DRAWINGS

SPECIFICATIONS

LISTS

LINE SCHEDULE

ISSUE	DATE	DESCRIPTION	BY	CKD	APPD
A	1/1/01	FOR REVIEW			

Burns & McDonnell SINCE 1898

B&McD Project No.: _____

Unit	Size	Service	Line No.	Pipe Spec	Insulation Type	Insulation Thk	Fluid Type	Description From	Description To	P&I Dwg	BPSD / MMSCFD	LB/HR	Density lb/ft³	Normal Operating T (°F)	Normal Operating P (psig)	Design T (°F)	Design P (psig)	Min Test P (psig)	Stress Analysis (Y/N)	Corrosion Allow (in)	Stress Relieve (Y/N)	X-Ray Req'd %	Paint Spec	Priority Piping	Rev. Changes	Comments
01	2	WP	2025	1CB2S01	ST	1 1/2	L	LHC PRECIPITATOR	01-2"-DOW-2163-1CH2S01H-ST	11661-D						175	150	225		0.125					A2	
01	3	H	2049	3CB2S01	NI		V	HTU	21-4"-H-2045-3CB2S01-NI	11587-D	10	2,750	0.57	113	550	170	650	975	Y	0.125			1		A2	
01	2	O	2079	3CB2S01	NI		L	HTU	NHDS	11599-D		4,224	44.61	110	150	170	300	450	Y	0.125			3.1		A2	
01	2	DOW	2163	1CH2S01H	ST	1 1/2	L	HTU	Exist. HTU Fract. Btms Line 21-O-6"-21-J13A-NI	18308-D		172	62.43	95	144	150	200	300	Y	0.125			1		A2	
02	8	O	2040	1CB2S01	NI		L	NHDS	Exist. Naphtha Feed to CRU 21-O-6"-19-J13A-FHC	19796-D		240,193	42.77	195	140	340	200	300		0.125					A2	
02	6	O	2042	1CB2S01	NI		L	NHDS	T-14	19796-D	NNF		45.32	110	50	190	200	300		0.125					A2	
02	4	GM	2064	1CB2S01	ST	1 1/2	V	NHDS	FCC FUEL GAS SCRUBBER	19796-D	0.64	912	0.33	110	120	160	200	300		0.125					A2	
02	2	WP	2135	1CH3S01H	ST	1 1/2	L	NHDS	3CF-103	19796-D		8,429	61.70	120	50	170	150	225	N	0.1875					A2	
02	12	RF	2183	1CB2S01	NI		V	NHDS	Secondary NHDS Flare KO Drum 21F-XXX	19796-D		92,130	0.29	417	25	600	50	75		0.125					A2	
02	8	WC	2222	12CB2T01	NI		L	NHDS	21-12"-WC-2050-12CB2T01-NI	19796-D		300,000	61.86	110	30	170	150	225		0.125					A2	
02	3	D	2361	1CB2S01	NI		L	NHDS	Existing Slop Header 21-6"-O-23-J13A-NI	19796-D		15,580	45.70	120	65	400	150	225		0.125					A2	
03B	6	MAR	2001	1CH2S01H	ST	1 1/2	L	#1 ARU	#2 ARU	11995-D		160,000	66.08	118	34	175	125	188		0.125					A2	
03B	2	WP	2005	1CH3S01H	ST	1 1/2	L	21-2"-WP-2095-1CH3S01H-ST	3BF-106	12075-D										0.1875					A2	
03C	4	WP	2018	1CH3S01H	ST	1 1/2	L	SWS	Existing Crude Desalter Water Preheater Feed Line	19796-D		107,474	60.85			200	200	300		0.1875					A2	
07	8	RF	2007	1CB2S01	NI		V	7E-9	Existing Flare Header	19030-D										0.125					A2	
08	3	WP	2000	1CB2S01	PP	1 1/2	L	8FA-10	21-6"-WP-2005-1CB2S01-NI	13291-D		42,068	59.60	220	25	300	150	225		0.125					A2	
08	3	WP	2001	1CB2S01	PP	1 1/2	L	8FA-11	08-3"-WP-2000-1CB2S01-PP	13292-D		42,068	59.60	220	25	300	150	225		0.125					A2	
10	8	O	2435	3CB2S01	FHC	1 1/2	L	10E-140 - CRU PREHEAT HXR	1E-135	20021-D		370,479	46.13	355	131	550	200	331	Y	0.125					A2	
10	6	H	2624	3CB2S01	NI		V	CCR NET GAS COMPRESSORS	21-4"-H-2046-3CB2S01-NI	19798-D	11	6,096	0.47	100	551	250	630			0.125					A2	
13	6	MAL	2000	1CH2S01H	ST	1 1/2	L	#2 ARU	03B-6"-MAL-2000-1CH2S01H-ST	19796-D		153,376	63.72	110	38	175	125	188		0.125					A2	
13	2	WP	2071	1CH3S01H	ST	1 1/2	L	# 2 ARU	02-2"-WP-2135-1CH3S01H-ST	19796-D	NNF		61.70	115	110	175	125	188		0.1875					A2	
13	6	O	2078	1CH2S01H	ST	1 1/2	V	#2 ARU	#2 SRU	19796-D	2	6,535	0.16	115	12	170	50	75		0.125					A2	
13	2	SC	2113	1CB1S01	ST	1 1/2	L	#2 ARU	Existing Cond. Return Header 21-2"-SC-5-J12-ST	19799-D		13,340	58.50	259	20	300	50	75		0.125					A2	Add SRU Load
13	6	RF	2119	1CB2S01	NI		V	#2 ARU	02-12"-RF-2183-1CB2S01-NI	19796-D		3,696	0.05	413	20	300	50	75		0.125					A2	
13	10	WC	2122	12CB2T01	NI		L	#2 ARU	21-12"-WC-2050-12CB2T01-NI	18985-D		512,057	62.43	110	30	175	150	225		0.125					A2	
21	6	O	2000	1CH2S01H	ST	1 1/2	V	EXISTING AAG HEADER 3B-6"-O-603-J115(P117A)-STP	13-6"-O-2078-1CH2S01H-ST	19796-D	2	6,535	0.16	115	12	170	50	75		0.125					A2	
21	4	O	2001	1CH2S01H	ST	1 1/2	V	SWS ACID GAS HEADER 3C-4"-O-603-J117A(P117A)-STP	#2 SRU	19796-D	0.49	1,156	0.07	195	22	270	50	75		0.125					A2	
21	8	O	2002	1CB2S01	FHC	1 1/2	L	EXISTING HOT HSR LINE 21-8"-O-5-J13A-FHC	NHDS	19797-D		180,238	39.13	300	55	350	200	300		0.125					A2	Reduce to 6" at NHDS B/L
21	6	O	2003	1CB2S01	NI		L	EXISTING COLD HSR LINE	NHDS	19797-D		60,079	45.87	90	55	350	200	300		0.125					A2	Reduce to 4" at NHDS B/L
21	12	RF	2004	1CB2S01	NI		V	21F-XXX1	EXISTING FLARE HEADER 21-RF-16"-4-J13A-NI	19802-D					3	600	50	75		0.125					A2	
21	6	WP	2005	1CB2S01	NI		L	EXIST. HTU FRACT. BTMS LINE	T-474	19798-D		106,991	58.00	220	25	300	150	225		0.125					A2	

