _____ PSIG _____ F. HYDRU. TEST _____ PSIG
CONNECT ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET
IMPELLER DIA. ☐ RATED _____ ☐ MAX _____ ☐ TYPE _____
MOUNT ☐ BETWEEN BRGS ☐ OVERHUNG
BEARINGS TYPE. ☐ RADIAL _____ ☐ THRUST _____
LUBE ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE
COUPLING ☐ MFR _____ ☐ MODEL _____
DRIVER HALF MTD BY ☐ PUMP MFR ☐ DRIVER MFR
☐ MECH SEAL ☐ PACKING ☐ AUX. SEAL/PACKING
MFR TYPE. MODEL _____
MFR CODE _____ API CODE _____

AUXILIARY PIPING
☐ C.W. PIPE PLAN ☐ Cu. ☐ SS. ☐ TUBING: ☐ PIPE
TOTAL COOLING WATER REQ'D GPM _____ ☐ SIGHT F.I. REQ'D
☐ PACKING COOL. INJECTION REQ'D ☐ TOTAL GPM _____ ☐ PSIG
☐ SEAL FLUSH PIPE PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE
☐ EXTERNAL SEAL FLUSH FLUID _____ ☐ GPM _____ ☐ PSIG
☐ AUXILIARY SEAL PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE
☐ AUX. SEAL FLUSH/QUENCH FLUID _____

MATERIALS
☐ PUMP CASE/TRIM API CLASS _____
CASING C.S. CORR. ALL. _____ IN.
IMPELLER SS 316 WEAR RINGS SS 316
SHAFT SS 316 SLEEVE(S) _____
CASE INT. COATING/LINING _____ GLAND _____
BASEPLATE _____ DRIP PAN _____

☐ SITE CONDITIONS
E. ELEVATION FT. _____ DUST/FUMES _____
AMB. TEMP. F. _____ MAX _____ MIN _____ AREA ELECT. CL. _____ GR. _____ DIV _____
COOLING WATER SUPPLY _____ PSIG _____ F. RETURN: _____ PSIG _____ F.

REMARKS: Pump is equipped with 5 HP motor

☐ PERFORMANCE
PROPOSAL CURVE NO. _____
RPM _____ NO. OF STAGES _____
NPSHR. FT. & IMPELLER _____ T.O.F. _____
EFF. _____ BHP RATED _____
MAX. BHP RATED IMP. _____
MAX. HEAD RATED IMP. _____
MIN. CONTINUOUS GPM _____
ROTATION (VIEWED FROM CPLG. END) _____

☐ INSPECTION AND TESTS
SHOP INSPECTION ☐ REQ'D
HYDROSTATIC TEST ☐ REQ'D ☐ WITNESS
PERFORMANCE TEST ☐ REQ'D ☐ WITNESS
NPSH TEST ☐ REQ'D ☐ WITNESS
INT. INSP. AFTER _____ TEST ☐ REQ'D ☐ WITNESS

☐ INT. WEAR PARTS
WEAR RINGS ☐ CASE ☐ IMP
DIA. _____ IN. CLEARANCE _____ IN.
INTERSTAGE BUSHINGS
DIA. _____ IN. CLEARANCE _____ IN.

VERTICAL PUMPS
PIT OR SUMP DEPTH 5'
PUMP LENGTH ☐ _____
MIN. SUBMERGENCE REQ'D. ☐ _____
COLUMN PIPE ☐ FLANGED ☐ THREADED
LINE SHAFT ☐ OPEN ☐ ENCLOSED
BRGS. ☐ BOWL _____ ☐ LINE SHAFT _____
BRG. LUB. ☐ WATER ☐ OIL ☐ GREASE
FLOAT & ROD ☐ C.S. ☐ S.S. ☐ BRZ. ☐ NONE
FLOAT SWITCH ☐ _____
PUMP THRUST LB. ☐ UP _____ ☐ DOWN _____
MOUNTING PLATE REQ'D ☐ _____

☐ WEIGHTS AND DIMENSIONS
APPROX. WT. PUMP & BASE _____ LB.
MOTOR _____ LB. TURBINE _____ LB.
BASE PLATE DIMENSIONS _____

APPLICABLE SPECIFICATIONS
☐ API 610 ☐ ANSI B73.1, B73.2
☐ PROJECT SPECIFICATIONS _____

PREPARED BY C.P. REVISION △ REVISION △ REVISION △
DATE 2-27-84 BY _____ DATE _____ BY _____ DATE _____
APPROVED BY _____ BY _____ DATE _____ BY _____ DATE _____
DATE _____ APP'D _____ DATE 166 APP'D _____ DATE _____

Rust

International Corporation

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO.	21-2548
EQUIPMENT NO.	TK-17874
NO. REQUIRED	1
SHEET	1 OF 1

CLIENT	International Coal Refining Company		
PROJECT	6000 TSPD SRC-I Demonstration Plant	PLANT LOCATION	Newman, Kentucky
SERVICE	Splitter Box		
VENDOR	P.O. NO.		

Size of splitter box is 5' x 5' x 5', c.s. coal tar epoxy coated

PREPARED BY	C. P.	REVISION	△	REVISION	△	REVISION	△
DATE	2-27-84	BY	DATE	BY	DATE	BY	DATE
APPROVED BY		APP'D	DATE	APP'D	DATE	APP'D	DATE

Rust

International Corporation

**TANK
DATA SHEET**

CONTRACT NO. 21-2548

EQUIPMENT NO. TK-17875

NO. REQUIRED 1

SHEET 1 OF 1

1	CLIENT	International Coal Refining Company				
2	PROJECT	6000 TPSD SRC-I Demonstration Plant			PLANT LOCATION Newman, Kentucky	
3	SERVICE	Thickener Overflow Sump				
4	VENDOR	P.O. NO.				
5	DIAMETER	6' x 9'	HEIGHT	6	FT.	MATERIAL
6	CAPACITY: NORMAL			GAL	SHELL Concrete	THICK. 4 IN.
7	NET WORKING			GAL	ROOF	THICK. IN.
8	OPERATING CONDITIONS				BOTTOM Concrete	THICK. 4 IN.
9	SPECIFIC GRAVITY, LIQ	1.0	AT TEMP	°F	STRUCTURALS	
10	PUMPING RATES: IN		OUT	GPM	NOZZLE: NECK	FLANGE
11	VAPOR PRESS		IN. WATER		COUPLINGS	
12	MAX OPER. TEMP.		°F		INTERNALS: FIXED	
13	DESIGN CONDITIONS				REMOVABLE	
14	CODE API	n/a	APPENDIX		GASKETS	
15	DESIGN METAL TEMP		°F		BOLTING	
16	DESIGN PRESS		IN. WATER		EST. ERECTION WT (LB)	
17	CORROSION ALLOW: SHELL		ROOF	IN.	NOZZLES	
18	BOTTOM		INTERNALS	IN.	FLANGE RATING	COUPLING RATING
19	ROOF TYPE				MARK NO.	NO. REQ'D.
20	ROOF LIVE LOADS		PSF		SIZE IN	FACING
21	WIND PRESS		PSF			SERVICE
22	EARTHQUAKE CODE		ZONE		N-1	INLET
23	FOUNDATION TYPE				N-2	OUTLET
24	RADIOGRAPHY: EXTENT				N-3	DRAIN
25	STRESS RELIEF: YES/NO		EXTENT		N-4	RELIEF/VENT
26	INSULATION: YES/NO		THICK:	IN.	N-5	
27	LEAK TESTING: BOTTOM		SHELL	ROOF	N-6	
28	MILL TEST REPORTS: YES/NO				N-7	
29	PAINTING: YES/NO SPEC:				M-1	MAN WAY
30	SKETCH					
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55	PREPARED BY	C. P.	REVISION		△	REVISION
56	DATE	2-27-84	REVISION		△	REVISION
57	APPROVED BY		BY	DATE	BY	DATE
58	DATE		APP'D	DATE	APP'D	DATE

Rust

International Corporation

**TANK
DATA SHEET**CONTRACT NO. 21-2548
EQUIPMENT NO. TK 17876
NO. REQUIRED 1
SHEET 1 OF 1

1	CLIENT	International Coal Refining Company			
2	PROJECT	6w00 T/D SRC-I Demonstration Plant		PLANT LOCATION Newman, Kentucky	
3	SERVICE	Filtrate Sump			
4	VENDOR	P.O. NO.			
5	DIAMETER	5' x 5'	HEIGHT	5	FT.
6	CAPACITY: NORMAL	GAL	SHELL	Concrete	THICK. 4 IN.
7	NET WORKING	GAL	ROOF	Concrete	THICK. 4 IN.
8	OPERATING CONDITIONS		BOTTOM Concrete THICK. 4 IN.		
9	SPECIFIC GRAVITY	LIO	AT TEMP	°F	STRUCTURALS
10	PUMPING RATES	IN	OUT	GPM	NOZZLE: NECK FLANGE
11	VAPOR PRESS	IN. WATER		COUPLINGS	
12	MAX. OPER. TEMP	°F		INTERNALS: FIXED	
13	DESIGN CONDITIONS		REMOVABLE		
14	CODE: API	n/a	APPENDIX	GASKETS	
15	DESIGN METAL TEMP	°F		BOLTING	
16	DESIGN PRESS	IN. WATER		EST. ERECTION WT (LB)	
17	CORROSION ALLOW: SHELL	ROOF	IN.	NOZZLES	
18	BOTTOM	INTERNALS	IN.	FLANGE RATING	
19	ROOF TYPE	MARK NO.		NO. REQ'D.	SIZE IN
20	ROOF LIVE LOADS	PSF	N-1		FACING
21	WIND PRESS	PSF	N-2		SERVICE
22	EARTHQUAKE: CODE	ZONE	N-3		INLET
23	FOUNDATION TYPE		N-4		OUTLET
24	RADIOGRAPHY: EXTENT		N-5		DRAIN
25	STRESS RELIEF: YES/NO	EXTENT	N-6		RELIEF/VENT
26	INSULATION: YES/NO	THICK: IN.	N-7		
27	LEAK TESTING BOTTOM	SHELL ROOF	M-1		
28	MILL TEST REPORTS: YES/NO				MAN WAY
29	PAINTING: YES/NO SPEC:				

SKETCH

PREPARED BY C. P.

DATE 2-27-84

REVISION

REVISION

REVISION

APPROVED BY

BY DATE

BY DATE

BY DATE

DATE

APP'D DATE

APP'D 169

DATE

APP'D DATE

Rust

International Corporation

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548

EQUIPMENT NO. X-17875 A & B

NO. REQUIRED 2

SHEET 1 OF 1

CLIENT International Coal Refining Company

PROJECT 6000 TPSD SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

SERVICE Vacuum System for Drum Filters

VENDOR

P.O. NO.

The system includes:

V-17875

Filtrate Receiver

300 gallons capacity

C-17875 A & B

Vacuum Pump

2,000 CFM ea. 125 HP Motor

P-17878 A & B

Filtrate Pump

46 GPM x 30' TDH, 3 HP Motor

PREPARED BY CP

DATE 2-27-84

REVISION

REVISION

REVISION

APPROVED BY

BY

DATE

BY

DATE

BY

DATE

DATE

APP'D

DATE

APP'D

170

DATE

APP'D

DATE

Rust

International Corporation

ROTARY FEED VALVE FROM
CEMENT SILO
(GENERAL EQUIPMENT DATA SHEET)CONTRACT NO. 21-2548
EQUIPMENT NO. AL-17875 A. B
NO. REQUIRED 2
SHEET 1 OF 1

CLIENT International Coal Refining Company

PROJECT 6000 T/D SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

SERVICE Cement Silo Rotary Feed Valve

VENDOR

P.O. NO.

