

**GENERAL NOTES**

1. EL. 100.00 = 5465 MSL. EQUIPMENT HEIGHTS ARE APPROXIMATE AND MEASURED FROM EL. 100.00 T.O.C.
2. PLANT NORTH IS 0°16' EAST OF TRUE NORTH.

1. ADMINISTRATION OFFICES
2. SITE FENCE
3. AUXILIARY TRANSFORMERS
4. GATE SECURITY - CARD READER & AUTO GATE, T.V. CAMERA
5. CT AUXILIARY COOLING MODULE
6. TRUCK FILTER SYSTEM PARKING AREA (RD)
7. FUEL GAS PRE-HEATER (START-UP) HTRG-3900
8. 24' SWING GATE
9. AIR COOLED CONDENSER (ACC), CON-0001
10. CRANE ACCESS PADS
11. STEAM TURBINE (ST) UNIT 3
12. COMBUSTION TURBINE (CT)
13. ST GENERATOR
14. STEAM DUCT DRAIN PUMPS, P-3523A/B
15. CT GENERATOR, UNIT 1 AND 2
16. PIPE RACK
17. FUEL GAS DRY SCRUBBER, UNIT 1: SCR8-1801, UNIT 2: SCR8-2801
18. HEAT RECOVERY STEAM GENERATOR (HRSG), UNIT 1 AND 2
19. DIESEL GENERATOR, DGEN-3560
20. HRSG STACK, UNIT 1 AND 2
21. BOILER B LOWDOWN TANK, UNIT 1: TNK-1100, UNIT 2: TNK-2100
22. BOILER FEED WATER PUMPS, UNIT 1: PMP-1202A/B, UNIT 2: PMP-2202A/B
23. CONTINUOUS EMISSION MONITORING SYSTEM
24. CLR BOT'LE ENCLOSURE
25. CONDENSATE PUMPS, PMP-0202A/B/C
26. HRSG RECIRCULATION PUMP, BY VOGT
27. DISTILLATE WATER STORAGE TANK 250,000 GALLON, TNK-0100
28. 4160/480 V TRANSFORMERS (6 TOTAL)
29. CONDENSATE TANK, TNK-0101
30. DUCT BURNER COOLING AIR SKID
31. DUCT BURNER FUEL SKID
32. STORMWATER COLLECTION BOX
33. GENERATOR STEP-UP TRANSFORMER (GSU)
34. 230 KV ELECTRICAL SUBSTATION AREA
35. CT POWER DISTRIBUTION CENTER (PDC)
36. FIRE HYDRANT
37. ST ELECTRICAL/DCS EQUIP. ENCLOSURE
38. BLOWDOWN SUMP, UNIT 1 AND 2
39. FUEL GAS PERFORMANCE HEATER, UNIT 1: HX-1301, UNIT 2: HX-2301
40. FIRE PROTECTION ENCLOSURE
41. HRSG ELECTRICAL/DCS EQUIP. ENCLOSURE
42. ISO LUBE OIL & EHC EQUIPMENT SKID
43. ST LUBE OIL & EHC EQUIPMENT SKID
44. LEACH FIELD
45. SERVICE WATER BLDG.
46. ST AUXILIARY COOLING MODULE
47. UNIT 2 BLOW DOWN SUMP PUMPS, PMP-2200A/B
48. ST GENERATOR EXCITATION SKID
49. ACC MCC
50. GAS METERING & REDUCING STATION
51. PACKAGE ELECTRICAL & ELECTRONIC CONTROL CENTER (PECC)
52. FIRE/SERVICE WATER STORAGE (1,000,000 GALLON), TNK-0105
53. 500,000 GALLON SERVICE WATER
54. UNIT 3 STG FLASH TANK CONDENSATE TRANSFER PUMPS, PMP-3203 A/B
55. UNIT 1 BLOW DOWN SUMP PUMPS, PMP-1200A/B
56. MECHANICAL PACKAGE, UNIT 1 & 2
57. WATER WASH SKID
58. SEPTIC TANK (3 TOTAL)
59. OIL/WATER SEPARATOR, SEP-0600 W/LIFT PUMPS: PMP-0208A/B
60. BOILER FEED PUMP ENCLOSURE
61. FIRE PUMPS SKID
62. CO2 FIRE SKID FOR CT GENERATOR
63. INTER AFTER CONDENSER, CON-0500
64. EXCITATION TRANSFORMER
65. FUEL GAS DETECTION SEPARATOR, UNIT 1: SEP-1600, UNIT 2: SEP-2600
66. FUEL GAS COALESCING FILTER, FL-0800A/B
67. SJAIE HOGGING EJECTOR SKID
68. OXYGEN SCAVENGER FEED SYSTEM SKID, CORROSION INHIBITOR FEED SYSTEM, TNK-0103
69. SAMPLE PANEL, UNIT 1 PNL-1900, UNIT 2 PNL-2900
70. DC LINK REACTOR
71. DC LINK REACTOR UNIT 1 EXCITATION COMPARTMENT
72. LCI TRANSFORMER
73. LCI TRANSFORMER
74. CLAND STEAM CONDENSER, CON-0501
75. SERVICE WATER ELECTRIC ROOM
76. ACC DRAIN POT SUMP
77. 400 GAL. CONDENSED FUEL GAS LIQUID HOLDING TANK, TNK-0110
78. 3000 GALLON WATER/WASH HOLDING TANK, UNIT 1: TNK-1102, UNIT 2: TNK-2102
79. HYDROGEN BOTTLE RACK
80. UNIT 3 STG FLASH TANK, TNK-0111
81. SMP-3102 (#7) W/SUMP PUMP, PMP-3202
82. SMP-2103 (#2) W/SUMP PUMP, PMP-2203
83. SMP-1103 (#1) W/SUMP PUMP, PMP-1203
84. SMP-2104 (#4) W/SUMP PUMP, PMP-2204
85. SMP-1104 (#5) W/SUMP PUMP, PMP-1204
86. SMP-0109 (#6) W/SUMP PUMP, PMP-0213
87. NITROGEN BOTTLE RACK

NO.	DESCRIPTION	DATE	BY	CHECKED
5	MODIFIED #38 OIL/WATER SEPARATOR & #39 LUBE OIL STORAGE PAD MODIFIED #45 AIR COMPRESSOR ADDED EQUIPMENT RELOCATED FENCE TO FIELD CORN.	03/27/03	DAW	JRW
4	MODIFIED #57 SEPTIC TANK & #44 LEACH FIELD ADDED #46 STEAM TURBINE BLOWDOWN TANK MODIFIED #48 SERVICE WATER ENCLOSURE MODIFIED #50 BOILER FEED ENCLOSURE EQUIP. MODIFIED #51 BURNER SKID MOVED UNIT 2 BURNER FEED PUMP ENCLOSURE MOVED UNIT 1 & 2 SAMPLE PANELS MOVED UNIT 1 & 2 CO2 FIRE SKID MODIFIED ADMIN BUILDING & PARKING LOT ADDED #52 WATER WASH SKID, #54 CT BRASH TANK, #60 BOILER FEED PUMP ENCLOSURE & #61 FIRE PUMP SEPARATION REMOVED #18 CONDENSATE STORAGE AREA MOVED #18 BLOWDOWN SUMP MODIFIED #18 SERVICE HYDRANTS	04/21/02	DJS, JEH, PAW, JRW	JRW
3	MODIFIED SERVICE WATER AREA, AUX TRANSFORMERS, ISO-BUS DUCTS ON ALL UNITS, #5 AUX COOLING SKID, #74 SERVICE WATER ELECT ENCLOSURE MOVED #64 EXCITATION TRANSFORMER, #48 GENERATOR EXCITATION SKID, #76 LCI EXCITATION COMPARTMENT, & #72 LCI TRANSFORMER #63 #40/#48 V TRANSFORMER, #29 CONDENSATE TANK, #27 SEPTIC TANK & #44 LEACH FIELD	10/02/01	DJC, JJA, JRW, JRW	JRW
2	MODIFIED #28 #62/#48 V TRANSFORMERS, #39 #61 GAS PERFORMANCE HEATER, #41 HRSG ELECTRICAL/DCS EQUIP ENCLOSURE, #46 SERVICE WATER FIRE PROTECTION ENCLOSURE, #56 FUEL GAS SEPARATOR, #49 #61 FIRE GAS DETECTOR SEPARATOR, #48 #61 ROAD RACKS AND MAIN EXTRACTS, SITE PLAN TO DRAWING TITLE	09/23/01	DDC	JJA
1	CHANGED LOCATION OF STORMWATER COLLECTION BOX, #50 FIRE HYDRANT, #70 UNIT 2 #48/#48V TRANS, #55 OIL/WATER SEP, #59 LUBE OIL STORAGE PAD, #7 FUEL GAS PRE-HEATER, #66 FUEL GAS FILTERS AND #202 FIRE SKID, ACCESS TO SWITCHBOARD GATES AND FIRE PROTECTION ENCLOSURE, #19 DIESEL GENERATOR, #44 #11 LUBE OIL, AND #73 GLAND STEAM BURNER FEED UNIT 2 ISO-PHASE BUS DUCT, #41 #55 #61, PIPE RACK AND # 2. BURNER FEED SKID	05/27/01	DDC, MMC, GJR, FF	FF

**UTILITY ENGINEERING**

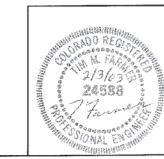
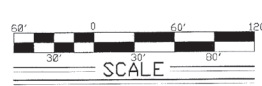
3141 TOWER, NW HIGHLAND, DENVER, COLORADO 80202  
 (303) 733-1100  
 WWW.UTILITYENGINEERING.COM