TIE-IN NO.	LINE NO.	SERVICE	SCHED. S'DOWN	HOT TAP (Y/N)	P&I DWG. NO.	PLAN DWG. NO.	DEMO DWG. NO.	APPROX. HEIGHT ABOVE GRADE	NOTES	PHOTO ID	SIZE & TYPE OF CONN.	REV NO.	TIE-IN NO.
001-003	03C-2"-WP-2041-1CH3S01H-ST			N	12001-D				Cut new 2" nozzle to 3CF-103		2" CUT & WELD	A1	001-003
001-004	03C-2"-WP-2042-1CH3S01H-ST			N	12001-D				Cut 3" tee into existing line to Sour Water Storage.		3" CUT & WELD	A1	001-004
030-001	07-8"-RF-2007-1CB2S01-NI			Y	19030-D				Hot tap existing flare header.		8" HOT TAP	A1	030-001
075-002	03B-2"-WP-2005-1CH3S01H-ST			N	12075-D				Tie-into 8" feed manifold at top of Flare Drum.		2" CUT & WELD	A1	075-002
291-001	08-3"-WP-2000-1CB2S01-PP			N	13291-D				Connect to existing 3" valve		3" 150# RF BOLT-UP	A	291-001
291-002	08-3"-WP-2000-1CB2S01-PP			N	13291-D				Replace existing LV with new valve		3" 150# RF BOLT-UP	A1	291-002
291-003	08-3"-WP-2000-1CB2S01-PP			N	13291-D				See tie-in 291-002 Notes		3" 150# RF BOLT-UP	A1	291-003
292-001	08-3"-WP-2001-1CB2S01-PP			N	13292-D				Connect to existing 3" valve		3" 150# RF BOLT-UP	A	292-001
292-002	08-3"-WP-2001-1CB2S01-PP			N	13292-D				Replace existing LV with new valve		2" 150# RF BOLT-UP	A1	292-002
292-003	08-3"-WP-2001-1CB2S01-PP			N	13292-D				See tie-in 292-002 Notes		2" 150# RF BOLT-UP	A1	292-003
332-003	21-3"-IA-2012-1BC1S01-NI			N	13332-D				Add new 3" spool w/ valve, tee and bleeder		3" 150# RF BOLT-UP	A	332-003
332-004	21-3"-IA-2012-1BC1S01-NI			N	13332-D				See tie-in 332-003 Notes		3" CUT & WELD	A	332-004
641-001	22-10"-O-2005-1CB2S01-NI			N	12641-D						8" CUT & WELD	A1	641-001
641-002	22-6"-O-2008-1CB2S01-NI			N	12641-D						6" CUT & WELD	A1	641-002
643-003	22-6"-O-2003-1CB2S01-NI			N	12643-D						6" CUT & WELD	A1	643-003
661-001	01-2"-WP-2025-1CB2S01-ST			N	11661-D				Add new spool to include CV station, tee and new valve		2" 150# RF BOLT-UP	A	661-001
661-002	01-2"-WP-2025-1CB2S01-ST			N	11661-D				See Tie-in 661-001 Notes		2" 150# RF BOLT-UP	A	661-002
661-003	01-2"-WP-2025-1CB2S01-ST			N	11661-D				See 661-001 notes		1 1/2" 150# RF BOLT-UP	A	661-003
729-001	21-6"-WP-2005-1CB2S01-NI			N	13729-D				Existing 6" valve at T-474		6" 150# RF BOLT-UP	A	729-001
729-002	34-6"-WP-2003-1CH3S01-PF			Y	13729-D				Hot tap new 6" nozzle to T-475		6" HOT TAP	A	729-002
729-004	Existing 12" Feed to T-474			Y	13729-D				Add new 16" nozzle to T-474		16" HOT TAP	A	729-004
729-005	34-14"-WU-2000-12CB2T01-NI			N	13729-D				Add new 14" valve to existing 14" flange on T-474.		14" 150# RF BOLT-UP	A	729-005
796-001	21-6"-O-2000-1CH2S01H-ST			N	19796-D				Perform tie-in during Unit 3B (ARU) shutdown		6" CUT & WELD	A1	796-001
796-002	21-4"-O-2001-1CH2S01H-ST			N	19796-D				Perform tie-in during Unit 3C (SWS) shutdown		4" CUT & WELD	A1	796-002
796-003	21-4"-O-2001-1CH2S01H-ST			N	19796-D						4" CUT & WELD	A1	796-003
797-001	21-8"-O-2002-1CB2S01-FHC			N	19797-D				Tie into new 4" valve		4" 150# RF BOLT-UP	A1	797-001
797-002	21-6"-O-2003-1CB2S01-NI			N	19797-D				Tie into new 6" valve.		6" 150# RF BOLT-UP	A1	797-002
797-003	02-3"-D-2361-1CB2S01-NI			Y	19797-D				Tie into slop header.		3" HOT TAP	A1	797-003

SCHEDULED SHUTDOWN

A Early Shutdown
B Pre-Turnaround
C Turnaround
D
E

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ISU	DATE	DESCRIPTION	BY	CKD	APPD
A	01/01/01				

APPD:

DATE:

Burns & McDonnell SINCE 1898

TIE-IN SCHEDULE

CHARGE NO.

PROJ N

SHEET 1 OF 4

Sample Project

Project No.: ____
File: Lists/Equip

Equipment List

3/28/2005
DRAFT

Tag No.	Name Unit	P&ID Est HP	Status Spec Pkg	Size Capacity	Design Temp (F)	Design Press	Materials of Construction	Insul Type Insul Thk	Notes
02F-021	Plant Air KO Pot 02 - NHDS	02-025	NEW	2'-6"x6'-0'	150	150	CS	FHC/ST 1 1/2	Located in NHDS
02F-022	Condensate Receiver 02 - NHDS	02-025	NEW	2'-0"x6'-0'	250	15	CS	FHC/ST 1 1/2	Located in NHDS
10P-XX1	Boiler Feed Water Booster Pump 010 - CRU	30	NEW	165 gpm @ 240' TDH			CS		Located in CRU
10P-XX2	Boiler Feed Water Booster Pump 010 - CRU	30	NEW	165 gpm @ 240' TDH			CS		Located in CRU
13F-105	#2 ARU Condensate Flash Drum 13 - ARU #2	18991-D	NEW	2'-6" ID x 8'-6" TF	300	30	CS		Located in #2 ARU
13P-103	ARU #2 Amine Sump Pump 13 - ARU #2	19803-D 5	NEW	50 gpm @ 125' TDH					
13P-106	#2 ARU Condensate Pump 13 - ARU #2	18991-D 10	NEW	30 gpm @ 200' TDH			CS		Located in #2 ARU
13P-206	#2 ARU Condensate Pump 13 - ARU #2	18991-D 10	NEW	30 gpm @ 200' TDH			CS		Located in #2 ARU
21F-XXX1	NHDS Secondary Flare KO Drum 21 - OSBL	19802-D	NEW	4'-0"X11'-0" / 1'-6"X2'-6"	650 F	50 PSIG	CS	FHC/ST(Boot) 1 1/2"	
21P-XXX	Cold HSR Feed Pump 21 - OSBL	75	NEW	575 gpm @ 325' TDH			CS		
21P-XXX1	OWS Sump Pump 21 - OSBL	19803-D 25	NEW	1500 gpm @ 25' TDH			CS		Common Sump for NHDS, SRU, ARU, TGTU
21P-XXX2	OWS Sump Pump 21 - OSBL	19803-D 25	NEW	1500 gpm @ 25' TDH			CS		Common Sump for NHDS, SRU, ARU, TGTU
21P-XXX3	OWS Sump Pump 21 - OSBL	19803-D 25	NEW	1500 gpm @ 25' TDH			CS		Common Sump for NHDS, SRU, ARU, TGTU

