OPERATIONS AND MAINTENANCE MANUAL

FOR

WATER STORAGE AND PUMPING SYSTEM

AT

GRISE FIORD, N.W.T.

GCG DILLON CONSULTING LIMITED
PROJECT: 9893-05

MARCH 1988

GRISE FIORD WATER TANKS
O&M MANUAL
DISTRIBUTION LIST

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CHAPTER 1 - INTRODUCTION

OPERATIONS AND MAINTENANCE MANUAL

FOR

WATER STORAGE AND PUMPING SYSTEM

AT

GRISE FIORD, N.W.T.

Year of Completion: 1987

Original Scope: Storage tanks, heating, pumping, chlorination, impoundment pond and fill line facilities.

This manual has been updated to include:

DATE	DESCRIPTION OF CHANGE

PHASE OF WORK	DPW PROJECT MANAGER	CONSULTANT	GENERAL CONTRACTOR	MECHANICAL CONTRACTOR	ELECTRICAL CONTRACTOR
Storage tank, heating, pres-surizing and chlorinating facilities (Tank No. 1)	Fred James	M. M. Dillon Ltd.	Canadian Erectors Ltd., Montreal	Canadian Erectors Ltd., Montreal	Holmes Electrical Cont. Ltd., Montreal
Tank No. 2 Granular Pad	Al Shevkenek	GCG Dillon Consulting Limited	Jomanic		
Tank No. 2	Al Shevkenek	GCG Dillon Consulting Limited Rae Inspection Services (Internal Coatings)	Norland Construction Ltd.	Horton CBI - tank Erectors Western Sandblasting - insulation and coatings Westeel - tank metal cladding	
Impoundment Pond & Fill Line	Al Shevkenek	GCG Dillon Consulting Limited	Universal Industries Ltd.		
Pumping System	Al Shevkenek	GCG Dillon Consulting Limited	Universal Industries Ltd.	Universal Industries Ltd.	Universal Industries Ltd.

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CHAPTER 10 - MANUFACTURER'S BROCHURES AND DATA - continued

CHAPTER 3 - DESIGN DATA

CHAPTER 3 - DESIGN DATA

3.1 Background Data

Grise Fiord is a community of approximately 110 located on the south shore of Ellesmere Island. The normal source of water supply for the community is from glacial streams flowing from the hills northeast of the community during the period from June to September. During the rest of the year, water has been delivered to the residences from the water storage tank and supplemented with ice obtained from icebergs, which the residents melt in their water holding tanks.

As water consumption had exceeded the storage tank capacity and the hauling of ice could not rectify the shortfall, a rationing procedure was initiated.

In 1985, design of an additional 857,000 IG storage tank, impoundment pond, fill line and pumping system commenced. Construction began in the summer of 1986 and the additional facilities became operational in the summer of 1987.

3.2 System Concept

The water supply to residences in Grise Fiord is trucked from the heated water storage tanks. Hypochlorination is used to disinfect the water supply. The tank heating system ensures reliable operation during cold weather.

The water system comprises:

- a 300 000 IG (1364 cu. meters) and a 857 000 IG (3896 cu. metres) storage tanks

- a water heating and recirculation system to heat water in winter

- a water delivery system including chemical feed of hypochlorite

- boilers to supply heat for maintaining stored water temperature

- a source of water to fill the tanks in summer

3.3 Design Data

Design Storage Capacity[1]:	5023 cubic metres
Existing Storage Capacity[2]:	1393 cubic metres
New tank Storage Capacity[2]:	3860 cubic metres
Total Storage Capacity[2]:	5253 cubic metres
Design Storage Period:	9.5 months
Design Water Consumption:	20/L/c/d
Fire Flow[3]:	1000 L/min.
Fire Storage[4]:	60 000 L
Snow Loads:	1.9 kPa
Wind Loads[5]:	0.69 kPa

Tankage Heat Loss:	140 000 BTU/hr.
Permafrost Protection:	75 mm (3") rigid insulation under tank floor

1 Storage capacity specified by GNWT-DPWH.

2 Assumes 4" (75 mm) freeboard and 3" (75 mm) dead storage.

3 Fire flow is equal to domestic flow.

4 Fire storage is included in tank storage capacities.

5 Wind load has a 1 in 30 chance of exceeding value shown in any year.

3.4 Climatic Information

Temperature

Mean annual July temperature (high): 10°C

Mean annual January temperature (low): -35°C

Precipitation

Rainfall:	- trace
Snowfall:	- 6" (150 mm)
Total Precipitation:	- 6" (150 mm)

CHAPTER 4 - SCHEMATICS AND FUNCTIONAL DATA

CHAPTER 4 - SCHEMATICS AND FUNCTIONAL DATA

4.1 Description of Facilities

The system is designed to provide a safe reliable supply of water from storage in winter.

The facilities are located in and next to the DPW maintenance garage. The boilers in the garage are for heating the stored water.

Details of the major components of the water supply system are given in Chapter 5.

The tanks are filled in summer by a hose connection from the summer fill line to the piping system.

The facilities are designed to provide automatic winter operation:

- stored water is continuously recirculated through the heat exchanger to keep the tanks from freezing.

- the heating system recirculation pump runs continuously, pumping heated glycol/water solution through the heat exchanger. Water from the tanks is continously pumped by the recirculation pumps through the heat exchanger and back onto the tanks. Overheating of the stored water is prevented by an automatic by-pass of the heated glycol/water around the heat exchanger.

- water is delivered to the tank truck either through a chain-operated valve (BFV-2), or a motorized operated valve (MCV-3). When MCV-3 valve is opened and flow estiblished, flow switch (FS-4) is activated automatically starting the hypochlorinator pump (P-4). When interior truck fill valve (BFV-2) is operated flow will be gravity fed, unless service pump (P-6 or P-7) is manually started.

ALARMS

Conditions:

- low temperature in storage tanks, alarm only.
- low water level in storage tanks; alarm and shut-down of water recirculation pumps and service pumps.
- high level in either storage tank; alarm and shut-down of Summer Fill Line Valve (MCV-1).
- hypochlorite storage tank low level; alarm only.
- low flow in water recirculating lines; alarm only.
- low room temperature; alarm only.

4.2 Component Functions

ITEM NO.	TAG NO. & COMPONENT	FUNCTION PERFORMED	REMARKS
74	MCV-1 Motorized Butterfly Valve (Auto)	Controls fill line operation during tank filling.	Can be operated manually. Closes when high level alarm activated.
23	MCV-2 Motorized 3-Way Valve (Auto)	Modulating control of flow from boiler to heat exchanger.	Valve bypasses heating fluid back to boiler when water in storage tanks reaches set temperature.
1	MCV-3 Motorized Butterfly Valve (Auto)	Controls flow to exterior truck fill piping.	Activated by Truck Control Panel. Auto closing when timer runs-out, stop button pushed or in event of power failure.
49	FCV-1 3-Way Ball Valve (Manual)	Modulating control of return flow of heated water to storage tanks from heat exchanger.	Operator to monitor flow and water temperature of each tank and manually control flow of heated water returning to tanks.
39	P-1 Water Circulating Pump	Circulates stored water from tanks through heat exchanger.	Runs continuously. Alternate use with P-2.
35	P-2 Water Circulating Pump	Circulates stored water from tanks through heat exchanger.	Runs continuously. Alternate use with P-1.
9	B-1 Hot Water Circulating Pump	Circulates heating fluid through boiler and heat exchanger.	Operates continuously when boiler is activated.

4.2 Component Functions - continued

ITEM NO.	TAG NO. & COMPONENT	FUNCTION PERFORMED	REMARKS
13	B-2 Hot Water Circulating Pump	Circulates heating fluid through boiler and heat exchanger.	Operates continuously when boiler is activated.
98	P-4 Solution Metering Pump (Hypochlorinator)	Hypochlorite solution metering pump.	Operated by flow switch FS-4 during truck fill operation and FS-3 during tank filling.
99	P-5 Solution Metering Pump (Hypochlorinator)	Hypochlorite solution metering pump.	Manually operated to maintain residual chlorine level of stored water.
81	P-6 Delivery Pump	Supply truck fill points.	Activated by Truck Control Panel. Pump control should be left in "R", remote position. Pump selector switch must be manually operated when using interior truck fill. Remote and manual selector is located on Plant Control Panel.
85	P-7 Delivery Pump	Supply truck fill points.	Activated by Truck Control Panel. Pump control should be left in "R", remote position. Pump selector switch must be manually operated when using interior truck fill. Remote and manual selector is located on Plant Control Panel.

4.2 Component Functions - continued

ITEM NO.	TAG NO. & COMPONENT	FUNCTION PERFORMED	REMARKS
63	BFV-1 Butterfly Valve	Isolates return flow to Tank No. 2.	Normally open.
4	BFV-2 Butterfly Valve With Chain Operator	Allows interior truck filling operation.	Leave closed except when using interior truck fill.
96	BFV-3 Butterfly Valve	Isolation of fill/ suction piping for Tank No. 1.	Normally open.
95	BFV-4 Butterfly Valve	Drain valve for piping system.	Normally closed.
93	BFV-5 Butterfly Valve	Drain valve for piping system.	Normally closed.
73	BFV-6 Butterfly Valve	Isolates fill line piping.	Normally closed except when summer fill line in use.
76	BFV-7 Butterfly Valve	Isolation valve for Pump P-6 suction.	Normally open. Do not close unless pump has been deactivated.
78	BFV-8 Butterfly Valve	Isolation valve for Pump P-7 suction.	Normally open. Do not close unless pump has been deactivated.
68	BFV-9 Butterfly Valve	Isolates fill/suction piping for Tank No. 2.	Normally open.

4.2 Component Functions - continued

ITEM NO.	TAG NO. & COMPONENT	FUNCTION PERFORMED	REMARKS
72	BFV-10 Butterfly Valve	Isolation valve for transfer pumping of water from Tank No. 1 to Tank No. 2.	Normally open.
6	BFV-11 Butterfly Valve	Exterior fire hydrant supply valve.	Normally closed.
84	BFV-12 Butterfly Valve	Isolation valve for Pump P-6 discharge.	Normally open. Do not close unless pump is deactivated.
88	BFV-13 Butterfly Valve	Isolation valve for Pump P-7 discharge.	Normally open. Do not close unless pump is deactivated.
89	BFV-14 Butterfly Valve	Isolation valve for transfer pumping of water from tank to tank.	Normally closed. Do not remove blind flange unless valve to be used.
80	BFV-15 Butterfly Valve	Isolates pump by-pass piping.	Normally closed. Do not open unless pumps are deactivated and isolated.
87	CKV-1 Check Valve	Prevent backflow through Pump P-7.	
83	CKV-2 Check Valve	Prevent backflow through Pump P-6.	
40	CKV-3 Check Valve	Prevent backflow through Pump P-1.	

4.2 Component Functions - continued

ITEM NO.	TAG NO. & COMPONENT	FUNCTION PERFORMED	REMARKS
36	CKV-4 Check Valve	Prevent backflow through through Pump P-2.	
32	CV-1 Gate Valve	Isolation valve for hot water by-pass feed to heat exchanger.	Normally closed.
21	CV-2 Gate Valve	Isolation valve for MCV-2 feed to heat exchanger.	Normally open. Do not close except for maintenance.
24	CV-3 Gate Valve	Isolation valve for MCV-2 feed to heat exchanger.	Normally open. Do not close except for maintenance.
31	CV-4 Gate Valve	Isolation valve for MCV-2 by-pass to boiler.	Normally open. Do not close except for maintenance.
29	CV-5 Gate Valve	Isolation valve for heat exchanger return flow to boiler.	Normally open. Do not close except for maintenance.
34	CV-6 Gate Valve	Isolation valve for Pump P-2 suction.	Normally open. Do not close unless pump is deactivated.
92	CV-7 Gate Valve	Isolation valve for tempering water supply.	Normally open. Do not close except for maintenance and Pumps P-1 and P-2 are deactivated.

4.2 Component Functions - continued

ITEM NO.	TAG NO. & COMPONENT	FUNCTION PERFORMED	REMARKS
41	CV-8 Gate Valve	Isolation valve for tempering water by-pass of heat exchanger.	Normally closed.
46	CV-9 Gate Valve	Isolation valve for tempering water.	Normally open.
42	CV-10 Gate Valve	Isolation valve for Pump P-1 discharge.	Normally open. Do not close except for maintenance and Pump P-1 is deactivated.
37	CV-11 Gate Valve	Isolation valve for Pump P-2 discharge.	Normally open. Do not close except for maintenance and Pump P-2 is deactivated.
38	CV-12 Gate Valve	Isolation valve for Pump P-1 suction.	Normally open. Do not close except for maintenance and Pump P-1 is deactivated.
8	Return Gate Valve	Isolation valve for hot water return to Boiler B-1.	Normally open. Do not close except for maintenance and Boiler B-1 is deactivated.
14	Supply Gate Valve	Isolation valve for hot water supply from Boiler B-1.	Open when Boiler B-1 in use. Close when Boiler B-2 in use.
15	Supply Gate Valve	Isolation valve for hot water supply from Boiler B-2.	Open when Boiler B-2 in use. Close when Boiler B-1 in use.

4.2 Component Functions - continued

ITEM NO.	TAG NO. & COMPONENT	FUNCTION PERFORMED	REMARKS
16	Return Gate Valve	Isolation valve for hot water return to Boiler B-2.	Normally open. Do not close except for maintenance and Boiler B-2 is deactivated.
10	Gate Valve	Isolation valve for hot water supply tank.	Normally closed. Open only when adding glycol solution to hot water system.
28	Gate Valve	Drain valve for heat exchanger.	Normally closed. Do not open except for maintenance.
	Hot Water Supply Tank (yellow tank)	Supply source for heating fluid make-up for boilers.	Mix 50/50 glycol/ water solution in tank.
11	B-1 Boiler	Heats water for supply to heat exchanger.	B-1 and B-2 cannot be operated simultaneously.
12	B-2 Boiler	Heats water for supply to heat exchanger.	
	GBV-1 Globe Valve	Supply valve for service sink water.	Normally open.
	GBV-2 Globe Valve	Supply valve for mixing tank water.	Normally closed.

4.2 Component Functions - continued

ITEM NO.	TAG NO. & COMPONENT	FUNCTION PERFORMED	REMARKS
58	TS-1 Temperature Switch	Sensor for Tank No. 1 low temperature alarm.	Set switch for 35°F.
70	TS-2 Temperature Switch	Sensor for Tank No. 2 low temperature alarm.	Set switch for 35°F.
50	FM-1 Flow Sensor	Senses tempering water flow to Tank No. 1.	Transmits flow rate to Flow Rate Indicator-FRT-3.
59	FM-2 Flow Sensor	Senses tempering water flow to Tank No. 2.	Transmits flow rate to Flow Rate Indicator-FRT-4.
75	FS-3 Flow Switch	Senses flow in tank fill line. Activates Pump P-4 (Hypochlorinator).	
90	FS-4 Flow Switch	Senses flow in service pump discharge piping (truck fill). Activates Pump P-4 (Hypochlorinator).	
25, 30, 33, 43, 48, 77, 79, 82, 86	P Pressure Gauge	Pressure indication at critical points.	Needle valve used to isolate gauge for replacement.
56, 59	PM Pressure Gauge	Pressure indicator which reads in metres.	Approximate water level in storage tank.

4.2 Component Functions - continued

ITEM NO.	TAG NO. & COMPONENT	FUNCTION PERFORMED	REMARKS
20, 22, 27, 44, 47, 57, 71	T Temperature Gauge	Indicates temperature of water at critical points.	
91	FT-1 Flow Sensor	Senses flow to truck fill discharge points.	Transmits flow rate to P.C.P. and T.C.P.
45/45A	TIC Temperature Indicator Controller	Senses temperature of incoming tempering water and controls position of 3-way motorized valve (MCV-2).	
54	LSL-1 Level Switch (on Varec tank gauge)	Senses low level of water in storage Tank No. 1 for alarm condition.	Shuts down Pumps P-1, P-2, P-6 & P-7 if Tank Selector Switch is in Tank 1 or Tank 1 & 2 position.
54	LHS-3 Level Switch (on Varec tank tank)	Senses high level of water in storage Tank No. 1 for alarm condition.	Actuates motorized Valve MCV-1 to closed position if Tank Selector Switch is in Tank 1 or Tank 1 & 2 position.
67	LSL-2 Level Switch	Senses low level of water in storage Tank No. 2 for alarm condition.	Shuts down Pumps P-1, P-2, P-6 & P-7 if Tank Selector Switch is in Tank 2 or Tank 1 & 2 position.

4.2 Component Functions - continued

ITEM NO.	TAG NO. & COMPONENT	FUNCTION PERFORMED	REMARKS
67	LSH-4 Level Switch	Senses high level of water in storage Tank No. 2 for alarm condition.	Actuates motorized Valve MCV-1 to closed position if Tank Selector Switch is in Tank 2 or Tank 1 & 2 position.
101	LSL-3 Level Switch	Senses low level in hypochlorite solution holding tank for alarm condition.	
5	WHA Water Hammer Arrestor	Dampens water hammer due to quick closing action of Valve MCV-3.	Ensure that air pressure is maintained in valve.
2,3	VRV (A/V) Air/Vacuum Release Valve	Prevents vacuum in exterior truck fill piping when Valve MCV-3 closes.	Ensure that isolating valve is in open position.
18, 19, 51, 52, 61, 62	ARV (A/R) Air Release Valves	Bleeds air from various high points in piping systems.	Ensure that isolating valves are in open position.
17	Air Scoop	Removes air from hot water feed piping to heat exchanger and diverts to expansion tank.	
26	Heat Exchanger	Allows heat transfer for maintaining stored water temperature.	

4.2 Component Functions - continued

ITEM NO.	TAG NO. & COMPONENT	FUNCTION PERFORMED	REMARKS
110	Hypochlorite Mixing Tank	For mixing calcium hypochlorite and water solution.	
111	Hypochlorite Storage Tank	For storing hypo-chlorite solution.	
100	Mixer	For mixing calcium hypochlorite solution in mixing tank.	
	Cl_2 Injectors	Injection of hypo-chlorite solution into storage tanks water.	
109	TCP Truck Control Panel	Controls exterior truck filling operation.	Truck fill selector switch must be on "Exterior" and Service Pump Selector switch on P.C.P. must be on "R" (remote).
108	PCP Plant Control Panel	Controls pumping system operation.	
60	FRP Flow Rate Panel	Indicates tempering water return flow to storage tanks.	
	Transfer Switch	Automatically controls start and stop of emergency generator in event of power failure.	Leave in "Auto" position except for system test.
	Battery Charger	Automatically charges emergency generator battery.	

4.2 Component Functions - continued

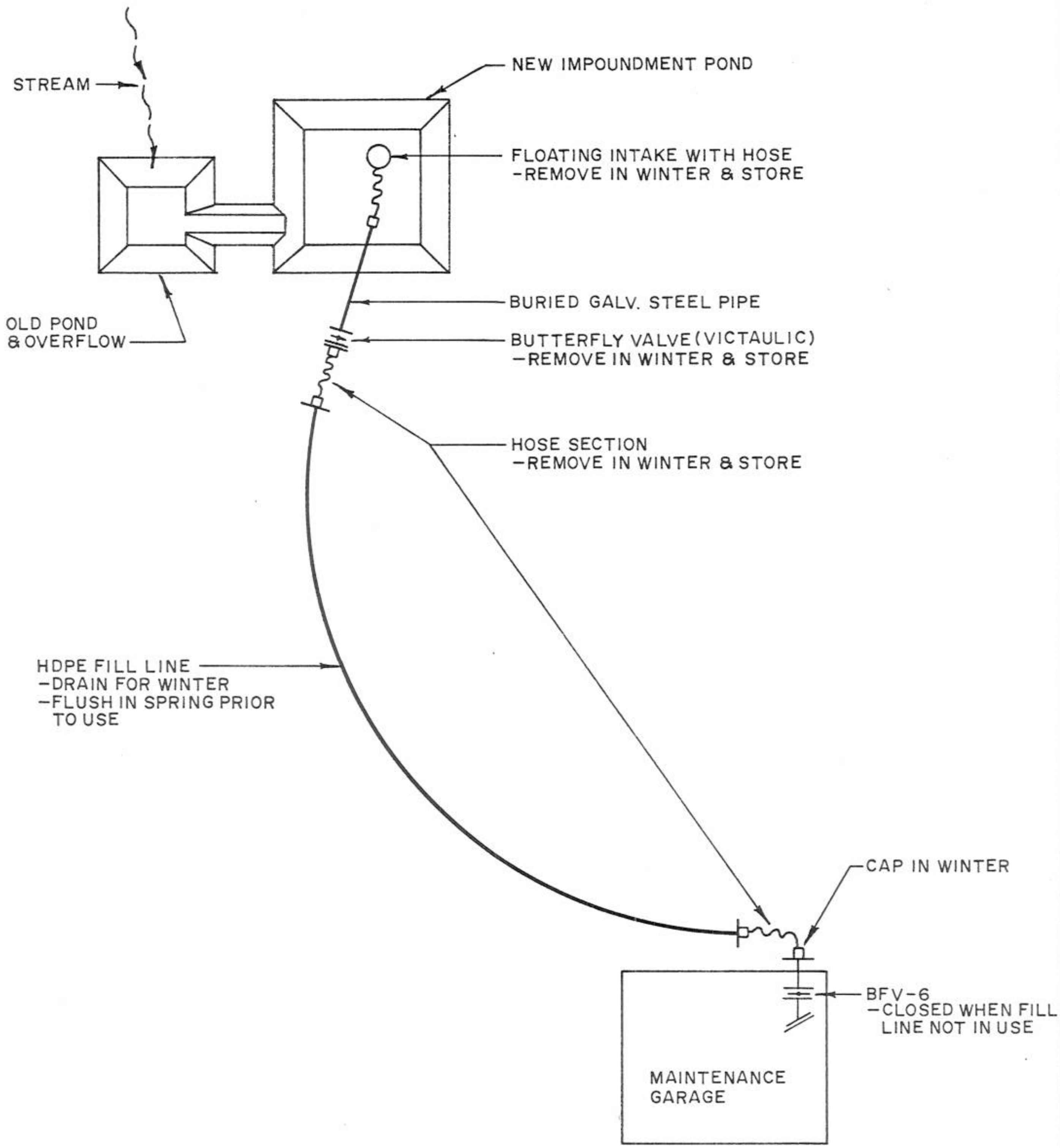
ITEM NO.	TAG NO. & COMPONENT	FUNCTION PERFORMED	REMARKS
104	Motor Starter for Pump P-2	Function selector and disconnect.	Leave in "Auto" position for normal operational conditions.
105	Motor Starter for Pump P-1	Function selector and disconnect.	Leave in "Auto" position for normal operational conditions.
106	Motor Starter for Pump P-7	Function selector and disconnect.	Leave in "Auto" position for normal operational conditions.
107	Motor Starters for Pump P-6	Function selector and disconnect.	Leave in "Auto" position for operational conditions.
55	TV-1 Butterfly Valve	Isolates Tank No. 1 fill/suction piping.	Normally open.
53	TV-2 Butterfly Valve	Isolates Tank No. 1 tempering water return piping.	Normally open.
66	TV-3 Butterfly Valve	Isolates Tank No. 2 fill/suction piping.	Normally open.
64	TV-4 Butterfly Valve	Isolates Tank No. 2 tempering return water.	Normally open.

4.2 Component Functions - continued

ITEM NO.	TAG NO. & COMPONENT	FUNCTION PERFORMED	REMARKS
65	TV-5 Butterfly Valve	Isolation valve for Tank No. 2 between fill/suction and tempering return water piping.	Normally closed.
7	Fire Hydrant	Provides 2 connections for fire truck suction hose.	Drain and replace caps when not in use.
94	Hose Connection Flange	For transfer of Tank No. 1 to Tank No. 2.	Leave blind flange with sampling point on piping unless transferring tank contents.
97	Hose Connection Flange	For transfer of Tank No. 2 to Tank No. 1.	Leave blind flange with sampling point on piping unless transferring tank contents.
112		Vacuum/Air Release Valve for Tank No. 1.	Keep valve clean of obstructions. Existing reused.

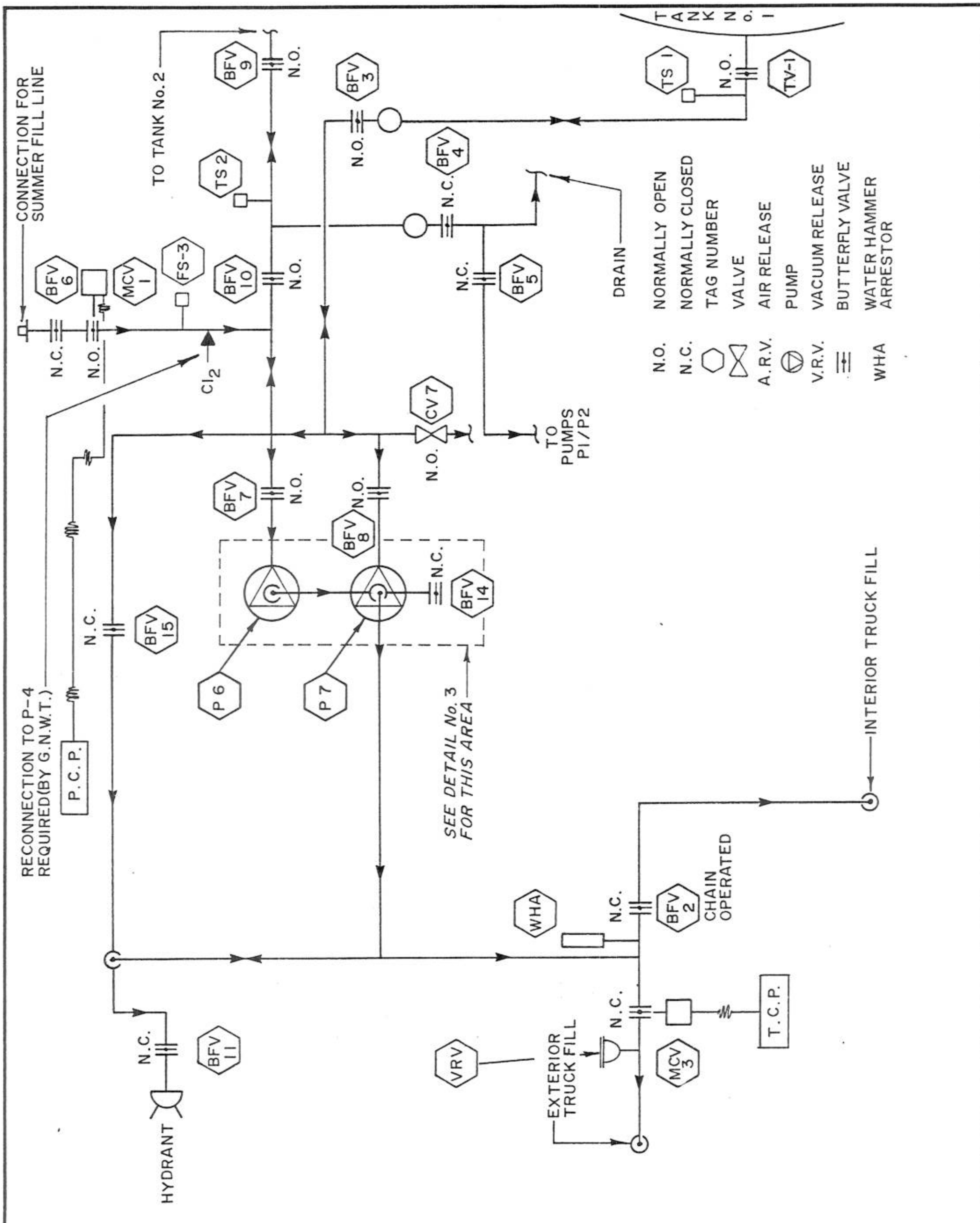
4.3 System Schematics

O/M-1	Summer Fill Line
O/M-2	Water Supply Pumping System
O/M-3	Service Pumps Schematic
O/M-4	Heating System
O/M-5	Recirculation System
O/M-6	Tank Valves
O/M-7	Hypochlorination System
O/M-8	Hypochlorinator Pump Controls
O/M-9	Plant Control Panel
O/M-10	Truck Control Panel
O/M-11	Flow Rate Panel
O/M-12	Piping and Instrumentation Schematic
O/M-13	Piping Isometric



GCG DILLON Consulting Engineers and Planners	TITLE IMPOUNDMENT POND & FILL LINE	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 1

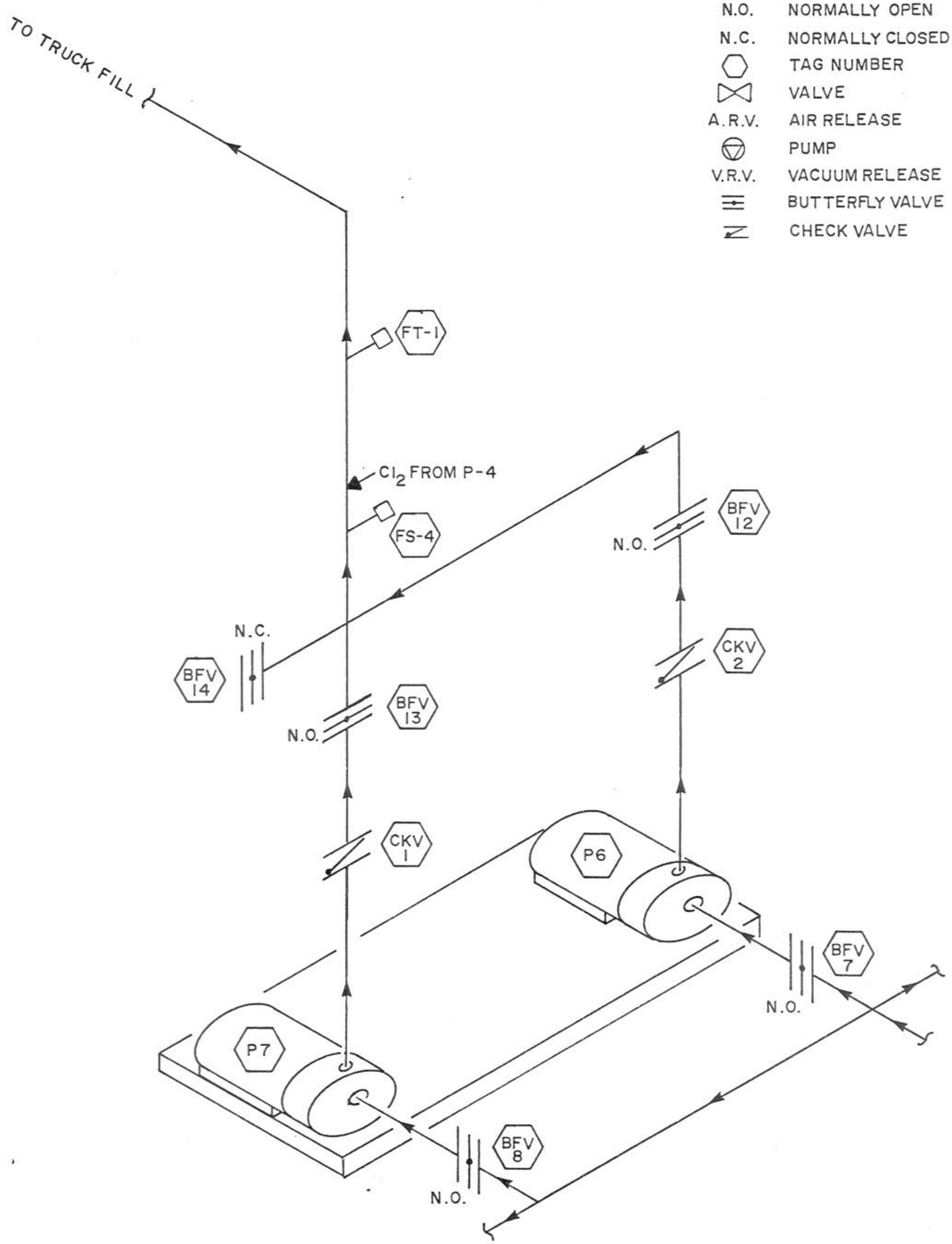
G–501–72



GCG DILLON Consulting Engineers and Planners	TITLE: WATER SUPPLY PUMPING SYSTEM	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT: GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 2

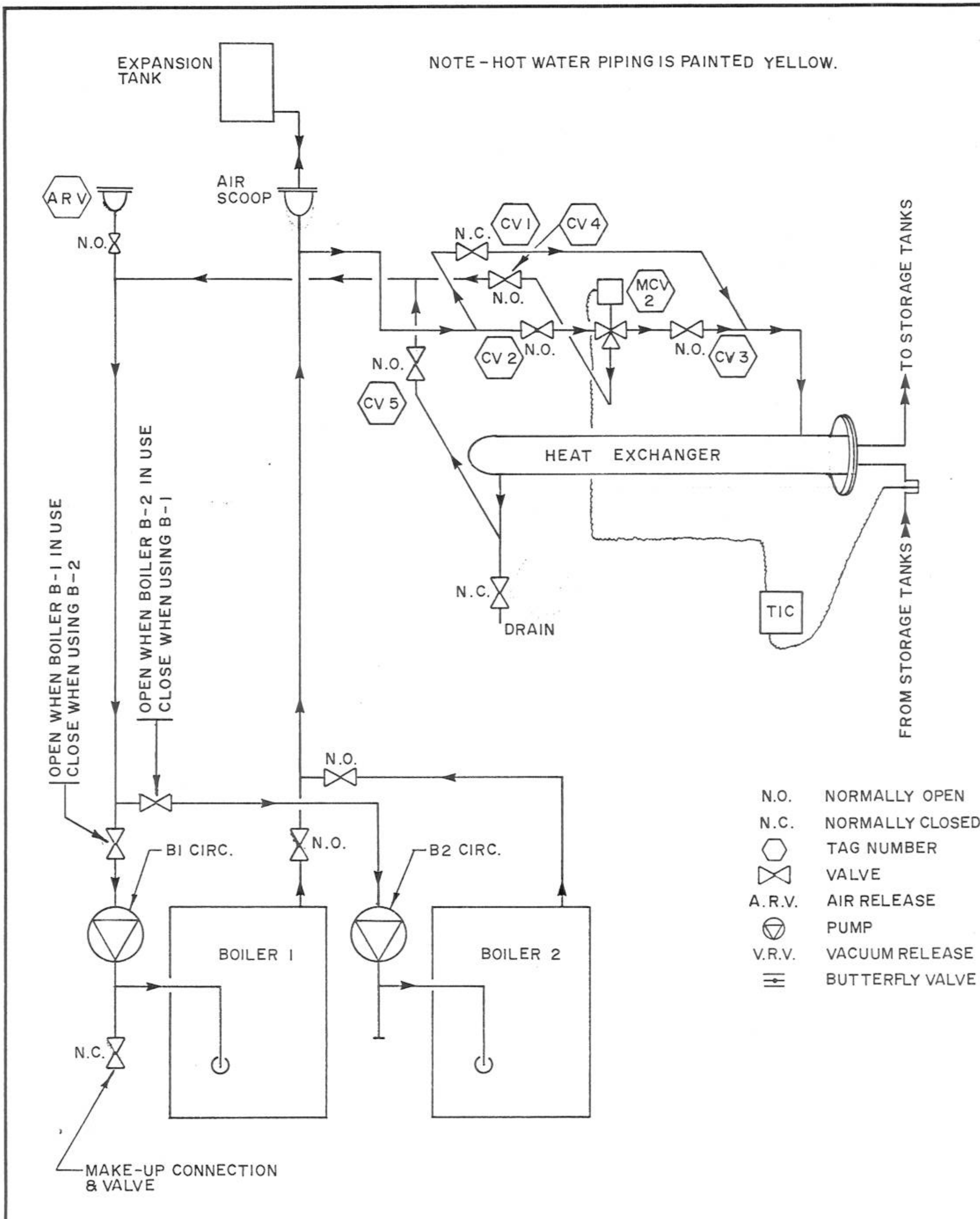
G–501–72

N.O.	NORMALLY OPEN
N.C.	NORMALLY CLOSED
	TAG NUMBER
	VALVE
A.R.V.	AIR RELEASE
	PUMP
V.R.V.	VACUUM RELEASE
	BUTTERFLY VALVE
	CHECK VALVE