**TIC**

**FRONT RANGE POWER**

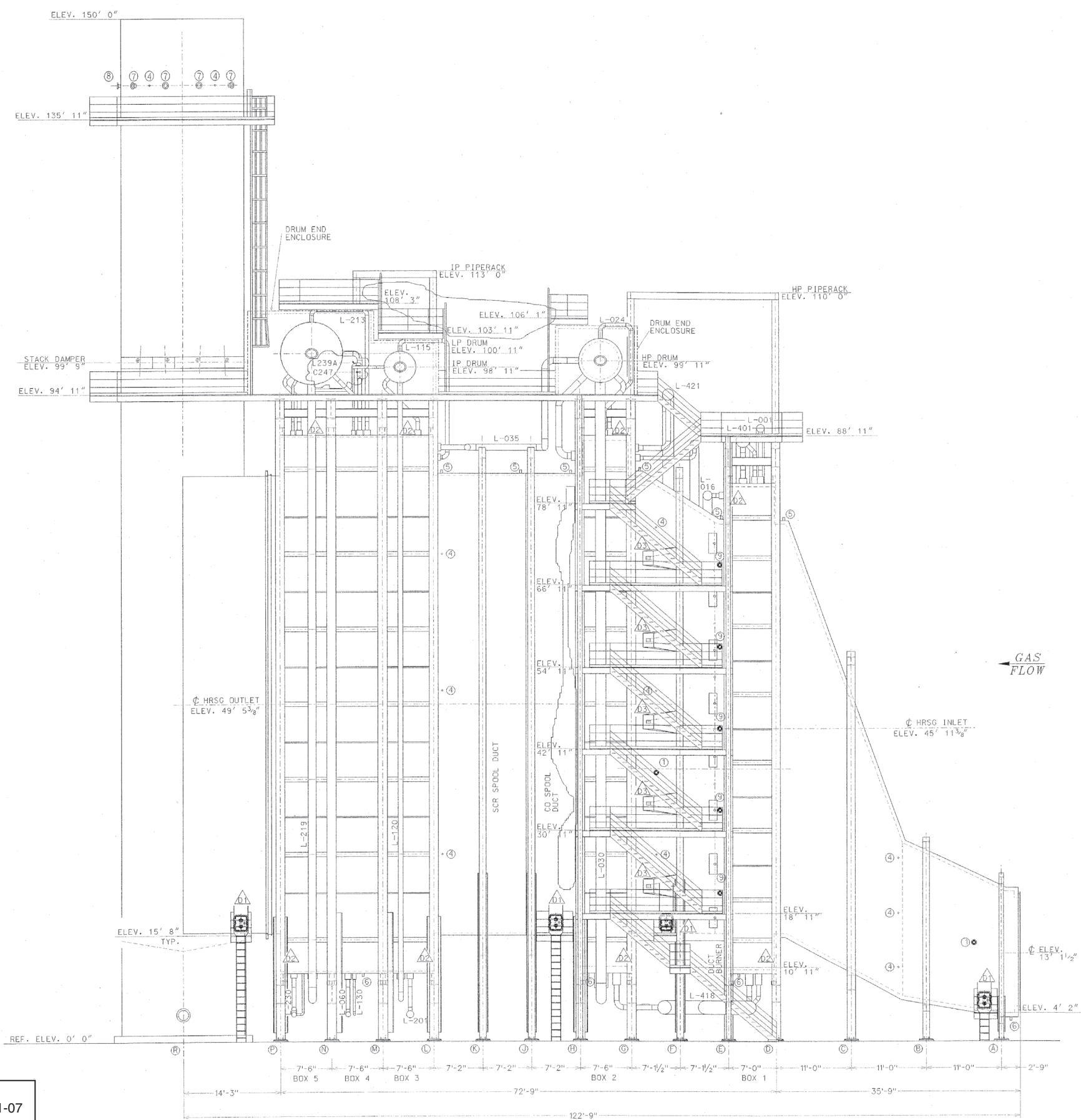
FRONT RANGE POWER PROJECT  
GENERAL ARRANGEMENT  
SITE PLAN

DATE	02/22/03	BY	GAFFA	CHECKED	02/26/03	BY	GAFFA
PROJECT NO.	D001250-100L100			SHEET NO.	01 5		



Pipefitting 4, Module 08401-07  
Advanced Blueprint Reading  
Blueprint One of Nine  
(Not to Scale)

REVISION RECORD				
NO	DATE	DESCRIPTION	BY	CK
1	02/12/01	RELOCATED PIPING, TEST CONNECTIONS, AND INLET FLANGE ELEVATION	NY	TDC
2	07/17/01	REMOVED TEST CONNECTIONS, REVISED PLATFORM ELEV., AND RELOCATED PIPING	NY	TDC



- GENERAL NOTES:
1. FOR GENERAL ARRANGEMENTS SEE DRAWINGS D-397-001 THRU -003.
  2. FOR BOILER SETTINGS SEE DRAWINGS D397-004 THRU -006.
  3. FOR FOUNDATION DIAGRAM SEE DRAWING D-397-021.
  4. FOR FOUNDATION LOADS SEE DOCUMENT 397-0023.
  5. FOR GENERAL NOTES AND DATA, AND CASING CONNECTIONS SEE DOCUMENT 397-0010.
  6. ALL PLATFORM ELEVATIONS ARE TO TOP OF GRATING.
  7. THIS CONTRACT IS FOR TWO IDENTICAL HRSG'S.

M001250-200A0002 S01 R02  
 CSU 480 MW 7/24/2001

Review does not relieve contractor from responsibility for errors or deviations from contract requirements

**UTILITY ENGINEERING**

*for 12/20/01*

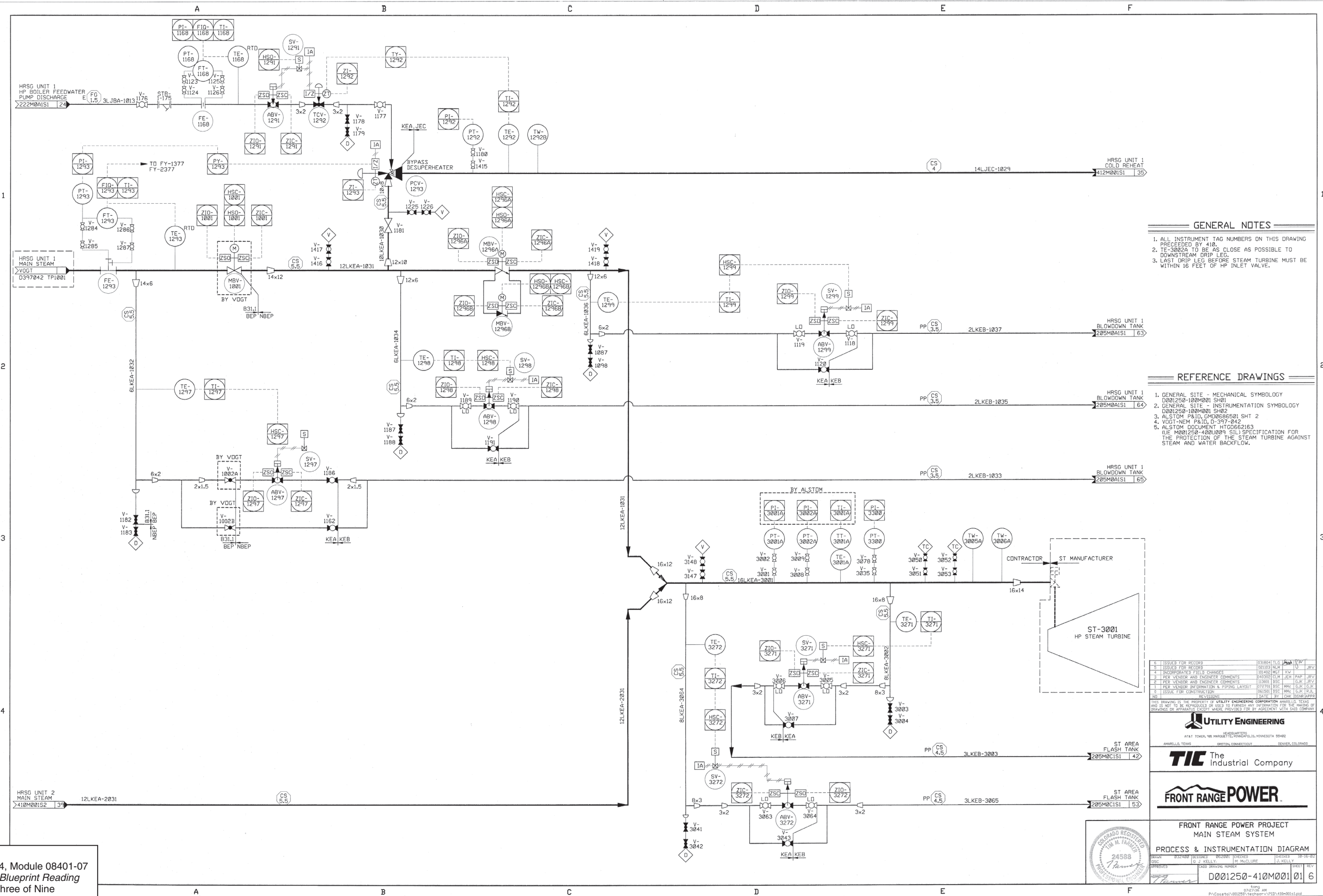
<input checked="" type="checkbox"/> NO EXCEPTIONS NOTED	Release for manufacture
<input type="checkbox"/> EXCEPTIONS NOTED	Release for manufacture
<input type="checkbox"/> RETURNED FOR CORRECTION	Do not proceed
<input type="checkbox"/>	Reverse and resubmit for authorization

**CONTROLLED**

FRONT RANGE POWER™  
 TIC/UE FRONT RANGE JOINT VENTURE  
 FRONT RANGE POWER PROJECT  
 TIC JOB NUMBER 42010  
 UE JOB NUMBER 001250  
 VOLT-NEM JOB NUMBER 17397

DWN. BY:	NY	
CKD. BY:	KLH	
RVD. BY:	AAT	
DATE:	12/5/00	
SCALE:	1/8" = 12"	
D-397-002		Rev 2

Pipefitting 4, Module 08401-07  
 Advanced Blueprint Reading  
 Blueprint Two of Nine  
 (Not to Scale)



**GENERAL NOTES**

1. ALL INSTRUMENT TAG NUMBERS ON THIS DRAWING PRECEDED BY 410.
2. TE-3002A TO BE AS CLOSE AS POSSIBLE TO DOWNSTREAM DRIP LEG.
3. LAST DRIP LEG BEFORE STEAM TURBINE MUST BE WITHIN 16 FEET OF HP INLET VALVE.