Project No.: ____
File: Lists/Equip

Equipment List

3/28/2005
DRAFT

Tag No.	Name Unit	P&ID Est HP	Status Spec Pkg	Size Capacity	Design Temp (F)	Design Press	Materials of Construction	Insul Type Insul Thk	Notes
21P-XXX5	ARU/SRU COSS Sump Pump 21 - OSBL	19803-D 5	NEW	50 gpm @ 125' TDH					Common Sump
21P-XXXX	NHDS Secondary Flare KO Pump 21 - OSBL	19802-D 10	NEW	50 gpm @ 175' TDH					
22P-XXX1	Kerosene Feed Pump 22 - Tank Farm	19804-D 100	NEW	3x4x13 580 gpm @ 410' TDH					
22P-XXX2	Middle Distillate Feed Pump 22 - Tank Farm	19804-D 100	NEW	3x4x13 580 gpm @ 410' TDH					
34P-XXXX	API Separator Flood Pump 034 - Waste Water	13729-D 75	NEW	3000 gpm @ 65' TDH					
3DP-103	Caustic Feed Pump (Spare) 3D - TGTU	12575-D 2.5	Existing	10 GPM @ 107'					Install Max Impeller
3DP-103	Caustic Feed Pump 3D - TGTU	12575-D 2.5	Existing	10 GPM @ 107'					Install Max Impeller

SAMPLE PROJECT

Instrument List

PID Sort

Tag Number	Instrument Ty	Service	PID	I/O Typ	Manufacturer
TW-432					
TW-433					
FE-400	Orifice Plate	1P-103/1P-203 Outlet Flow	11575-D		Rosemount
FIC-400	DCS Flow Controller	1P-103/1P-203 Outlet Flow	11575-D		
FT-400	DP Flow Transmitter	1P-103/1P-203 Outlet Flow	11575-D	AI	Rosemount
FV-400	Flow Control Valve	1P-103/1P-203 Outlet Flow	11575-D	AO	Fisher
FE-406	Orifice Plate	H2 Feed to 1E-101A	11577-D		Rosemount
FE-407	Orifice Plate	H2 Feed to 1E-101E	11577-D		Rosemount
FE-407A	Orifice Plate	H2 Feed to 1E-101C	11577-D		Rosemount
FIC-406	DCS Flow Control	H2 Feed to 1E-101A	11577-D		
FIC-407	DCS Flow Control	H2 Feed to 1E-101E	11577-D		
FIC-407A	DCS Flow Control	H2 Feed to 1E-101C	11577-D		
FT-406	DP Flow Transmitter	H2 Feed to 1E-101A	11577-D	AI	Rosemount
FT-407	DP Flow Transmitter	H2 Feed to 1E-101E	11577-D	AI	Rosemount
FT-407A	DP Flow Transmitter	H2 Feed to 1E-101C	11577-D	AI	Rosemount
FV-406	Flow Control Valve	H2 Feed to 1E-101A	11577-D	AO	Fisher
FV-407	Flow Control Valve	H2 Feed to 1E-101E	11577-D	AO	Fisher

SAMPLE PROJECT

I/O LIST

Tag Number	Instrument Type	Service	PID	I/O Type
AT-400	Analyzer Transmitter	Sulfur Analyzer	18304-D	AI
FIT-410	DP Flow Transmitter	NF-004's Outlet Flow	18304-D	AI
FT-400	DP Flow Transmitter	1P-103/1P-203 Outlet Flow	11575-D	AI
FT-401	DP Flow Transmitter	1F-104 Outlet Flow Indication	11587-D	AI
FT-403	DP Flow Transmitter	1F-106 Inlet Flow Control	11599-D	AI
FT-406	DP Flow Transmitter	H2 Feed to 1E-101A	11577-D	AI
FT-407	DP Flow Transmitter	H2 Feed to 1E-101E	11577-D	AI
FT-407A	DP Flow Transmitter	H2 Feed to 1E-101C	11577-D	AI
FT-409	DP Flow Transmitter	NF-001 Inlet Flow Control	18301-D	AI
FV-36	Flow Control Valve	Existing Control Valve Replacement	11599-D	AO
FV-37	Flow Control Valve	Existing Control Valve Replacement	11599-D	AO
FV-400	Flow Control Valve	1P-103/1P-203 Outlet Flow	11575-D	AO
FV-403	Flow Control Valve	1F-106 Inlet Flow Control	11599-D	AO
FV-406	Flow Control Valve	H2 Feed to 1E-101A	11577-D	AO
FV-407	Flow Control Valve	H2 Feed to 1E-101E	11577-D	AO
FV-407A	Flow Control Valve	H2 Feed to 1E-101C	11577-D	AO
FV-409	Flow Control Valve	NF-001 Inlet Flow Control	18301-D	AO
LT-406	Level Transmitter	NF-005 Level Control	18300-D	AI

DATASHEETS

Burns & McDonnell
Process & Industrial Group
Kansas City, Missouri
Tanks and Pressure Vessels
Specification Sheet

Customer:
Location:
Service: Stripper Bottoms Coalescer
Manufacturer:
Model Number:
Serial Number: No. Required: 1

Equipment / Item No.: NF-003
Specification No.:
Project No.:
Prepared By:
Original Date: 1-Mar-04
Revision Date: 2-Aug-04

1	**DESIGN CONDITIONS**	
2	Code / Stamp Req'd	ASME sec. VIII Div. 1/yes
3	Design Int. Press/Temp	200 psig @ 170F
4	Design Ext. Press/Temp	FV @ 510F
5	Min. Des. Metal Temp.	0°F
6	Corrosion Allowance, in.	0.125
7	Wind Design	ASCE 7-02 Cat C 90 MPH
8	Seismic Design	IBC Class B
9	MAWP	Calculated
10	**OPERATING CONDITIONS**	
11	Fluid Name	Stripper Bottoms
12	Pressure, PSIG	150
13	Temperature, °F	95
14	Specific Gravity	0.84
15	Viscosity, cP	
16	Heat Capacity, BTU/lb	
17	**CONSTRUCTION**	
18	Diameter x Length T/T, in.	6'-0" ID X 20'-0" TT
19	Volume, gal.	
20	Heat Transfer Area, ft²	
21	Nozzle Projection, in.	12" MW, 9" Others
22	Type of Heads	2 : 1 Elliptical
23	Type of Supports	120° Saddles - Two (2) reqd
24	**MATERIALS OF CONSTRUCTION**	
25	Heads	SA516 Gr 70N
26	Shell	SA516 Gr 70N
27	Saddles/Belly Band	SA 36 W/SA516 Gr70N
28	Jacket	
29	Nozzles	SA106 Gr B/SA105
30	Flanges	SA105
31	Internals	SA516 Gr70/SA106 GrB
32	Bolts / Nuts	SA193-B7/SA194-2H
33	Gaskets	SW 304 SS W/graphite fill
34	Other	
35	**ACCESSORIES SUPPLIED BY SELLER**	
36	Ladder and Platform	5' wide X 20' long with ladder to grade
37	Insulation Supports	None
38	Insulation	None
39	External Pipe Supports	None
40	Surface Prep. / Cleaning	per PIP CTSE 2024
41	Prime / Paint / Finish	per PIP CTSE 2024
42	Internals	Feed pipe, coalescer pad, support rings
43	Grounding Lugs	1
44	Lifting Lugs	None
45	Other	N/A
46	**BOOT LIQUID LEVELS**	
47	High High	
48	High	
49	Normal	Liquid full
50	Low	
51	Low Low	
52	Zero Reference	