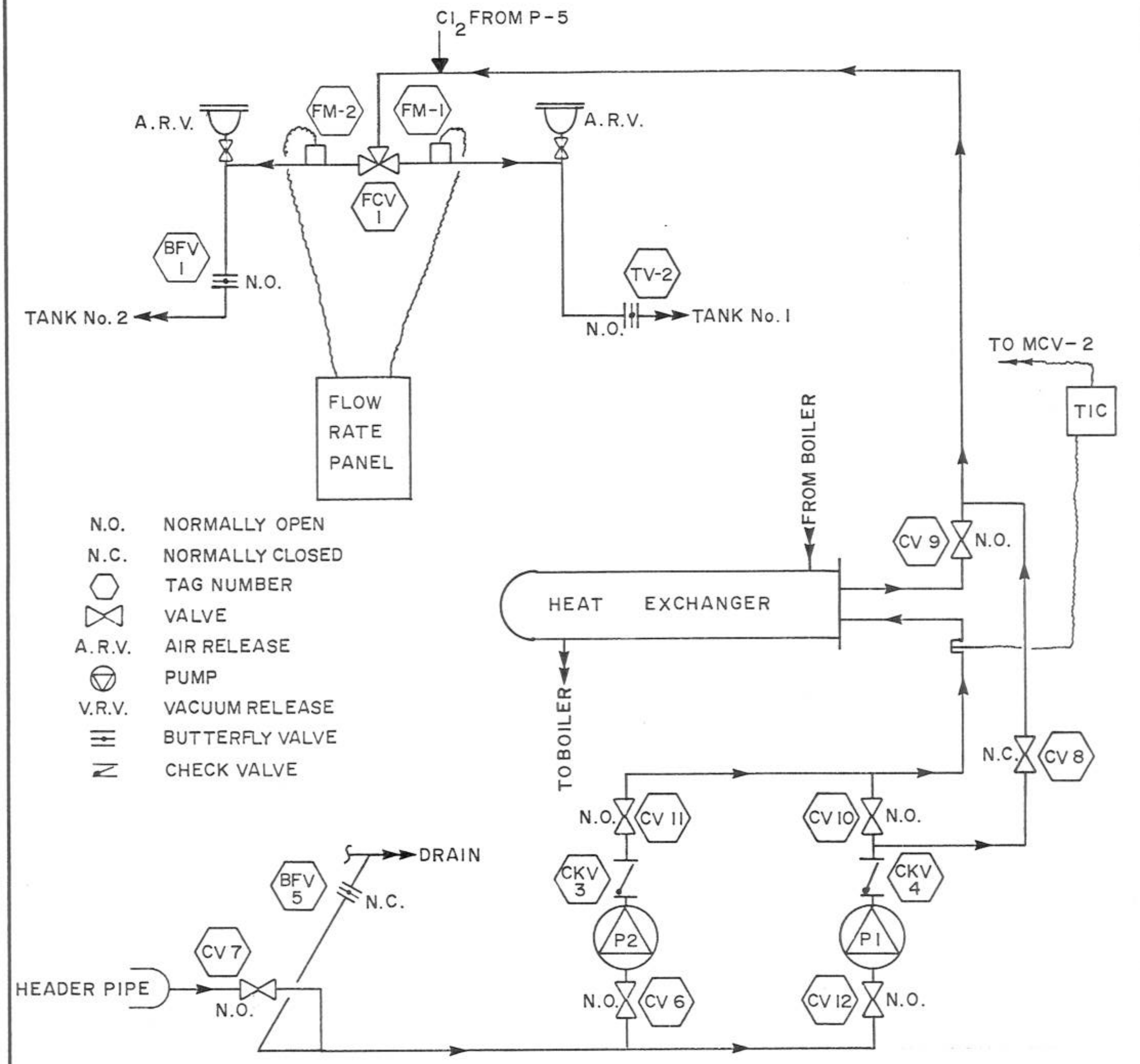
GCG DILLON Consulting Engineers and Planners	TITLE SERVICE PUMPS SCHEMATIC	PROJECT NO. 9893 - 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M — 3

G–501–72



GCG DILLON Consulting Engineers and Planners	TITLE HEATING SYSTEM	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 4

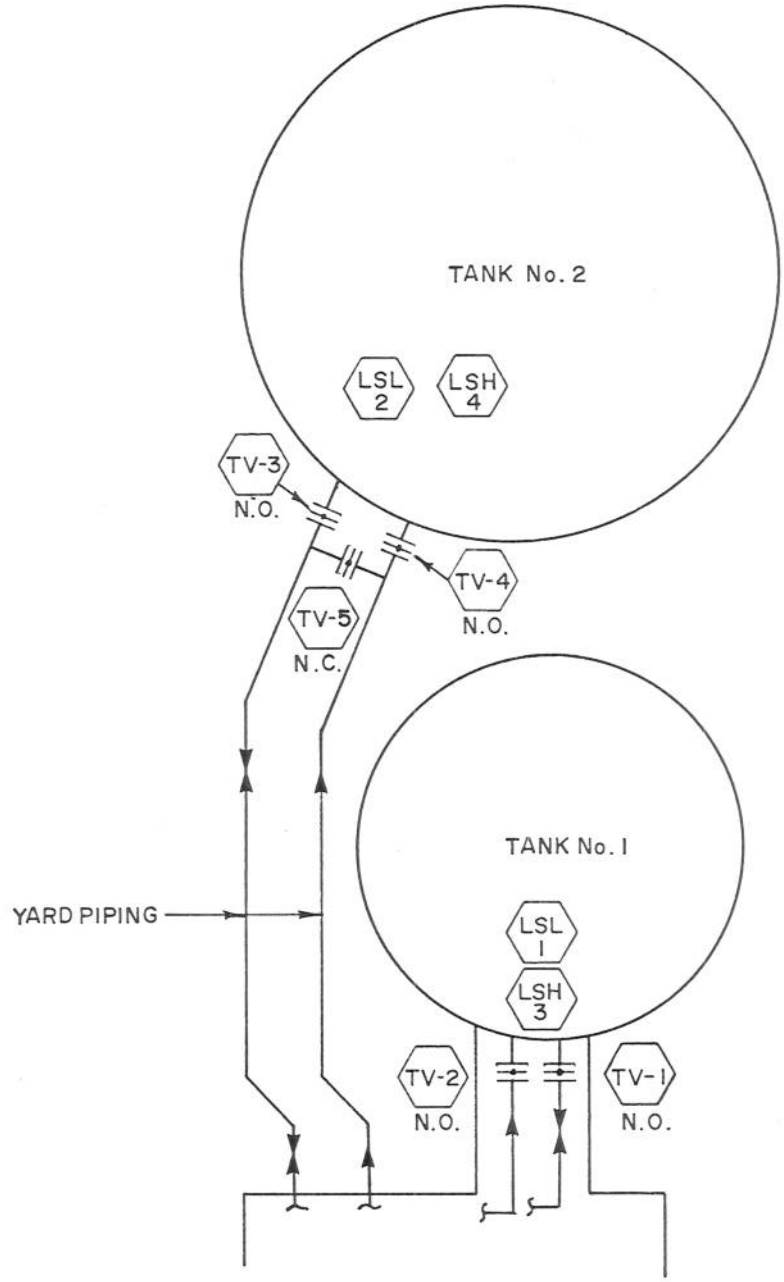
G–501–72



GCG DILLON Consulting Engineers and Planners	TITLE RECIRCULATION SYSTEM	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 5

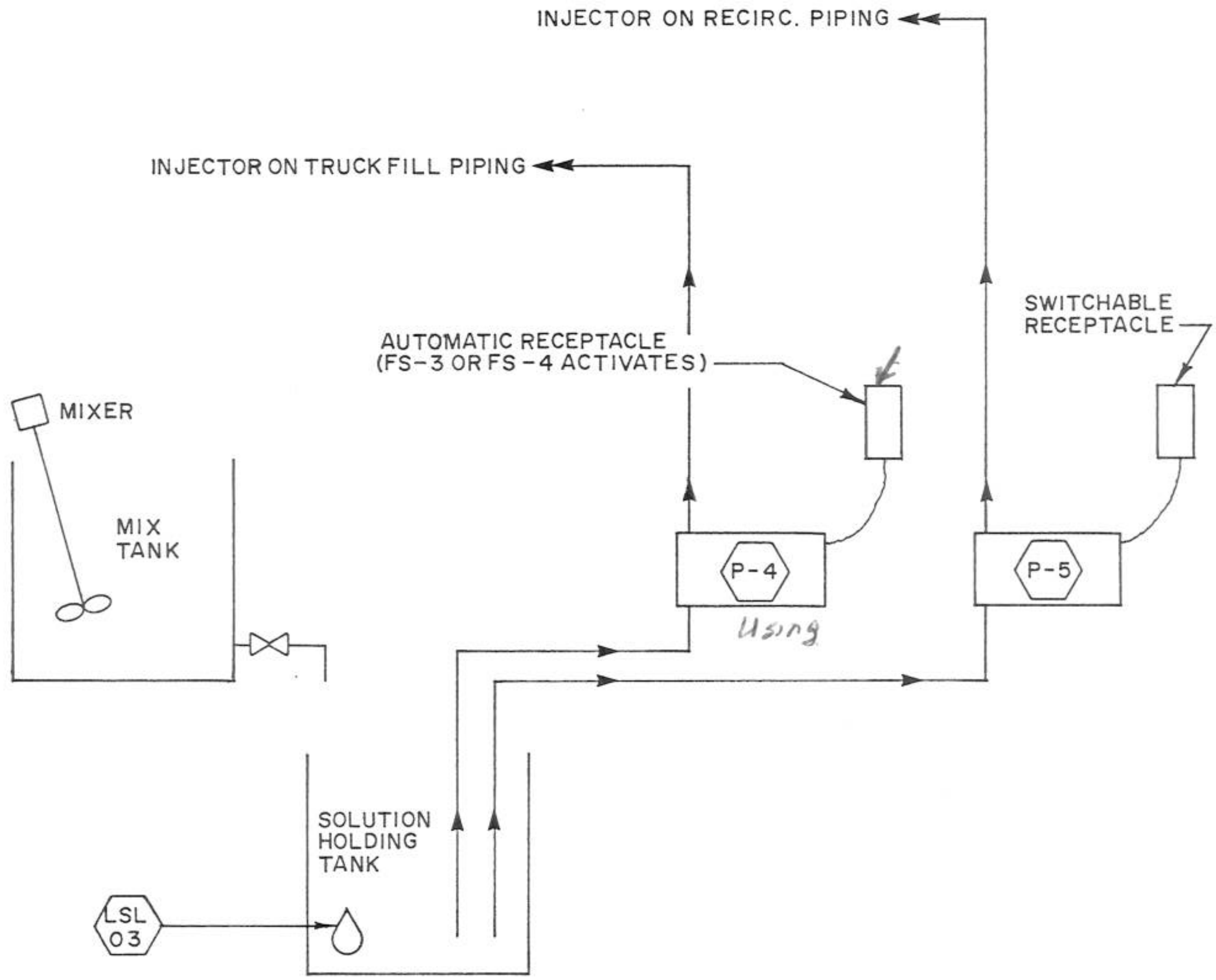
G–501–72

TAG NUMBER
BUTTERFLY VALVE
N.O. NORMALLY OPEN
N.C. NORMALLY CLOSED



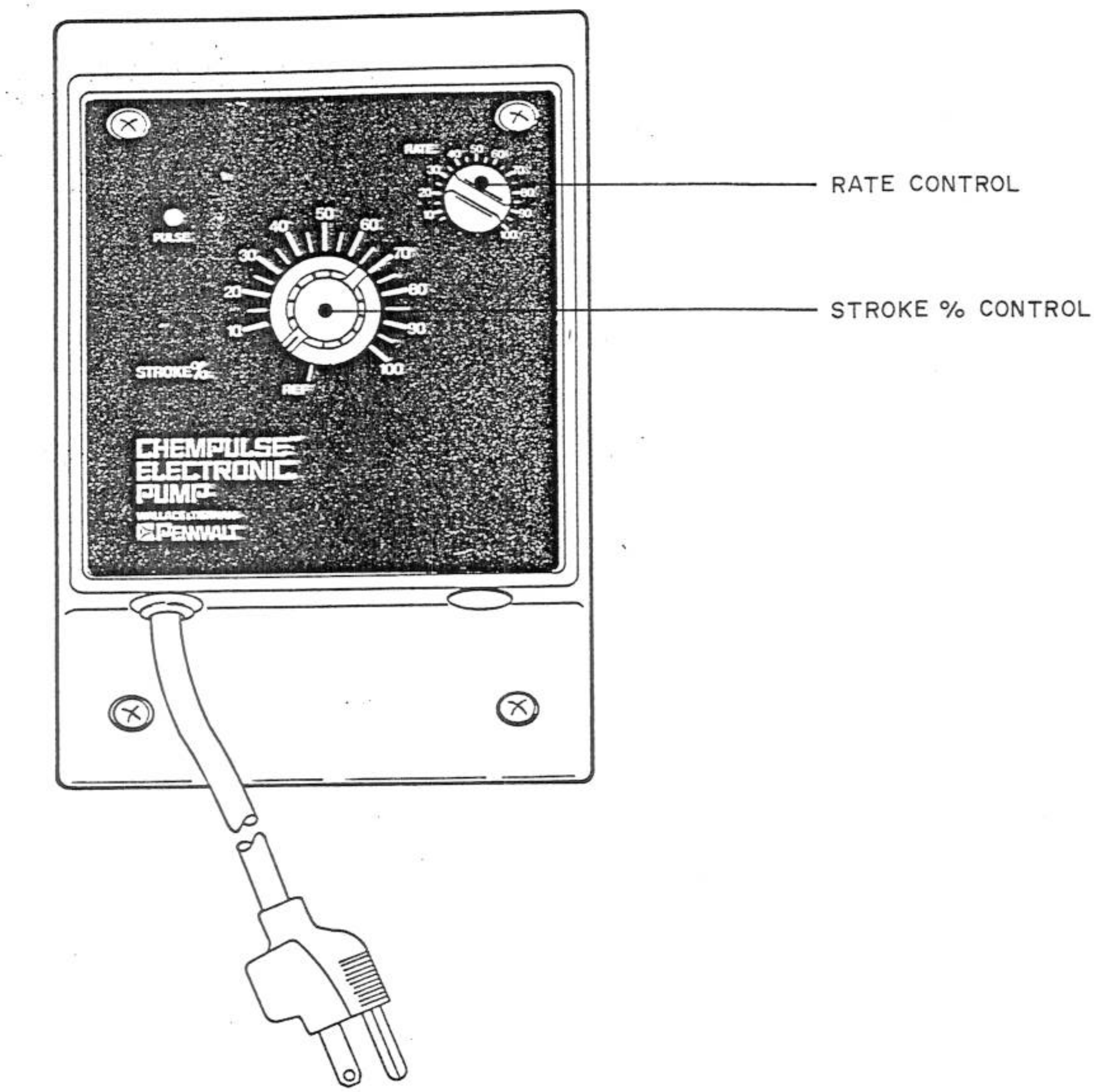
GCG DILLON Consulting Engineers and Planners	TITLE TANK VALVES	PROJECT NO. 9893–05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 6

G–501–72



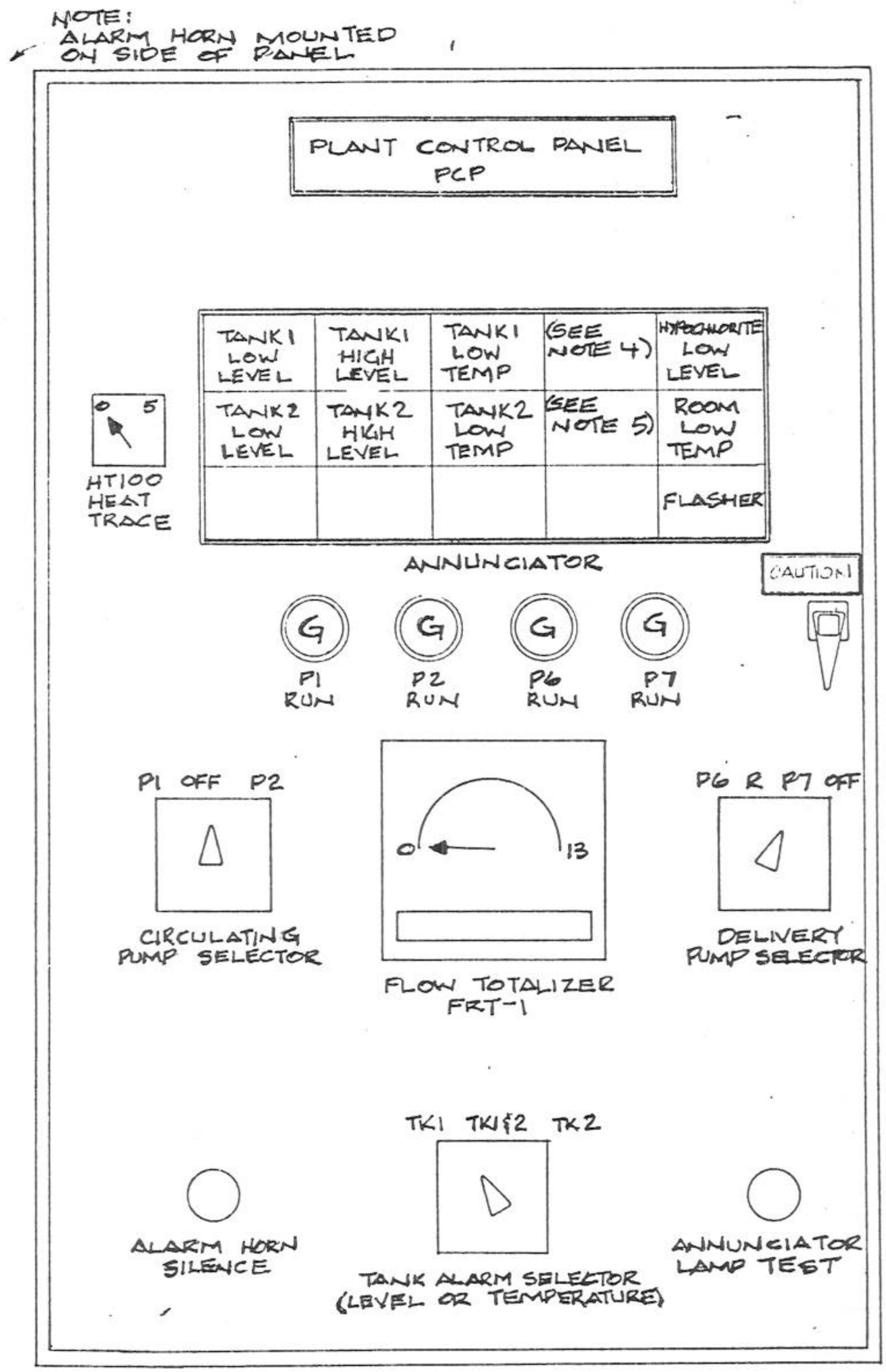
GCG DILLON Consulting Engineers and Planners	TITLE HYPOCHLORINATION SYSTEM	PROJECT NO. 9893-05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M-7

G-501-72



GCG DILLON Consulting Engineers and Planners	TITLE HYPOCHLORINATOR PUMP CONTROLS	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 8

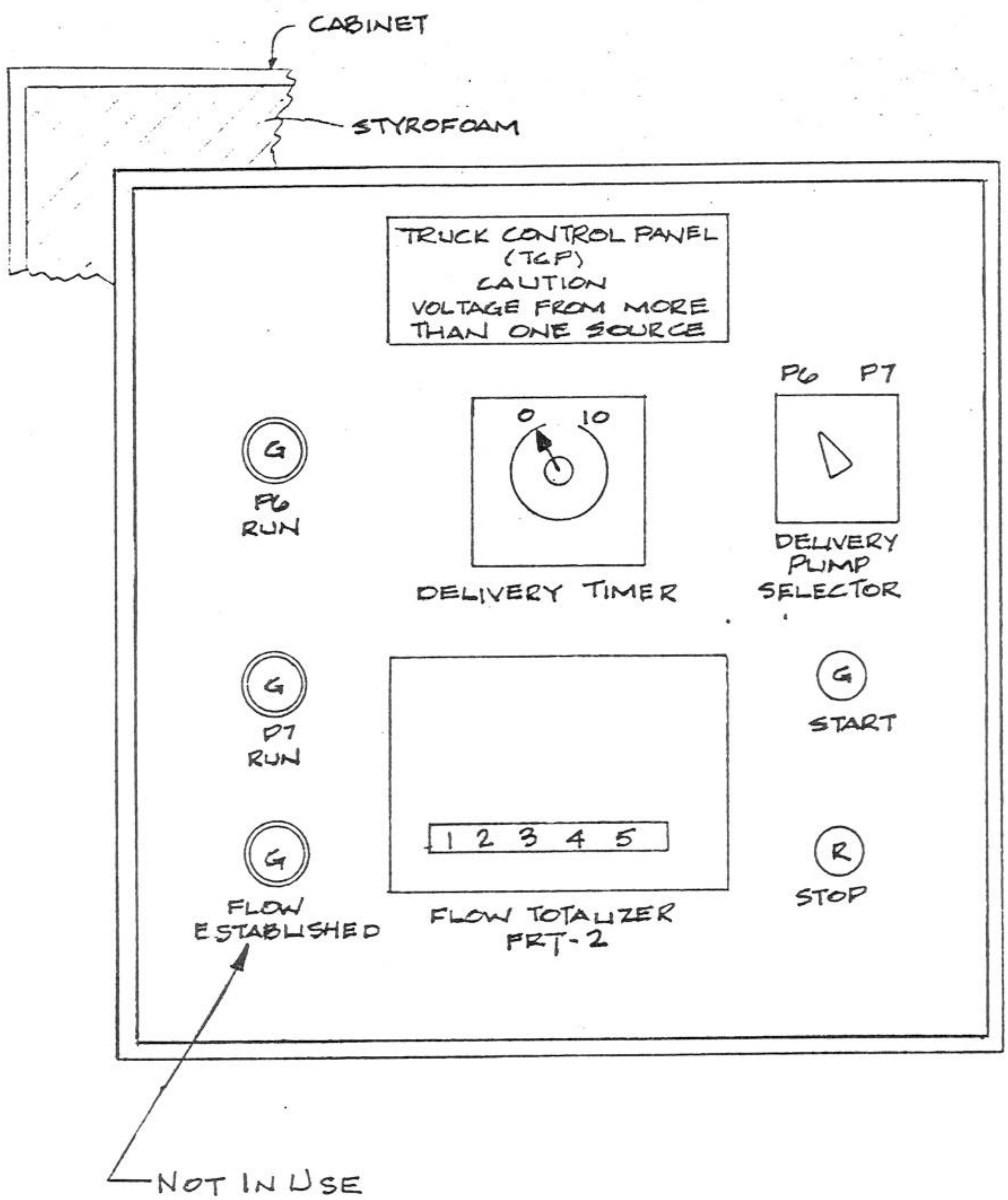
G–501–72



NOTES: 4. "RECIRCULATION LINE LOW FLOW TANK 1"
5 " " " " " TANK 2"

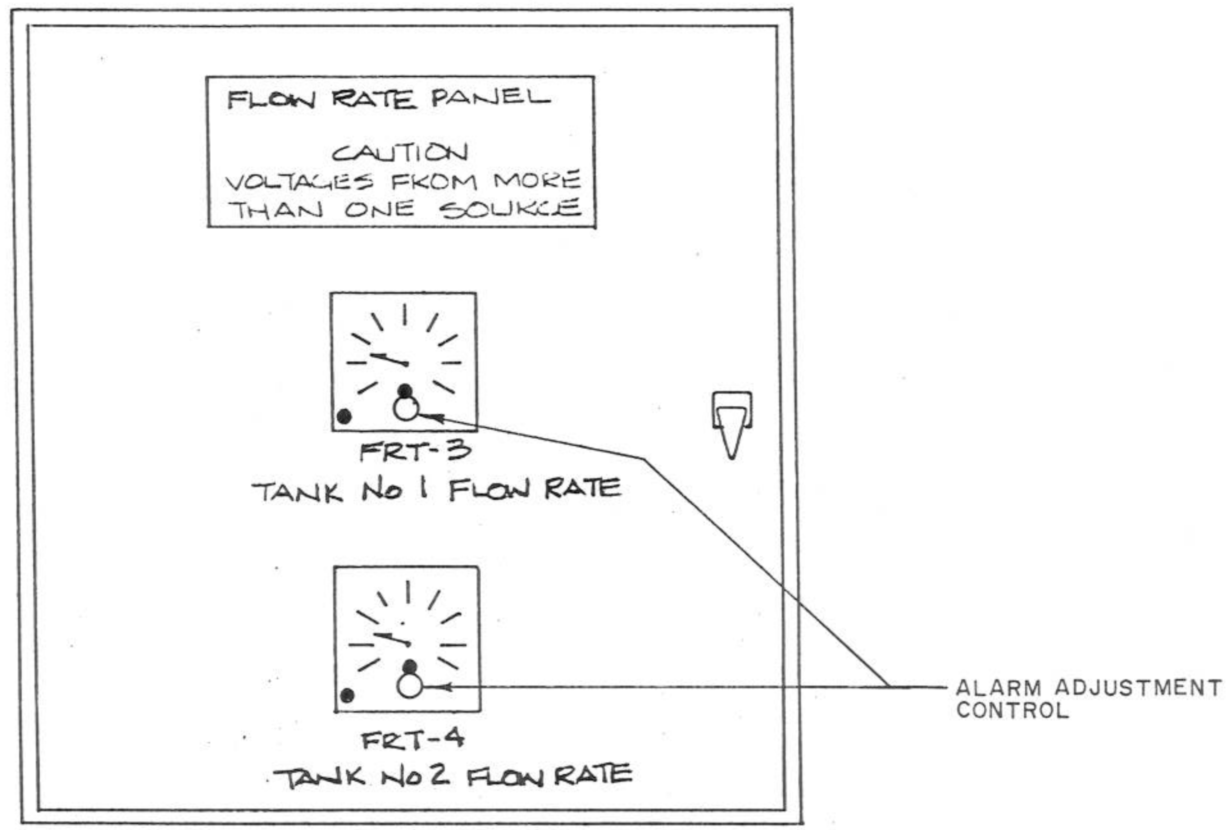
GCG DILLON Consulting Engineers and Planners	TITLE PLANT CONTROL PANEL (P.C.P.)	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 9

G–501–72



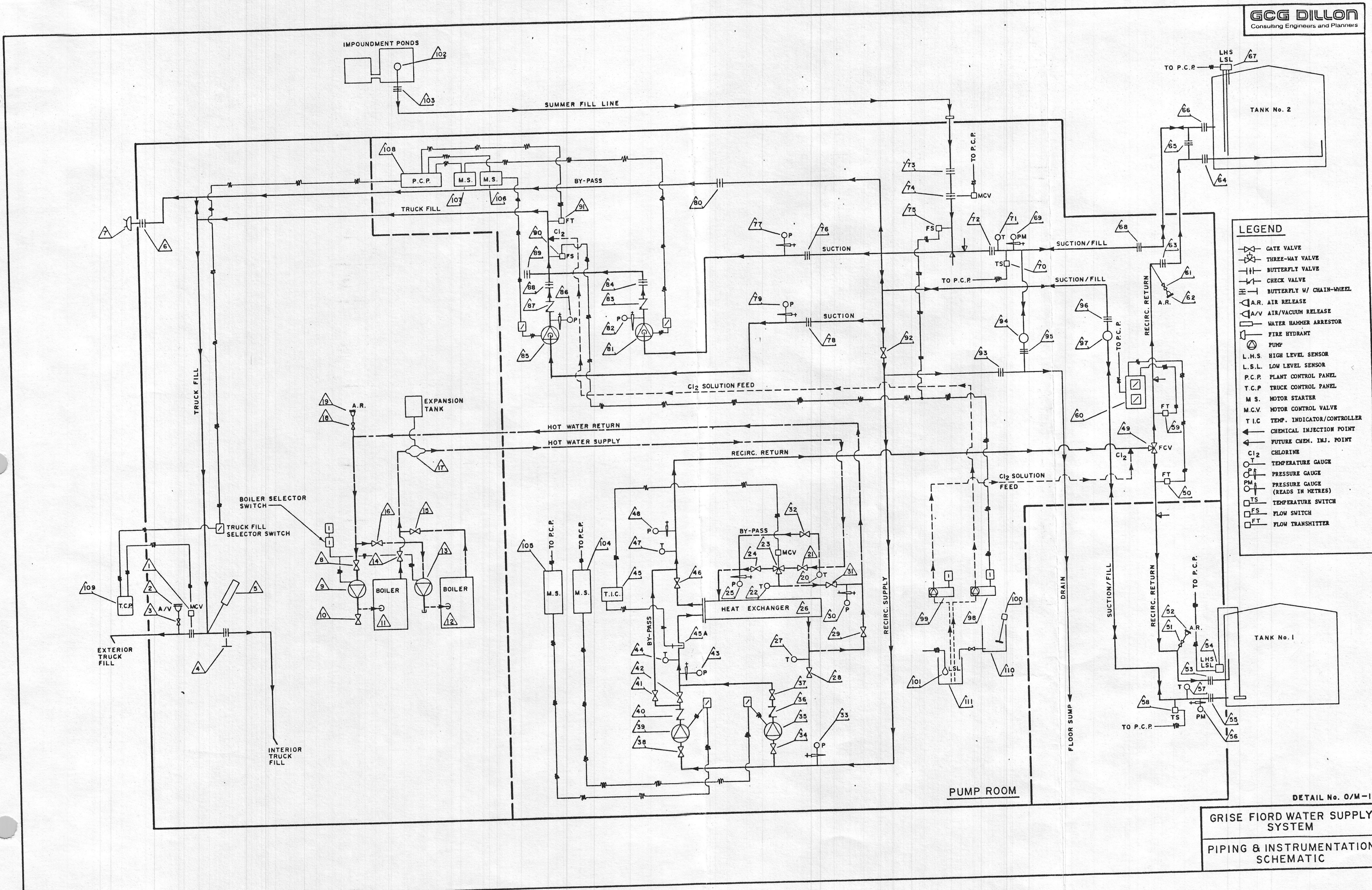
GCG DILLON Consulting Engineers and Planners	TITLE TRUCK CONTROL PANEL (T.C.P.)	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 10

G–501–72



GCG DILLON Consulting Engineers and Planners	TITLE FLOW RATE PANEL (RECIRCULATION SYSTEM)	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – II

G–501–72


GCG DILLON
Consulting Engineers and Planners
IMPOUNDMENT PONDS
SUMMER FILL LINE
TANK No. 2
TANK No. 1
TO P.C.P.
LHS
LSL
BY-PASS
TRUCK FILL
P.C.P.
M.S.
SUCTION
SUCTION/FILL
Cl2 SOLUTION FEED
HOT WATER RETURN
HOT WATER SUPPLY
RECIRC. RETURN
RECIRC. SUPPLY
EXPANSION TANK
A.R.
BOILER SELECTOR SWITCH
TRUCK FILL SELECTOR SWITCH
BOILER
T.C.P.
T.I.C.
HEAT EXCHANGER
MCV
FCV
EXTERIOR TRUCK FILL
INTERIOR TRUCK FILL
DRAIN
FLOOR SUMP
PUMP ROOM
LEGEND
GATE VALVE
THREE-WAY VALVE
BUTTERFLY VALVE
CHECK VALVE
BUTTERFLY W/ CHAIN-WHEEL
A.R. AIR RELEASE
A/V AIR/VACUUM RELEASE
WATER HAMMER ARRESTOR
FIRE HYDRANT
PUMP
L.H.S. HIGH LEVEL SENSOR
L.S.L. LOW LEVEL SENSOR
P.C.P. PLANT CONTROL PANEL
T.C.P. TRUCK CONTROL PANEL
M.S. MOTOR STARTER
M.C.V. MOTOR CONTROL VALVE
T.I.C. TEMP. INDICATOR/CONTROLLER
CHEMICAL INJECTION POINT
FUTURE CHEM. INJ. POINT
Cl2 CHLORINE
T TEMPERATURE GAUGE
P PRESSURE GAUGE
PM PRESSURE GAUGE (READS IN METRES)
TS TEMPERATURE SWITCH
FS FLOW SWITCH
FT FLOW TRANSMITTER
DETAIL No. O/M-12
GRISE FIORD WATER SUPPLY SYSTEM
PIPING & INSTRUMENTATION SCHEMATIC

15-03-88

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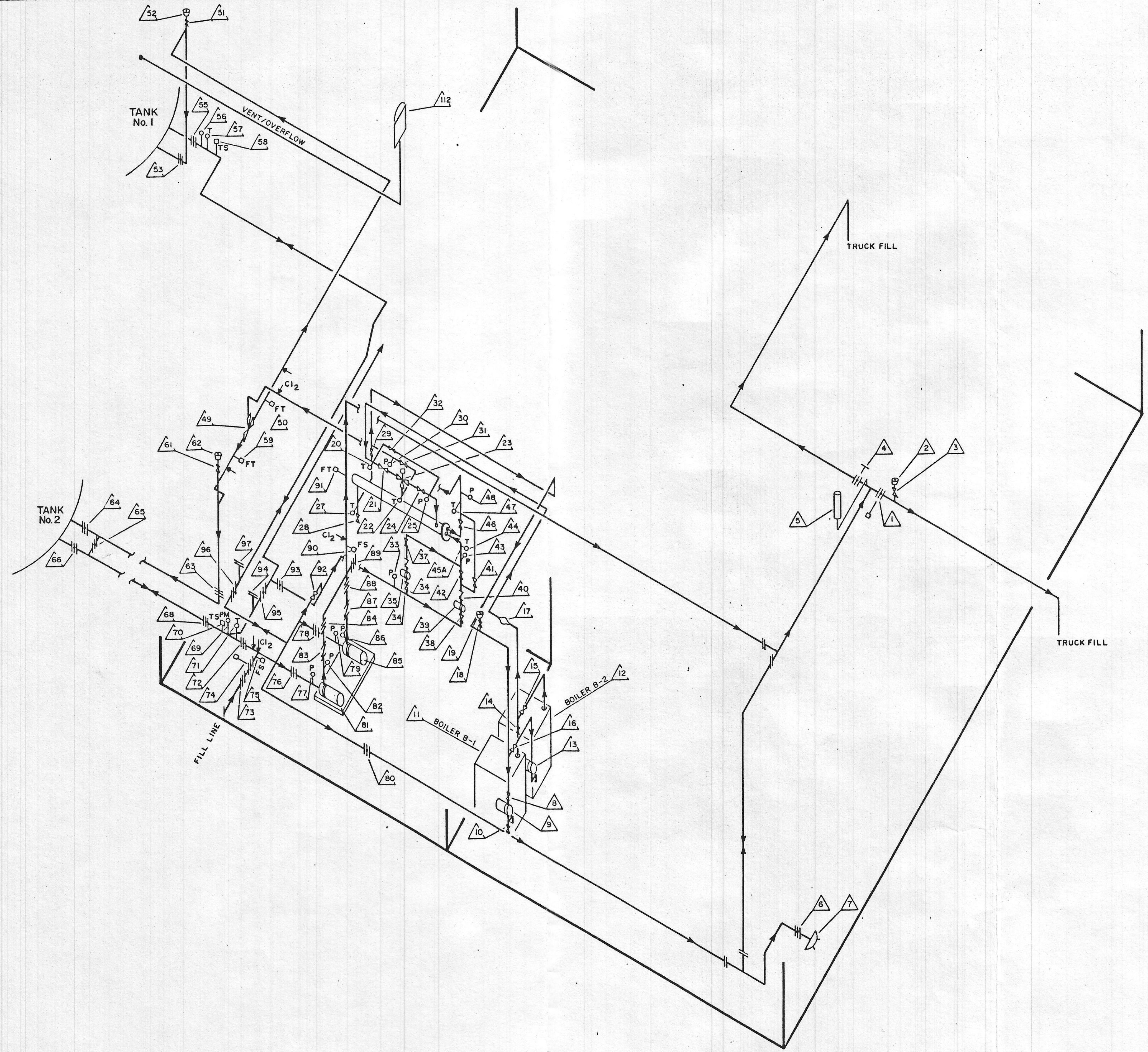


LEGEND

- GATE VALVE
- THREE-WAY VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- BUTTERFLY W/ CHAIN-WHEEL
- A.R. AIR RELEASE
- A/V AIR/VACUUM RELEASE
- WATER HAMMER ARRESTOR
- FIRE HYDRANT
- PUMP
- L.H.S. HIGH LEVEL SENSOR
- L.S.L. LOW LEVEL SENSOR
- P.C.P. PLANT CONTROL PANEL
- T.C.P. TRUCK CONTROL PANEL
- M.S. MOTOR STARTER
- M.C.V. MOTOR CONTROL VALVE
- T.I.C. TEMP. INDICATOR/CONTROLLER
- CHEMICAL INJECTION POINT
- FUTURE CHEM. INJ. POINT
- Cl_2 CHLORINE
- T TEMPERATURE GAUGE
- P PRESSURE GAUGE
- PM PRESSURE GAUGE (READS IN METRES)
- TS TEMPERATURE SWITCH
- FS FLOW SWITCH
- FT FLOW TRANSMITTER

DETAIL No. O/M-13

GRISE FIORD WATER SUPPLY SYSTEM

PIPING ISOMETRIC

CHAPTER 5 - COMPONENT DETAILS

5.1 Component Details

ITEM NO.	TAG NAME/NO.	MANUFACTURER'S DESCRIPTION	BROCHURE NO	SOURCE
74	MCV-1	Valve: Keystone Figure F1020 Butterfly Valve (6") 6F1020CEJ2 Actuator: Raymond Control Systems (RCS) Type AR Electripowr Actuator Model: MAR-90-15-4	10.1	Keystone Valve 3809-98 Street Edmonton, Alberta 463-7251
23 45 & 45A	MCV-2 T.I.C.	Honeywell - Model V5013A mixing valve (2") with threaded ends. C/W - Modutrol M945 actuator - T954 Temperature Indicating Controller - AT72D transformer (115V/24V)	10.2	Existing re-used. Honeywell Controls Ltd.
1	MCV-3	Valve: Keystone Figure F1020 Butterfly Valve (4") 4F1020CEJ2 Actuator: Raymond Control Systems (RCS) Type SR (S.U.R.E. Powr II) Electri-powr Actuator Model: SURE-49-15CCW	10.3	Same as 10.1.
49	FCV-1	Worcester, 3-way diverter ball valve flanged ends 1"D51-4466RT-150-V1	10.4	
39	Pump P-1	S.A. Armstrong Ltd. Type S35 circulating pump rated at 30 USGPM (114 L/Min) @ 9 ft. (2.75 m) TDH Motor: 1/16 H.P., 1750 rpm, 115 V/1 Ø/60 cycle close coupled	10.5	S.A. Armstrong Ltd. 8720A-51 Avenue Edmonton, Alberta 468-1313