Size: 12" Ø
Material: CS
Motor: 2Hp @ 19 RPMPREPARED BY CP
DATE 3-1-84

REVISION △

REVISION △

REVISION △

APPROVED BY

BY

DATE

BY

DATE

BY

DATE

DATE

APP'D

DATE

APP'D

171

DATE

APP'D

DATE

Rust

International Corporation

FLY DUST BATCHING
HOPPER

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548

EQUIPMENT NO. BH-17875 A,B,

NO. REQUIRED 2

SHEET 1 OF 1

1 CLIENT International Coal Refining Company
2 PROJECT 6000 T/D SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Fly Dust Batching Hopper
4 VENDOR P.O. NO.

Capacity: 244 CF
Activator: 1 Hp
Material: C.S.

55 PREPARED BY CP	REVISION	REVISION	REVISION
56 DATE 1-29-84			
57 APPROVED BY	BY DATE	BY DATE	BY DATE
58 DATE	APP'D DATE	APP'D 172 DATE	APP'D DATE

Rust

International Corporation

CEMENT BATCHING HOPPER

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548

EQUIPMENT NO. BH-17876 A.B

NO. REQUIRED 2

SHEET 1 OF 1

CLIENT International Coal Refining Company

PROJECT 6000 T/D SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

SERVICE Cement Batching Hopper

VENDOR P.O. NO.

Capacity: 45 Cubic feet
Activator: 1 Hp
Material: C.S.

REPAIRED BY CP
DATE 1-29-84

APPROVED BY
DATE

REVISION

BY DATE
APP'D DATE

REVISION

BY DATE
APP'D DATE

REVISION

BY DATE
APP'D DATE

Rust

International Corporation

**SCREW CONVEYOR
DATA SHEET**

PAGE 1 OF 3

CONTRACT NO. 21-2548

EQUIPMENT NO. CV-17877 A.B

NO. REQUIRED 2

SHEET 1 OF 1

1 CLIENT International Coal Refining Company
2 PROJECT 6000 T/D SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Fly Dust Screw Conveyor from Silo to Charging Hopper
4 VENDOR P.O. NO.
5 APPLICABLE SPECIFICATIONS AND CODES
6
7
8
9

PURCHASER'S DATA

MATERIAL TO BE HANDLED		OPERATING CONDITIONS	
12 MATERIAL Fly dust case		CAPACITY NORMAL 65	YPH
		DESIGN	YPH
14 PHYSICAL PROPERTIES		OPERATION: ☐ CONTINUOUS	
15 BULK DENSITY 55.5	LB/FT ³	☒ INTERMITTENT	HR/DAY
16 ANGLE OF REPOSE	°	LOCATION: ☒ OUTDOOR	
17 MOISTURE CONTENT 20	%	☐ INDOOR	
18 CHARACTERISTICS: ☐ STICKY ☐ TOXIC		AMBIENT TEMPERATURE RANGE	°F
19 ☐ ABRASIVE ☐ CORROSIVE ☐ EXPLOSIVE		DISTANCE TO BE CONVEYED	FT. IN.
20 ☐ HYGROSCOPIC ☐ DEGRADABLE		☐ OR SEE SKETCH	
21 ☐ FLUIDIZING ☐ OTHER		ELECT. AREA CLASS. GROUP DIV.	
22		CONVEYOR LOADING:	
23 PARTICLE SIZE DISTRIBUTION		☐ FROM REGULATED FEEDING DEVICE	
24 SIZE	%	☐ FROM STATIC STORAGE	
25		NUMBER OF LOADING INLETS	
26		☐ SINGLE ☐ MULTIPLE	(NUMBER)
27		CONVEYOR DISCHARGE:	
28		☐ STANDARD DISCHARGE SPOUT	
29 MAX SIZE LUMPS	IN	☐ MECHANICALLY OPERATED GATE	
30 % OF MAX. LUMPS		☐ OTHER	
31 MATERIAL TEMPERATURE	°C	NUMBER OF DISCHARGE:	
32 OTHERS		☐ SINGLE ☐ MULTIPLE	(NUMBER)
33		OTHERS	
34 ATTACH PARTICLE SIZE DISTRIBUTION GRAPH			
35			

VENDOR'S DATA

(VENDOR TO COMPLETE ALL DATA BELOW UNLESS OTHERWISE FILLED BY PURCHASER)

EQUIPMENT DATA		OTHERS	
38 TYPE OF CONVEYOR:		24" diam screw, 42 RPM	
40 ☐ HORIZONTAL ☐ VERTICAL ☐ INCLINED			
41 MFG'S MODEL NO			
42 SIZE DIAMETER IN. LENGTH FT. IN.			
43 OPERATING SPEED AT DESIGNED CAP.			
44 % LOADING OF TROUGH VOLUME			
45 MOTOR DATA (SEE ATTACHED SHEET)			
46 POWER REQUIRED AT DESIGNED CAPACITY HP			
47 RECOMMENDED MOTOR 1.5 HP			
48			
49			
50			
51			
52			
53			
54			

PREPARED BY CP		REVISION		REVISION		REVISION	
56 DATE 2-29-84							
57 APPROVED BY	BY	DATE		BY	DATE	BY	DATE
58 DATE	APP'D	DATE 174		APP'D	DATE	APP'D	DATE

Rust
International Corporation

**SCREW CONVEYOR
DATA SHEET**

PAGE 2 OF 3

CONTRACT NO. 21-2548
EQUIPMENT NO. CV-17877 A, B,
NO REQUIRED 2
SHEET 2 OF 3

EQUIPMENT COMPONENTS

HOUSING

TYPE:

☐ TROUGH ☐ TUBULAR

☐ OTHER _____

MATERIAL _____

SUPPORTED BY

☐ FLANGE FEET ☐ SADDLES

☐ OTHER _____

TROUGH THICKNESS _____ IN.

TYPE OF TROUGH ENDS _____

HOUSING COVER PLATE

STYLE _____

MATERIAL _____

PLATE THICKNESS _____ IN.

METHOD OF SEALING _____

TYPE OF CLOSING:

☐ CLIPS OR CLAMPS

☐ PACKING AND BOLTS

CONVEYOR SCREW

TYPE:

☐ INDUSTRIAL HELICOID

☐ SECTIONAL SCREW

☐ RIBBON ☐ OTHER _____

MATERIAL _____

HARDNESS OF FLIGHTS _____ BHN

THICKNESS OF FLIGHTS _____ IN.

NO. OF FLIGHTS: ☐ SINGLE ☐ DOUBLE

PITCH _____ IN.

SHAFT

DIAMETER _____ IN.

MATERIAL _____

TYPE OF END SHAFT SEAL _____

SHAFT COUPLING MATERIAL _____

COUPLING BOLTS MATERIAL _____

END BEARINGS

FEED END:

TYPE _____

MATERIAL _____

DISCHARGE END:

TYPE _____

MATERIAL _____

HANGERS

TYPE _____

MATERIAL _____

NUMBER _____

DRIVE

ARRANGEMENT

☐ INTEGRAL END DRIVE _____

☐ COMBINATION MOTOR-REDUCER _____

☐ INTEGRAL SHAFT-MOUNTED WORM DRIVE _____

☐ COUNTERSHAFT END DRIVE _____

☐ OTHER _____

LOCATION: ☐ HEAD ☐ TAIL

MOTOR SPEED _____ RPM

TYPE OF REDUCER _____

REDUCER RATIO _____

V-BELT RATIO _____

VARIABLE SPEED RANGE _____

SERVICE FACTOR _____

SAFETY DEVICES:

☐ TORQUE LIMITING DEVICE

☐ ZERO SPEED SWITCHES

☐ OTHER _____

OTHERS _____

REMARKS:

Rust
International Corporation

**SCREW CONVEYOR
DATA SHEET**
PAGE 3 OF 3

CONTRACT NO. 21-2548
EQUIPMENT NO. CV-17877 A,B
NO. REQUIRED 2
SHEET 3 of 3

SKETCH

A — TROUGH LENGTH _____ FT _____ IN.

B — DISTANCE TO BE CONVEYED _____ FT _____ IN.

C — CENTER LINE TO INLET FLANGE _____ FT _____ IN.

D — CENTER LINE TO DISCHARGE FLANGE _____ FT _____ IN.

E — CENTER LINE DISCHARGE SPOUT TO END PLATE _____ FT _____ IN.

INLET SPOUT: F — CENTER LINE BETWEEN SPOUTS _____ FT _____ IN.
OTHERS _____ FT _____ IN.

SPOUT SIZE I₁ _____ IN. X _____ IN.
I₂ _____ IN. X _____ IN.
OTHERS _____ IN. X _____ IN.

DISCHARGE SPOUT: G — CENTER LINE BETWEEN SPOUTS _____ FT _____ IN.
OTHERS _____ FT _____ IN.

SPOUT SIZE O₁ _____ IN. X _____ IN.
O₂ _____ IN. X _____ IN.
OTHERS _____ IN. X _____ IN.

FOR INCLINED CONVEYOR:

ANGLE OF INCLINATION FROM HORIZONTAL _____

TOTAL ESTIMATED CONVEYOR WEIGHT _____ LB

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**SCREW CONVEYOR
DATA SHEET**
PAGE 1 OF 3

CONTRACT NO. 21-2548
EQUIPMENT NO. CV-17878 A.B
NO. REQUIRED 2
SHEET 1 OF 3

1 CLIENT International Coal Refining Company
2 PROJECT 6000 T/D SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Cement Screw Conveyor from Silo to Charging Hopper
4 VENDOR _____ P.O. NO. _____

5 APPLICABLE SPECIFICATIONS AND CODES

PURCHASER'S DATA

MATERIAL TO BE HANDLED

12 MATERIAL Cement Powder

14 PHYSICAL PROPERTIES

15 BULK DENSITY 90 LB/FT³

16 ANGLE OF REPOSE _____ °

17 MOISTURE CONTENT _____ %

18 CHARACTERISTICS: ☐ STICKY ☐ TOXIC

19 ☐ ABRASIVE ☐ CORROSIVE ☐ EXPLOSIVE

20 ☐ HYGROSCOPIC ☐ DEGRADABLE

21 ☐ FLUIDIZING ☐ OTHER _____

23 PARTICLE SIZE DISTRIBUTION *

24 SIZE %

29 MAX. SIZE LUMPS _____ IN

30 % OF MAX. LUMPS _____

31 MATERIAL TEMPERATURE _____ °F

32 OTHERS _____

34 *ATTACH PARTICLE SIZE DISTRIBUTION GRAPH

OPERATING CONDITIONS

CAPACITY NORMAL 20 TPH

DESIGN _____ TPH

OPERATION: ☐ CONTINUOUS

☒ INTERMITTENT _____ HR/DAY

LOCATION: ☒ OUTDOOR

☐ INDOOR

AMBIENT TEMPERATURE RANGE _____ / _____ °F

DISTANCE TO BE CONVEYED: _____ FT _____ IN.