**REFERENCE DRAWINGS**

1. GENERAL SITE - MECHANICAL SYMBOLOLOGY D001250-100M001 SH01
2. GENERAL SITE - INSTRUMENTATION SYMBOLOLOGY D001250-100M001 SH02
3. ALSTOM P&ID, CND00605501 SH1
4. V001-NEM P&ID, D-397-242
5. ALSTOM DOCUMENT HT00662163 (IE: M000250-400U009) S111 SPECIFICATION FOR THE PROTECTION OF THE STEAM TURBINE AGAINST STEAM AND WATER BACKFLOW.

NO.	REVISIONS	DATE	BY	CHK	APP
6	ISSUED FOR RECORD	03/08/04	TLC	JK	LD
5	ISSUED FOR RECORD	01/02/04	JK	LD	JK
4	INCORPORATED FIELD CHANGES	01/02/04	HGT	KW	JK
3	PER VENDOR AND ENGINEER COMMENTS	02/02/04	JK	LD	JK
2	PER VENDOR AND ENGINEER COMMENTS	11/20/03	BSC	GLK	JK
1	PER VENDOR INFORMATION & PIPING LAYOUT	07/27/03	BSC	HMC	GLK
0	ISSUED FOR CONSTRUCTION	06/20/03	BSC	HMC	GLK

UTILITY ENGINEERING  
 4101 TOWNE, 780 MARQUETTE HONOLULU, HONOLULU, HAWAII 96822  
 AMARILLO, TEXAS    BRISTOL, CONNECTICUT    DENVER, COLORADO

**TIC** Industrial Company

**FRONT RANGE POWER**

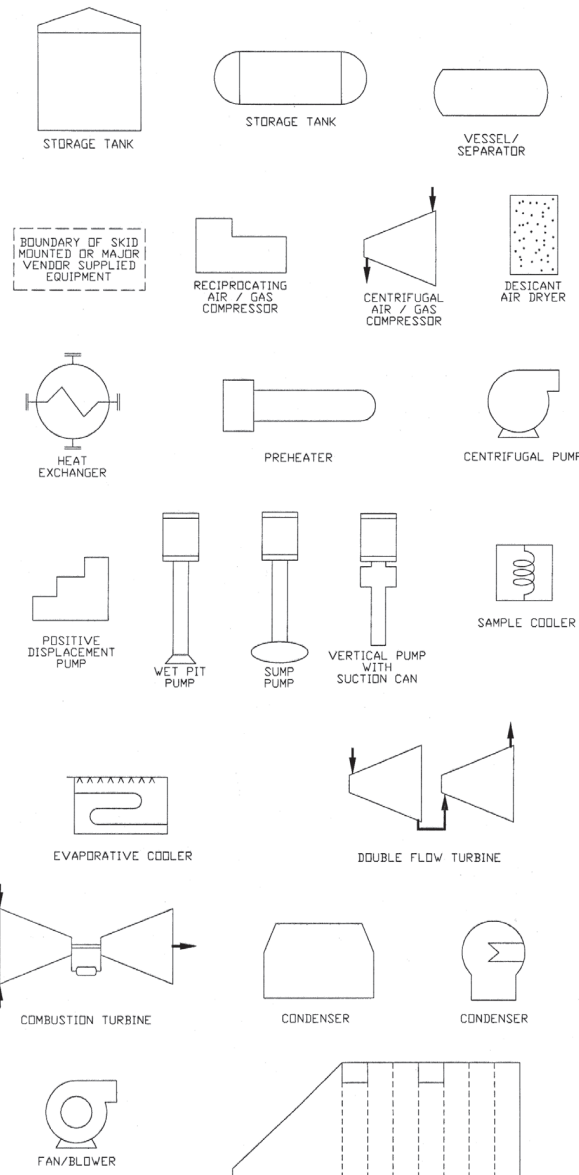
FRONT RANGE POWER PROJECT  
 MAIN STEAM SYSTEM  
 PROCESS & INSTRUMENTATION DIAGRAM

DATE: 07/27/03  
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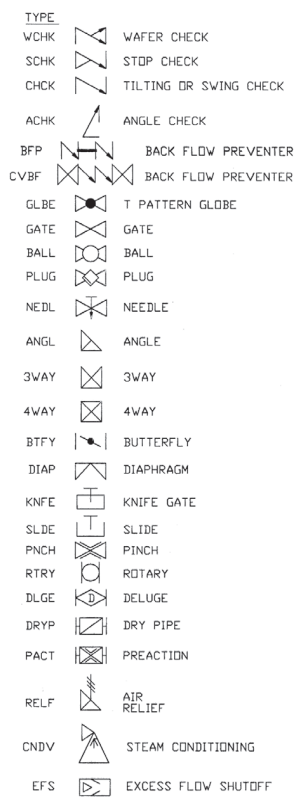
01 6

Pipefitting 4, Module 08401-07  
 Advanced Blueprint Reading  
 Blueprint Three of Nine  
 (Not to Scale)

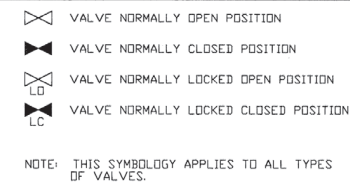
MAJOR EQUIPMENT



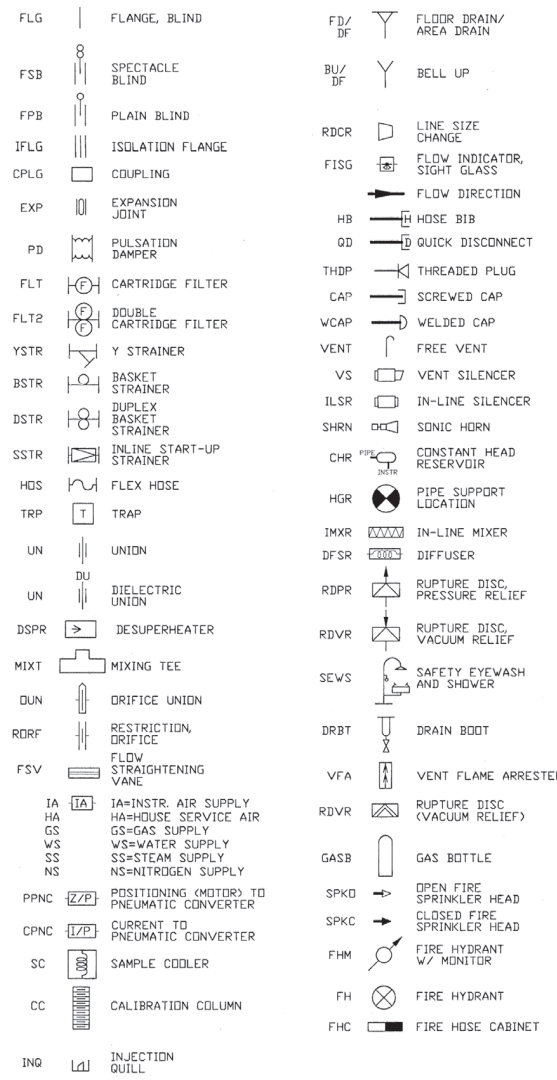
VALVE TYPES



VALVE STATUS SYMBOLS



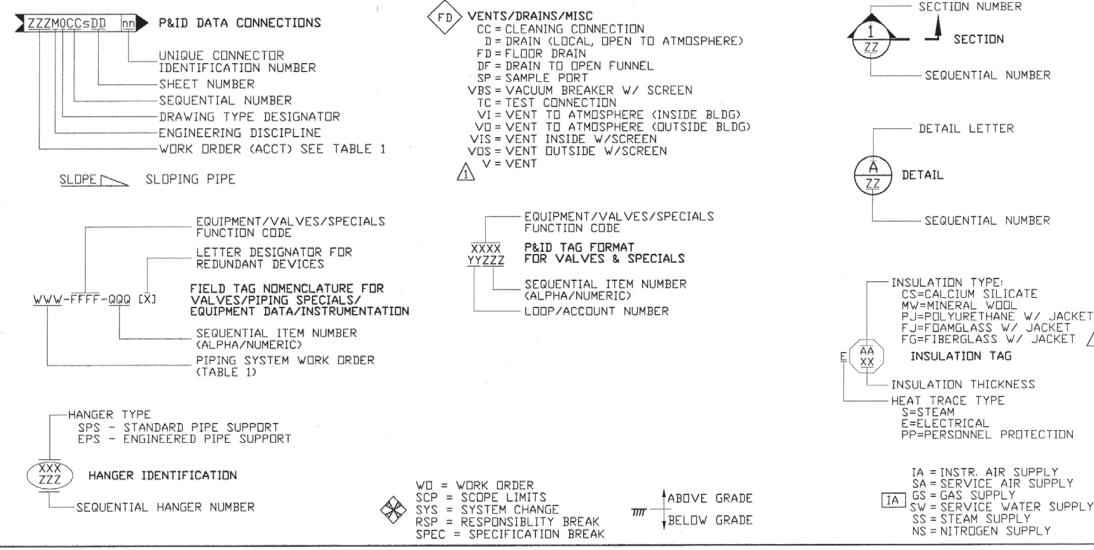
PIPING SPECIALS & ABBREVIATIONS



EQUIPMENT/VALVES/SPECIALS FUNCTION

Table listing equipment/valves/specials with columns for CODE and DESCRIPTION. Includes items like adjustable frequency drive, air cock, air conditioning, air cylinder, air ejector, steam jet, air handling unit, back-pressure regulator, battery, battery charger, blower, vacuum, blower, wall, boiler, electric, HRSG, boiler, package, brine concentrator, centrifuge, check valve, wafer, stop, tilting, swing, angle, combustion turbine, compressor, compressor, air, condenser, condenser cleaning system, condenser, gland steam, connector, cooler, cooler, vortex, cooling tower, coupling, crane, damper, decarbonator, air dryer, desuperheater, diesel engine, economizer, eductor, elevator, exciters, expansion joint, fan, filter, flow straightener, fluid drive, gas chromatograph, generator, generator, emergency, heat exchanger, heat recovery steam generator, heater, electric, heater, gas, heater, oil, heater, steam, hoist, ignitor, inductor, injector, instrument valve manifold, manifold, motor, non-return valve, photo cell, pilot, power supply, pressure regulator, self contained, pressure relief valve, pump, receiver tank, quick disconnect, refrigerator, equipment, reheater, reverse osmosis equipment, safety valve, scanner, scrubber, separator, shop equipment, silencer, siphon tube, stack, steam drum, steam trap, steam turbine, superheater, sump, tank, surge, temperature probe, furnace, temperature probe, retractable, temperature sensing relief valve, thermostat, turbine, vacuum relief valve, valve, ball, gate, globe, plug, needle, angle, sway, 4way, butterfly, slide, deluge, pinch, rotary, dry pipe, vapor extractor, ventilator, volume chamber, weather house.