5.1 Component Details

ITEM NO.	TAG NAME/NO.	MANUFACTURER'S DESCRIPTION	BROCHURE NO	SOURCE
35	Pump P-2	S.A. Armstrong Ltd. Type S35 circulating pump rated at 30 USGPM (114 L/Min) @ 9 ft. (2.75 m) TDH Motor: 1/16 H.P., 1750 rpm, 115 V/1 Ø/60 cycle close coupled	10.5	S.A. Armstrong Ltd. 8720A-51 Avenue Edmonton, Alberta 468-1313
9	Pump B-1	S.A. Armstrong Ltd. Type S35 circulating pump rated at 30 USGPM (114 L/Min) @ 9 ft. (2.75 m) TDH Motor: 1/16 H.P., 1750 rpm, 115 V/1 Ø/60 cycle close coupled	10.5	S.A. Armstrong Ltd. 8720A-51 Avenue Edmonton, Alberta 468-1313
13	Pump B-2	S.A. Armstrong Ltd. Type S35 circulating pump rated at 30 USGPM (114 L/Min) @ 9 ft. (2.75 m) TDH Motor: 1/16 H.P., 1750 rpm, 115 V/1 Ø/60 cycle close coupled	10.5	S.A. Armstrong Ltd. 8720A-51 Avenue Edmonton, Alberta 468-1313
	Spare	S.A. Armstrong Ltd. Type S35 circulating pump rated at 30 USGPM (114 L/Min) @ 9 ft. (2.75 m) TDH Motor: 1/16 H.P., 1750 rpm, 115 V/1 Ø/60 cycle close coupled	10.5	S.A. Armstrong Ltd. 8720A-51 Avenue Edmonton, Alberta 468-1313
98	Pump P-4	Wallace and Tiernan Model: 45-050 5 GPH @ 100 PSI (690 kPa)	10.6	Wallace & Tiernan 207-14 Street N.W. Calgary, Alberta 283-0593
99	Pump P-5	Wallace and Tieran Model: 45-050 5 GPH @ 100 PSI (690 kPa)	10.6	Wallace & Tiernan 207-14 Street N.W. Calgary, Alberta 283-0593

5.1 Component Details - continued

ITEM NO.	TAG NAME/NO.	MANUFACTURER'S DESCRIPTION	BROCHURE NO	SOURCE
81	Pump P-6	PACO (Pacific Pumping Co.) Model: 3070-7 Type L Rating: 264 USGPM (1000 L/MIN) @ 32 ft. (9.8 m) TDH Motor: 3 H.P., 1750 R.P.M., 240 V/1 Ø/60 cycle Order: 10-30707-730001-1592	10.7	Sego Industries Ltd. 711-30 Street, N. Lethbridge, Alberta 328-1770
85	Pump P-7	PACO (Pacific Pumping Co.) Model: 3070-7 Type L Rating: 264 USGPM (1000 L/MIN) @ 32 ft. (9.8 m) TDH Motor: 3 H.P., 1750 R.P.M., 240 V/1 Ø/60 cycle Order: 10-30707-730001-1592	10.7	Sego Industries Ltd. 711-30 Street, N. Lethbridge, Alberta 328-1770
63 & 93	BFV-1 & BFV-5	Keystone Figure F1020 butterfly valve (2") 2F1020CEJ2 with F401-B lever handle actuator	10.8	Keystone Valve 3809 - 98 Street Edmonton, Alberta 463-7251
4	BFV-2	Keystone Figure F1020 butterfly valve (4") 4F1020CEJ2 with F427-P gear actuator with chain wheel option	10.9	Same as 10.8
96 95 84 88 89	BFV-3 BFV-4 BFV-12 BFV-13 BFV-14	Keystone Figure F1020 butterfly valve (4") 4F1020CEJ2 with F401-C lever handle actuator	10.10	Same as 10.8
73 76 78 68 72 6 80	BFV-6 BFV-7 BFV-8 BFV-9 BFV-10 BFV-11 BFV-15	Keystone Figure F1020 butterfly valve (6") 6F1020CEJ2 with F401-D lever handle actuator	10.11	Same as 10.8

5.1 Component Details - continued

ITEM NO.	TAG NAME/NO.	MANUFACTURER'S DESCRIPTION	BROCHURE NO	SOURCE
87 83	CKV-1 CKV-2	Apco Series 300 Wafer Style Silent Check Valve Model 304 (4")	10.12	J.F. Comer Inc. 1875 Leslie St. Don Mills, Ontario 416-888-1164
40 36	CKV-3 CKV-4	Apco Series 300 Wafer Style Silent Check Valve Model 302 (2")	10.13	J.F. Comer Inc. 1875 Leslie St. Don Mills, Ontario 416-888-1164
32 21 24 31 29 34 92 41 46 42 37 38 8 14 15 16	CV-1 CV-2 CV-3 CV-4 CV-5 CV-6 CV-7 CV-8 CV-9 CV-10 CV-11 CV-12 Return Supply Supply Return	Crane bronze gate valves No. 428UB, threaded ends (2" size)	10.14	Crane Supply 11926 Kingsway Avenue Edmonton, Alberta 453-1521
3,10, 18,51, 61		Crane bronze gate valve No. 428UB, threaded ends (3/4" size)	10.14	
11	B-1 (Boiler)	Weil McLain, 238,000 BTU/hr. output, 82% efficiency, cast sectional, oil fired unit Model P-766HEA	10.15	
12	B-2 (Boiler)	Weil McLain, 208,200 BTU/hr. output, 82% efficiency, cast sectional, oil fired unit Model P-666HEA	10.15	

5.1 Component Details - continued

ITEM NO.	TAG NAME/NO.	MANUFACTURER'S DESCRIPTION	BROCHURE NO	SOURCE
	GBV-1 and GBV-2	Crane bronze globe valves No. 1310 with No. 12 composition disc, solder ends	10.16	Crane Supply 11926 Kingsway Ave. Edmonton, Alberta 453-1521
58 70	TS-1 & TS-2 (Temperature Switch)	United Electric Controls Company, Type B300, Model 103, with 3/4" bottom connection and separable well	10.17	Barber Engineering 8803 - 58 Avenue Edmonton, Alberta 468-6950
50 59	FM-1 FM-2 (Flow Sensor)	Signet Scientific, Model MK515, Paddlewheel Flosensor for 1" piping	10.18	Brian Engineering 9529 - 48 Street Edmonton, Alberta 468-2123
91	FT-1 (Flow Sensor)	Signet Scientific, Model MK515, Paddlewheel Flosenor for 4" piping	10.18	Brian Engineering 9529 - 48 Street Edmonton, Alberta 468-2123
75 90	FS-3 & FS-4 (Flow Switch)	McDonnell & Miller, Model No. FS4-3-D, Flow Switch. Brass/model paddle type, 115V/1 Ø/60 cycle, 7.4 amp.	10.19	Electrical Industries Western Ltd. 10136 - 111 Street Edmonton, Alberta 426-0865
25,30, 33,43, 48,77, 79,82, & 86	P Pressure Gauge	Marsh, J9446 0-400 kPa, 4 1/2 dial, 1/4" bottom connection. c/w Marsh No. N1532 needle valve	10.20	Marsh Instrument Canada 4133 - 98 Street Edmonton, Alberta 463-7055
56 59	PM Pressure Gauge	NOTE: gauge as above except to read 0-21 metres for tank level applications		Same as 10.20

5.1 Component Details - continued

ITEM NO.	TAG NAME/NO.	MANUFACTURER'S DESCRIPTION	BROCHURE NO	SOURCE
     20,22, 27,44, & 47 57,71	T Temper- ature Gauges	Marsh bimetallic, 4" stem, 1/2" NPT back connection c/w separable 1/2" x 3/4" stainless steel wells (Marsh No. 9-34695A-4) Process Gauge: -5°C to 50°C : 3" dial : Marsh No. L3145 Others : 0° to 120°C : 5" dial : Marsh No. L5160	10.21	Same as 10.20.
54	LSL-1 LSH-3 (Low and High Level Switch)	Varec, Figure No. 2557-BD, 4 switch programmer (Installed on existing Varec Automatic Tank Gauge on Tank No. 1)	10.22	Westec Industries Ltd. 134 Forge Road S.E. Calgary, Alberta 252-8803
67	LSL-2 LSH-4 (Low and High Level Switch Tank No. 2)	Warrick Controls, 2DIFØ-2Z1E, 3F3C in common NEMA 4 housing with Series 3W2 electrodes, and type 3Z1A suspension wires with 3Z1B adaptors	10.23	Davis Controls Ltd. 9814 - 44 Avenue Edmonton, Alberta 436-9836
101	LSL-3 (Low Level Switch)	Flyght Model No. ENP-10 (Existing re-used)	10.24	Flyght Canada Ltd.
5	Water Hammer Arrestor (WHA)	Zurn Industries, "Accumutrol" 4000, 2" A.I.P.S.	10.25	
2	VRV (A/V)	Val-Matic Model No. 101 cast iron body with stainless steel float and trim (1" inlet size) combination air and vacuum release valve	10.26	

5.1 Component Details - continued

ITEM NO.	NAME/NO.	MANUFACTURER'S DESCRIPTION	BROCHURE NO.	SOURCE
19,52, & 62	ARV (A/R) (Air Release Valves)	Val-Matic Model No. 15 cast iron body with stainless steel float and trim (3/4" size)	10.27	
26	Heat Exchanger	S.A. Armstrong Ltd. Model No. WF64-2, 140,000 BTU/hr. output	10.28	Same as 10.5
	Transfer Switch	Westinghouse Type LRO Robonic II Automatic Transfer Switch - wall mount - 100 ampere, 120/240 volt, 1 Ø	10.29	Wesco 14760 - 116 Avenue Edmonton, Alberta 452-7920
	Battery Charger	Mechron Model CRIF 120-012-010B - 120 v/1 Ø/6HZ - 12 volt D.C. output	10.30	Accubuild Industries 12924 - 146 Street Edmonton, Alberta 455-5540
	Truck Fill Hose	Epton Epflex H 4000 Arctic	10.31	Continental Petroleum Rubber Co. 9725 - 62 Avenue Edmonton, Alberta 437-1260
7	Fire Hydrant	Elkart No. 153, twin outlets with caps & chains 6" x 2 1/2" x 2 1/2" w/5 T.P.I.	10.32	Crane Supply 11926 Kingsway Ave. Edmonton, Alberta 453-1521
	Heat Tracing	Raychem BTV Chemelex Auto-Trace - 5 BTV (5 watts/ft) - 10 BTV (10 watts/ft)	10.33	Cantech Controls 10604 - 105 Avenue Edmonton, Alberta 425-9810
	Exterior T.C.P. Yard Light	Philips Model SOX-PAX - low pressure sodium lamp SOX-35W - Tork photocontrol Model 2101	10.34	BRE Electric Ltd. 5213 - 63 Street Lloydminster, Alberta 875-0121

5.1 Component Details - continued

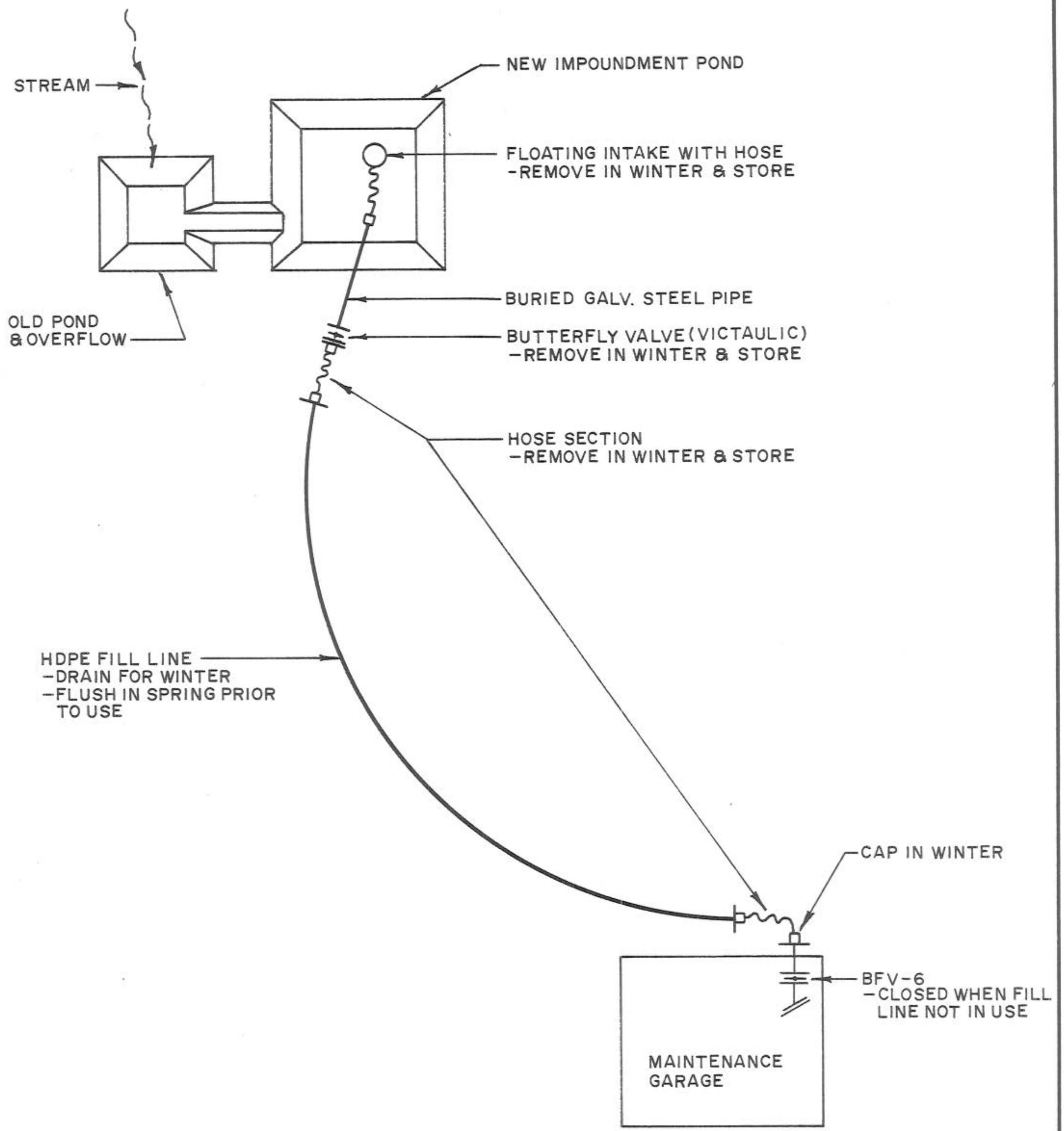
ITEM NO.	TAG NAME/NO.	MANUFACTURER'S DESCRIPTION	BROCHURE NO	SOURCE
108	Flow Rate Totalizer (P.C.P.) - FRT-1	Signet Scientific Model MK-575 Accum-U-Flo - 7-digit non-resettable counter - 0 to 1800 LPM scale	10.35	Brian Engineering 9529 - 63 Street Edmonton, Alberta 468-2123
109	Flow Rate Totalizer (T.C.P.) - FRT-2	Signet Scientific Model No. 579R Accumulator - 5 digit resettable counter	10.36	Same as 10.35
60	Flow Rate Totalizer FRT-3, FRT-4	Signet Scientific Model MK585 Flow Alarm	10.37	Same as 10.35
66	TV-3 Valve (Tank No. 2)	DeZurik Figure 632 - 6" butterfly - nut actuator - 0600, Fig. 632, L, D, RS66, 3, KBG3N	10.38	Emco Supply 801 Century Street Winnipeg, Manitoba
64 65	TV-4 TV-5 Valves (Tank No. 2)	DeZurik Figure 632 - 2" butterfly - TV-4 nut actuator; TV-5 lever actuator	10.39	Same as 10.38
	Valve Tank No. 2 Ball Valve	Ford Model B11-444 - 1" ball valve	10.40	
	Alarm Horn	Edwards Adaptahorn - vibrating flush mount horn - Model 870-NS	10.41	Nedco 5218 - 62 Avenue Lloydminster, Alberta 875-1335
	Low Room Tem-perature Thermostat	Honeywell - T60518 Explosion proof heavy duty thermostat	10.42	Same as 10.41

5.1 Component Details - continued

ITEM NO.	TAG NAME/NO.	MANUFACTURER'S DESCRIPTION	BROCHURE NO	SOURCE
	T.C.P. Strip Heaters & Thermostat TSH-1	Chromalox - thermostat: 12 amp #080235 - heaters: 8" long 120 V, 150 W #OT-815	10.43	Same as 10.41.
	Annunci-ators (P.C.P.)	Panalarm Series 10 Model 11 c/w 1 - Model 1035 Cabinet 10 - Model ACS - 8 relays 120 V/60 Hz 10 - Model BCS-M55 light boxes 15 - M56-W covers 1 - Model ACSF-1 flasher 120 V/60 Hz	10.44	Sioc Ltd. c/o Barber Engineering 8803 - 58 Avenue Edmonton, Alberta 468-6950
	HT-100 Ammeter	Wilbac Panel Meters - 0-5 A.C. amperes range - 3 1/2" width - Cat. N. 18480	10.45	Cardinal Electronics Box 1200 Edmonton, Alberta 1-800-661-9328
112		Shand & Wurs Model 94020 (6") breather valve with open vent	10.49	Lytle Specialities Ltd. 8405 Wagner Road Edmonton, Alberta
100	Mixer	Wallace & Tiernan No. U-23139 & U-21751 1/20 HP (37 W) Light Duty, 120V	10.50	Perma Engineering Sales Ltd. Winnipeg, Manitoba

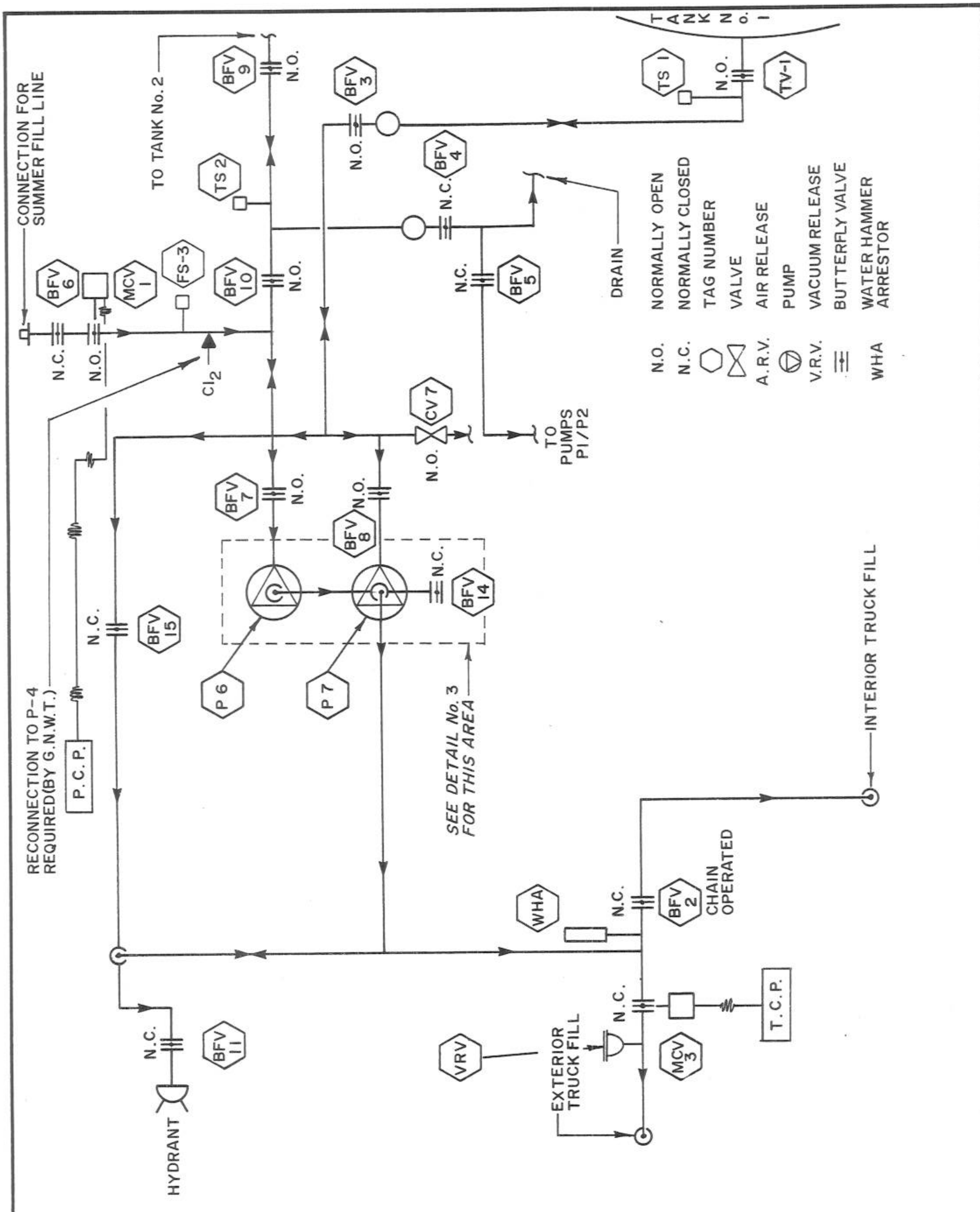
5.2 System Schematics

O/M-1	Summer Fill Line
O/M-2	Water Supply Pumping System
O/M-3	Service Pumps Schematic
O/M-4	Heating System
O/M-5	Recirculation System
O/M-6	Tank Valves
O/M-7	Hypochlorination System
O/M-8	Hypochlorinator Pump Controls
O/M-9	Plant Control Panel
O/M-10	Truck Control Panel
O/M-11	Flow Rate Panel
O/M-12	Piping and Instrumentation Schematic
O/M-13	Piping Isometric



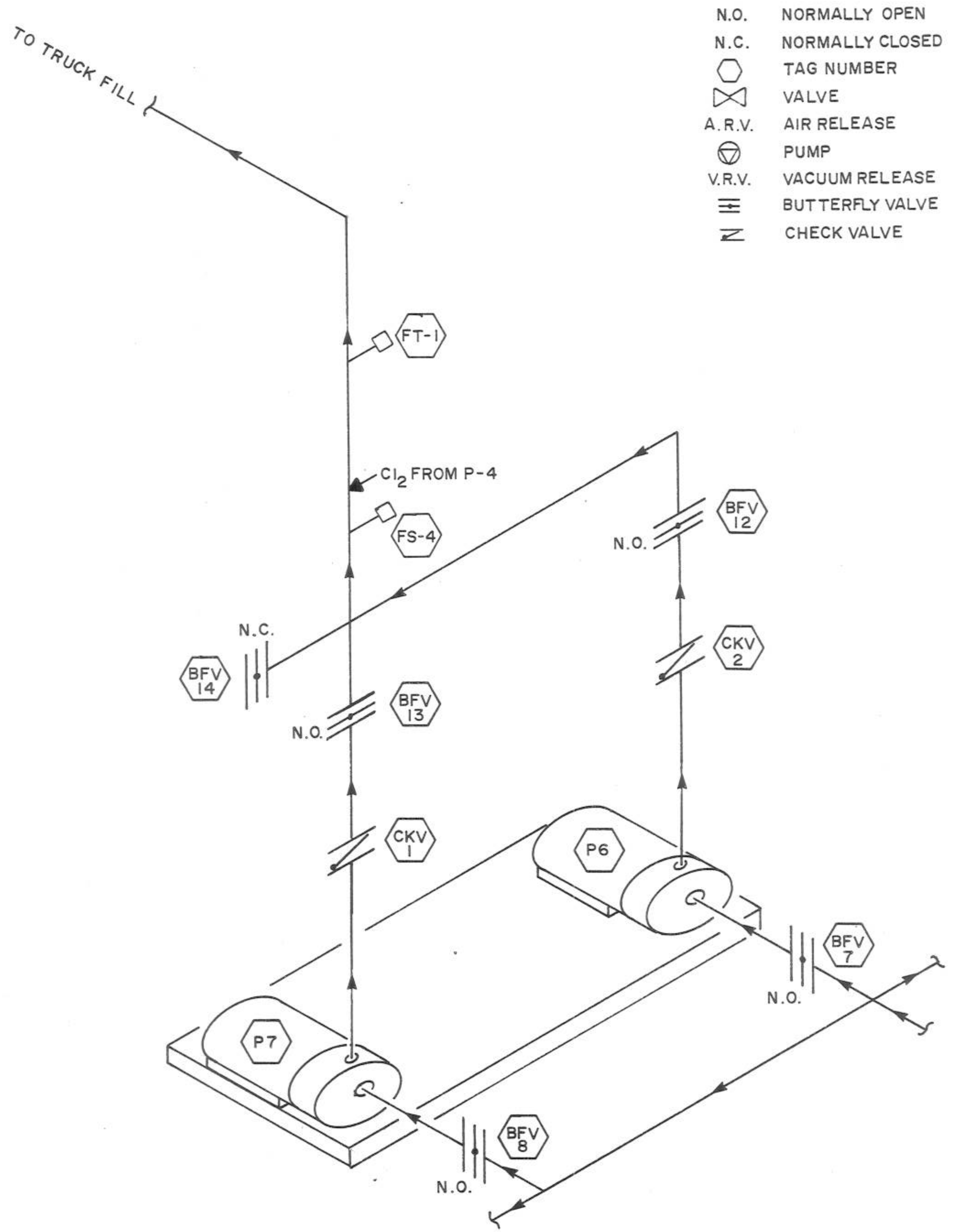
GCG DILLON Consulting Engineers and Planners	TITLE IMPOUNDMENT POND & FILL LINE	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – I

G–501–72



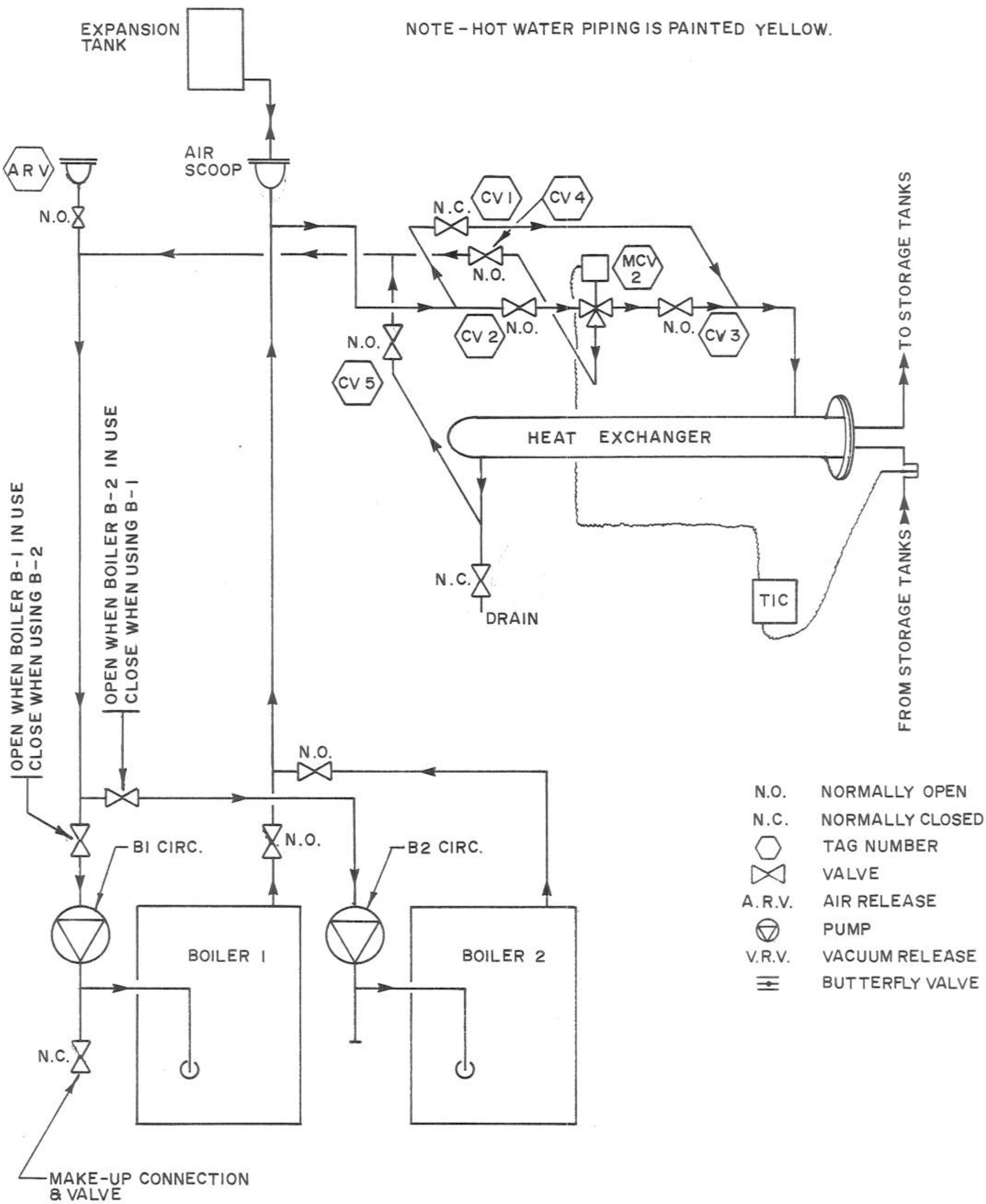
GCG DILLON Consulting Engineers and Planners	TITLE WATER SUPPLY PUMPING SYSTEM	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 2

G–501–72



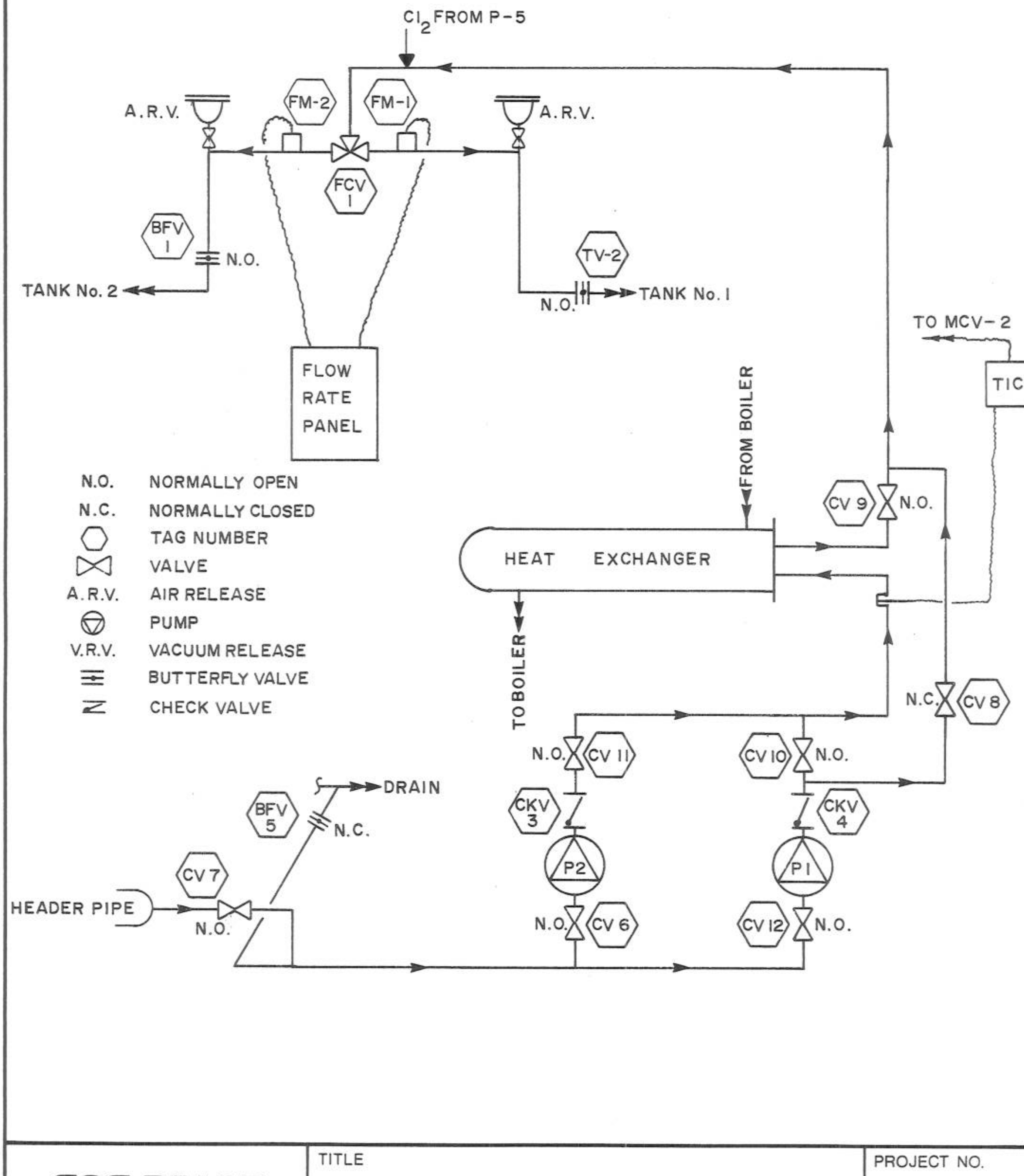
GCG DILLON Consulting Engineers and Planners	TITLE SERVICE PUMPS SCHEMATIC	PROJECT NO. 9893 - 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M — 3

G—501—72



GCG DILLON Consulting Engineers and Planners	TITLE HEATING SYSTEM	PROJECT NO. 9893 — 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M — 4

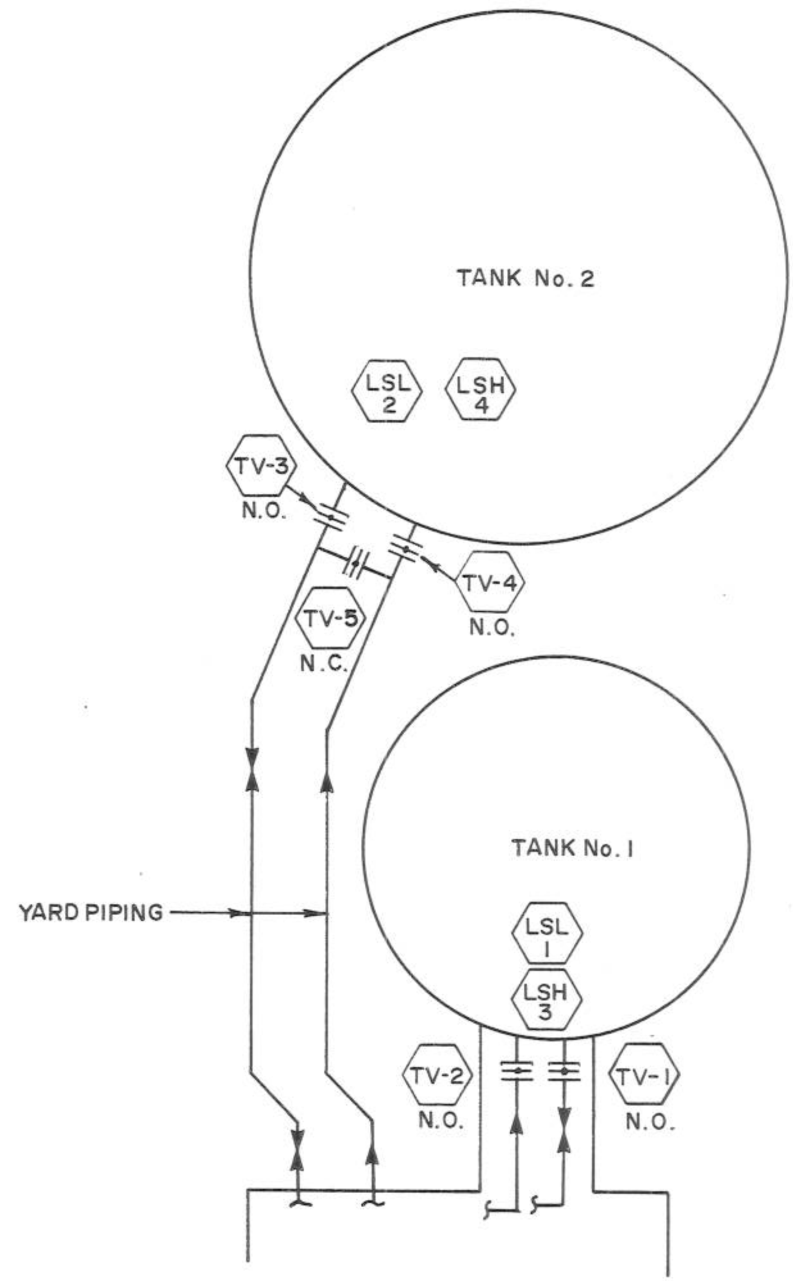
G—501—72



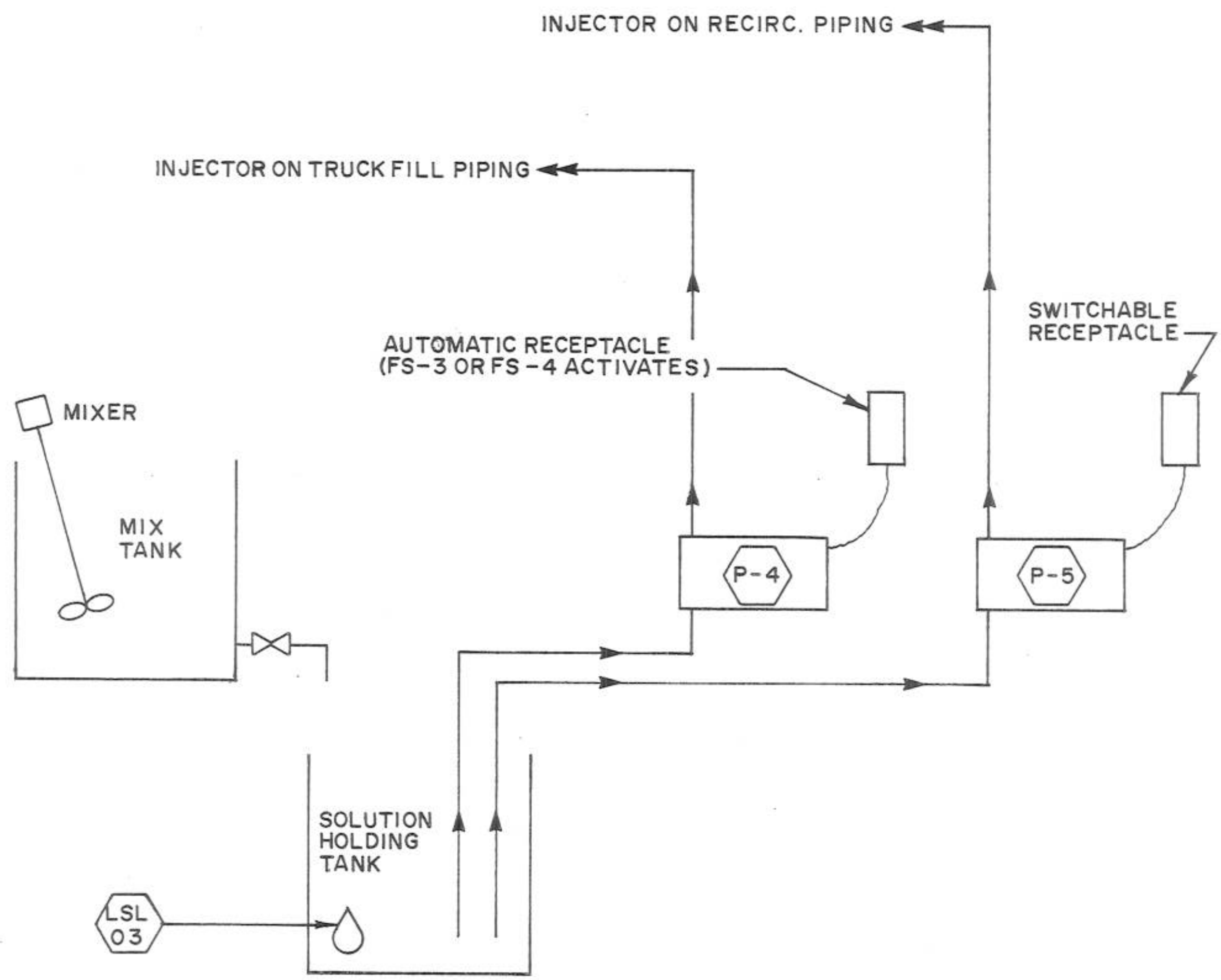
GCG DILLON Consulting Engineers and Planners	TITLE: RECIRCULATION SYSTEM	PROJECT NO. 9893-05
DATE JAN. 1988	PROJECT: GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M-5