NOZZLES

Mark	Loc.	Size	Rtg. / Face	Description
N1		8	150 RFWN	Inlet w/ flanged internal pipe
N2		2	150 RFWN	Steam Out
N3		6	300 RFWN	Relief Valve
N4		2	150 RFWN	Pressure
N5		6	150 RFWN	Vent
N6		8	150 RFWN	Liquid Outlet
N7		2	300 RFWN	Boot Level
N8		2	300 RFWN	Boot Level
N9		2	150 RFWN	Drain
N10		2	150 RFWN	Water Outlet
N11		2	300 RFWN	Boot Level
N12		2	300 RFWN	Boot Level
M1		20	150 RFWN	Manway w/ davit
M2		20	150 RFWN	Manway w/ davit

TESTING REQUIREMENTS

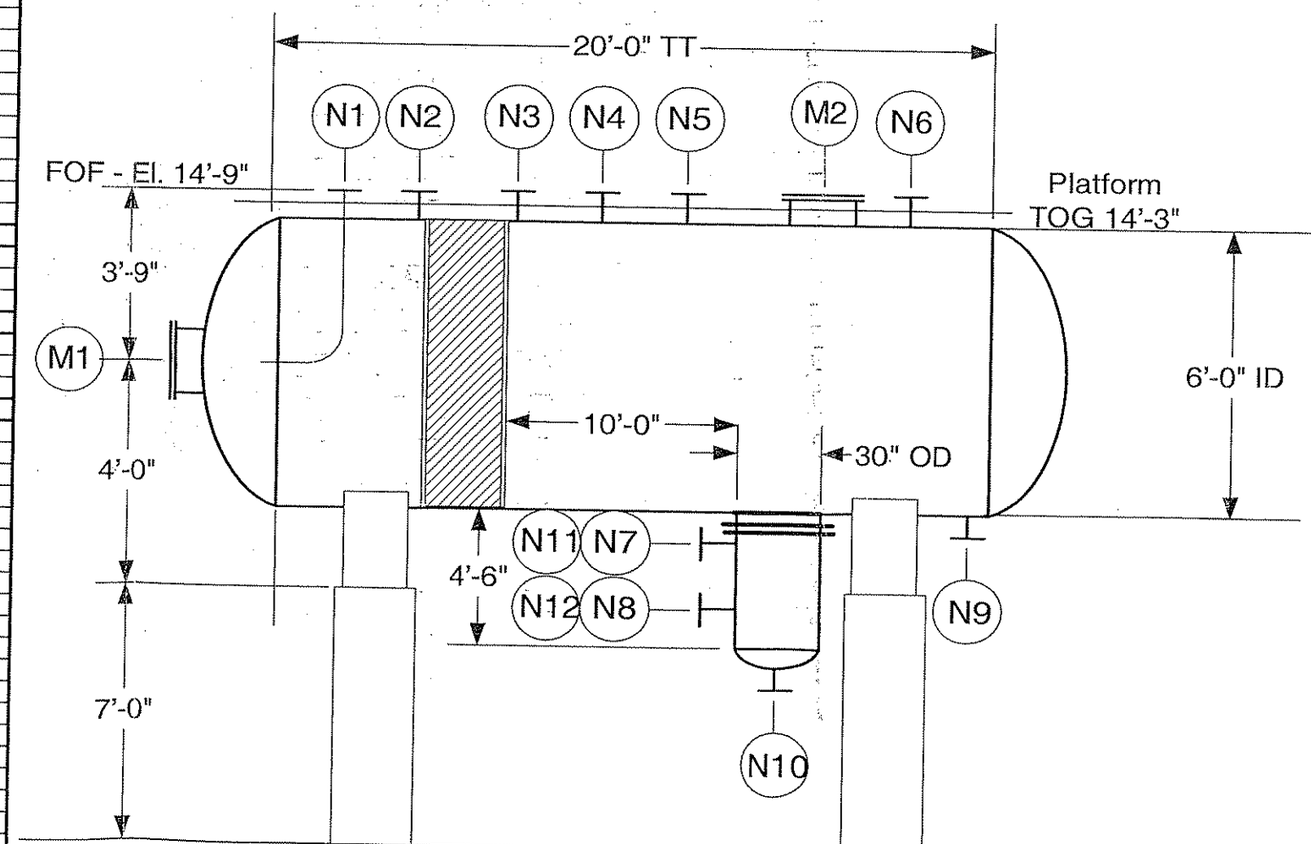
Radiograph	RT-3
Hydrostatic	1.3 x M.A.P.
Post Weld Heat Treat	Yes

AGITATOR LOADS

Maximum Vertical Load, lb.	
Maximum Bending Moment, in-lbs.	
Maximum Torque, in-lbs.	

MISCELLANEOUS

VESSEL DRAWINGS



NOTES
1. Internal 8" pipe on nozzle N1 to direct feed flow into head at vessel centerline
2. Installation of 36" thick mesh pad in shop by vessel supplier.
3. Provide two (2) 360°, 2"W x 1/2" thk, CS support rings. Provide removable section in inside ring with two (2) bolted angles, 3"x3"x3/8" thk

* Indicates that information is to be provided by equipment vendor / manufacturer

Burns & McDonnell
Process & Industrial Group
Kansas City, Missouri
Filter / Strainer
Specification Sheet

Customer:		Equipment / Item No.:	
Location:		Specification No.:	
Service:	**Stripper Bottoms Coalescer (Note 1)**	Project No.:	
Manufacturer:	*	Prepared By:	
Model Number:	*	Original Date:	**7-Apr-04**
Serial Number:	Number Required: **One**	Revision Date:	**21-May-04**

1	**GENERAL**					
2	Filter Housing Shape	**Note 1**		Cleaning Method / Frequency		
3	Filter Type	**Mesh pad coalescer**				
4	Orientation	**Horizontal**		Operation	**Continuous**	
5	**OPERATING CONDITIONS**					
6	Fluid		**Stripper Btms (Diesel)**			
7	Normal Flow Rate	lb/hr	**306,426**	Normal Flow Rate	lb/hr	
8	Design Flow Rate	lb/hr	**372,189**	Design Flow Rate	lb/hr	
9	Operating Pressure	PSIG		Maximum Particle Size	in.	
10	Operating Temperature	ºF	**95**	Average Particle Size	in.	
11	% Liquid	%	**0.53 wt% water**	Cleaning Pressure Drop	PSI	
12	Viscosity	cP	**4.3 (Diesel)**	Corrosive / Erosive Due To		**None**
13	Specific Gravity		**0.85 (Diesel)**			
14	Allowable ΔP Clean/Dirty	PSI	**10**			
15	Actual ΔP Clean/Dirty	PSI	* *			

16	**CONSTRUCTION**						**SKETCH**
17	Nozzles	Mark	Size	Qty.	Rating	Notes	
18	Inlet						
19	Outlet						
20	Drain						
21	Vent						
22	Other						
23	Other						
24	Design Int. Press/Temp						
25	Design Ext. Press/Temp						
26	Min. Des. Metal Temp.						
27	Corrosion Allowance, in.						
28	MAWP						
29	Basket / Filter Media Details						
30	Perforated Plate	Hole Size				in.	
31	Wire Mesh	Mesh Type			**See Note 4**		
32		Mesh Size					
33	Fibrous / Cloth	Type					
34		No. Cartridges					
35		Cartridge Size				in.	
36	Bonded Granular	Max. Particle Size				microns	
37	Filter Media Area			in^2			
38	Filter Media Usage			filters / month			
39	Filter Mounting	**See Note 1**					
40	Insulation Thickness			in.			
41	Davit or Swing Bolt Required						
42	Lifting Lugs						
43	Grounding Lug						
44	Code Requirements						
45	**MATERIALS OF CONSTRUCTION**						
46	Housing						
47	Nozzles						
48	Flanges						
49	Bolts/Nuts						
50	Gaskets						
51	Supports						
52	Filter Media	**304 SS or SS/FG co-knit - See Note 4**					

NOTES

1. Internals for pressure vessel NF-003. See vessel specification for vessel design conditions and construction.
2. Design rate is for LAGO/LCO feed case, 29000 BPD, SOR conditions
3. Feed contains insoluble water, both free and emulsified, formed as hot steam stripper bottoms is cooled. Coalescer to remove total insoluble water to 200 wppm.
4. As a minimum, vendor shall provide 36" thick, 304 SS wire mesh element, 9-12 lb/cf. Vendor shall quote co-knit mesh if required to meet outlet water specification.
5. Mesh pad sections to be installed through 24" manway.