PIPING & MISCELLANEOUS TAGS



PIPELINE IDENTIFICATION & LINE STYLES

Table 1 - Piping System Definitions. Lists system descriptions and work order numbers. Includes a section for Line Tagging with examples like SSS-bbl-YYY-X001 and a legend for line styles: Main Process Line, Secondary Process Line, Existing Piping, Future Piping.

Table listing pipe classes and descriptions. Includes codes like ABC, ACA, ADA, ADB, BAB, BBA, BBB, BFC, BFA, BFB, CBA, CBD, DBA, DBC, DFC, DPA, EDA, FBA, FBB, FBC, FEA, FFA, JBA, JDA, JEA, JEB, JEC, JED, KEA, KEB, TFA, TFB, TFD.

Pipefitting 4, Module 08401-07 Advanced Blueprint Reading Blueprint Four of Nine (Not to Scale)

SYMBOLS- SPECIALTY EQUIPMENT AND LARGE PROCESS EQUIPMENT MAY BE DRAWN IN CUSTOM FASHION AS APPROPRIATE TO ITS USE ON A P&ID.

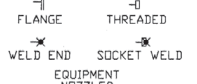


Table with columns for NO, REVISIONS, DATE, and BY. Includes a note about the drawing being the property of Utility Engineering Corporation.

Logos for Utility Engineering, TIC The Industrial Company, and Front Range Power.

FRONT RANGE POWER PROJECT GENERAL SITE MECHANICAL SYMBOLLOGY



Table with columns for DRAWN, CHECKED, DESIGNED, APPROVED, SHEET, and REV. Includes drawing number D001250-100M001 and sheet number 01 of 2.

**INSTRUMENT COMPONENTS**

- FLOW ELEMENT, VENTURI
- FLOW ELEMENT, NOZZLE
- FLOW ELEMENT, POSITIVE DISPLACEMENT TOTALIZING
- FLOW ELEMENT, TURBINE
- FLOW ELEMENT, VORTEX
- FLOW ELEMENT, MAGNETIC
- FLOW ELEMENT, ANNUBAR

- PITOT TUBE, FORWARD-REVERSE
- PITOT TUBE, SINGLE PORT
- PITOT TUBE, TARGET
- PITOT TUBE, AVERAGING

- FLUME
- WEIR
- VARIABLE AREA FLOW INDICATOR (ROTAMETER)

**INSTRUMENT FUNCTION TAGS**

- DISCRETE, PRIMARY
- DISCRETE, FIELD MOUNTED
- DISCRETE, AUX. LOCATION
- SHARED DISPLAY, PRIMARY
- SHARED DISPLAY, FIELD MOUNTED
- SHARED DISPLAY, AUX. LOCATION
- INDICATES BEHIND PANEL OR INACCESSIBLE
- PILOT LIGHT

**INSTRUMENT LINE STYLES**

- WT=1 INSTRUMENT SUPPLY OR CONNECTION TO PROCESS
- WT=1 STYLE-1 ELECTRIC SIGNAL
- PNEUMATIC SIGNAL
- HYDRAULIC SIGNAL
- CAPILLARY SIGNAL
- UNDEFINED SIGNAL
- ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)
- ELECTROMAGNETIC OR SONIC SIGNAL (NOT GUIDED)
- INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK)

**ACTUATOR/OPERATORS**

- MANUALLY OPERATED
- DIAPHRAGM
- DIAPHRAGM, FAIL OPEN
- DIAPHRAGM, FAIL OPEN, PATH A-C
- DIAPHRAGM, FAIL CLOSE
- DIAPHRAGM, FAIL LOCKED (IN PLACE)
- DIAPHRAGM, FAIL INDETERMINATE
- DIAPHRAGM, PRESSURE BALANCED
- PRESSURE REGULATOR, SELF CONTAINED
- PRESSURE REGULATOR, EXTERNAL TAP
- MOTOR OPERATED
- HYDRAULICALLY OPERATED
- SOLENOID OPERATED
- 2WAY
- 3WAY
- 4WAY

NOTES:  
 FOR DIAPHRAGM  
 FO=FAIL OPEN  
 FC=FAIL CLOSED  
 FL=FAIL LOCKED (IN PLACE)  
 FI=FAIL INDETERMINATE

FOR SOLENOID  
 P=PRESSURE SUPPLY  
 E=EXHAUST  
 A=CYLINDER A  
 B=CYLINDER B  
 NA=NOT APPLICABLE

**INSTRUMENT FUNCTION**

FIRST-LETTERS	INITIATING OR MEASURED VARIABLE	CONTROLLERS				READOUT DEVICES		SWITCHES AND ALARM DEVICES SEE NOTES 1, 2, & 3			TRANSMITTERS			SOLENOIDS, RELAYS, COMPUTING DEVICES	PRIMARY ELEMENT	TEST POINT	WELL OR PROBE	VIEWING DEVICE, GLASS	SAFETY DEVICE	FINAL ELEMENT
		RECORDING	INDICATING	BLIND	SELF-ACTUATED CONTROL VALVES	RECORDING	INDICATING	HIGH	LOW	COMB	RECORDING	INDICATING	BLIND							
A	ANALYSIS	ARC	AIC	AC	AR	AI	ASH	ASL	ASHL	ART	AIT	AT	AY	AE	AP	AW	BG		AV	
B	BURNING/COMBUSTION	BRC	BIC	BC	BR	BI	BSH	BSL	BSHL	BRT	BIT	BT	BY	BE					BZ	
C	USER'S CHOICE																			
D	VOLTAGE	ERC	EIC	EC	ER	EI	ESH	ESL	ESHL	ERT	EIT	ET	EY	EE	FP		FG		EZ	
E	FLOW RATE	FRC	FIC	FC	FR	FI	FSH	FSL	FSHL	FRT	FIT	FT	FY	FE					FV	
F	FLOW QUANTITY	FORC	FQIC	FFC	FOR	FOI	FOSH	FOSL	FOSHL	FOT	FOT	FOT	FQY	FQE					FQV	
G	FLOW RATIO	FFRC	FFIC	FFC	FFR	FFI	FFSH	FFSL	FFSHL										FFV	
H	USER'S CHOICE																			
I	HAND CURRENT	IRC	IIC	HC	IR	II	ISH	ISL	ISHL	IRT	IIT	IT	IY	IE		LW	LG		IV	
J	POWER	JRC	JIC	JIC	JR	JI	JSH	JSL	JSHL	JRT	JIT	JT	JY	JE					JZ	
K	TIME	KRC	KIC	KC	KR	KI	KSH	KSL	KSHL	KRT	KIT	KT	KY	KE					KV	
L	LEVEL	LRC	LIC	LC	LR	LI	LSH	LSL	LSHL	LRT	LIT	LT	LY	LE					LV	
M	USER'S CHOICE																			
N	USER'S CHOICE																			
O	PRESSURE/VACUUM	PRC	PIC	PC	PR	PI	PSH	PSL	PSHL	PRT	PIT	PT	PY	PE	PP			PSV, PSE	PV	
P	PRESSURE	PDR	PDIC	PDC	PDR	POI	PDSH	PDSL	PDSHL	PDR	PDI	PDT	PDY	PE	PP				PDV	
Q	DIFFERENTIAL QUANTITY	QRC	QIC	QC	QR	QI	QSH	QSL	QSHL	QRT	QIT	QT	QY	QE					QZ	
R	RADIATION	RRC	RIC	RC	RR	RI	RSH	RSL	RSHL	RRT	RT	RT	RY	RE					RZ	
S	SPEED	SRC	SIC	SC	SR	SI	SSH	SSL	SSHL	SRT	SIT	ST	SY	SE					SV	
T	TEMPERATURE	TRC	TIC	TC	TR	TI	TSH	TSL	TSHL	TRT	TIT	TT	TY	TE	TP, TTW	TW	TSE		TV	
U	TEMPERATURE DIFFERENTIAL	TDR	TDIC	TDC	TDR	TDI	TDSH	TDSL	TDSHL	TDR	TDI	TDI	TDY	TE					TDV	
V	MULTIVARIABLE VIBRATION/MACHINERY ANALYSIS	VR	VI	VCV	VR	VI	VSH	VSL	VSHL	VRT	VIT	VT	UY	VE					UV	
W	WEIGHT/FORCE	WRC	WIC	WC	WR	WI	WSH	WSL	WSHL	WRT	WIT	WT	WY	WE					WZ	
X	DIFFERENTIAL UNCLASSIFIED EVENT/STATE/PRESENCE	WDR	WDIC	WDC	WDR	WDI	WDSH	WDSL	WDSHL	WDR	WDI	WDT	WDY	WE					WZ	
Y	POSITION/DIMENSION GAUGING/DEVIATION	YRC	YIC	YC	YR	YI	YSH	YSL	YSHL			YT	YY	YE					YZ	
Z		ZRC	ZIC	ZC	ZR	ZI	ZSH	ZSL	ZSHL	ZRT	ZIT	ZI	ZY	ZE					ZV	
ZD		ZDRC	ZDIC	ZDC	ZDR	ZDI	ZDSH	ZDSL	ZDSHL	ZDRT	ZDIT	ZDT	ZDY	ZDE					ZDV	

NOTE: THIS TABLE IS NOT ALL-INCLUSIVE.  
 1) A, ALARM, THE ANNUNCIATING DEVICE, MAY BE USED IN THE SAME FASHION AS 'S' SWITCH THE ACTUATING DEVICE.  
 2) THE LETTERS H AND L MAY BE OMITTED IN THE UNDEFINED CASE.  
 3) THE TERTIARY LETTERS D AND C OR THE WORDS OPEN AND CLOSED MAY BE USED TO INDICATE OPEN AND CLOSED POSITIONS.