G-501-72

TAG NUMBER
BUTTERFLY VALVE
N.O. NORMALLY OPEN
N.C. NORMALLY CLOSED

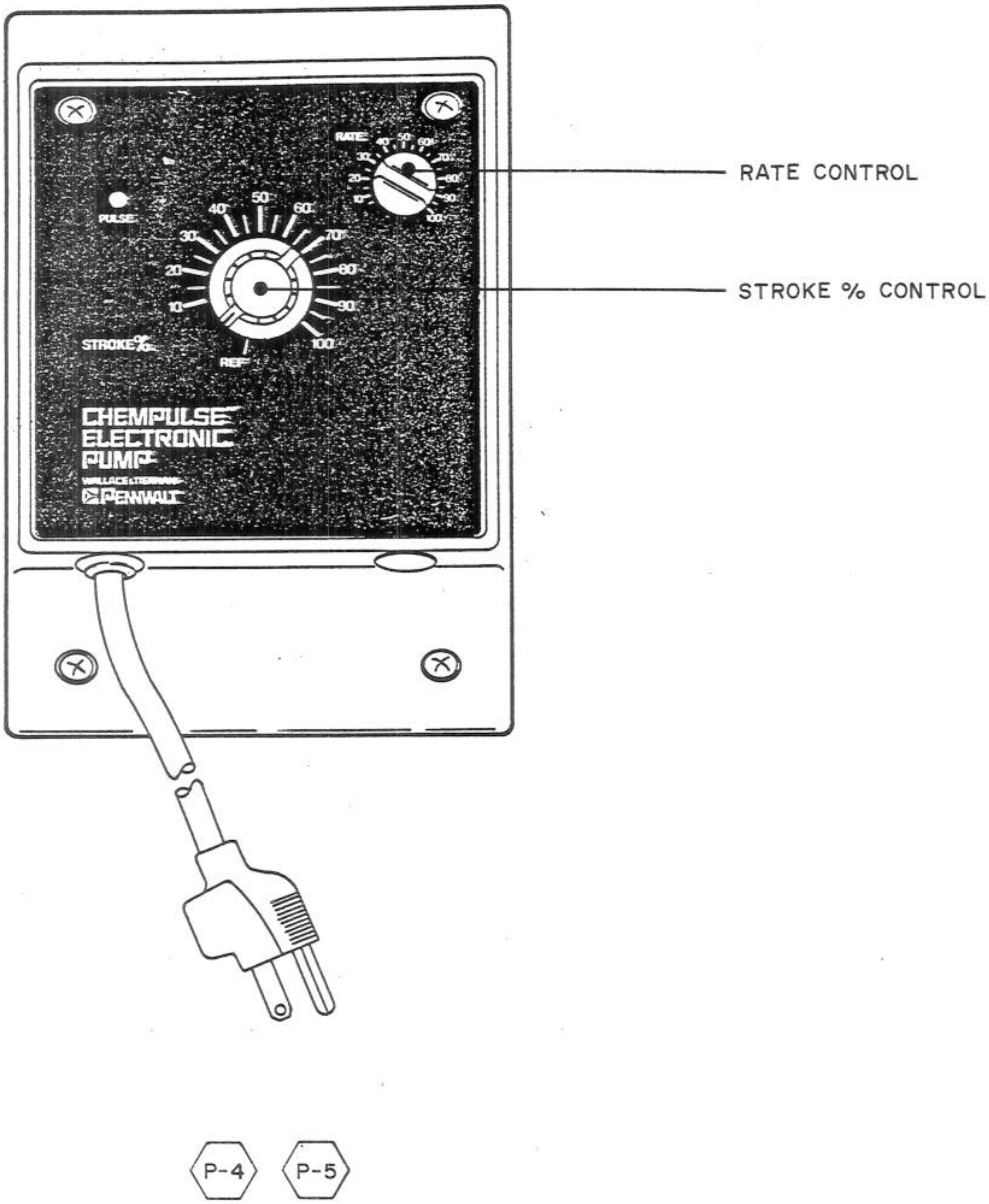


GCG DILLON Consulting Engineers and Planners	TITLE TANK VALVES	PROJECT NO. 9893–05
	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 6
DATE JAN. 1988		



GCG DILLON Consulting Engineers and Planners	TITLE HYPOCHLORINATION SYSTEM	PROJECT NO. 9893-05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M-7

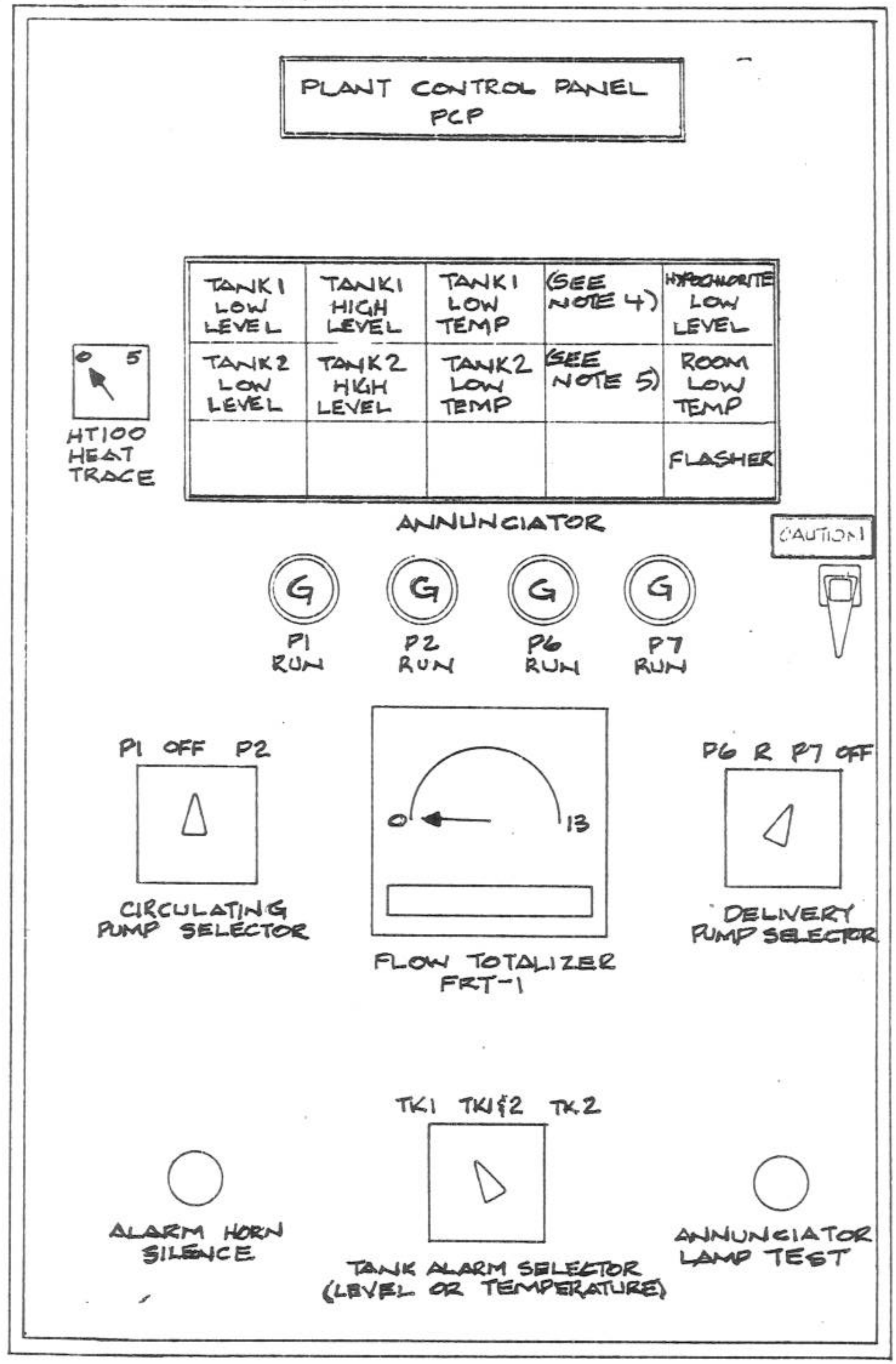
G-501-72



GCG DILLON Consulting Engineers and Planners	TITLE HYPOCHLORINATOR PUMP CONTROLS	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 8

G–501–72

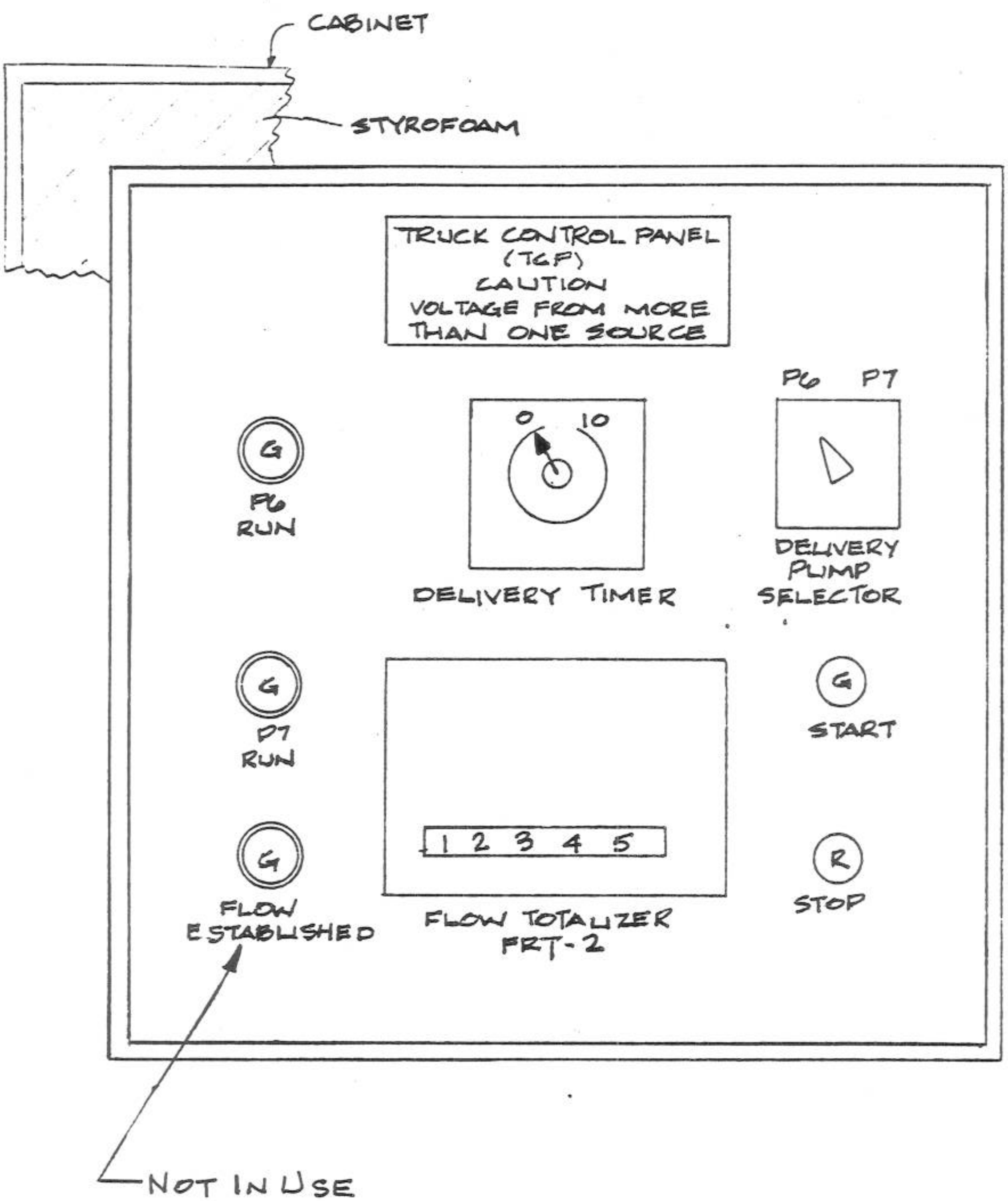
NOTE:
ALARM HORN MOUNTED
ON SIDE OF PANEL



NOTES: 4. "RECIRCULATION LINE LOW FLOW TANK 1"
5 " " " " " TANK 2"

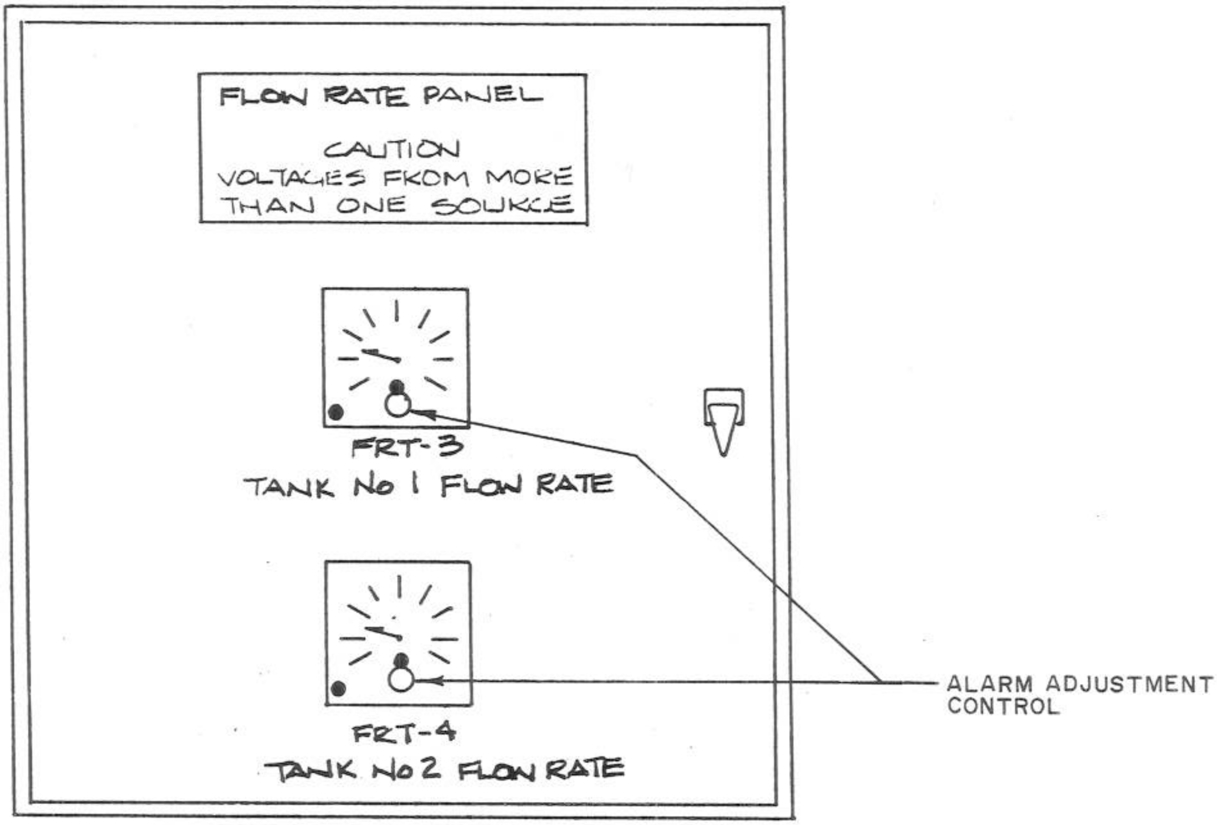
GCG DILLON Consulting Engineers and Planners	TITLE PLANT CONTROL PANEL (P.C.P.)	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 9

G–501–72



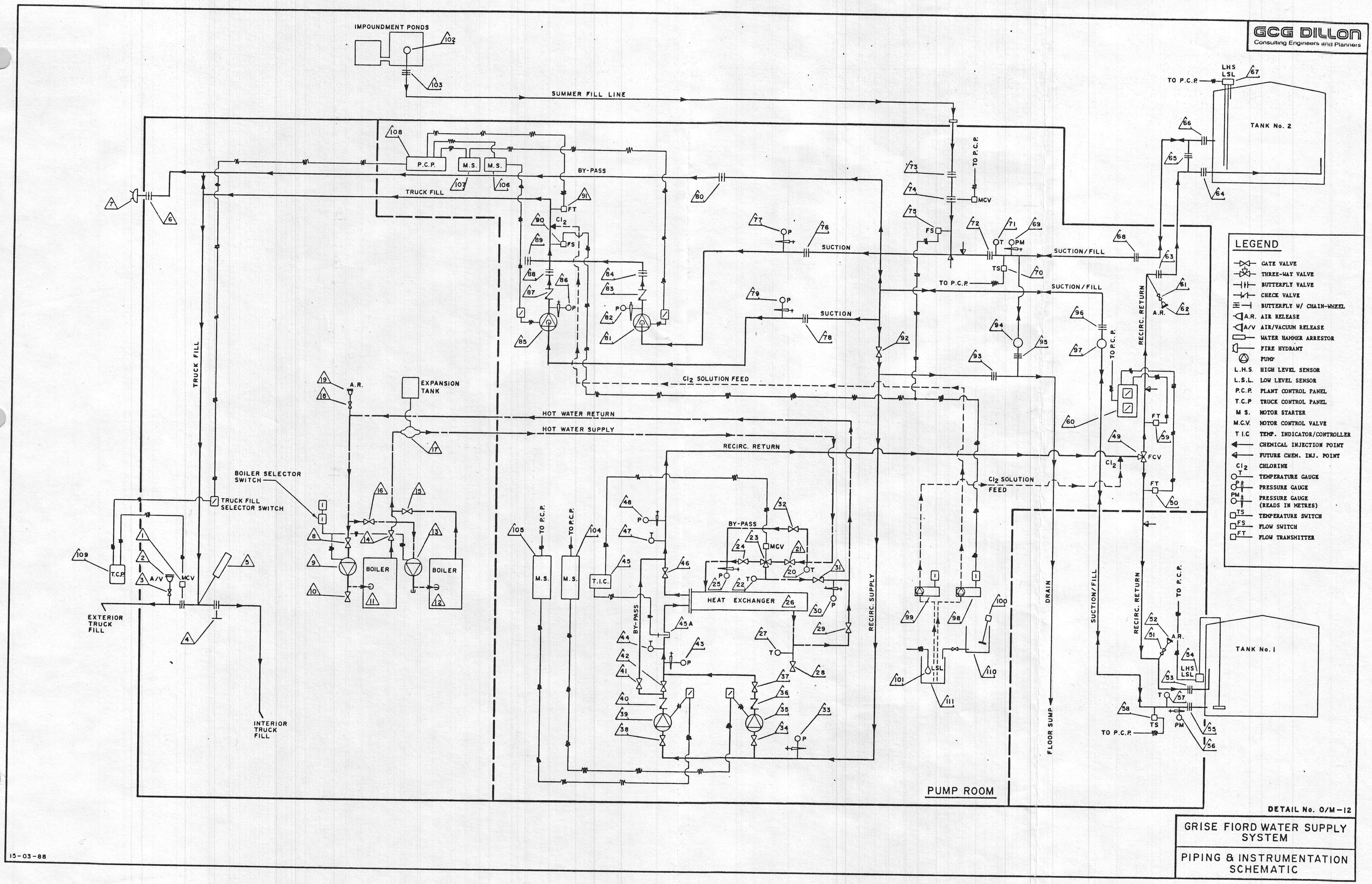
GCG DILLON Consulting Engineers and Planners	TITLE TRUCK CONTROL PANEL (T.C.P.)	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 10

G–501–72



GCG DILLON Consulting Engineers and Planners	TITLE FLOW RATE PANEL (RECIRCULATION SYSTEM)	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 11

G–501–72

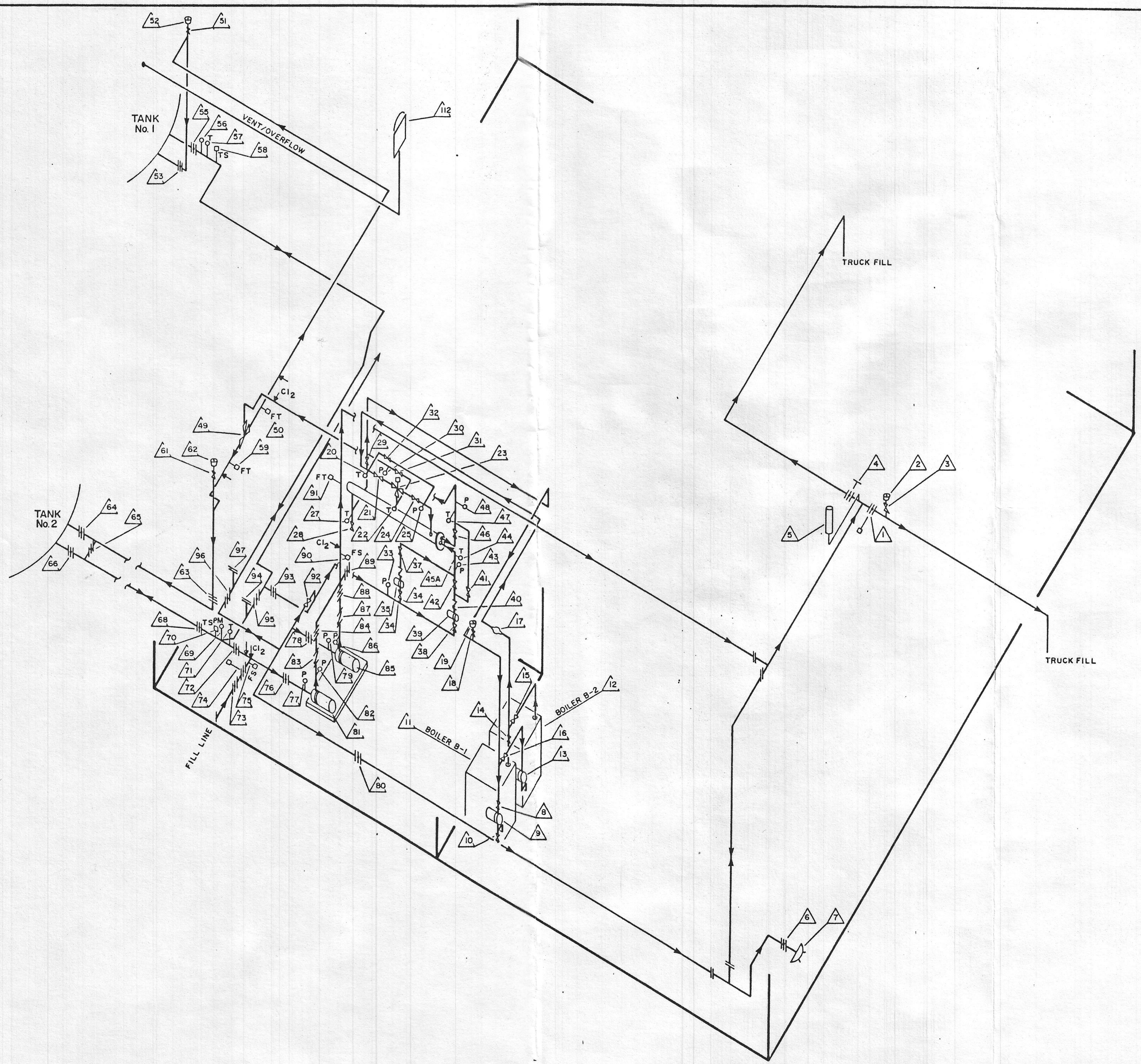


DETAIL No. O/M-12

GRISE FIORD WATER SUPPLY SYSTEM

PIPING & INSTRUMENTATION SCHEMATIC

GCG DILLON
Consulting Engineers and Planners



LEGEND

—⋈—	GATE VALVE
	THREE-WAY VALVE
—‖—	BUTTERFLY VALVE
	CHECK VALVE
	BUTTERFLY W/ CHAIN-WHEEL
A.R.	AIR RELEASE
A/V	AIR/VACUUM RELEASE
	WATER HAMMER ARRESTOR
	FIRE HYDRANT
	PUMP
L.H.S.	HIGH LEVEL SENSOR
L.S.L.	LOW LEVEL SENSOR
P.C.P.	PLANT CONTROL PANEL
T.C.P.	TRUCK CONTROL PANEL
M.S.	MOTOR STARTER
M.C.V.	MOTOR CONTROL VALVE
T.I.C	TEMP. INDICATOR/CONTROLLER
←	CHEMICAL INJECTION POINT
←	FUTURE CHEM. INJ. POINT
Cl_2	CHLORINE
T	TEMPERATURE GAUGE
P	PRESSURE GAUGE
PM	PRESSURE GAUGE (READS IN METRES)
TS	TEMPERATURE SWITCH
FS	FLOW SWITCH
FT	FLOW TRANSMITTER

DETAIL No. O/M-13

GRISE FIORD WATER SUPPLY SYSTEM

PIPING ISOMETRIC

CHAPTER 6 - OPERATING PROCEDURES

CHAPTER 6 - OPERATING PROCEDURES

6.1 General

The system has been generally designed to be operated in the "Automatic" mode of operation whenever possible.

Operation of pumps and other various equipment in a "Hand" mode should be avoided as much as possible. The operation of equipment in this mode should be limited to testing, maintenance and emergencies and the system returned to the "Automatic" mode as soon as possible.

The system is also designed so that filling of storage tanks and truck filling can be carried out simultaneously.

6.2 Storage Tank Filling

This operation should be carried out as soon as possible after tank cleaning (if required) is completed since fresh water run-off is available for only a limited period.

6.2.1 Impoundment Pond and Fill Line

The operation of the impoundment pond and fill line is common for all tank filling options.

1. Connect floating intake and hose to steel piping in impoundment pond.

2. Connect hose sections to fill line.

3. Install valve on piping at impoundment pond.

4. Open valve on fill line at impoundment pond and flush piping system.

5. Connect hose section to fill pipe at maintenance garage.

6. Open Valve BFV-6 located in pump room.

When use of fill line is completed the following must be done:

1. Close Valve BFV-6 located in pump room.

2. Close valve at impoundment pond.

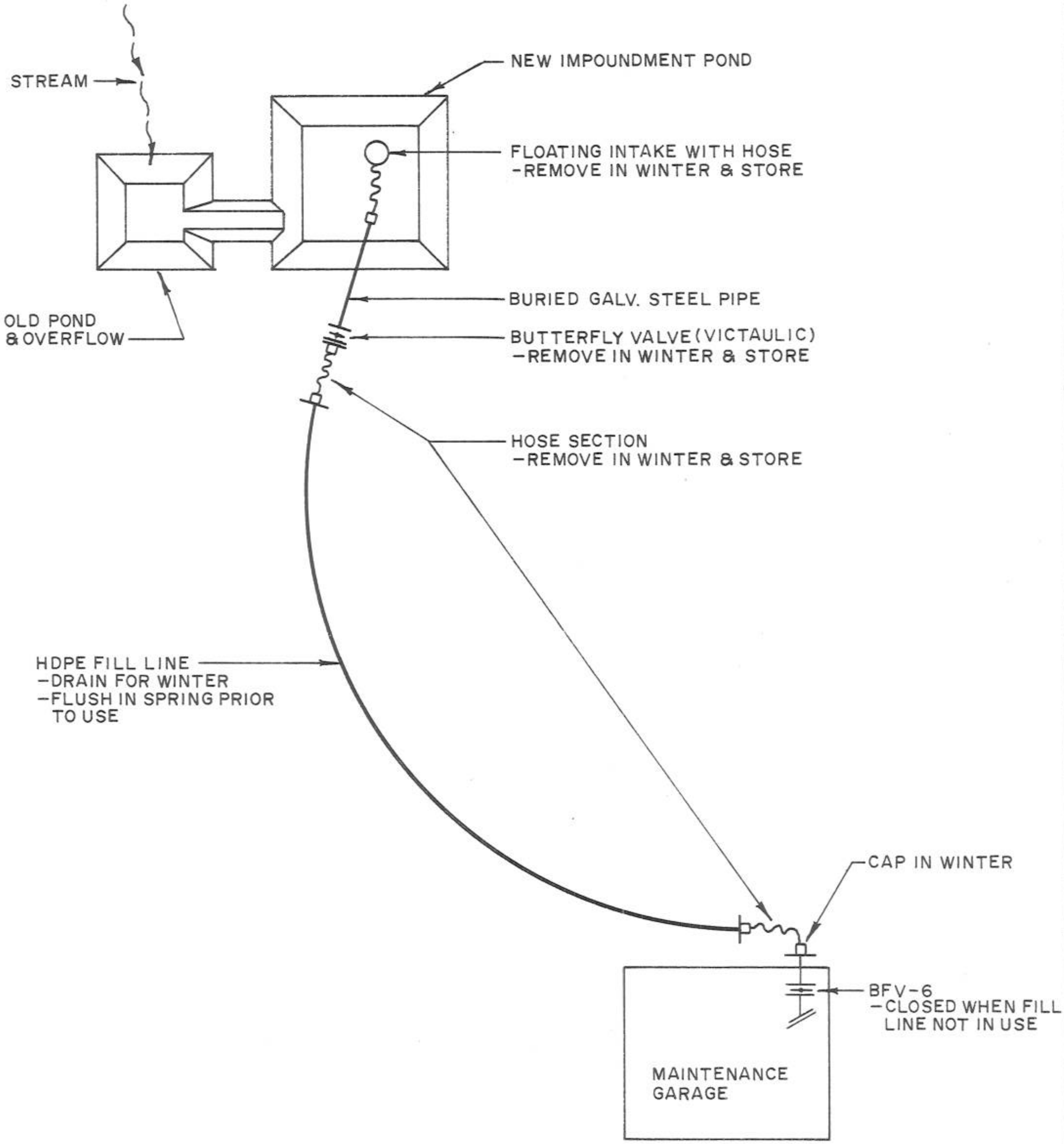
3. Remove hose sections from fill line and store.

4. Drain fill line.

5. Open valve at impoundment pond and drain pond.

6. Remove floating intake and hose and store.

7. Remove valve at impoundment pond and store.



GCG DILLON Consulting Engineers and Planners	TITLE IMPOUNDMENT POND & FILL LINE	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 1

G–501–72

6.2.2 Fill Tanks No. 1 and No. 2 At Same Time (Option 1)

1. Ensure that fill line has been connected according to Section 6.2.1.

2. Set Tank Selector Switch located on Plant Control Panel to Tank No. 1 and 2 position.

3. Open Valves BFV-3, 6, 9 and 10 and TV-1, 2, 3 and 4.

4. Valve MCV-1 will open automatically unless a high level alarm condition exists (see Section 6.2.3 or 6.2.4 depending on which tank has a high level alarm condition).

5. When a high level alarm condition exists in either tank, Valve MCV-1 will close automatically (see Section 6.2.3 or 6.2.4 depending on which tank has a high level alarm condition).

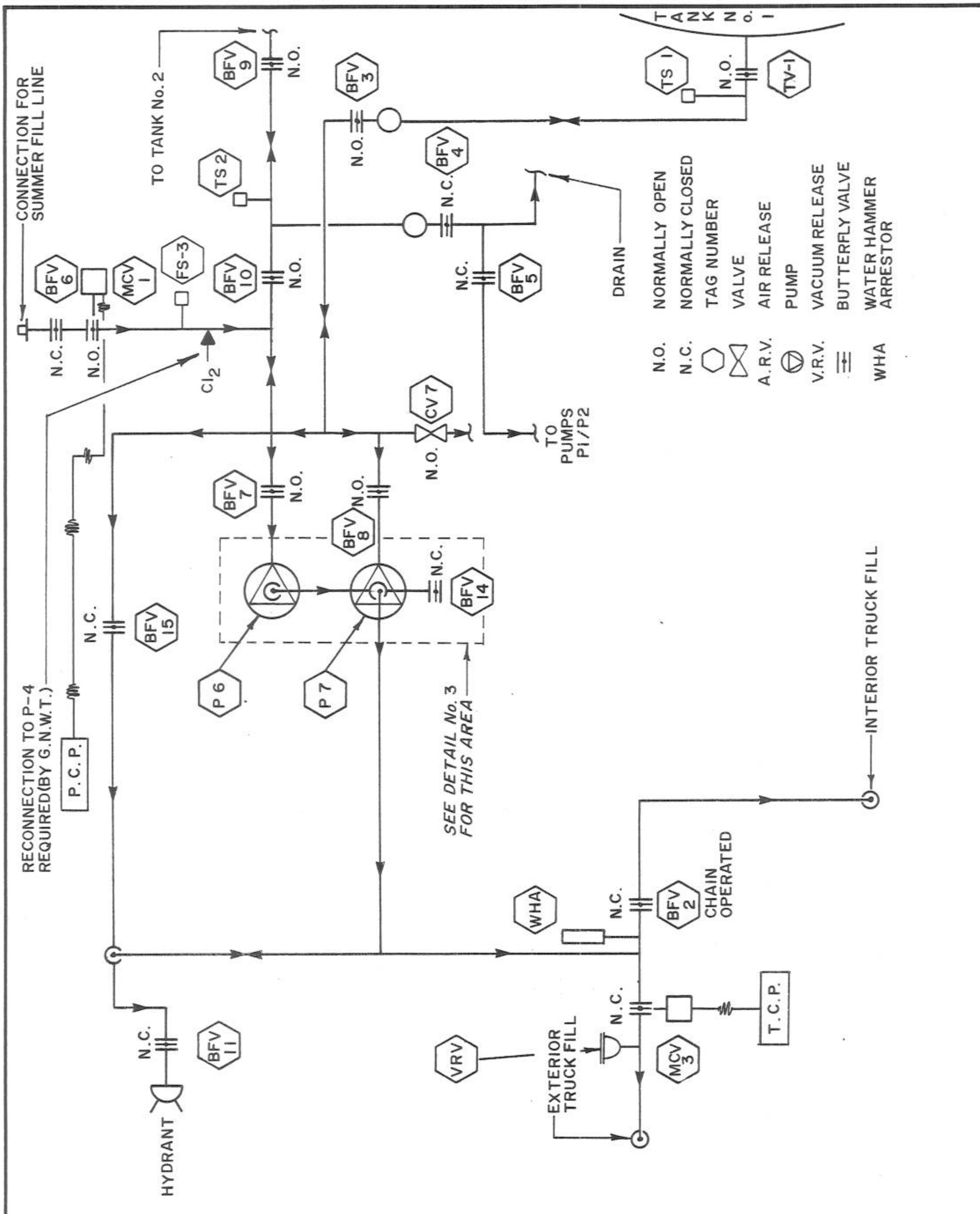
6.2.3 Fill Tank No. 1 (Option 2)

1. Ensure that fill line has been connected according to Section 6.2.1.

2. Close Valves BFV-1 and BFV-9.

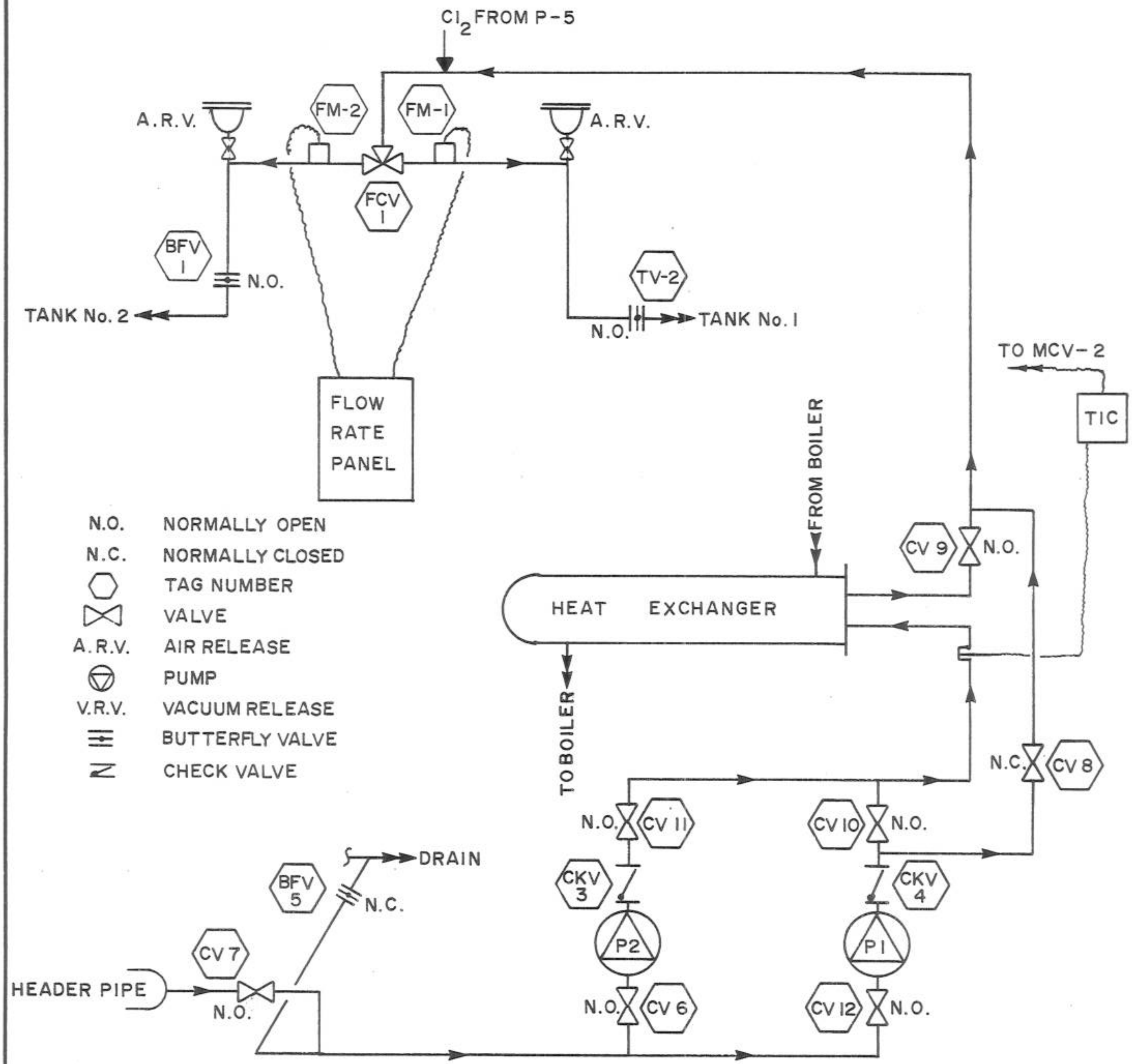
3. Set Tank Selector Switch located on Plant Control Panel to Tank No. 1 position.