☐ OR SEE SKETCH

ELECT. AREA CLASS. _____ GROUP _____ DIV. _____

CONVEYOR LOADING:

☐ FROM REGULATED FEEDING DEVICE

☐ FROM STATIC STORAGE

NUMBER OF LOADING INLETS

☐ SINGLE ☐ MULTIPLE _____ (NUMBER)

CONVEYOR DISCHARGE:

☐ STANDARD DISCHARGE SPOUT

☐ MECHANICALLY OPERATED GATE

☐ OTHER

NUMBER OF DISCHARGE:

☐ SINGLE ☐ MULTIPLE _____ (NUMBER)

OTHERS _____

VENDORS DATA

(VENDOR TO COMPLETE ALL DATA BELOW UNLESS OTHERWISE FILLED BY PURCHASER)

EQUIPMENT DATA

39 TYPE OF CONVEYOR:

40 ☐ HORIZONTAL ☐ VERTICAL ☐ INCLINED

41 MFG'S MODEL NO _____

42 SIZE: DIAMETER _____ IN.. LENGTH _____ FT _____ IN.

43 OPERATING SPEED AT DESIGNED CAP. _____

44 % LOADING OF TROUGH VOLUME _____

45 MOTOR DATA (SEE ATTACHED SHEET)

46 POWER REQUIRED AT DESIGNED CAPACITY _____ HP

47 RECOMMENDED MOTOR 5 HP

OTHERS _____

16" diam screw, 30 RPM

55 PREPARED BY CP

56 DATE 2-29-84

REVISION

57 APPROVED BY _____

58 DATE _____

BY

DATE

APP'D

DATE

REVISION

BY

DATE

APP'D

177

DATE

REVISION

BY

DATE

APP'D

DATE

Rust
International Corporation

**SCREW CONVEYOR
DATA SHEET**

PAGE 2 OF 3

CONTRACT NO. 21-2548
EQUIPMENT NO. CV-17878 A, B
NO. REQUIRED 2
SHEET 2 OF 3

EQUIPMENT COMPONENTS

HOUSING

TYPE:

☐ TROUGH ☐ TUBULAR

☐ OTHER _____

MATERIAL _____

SUPPORTED BY

☐ FLANGE FEET ☐ SADDLES

☐ OTHER _____

TROUGH THICKNESS _____ IN.

TYPE OF TROUGH ENDS _____

HOUSING COVER PLATE

STYLE _____

MATERIAL _____

PLATE THICKNESS _____ IN.

METHOD OF SEALING _____

TYPE OF CLOSING:

☐ CLIPS OR CLAMPS

☐ PACKING AND BOLTS

CONVEYOR SCREW

TYPE:

☐ INDUSTRIAL HELICOID

☐ SECTIONAL SCREW

☐ RIBBON ☐ OTHER _____

MATERIAL _____

HARDNESS OF FLIGHTS _____ BHN

THICKNESS OF FLIGHTS _____ IN.

NO. OF FLIGHTS: ☐ SINGLE ☐ DOUBLE

PITCH _____ IN.

SHAFT

DIAMETER _____ IN.

MATERIAL _____

TYPE OF END SHAFT SEAL _____

SHAFT COUPLING MATERIAL _____

COUPLING BOLTS MATERIAL _____

END BEARINGS

FEED END:

TYPE _____

MATERIAL _____

DISCHARGE END:

TYPE _____

MATERIAL _____

HANGERS

TYPE _____

MATERIAL _____

NUMBER _____

DRIVE

ARRANGEMENT

☐ INTEGRAL END DRIVE _____

☐ COMBINATION MOTOR-REDUCER _____

☐ INTEGRAL SHAFT-MOUNTED WORM DRIVE _____

☐ COUNTERSHAFT END DRIVE _____

☐ OTHER _____

LOCATION: ☐ HEAD ☐ TAIL

MOTOR SPEED _____ RPM

TYPE OF REDUCER _____

REDUCER RATIO _____

V-BELT RATIO _____

VARIABLE SPEED RANGE _____

SERVICE FACTOR _____

SAFETY DEVICES:

☐ TORQUE LIMITING DEVICE

☐ ZERO SPEED SWITCHES

☐ OTHER _____

OTHERS _____

REMARKS:

Rust
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**SCREW CONVEYOR
DATA SHEET**
PAGE 3 OF 3

CONTRACT NO. 21-2548
EQUIPMENT NO. CV-17878 A,B
NO REQUIRED 2
SHEET 3 OF 3

SKETCH

A — TROUGH LENGTH _____ FT _____ IN.

B — DISTANCE TO BE CONVEYED _____ FT _____ IN.

C — CENTER LINE TO INLET FLANGE _____ FT _____ IN.

D — CENTER LINE TO DISCHARGE FLANGE _____ FT _____ IN.

E — CENTER LINE DISCHARGE SPOUT TO END PLATE _____ FT _____ IN.

INLET SPOUT: F — CENTER LINE BETWEEN SPOUTS _____ FT _____ IN.

OTHERS _____ FT _____ IN.

SPOUT SIZE I₁ _____ IN. X _____ IN.

I₂ _____ IN. X _____ IN.

OTHERS _____ IN. X _____ IN.

DISCHARGE SPOUT: G — CENTER LINE BETWEEN SPOUTS _____ FT _____ IN.

OTHERS _____ FT _____ IN.

SPOUT SIZE: O₁ _____ IN. X _____ IN.

O₂ _____ IN. X _____ IN.

OTHERS _____ IN. X _____ IN.

FOR INCLINED CONVEYOR:

ANGLE OF INCLINATION FROM HORIZONTAL _____ °

TOTAL ESTIMATED CONVEYOR WEIGHT _____ LB

Rust
International Corporation

DUST COLLECTOR DATA SHEET

CONTRACT NO. 21-2548
EQUIPMENT NO. AC-17875
NO. REQUIRED 1
SHEET 1 OF 1

1 CLIENT International Coal Refining Company
2 PROJECT 6000 T/D SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Cement Silo Dust Collector
4 VENDOR P.O. NO.

5 SERVICE CONDITIONS ☐ INDOOR ☒ OUTDOOR ☒ CONTINUOUS ☐ INTERMITTENT

PROCESS

8 FLOW MEDIUM	DUST MATERIAL Cement
9 VOLUME (CFM)	INLET TEMP. °F
10 MOISTURE %	DUST PARTICLE DISTRIBUTION % BY WEIGHT AS FOLLOWS:
11 DUST LOADING (GRAMS/FT ³)	— MICRON %
12 DUST QUANTITY (LB/HR)	— MICRON %
13 APPARENT DENSITY TRUE DENSITY	— MICRON %
14 ABRASIVENESS	— MICRON %
15 DESIGN PRESSURE (INCHES WATER)	— MICRON %
16 PRESSURE DROP (INCHES WATER) ALLOW. ACTUAL	— MICRON %
17 INDEX OF EXPLOSIBILITY	
18 MINIMUM EXPLOSIVE CONCENTRATION	
19 LIMITING OXYGEN CONCENTRATION	COLLECTING EFFICIENCY % BY WEIGHT

MECHANICAL

22 MANUFACTURER	MODEL OR TYPE	SIZE
23 FILTER HOUSING MATERIAL	GAGE	NO. OF COMPARTMENTS
24 ACCESS DOOR SIZE	ASSEMBLY ☐ ALL WELDED ☐ BOLTED PANELS ☐ UNITIZED COMPARTMENTS	
25 FILTER CLOTH MATERIAL	WEAVE	
26 TUBULAR DIAMETER OTHER	AIR PERMEABILITY (FRAZIER)	
27 CLEANED BY ☐ REVERSE AIR FLOW ☐ MECHANICAL SHAKERS ☐ OTHERS		
28 TOTAL FILTER AREA GROSS SQ. FT. NET 150 SQ. FT.	NET AIR TO CLOTH RATIO	CFM PER SQ. FT.
29 PLENUM CHAMBER MATERIAL	INLET SIZE	EXPLOSION DOORS SQ. FT. PER COMPARTMENT
30 DUST HOPPER(S) MATERIAL	GAGE	
31 FILTER COMPARTMENTS PER HOPPER	VOLUME	SHAPE ☐ INVERTED CONE ☐ INVERTED PYRAMID
32 MINIMUM VALLEY ANGLE	ACCESS DOOR SIZE	SIZE OF DISCHARGE CONNECTION FLANGED OTHER
33 DUST DISCHARGE VALVE TYPE	FURNISHED BY	HOPPERS ☐ REQUIRED ☐ NOT REQUIRED
34 GAS DISCHARGE CONNECTION		
35 HIGH LEVEL INDICATOR		
36 NUMBER OF BAGS	BAG DIMENSION	
37 INSULATION ☐ REQUIRED ☐ NOT REQUIRED	FURNISHED BY	FOR SPECIAL REQUIREMENTS SEE REMARKS
38 FAN	WITH COLLECTOR ☐ SEE FAN DATA SHEET ATTACHED TYPE OF HOUSING	DUST ☐ TIGHT ☐ WEATHER ☐ PROOF ☐ NONE
39 ACCESS PLATFORMS ☐ REQUIRED ☐ NOT REQUIRED	FURNISHED BY	FOR SPECIAL REQUIREMENTS SEE REMARKS
40 STRUCTURAL SUPPORTS ☐ REQUIRED ☐ NOT REQUIRED	FURNISHED BY	CO DWG NO
41 PAINTING ☐ NOT REQUIRED	☐ SHOP COAT ☐ OTHER (SEE REMARKS)	

ELECTRICAL

44 AREA CLASS	GROUP	DIV
45 REMARKS Pulse-jet bag house, C.S., 150 ft ² filter area with 5 HP blower		

55 PREPARED BY CP	REVISION	REVISION	REVISION
56 DATE 2-29-84	BY DATE	BY DATE	BY DATE
57 APPROVED BY	APP'D DATE	APP'D DATE	APP'D DATE
58 DATE	APP'D DATE	APP'D DATE	APP'D DATE

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**CENTRIFUGAL PUMP
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. P-17879 A,B,C
NO. REQUIRED 3
SHEET 1 OF 1

CLIENT International Coal Refining Company

PROJECT 6000 T/D SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

SERVICE Salt Slurry Transfer Pump

VENDOR

P.O. NO.