* Indicates that information is to be provided by equipment vendor / manufacturer

Burns & McDonnell
Process & Industrial Group
Kansas City, Missouri
Centrifugal Pump
Specification Sheet

Equipment / Item No.:	1P-135
Specification Number:	
Project Number:	
Original Date:	3/5/04
Prepared By:	R. Spangler
Revision Date:	8/5/04

Customer			
Location			
Service	Wash Water Circuit	No. Required	1
Mfr.		Serial Number	

	OPERATING CONDITIONS						PERFORMANCE			
1										
2	Liquid:	Wash (Sour) Water		GPM @ PT:	24	Norm	Curve No.	*		
3		(Note 3)		GPM @ PT:	48	Rated	Outline Dwg No.	*		
4	PT Temp	111	°F	Disch Press.	1,056	psig	RPM	*	NPSHR	*
5	SP GR at PT	1.00		Suct Press.	152	psig	Number of Stages	*		
6	V. Press at PT.	1.275	psia	Diff Pressure	904	psi	Eff at Design	*		
7	Vis at PT:		SSU	Diff Head	2,096	ft	BHP: Des	*	Max	*
8		0.6438	CP			ft of Water	Shut.-off Head Ft	*		
9	Corr/Eros Properties		Yes	NPSHA	384	ft	Min Continuous GPM		*	
10					(Note 5)		Rotation Facing CPLG		*	
	CONSTRUCTION						CLG Water, GPM:	*		
11	Case-Mount:						Bearings		Gland	
12	Split:						Stuff Box		Pedestal	
13	Case Des Press. psig						Press. psig		Temp. °F	
14	Tapped Connections:						Flushing Water			
15	Nozzles	Size	Rating	Face	Location		API Seal Plan	Plan 11 and 52		
16	Suction	*	*	RF						
17	Discharge	*	*	RF			SHOP TESTS			
18	Impeller: Type	*								
19	Dia-in:Supplied	(Note 1)	max	*	min	*	Shop Inspection		Yes	
20	Bearings: Radial	N/A			Thrust		Performance		Yes	
21	Lube:				Oiler:		NPSH, ft			
22	CPLG: MFR/Model		Note 8		Guard:		Hydrostatic psig/°F			
23	Packing	N/A					Witness		No	
24	Mech Seal: MFR	Tandem			Model					
25	Base:	API - prepare for epoxy grout					Weights:	Pump, lb	*	
26	API 610:	Yes			ANSI B73.1:	No	Driver, lb *	Shipping, lb	*	
27										

	MATERIALS OF CONSTRUCTION			
28	Case	Imp Wear Ring	Other	
29	Case Wear Ring	Shaft	Base	Mfg. Std.
30	Impeller	Shaft Sleeve	API Matl	S-1 (Note 4)
31				

	MOTOR DRIVER				TURBINE DRIVER				
32	Supplied by	Mfg.	Mounted by	Vendor	Supplied by		Mounted by		
33	MFR	Reliance	Type	*	MFR		Type		
34	Enclosure	TEFC	RPM	*	HP		RPM		
35	HP	(Note 2)	SF	1.15	Inlet STM Press. psig:		Norm/Max		
36	Frame	*	Insulation	F	Inlet STM Temp, °F:		Norm/Max		
37	Volts/PH/Hz	460/3/60	Temp Rise	40 C	Exhaust STM Press. psig:		Norm/Other		
38	Bearings	*	Lube	*	Bearings		Lube		
39	Area Classification	Class 1 Div. 2 Group B, C, D			Nozzles	Size	Rating	Face	Location
40	Speed Reducer:				Inlet				
41	MFR		Model		Exhaust				
42	Ratio		Class		API 611:		Water Rate, lb/hp-hr		

Notes:

1. Impeller to be not larger than 95% of the maximum diameter. Maximum impeller is not acceptable.
2. Size motor for operation at end of curve for maximum impeller w/no credit for the service factor.
3. Sour water contains up to 1000 wppm H2S and may contain up to 2 wt% NH4SH
4. API Class 610 S-1, NACE MR0175-99 Compliant (minimum). Alternate better materials may be offered if economical (i.e. A-8)
5. NPSHA is estimated based on 1.5 volume percent gas in pump suction.
6. Deleted
7. Seals shall be Flowserve.
8. Use Thomas 71 coupling if allowed by pump design

* Information shall be provided by manufacturer.

Prepared by Burns & McDonnell

GENERAL	1	Tag No.		LV-401	
	2	Service		Cold HP Separator Liquid to 1F-106	
	3	Line No.		1-4"-OH-2010-6CB4S01-NI	
	4	Area Classification		Class I Div II Groups C, D	
	5	Ambient Temperature:	Min. / Max.		
	6	Allowable Sound Pressure Level dBA		85 dBA	
	7	Tightness Requirements		ANSI IV (standard)	
	8	Available Air Supply Pressure:	Min. / Max.	40 psig	125 psig
	9	Power Failure Position		FC	
	10	P&ID		11586-D	
PIPE LINE	11	Line Size and Schedule	Inlet / Outlet	4" SCH 80	4" SCH 80
	12	Pipe Material		CS	
	13	Pipe Insulation			
PROCESS CONDITIONS	14	Process Fluid		Light Hydrocarbon	
	15	Upstream Condition			
	16	Differential Pressure			

		Units	@ Max. Flow	@ Norm. Flow	@ Min. Flow
17					
18	Flow Rate	GPM	84	70	28
19	Inlet Pressure	PSIG	890	894	979
20	Pressure Drop	PSI	709	713	798
21	Inlet Temperature	DEG F		100	
22	Inlet Density / Specific Gravity / Molecular Mass		50.26		139.5
23	Inlet Compressibility Factor				
24	Inlet Viscosity	cP		1.01	
25	Inlet Specific Heats Ratio				
26	Inlet Vapour Pressure	PSIA		904	
27	Critical Pressure	PSIG		652	
28	Flow Coefficient Cv				
29	Travel	%			
30	Sound Pressure Level	dBA			

BODY AND TRIM	31	MFR / Model	Fisher		
	32	Body Type	Globe or Angle		
	33	Body Size / Trim Size	3 in (est)		
	34	Rated Cv / Characteris.			
	35	End Connec. & Rating	600# RF Flange		
	36	Body Material	Carbon Steel (WCC)		
	37	Bonnet Type / Material			
	38	Flow Direction			
	39	Flow Action To			
	40	Lubricator / Isolat. Valve			
	41	Guiding / No. of Ports			
	42	Trim Type	Anti-cavitation		
	43	Rated Travel			
	44	Plug/ Ball/ Disk Material	410 SS HD		
	45	Seat Material	316 SS/Alloy-6		
	46	Cage / Stem Material			
	47	Gasket Material			
ACTUATOR	48	MFR / Model	Fisher		
	49	Type	Diaphragm		
	50	Size / Area			
	51	Air Failure Valve:			
	52	Handwheel Location			
	53	Bench Range			
	54				

POSITIONER	56	MFR / Model	Fisher		
	57	Signal: Inlet / Outlet	4-20 mA		
	58	Increase Signal Valve:			
	59	Cam Characteristic			
	60	Bypass / Gauges			
	61				
	62				
SOLENOID VALVE	63	MFR / Model	N/A		
	64	Type			
	65	When De-Enegr.Valve:			
	66				
SWITCHES	67	MFR / Model	N/A		
	68	Type / Quantity			
	69	Contacts / Rating			
	70	Switching Position			
	71				
PURCHASE	72	Manufacturer	Fisher		
	73	Model			
	74	Purchase Order Num.			
	75	Price / Item Number			
	76	Serial Number			

Notes:
1. Sizing based on 24K BPD Mixed Feed, EOR Conditions.
2. Vendor to provide recommended valve selection for critical high pressure drop service.