4. Open Valves BFV-3, 6, 10 and TV-1 and 2.



GCG DILLON Consulting Engineers and Planners	TITLE WATER SUPPLY PUMPING SYSTEM	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 2

G–501–72



GCG DILLON Consulting Engineers and Planners	TITLE RECIRCULATION SYSTEM	PROJECT NO. 9893-05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M-5

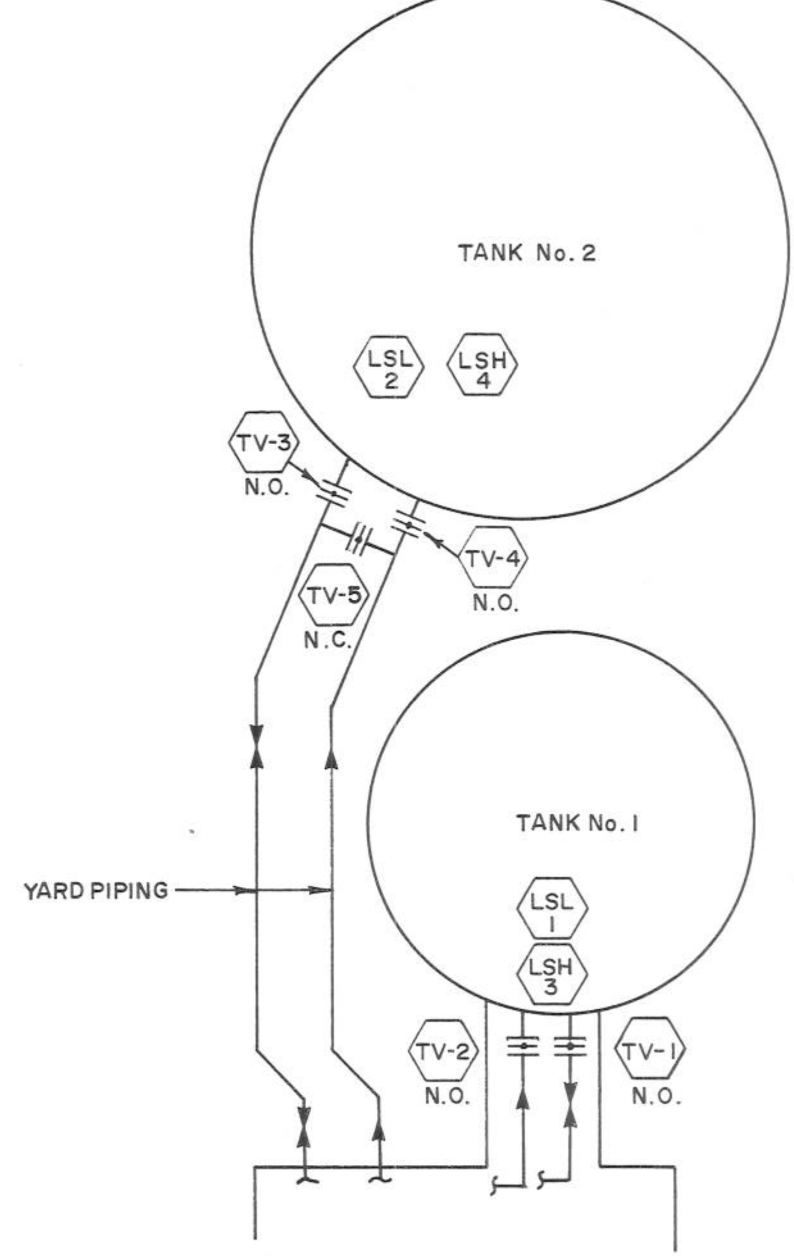
G-501-72

TAG NUMBER

BUTTERFLY VALVE

N.O. NORMALLY OPEN

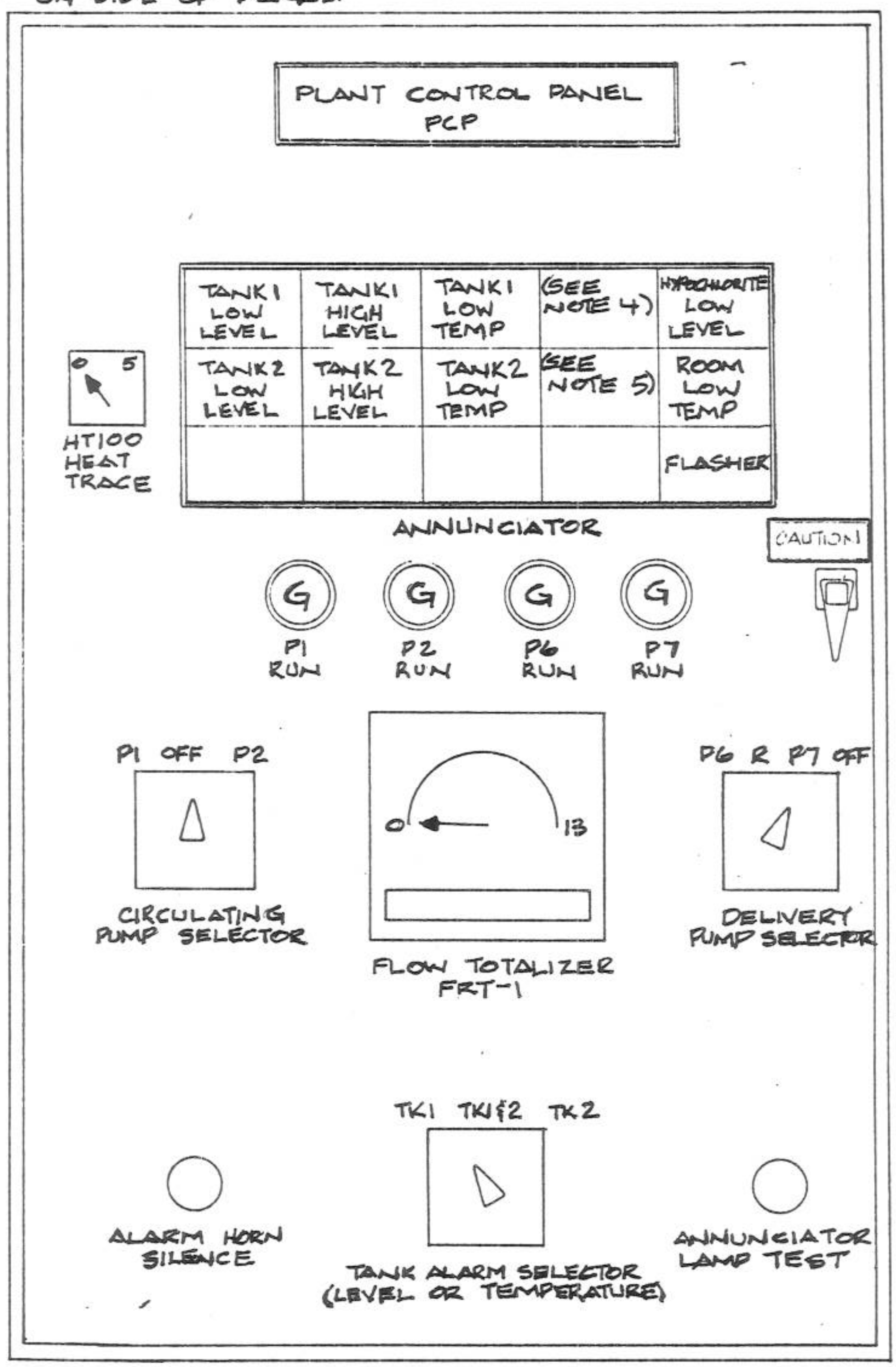
N.C. NORMALLY CLOSED



GCG DILLON Consulting Engineers and Planners	TITLE TANK VALVES	PROJECT NO. 9893–05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 6

G–501–72

NOTE:
ALARM HORN MOUNTED
ON SIDE OF PANEL



NOTES: 4. "RECIRCULATION LINE LOW FLOW TANK 1"
5 " " " " " TANK 2"

GCG DILLON Consulting Engineers and Planners	TITLE PLANT CONTROL PANEL (P.C.P.)	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 9

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5. Valve MCV-1 will open automatically unless a high level alarm condition exists in Tank No. 1.

6. Valve MCV-1 will automatically close when high level alarm condition exists.

6.2.4 Fill Tank No. 2 (Option 3)

1. Ensure that fill line has been connected according to Section 6.2.1.

2. Close Valves BFV-3 and TV-2.

3. Set Tank Selector Switch located on Plant Control Panel to Tank No. 2 position.

4. Open Valves BFV-1, 6, 9, 10, and TV-3, 4.

5. Valve MCV-1 will open automatically unless a high level alarm condition exists.

6. Valve MCV-1 will close automatically when a high level alarm condition exists.

With any of the above tank fill options the truck fill procedures (Section 6.4) are not changed.

When both tanks have been filled and the fill line is not being used close Valve BFV-6 and remove the fill line as described in Section 6.2.1.

The Storage Tank Filling operation cannot be operated in a "Hand" mode as Valve MCV-1 cannot be manually opened when a high level alarm condition exists.

6.3 Storage Tanks Heating and Recirculation Systems

The water in the storage tanks is recirculated through the heat exchanger to prevent freezing.

The Heating and Recirculation Systems are connected to each other by the heat exchanger and both must be operating properly to provide freeze protection.

6.3.1 Heating System

The heating system is made up of the following items:

1. Boilers B-1 and B-2.

2. Circulating pumps on B-1 and B-2.

3. Heat Exchanger.

4. Temperature Indicator Controller (TIC) for Valve MCV-2.

5. Piping, valves, gauges, etc.

6. Heating fluid mix/supply tank.

The operation of the heating system is as follows:

1. Turn circuit breakers to ON position. Breakers are on "Panel B" located next to door in pump room.

2. Turn Emergency Boiler Shut-Off switch ON. Switch is located adjacent to interior truck fill, mounted on wall and has a red cover plate.

3. Open or close valves on piping as shown on Detail No. O/M-4.

4. Set Boiler Selector Switch located on wall adjacent to boilers to either B-1 or B-2.

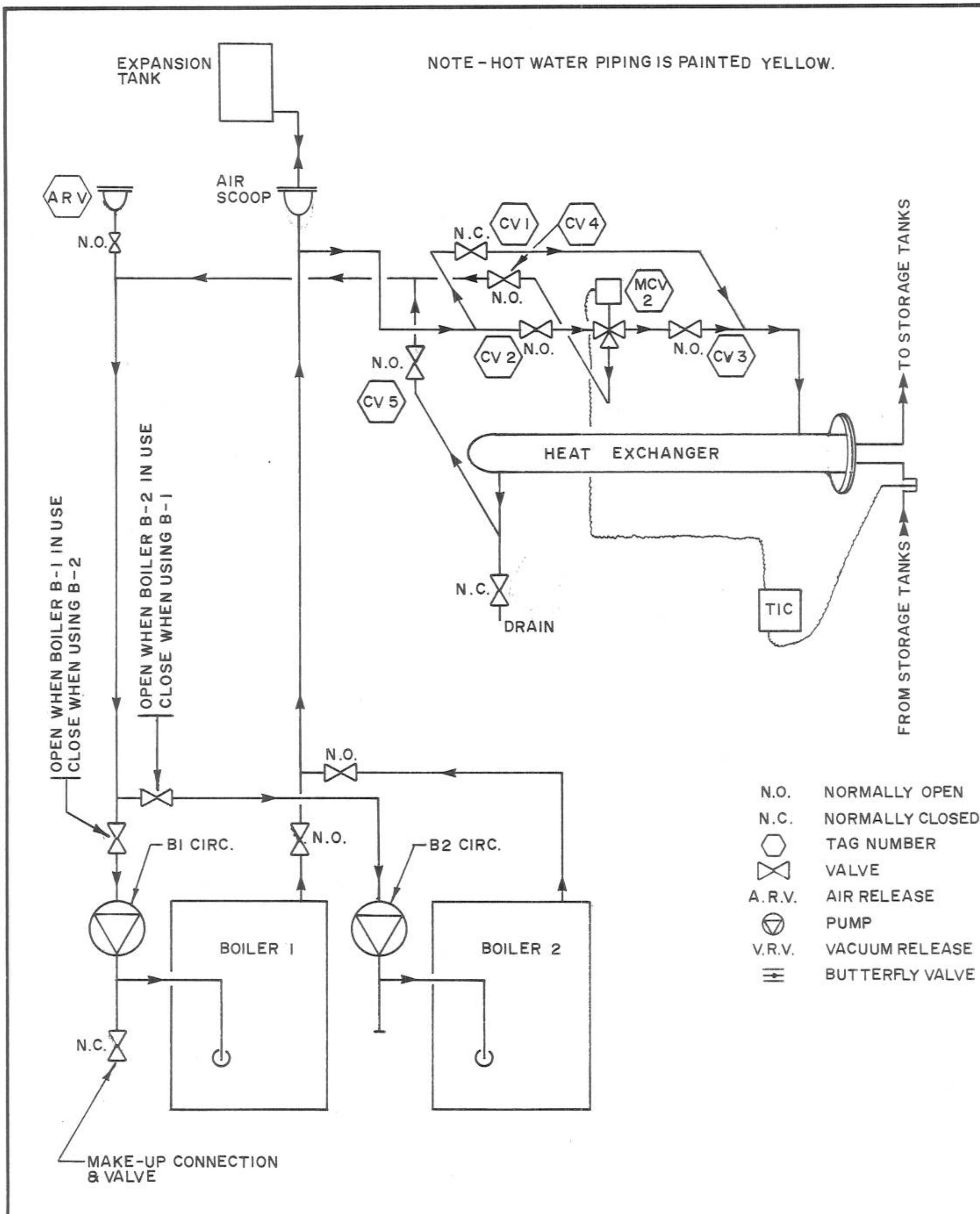
5. Set Temperature Indicator Controller (TIC) (knob on left side of unit used to adjust) to 40°F. TIC is located on the wall in the pump room beside the heat exchanger.

6. Turn selected boiler ON by turning switch on wall adjacent to boiler to ON position.

   Circulating pump on boiler selected will start.

   Boiler will start automatically when heating fluid temperature is below reset temperature set on boiler controls.

7. Valve MCV-2 located in pump room above heat exchanger will open when the temperature of water in the tanks is below 40°F and will close when it is above 40°F. The setting of the TIC (40°F) is what controls the opening and closing of MCV-2.



GCG DILLON Consulting Engineers and Planners	TITLE HEATING SYSTEM	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 4

G–501–72

When MCV-2 is open, hot heating fluid flows through the heat exchanger heating the water in the tanks. When closed the heating fluid flows directly back to the boiler.

8. Operator to monitor heating fluid pressure at gauge mounted on boiler and add additional liquid as described in Section 6.3.2.

9. Operator to monitor temperature of water in storage tanks and adjust setting on TIC as required to either increase or decrease temperature of water.

10. Operator to change use of boilers on monthly basis.

6.3.2 Heating Fluid Mixing and Addition

The following procedures should be followed for mixture and addition of glycol/water solution to heating system.

1. In yellow tank equipped with manual hand pump mix solution of 50% water and 50% propylene glycol.

   NOTE: PROPYLENE GLYCOL IS A SAFE GYLCOL AND NO OTHER TYPE IS TO BE USED.

2. Connect pump hose to valve on Boiler B-1 piping. Valve is directly below circulating pump.

3. Open valve.

4. Pump solution from yellow tank into boiler piping until pressure on boiler gauge reaches desired point (12 p.s.i.).

5. Shut-off valve.

6. Disconnect pump hose from valve.

NOTE: ADDITION OF HEATING FLUID SOLUTION SHOULD BE DONE WHEN CIRCULATING PUMP AND BOILER ARE BOTH RUNNING AND FLUID IS HOT SO AS NOT TO ADD TOO MUCH ADDITIONAL FLUID.

6.3.3 Recirculation System

The water in the storage tanks is pumped through the heat exchanger to be heated and prevent freezing.

The following procedures are to be followed for the pumping/heating of water from both storage tanks.

1. Close Valve BFV-6, located in pump room on summer fill line if fill line is not connected or in use.

   Failure to close Valve BFV-6 could result in the loss of water from the tanks.

2. Open valves as follows:

   - TV-1 & TV-2, located in walkway to Tank No. 1.

   - TV-3 & TV-4, located in valve enclosure on Tank No. 2.

- BFV-3, BFV-9, BFV-10, CV-6, CV-7, CV-9, CV-10, CV-11 & CV-12, all located in pump room.

3. Set at 38°F the control knob on Temperature Sensor TS-1 located in walkway on Tank No. 1 suction/fill pipe and on TS-2 located in pump room on Tank No. 2 suction/fill line.

4. Set Circulating Pump Selector switch located on Plant Control Panel in pump room to either P-1 or P-2 position.

5. Set Motor Starter switches for Pumps P-1 and P-2 to AUTO position. Motor Starters are located on wall next to heat exchanger.

6. Turn pump isolating switches to "ON" position (switch in up position). Switches are mounted on the wall next to the pumps under the heat exchanger.

7. Turn circuit breakers on Panel "B" located next to door in pump room to ON position.

   Selected pump (switch on P.C.P.) will start and pump water from the tanks through the heat exchanger and back to the tanks.

8. Monitor temperature of water being drawn from the tanks and adjust the return flow of heated water to each tank using Valve FCV-1 which is located on the wall above the service sink in the pump room.

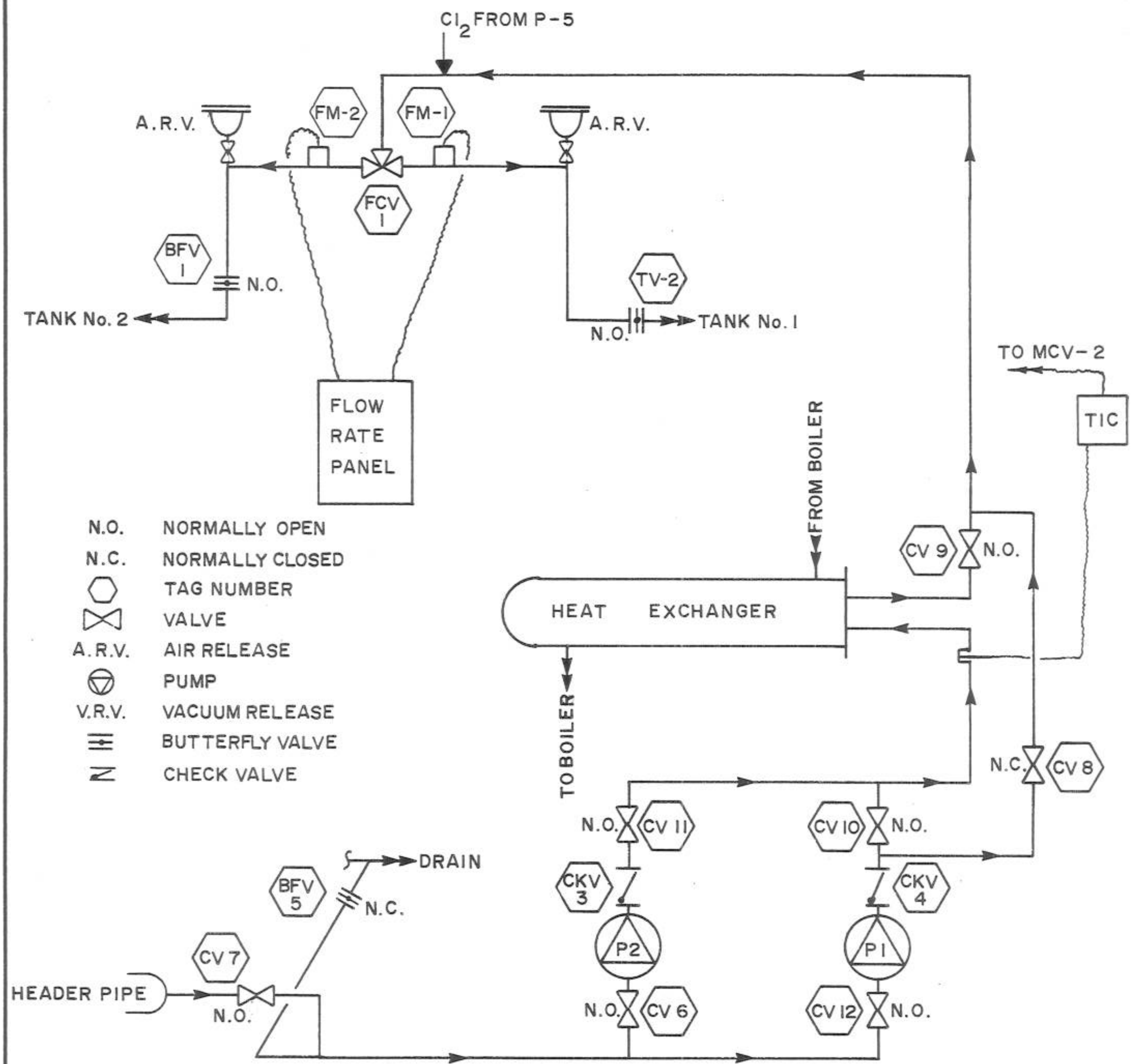
   NOTE: It is expected that flow to Tank No. 2 will have to be greater than to Tank No. 1 due to difference of volumes. Flows should be adjusted to maintain water in both tanks at the same temperature.

9. The return flows of heated water to the tanks are shown on the Flow Rate Panel (FRP) located on the wall in the pump room next to Valve FCV-1. This panel has two(2) flow meters which show the return flow to Tank No. 1 and Tank No. 2 individually.

   The operator is to adjust the alarm setting for each meter so that an alarm will register when flow to either or both of the tanks is less than desired.

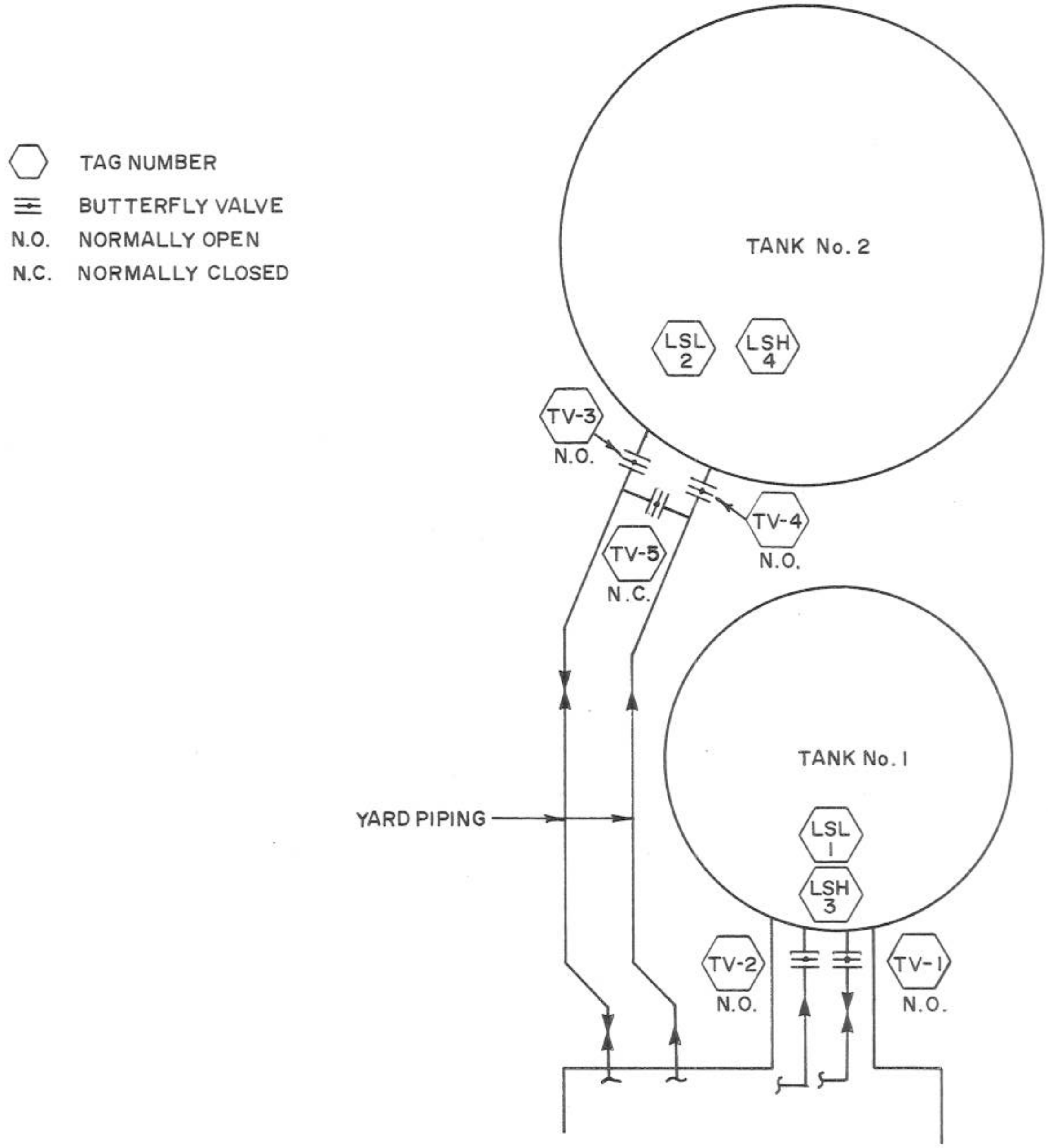
10. The operator is to alternate use of circulating Pumps P-1 and P-2 on a monthly basis.

    CAUTION: Damage to the tanks and piping could result without the Heating and Recirculation Systems properly operating.



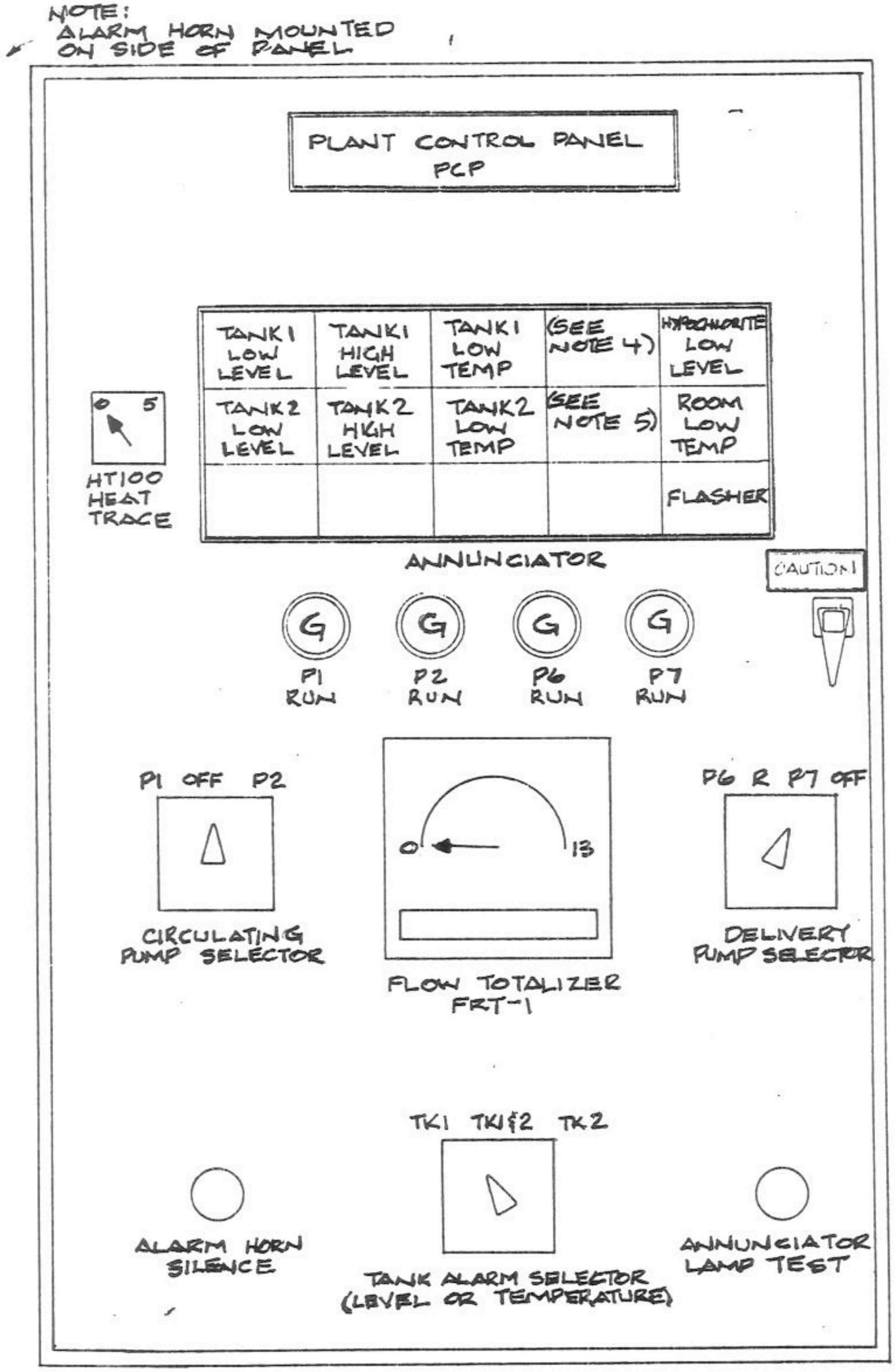
GCG DILLON Consulting Engineers and Planners	TITLE RECIRCULATION SYSTEM	PROJECT NO. 9893-05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M-5

G-501-72



GCG DILLON Consulting Engineers and Planners	TITLE TANK VALVES	PROJECT NO. 9893–05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 6

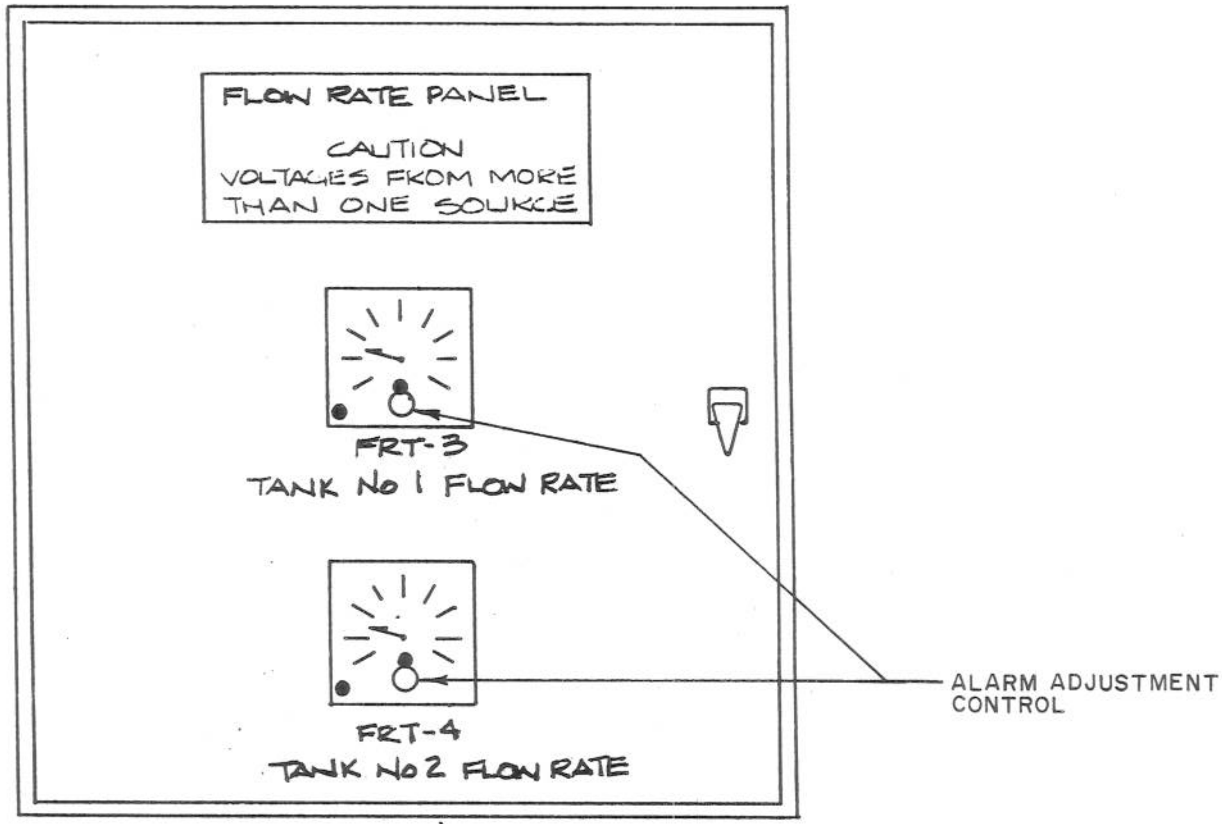
G–501–72



NOTES: 4. "RECIRCULATION LINE LOW FLOW TANK 1"
5 " " " " " TANK 2"

GCG DILLON Consulting Engineers and Planners	TITLE PLANT CONTROL PANEL (P.C.P.)	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 9

G–501–72



GCG DILLON Consulting Engineers and Planners	TITLE FLOW RATE PANEL (RECIRCULATION SYSTEM)	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – II

G–501–72

6.4 Filling of Water Delivery Tank Truck

There are two(2) locations from which the tank truck may be filled. The system has been designed so that the outside filling facilities may be used year round, if desired. Trucks can also be filled within the maintenance garage.

6.4.1 General

To prepare the pumping system for use by the truck operator for truck filling the plant operator must perform the following procedures.

1. Close Valve BFV-6 if fill line is not in use or has been disconnected.

2. Close Valves BFV-3, 4, 5 and 15, (normally closed) all located in pump room.

3. Close Valve TV-5 (normally closed) located in Tank No. 2 valve enclosure.

4. Close Valve BFV-11 (normally closed) located in maintenance garage on the interior side of the wall that fire hydrant is located on.

5. Close Valve BFV-2 (normally closed) using the chain-wheel operator.

6. Open Valve TV-3 (normally open) located in Tank No. 2 valve enclosure.

7. Open Valve TV-1 (normally open) located in the walkway to Tank No. 1.

8. Open Valves BFV-7, 8, 9, 10, 12 and 13 (normally open) all located in pump room.

9. Set Tank Selector switch on Plant Control Panel to TK1 & 2 position.

10. Set Delivery Pump Selector switch on Plant Control Panel to "R" position.

11. Set Truck Fill Selector switch located on the interior wall next to the overhead pipe support for interior truck fill piping to the "EXTERIOR" position.