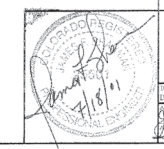
OTHER POSSIBLE COMBINATIONS:  
 FO (RESTRICTION ORIFICE)  
 FRK, HK (CONTROL STATIONS)  
 FX (ACCESSORIES)  
 TJR (SCANNING RECORDER)  
 LLH (PILOT LIGHT)

PFR (RATIO)  
 KOI (RUNNING TIME INDICATOR)  
 OOI (INDICATING COUNTER)  
 WKIC (RATE-OF-WEIGHT-LOSS CONTROLLER)  
 HMS (HAND MOMENTARY SWITCH)

**GENERAL NOTES**

- VALVES, VALVE OPERATORS, PIPING ACCESSORIES AND INSTRUMENT FUNCTION CODES ARE SHOWN ON THE P&ID UNLESS OTHERWISE INDICATED. THE INSTRUMENT LEGEND IS BASED ON ISA STANDARD 55.1-1973. FOR FURTHER DETAILS AND CLARIFICATION, REFER TO ISA STANDARDS.
- THE FOLLOWING SUFFIX MAY BE ADDED, IF APPLICABLE, TO SWITCH AND ALARM FUNCTION CODES, E.G., PSH DESIGNATES HIGH PRESSURE SWITCH, TAL DESIGNATES LOW TEMPERATURE ALARM, ETC.  
 L - LOW      HH - HIGH HIGH  
 LL - LOW LOW      HL - HIGH & LOW  
 H - HIGH
- A DUAL FUNCTION INSTRUMENT SUCH AS A PDAHL MAY BE IDENTIFIED BY TWO INSTRUMENT BALLOONS PDAH AND PDAHL TANGENTIAL TO EACH OTHER.

Pipefitting 4, Module 08401-07  
 Advanced Blueprint Reading  
 Blueprint Five of Nine  
 (Not to Scale)

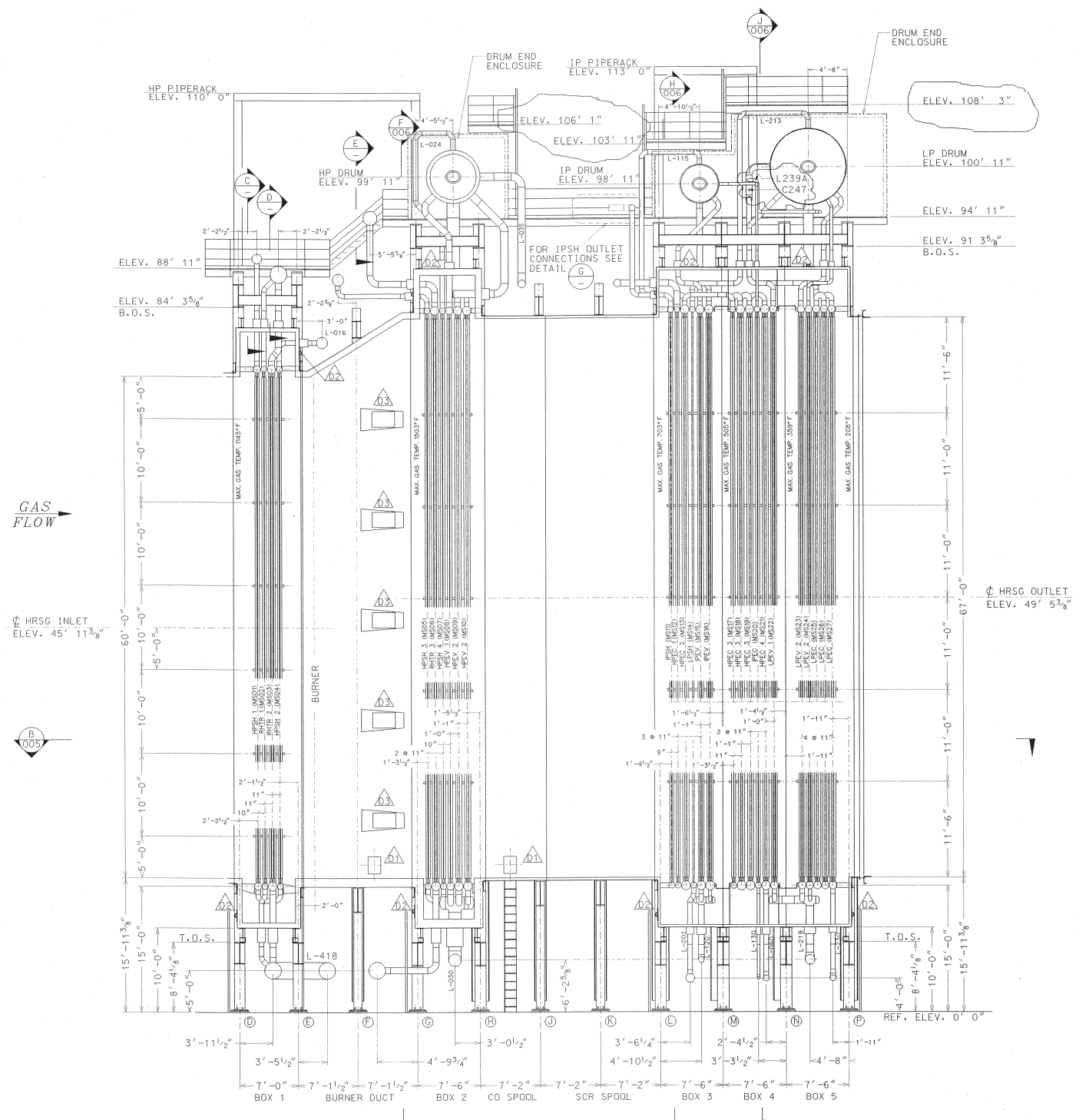
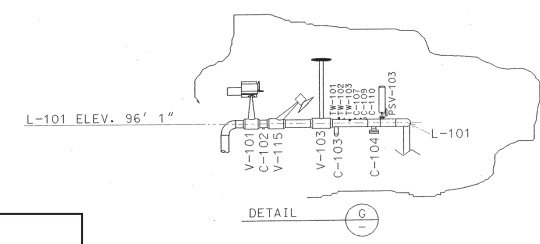
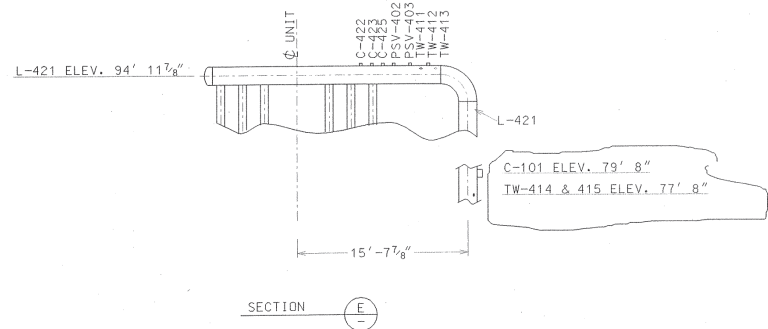
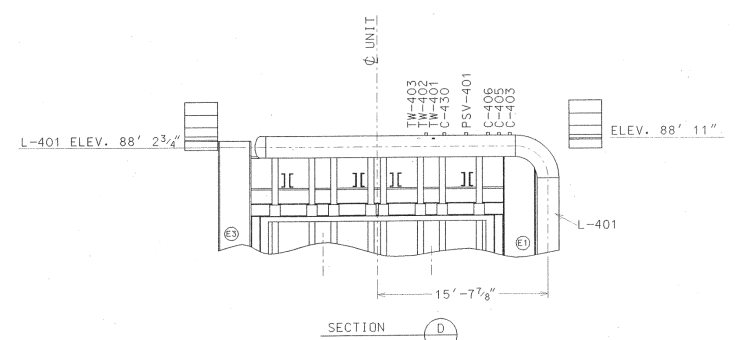
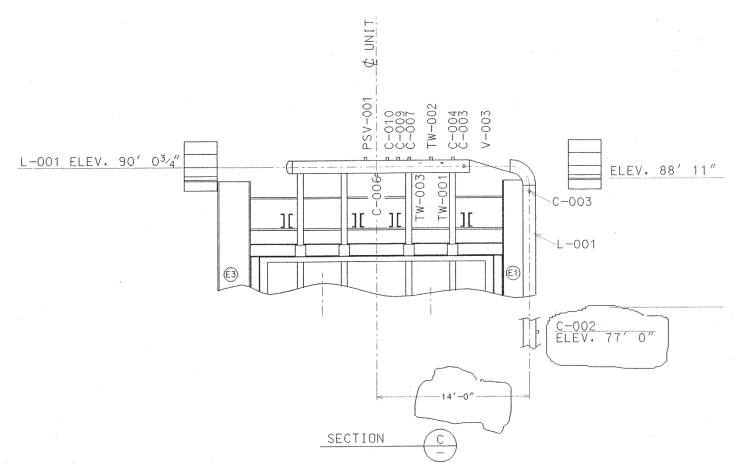


UTILITY ENGINEERING  
 THE Industrial Company  
 FRONT RANGE POWER  
 FRONT RANGE POWER PROJECT  
 GENERAL SITE  
 INSTRUMENTATION SYMBOLLOGY  
 ISSUE NO. 1/18/21  
 D001250-100M001 02 0

REVISION RECORD				
NO	DATE	DESCRIPTION	BY	CHK
1	02/12/01	REVISED PIPING CONNECTION LOCATIONS	NY	TDO
2	07/17/01	REVISED PIPING CONNECTIONS, PLATFORM ELEVATIONS, AND FEEDWATER PIPING	NY	ldo

GENERAL NOTES:

1. FOR GENERAL ARRANGEMENTS SEE DRAWINGS D-397-001 THRU -003.
2. FOR BOILER SETTINGS SEE DRAWINGS D397-004 THRU -006.
3. FOR FOUNDATION DIAGRAM SEE DRAWING D-397-021.
4. FOR FOUNDATION LOADS SEE DOCUMENT 397-0023.
5. FOR GENERAL NOTES AND DATA, AND CASING CONNECTIONS SEE DOCUMENT 397-0010.
6. ALL PLATFORM ELEVATIONS ARE TO TOP OF GRATING.
7. THIS CONTRACT IS FOR TWO IDENTICAL HRSG'S.