TYPE	MODEL	SERIAL NO.
NO. OF MOTORS REQ'D	ITEM NO.	FURN. BY
NO. OF TURBINES REQ'D	ITEM NO.	FURN. BY

NOTE: ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER

☐ OPERATING CONDITIONS (EACH PUMP)

☐ PERFORMANCE

LIQUID 50 wt% TS US GPM AT PT. NOR. 300 RATED
salt slurry DISCHARGE PSIG 40
PT. F. NOR. 231 MAX. 250 SUCTION PSIG MAX 13.6 RATED 20
SP. GR. AT PT. 1.43 DIFF. PRESS. PSI 26.4
VAP. PRESS. AT PT. PSIA DIFF. HEAD. FT. 42.7
VIS. AT PT. LB(M)/FT-HR NPSHA. FT.
CORR/EROS. CAUSED BY

PROPOSAL CURVE NO.
RPM NO. OF STAGES
NPSHR. FT. & IMPELLER T.O.F.
EFF. BHP RATED
MAX. BHP RATED IMP
MAX. HEAD RATED IMP
MIN. CONTINUOUS GPM
ROTATION (VIEWED FROM CPLG' END)

CONSTRUCTION

NOZZLES	SIZE (IN.)	RATING	FACING	LOCATION
SUCTION				
DISCHARGE				

CASE MT. ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE)
SPLIT: ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER
PRESS: ☐ MAX. ALLOW. PSIG °F. ☐ HYDRO TEST PSIG
CONNECT: ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET
IMPELLER DIA: ☐ RATED ☐ MAX. TYPE
MOUNT: ☐ BETWEEN BRGS ☐ OVERHUNG
BEARINGS TYPE: ☐ RADIAL ☐ THRUST
LUBE: ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE
COUPLING: ☐ MFR. MODEL
DRIVER HALF MTD BY: ☐ PUMP MFR ☐ DRIVER MFR
☐ MECH. SEAL ☐ PACKING ☐ AUX. SEAL/PACKING
MFR. TYPE. MODEL
MFR. CODE API CODE

☐ INSPECTION AND TESTS

SHOP INSPECTION ☐ REQ'D
HYDROSTATIC TEST ☐ REQ'D ☐ WITNESS
PERFORMANCE TEST ☐ REQ'D ☐ WITNESS
NPSH TEST ☐ REQ'D ☐ WITNESS
INT. INSP. AFTER TEST ☐ REQ'D ☐ WITNESS

☐ INT. WEAR PARTS

WEAR RINGS: ☐ CASE ☐ IMP
DIA. IN. CLEARANCE IN.
INTERSTAGE BUSHINGS
DIA. IN. CLEARANCE IN.

VERTICAL PUMPS

PIT OR SUMP DEPTH ☐
PUMP LENGTH ☐
MIN. SUBMERGENCE REQ'D. ☐
COLUMN PIPE: ☐ FLANGED ☐ THREADED
LINE SHAFT: ☐ OPEN ☐ ENCLOSED
BRGS: ☐ BOWL ☐ LINE SHAFT
BRG. LUB ☐ WATER ☐ OIL ☐ GREASE
FLOAT & ROD ☐ C.S. ☐ S.S. ☐ BRZ. ☐ NONE
FLOAT SWITCH ☐
PUMP THRUST. LB ☐ UP ☐ DOWN
MOUNTING PLATE REQ'D ☐

☐ WEIGHTS AND DIMENSIONS

APPROX. WT. PUMP & BASE LB
MOTOR LB. TURBINE LB
BASE PLATE DIMENSIONS

APPLICABLE SPECIFICATIONS

☐ API 610 ☐ ANSI B73.1, B73.2
☐ PROJECT SPECIFICATIONS

MATERIALS

☐ PUMP CASE/TRIM API CLASS
CASING SS 316 CORR. ALL. IN.
IMPELLER SS 316 WEAR RINGS
SHAFT SS 316 SLEEVE(S)
CASE INT. COATING/LINING GLAND
☐ BASEPLATE ☐ DRIP PAN

☐ SITE CONDITIONS

ELEVATION. FT. DUST/FUMES
AMB TEMP. F MAX. MIN. AREA ELECT. CL GR. DIV.
COOLING WATER SUPPLY PSIG °F. RETURN: PSIG °F

REMARKS: 15 HP motor

REVISION ☐

REVISION ☐

REVISION ☐

PREPARED BY CP

DATE 2-29-84

APPROVED BY

BY

DATE

BY

DATE

BY

DATE

DATE

APP'D

DATE

APP'D

181

DATE

APP'D

DATE

Rust

International Corporation

FLY DUST SILO

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548

EQUIPMENT NO. SH-17875

NO. REQUIRED 1

SHEET 1 OF 1

1 CLIENT International Coal Refining Company

2 PROJECT 6000 T/D SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

3 SERVICE Fly Dust Silo

4 VENDOR

P.O. NO.

Material: C.S.

55 PREPARED BY CP

56 DATE

REVISION

REVISION

REVISION

57 APPROVED BY

BY

DATE

BY

DATE

BY

DATE

58 DATE

APP'D

DATE

APP'D

DATE

APP'D

DATE

182

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CEMENT SILO

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548

EQUIPMENT NO. SH-17876

NO. REQUIRED 1

SHEET 1 OF 1

1 CLIENT International Coal Refining Company
2 PROJECT 6000 T/D SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Cement Silo
4 VENDOR P.O. NO.

Material: C.S.

PREPARED BY CP	REVISION	REVISION	REVISION
DATE	BY DATE	BY DATE	BY DATE
APPROVED BY	APP'D DATE	APP'D DATE	APP'D DATE
DATE	APP'D DATE	APP'D DATE	APP'D DATE

Rust
International Corporation

**STORAGE TANK
DATA SHEET**

CONTRACT NO. 21-2548
EQUIPMENT NO. TK-17877
NO. REQUIRED 1
SHEET 1 OF 1

CLIENT International Coal Refining Company
PROJECT 6000 T/D SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
SERVICE 50% Salt Storage Tank

VENDOR				P.O. NO.			
DIAMETER <u>18 ft</u>		HEIGHT <u>22</u>		FT.		MATERIAL	
CAPACITY: NORMAL		GAL		SHELL C.S. Epoxy Lined THICK.			
NET WORKING		GAL		ROOF C.S. THICK.			
OPERATING CONDITIONS				BOTTOM C.S. Epoxy Lined THICK.			
SPECIFIC GRAVITY: LIQ <u>1.43</u>		AT TEMP <u>231</u>		°F		STRUCTURALS	
PUMPING RATES: IN <u>89</u>		OUT <u>300</u>		GPM		NOZZLE: NECK FLANGE	
VAPOR PRESS				COUPLINGS			
MAX. OPER. TEMP. <u>231</u>				°F			
DESIGN CONDITIONS				REMOVABLE			
CODE: API <u>N/A</u>		APPENDIX		GASKETS			
DESIGN METAL TEMP		<u>300</u>		°F			
DESIGN PRESS		IN. WATER		EST. ERECTION WT (LB)			
CORROSION ALLOW: SHELL		ROOF		NOZZLES			
BOTTOM		INTERNAL		IN.			
ROOF TYPE		PSF		FLANGE RATING			
ROOF LIVE LOADS		PSF		COUPLING RATING			
WIND PRESS		PSF		MARK NO.			
EARTHQUAKE: CODE		ZONE		NO. REQ'D.			
FOUNDATION TYPE				SIZE IN			
RADIOGRAPHY: EXTENT				FACING			
STRESS RELIEF: YES/NO		EXTENT		SERVICE			
INSULATION: YES/NO		THICK: IN.		N-1			
LEAK TESTING: BOTTOM		SHELL		N-2			
MILL TEST REPORTS: YES/NO		ROOF		N-3			
PAINTING: YES/NO SPEC:				N-4			
				N-5			
				N-6			
				N-7			
				M-1			
				MAN WAY			

SKETCH

18' ID x 22' T-T
Insulated.
Equipped with 9' diameter
turbine agitator with 20 HP motor
C.S. epoxy lined

PREPARED BY <u>CP</u>	REVISION <u>△</u>	REVISION <u>△</u>	REVISION <u>△</u>
DATE <u>2-29-84</u>	BY <u></u> DATE <u></u>	BY <u></u> DATE <u></u>	BY <u></u> DATE <u></u>
APPROVED BY <u></u>	APP'D <u></u> DATE <u></u>	APP'D <u></u> DATE <u></u>	APP'D <u></u> DATE <u></u>

Rust

International Corporation

CONCRETE MIX TRUCK
(GENERAL EQUIPMENT DATA SHEET)CONTRACT NO. 21-2548
EQUIPMENT NO. x-17876 A,B,C,D,E,F
NO. REQUIRED 6
SHEET 1 OF 1

CLIENT International Coal Refining Company

PROJECT 6000 T/D SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

SERVICE Concrete Mix Truck

VENDOR P.O. NO.

Capacity: 15 Cubic Yards Each

PREPARED BY CP	REVISION	REVISION	REVISION
DATE 2-29-84			
APPROVED BY	BY DATE	BY DATE	BY DATE
DATE	APP'D DATE	APP'D DATE	APP'D DATE

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TRUCK WEIGHING SCALE

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548

EQUIPMENT NO. X-17877 A.B

NO. REQUIRED 2

SHEET 1 OF 1

1 CLIENT International Coal Refining Company

2 PROJECT 6000 T/D SRC-I Demonstration Plant

PLANT LOCATION Newman, Kentucky

3 SERVICE Truck Weighing Scale

4 VENDOR

P.O. NO.

Capacity: 20 Tons

55 PREPARED BY CP

56 DATE 2-29-84

REVISION

REVISION

REVISION

57 APPROVED BY

BY

DATE

BY

DATE

BY

DATE

58 DATE

APP'D

DATE

APP'D

186

DATE

APP'D

DATE

Rust

International Corporation

FLY DUST WEIGH SCALE
(Load Cell)

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548
EQUIPMENT NO. x-17878 A,B
NO. REQUIRED 2
SHEET 1 OF 1

1 CLIENT International Coal Refining Company
2 PROJECT 6000 T/D SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Fly Dust Weigh Scale
4 VENDOR P.O. NO. 1

Capacity: 10 Tons each

55 PREPARED BY CP

56 DATE 2-29-84

REVISION

REVISION

REVISION

57 APPROVED BY

BY

DATE

BY

187

DATE

BY

DATE

58 DATE

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(GENERAL EQUIPMENT DATA SHEET)

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3.1.4 Waste Solids Handling

3.1.4.1 Process Description

3.1.4.1.1 General

3.1.4.1.1.1 Waste solids handling will encompass the collection and ultimate disposition of all waste solids created during operation of various unit processes at the plant. The waste solids handled will include gasifier slag, process area runoff solids, SRC and coal pile runoff retention pond solids, gasifier flyash, water treatment plant sludge, plant trash, strong waste primary treatment solids, evaporation and chemical fixation solids, weak waste primary treatment and wet-air-oxidation ash solids, and waste granular activated carbon.

3.1.4.1.1.2 These waste solids will be discharged into six disposal areas: a gasifier slag landfill, a gasifier flyash pond, a sanitary landfill, hazardous waste landfill, softening sludge landfill, and stabilized salt sludge landfill. Refer to Drawing No. 00-17-10001D, Site Plan.

3.1.4.1.2 Gasifier Slag

3.1.4.1.2.1 GKT Slag Handling (Dwg. 00-17-01007D)

The GKT slag handling system (ash handling system) begins at the end of GKT slag conveyors and terminates at the slag storage bin. Major equipment areas are as follows:

1. Slag conveying system.
2. Slag storage bin.

Conveying System

The GKT slag handling system, consisting of the slag collecting conveyor (CV-17701) and the slag transfer conveyor (CV-17702) will receive slag from the GKT gasifier slag discharge conveyors and transport the slag to the slag storage bin. The conveyor system will have a capacity of 11 tph at 100 fpm.