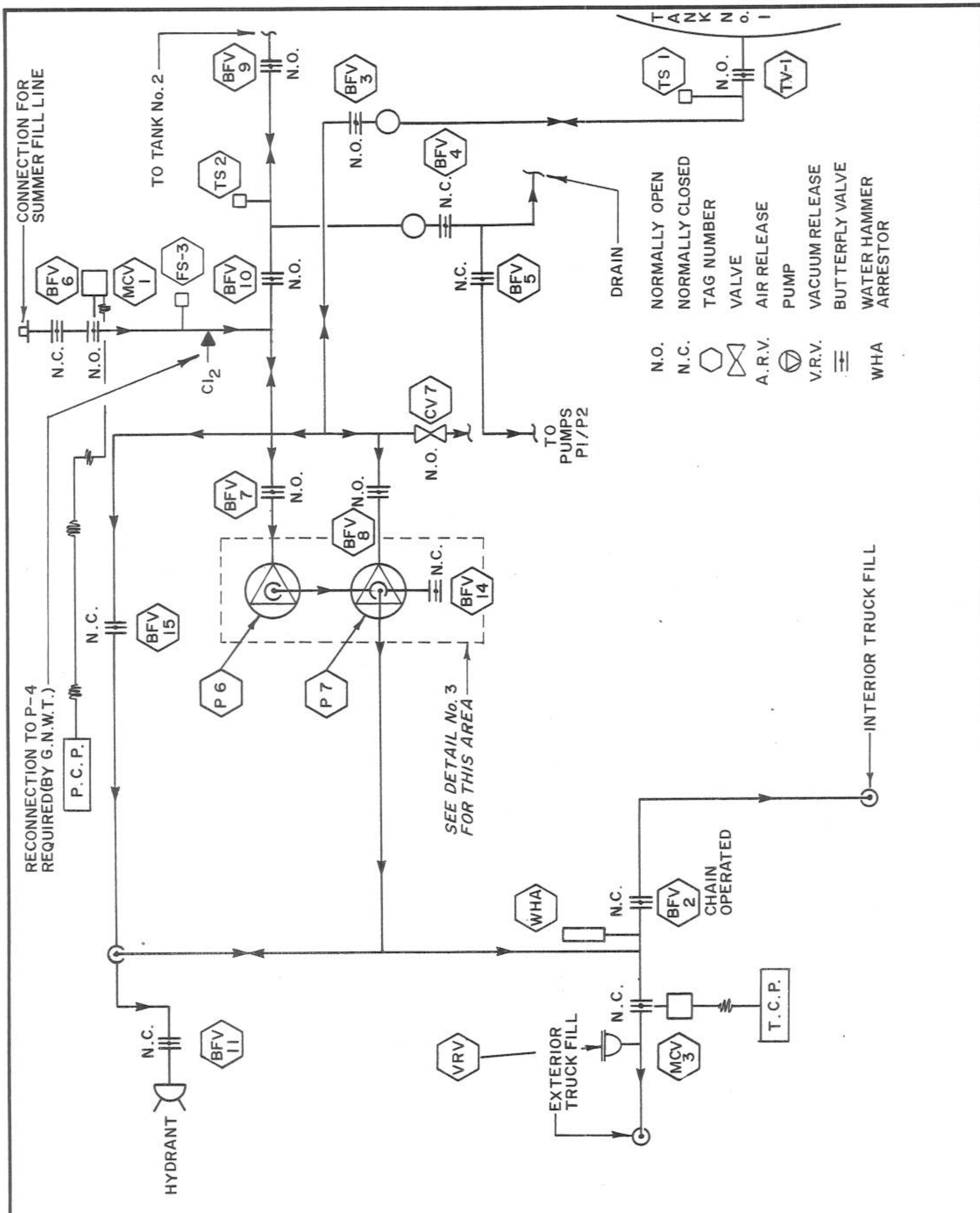
12. Turn circuit breakers on Panel "B", located in pump room adjacent to the door, in the "ON" position.

13. Set Motor Starter switches for Pumps P-6 and P-7 to "AUTO" position. Motor Starters are located on the wall next to the Plant Control Panel in the pump room.

14. Set isolating switches for Pumps P-6 and P-7 to "ON" position (switch in up position). Switches are located on vertical support next to motor of each pump.

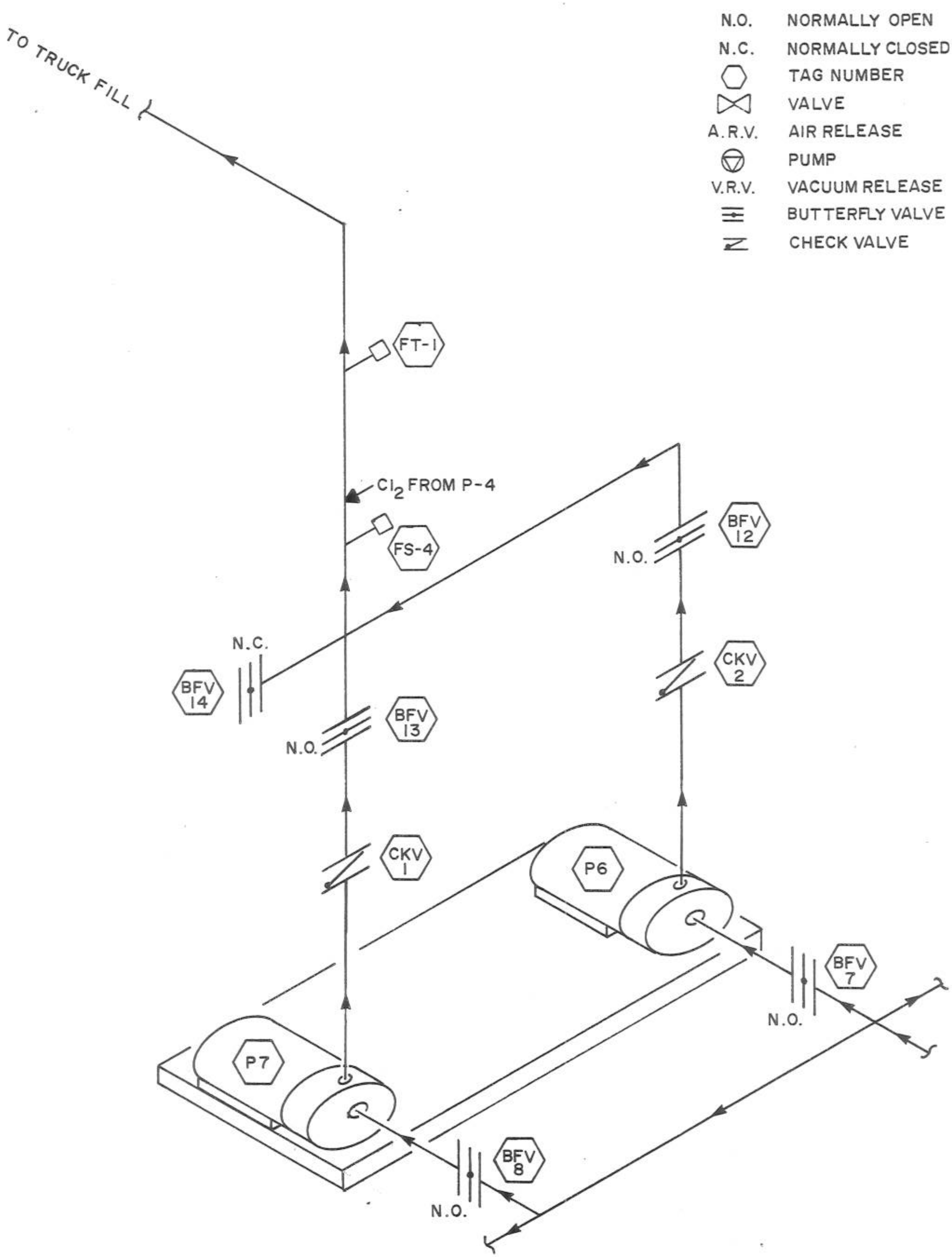
15. Prepare Hypochlorination System for use as described in Section 6.5.

16. Prepare Water Hammer Arrestor (WHA) located on overhead truck fill piping in maintenance garage and next to Valve BFV-2, as required in manufacturer's brochure (Volume 2; Chapter 10; 10.25).



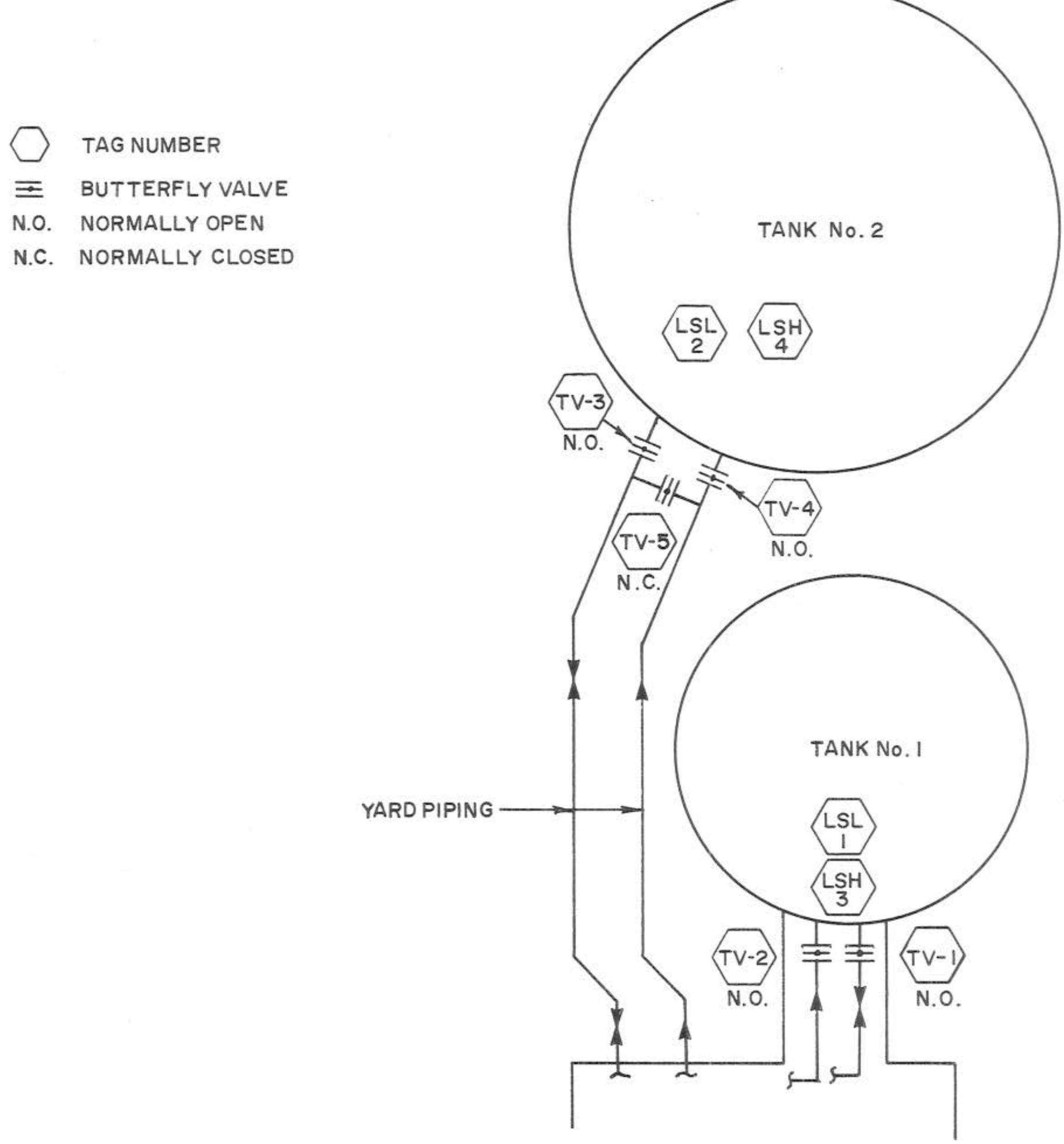
GCG DILLON Consulting Engineers and Planners	TITLE WATER SUPPLY PUMPING SYSTEM	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 2

G–501–72



GCG DILLON Consulting Engineers and Planners	TITLE SERVICE PUMPS SCHEMATIC	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M — 3

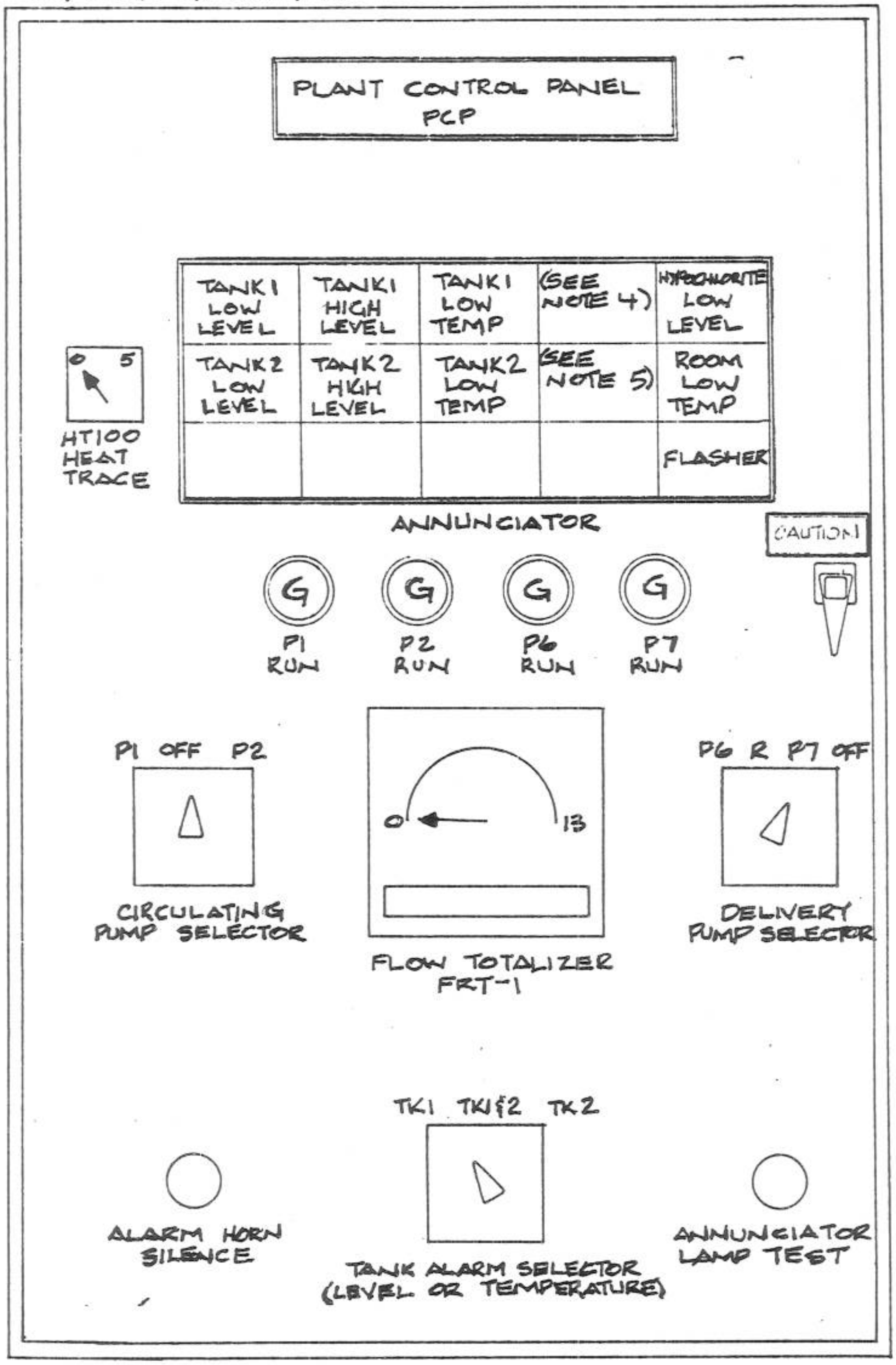
G–501–72



GCG DILLON Consulting Engineers and Planners	TITLE: TANK VALVES	PROJECT NO. 9893-05
DATE JAN. 1988	PROJECT: GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M - 6

G-501-72

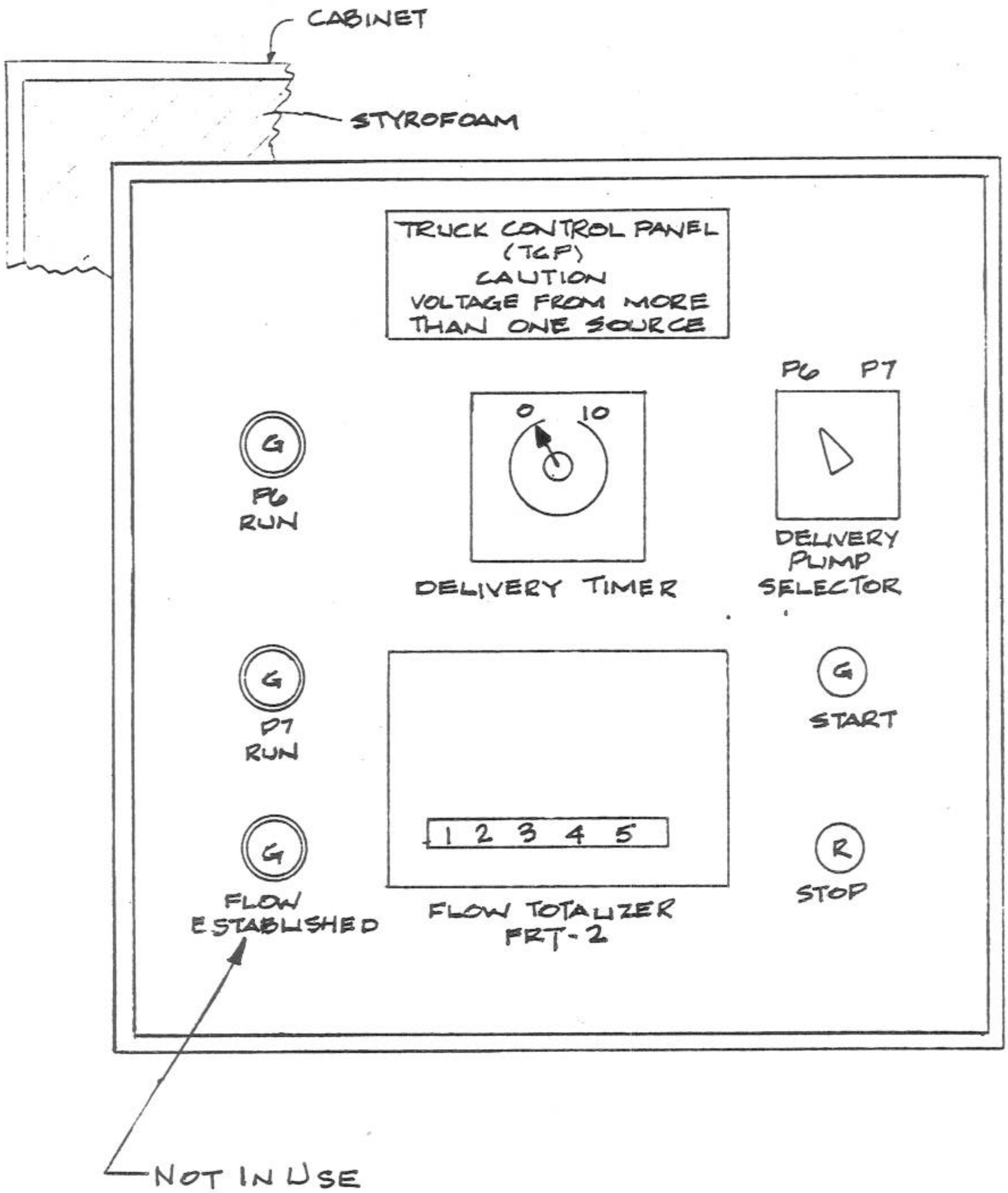
NOTE:
ALARM HORN MOUNTED
ON SIDE OF PANEL



NOTES: 4. "RECIRCULATION LINE LOW FLOW TANK 1"
5 " " " " " TANK 2"

GCG DILLON Consulting Engineers and Planners	TITLE PLANT CONTROL PANEL (P.C.P.)	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 9

G–501–72



GCG DILLON Consulting Engineers and Planners	TITLE TRUCK CONTROL PANEL (T.C.P.)	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 10

6.4.2 Exterior Truck Fill

The use of the exterior truck fill is controlled by the Truck Control Panel (TCP) which is located on the exterior building wall adjacent to the overhead piping. The TCP serves as an interface between the pumping equipment and the truck operator.

The following outlines the procedures the truck operator is to follow when using the outside truck fill:

Normal Pumping Cycle

1. Truck operator arrives at truck fill panel.

2. Open water intake of truck.

3. Insert hose into truck.

4. Open outer control panel cover.

5. Reset flow accumulator if not already reset.

6. Select pump (plant operator to inform truck operator which pump to use).

7. Set timer for required pumping cycle.

8. Press "START" button.

9. Pump light comes "ON" when pump contacts locks in.

10. When time cycle expires, pump stops.

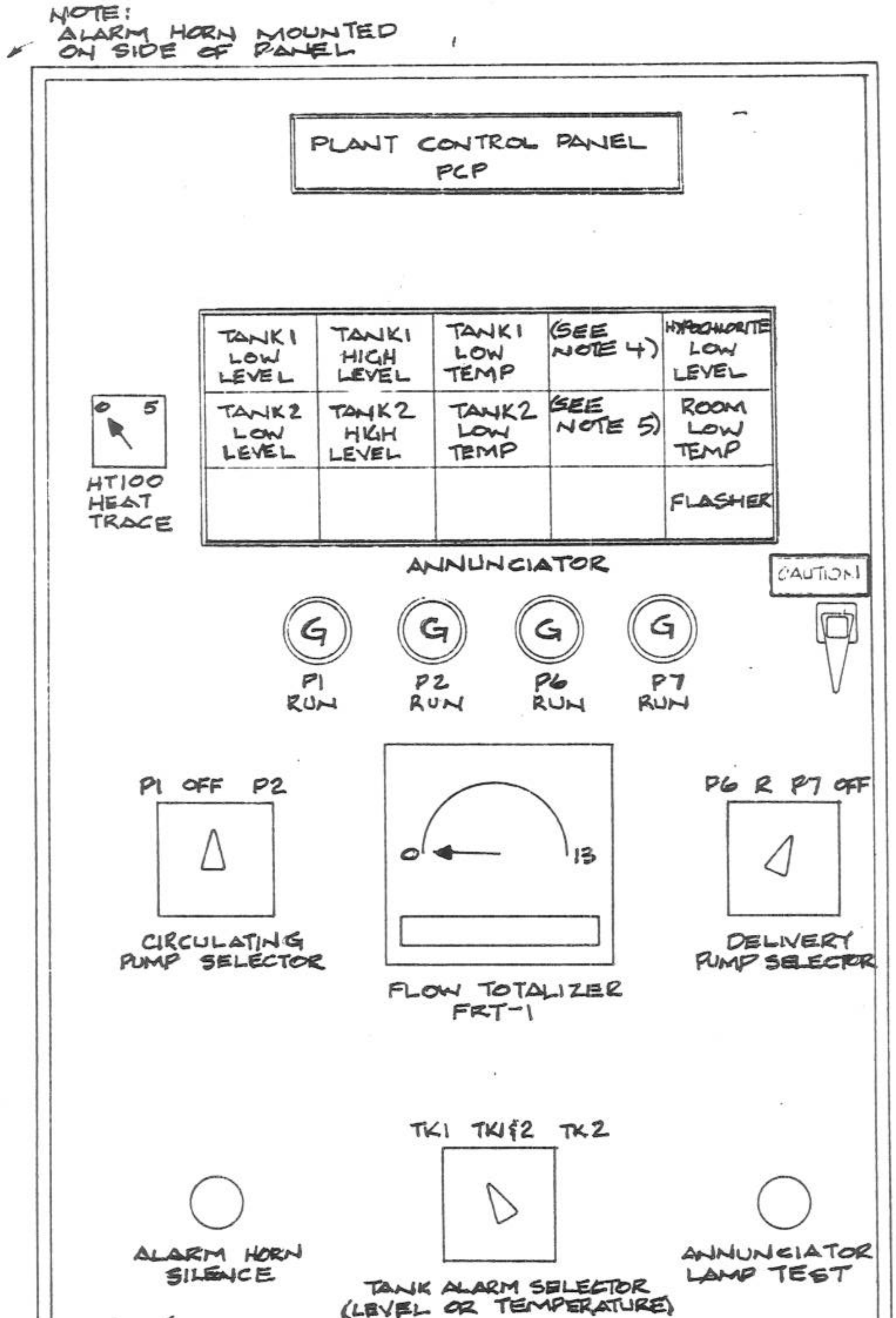
11. Indicator lights go "OFF".

<u>Time Cycle Not Expired and Truck is Overflowing</u>

1. Truck operator must stop the pump by pressing the "STOP" button.

<u>Delivery Pump P-6 or P-7 Running and Utility Power Failure Occurs</u>

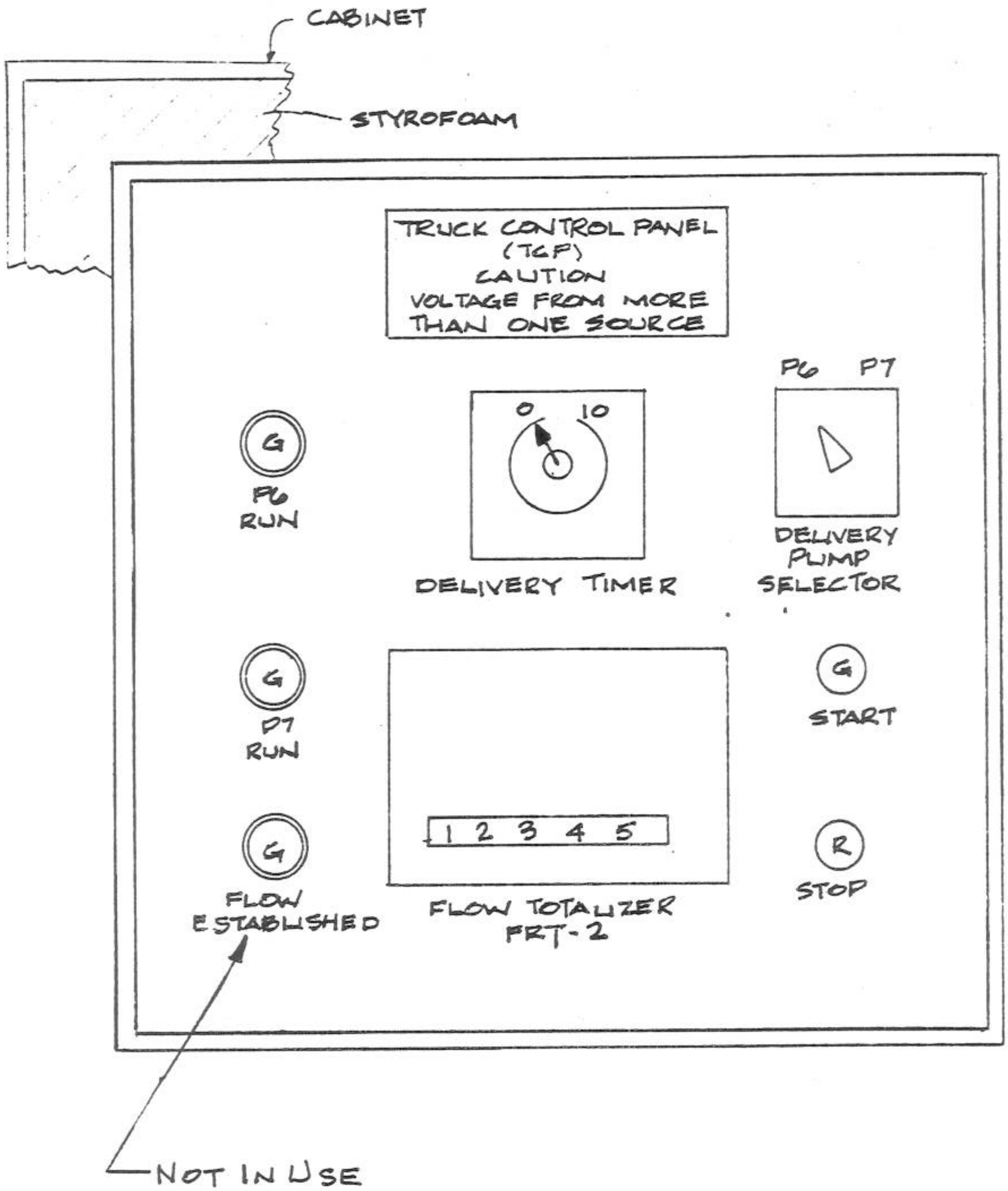
1. The speed of the transfer switch from normal to emergency utility power is slow enough to cause the delivery pump to stop. After emergency utility power is established, the pump must be restarted again by pressing the "START" button.



NOTES: 4. "RECIRCULATION LINE LOW FLOW TANK 1"
5 " " " " " TANK 2"

GCG DILLON Consulting Engineers and Planners	TITLE PLANT CONTROL PANEL (P.C.P.)	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 9

G–501–72



GCG DILLON Consulting Engineers and Planners	TITLE TRUCK CONTROL PANEL (T.C.P.)	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 10

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Delivery Pump P-6 or P-7 Running on Emergency Power With Restoration of Utility Power

1. The speed of the transfer switch from emergency to normal power will be slow enough to cause the delivery pump to stop. After utility power is restored, the pump must be restarted again by pressing the "START" button.

Note that the Delivery Pump Selector switch on the Plant Control Panel (PCP) must be at the "R" (Remote) position and the Truck Fill Selector Switch must be at the "EXTERIOR" position for the above system to operate. If either or both switches are not set this way the system will not operate. The Truck Fill Selector switch is located on the interior wall adjacent to the pipe support for the interior truck fill piping.

6.4.3 Interior Truck Fill

The use of the interior truck fill is controlled manually by the truck operator.

The following procedures are to be followed when using the interior truck fill.

Pump Feed

1. Truck operator arrives at maintenance building.

2. Open water intake of truck.

3. Insert hose into truck.

4. Set Truck Fill Selector switch, located on wall adjacent to overhead piping support to "Interior" position.

5. Set Delivery Pump Selector switch, located on Plant Control Panel in pump room to either P-6 or P-7 position. (Plant operator to inform truck operator which pump to use.)

6. Green indicator light comes "ON" and pump starts.

7. Open Valve BFV-2 with chain-wheel operator.

   CAUTION: When using pump feed the truck will fill rapidly so the truck driver must be monitoring operation continuously so as to avoid overflowing onto building floor.

8. Close Valve BFV-2 when truck is full.

9. Set Delivery Pump Selector switch to either "OFF" or "R" position. (Plant operator to inform truck operator.)

   Pump will stop and indicator light goes "OFF".

10. Set Truck Fill Selector switch to "Exterior" position if Exterior Truck Fill to be used next.

Gravity Feed

1. Truck operator arrives at maintenance building.

2. Open water intake of truck.

3. Insert hose into truck.

4. Open Valve BFV-2 with chain-wheel operator.

5. When truck is full close Valve BFV-2.

NOTE: When gravity feed is used, as the storage tank water level drops the rate of flow will decrease. It will be necessary that the pumps be used to deliver water at the point when the water level in the tanks is equal to the interior truck fill piping level.

CAUTION: When gravity feed is used for truck fill, adjustment to the hypochlorinator feed rate will be required or the residual chlorine level may exceed acceptable levels due to the longer filling time period.

6.5 Hypochlorination System

The hypochlorination system is designed to operate both manually and automatically. The automatic operating mode will activate hypochlorinator Pump P-4 when there is flow in the piping downstream of the service pumps or when the summer fill line is in use. For manual addition of hypochlorite solution to the stored water, the operator must manually activate hypochlorinator Pump P-5.

Calcium hypochlorite is available as a white powder, granules or tablets. The material is highly corrosive when wet and the dust will irritate eyes, nose, lungs and skin. Safety equipment/clothes should be used at all times when working with this material. Also any spills should be washed down immediately with water to dilute effects.

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+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+     CAUTION:   Due to alterations requested by G.N.W.T..  +
+                chlorine will be injected into truck fill  +
+                piping when the summer fill line is in use.+
+                Additional chemical injection tubing and   +
+                valves are to be installed by G.N.W.T..    +
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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6.5.1 Solution Preparation

The following outlines the procedure to make up 38 litres (10 U.S. gal. or 8.3 Imp. gal.) of solution containing 5000 mg/L available chlorine:

1. Close mix tank valve.
2. Add 38 litres water to solution mixing tank.
3. Turn on mixer.
4. Add 360 ml (1 1/2 cups) of calcium hypochlorite*.
5. Mix until dissolved.
6. Turn mixer off.
7. Allow any sediment to settle.
8. Open mix tank valve to allow solution to enter solution holding tank.
9. Close mix tank valve.

*NOTE: 360 ml (1 1/2 cups) is approximately 270 gm. (0.6 lbs.) dry calcium hypochlorite containing 190 gm. (0.42 lbs.) available chlorine.

NOTE: Solution mixing and holding tanks will require periodic cleaning by the operator to remove sediments.

6.5.2 Solution Injection

The system was originally designed so that chlorine would be added automatically to the water as it was piped to the storage tanks during the summer filling period and thereafter maintained at a minimum residual level manually.

This was altered during start-up testing at the request of the G.N.W.T. so that chlorine would be injected into the water automatically at the time of delivery for use.

Automatic Injection

Pump P-4 is automatically activated by Flow Switches FS-3 and FS-4. The injection point from P-4 is immediately downstream of the Service Pumps.

CAUTION: Due to alterations requested by G.N.W.T. chlorine will be injected into truck fill piping when the summer fill line is in use. Additional chemical injection tubing and valves are to be installed by G.N.W.T..

The hypochlorinator (P-4) has two(2) points of adjustment which affect the rate of flow. The Stroke % knob adjusts length of pump stroke from 10 to 100% while the Rate knob adjusts from 4 to 100 strokes per minute.

These two adjustments allow for virtually limitless variations when solution strength is also considered.

Based upon the following procedures a residual chlorine level of 0.2 mg/l (.2 ppm) should be registered at the discharge point of the piping system.

1.	Chlorine solution strength: (see 6.5.1)	5000 mg/l
2.	Pump P-6 or P-7 flow rate:	1500 l/min.
3.	Hypochlorinator (P-4)	
	- Stroke % knob:	50%
	- Rate knob:	40

CAUTION: Many factors can affect the residual chlorine level in the water being delivered for consumption so a minimum level of testing would be once a day. Results of tests should be recorded and if required the above procedures altered so as to ensure a safe level of disinfection of water being used for consumption.

Testing shall be done in strict conformance with testing apparatus manufacturers' instructions.

Manual Injection

Pump P-5 is operated manually by the operations staff via the switchable receptable mounted on the wall adjacent to the pump.

This pump has the same features for adjustments as P-4. The injection point from this pump is immediately upstream of Valve FCV-1, on the return side of the recirculation piping.

Use of this pump will allow for manual addition of chlorine solution to the water in the storage tanks by injection into the return flow of the recirculation system.

CAUTION: Daily testing of residual chlorine must be carried out so as not to over chlorinate the water supply. In addition, if the manual injection system is used adjustment to the automatic injection system may be required.

6.5.3 Manual Chlorination Using Household Bleach

In the event that the chlorination system is not operational or that it has been by-passed by use of the pump by-pass piping, manual chlorination of the water may be done in the water delivery tank truck.

The following procedure should be followed to produce a chlorine residual level of 0.2 mg/litre (0.2 ppm) in a tank truck with a capacity of 4500 litres (1000 gal.).

1. Check to see if truck is empty. If truck is not empty the amount of bleach used will have to be reduced proportionately.

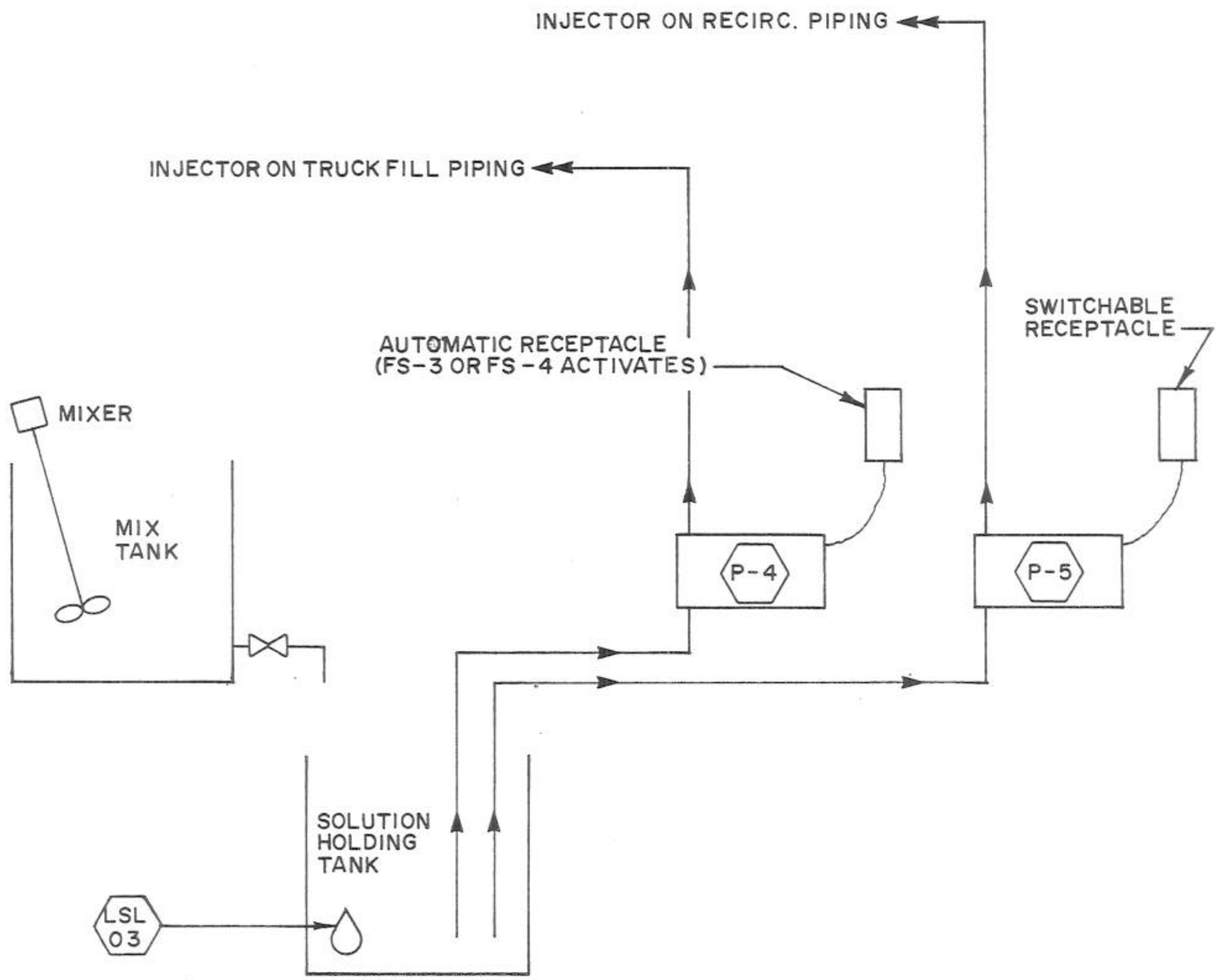
2. If truck is empty add 0.015 litres of household bleach.