M001250-200A0007 S01 R02  
 CSU 480 MW 7/24/2001

Review does not relieve contractor from responsibility for errors or deviations from contract requirements.

UTILITY ENGINEERING  
 Jm 120701

CONTROLLED

FRONT RANGE POWER™  
 TIC/UE FRONT RANGE JOINT VENTURE  
 FRONT RANGE POWER PROJECT  
 TIC JOB NUMBER 42010  
 UE JOB NUMBER 001250  
 VOGT-NEM JOB NUMBER 17397

DWN. BY: NY  
 CKD. BY: KLH  
 RVD. BY: AAT  
 DATE: 12/20/00  
 SCALE: 1/8" = 12"

Voigt NEM  
 LOUISVILLE, KY., USA

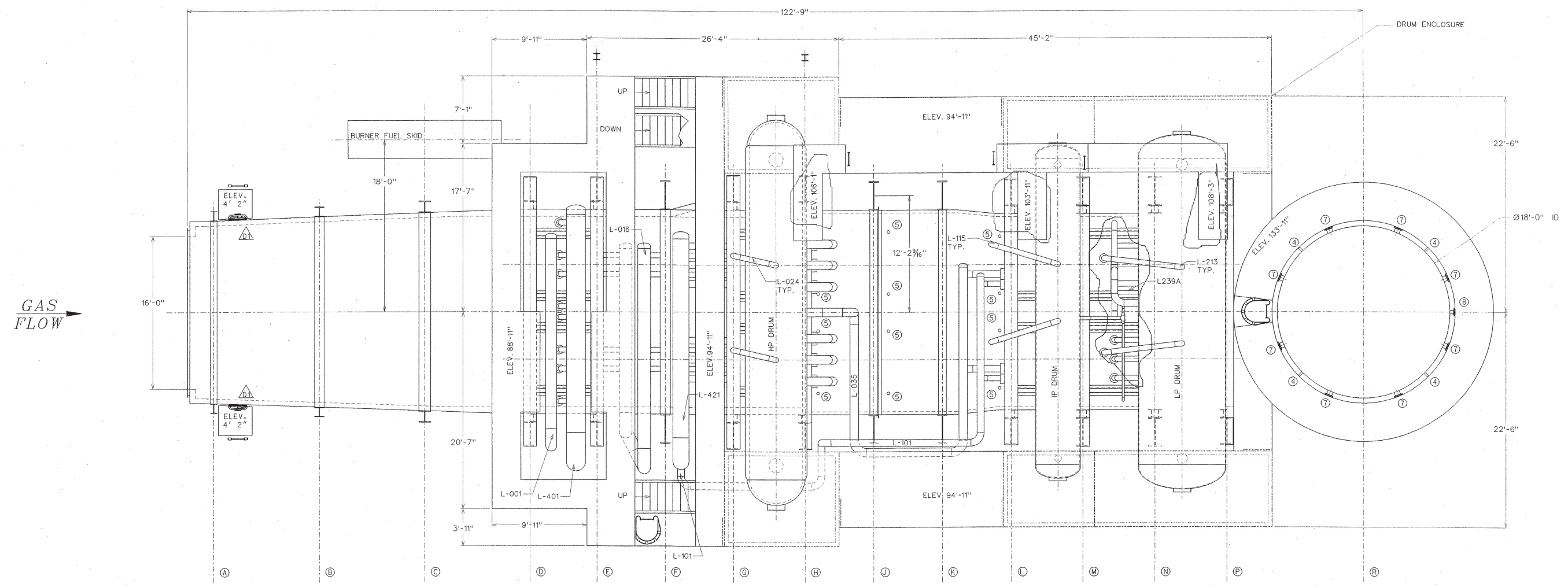
SIDE ELEVATION SECTION "A"

D-397-004 Rev. 2

Pipfitting 4, Module 08401-07  
 Advanced Blueprint Reading  
 Blueprint Six of Nine  
 (Not to Scale)

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REVISION RECORD			
NO.	DATE	DESCRIPTION	BY/CK
1	02/12/01	MOVED PIPING, TEST CONN., ADDED BURNER SKID, BLOWDOWN TANK, AND RECIRC. PUMP	tdo/ny
2	07/17/01	REVISED PLATFORMS AND FEEDWATER PIPING	ny/tdo



- GENERAL NOTES:**
1. FOR GENERAL ARRANGEMENTS SEE DRAWINGS D-397-001 THRU -003.
  2. FOR BOILER SETTINGS SEE DRAWINGS D397-004 THRU -006.
  3. FOR FOUNDATION DIAGRAM SEE DRAWING D-397-021.
  4. FOR FOUNDATION LOADS SEE DOCUMENT 397-D023.
  5. FOR GENERAL NOTES AND DATA, AND CASING CONNECTIONS SEE DOCUMENT 397-D010.
  6. ALL PLATFORM ELEVATIONS ARE TO TOP OF GRATING.
  7. THIS CONTRACT IS FOR TWO IDENTICAL HRSG'S.

**M001250-200A0003 S01 R02**  
**CSU 480 MW**      7/24/2001

Review does not relieve contractor from responsibility for errors or deviations from contract requirements

NO EXCEPTIONS NOTED  
 Release for manufacture

EXCEPTIONS NOTED  
 Release for manufacture  
 Revise and resubmit for distribution

RETURNED FOR CORRECTION  
 Do not proceed  
 Revise and resubmit for authorization

**UTILITY ENGINEERING**  
*S. M. 20701*

**CONTROLLED**

**FRONT RANGE POWER™**  
 TIC/UE FRONT RANGE JOINT VENTURE  
 FRONT RANGE POWER PROJECT  
 TIC JOB NUMBER 42010  
 UE JOB NUMBER 001250  
 VOGT-NEM JOB NUMBER 17397

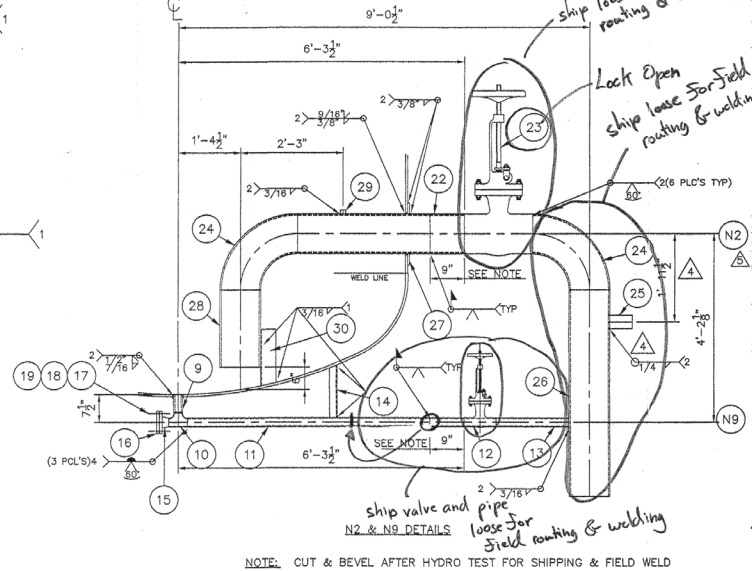
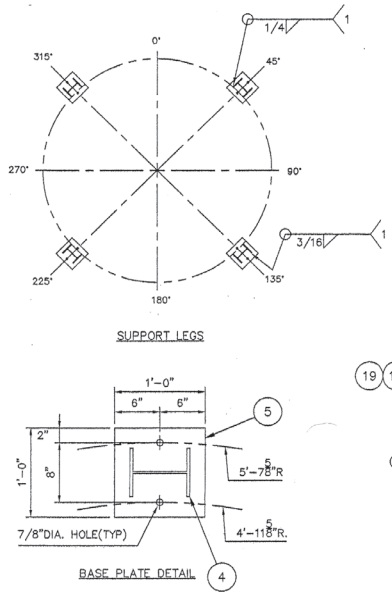
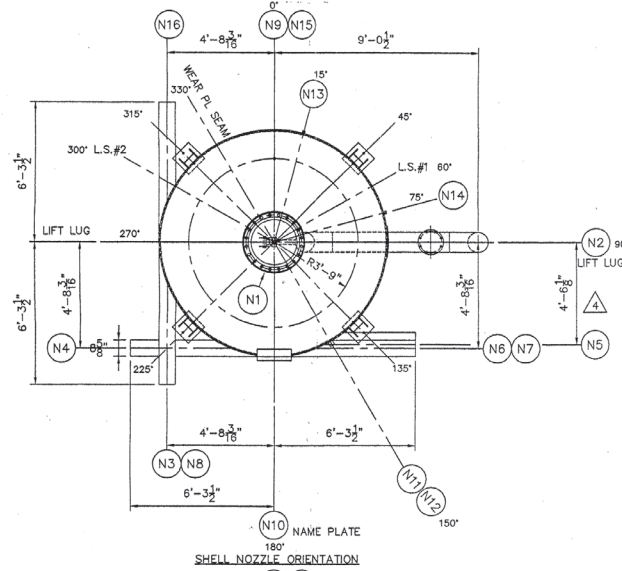
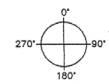
DWN. BY: T. OGDEN  
 CKD. BY: KLH  
 RVD. BY: AAT  
 DATE: 12/5/00  
 SCALE: 3/8" = 1'