3.1.4.1.2.2 GKT Slag Landfill

The 45 acre gasifier slag landfill will be located in area number 49 of the Site Plan, Drawing No. 00-17-10001D. Gasifier slag will be collected in bins in the utilities off-sites process area. The bins will be emptied into trucks. This slag will then be hauled to the landfill and deposited. The gasifier slag landfill will be designed as a hazardous waste landfill in compliance with Resource Conservation and Recovery Act (RCRA) Regulations, Kentucky Hazardous Waste Management (KHWM) Regulations, and local regulations, however, provisions will be made to allow for future reclaim of the slag should it become evident that it is non-hazardous. Stormwater runoff from the slag disposal area is discharged to the sewer.

3.1.4.1.3 Gasifier Flyash Pond

The 40 acre gasifier flyash pond will be located in area 49 of the site plan, Drawing No. 00-17-10001D. The landfill will be used for disposal of gasifier flyash only. The gasifier flyash will be pumped to the pond in slurry form. Refer to Drawing No. 00-17-01020D and the wastewater treatment process description for consideration of sluice water handling. Suspended solids will be allowed to settle in the pond. The gasifier flyash pond will be designed as a hazardous waste surface impoundment in compliance with Resource Conservation and Recovery Act (RCRA) Regulations, Kentucky Hazardous Waste Management (KHWM) Regulations, and local regulations.

3.1.4.1.4 Sanitary Landfill (Dwg. 00-19-01411D)

The 7 acre sanitary landfill will be located in areas 38 and 39 of the site plan, Drawing No. 00-17-10001D. The landfill will be used for disposal of plant refuse and waste GAC. Non-hazardous debris will be produced at a rate of 14,000 cubic yards per year. Containers storing refuse and debris will be removed by truck and emptied into the landfill. Plant trash will be collected in retrievable container at various locations in the plant. These containers will be picked up by truck and taken to the landfill. The containers will be emptied and returned to the plant for reuse. Waste granular activated carbon will be collected in a spent carbon container in the tertiary treatment area. The containers will be trucked to the

landfill, emptied and reused. The landfill will be designed to comply with Kentucky Department of Natural Resources and Environmental Protection regulations for landfills. Daily cover of landfill contents will be provided. The landfill area is described in detail in Catalytic's Design Baseline Revision Vol. 2 Report (DOE/OR/03054-71 Vol. 2).

3.1.4.1.5 Hazardous Waste Landfill (Dwg. 00-19-01411D)

The 4 acre hazardous waste landfill will be located in area 27 of the site plan, Drawing No. 00-17-10001D. The landfill will be divided into cells and will be used for disposal of strong waste primary treatment solids, weak waste primary treatment and WAO ash solids, process area runoff solids, SRC and coal pile runoff retention pond solids, and waste solids that are classified as hazardous. Hazardous waste will be produced at a rate of 30,600 cubic yards per year. The strong waste primary treatment solids and weak waste primary treatment and WAO ash solids will be collected in retrievable contrainers in the sludge dewatering area. The container will be transported by truck to the hazardous waste landfill and emptied. The emptied container will be reused. The process area runoff solids will be removed from the surge basin, area 29 of the site plan, by front-end loader and trucked to the landfill. SRC and coal pile runoff retention pond solids will be removed from area 33 of the site plan by front-end loader and trucked to the landfill. The hazardous waste landfill will be designed, operated, and closed as a hazardous waste landfill in compliance with Resource Conservation and Recovery Act. (RCRA) Regulations, Kentucky Hazardous Waste Management (KHWM) Regulations and local regulations. The landfill area is described in detail in Catalytic's Design Baseline Revision Vol. 2 Report (DOE/OR/03054-71 Vol. 2)

3.1.4.1.6 Softening Sludge Landfill (Dwg. 00-17-02003D)

A separate landfill cell is provided for the dewatered softening sludge. As with the other landfills on-site, its bottom and sides will be double-lined. A leachate collection system is provided on top of these liners and a leak detection system is between them. Storm water runoff and leachate will be pumped to the equalization basins. The cell has a volume equivalent to five year's softening sludge production. Upon completion, the landfill will be capped.

The softening sludge landfill cell is located (approximately) in the area bounded by coordinates E 18,000 to E 19,000 and N 4,600 to N 4,900, as shown on the drawing.

3.1.4.1.7 Stabilized Salt Sludge Landfill (Dwg. 00-17-02003D)

Adjacent to the softening sludge landfill is the stabilized salt sludge landfill. It is divided into five (5) operating cells, each having a volume equivalent to one year's stabilized waste production. The cell construction, the leak detection system, and the leachate collection system are similar to the system described for softening sludge landfill. The landfill will operate 8 hours/day, 7 days/week, and follows the stabilization process schedule. The stabilized waste is hauled to the landfill by trucks. These trucks are of the type used for wet concrete. In the landfill the stabilized waste will chemically set (similar to concrete) which will greatly decrease its permeability. Compaction is not required. Leachate from the landfill, including storm water runoff, will be pumped to the equalization basins. Each cell upon completion will be capped.

3.1.4.2 Process Flow Diagram and Sketches

The following process flow diagram and sketches are included after this page:

- 00-19-01411D Process Flow Diagram, Landfill Area
- 00-17-01007D GKT Slag Handling System Flow Diagram
- 00-17-02003D Softener Sludge and Cement Stabilized Waste Landfill
 - Slag Ponds Leachate Collection System (Calculation Sheet 7)
 - Gasifier Slag and Flyash Landfill Leak Detection Layout (SK-174)

011110-61-00

TK-19400
NON-HAZARDOUS LEACHATE
PUMPING STATION
4' X 4' X 12' DEEP

TK-19401-1.2
LEAK DETECTION
PUMPING STATION
4' X 4' X 6' DEEP
(NOTE 1)

TK-19402-1.2
HAZARDOUS LEACHATE
PUMPING STATION
4' X 4' X 6' DEEP
(NOTE 1)

NOTES:
1. THERE WILL BE TWO LEAK
DETECTION PUMP STATIONS
AND TWO LEACHATE PUMPING
STATIONS FOR EACH LANDFILL
CELL.

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TX-17952 A B
LEACHATE PUMPING STATION A, B
4' x 4' x 6'H
CONCRETE

SCALE: $\frac{1}{4}'' = 100'$

CROSS SECTION OF SOFTENING SLUDGE CELL A-A'

SCALE: 1" = 1'

CROSS SECTION OF CEMENT STABILIZED WASTE B-B'

SCALE: 1" = 1'

P. 17951 A, B
LEAK DETECTION PUMP
CENTRIFUGAL, VERTICAL
5GPM, 10P

R17952 O, A
LEACHATE PUMP
CENTRIFUGAL, VERTICAL
5 GPM, 1 HP

[illegible]

SCALE	DATE
NUMBER OF C.P.	3-64
SIGNATURE OF	
CHECKED BY	
SUPV. BY	
REMARKS BY	
APPROV BY	
APPROV BY	
APPROV BY	

6.000 T/D SRC-1 DEMONSTRATION PLANT
NEWMAN, KENTUCKY
FOR UNITED STATES
DEPARTMENT OF ENERGY

SOFTENER SLUDGE & CEMENT
STABILIZED WASTE LADFILL

Rust
International Corp
CONTRACT 21-2548
BIRMINGHAM
00-17-0200

196

**BASLINE ESTIMATE
SLAG POND
LEACHATE COLLECTION
SYSTEM**
(POND #3 AND #6 ONLY)
QTY. TAKEOFF DRAWING
NOV. 1981

FOR INFORMATION ONLY
**FOR QUANTITY ESTIMATING
PURPOSES ONLY**

NOTE:
POND #1 AND #2 ARE
CONSIDERED TO BE ASH
POND #3 AND #4
ARE SLAG POND.

SUMP

PLAN
ASH POND
SCALE 1"=200'

SECTION A-A
SCALE: 1" = 30'

SECTION B-B
SCALE: 1" = 30'

SK-174

FONDS "1" AND "2" ARE INTENDED FOR ASH
AND "3" AND "4" FOR SLAG

2 SECTIONS A-A AND B-B ARE TYPICAL FOR
PONDS #1 AND #2 THESE PONDS DO NOT
REQUIRE A LEACHATE COLLECTION
SYSTEM

3. PONDS #3 AND #4 REQUIRE A LEACHATE COLLECTION SYSTEM. LEACHATE COLLECTION PIPING IS NOT SHOWN ON THIS DRAWING.

FOR QUANTITY ESTIMATING
PURPOSES ONLY

FOR INFORMATION ONLY

						G.J. MARONE CHIEF ENGINEER	DATE 9-30-84	SUB TPO SRC-4 DEMONSTRATION PLANT NEWMAN, KENTUCKY	International Coal Refining Company Adamsport, PA
						D.F.W. ENGINEER	10-12-84	FOR UNITED STATES DEPARTMENT OF ENERGY	
						PROJECT		GASIFIER SLAG AND FLYASH LANDFILL LEAK DETECTION LAYOUT	THE RUST ENGINE BUILDING COMPANY P.O. BOX 100 NEWARK, OH 43055
REV.	CHANGE NOTED	REVISION DESCRIPTION	DATE	BY	CHECK'D	APPROVED		AS SHOWN	

3.1.4.3 Utility Summary

The Utility Summary for the Waste Solids Handling follows this page.

CONTRACT NO. 21-2548C
AREA WASTE SOLIDS HANDLING
BY BSY DATE 5-10-84
SHEET 1 OF

PLANT LOCATION: Newman, Kentucky

EQUIPMENT OR AREA NUMBER	DESCRIPTION	PROC. DUTY MM BTU HR	PROCESS COOLING WATER INLET		HEAT TRANSFER FLUID INLET		FIRED DUTY		POWER			BOILER FEEDWATER		STEAM IMPORT (EXPORT)						COND. RETURN (REQ'D) PSIG °F	BLOW DOWN PSIG	UTIL. H ₂ PSIG =	PLANT AIR PSIG =	INSTRU AIR PSIG =	PROC. WATER PSIG =	PO WATER PSIG =											
			GPM	Δ°F	GPM	Δ°F	FUEL GAS LHV = MM BTU/HR	FUEL OIL LHV = MM BTU/HR	INST. HP	OPER. BHP	OPER KW	PSIG °F	PSIG °F	PSIG °F	PSIG °F	PSIG °F	PSIG °F																				
																		M LBS/HR									M LBS/HR						M LBS/HR		SCFM		GPM
									SEE																												
										MOTOR																											

53	PREPARED BY	BSY	REVISION		REVISION		REVISION		NOTES:
54	DATE	5-10-84							
55	APPROVED BY		BY	DATE	BY	DATE	BY	DATE	
56	DATE		APP'D	DATE	APP'D	DATE	APP'D	DATE	

3.1.4.4 Motor List

The Motor List for the Waste Solids Handling follows this page.