No.	By	Date	Revision
B	JPM	8/17/04	PROCESS DATA
A	BRF	4/6/04	FOR REVIEW

INSTRUMENT SPECIFICATION
Modulating Control Valve

Burns & McDonnell
SINCE 1898

Sheet of

Code: 114 | Dwg. No.:

GENERAL	1	Tag Number		PRV-510	
	2	Service		1F-157 Diesel Salt Dryer	
	3	Line No.	Vessel No.		1F-157
	4	Nozzle (Full, Semi)			
	5	Design	Safety, Relief, Safety-Relief	Safety-Relief	
	6	Type	Conventional, Bellow, Pilot Operated	Conventional	
	7	Bonnet Type			
	8	P&ID No.		18304-D	
PROCESS CONDITIONS	9	Fluid	State	Diesel	L-V
	10	Required Capacity		94,841 lb/hr	
	11	Molecular Mass		203.5	
	12	Oper. Pressure	Set Pressure	140 psig	200 psig
	13	Oper. Temperature	RelievingTemperature	95 F	829 F
	14	Back Pressure	Constant	3 psig	
	15		Variable		
	16		Total		
	17	% Allowable Overpressure		21%	
	18	Overpressure Factor			
	19	Compressibility Factor		1.0	
	20	Latent Heat of Vaporization		58.37 Btu/lb	
	21	Ratio of Specific Heats		1.0	
	22	Relief Density		21.3 lb/ft3	
	23	Relief Viscosity		0.05	
	24	Barometric Pressure		14.34	
	25	Selected/Nameplate Capacity			
	26				
BASIS AND SELECTION	27	Design Code		API	
	28	Sizing Basis		Blocked In Fire Case	
	29	Calculated Area		3.104	
	30	Selected Area		3.6	
	31	Orifice Designation		M	
	32	Code Stamp Requirement		Yes	
	33				
	34				
CONNECTIONS	35	Size: Inlet	Outlet	4	6
	36	Rating	Facing	300# / 150#	RF
MATERIALS	37	Body and Bonnet			
	38	Seat and Rings			
	39	Resilient Seat Seal			
	40	Guide and Rings			
	41	Spring			
	42	Bellows			
	43				
	44				
OPTIONS	45	Cap: Screwed or Bolted			
	46	Lever: Plain or Packed			
	47	Test Gag			
	48				
	49				
PURCHASE	50	Manufacturer			
	51	Model			
	52	Purchase Order Number			
	53	Price	Item Number		
	54	Serial Number			

Notes:

No.	By	Date	Revision
D	RCS	12/22/04	REVISED
C	RCS	11/1/04	Q4 REVISIONS
B	RCS	10/20/04	FOR BID
A	BRF	4/15/04	FOR REVIEW

INSTRUMENT SPECIFICATION
Relief Valve

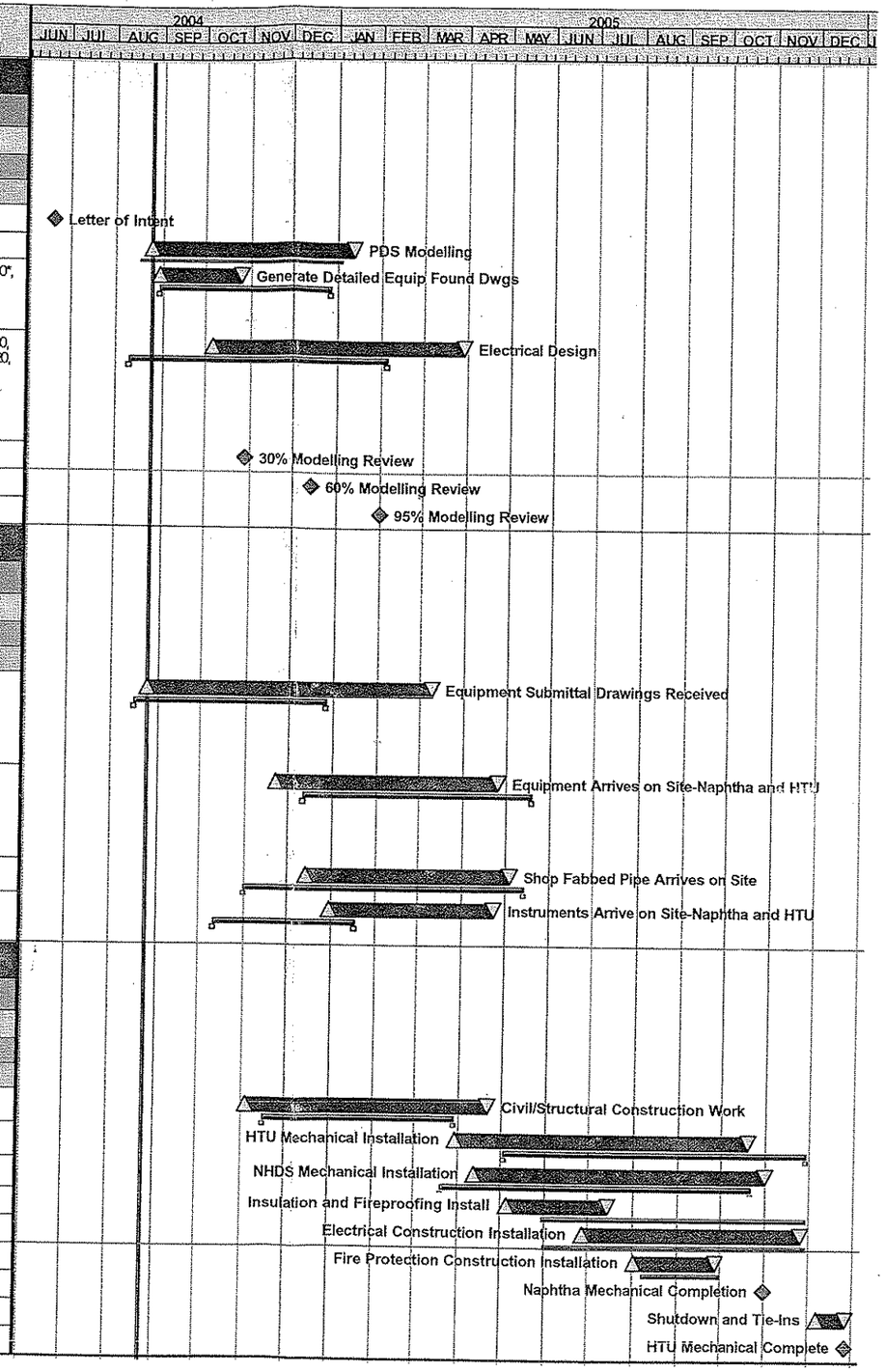
Burns & McDonnell
SINCE 1898

Sheet 1 of 1

Code: 129 | Dwg. No.: | Rev.:

SCHEDULES

Activity ID	Activity Description	Orig Dur	%	Early Start	Early Finish	Predecessors	Successors
Engineering Summary							
Engineering Summary Bars							
ES1380	Letter of Intent	0	100		18JUN04A		
ES1375	PDS Modeling	100*	0	25AUG04	11JAN05	DH3390*, DH3410, NA1115, NA1125*	DH3390, DH3410*, NA1115*, NA1125
ES1250	Generate Detailed Equip Found Dwgs	41*	0	30AUG04	25OCT04	DH3100, DH3140, DH3150, DH3170, DH3180, DH3190, NA3020, NA3030, NA3040*, NA3050, NA3080, NA3090, NA3180, NA3230, PR1787	DH3100, DH3140, DH3150, DH3170*, DH3180, DH3190, NA3020, NA3030*, NA3040, NA3050, NA3080, NA3090, NA3180, NA3230
ES1370	Electrical Design	124*	0	07OCT04	29MAR05	DH5280, DH5290*, DH5310, DH5320, DH5330, DH5340, DH5350, DH5360, DH5380, DH5390, DH5400, NA5270, NA5280, NA5290, NA5300, NA5320, NA5330*, NA5340, NA5350, NA5360, NA5375, NA5385	DH5280, DH5290, DH5310, DH5320, DH5330, DH5340*, DH5350, DH5360, DH5380*, DH5390, DH5400, NA5270*, NA5280, NA5290, NA5300*, NA5320, NA5330, NA5340, NA5350, NA5360, NA5375, NA5385
ES1385	30% Modeling Review	0	0		28OCT04*	DH3395, NA1145	
ES1390	60% Modeling Review	0	0		14DEC04*		
ES1395	95% Modeling Review	0	0		31JAN05*		
Procurement Summary							
Procurement Summary Bars							
PS1205	Equipment Submittal Drawings Received	141*	0	25AUG04	09MAR05	PR1462, PR1463, PR1464, PR1466, PR1467, PR1526*, PR1547*, PR1586, PR1617, PR1677, PR1696, PR1747, PR1787, PR1826, PR1886*, PR1888, PR1946, PR1981, PR2033	PR1462, PR1463, PR1464, PR1466, PR1467, PR1516, PR1547, PR1586, PR1617, PR1696, PR1747, PR1787*, PR1826, PR1886, PR1888, PR2033
PS1210	Equipment Arrives on Site-Naphtha and HTU	111*	0	22NOV04	25APR05	PR1478, PR1481, PR1482, PR1502, PR1509, PR1541, PR1572, PR1651, PR1721, PR1742, PR1752, PR1781, PR1807, PR1841*, PR1901, PR1908, PR1991, PR2063	PR1478, PR1481, PR1482, PR1502, PR1509, PR1541*, PR1572, PR1651, PR1721, PR1742, PR1752, PR1781, PR1807, PR1841, PR1901, PR1908, PR1991, PR2063
PS1215	Shop Fabbed Pipe Arrives on Site	100*	0	15DEC04	03MAY05	PR1652*	AA2325, PR1652*
PS1225	Instruments Arrive on Site-Naphtha and HTU	81*	0	31DEC04	22APR05	PR1465, PR1515, PR1620, PR1630*, PR1660, PR1825, PR1830, PR1845, PR1955	PR1465, PR1515, PR1620, PR1630, PR1660, PR1825, PR1830*, PR1845, PR1955
Construction Summary							
Construction Summary Bars							
CS2200	Civil/Structural Construction Work	120*	0	04NOV04	20APR05	AA2120*	AA1915*
CS1960	HTU Mechanical Installation	146*	0	30MAR05	19OCT05	AA2500*	AA2510*
CS2480	NHDS Mechanical Installation	144*	0	13APR05	31OCT05	AA2250*	AA2330*
CS2230	Insulation and Fireproofing Install	50*	0	05MAY05	13JUL05	AA2080*	AA2030*
CS2210	Electrical Construction Installation	110*	0	27JUN05	25NOV05	AA1940*	AA1980*
CS2235	Fire Protection Construction Installation	40*	0	03AUG05	27SEP05	AA1895*	AA1905*
CS2240	Naphtha Mechanical Completion	0	0		31OCT05	AA2330*	
CS2250	Shutdown and Tie-Ins	14*	0	07DEC05	26DEC05	AA2550*	AA2560*
CS2255	HTU Mechanical Complete	0	0		26DEC05	AA2550*, AA2555*	



Start Date	01JUL04
Finish Date	16JAN06
Must Finish Date	10FEB06
Data Date	25AUG04
Run Date	10SEP04 15:01

Early Bar
Target Bar
Progress Bar
Critical Activity

NHTU

Sheet 1 of 15

Date	Revision	Checked	Approved
06JUL04	Revision 0		
03AUG04	Revision 1		
10SEP04	Revision 2		

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ESTIMATES

SAMPLE PROJECT

ESTIMATE SUMMARY SHEET
TOTAL ESTIMATE

SEE REVISED SUMMARIES on NOF SERVER

	Direct Man-hours	Direct S/C Man-hours	Equipment (X1000)	Materials (X1000)	S/C (X1000)	Labor (X1000)	Total (X1000)
SITEWORK		500.0	--	--	93.4	--	93.4
BUILDINGS (NONE)							
STRUCTURAL STEEL	1,445.0		--	39.5	--	76.2	115.7
CONCRETE		2,800.0	--	--	188.5	--	188.5
VESSELS	1,475.0	23,000.0	3,985.0	--	--	79.2	3,000.0
BOILERS		6,000.0	2,371.9	--	--	--	1,000.0
EXCHANGERS & EVAPORATORS	958.0		897.6	--	--	49.9	947.5
COOLING TOWERS (NONE)							
MECH EQUIP & MOLE SIEVE	3,100.0		1,395.5	--	--	162.6	600.0
INSTRUMENTS	3,716.0		--	509.8	--	195.7	705.5
PIPING	42,470.0		--	2,124.0	--	2,210.5	1,000.0
ELECTRICAL	6,652.0		--	186.5	--	343.4	529.9
INSULATION		4,200.0	--	--	315.6	--	315.6
PAINTING		700.0	--	--	55.3	--	55.3
HEAVY CRANE		4,200.0	--	--	1,350.0	--	500.0
LATE ADDS	1,770.0	900.0	--	230.0	64.0	91.9	385.9
							0.0
DEMO ALLOWANCE		5,000.0	--	--	300.0	--	300.0
							0.0
Total Field Hours							0.0
0							0.0
Direct totals	**61,586.0**	**47300.0**	**$8,650**	**$3,090**	**$2,367**	**$3,209**	**$9,737**
Contingency							1540
Escalation							TDB
Safety Incentive $1.00/hr							$110

Sales Tax	$0
Engineering	$2,186
Builder's Risk	$0
Construction Management	$2,122
General Conditions	$851
Fee 5%	$1,200
Total	**$17,746**
Owner Costs	**$1,030**
Owner Contingency	**$0**
Total Additional Costs	**$0**

PROJECT DEFINITION REPORTS

PROJECT DEFINITION RATING INDEX

PROJECT: **Sample Project**

Definition Levels		
0 = Not Applicable	2 = Minor Deficiencies	4 = Major Deficiencies
1 = Complete Definition	3 = Some Deficiencies	5 = Incomplete or Poor Definition

NORMALIZED PDRI TOTAL SCORE **156**

PDRI TOTAL SCORE **155**

(Maximum Score = 1000)