3. Fill truck tank with water.

4. Test residual chlorine level of water in truck and adjust if required.

Caution: **It is assumed that household bleach (Javex) has a 6% chlorine level. If product used is different than 6%, adjustment to amount added to water will be necessary.**

One litre of bleach will be enough to chlorinate approximately 66 truck loads of water.



GCG DILLON Consulting Engineers and Planners	TITLE HYPOCHLORINATION SYSTEM	PROJECT NO. 9893-05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M-7

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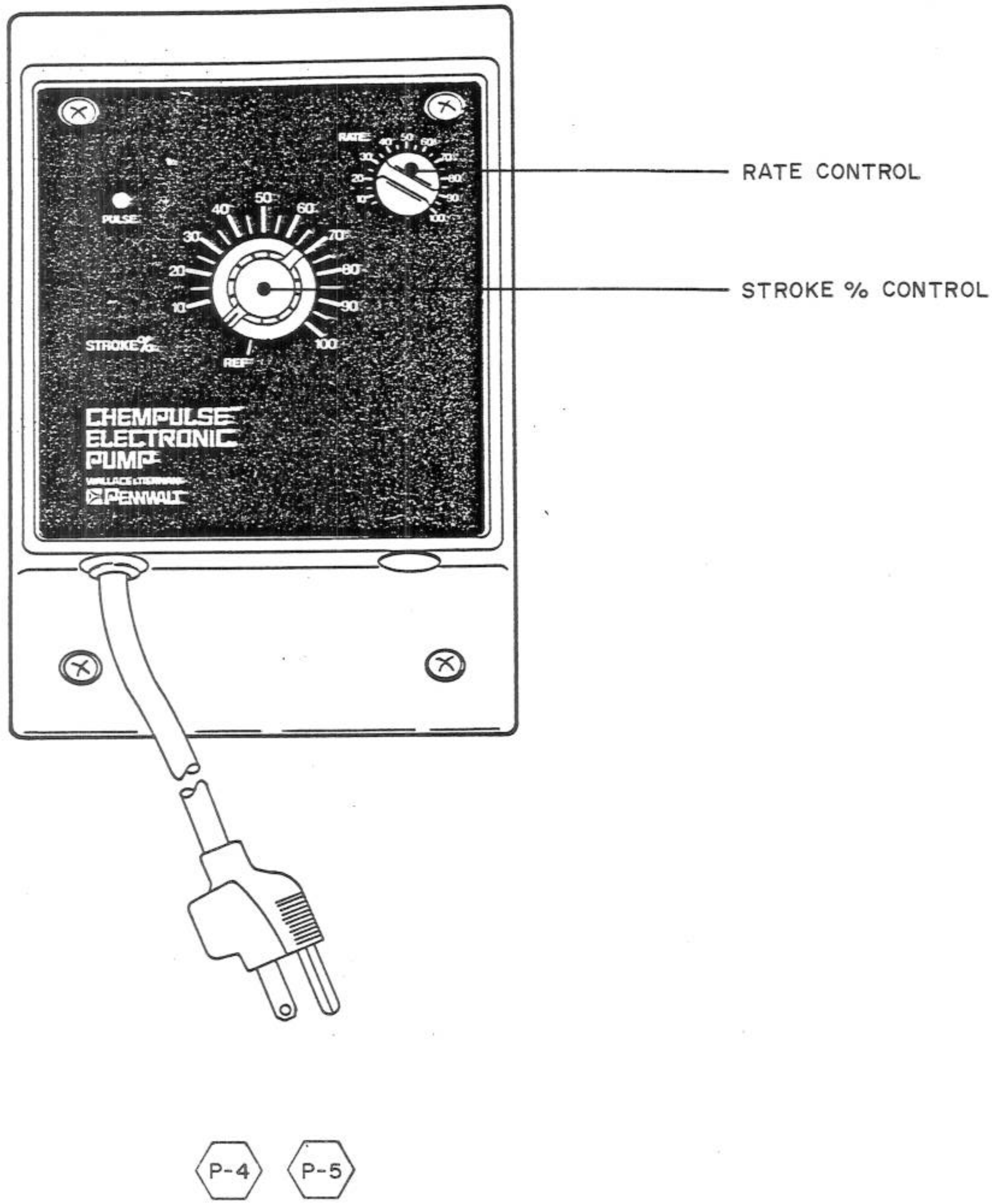

GCG DILLON Consulting Engineers and Planners	TITLE HYPOCHLORINATOR PUMP CONTROLS	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 8

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6.6 Fire Hydrant

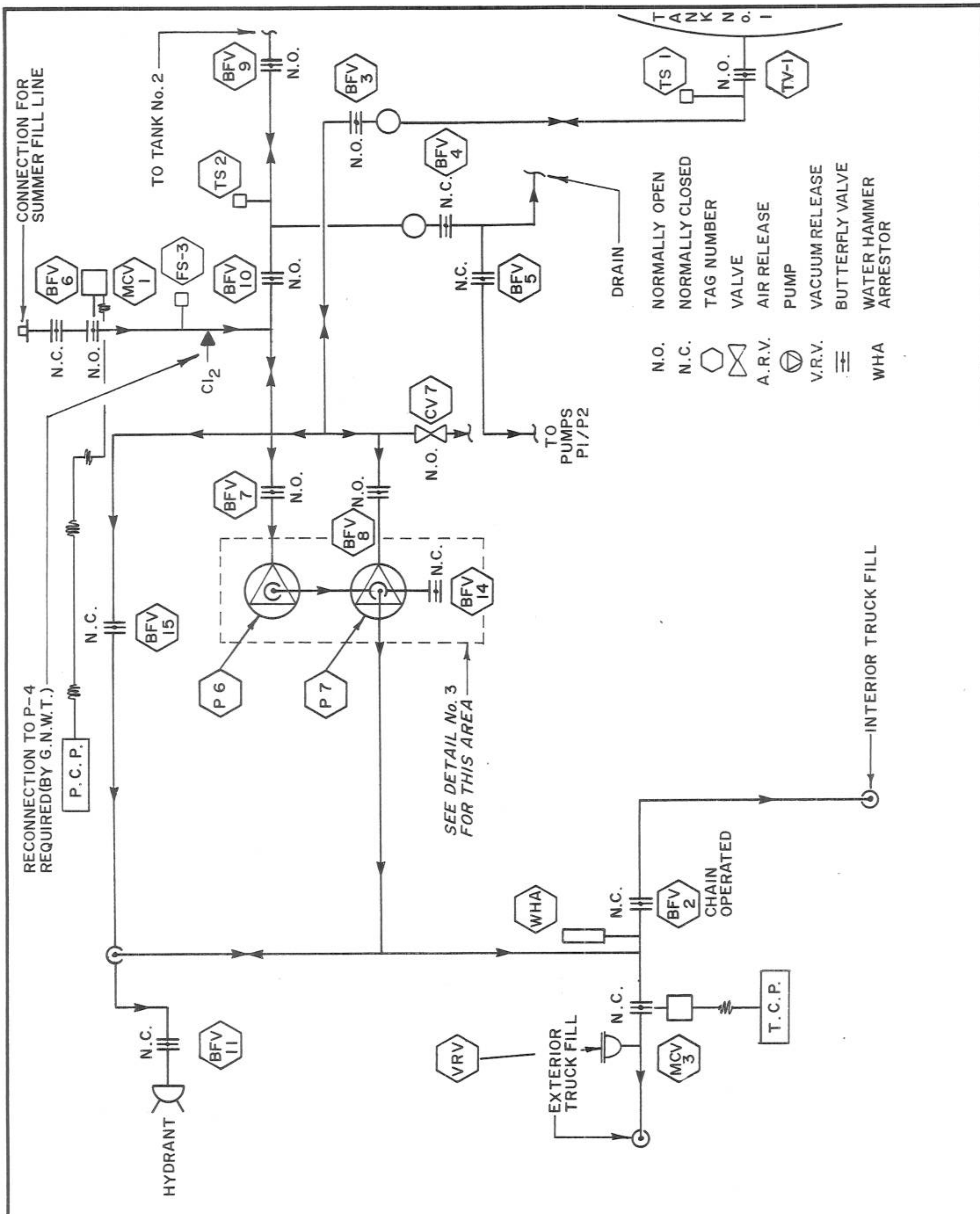
Located on the maintenance garage exterior wall adjacent to the truck fill station is the siamese wall hydrant.

To establish flow to the hydrant Valve BFV-11 located on the building wall interior side of the hydrant must be opened.

Flow to the hydrant can be either by gravity or with the use of the Delivery Pumps (P-6 or P-7).

In the event that the delivery pumps are inoperable, Valve BFV-15 on the pump by-pass line should be opened.

To prevent damage and/or abnormal operating conditions to the pumping system when use of the hydrant is not required, ensure that Valves BFV-11 and BFV-15 are in a closed position and that the hydrant has been allowed to drain free of water before replacing caps.



GCG DILLON Consulting Engineers and Planners	TITLE WATER SUPPLY PUMPING SYSTEM	PROJECT NO. 9893 – 05
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6.7 Storage Tanks No. 1 and 2

The storage of water is accomplished by means of two(2) welded steel insulated tanks with internal protective coatings.

Normal procedures that should be followed are:

1. Prior to filling ensure that all piping and manholes are bolted into place.

2. Ensure that vent/overflow piping is not blocked (see Section 6.7.1 for additional information).

3. During filling and on a regular basis thereafter check all piping and manholes for leaks and re-tighten bolts as required.

6.7.1 Storage Tanks Vent/Overflow Piping

Tank No. 1 Vent/Overflow

When originally constructed Tank No. 1 was equipped with a vacuum/air release valve. This valve and associated piping is still in use and is located within the walkway connecting Tank No. 1 to the maintenance garage and within the maintenance garage.

Operations staff should ensure that this equipment is maintained and functioning or damage may occur to the storage tank.

Tank No. 2 Vent/Overflow

The vent/overflow piping is located within the tank and is open to the atmosphere via a shell nozzle. **It is imperative that this piping remain clear at all times.**

The nozzle is equipped with heat tracing which should be left on at all times. An amperage meter is located on the Plant Control Panel (HT-100) which shows current draw. If the meter is not registering the operator must immediately check the system and repair as necessary.

Failure to maintain heat tracing could lead to freezing of pipe and possibly block free air/water movement which could result in structural damage or collapse to the tank.

6.8 Emergency Power

The pumping system has been provided with an emergency standby power generator for use in the event of N.C.P.C. disruptions.

The major components of this system include the following:

1. Diesel Engine
2. Generator
3. Automatic Transfer Switch
4. Battery Charger

6.8.1 Diesel Powered Generator

The generator was supplied by the G.N.W.T. and therefore operational data is not available and should be supplied by G.N.W.T.

6.8.2 Automatic Transfer Switch

The transfer switch located on the wall adjacent to the generator, runs automatically and except for periodic system test or maintenance no additional operational functions are required.

The following describes the automatic procedures of the transfer switch:

1. When the normal ac power supply voltage to the transfer switch drops to 70 per cent or less on any phase, the switch shall automatically start the emergency power generating plant after a set time delay and transfer the emergency load to the alternator.

2. When the normal power supply is restored to more than 90 per cent of normal voltage on all phases, the switch shall automatically transfer the emergency load back to the normal supply after a set time delay and stop the generating plant, leaving it in a ready state for the next automatic start-up.

3. A 0-60 second adjustable time delay on transfer to engine start has been provided to ignore momentary voltage dips and outages of the normal power supply.

4. An adjustable time delay (0 to 3 minutes) to permit engine warm-up before transfer to emergency power.

5. An adjustable time delay (0 to 3 minutes) to permit voltage stabilization of the normal supply before the load is transferred back to normal supply.

6. Voltage and frequency sensitive relays to prevent power transfer until the voltage and frequency of the emergency alternator are normal.

7. An adjustable time delay (0 to 10 minutes) after the load is transferred back to normal and before the engine is shut down. This will ensure the engine does not have to restart too frequently and allows engine cool down.

The transfer switch has been provided with an AUTO/TEST/OFF selector switch which initiates the following functions:

1. In AUTO position - send start signal to generating plant to start (after a predetermind delay) when a normal power failure takes place and carry out transfer when generator is running properly and shut off generator after cool down when normal power has been restored.

2. In TEST position - simulate a power failure and start generating plant as above.

NOTE: Operational staff should set switch to TEST position to verify that the system is functional on a weekly basis and run the generator unit for 1/2 hour before returning the switch to the "AUTO" position

6.8.3 Battery Charger

To ensure that the emergency generator will have power to operate its starter motor an external remote battery charger has been provided.

Located on the wall next to the transfer switch the battery charger is equipped with a toggle switch with "EQUALIZE" and "FLOAT" positions. The switch is normally left in the "FLOAT" position **but should be set on "EQUALIZE" for a 24 hour period every week.**

6.9 Special Procedures

6.9.1 Delivery Pump By-Pass

In the event of delivery Pumps P-6 and P-7 both being out of service and water flow cannot be maintained in the normal piping system of if increased gravity flow is required for the hydrant, the pump by-pass piping may be utilized.

Procedures to operate the system under these conditions are as follows:

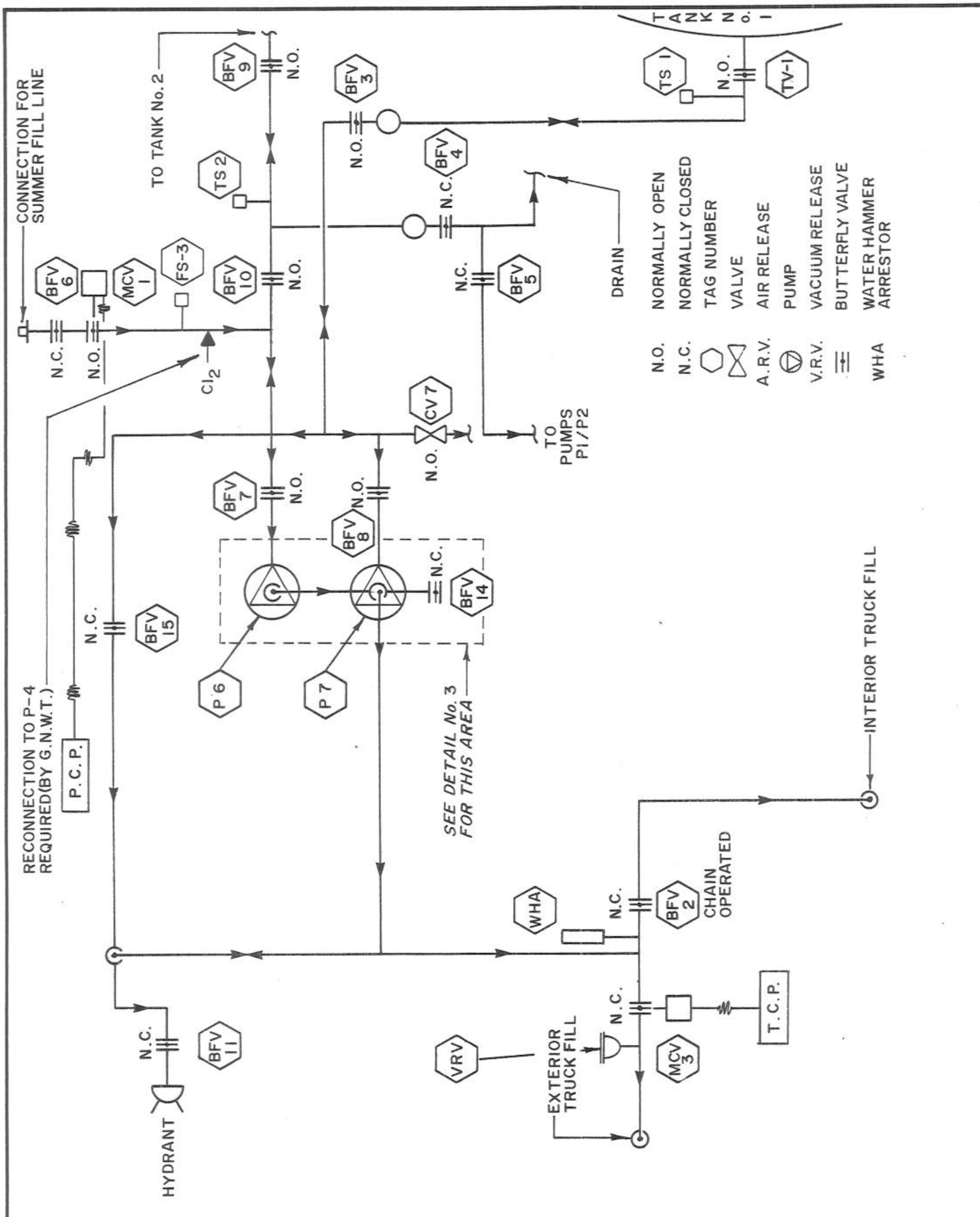
1. Close Valves BFV-7, 8, 12 and 13 (normally open) all located in pump room.

2. Open Valve BFV-15 (normally closed) located in pump room.

3. Open Valve BFV-11 (hydrant use only).

It should be noted that when using the system under these conditions that water flow is by gravity and reate of flow will vary according to water level in storage tanks.

The system should only be operated in an emergency under these conditions as no automatic chlorination of water can be achieved unless modifications are made. Refer to Section 6.5.3 for information on chlorination of water with use of household bleach.



GCG DILLON Consulting Engineers and Planners	TITLE: WATER SUPPLY PUMPING SYSTEM	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT: GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M — 2

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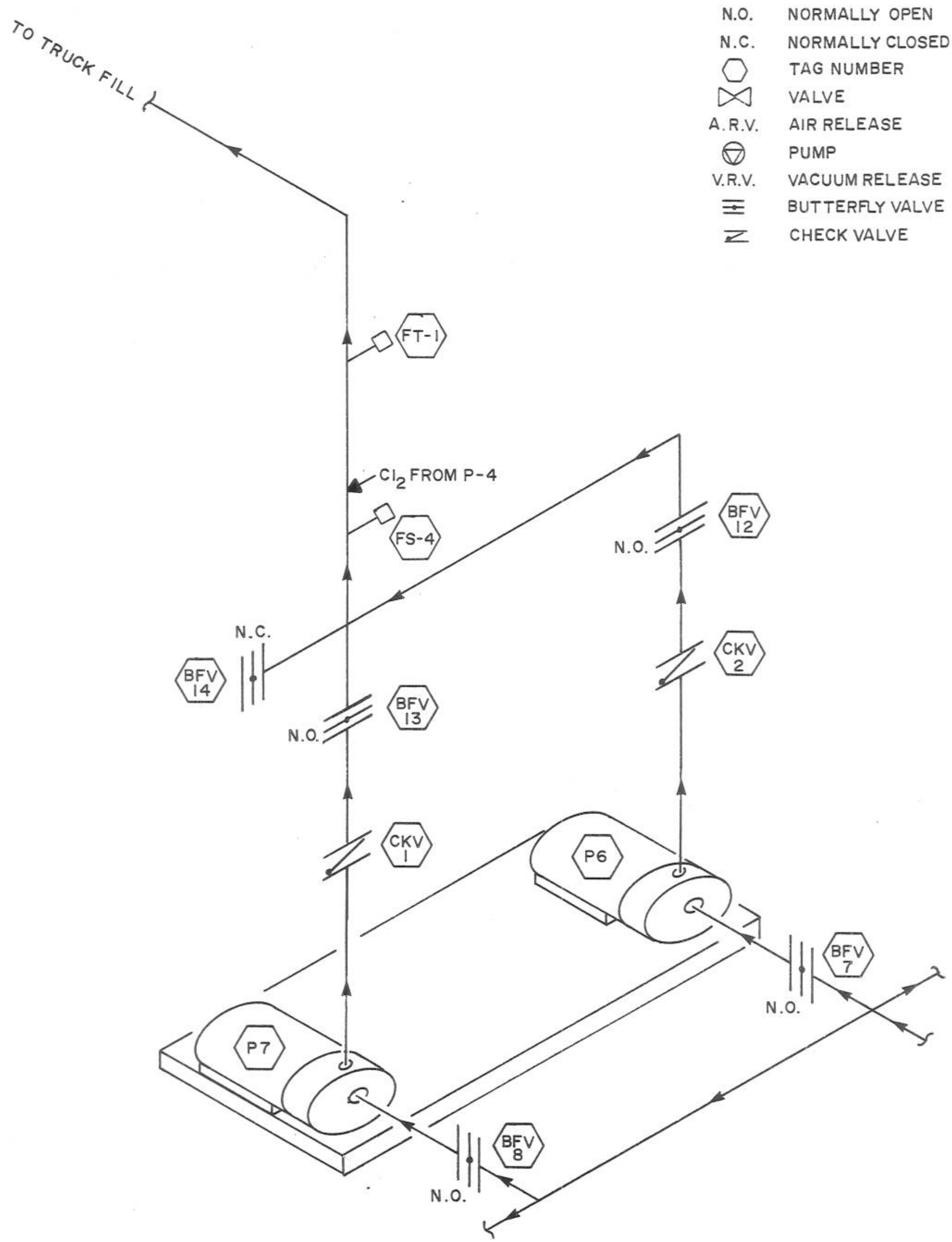

GCG DILLON Consulting Engineers and Planners	TITLE SERVICE PUMPS SCHEMATIC	PROJECT NO. 9893 - 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M — 3

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6.9.2 Heating System By-Pass of Valve MCV-2

In the event that MCV-2 is not operating correctly and heat is still required Valve MCV-2 may be by-passed.

The following procedure will allow by-passing of Valve MCV-2:

1. Open Valve CV-1.

2. Close Valves CV-2, 3 and 4.

NOTE: **Flow from the boilers to the heat exchanger is now continuous and the Temperature Indicator Controller (TIC) will not regulate flow of heating fluid. The operator must monitor temperature of water in tanks and manually turn boilers ON/OFF to regulate water temperature.**

6.9.3 Recirculation System By-Pass of Heat Exchanger

To by-pass the heat exchanger and maintain recirculation flow of water in the storage tanks the following procedure is to be followed.

1. Set Circulating Pump Selector switch on Plant Control Panel to P-1 position.

2. Open Valve CV-8.

3. Close Valves CV9, 10 & 11.

NOTE: **Pump P-2 cannot be used when by-pass piping is being used.**

CAUTION: No heating of storage tank water is done when using by-pass piping. Operator to turn "ON" Tank No. 2 yard piping heat tracing if freezing conditions exist. Normal operation procedures to be re-established as soon as possible to prevent damage due to freezing.

6.9.4 Operation of Pumps in Hand Mode

In the event that the need should arise to operate the Delivery Pumps P-6 and P-7 or the Circulating Pumps P-1 and P-2 other than by use of the switches on the Plant Control Panel the following procedures should be used.

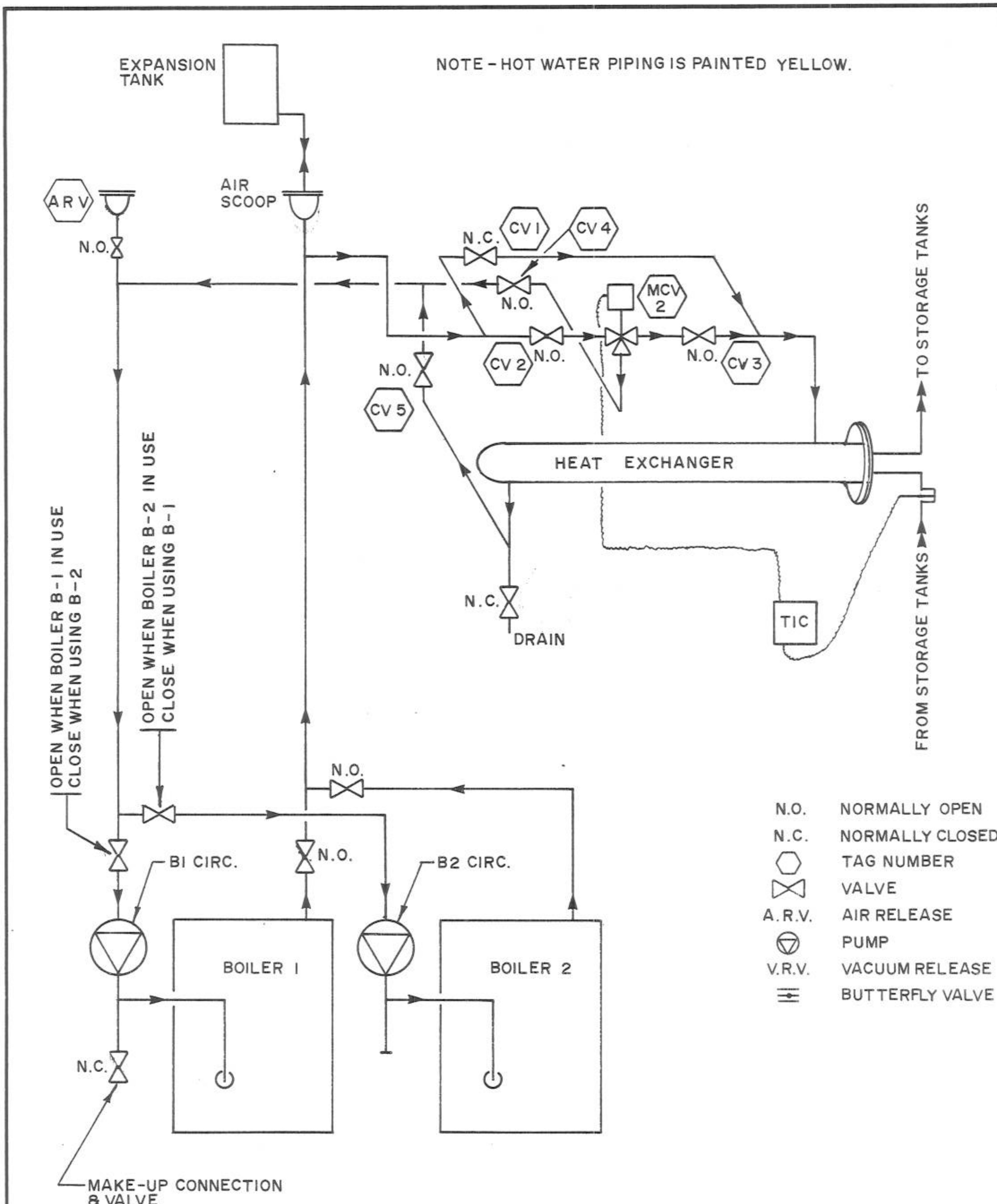
Delivery Pumps P-6 and P-7

1. Set Delivery Pump Selector switch on Plant Control Panel to OFF position.

2. Set either P-6 or P-7 (NOT BOTH) Motor Starter switch to HAND position. Motor Starters are located on wall next to Plant Control Panel.

3. When use of pump is completed set Motor Starter switch to either the OFF or AUTO position.

CAUTION: Do not use both pumps at the same time as damage to system components may result.



GCG DILLON Consulting Engineers and Planners	TITLE HEATING SYSTEM	PROJECT NO. 9893 – 05
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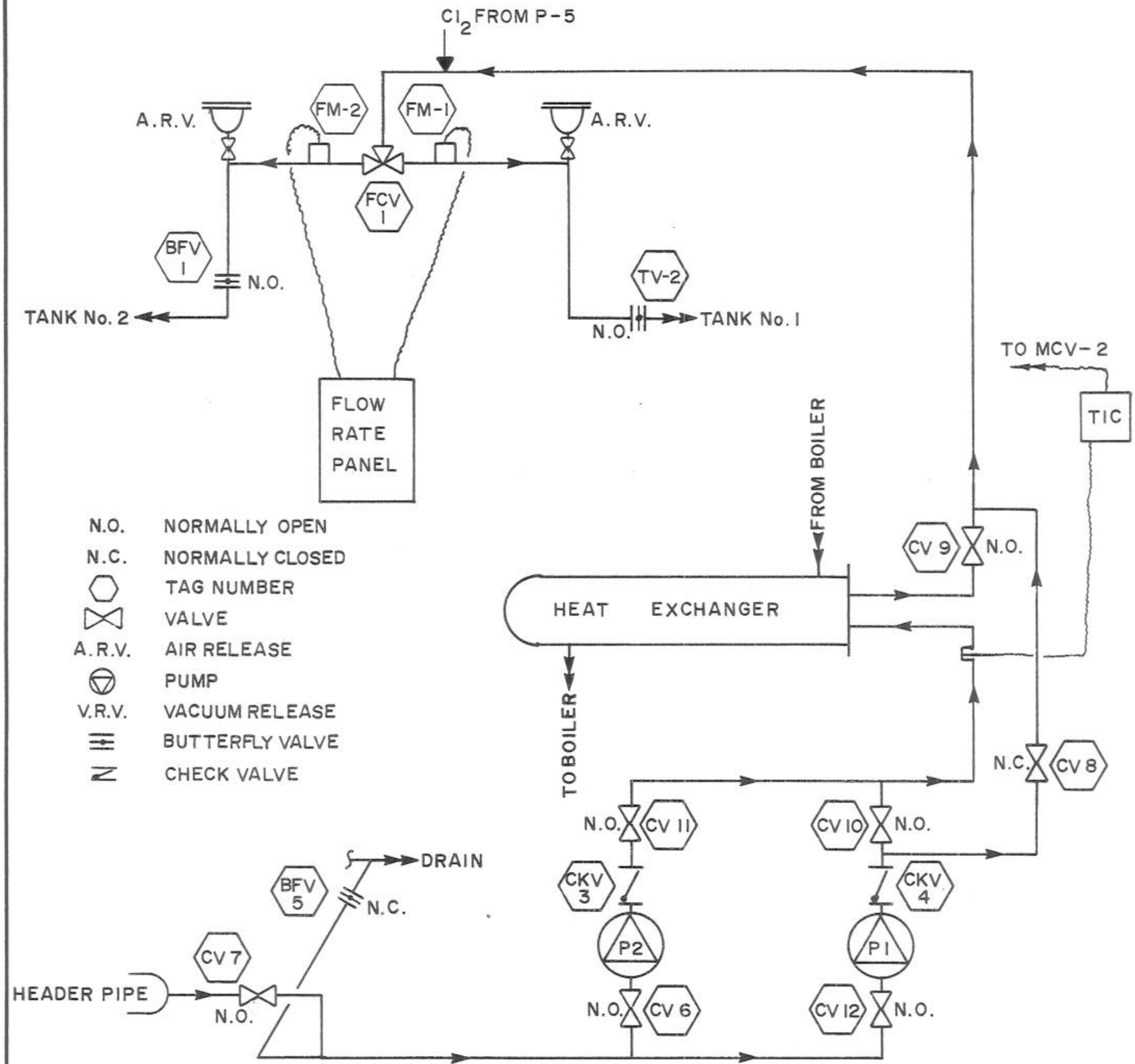

GCG DILLON Consulting Engineers and Planners	TITLE RECIRCULATION SYSTEM	PROJECT NO. 9893 - 05
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Circulating Pumps P-1 & P-2

1. Set Circulating Pump Selector switch on Plant Control Panel to OFF position.

2. Set either P-1 or P-2 or both Motor Starter switches to HAND position. Motor Starters are located on the wall next to the heat exchanger.

3. When use of pump(s) is completed set Motor Starter switch to either the OFF or AUTO position.

6.9.5 Tank No. 2 Yard Piping Heat Tracing

The piping connecting Tank No. 2 to the piping in the pump room has been supplied with electrical heat tracing. In the event that the Heating System or Recirculation System is not operating and there is a possibility of freezing the heat tracing should be turned ON.

The switches to operate the Heat Tracing are mounted on the wall directly above the piping where it penetrates the exterior building wall in the pump room.

When the Heat Trace is no longer required it should be turned OFF to conserve power consumption.

6.9.6 Exterior Truck Fill Non-Operational

If the Truck Control Panel or its associated components should fail to function properly the operations staff should refer to Sections 6.4.3, 6.5.3 and 6.9.1 for procedures to fill the water delivery truck.

6.9.7 Emergency Boiler Shut-Off

The Heating System Boilers B-1 and B-2 have been supplied with an Emergency Shut-Off switch. This switch is located on the wall in the maintanence garage next to truck fill overhead pipe support. The switch is identified by a tag and also the cover plate is red in colour.

6.9.8 Transfer of Stored Water

The system allows for the transfer of water from one storage tank to the other.

The following procedures will allow the operator to perform this in the event that it is required.

Tank No. 1 to Tank No. 2

1. Set Tank Selector switch on Plant Control Panel to TK1 & 2 position.

2. Close Valve TV-2 located in walkway to Tank No. 1.

3. Close Valves BFV-6, 9 & 10 located in pump room.

4. Remove blind flanges at BFV-14 and at tee with flange next to BFV-4, all in pump room.

5. Install kamloc flanges and hose between BFV-14 and tee next to BFV-4.

6. Open Valves BFV-9 and BFV-14.

7. Set Delivery Pump Selector switch on Plant Control Panel to either P-6 or P-7 position. Pump will start and indicator light will go ON.

CAUTION: Operator must manually monitor water level in Tank No. 2 and shut-off pump to prevent over-filling.

When either Tank No. 2 is full or Tank No. 1 empty, the following procedures must be done to return the system to normal operational status:

8. Set Delivery Pump Selector switch on Plant Control Panel to "R" position. Pump will stop and indicator light go OFF.

9. Close Valves BFV-9 and BFV-14.

10. Remove hamloc flanges and hose and replace blind flanges.

11. Close Valve TV-1 located in walkway to Tank No. 1.

12. Open Valves BFV-9 and BFV-10.

13. Set Tank Selector switch on Plant Control Panel to TK-2 position.

14. Set Valve FCV-1 so that total recirculation return flow is going to Tank No. 2. Valve FCV-1 is located on wall above service sink in pump room.

The system is now functional with Tank No. 2 as the only water supply source.

<u>Tank No. 2 to Tank No. 1</u>

1. Set Tank Selector Switch on Plant Control Panel to TK-1 & 2 position.

2. Close Valves BFV-1 & 3 located in pump room.

3. Close Valve TV-1, located in walkway to Tank No. 1.

4. Remove blind flanges at BFV-14 and at tee with flange next to Valve BFV-3.

5. Install kamloc flanges and hose between BFV-14 and tee next to BFV-3.

6. Open Valves TV-1 and BFV-14.

7. Set Delivery Pump Selector switch on Plant Control Panel to either P-6 or P-7 position. Pump will start and indicator light go ON.

CAUTION: Operator must manually monitor water level in Tank No. 1 and shut-off pump to prevent overfilling.

When either Tank No. 1 is full or Tank No. 2 is empty, the following procedures must be done to return the system to normal operational status:

8. Set Delivery Pump Selector switch on Plant Control Panel to "R" position. Pump will stop and indicator light go OFF.

9. Close Valves BFV-14 and TV-1.

10. Remove kamloc flanges and hose and replace blind flanges.

11. Close Valve BFV-9.

12. Open Valves BFV-3 and TV-1.

13. Set Tank Selector switch on Plant Control Panel to TK-1 position.

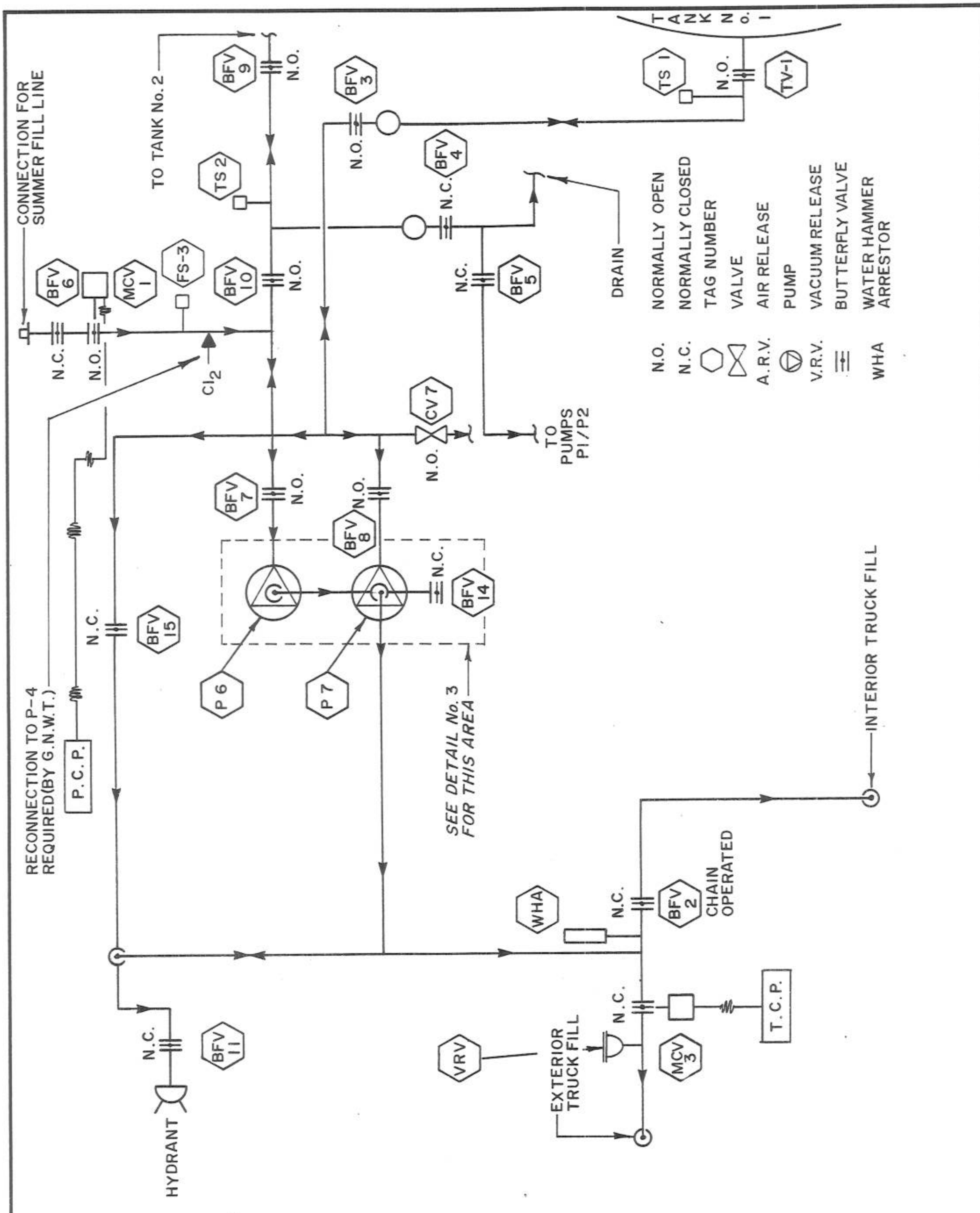
14. Set Valve FCV-1 so that total recirculation return flow is going to Tank No. 1. Valve FCV-1 is located on wall above service sink in pump room.