**Voigt NEM**  
 LOUISVILLE, KY., USA

**GENERAL ARRANGEMENT**  
**PLAN VIEW**

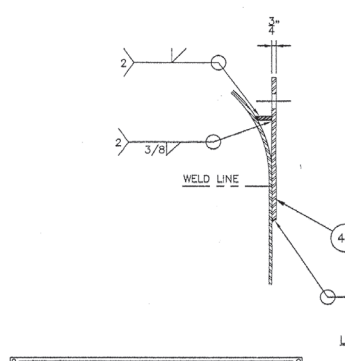
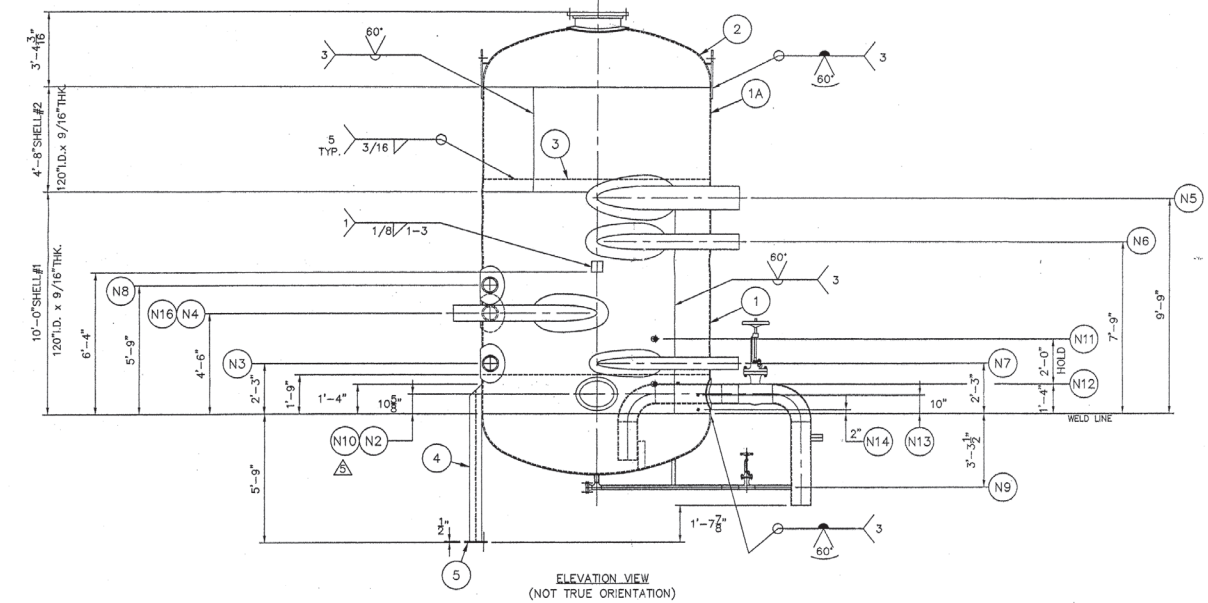
D-397-003      Rev. 2

Pipefitting 4, Module 08401-07  
 Advanced Blueprint Reading  
 Blueprint Seven of Nine  
 (Not to Scale)



BILL OF MATERIAL: ONE AS SHOWN (2 REQ'D)

ITEM	PART	QTY	MATERIAL	REQUIRED SIZE
1	SHELL #1	1	SA 516 70	9/16" THK x 120" x 37 1/2" (ROLLED TO 120" I.D.)
2	SHELL #2	1	SA 516 70	9/16" THK x 120" x 37 1/2" (ROLLED TO 120" I.D.)
3	HEAD	2	SA 516 70	2 1/2" HEAD x 5/8" NOM (525 MIN) x 120" I.D. x 2" SF
4	WEAR PLATE	2	SA 516 70	1 1/2" THK x 108" x 37 1/2" (ROLLED TO 119 7/8" O.D.)
5	BASE PLATE	4	SA 36 74W	W6 x 24 WFL PLATE x 48 1/2" LG
6	N1	1	SA 106C	24" SCH 40 STD
7	N2	1	SA 106C	24" SCH 40 STD
8	N3	1	SA 106C	24" SCH 40 STD
9	N4	1	SA 106C	24" SCH 40 STD
10	N5	1	SA 106C	24" SCH 40 STD
11	N6	1	SA 106C	24" SCH 40 STD
12	N7	1	SA 106C	24" SCH 40 STD
13	N8	1	SA 106C	24" SCH 40 STD
14	N9	1	SA 106C	24" SCH 40 STD
15	N10	1	SA 106C	24" SCH 40 STD
16	N11	1	SA 106C	24" SCH 40 STD
17	N12	1	SA 106C	24" SCH 40 STD
18	N13	1	SA 106C	24" SCH 40 STD
19	N14	1	SA 106C	24" SCH 40 STD
20	N15	1	SA 106C	24" SCH 40 STD
21	N16	1	SA 106C	24" SCH 40 STD
22	N17	1	SA 106C	24" SCH 40 STD
23	N18	1	SA 106C	24" SCH 40 STD
24	N19	1	SA 106C	24" SCH 40 STD
25	N20	1	SA 106C	24" SCH 40 STD
26	N21	1	SA 106C	24" SCH 40 STD
27	N22	1	SA 106C	24" SCH 40 STD
28	N23	1	SA 106C	24" SCH 40 STD
29	N24	1	SA 106C	24" SCH 40 STD
30	N25	1	SA 106C	24" SCH 40 STD
31	N26	1	SA 106C	24" SCH 40 STD
32	N27	1	SA 106C	24" SCH 40 STD
33	N28	1	SA 106C	24" SCH 40 STD
34	N29	1	SA 106C	24" SCH 40 STD
35	N30	1	SA 106C	24" SCH 40 STD
36	N31	1	SA 106C	24" SCH 40 STD
37	N32	1	SA 106C	24" SCH 40 STD
38	N33	1	SA 106C	24" SCH 40 STD
39	N34	1	SA 106C	24" SCH 40 STD
40	N35	1	SA 106C	24" SCH 40 STD
41	N36	1	SA 106C	24" SCH 40 STD
42	N37	1	SA 106C	24" SCH 40 STD
43	N38	1	SA 106C	24" SCH 40 STD
44	N39	1	SA 106C	24" SCH 40 STD
45	N40	1	SA 106C	24" SCH 40 STD



CERTIFIED BY: HOOPER WELDING ENT. LTD. OAKVILLE, ONTARIO. MADE IN CANADA. WELDED TO: 150 PSI AT 400 DEG F. EXTERNAL PRESSURE: 150 PSI AT 150 PSI. WELDED TO: 200 PSI AT 150 PSI. WELDED TO: 200 PSI AT 150 PSI.

VOGT-NEM logo and text: VOGT-NEM, 1797 RD, OAKVILLE, ONTARIO, CANADA. WELDED TO: 150 PSI AT 400 DEG F. EXTERNAL PRESSURE: 150 PSI AT 150 PSI. WELDED TO: 200 PSI AT 150 PSI. WELDED TO: 200 PSI AT 150 PSI.

WELD PROCEDURE TABLE

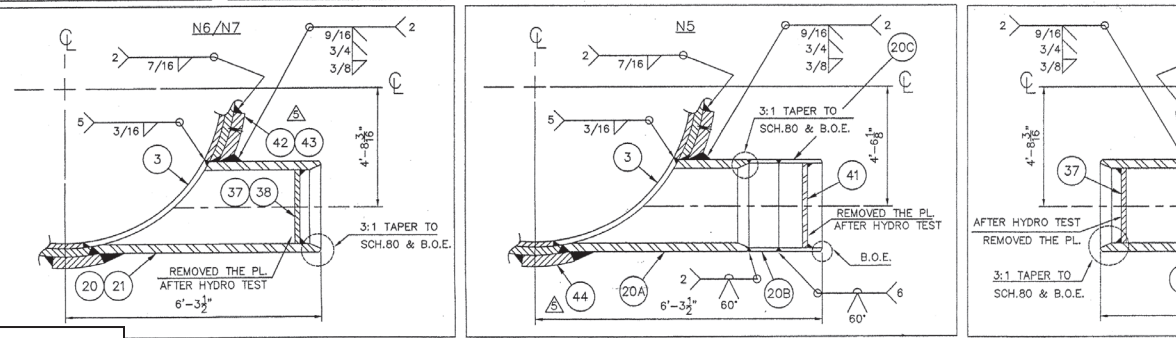
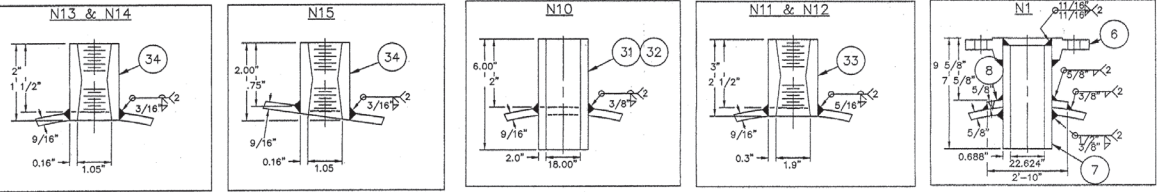
NO	PROCEDURE	PROCESS	P. NO.	FILLER METAL
1	FCAW	P1 TO P1	E71-TiE70-Ti	
2	SAW	P1 TO P1	E7018	
3	SAW & SAW	P1 TO P1	E7018 & E718/780	
4	GTAW & SAW	P1 TO P1	E7018-2 & E7018	
5	FCAW	PHD. P8	E5018-T1	
6	SAW	PHD. P4	E5018-SF	

MAJOR COMPONENT DESIGN DATA

DESIGN PRESSURE INTERNAL: 150 PSI @ 400 DEG F  
DESIGN PRESSURE EXTERNAL: N/A  
OPERATING PRESSURE: 195 PSI @ 40 DEG F  
CORR. ALLOW.: 0.000"  
HYDRO TEST: 195 PSI @ 40 DEG F  
MAP: 155 PSI  
MOMT: 200 DCLG  
SEISMIC CODE: 400 SEISMIC LOAD  
HEAD TYPE, TOP: 2:1 ELLIPSOIDAL  
HEAD TYPE, BOTTOM: 2:1 ELLIPSOIDAL  
RADIOGRAPH: HEAD/SHELL: FULL UW-11(A) JOINT EFFICIENCY: HEAD/SHELL: 1  
SHELL CIRC. FULL UW-11(A) SHELL LONG. FULL UW-11(A)  
ESTIMATED WEIGHT: FABRICATION: 19830 LBS  
ESTIMATED CAPACITY: 10838 US GALLONS  
INTERIOR SURFACE PREP: SSPC-SP6 HEAD/SHELL EXTERIOR COATING: 1 COAT OF INORGANIC ZINC PRIMER  
INSULATION: NONE INSPECTION BY: T.S.S.A.