Waste Solids Handling Area

Motor List

<u>Item No.</u>	<u>Description</u>	<u>Installed HP</u>	<u>Operating KW</u>	<u>Hr/Day</u>	<u>KWH/Day</u>
CV-17701	Slag Collecting Conveyor	20	12	24	288
CV-17702	Slag Transfer Conveyor	5	3	24	72
P-17951A	Leak Detection Sump Pump	1	0.5	24	12
P-17951B	Leak Detection Sump Pump	1	0	0	0
P-17952A	Leachate Sump Pump	1	0.5	24	12
P-17952B	Leachate Sump Pump	1	0	0	0
00-P-19400-A	Non-hazardous Leachate Pump	0.75	0.50	4	2
00-P-19400-B	Non-hazardous Leachate Pump	0.75	0	0	0
00-P-19401-1	Hazardous Leak Detection Pump	0.25	0	0	0
00-P-19401-2	Hazardous Leak Detection Pump	0.25	0	0	0
00-P-19402-1A	Hazardous Leachate Pump	0.25	0.2	2	0.4
00-P-19402-1B	Hazardous Leachate Pump	0.25	0	0	0
00-P-19402-2A	Hazardous Leachate Pump	0.25	0.2	2	0.4
00-P-19402-2B	Hazardous Leachate Pump	<u>0.25</u>	<u>0</u>	0	<u>0</u>
		32	16.90		386.8

3.1.4.5 Layout Drawing

The following layout drawing is included after this page:

00-17-70002D Slag Handling Conveyor Arrangement

BELT CONVEYOR FROM
GASIFICATION TRAIN 1 & 2
TRANSFER TOWER BY THE
RALPH M. PARSONS COMPANY

BELT CONVEYOR FROM
GASIFICATION TRAIN 3 & 4
TRANSFER TOWER BY THE
RALPH M. PARSONS COMPANY

CV-17701
SLAG COLLECTING CONVEYOR

TRANSFER
TOWER

WALKWAY

CV-17702
SLAG TRANSFER CONVEYOR

PLAN

BH-17701
SLAG STORAGE BIN

347'-0" C/C PULLEYS

MINIMUM
CLEARANCE

SECTION A-A

X-17701
DUPLEX TRUCK
LOADING GATE

ELEVATION LOOKING WEST

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

3.1.4.6 Equipment List/Summary

The equipment list/summary for the waste solids handling system, except that for Catalytic's Landfill Area, follows this page.

EQUIPMENT LIST

CONTRACT NO. 21-2548

Dwg. No. 00-17-02003D

CLIENT International Coal Refining Co.

AREA 17: Waste Solids Handling

LOCATION Newman, Kentucky

SECTION Landfill

DESCRIPTION	6000 TSPD SRC-1
-------------	-----------------

SHEET 1 OF 1

Demonstration Plant

[illegible]**PROPOSAL NO.**

ENGINEER

EQUIPMENT PRICED FOR PURCHASE BY: (DATE) March 1984

ESTIMATOR

DATE _____

REVISED

***MOTORS A.C. UNLESS OTHERWISE STATED**

[illegible]

Leeds

Leeds

EQUIPMENT LIST/SUMMARY

REV. 4

03-26-82

WBS ELEMENT: 1.4.1.2.1 ICRC AREA: 17

WATER AND WASTE TREATMENT--ASH HANDLING

PAGE 1 OF 1

REV.	ICRC/RUST EQUIP NO	QTY	EQUIPMENT DESCRIPTION	P.O. NUMBER	SIZE/ WEIGHT	P.D. DATE	VENDOR ENG		DELV DATE	EQUIP COST	PURCH BY	TYPE EQUIP
							NEED DATE	COST				
206	BH-17701	1	Bin, slag storage; top 6' to be vert- icle sides and bottom opening to be 3' x 3'; structurally supported with top 35' above grade; support bracing		20' long 20' wide 16' deep	S 10-82 P A	S 12-82 P A	2.5	S 5-83 P A	22.8 M = 17.9 L = 4.9	CMC	FF
	BH-17701 con't.		omitted on two sides to allow truck passage; constructed of 0.25" structurally reinforced steel plates with 0.25" 360 br. abrasion resistant								CMC	FF
	BH-17701 con't.		liners on sloping bottom plates; 10 gauge reinforced steel cover; access platform provided 15' above grade; caged access ladder from ground to slag								CMC	FF
	BH-17701 con't.		transfer conveyor walkway.								CMC	FF
	CV-17701	1	Conveyor, slag collecting, 24" wide x 370' horizontal centers, 11 tph at 200 fpm, with motor		20 hp 1,750 rpm	S 10-82 P A	S 12-82 P A	6.0	S 5-83 P A	50.9	CMC	SF
	CV-17702	1	Conveyor, slag transfer, 24" wide x 100' horizontal centers, 25' lift, 11 tph at 200 fpm, with motor		5 hp 1,750 rpm	S 10-82 P A	S 12-82 P A	1.3	S 5-83 P A	27.9	CMC	SF
	X-17701	1	Gate, Duplex truck loading, pneumatically operated, clam shell type gate		36" x 36" x 4' oh	S 10-82 P A	S 12-82 P A	inc with BH-17701	S 5-83 P A	inc with BH-17701	CMC	FF

NOTES:

1. All costs 1st Quarter Fiscal Year 1982 in thousand dollars.
2. Equipment costs are FOB jobsite with shipping & vendor field support less vendor engineering.
3. This equipment is Appendix C Bulk.

RUST: Rust Engineering
CMC: Stone & Webster

S: Scheduled
P: Projected
A: Actual

FL: Field Labor N/A: Not Applicable
M: Material for field fab equipment
SF: Shop Fabricated FF: Field Fabricated

3.1.4.7 Equipment Data Sheets

The equipment data sheets for the waste solids handling system, except those for Catalytic's landfill area, follow this page.

The equipment data sheets for Catalytic's Landfill Area are included in section 6.7 of Volume V of Design Baseline.

CLIENT: INTERNATIONAL COAL REFINING COMPANY

PROJECT: 6000 TPSD SRC DEMONSTRATION PLANT PLANT LOCATION: NEWMAN KENTUCKY

SERVICE: SLAG COLLECTING CONVEYOR

VENDOR: _____ P.O. NO. _____

APPLICABLE SPECIFICATIONS AND CODES

PURCHASER'S DATA

MATERIAL TO BE HANDLED		OPERATING CONDITIONS	
MATERIAL: <u>ASH SLAG</u>		CAPACITY: NORMAL _____	DESIGN: _____
		OPERATION: ☒ CONTINUOUS	INTERMITTENT _____
PHYSICAL PROPERTIES			
BULK DENSITY: <u>94</u> LB/FT ³		LOCATION: <u>INDOOR</u>	
ANGLE OF REPOSE: <u>20</u>		☒ OUTDOOR	
MOISTURE CONTENT: _____		PROTECTION: ☒ COVERED	
CHARACTERISTICS: <u>STICKY</u> <u>TOXIC</u>		☒ SEMI COVERED	
☒ ABRASIVE ☒ CORROSIVE ☐ EXPLOSIVE		UNCOVERED _____	
☐ HYGROSCOPIC ☐ DEGRADABLE		AMBIENT TEMPERATURE RANGE: <u>50</u> F	
☐ FLUIDIZING ☐ OTHER _____		DESIGN WIND PRESSURE: <u>50</u> PSF	
PARTICLE SIZE DISTRIBUTION		NO. OF FEED POINTS: _____	
SIZE: <u>3/4</u>		MATERIAL FEED FROM: _____	
		VERTICAL FALL OF MATERIAL: _____	
		DISCHARGED BY: ☒ OVERHEAD PULLEY	
		☐ TRIPPER	
		☐ PLOW	
		☐ OTHER _____	
MAX. SIZE LUMPS: <u>1/2</u> IN			
NO. OF MAX. LUMPS: _____			
MATERIAL TEMPERATURE: _____ F			
ATTACH PARTICLE SIZE DISTRIBUTION GRAPH			

SKETCH

PREPARED BY	REVISION	REVISION	REVISION
DATE	△	△	△
APPROVED BY	BY	BY	BY
DATE	DATE	DATE	DATE
APP'D	APP'D	APP'D	APP'D

The Rust Engineering Company
A Division of The Rust Group, Inc.

**BELT CONVEYOR
DATA SHEET**

PAGE 2 OF 3

CONTRACT NO. 21-1997-F
EQUIPMENT NO. CV-17701
NO. REQUIRED _____
SHEET _____ OF _____

PURCHASER'S DATA (CONTINUED)

CONVEYOR AND COMPONENTS

TYPE ☒ HORIZONTAL ☐ INCLINED
☐ HORIZONTAL & INCLINED ☐ PORTABLE
☐ DECLINED ☐ REVERSIBLE
☐ SHUTTLE
☐ OTHER _____
CONVEYOR LENGTH 370 FT 0 IN.

IDLERS:

TYPE OF CARRYING IDLER ☒ TROUGHED
☐ FLAT
MAX. SPACING OF CARRYING IDLER 4'-0"
MIN DIAMETER IDLERS DIAMETER

_____ IN

BELTING:

MIN. NUMBER PLYS 4
MIN. THICKNESS OF COVERS
TOP 3/16 IN. BOTTOM 1/16 IN.
SPICE ☒ VULCANIZED
☐ MECHANICALLY FASTENED
MINIMUM BASE PULLEY DIA _____ IN

TRIPPERS:

NUMBER REQUIRED 0
TYPE ☐ STATIONARY
☐ MOVABLE
DISCHARGE ☐ ONE SIDE
☐ BOTH SIDES

SAFETY DEVICES

☐ HOLD BACKS AND BRAKES
☒ EMERGENCY STOP WITH PULL CORDS
☐ OTHER _____

SENSING DEVICES

☒ SPEED SENSORY DEVICES
☒ SIDE TRAVEL SWITCHES
☐ OTHER _____

BELT CLEANER

☒ BLADE SCRAPER
☐ ROTARY BRUSH
☐ ROTARY RUBBER BLADE
☐ RETURN BELT CLEANER PLOW

ELECTRIC MOTOR—SEE ATTACHED DATA SHEET

ELEC. AREA CLASS _____ GROUP _____ DIV _____

AUXILIARY EQUIPMENT REQUIRED:

☐ LOAD HOPPER
☒ FEED CHUTES
☒ DISCHARGE HOOD
☒ SKIRT BOARDS
☐ WALKWAYS
☐ PLATFORMS
☐ SUPPORTS
☐ ENCLOSED GALLERY
☐ SEMI-CIRCULAR BELT COVERS
☒ THREE-QUARTER BELT COVERS
☐ WIND BREAKS
☐ WIND HOOPS
☐ OTHERS _____

REMARKS

The Rust Engineering Company
A Subsidiary of Wheelabrator-Frye Inc.

**BELT CONVEYOR
DATA SHEET**

PAGE 3 OF 3

CONTRACT NO. 21-1997-1
EQUIPMENT NO. CV-17701
NO. REQUIRED _____
SHEET _____ OF _____

MANUFACTURER'S DATA

(VENDOR TO COMPLETE ALL DATA BELOW UNLESS OTHERWISE FILLED BY PURCHASER)

CONVEYOR DATA:

BELT WIDTH 24 IN
BELT SPEED AT DESIGNED CAP 200 FPM
IDLER TROUGH ANGLE 20
ANGLE OF SURCHARGE 5
CONVEYOR TAKE-UP
TYPE GRAVITY
TRAVEL _____ FT _____ IN
LOCATION _____

IDLERS:

CARRYING IDLERS

MANUFACTURER _____
CEMA SERIES _____
DIAMETER C5
SPACING _____ FT _____ IN
IMPACT IDLERS
MANUFACTURER _____
CEMA SERIES _____
STEEL ROLL DIAMETER _____ IN
RUBBER DISC DIAMETER _____ IN
SPACING _____ FT _____ IN

TRANSITION IDLERS

MANUFACTURER _____
CEMA SERIES _____
DIAMETER _____ IN
NUMBER REQUIRED _____

RETURN IDLERS

MANUFACTURER _____
CEMA SERIES _____
TYPE STEEL RUBBER DISC VEE-TROUGH
DIAMETER _____ IN
SPACING _____ FT _____ IN
TRAINING IDLERS
THROUGH TYPE _____ SPACING _____
RETURN TYPE _____ SPACING _____

BELTING:

BELT LENGTH
WITHOUT TAKE-UP _____
TAKE-UP ALLOWANCE _____
SPlice ALLOWANCE _____
TOTAL BELT LENGTH _____

COVERS

GRADE RMA _____
THICKNESS TOP _____ IN BOTTOM _____ IN

CARCASS

FABRIC _____
FABRIC RATING RMA _____
NUMBER PLIES _____
BREAKER TOP _____ BOTTOM _____
MAXIMUM WORKING TENSION _____
ALLOWABLE BELT SAG _____
ULTIMATE STRENGTH _____
BELT WEIGHT _____ LB.