SECTION I - BASIS OF PROJECT DECISION

	Definition Level 0	1	2	3	4	5	Project Level	Score
A. MANUFACTURING OBJECTIVES CRITERIA								
A1. Reliability Philosophy	0	1	5	9	14	20	2	5
A2. Maintenance Philosophy	0	1	3	5	7	9	1	1
A3. Operating Philosophy	0	1	4	7	12	16	2	4
							CATEGORY A TOTAL	**10**
B. BUSINESS OBJECTIVES								
B1. Products	0	1	11	22	33	56	1	1
B2. Market Strategy	0	2	5	10	16	26	1	2
B3. Project Strategy	0	1	5	9	14	23	1	1
B4. Affordability/Feasibility	0	1	3	6	9	16	1	1
B5. Capacities	0	2	11	21	33	55	1	2
B6. Future Expansion Considerations	0	2	3	6	10	17	1	2
B7. Expected Project Life Cycle	0	1	2	3	5	8	0	0
B8. Social Issues	0	1	2	5	7	12	1	1
							CATEGORY B TOTAL	**10**
C. BASIC DATA RESEARCH & DEVELOPMENT								
C1. Technology	0	2	10	21	39	54	1	2
C2. Processes	0	2	8	17	28	40	1	2
							CATEGORY C TOTAL	**4**
D. PROJECT SCOPE								
D1. Project Objectives Statement	0	2				25	1	2
D2. Project Design Criteria	0	3	6	11	16	22	1	3
D3. Site Characteristics Available vs. Required	0	2				29	1	2
D4. Dismantling and Demolition Requirements	0	2	5	8	12	15	1	2
D5. Lead/Discipline Scope of Work	0	1	4	7	10	13	1	1
D6. Project Schedule	0	2				16	1	2
							CATEGORY D TOTAL	**12**
E. VALUE ENGINEERING								
E1. Process Simplification	0	0				8	1	0
E2. Design & Material Alternates Considered/Rejected	0	0				7	1	0
E3. Design For Constructability Analysis	0	0	3	5	8	12	1	0
							CATEGORY E TOTAL	**0**

SECTION I Maximum Score = 499 ***SECTION I TOTAL*** ***36***

PROJECT DEFINITION RATING INDEX

PROJECT: Sample Project

Definition Levels		
0 = Not Applicable	2 = Minor Deficiencies	4 = Major Deficiencies
1 = Complete Definition	3 = Some Deficiencies	5 = Incomplete or Poor Definition

NORMALIZED PDRI TOTAL SCORE ***156***

PDRI TOTAL SCORE **155**

(Maximum Score = 1000)

SECTION II - FRONT END DEFINITION

	Definition Level 0	1	2	3	4	5	Project Level	Score
F. SITE INFORMATION								
F1. Site Location	0	2				32	1	2
F2. Surveys & Soil Tests	0	1	4	7	10	13	2	4
F3. Environmental Assessment	0	2	5	10	15	21	1	2
F4. Permit Requirements	0	1	3	5	9	12	1	1
F5. Utility Sources with Supply Conditions	0	1	4	8	12	18	1	1
F6. Fire Protection & Safety Consideration	0	1	2	4	5	8	2	2
CATEGORY F TOTAL								12
G. PROCESS / MECHANICAL								
G1. Process Flow Sheets	0	2	8	17	26	36	1	2
G2. Heat & Material Balances	0	1	5	10	17	23	1	1
G3. Piping & Instrumentation Diagrams (P&ID's)	0	2	8	15	23	31	2	8
G4. Process Safety Management (PSM)	0	1	2	4	6	8	1	1
G5. Utility Flow Diagrams	0	1	3	6	9	12	2	3
G6. Specifications	0	1	4	8	12	17	2	4
G7. Piping System Requirements	0	1	2	4	6	8	1	1
G8. Plot Plan	0	1	4	8	13	17	2	4
G9. Mechanical Equipment List	0	1	4	9	13	18	1	1
G10. Line List	0	1	2	4	6	8	1	1
G11. Tie-in List	0	1	4	3	4	6	2	4
G12. Piping Specialty Items List	0	1	1	2	3	4	3	2
G13. Instrument Index	0	1	2	4	5	8	2	2
CATEGORY G TOTAL								34
H. EQUIPMENT SCOPE								
H1. Equipment Status	0	1	4	8	12	16	3	8
H2. Equipment Location Drawings	0	1	2	5	7	10	3	5
H3. Equipment Utility Requirements	0	1	2	3	5	7	2	2
CATEGORY H TOTAL								15
I. CIVIL, STRUCTURAL, & ARCHITECTURAL								
I1. Civil/Structural Requirements	0	1	3	6	9	12	3	6
I2. Architectural Requirements	0	1	2	4	5	7	3	4
CATEGORY I TOTAL								10
J. INFRASTRUCTURE								
J1. Water Treatment Requirements	0	1	3	5	7	10	1	1
J2. Loading/Unloading/Storage Facilities Requirements	0	1	3	5	7	10	2	3
J3. Transportation Requirements	0	1				5	1	1
CATEGORY J TOTAL								5
K. INSTRUMENT & ELECTRICAL								
K1. Control Philosophy	0	1	3	5	8	10	2	3
K2. Logic Diagrams	0	1				4	5	4
K3. Electrical Area Classifications	0	0	2	4	7	9	2	2
K4. Substation Requirements Power Sources Identified	0	1	3	5	7	9	2	3
K5. Electric Single Line Diagrams	0	1	2	4	6	8	2	2
K6. Instrument & Electrical Specifications	0	1	2	3	5	6	3	3
CATEGORY K TOTAL								17

SECTION II Maximum Score = 423 ***SECTION II TOTAL*** ***93***

PROJECT DEFINITION RATING INDEX

PROJECT: **Sample Project**

Definition Levels		
0 = Not Applicable	2 = Minor Deficiencies	4 = Major Deficiencies
1 = Complete Definition	3 = Some Deficiencies	5 = Incomplete or Poor Definition

NORMALIZED PDRI TOTAL SCORE ***156***

PDRI TOTAL SCORE **155**

(Maximum Score = 1000)

SECTION III - EXECUTION APPROACH

	Definition Level 0	1	2	3	4	5	Project Level	Score
L. PROCUREMENT STRATEGY								
L1. Identify Long Lead/Critical Equipment & Materials	0	1	2	4	6	8	1	1
L2. Procurement Procedures and Plans	0	0	1	2	4	5	2	1
L3. Procurement Responsibility Matri	0	0				3	1	0
CATEGORY L TOTAL								2
M. DELIVERABLES								
M1. CADD/Model Requirements	0	0	1	1	2	4	1	0
M2. Deliverables Defined	0	0	1	2	3	4	2	1
M3. Distribution Matrio	0	0				1	1	0
CATEGORY M TOTAL								1
N. PROJECT CONTROLS								
N1. Project Control Requirements	0	0	2	4	6	8	3	4
N2. Project Accounting Requirements	0	0	1	2	2	4	2	1
N3. Risk Analysis	0	1				5	1	1
CATEGORY N TOTAL								6
P. PROJECT EXECUTION PLAN								
P1. Owner Approval Requirements	0	0	2	3	5	6	4	5
P2. Engineering/Construction Plan & Approach	0	1	3	5	8	11	2	3
P3. Shut Down/Turn-Around Requirements	0	1				7	1	1
P4. Pre-Commissioning Turnover Sequence Requirements	0	1	1	2	4	5	4	4
P5. Startup Requirements	0	0	1	2	3	4	4	3
P6. Training Requirements	0	0	1	1	2	3	2	1
CATEGORY P TOTAL								17

Section III Maximum Score = 78 ***SECTION III TOTAL*** ***26***