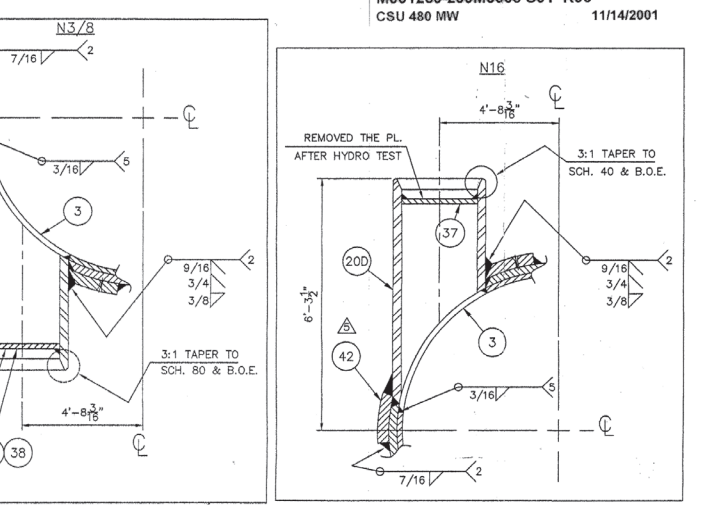
IMPACT TEST EXEMPT PER UG-20(I)

NO	ITEM	DESCRIPTION	CLASS	RATING	NOZZLE
N18	STEAM INLET	8 SCH 120	L-555	HBD	
N19	TEMPERATURE WELL	0.75 3000W SCRD F.O.P.L			
N20	TEMPERATURE WELL	0.75 3000W SCRD F.O.P.L			
N21	TEMPERATURE WELL	0.75 3000W SCRD F.O.P.L			
N22	LEVEL GAUGE	1.5 3000W SCRD F.O.P.L			
N23	MANWAY	18 14" x 18" RING			
N24	STEAM INLET	8 SCH 120	L-548	HBD	
N25	STEAM INLET	8 SCH 120	L-543	HBD	
N26	STEAM INLET	8 SCH 120	L-551	HBD	
N27	STEAM INLET	12 SCH 160	L-550	HBD	
N28	STEAM INLET	8 SCH 120	L-545	HBD	
N29	STEAM INLET	8 SCH 120	L-544	HBD	
N30	DRAIN	10 SCH 40			
N31	VENT	24 SCH 40	24 SO 150W 200		



CODE NAMEPLATE

NATL. BD: \_\_\_\_\_  
CERTIFIED BY: \_\_\_\_\_  
HOOPER WELDING ENT. LTD.  
OAKVILLE, ONTARIO  
MADE IN CANADA



MO01250-200M008 S01 R05  
CSU 480 MW 11/14/2001

NOV 6 2001

REVISIONS

NO	DATE	DESCRIPTION
5	OCT-30-01	N3 TO 8 & N16 MAT. WAS SA 106C, ADDED REPAIRS (24,44,45) N7 & N8 WAS SCH.80, N9 WAS SCH.100, N10 (N10) ELEV. WAS 15' CORRECTED NEAR PL. ITEM (3), TEST PL. ITEM (28) WAS 5 1/2" O.D. NOZZLE N5 WAS 8" SCH.120; ITEM # 3 WAS 104" HIGH BELIEVED BY REDUCING THE 1" AGED 3/8" ITEM 26 WAS 27 3/4" LG. RE-ORIENTATION N2 48/6/7; 1" AGED N18 & B.O.E. NOZZLE N5/6 PIPE MAT.; ITEM NO. 25 WAS 10" x 4" TEE
4	OCT-23-01	CORRECTED ELEVATION VIEW ON N15
3	OCT-18-01	SHELL WAS 1 1/2" THK; NOZZLE N3/4/5/6/7/8 WAS SCH.100 & 120; REORIENTATION N3 TO N8 & N11/12 NEAR PL. WAS 65" LG
2	DEC-3-01	ISSUED FOR APPROVAL
1	SEP-20-01	ISSUED FOR APPROVAL
0	AUG-30-01	ISSUED FOR APPROVAL

CONTRACT DATA

CUSTOMER: TSC/UE  
PROJECT NAME: FRONT RANGE POWER PROJECT  
VOGT-NEM JOB NO./COST SYMBOL: 17397/BD  
VOGT-NEM DOC. NO.: \_\_\_\_\_  
VOGT-NEM P.O. NO.: \_\_\_\_\_  
HOOPER JOB NO.: 4569

HOOPER WELDING ENTERPRISES LTD.

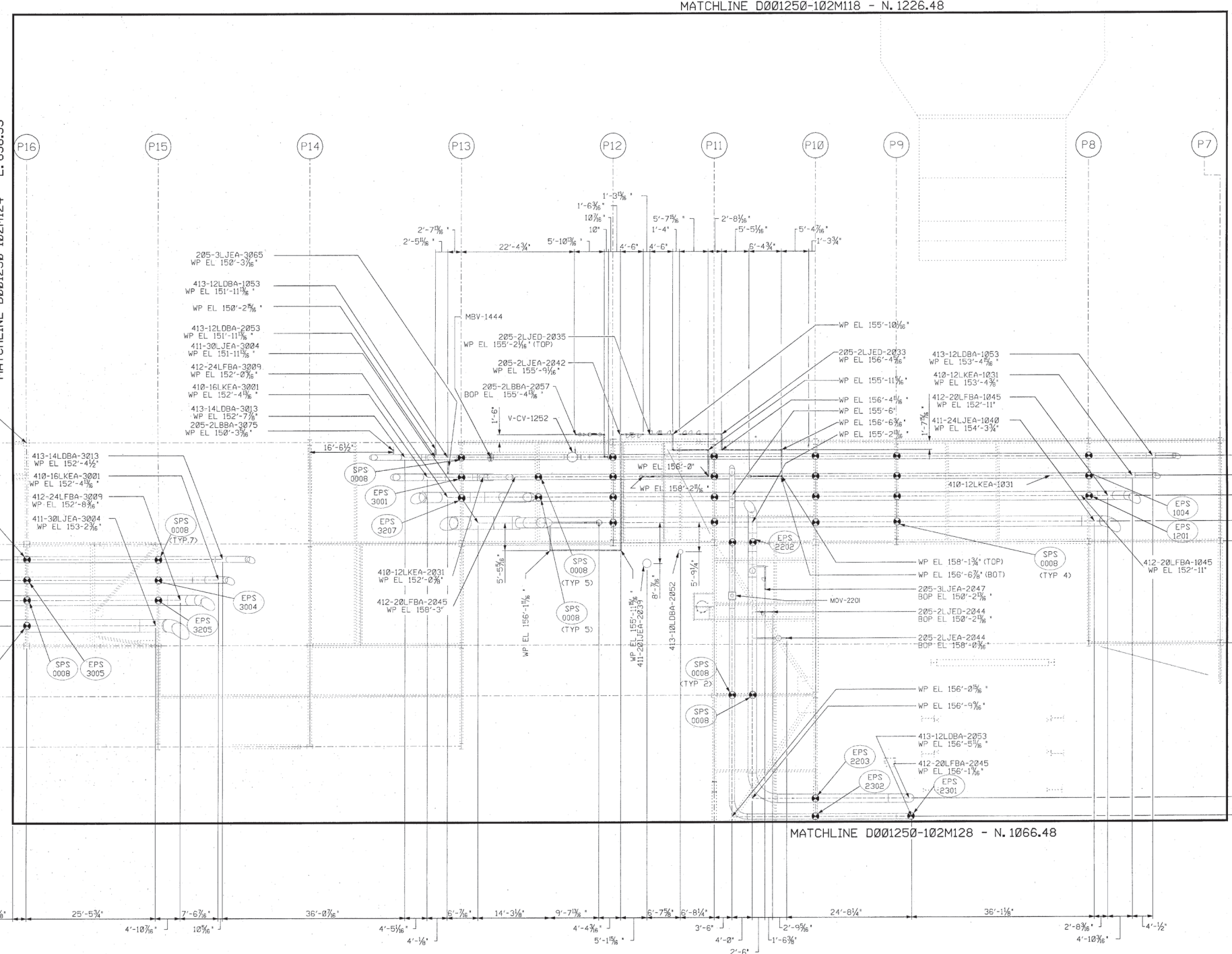
SCALE: \_\_\_\_\_ PLOT FACTOR: \_\_\_\_\_ FILE SPD: \_\_\_\_\_ DATE: AUG-30-01

TITLE: 9/16" THK. x 120" I.D. BLOWDOWN TANK

DRAWN BY: \_\_\_\_\_ APPROVED BY: \_\_\_\_\_ DRAWING NUMBER: 01-A686 REV: 5

Pipefitting 4, Module 08401-07  
Advanced Blueprint Reading  
Blueprint Eight of Nine  
(Not to Scale)





**GENERAL NOTES**

- FOR PIPING 2" AND SMALLER, THE FOLLOWING SUPPORT SPACING SHALL BE USED:  

2"	10'-0" CTRS	13'-0" CTRS
1 1/2"	8'-0" CTRS	11'-0" CTRS
1"	7'-0" CTRS	9'-0" CTRS
3/4"	6'-0" CTRS	8'-0" CTRS

**REFERENCE DRAWINGS**

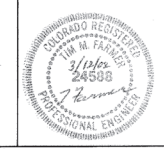
- GENERAL SITE MECHANICAL SYMBOLLOGY  
D001250-102M122 - E. 896.33

NOT TO BE USED FOR CONSTRUCTION  
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FRONT RANGE POWER PROJECT  
 ABOVE GROUND PIPING  
 PIPING GENERAL ARRANGEMENT  
 EL. 149'-5" TO 158'-3"

DATE	01/12/2024	BY	3/10/2024
SCALE	AS SHOWN	PROJECT	D001250-102M123
REV	04	APP	0



Pipefitting 4, Module 08401-07  
 Advanced Blueprint Reading  
 Blueprint Nine of Nine  
 (Not to Scale)