DRIVES:

STARTING CHARACTERISTICS _____
TYPE OF BRAKE AND/OR BACKSTOP _____
BRAKE RATING _____ LB.
BACKSTOP RATING _____ LB.
HP REQ'D AT DRIVE SHAFT 15.2 HP
SPEED REDUCER TYPE _____ MODEL _____
RATIO _____ OUTPUT SPEED _____
COUPLING TYPE _____ MODEL _____
CHAIN DRIVE TYPE _____
V-BELT DRIVE P.D. DRIVE _____ P.D. DRIVEN _____
NO. BELTS _____ BELT SIZE _____
GUARDS COUPLINGS _____
CHAIN _____
V-BELT _____

PULLEYS

LOCATION	TYPE OF PULLEY*	SIZE (DIA. X FACE LENGTH)
		IN X FT
		IN X FT
		IN X FT
		IN X FT
		IN X FT
		IN X FT

*TYPE: MILD STEEL, CHAIN, LAGGING, GROOVED LAGGING, CAST IRON, ETC.

REMARKS

CLIENT INTERNATIONAL COAL REFINING COMPANY
PROJECT 6000 TPSD SRC-1 DEMONSTRATION PLANT PLANT LOCATION NEWMAN, KENTUCKY
SERVICE SLAG TRANSFER CONVEYOR (TRUCK LOADING)
VENDOR _____ P.O. NO. _____

APPLICABLE SPECIFICATIONS AND CODES

PURCHASER'S DATA

MATERIAL TO BE HANDLED

OPERATING CONDITIONS

MATERIAL ASH (SLAG)
CAPACITY _____ TPH
DESIGN _____ TPH
OPERATION ☒ CONTINUOUS
☐ INTERMITTENT
PHYSICAL PROPERTIES
BULK DENSITY 34 LB/FT³
ANGLE OF REPOSE 20
MOISTURE CONTENT _____
CHARACTERISTICS ☐ STICKY ☐ TOXIC
☒ ABRASIVE ☒ CORROSIVE ☐ EXPLOSIVE
☐ HYGROSCOPIC ☐ DEGRADABLE
☐ FLUIDIZING ☐ OTHER _____

LOCATION ☐ INDOOR
☒ OUTDOOR
PROTECTION ☐ COVERED
☒ SEMI-COVERED
☐ UNCOVERED
AMBIENT TEMPERATURE RANGE -5 / 5 F
DESIGN WIND PRESSURE _____ PSF
NO. OF FEED POINTS 1
MATERIAL FEED FROM _____
VERTICAL FALL OF MATERIAL _____ F
DISCHARGED BY ☒ OVERHEAD PULLEY
☐ TRIPPER
☐ PLOW
☐ OTHER _____

PARTICLE SIZE DISTRIBUTION

SIZE

20

MAX. SIZE LUMPS 1 1/2 IN
NO. OF MAX. LUMPS _____
MATERIAL TEMPERATURE _____ F

*ATTACH PARTICLE SIZE DISTRIBUTION GRAPH

SKETCH

PREPARED BY	REVISION	REVISION	REVISION
DATE	BY	DATE	BY
APPROVED BY	DATE	DATE	DATE
DATE	APPRO	DATE	APPRO

The Rust Engineering Company
A Subsidiary of International Equipment Corporation

**BELT CONVEYOR
DATA SHEET**

PAGE 2 OF 3

CONTRACT NO. 21-1997-F
EQUIPMENT NO. CV-17702
NO. REQUIRED _____
SHEET _____ OF _____

PURCHASER'S DATA (CONTINUED)

CONVEYOR AND COMPONENTS

TYPE ☐ HORIZONTAL ☒ INCLINED
☐ HORIZONTAL & INCLINED ☐ PORTABLE
☐ DECLINED ☐ REVERSIBLE
☐ SHUTTLE
☐ OTHER _____
CONVEYOR LENGTH 100 FT 0 IN.

IDLERS:

TYPE OF CARRYING IDLER ☒ TROUGHED
☐ FLAT
MAX. SPACING OF CARRYING IDLER 4'-0"
MIN DIAMETER: IDLERS DIAMETER

IN.
IN.
IN.
IN.

BELTING:

MIN. NUMBER PLIES 5
MIN THICKNESS OF COVERS
TOP 3/16 IN. BOTTOM 1/16 IN.
SPICE ☒ VULCANIZED
☐ MECHANICALLY FASTENED
MINIMUM BASE PULLEY DIA. _____ IN.

TRIPPERS:

NUMBER REQUIRED 0
TYPE ☐ STATIONARY
☐ MOVABLE
DISCHARGE ☐ ONE SIDE
☐ BOTH SIDES

SAFETY DEVICES

☒ HOLD RACKS AND BRAKES
☒ EMERGENCY STOP WITH PULL CORDS
☐ OTHER _____

SENSING DEVICES

☒ SPEED SENSORY DEVICES
☒ SIDE TRAVEL SWITCHES
☐ OTHER _____

BELT CLEANER

☐ BLADE SCRAPER
☐ ROTARY BRUSH
☐ ROTARY RUBBER BLADE
☐ RETURN BELT CLEANER PLOW

ELECTRIC MOTOR—SEE ATTACHED DATA SHEET

ELEC AREA CLASS _____ GROUP _____ DIV _____

AUXILIARY EQUIPMENT REQUIRED:

☐ LOAD HOPPER
☒ FEED CHUTES
☒ DISCHARGE HOOD
☒ SKIRT BOARDS
☒ WALKWAYS
☐ PLATFORMS
☐ SUPPORTS
☐ ENCLOSED GALLERY
☐ SEMI-CIRCULAR BELT COVERS
☒ THREE-QUARTER BELT COVERS
☐ WIND BREAKS
☐ WIND HOOPS
☐ OTHERS _____

REMARKS

MANUFACTURER'S DATA

(VENDOR TO COMPLETE ALL DATA BELOW UNLESS OTHERWISE FILLED BY PURCHASER)

CONVEYOR DATA:

BELT WIDTH 24 IN
BELT SPEED AT DESIGNED CAP 200 FPM
IDLER TROUGH ANGLE 20°
ANGLE OF SURCHARGE 5°
CONVEYOR TAKE-UP
TYPE GRAVITY
TRAVEL _____ FT _____ IN
LOCATION _____

IDLERS:

CARRYING IDLERS

MANUFACTURER _____
CEMA SERIES C5
DIAMETER _____ IN
SPACING _____ FT _____ IN

IMPACT IDLERS

MANUFACTURER _____
CEMA SERIES _____
STEEL ROLL DIAMETER _____ IN
RUBBER DISC DIAMETER _____ IN
SPACING _____ FT _____ IN

TRANSITION IDLERS

MANUFACTURER _____
CEMA SERIES _____
DIAMETER _____ IN
NUMBER REQUIRED _____

RETURN IDLERS

MANUFACTURER _____
CEMA SERIES _____
TYPE _____ STEEL _____ RUBBER DISC _____ VEE-TROUGH
DIAMETER _____ IN
SPACING _____ FT _____ IN

TRAINING IDLERS

TROUGH TYPE _____ SPACING _____
RETURN TYPE _____ SPACING _____

BELTING:

BELT LENGTH
WITHOUT TAKE-UP _____ FT
TAKE-UP ALLOWANCE _____ FT
SPlice ALLOWANCE _____ FT
TOTAL BELT LENGTH _____ FT

COVERS

GRADE RMA _____
THICKNESS TOP _____ IN BOTTOM _____ IN

CARCASS

FABRIC _____
FABRIC RATING RMA _____
NUMBER PLYS _____
BREAKER TOP _____ BOTTOM _____
MAXIMUM WORKING TENSION _____ LB
ALLOWABLE BELT SAG _____
ULTIMATE STRENGTH _____ LB
BELT WEIGHT _____ LB/FT

DRIVES:

STARTING CHARACTERISTICS _____

TYPE OF BRAKE AND/OR BACKSTOP _____

BRAKE RATING _____ LB-FT

BACKSTOP RATING _____ LB-FT

HP REQ'D AT DRIVE SHAFT 3.6 HP

SPEED REDUCER TYPE _____ MODEL _____

RATIO _____ OUTPUT SPEED _____

COUPLING TYPE _____ MODEL _____

CHAIN DRIVE TYPE _____

V-BELT DRIVE, P.D. DRIVE _____ P.D. DRIVEN _____

NO BELTS _____ BELT SIZE _____

GUARDS COUPLINGS _____

CHAIN _____

V-BELT _____

PULLEYS

LOCATION	TYPE OF PULLEY*	SIZE (DIA. X FACE LENGTH)
		IN X _____ FT _____ IN
		IN X _____ FT _____ IN
		IN X _____ FT _____ IN
		IN X _____ FT _____ IN
		IN X _____ FT _____ IN
		IN X _____ FT _____ IN

*TYPE: ALUMINUM STEEL, CROWN, LAGGING GROOVED LAGGING CAST IRON, ETC

REMARKS

**The Rust
Engineering Company**
A Subsidiary of American Bridge Company

(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-1447-F
EQUIPMENT NO. 4-17701
NO. REQUIRED 1
SHEET 05

36" DUPLEX TRUCK LOADING GATE COMPLETE
WITH PNEUMATIC OPERATOR.

FULL DETAILS TO BE DEVELOPED DURING DESIGN

Rust

International Corporation

**CENTRIFUGAL PUMP
DATA SHEET**CONTRACT NO. 21-2548
EQUIPMENT NO. P-17951 A.B
NO. REQUIRED 2
SHEET _____ OF _____

1 CLIENT International Coal Refining Company
2 PROJECT 6000 TPSD SRC-1 Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Leak Detection Pumping Station
4 VENDOR _____ P.O. NO. _____

5 TYPE Centrifugal MODEL _____ SERIAL NO. _____
6 NO. OF MOTORS REQ'D _____ ITEM NO. _____ FURN. BY _____ MFR BY _____
7 NO OF TURBINES REQ'D _____ ITEM NO. _____ FURN BY _____ MFR BY _____

8 NOTE ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER

9 ☐ OPERATING CONDITIONS (EACH PUMP)

10 LIQUID _____ US GPM AT PT NOR _____ RATED 5
11 _____ DISCHARGE PSIG 17.3
12 PT. F. NOR. 70 MAX. 100 SUCTION PSIG MAX _____ RATED _____
13 SP GR AT PT _____ DIFF PRESS. PSI _____
14 VAP PRESS AT PT. PSIA _____ DIFF HEAD. FT. 40
15 VIS AT PT LB(M)/FT-HR _____ NPSHA FT. _____
16 CORR/EROS. CAUSED BY _____

PROPOSAL CURVE NO _____
RPM _____ NO OF STAGES _____
NPSHR FT & IMPELLER _____ T O F _____
EFF _____ BHP RATED _____
MAX BHP RATED IMP _____
MAX HEAD RATED IMP _____
MIN CONTINUOUS GPM _____
ROTATION (VIEWED FROM CPLG END) _____

17 CONSTRUCTION
18 NOZZLES SIZE (IN) RATING FACING LOCATION
19 SUCTION _____
20 DISCHARGE _____
21 CASE MT ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE) _____
22 SPLIT ☐ AXIAL ☐ RAD: TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER
23 PRESS ☐ MAX ALLOW _____ PSIG _____ F. ☐ HYDRO TEST _____ PSIG
24 CONNECT ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKET
25 IMPELLER DIA ☐ RATED _____ ☐ MAX _____ ☐ TYPE _____
26 MOUNT ☐ BETWEEN BRGS ☐ OVERHUNG
27 BEARINGS TYPE ☐ RADIAL _____ ☐ THRUST _____
28 LUBE ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE
29 COUPLING ☐ MFR _____ ☐ MODEL _____
30 DRIVER HALF MTD BY ☐ PUMP MFR ☐ DRIVER MFR
31 ☐ MECH SEAL ☐ PACKING ☐ AUX SEAL/PACKING
32 MFR TYPE MODEL _____
33 MFR CODE _____ API CODE _____

☐ PERFORMANCE
☐ INSPECTION AND TESTS
SHOP INSPECTION ☐ REQ'D
HYDROSTATIC TEST ☐ REQ'D ☐ WITNESS
PERFORMANCE TEST ☐ REQ'D ☐ WITNESS
NPSH TEST ☐ REQ'D ☐ WITNESS
INT INSP AFTER _____
TEST ☐ REQ'D ☐ WITNESS

☐ INT WEAR PARTS
WEAR RINGS ☐ CASE ☐ IMP
DIA _____ IN CLEARANCE _____ IN
INTERSTAGE BUSHINGS
DIA _____ IN CLEARANCE _____ IN

VERTICAL PUMPS
PIT OR SUMP DEPTH 6'
PUMP LENGTH ☐ _____
MIN SUBMERGENCE REQ'D ☐ _____
COLUMN PIPE ☐ FLANGED ☐ THREADED
LINE SHAFT ☐ OPEN ☐ ENCLOSED
BRGS ☐ BOWL _____ ☐ LINE SHAFT _____
BRG LUB ☐ WATER ☐ OIL ☐ GREASE
FLOAT & ROD ☐ CS ☐ SS ☐ BPZ ☐ NONE
FLOAT SWITCH ☐ _____
PUMP THRUST LB ☐ UP _____ ☐ DOWN _____
MOUNTING PLATE REQ'D ☐ _____

☐ WEIGHTS AND DIMENSIONS
APPROX WT PUMP & BASE _____ LB
MOTOR _____ LB TURBINE _____ LB
BASE PLATE DIMENSIONS _____

APPLICABLE SPECIFICATIONS
☐ API 610 ☐ ANSI B73.1 B73.2
☐ PROJECT SPECIFICATIONS

AUXILIARY PIPING
35 ☐ C W PIPE PLAN ☐ Cu ☐ SS ☐ TUBING ☐ PIPE
36 ☐ TOTAL COOLING WATER REQ'D GPM _____ ☐ SIGHT F I REQ'D
37 ☐ PACKING COOL INJECTION REQ'D ☐ TOTAL GPM _____ ☐ PSIG
38 ☐ SEAL FLUSH PIPE PLAN _____ ☐ CS ☐ SS ☐ TUBING ☐ PIPE
39 ☐ EXTERNAL SEAL FLUSH FLUID _____ GPM _____ PSIG
40 ☐ AUXILIARY SEAL PLAN _____ ☐ CS ☐ SS ☐ TUBING ☐ PIPE
41 ☐ AUX SEAL FLUSH/QUENCH FLUID _____

42 MATERIALS
43 ☐ PUMP CASE/TRIM API CLASS _____
44 CASING _____ CORR ALL _____ IN.
45 IMPELLER _____ WEAR RINGS _____
46 SHAFT _____ SLEEVE(S) _____
47 CASE INT. COATING/LINING _____ GLAND _____
48 ☐ BASEPLATE _____ DRIP PAN _____

49 ☐ SITE CONDITIONS
50 ELEVATION FT _____ DUST/FUMES _____
51 AMB TEMP F _____ MAX _____ MIN _____ AREA ELECT CL _____ GR _____ DIV _____
52 COOLING WATER SUPPLY _____ PSIG _____ F RETURN _____ PSIG _____ F

53 REMARKS: 1 HP Motor

55 PREPARED BY <u>CP</u>	REVISION <u>△</u>	REVISION <u>△</u>	REVISION <u>△</u>
56 DATE <u>3-7-84</u>			
57 APPROVED BY _____	BY _____ DATE _____	BY _____ DATE _____	BY _____ DATE _____
58 DATE _____	APPO _____ DATE _____	APPO _____ DATE _____	APPO _____ DATE _____

Rust

International Corporation

**CENTRIFUGAL PUMP
DATA SHEET**CONTRACT NO. 21-2548
EQUIPMENT NO. P-17952 A, B
NO. REQUIRED 2
SHEET _____ OF _____CLIENT International Coal Refining CompanyPROJECT 6,000 TPSD SRC-1 Demonstration PlantPLANT LOCATION Newman, KentuckySERVICE Leachate Pumping Station

VENDOR _____

P.O. NO. _____

TYPE Centrifugal

MODEL _____

SERIAL NO. _____

NO. OF MOTORS REQ'D _____

ITEM NO. _____

FURN. BY _____

MFR BY _____

NO OF TURBINES REQ'D _____

ITEM NO. _____

FURN BY _____

MFR BY _____

NOTE: ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER☐ BY MANUFACTURER☐ OPERATING CONDITIONS (EACH PUMP)☐ PERFORMANCELIQUID _____ US GPM AT PT. NOR. _____ RATED 5

DISCHARGE PSIG _____

PROPOSAL CURVE NO. _____

RPM _____ NO OF STAGES _____

PT. F. NOR. 70 MAX. 100 SUCTION PSIG. MAX. _____ RATED _____

NPSHR FT. & IMPELLER _____ TO F. _____

SP. GR. AT PT. _____ DIFF. PRESS. PSI _____

EFF. _____ BHP RATED _____

VAP. PRESS. AT PT. PSIA _____ DIFF. HEAD. FT. 40

MAX. BHP RATED IMP. _____

VIS. AT PT. LB(M)/FT.-HR. _____ NPSHA. FT. _____

MAX. HEAD RATED IMP. _____

CORR./EROS. CAUSED BY _____

MIN. CONTINUOUS GPM _____

ROTATION (VIEWED FROM CPLG. END) _____

CONSTRUCTION

NOZZLES _____ SIZE (IN) _____ RATING _____ FACING _____ LOCATION _____

SUCTION _____

DISCHARGE _____

CASE MT. ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE) _____SPLIT ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSERPRESS. ☐ MAX. ALLOW. _____ PSIG _____ F. ☐ HYDRO TEST _____ PSIGCONNECT ☐ VENT ☐ DRAIN ☐ GAUGE ☐ STEAM JACKETIMPELLER DIA. ☐ RATED _____ ☐ MAX. _____ ☐ TYPE _____MOUNT ☐ BETWEEN BRGS ☐ OVERHUNGBEARINGS TYPE ☐ RADIAL _____ ☐ THRUST _____LUBE ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURECOUPLING ☐ MFR _____ ☐ MODEL _____DRIVER HALF MTD BY ☐ PUMP MFR ☐ DRIVER MFR☐ MECH. SEAL ☐ PACKING ☐ AUX. SEAL/PACKING

MFR TYPE MODEL _____

MFR CODE _____ API CODE _____

AUXILIARY PIPING☐ C.W. PIPE PLAN ☐ C.U. ☐ S.S. ☐ TUBING ☐ PIPE☐ TOTAL COOLING WATER REQ'D GPM _____ ☐ SIGHT F.I. REQ'D☐ PACKING COOL. INJECTION REQ'D ☐ TOTAL GPM _____ ☐ PSIG☐ SEAL FLUSH PIPE PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE☐ EXTERNAL SEAL FLUSH FLUID _____ ☐ GPM _____ ☐ PSIG☐ AUXILIARY SEAL PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE☐ AUX. SEAL FLUSH/QUENCH FLUID _____**MATERIALS**☐ PUMP CASE/TRIM API CLASS CSCASING CS CORR. ALL _____ INIMPELLER CS WEAR RINGS _____SHAFT CS SLEEVE(S) _____

CASE INT. COATING/LINING _____ GLAND _____

☐ BASEPLATE _____ DRIP PAN _____☐ **SITE CONDITIONS**

ELEVATION FT. _____ DUST/FUMES _____

AMB. TEMP. F. _____ MAX. _____ MIN. _____ AREA ELECT. CL. _____ GR. DIV. _____

COOLING WATER SUPPLY _____ PSIG _____ F. RETURN _____ PSIG _____ F.

REMARKS 1 HP MotorPREPARED BY CPDATE 3-7-84

APPROVED BY _____

DATE _____

REVISION

DATE _____

BY _____

DATE _____

APP'D _____

REVISION

DATE _____

BY _____

DATE _____

APP'D _____

REVISION

DATE _____

BY _____

DATE _____

APP'D _____

Rust
International Corporation

Leak Detection
Pumping Station
(GENERAL EQUIPMENT DATA SHEET)

CONTRACT NO. 21-2548
EQUIPMENT NO. TK-17951 A, B
NO. REQUIRED 2
SHEET _____ OF _____

1 CLIENT International Coal Refining Company
2 PROJECT 6,000 TPSD SRC-I Demonstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Intermittent Pumping in Case of Leak
4 VENDOR P.O. NO.

4' x 4' x 6' high; 4" thick concrete sump

55 PREPARED BY CP	REVISION	REVISION	REVISION
56 DATE 3-7-84	BY DATE	BY DATE	BY DATE
57 APPROVED BY	BY DATE	BY DATE	BY DATE
58 DATE	DATE	DATE	DATE

Rust

International Corporation

Leachate Pumping
Station
(GENERAL EQUIPMENT DATA SHEET)CONTRACT NO. 21-2548
EQUIPMENT NO. TK-17952 A, B
NO. REQUIRED 2
SHEET _____ OF _____

1 CLIENT International Coal Refining Company
2 PROJECT 6,000 TPSD SRC-1 Semconstration Plant PLANT LOCATION Newman, Kentucky
3 SERVICE Pumping Leachate to Equilization Basin
4 VERSION P.Q. NO.

4' x 4' x 6' high; 4" thick concrete pump

55	PREPARED BY	CP	REVISION	△	REVISION	△	REVISION	△
56	DATE	3-7-84						
57	APPROVED BY		BY	DATE	BY	DATE	BY	DATE
58	NAME		NAME		NAME		NAME	