    The system is now functional with Tank No. 1 as the only water source.

CAUTION: **The operator must exercise care when performing the above procedures to prevent damage to pumps if allowed to run dry.**

The preceding operations will be useful if the requirement to have a storage tank taken out of service arises as water would not have to be wasted.

It would also facilitate the draining and cleaning of tanks on a staggered basis so as to have a minimum of one tank ready to accept new water for storage when the first run-off occurs.



GCG DILLON Consulting Engineers and Planners	TITLE WATER SUPPLY PUMPING SYSTEM	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 2

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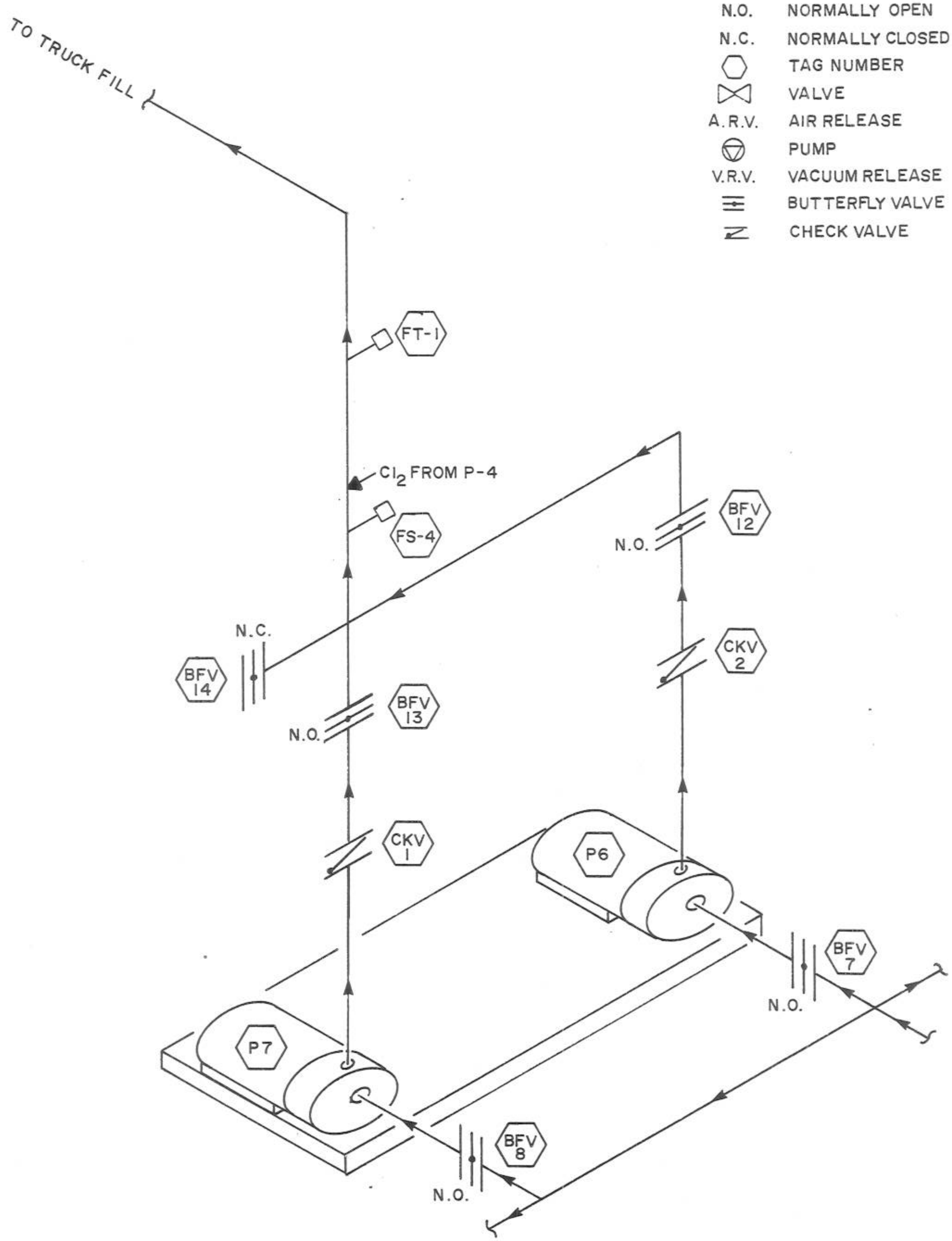

N.O.	NORMALLY OPEN
N.C.	NORMALLY CLOSED
⬡	TAG NUMBER
⋈	VALVE
A.R.V.	AIR RELEASE
⊽	PUMP
V.R.V.	VACUUM RELEASE
≑	BUTTERFLY VALVE
⊭	CHECK VALVE

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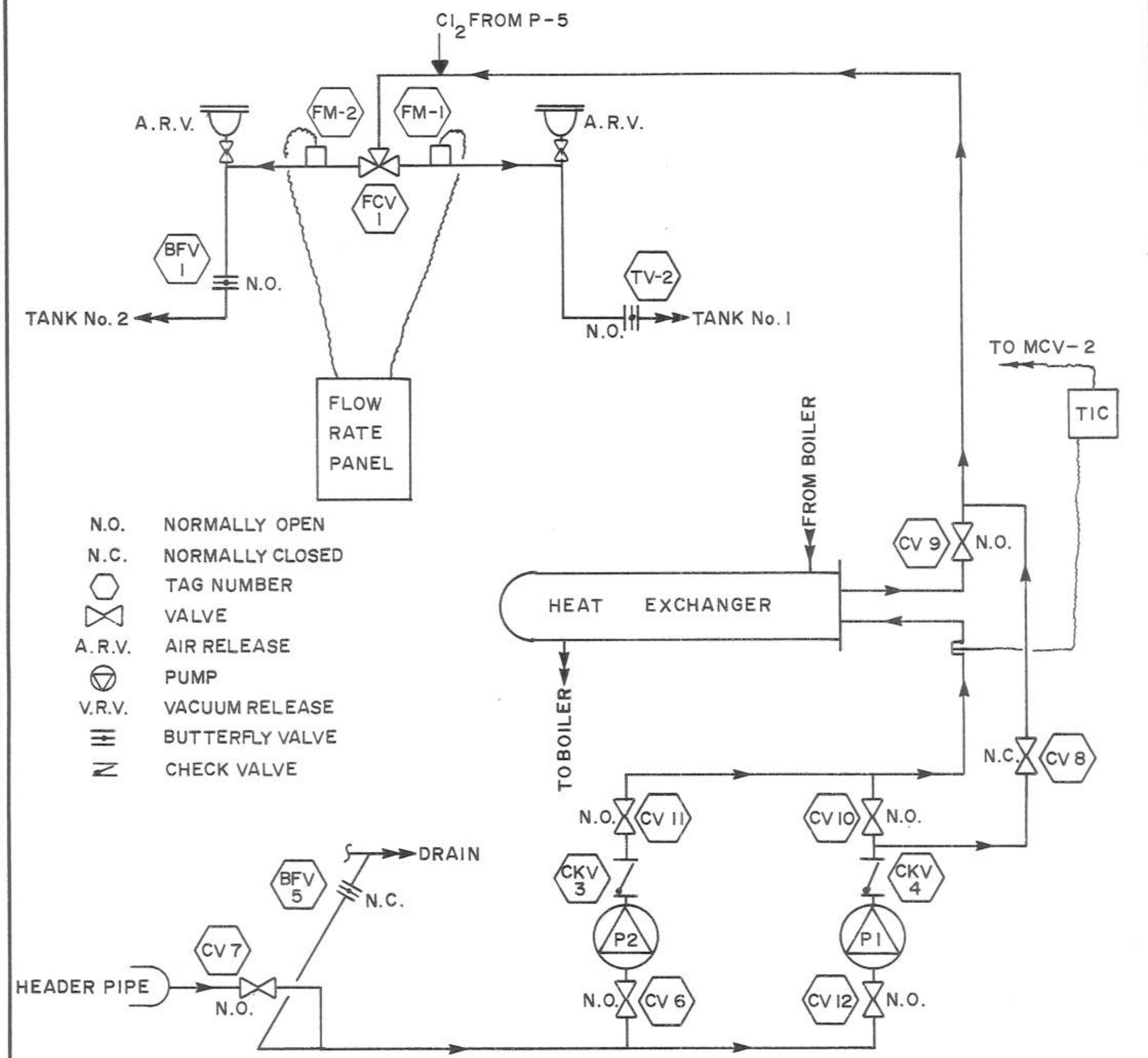

GCG DILLON Consulting Engineers and Planners	TITLE RECIRCULATION SYSTEM	PROJECT NO. 9893 – 05
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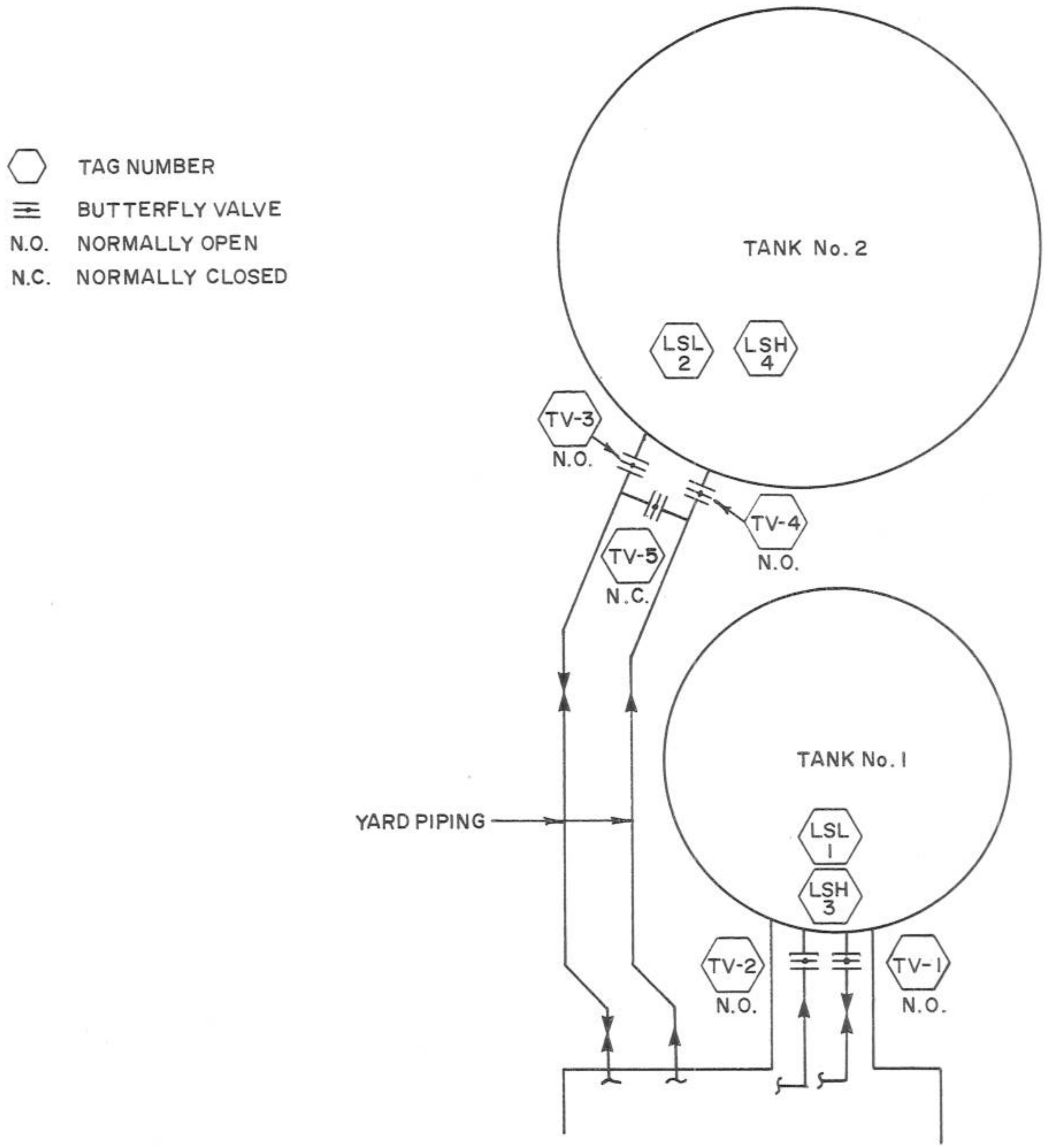

GCG DILLON Consulting Engineers and Planners	TITLE TANK VALVES	PROJECT NO. 9893–05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 6

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6.10 Alarms

Within the system are various components that will sense and trigger an alarm condition.

When an alarm has been triggered the following indicators will generally be evident:

1. Alarm horn will sound. Horn may be silenced by pressing the Alarm Horn Silencer button located on the Plant Control Panel.

2. Alarm light (red) on Plant Control Panel will be flashing.

3. Alarm light on exterior roof mounted status light standard will switch from green to red.

4. Equipment will automatically shut-down in some cases (see additional information this section).

NOTE: The Tank Selector switch located on the Plant Control Panel must be set at the TK1 & 2 position for the alarm system monitor both tanks simultaneously. Failure to set switch at this position may cause damage to system as only the tank indicated by the switch will be monitored for alarm conditions.

6.10.1 Hypochlorite Low Level

Indicator light on PCP and exterior status light will change to red and horn will sound.

Operator to prepare additional hypochlorite solution and transfer to holding tank.

6.10.2 Room Low Temperature

Thermostat located on wall adjacent to pump room door senses the air temperature of maintenance garage and activates alarms as described in 6.10.1.

Operator to increase temperature in maintenance garage.

Operator may adjust thermostat to desired setting to minimize alarm conditions.

6.10.3 Recirculation Line - Low Flow Tank No. 1 (Recirculation Line - Low Flow Tank No. 2 Similar)

When the flow of heated water returning to the storage tank drops below a preset level (operator to set alarm points on Flow Rate Panel) an alarm is activated as described in 6.10.1.

The operator must determine reason(s) for low/no flow in system and correct. Failure to re-establish flow of heated water to tanks could result in damage to the system due to freezing.

6.10.4 Tank No. 1 Low Temperature
(Tank No. 2 Low Temperature Similar)

Located on the suction/fill piping of the respective tanks are Temperature Switch TS-1 (Tank No. 1) and TS-2 (Tank No. 2). These components monitor the temperature of the water being drawn from the respective tanks on a continuous basis.

If the water temperature drops below the preset valve (35°F) set by the operator (using the adjustment knob on the component) an alarm will be activated as described in 6.10.1.

The operations staff must take necessary remedial measures to raise the temperature of the water as damage to the system may occur due to freezing.

6.10.5 Tank No. 1 High Level
(Tank No. 2 High Level Similar)

When the water level in a storage tank reaches a level which if exceeded would cause the tank to overflow a level switch (LSH-3 and LSH-4 for Tank No. 1 and No. 2 respectively) will activate an alarm as described in 6.10.1.

In addition to an alarm being activated the summer fill line will be shut-off by Valve MCV-1 automatically closing.

CAUTION: **The position of the Tank Selector Switch on the Plant Control Panel is critical. If during the filling operation of both tanks simultaneously the switch is not at the TK-1 & 2 position monitoring and automatic valve closure will not necessarily occur without overflowing of one of the tanks due to variances in high level alarm settings.**

The selector switch will only monitor the tank(s) as indicated at the various switch positions.

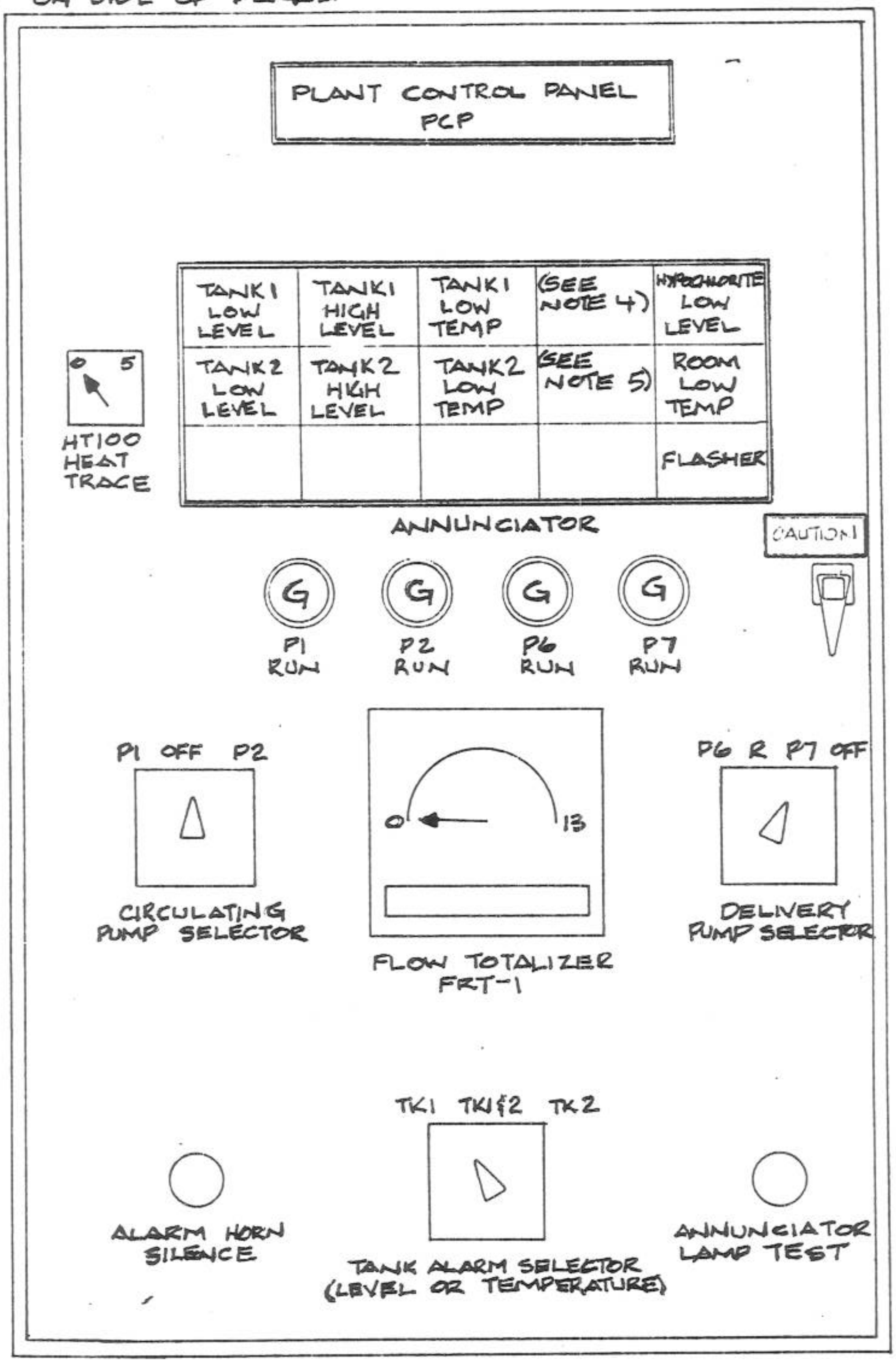
6.10.6 Tank No. 1 Low Level
(Tank No. 2 Low Level Similar)

When the water level in the storage tank is lowered to a preset level a Low Level Alarm will be activated (See 6.10.1).

In conjunction with the alarm indicators, Delivery Pumps P-6 and P-7 and Recirculating Pumps P-1 and P-2 will be automatically locked out (shut off) to prevent damaged to the pumps.

CAUTION: **The position of the Tank Selector Switch on the PCP is critical as the Low Level Alarm features incorporated into the system will only monitor the tank(s) as indicated by the various switch positions.**

NOTE:
ALARM HORN MOUNTED
ON SIDE OF PANEL



NOTES: 4. "RECIRCULATION LINE LOW FLOW TANK 1"
5 " " " " " TANK 2"

GCG DILLON Consulting Engineers and Planners	TITLE PLANT CONTROL PANEL (P.C.P.)	PROJECT NO. 9893 – 05
DATE JAN. 1988	PROJECT GRISE FIORD WATER SUPPLY SYSTEM	DETAIL NO. O/M – 9

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6.11 Trouble Shooting

6.11.1 General

The following is a general check list that the operations staff may use in event of equipment malfunction.

Reference should be made to manufacturers equipment data for additional information (see Chapter 10) and remaining material in this Section.

a) Emergency Generator Fails To Start

- Transfer Switch in "OFF" position
- battery dead
- controls on generator at improper position
- no fuel

NOTE: **Emergency generator was supplied by G.N.W.T. who should provide additional operational and maintenance information.**

b) Pump Does Not Deliver Water

- pump or suction pipe not completely filled with water (air bound)
- wrong direction of rotation
- valve closed
- pump and/or pipes clogged

c) <u>Pump Delivers Water At Low Capacity</u>

- pump or suction pipe not completely filled with water
- air leak into suction line
- air leak into pump
- impeller clogged
- wearing rings worn
- impeller damaged
- casing gasket defective (internal leakage)
- pipes partially clogged

d) <u>Pump Delivers At Low Pressure</u>

- wrong direction of rotation
- wearing rings worn
- impeller damaged
- internal leakage (casing gasket defective)

e) <u>Pump Will Not Start</u>

- circuit breaker or fuses tripped
- motor starters or remote switches off
- general power failure at station
- motor failure
- pump or motor seized (will not rotate)
- low level in storage tanks

f) Pump Vibrates or Is Noisy

- pump or suction pipe not completely filled
- operating near shut off
- impeller clogged
- misalignment
- shaft bent
- rotating part rubbing on stationary part
- bearings worn
- impeller damaged
- rotor out of balance
- excessive grease or oil in bearing housing
- lack of lubrication
- improper installation of anti-friction bearings
- dirt or rust on bearings

g) Electrical and Control Panel Malfunctions

It is not expected that the local operators will trouble-shoot these systems as personal harm and/or damage to components may result from unqualified personnel attempting such work.

6.11.2 Fill Line

Problem: No flow to tanks

1. Is there a High Level Alarm indicated?

   - Yes: See Section 6.2.2, 6.2.3 and 6.2.4 for normal operational procedures.

   - No: Go to Step No. 2.

2. Has fill line been installed according to Section 6.2.1.

   - Yes: Go to Step No. 3.

   - No: Install fill line according to Section 6.2.1.

3. Have Tank Filling procedures been done according to Sections 6.2.2, 6.2.3 or 6.2.4?

   - Yes: Go to Step No. 4.

   - No: Perform procedures according to Sections 6.2.2, 6.2.3 or 6.2.4.

4. Is there water in the impoundment pond?

   - Yes: Go to Step No. 5.

   - No: Wait for run-off to fill pond.

5. Is floating intake screen plugged?

   - Yes: Clean screen.

   - No: Go to Step No. 6.

6. Is hose connecting floating intake to steel pipe floating on pond surface?

   - Yes: Hose is probably air-locked. Try to push hose below water level so that air will escape through intake. If this cannot be done the hose must be removed from steel pipe in the pond, filled with water and reconnected.

   - No: Go to Step No. 7.

7. Close valve at pond and remove hose section connecting valve to plastic pipe. Open valve at pond. Is water flowing from valve freely.

   - Yes: Go to Step 8.

   - No: Pipe between valve and floating intake is plugged. Go to Step No. 13.

8. Close valve at pond and reconnect hose section. Go to pump room and close BFV-6. Remove hose section from pipe maintenance building. Open valve at pond. Does water flow freely from hose?

   - Yes: Go to Step No. 9.

   - No: Fill line is plugged or broken between pond and maintenance building. Go to Step No. 14.

9. Close valve at pond and reconnect hose section to pipe at maintenance building. Go to pump room and check if Valve MCV-1 is open.

   - Yes: Go to Step No. 10.

   - No: Go to Step No. 11.

10. Open Valve BFV-6 in pump room and valve at pond. Is there flow to the tanks?

   - Yes: Perform procedures according to Section 6.2.

   - No: Go to Step No. 1 and repeat procedures or seek additional assistance

11. Open Valve MCV-2 manually by lifting black plastic knob on top of valve motor and turning valve shaft with a wrench. Does the valve remain open?

- Yes: Go to Step No. 12

- No: Check Plant Control Panel for faulty alarm indicator lights and horn as valve would not close unless a High Level Alarm condition exists. Refer to Section 6.2 for Tank Filling procedures.

12. If Valve MCV-2 remains open, it indicates:
    a) no power supply to valve or;
    b) valve actuator (motor) is damaged or;
    c) Plant Control Panel is damaged.

    The operator should continue Tank Filling procedures and seek assistance for necessary repairs.

    CAUTION: As valve MCV-2 is not working correctly the operator must manually monitor tank levels and manually close valve(s) to prevent overfilling.

13. To clear plug in steel pipe, which is buried in pond bank, the operator must open valve at pond and using a long section(s) of rigid pipe of suitable size try to push through and/or break-up material causing blockage. Once plug is removed flush pipe and reconnect as required. Open valve at pond.

Is water flowing to tanks?

- Yes: Refer to Section 6.2 for Tank Filling procedures.

- No: Go to Step No. 8.

14. Starting at low end of fill line (by maintenance garage) loosen pipe couplings and check for water flow. When water flow is found at a pipe joint the blockage in the pipe is below (closer to maintenance garage) than this joint. Close valve at pond and check pipe until blockage is found and removed.

    Open valve at pond and flush pipe. Reconnect hose section to pipe at maintenance garage and open valve at pond and Valve BFV-6 in pump room.

    Is water flowing to tanks?

    - Yes: Refer to Section 6.2 for Tank Filling procedures.

    - No: Go to Step No. 11.

6.11.3 Heating System

Problem: No hot heating fluid at heat exchanger.

1. Has heating system been prepared according to Section 6.3.1 and 6.3.2?

   - Yes: Go to Step No. 2.

   - No: Refer to Section 6.3.1 and 6.3.2.

2. Is boiler circulating pump running?

   - Yes: Go to Step No. 4.

   - No: Go to Step No. 3.

3. Switch to other boiler. Refer to Section 6.3.1. Does circulating pump run?

   - Yes: Go to Step No. 4.

   - No: Fault in electrical power supply. Go to Step No. 13.

4. Is boiler operating?

   - Yes: Go to Step No. 5.

   - No: Go to Step No. 16.

5. Is Valve MCV-2 open?

   - Yes: Go to Step No. 6.

   - No: Go to Step No. 9.

6. Are pipes hot on downstream side of Valve MCV-2?

   - Yes: Go to Step No. 7 and seek assistance.

   - No: Go to Step No. 8 and seek assistance.

7. Blockage in heat exchanger or piping returning to boiler is probable cause. Shut-off heating system and drain. Check return piping from heat exchanger for blockage. If none found check heat exchanger.

   After blockage removed reinstall piping and fill heating system (see Section 6.3.2).

   Turn heating system on.

   Is heating system working properly?

   - Yes: Refer to Section 6.3 for operating procedures.

   - No: Go to Step No. 6.

8. Blockage in supply piping between boiler and heat exchanger is probable cause. Shut-off heating system and drain. Check and remove blockage from piping. Reinstall piping and fill system (see Section 6.3.2). Turn heating system on. Is heating system working properly?

   - Yes: Refer to Section 6.3 for operating procedures.

   - No: Go to Step No. 6.

9. Is temperature of water coming from tanks 40°F or higher?

   - Yes: System is okay. Refer to Section 6.3 for operation procedures.

   - No: Go to Step No. 10.

10. Valve MCV-2 is not working correctly and requires repair:

    - Close valves CV-2, CV-3 and CV-4.
    - Open valve CV-1.
    - Hot heating fluid should now be flowing. through heat exchanger.

    Is heat exchanger warming up?

    - Yes: Go to Step No. 11.

    - No: Go to Step No. 12.

11. Heating system is now working but the operator must manually monitor temperature of water in storage tanks and shut-off boiler when necessary so water in tanks is not overheated.

12. It is probable that the circulation pump on the boiler is not pumping correctly. Switch to the other boiler and repair or replace the broken pump.

    Is system operating correctly?

    - Yes: Refer to Section 6.3 for operating procedures.

    - No: Go to Step No. 2.

13. Is normal utility power ON?

    - Yes: Go to Step No. 14.

    - No: Go to Step No. 15.

14. Check that all switches, breakers and fuses are okay on heating system.

    Were faulty components found?

    - Yes: Repair/replace and go to Step No. 2.

    - No: Seek immediate assistance.

15. If normal utility power is not ON the emergency generator should be running.

Is generator running?

- Yes: Go to Step No. 14.

- No: Refer to Sections 6.8 and 6.11.1

16. Is fuel supply available for boiler?

- Yes: Go to Step No. 17.

- No: Obtain fuel and go to Step No. 4.

17. Boiler(s) need servicing. Refer to Chapter 10, brochure 10.15. When servicing is complete go to Step No. 4.

6.11.4 Recirculation System (Circulating Pumps P-1 and P-2)

Problem: Circulating Pump (P-1 and P-2) not running.

1. Is Low Level Alarm indicated on Plant Control Panel?

- Yes: Pumps are automatically shut-off to prevent damage. If Low Level Alarm is indicated for both tanks there is no more water. If alarm is for only one tank go to Step No. 2.

- No: Go to Step No. 3.

2. At Plant Control Panel set Tank Selector Switch to TK-1 or TK-2 position, whichever tank is not showing Low Level Alarm.

   Do pumps run?

   - Yes: Operate system using this tank and shut proper valves to other tank to prevent flow from full tank into empty tank.

   - No: Go to Step No. 3.

3. Using pump Motor Starters set selector switch(s) to HAND position.

   Does pump(s) run?

   - Yes: Fault in Plant Control Panel. Seek repair assistance. Pumps can be used in HAND position but must be manually turned ON and OFF.

   - No: Go to Step No. 4.

4. Check that circuit breakers in Panel "B" are ON and fuses in Motor Starters are okay. Once these checks are done try running pumps using the "HAND" position on the Motor Starter. Does pump run?

   - Yes: Go to Step No. 5.

   - No: Go to Step No. 6.

5. Set Motor Starter Selector switch at "AUTO" position and using Circulating Pump Selector switch on Plant Control Panel turn pump on. Does pump run?

   - Yes: System is okay.

   - No: Fault in Plant Control Panel. Seek repair assistance. Pumps can be used in "HAND" position but must be manually turned ON and OFF.

6. It is possible that the electrical controls for the pumps have developed a major fault. If after confirming that the pump(s) are not siezed and repeating the above procedures in detail does not correct the problem, qualified electrical repair personnel should be contacted to locate and repair fault.

   If both pumps should fail to run and the spare pump which was supplied has been installed and also fails to run the operator must **turn ON the Tank No. 2 yard piping heat tracing if freezing conditions exist.**

   It is critical that repairs be made as quickly as possible as damage to the system may occur if freezing conditions exist.

6.11.5 Recirculation System (Heat Exchanger)

Problem: Low or no flow through heat exchanger.

1. To determine if low or no flow is caused by blockage in heat exchanger close Valves CV-9, 10 & 11. Open Valve CV-8. Start Pump P-1 and record flow meter valves shown on Flow Control Panel. Go to Step No. 2.

2. Close Valve CV-8 and open Valves CV-9 and CV-10. Again record flow meter values shown on Flow Control Panel with Pump P-1 running. Go to Step No. 3.

3. If valves record in Step No. 1 are greater than those values recorded in Step No. 2 the tubes in the heat exchanger are either burst or plugged. Go to Step No. 4.

4. From storage locate spare tube bundle for heat exchanger which was supplied at time of construction. Remove old bundle from heat exchanger and install new one.

NOTE: If replacement of heat exchanger tube bundle is going to be delayed, water from the tanks should be kept circulating even though no heating can be done.

5. To maintain flow of water to the tanks close Valves CV-9, 10 & 11. Open Valve CV-8. Turn Pump P-1 on.

   If freezing conditions exist, **the heat tracing for the Tank No. 2 yard piping must be turned ON.** These switches are located on the wall directly above the pipes where they penetrate the wall.

CAUTION: Repairs to heat exchanger must be done as quickly as possible or damage to the tanks and piping may occur due to freezing.

6.11.6 Delivery Pumps P-6 & P-7

Problem: Delivery Pump (P-6 & P-7) not running.

1. Is Low Level Alarm indicated on Plant Control Panel.?

   - Yes: Pumps are automatically shut-off to prevent damage. If Low Level Alarm is indicated for both tanks there is no more water. If alarm is for only one tank go to Step No. 2.

   - No: Go to Step No. 3.

2. At Plant Control Panel set Tank Selector Switch to TK-1 or TK-2 position, whichever tank is not showing Low Level Alarm.

   Do pumps run?

   - Yes: Operate system using this tank and shut proper valves to other tank to prevent flow from full tank into empty tank.

   - No: Go to Step No. 3.

3. Using Pump Motor Starters set selector switch(s) to HAND position.

   Does pump run?

   - Yes: Fault in Plant Control Panel. Seek repair assistance. Pumps can be used in HAND position but must be manually turned ON and OFF.

   - No: Go to Step No. 4.

4. Check that circuit breakers in Panel "B" are ON and fuses in Motor Starters are okay. Once these checks are done try running pumps using the "HAND" position on the Motor Starter.

   Does pump run?

   - Yes: Go to Step No. 5.

   - No: Go to Step No. 6.

5. Set Motor Starter Selector switch at "AUTO" position and using Pump Selector Switch on Plant Control Panel turn pump on.

   Does pump run?

   - Yes: System is okay.

   - No: Fault in Plant Control Panel. Seek repair assistance. Pumps can be used in "HAND" position but must be manually turned ON and OFF.

6. It is possible that the electrical controls for the pumps have developed a major fault. If after confirming that the pump(s) are not siezed and repeating the above procedures in detail do not correct the problem, qualified electrical repair personnel should be contacted to locate and repair fault.

   If both pumps should fail to run, water will still be available for use by using gravity flow to fill the water delivery truck as described in Sections 6.4.3 and 6.9.1.

6.11.7 <u>Exterior Truck Fill</u>

Problem: No water flow.

1. Has system been prepared as described in Section 6.4.2.?

   - Yes: Go to Step No. 2.

   - No: Refer to Section 6.4.2.

2. Does Delivery Pump (P-6 or P-7) run?

   - Yes: Go to Step No. 3.

   - No: Refer to Section 6.11.6.

3. If fill system has been prepared for use as described in Section 6.4 the probable cause for no water at discharge point is failure of Valve MCV-3 to open.

   Valve MCV-3 automatically closes when power supply to valve motor is discontinued. Refer to Chapter 10, brochure 10.3 for trouble shooting items.

4. Filling of water truck must be done by using Interior Truck Fill as described in section 6.4.3 until Valve MCV-3 is repaired.

6.11.8 Plant Control Panel

It is not expected or necessarily desired that the operator perform trouble shooting in the Plant Control Panel. Personal injury and/or further damage may occur it persons unfamiliar with this equipment attempt repair.

The operator is expected to check and replace indicator lights as required.

1. Pump indicator lights may be checked by pushing the green plastic lens. If the light comes ON the indicator is okay.

   If the light does not come ON the bulb (spares supplied at time of construction) should be replaced.

   To replace bulb, remove the nut on exterior face of pond door and lens will come off.

2. The Alarm indicator lights may be tested by pushing the Annunciator Lamp Test button on the bottom right side of the Plant Control Panel. If a light fails to come ON the bulb should be replaced.

   To replace the bulb the black screw on the top of the indicator must be undone and the bulbs will be visible.

Note that there are 2 bulbs in each indicator, 1 for OK status and 1 with a red sleeve on bulb for Alarm status.

To check the Alarm status bulb the operator will have to simulate an alarm condition.

6.12 Record Keeping

In addition to maintaining the water supply system the operator is expected to carry out chlorine residual testing and record keeping on a daily basis.

The forms provided in this Section are to be completed by the operator and retained for future use.

A master copy of these forms have been provided and have been plastic laminated for protection. These master copies are to be retained in a secure location and used to photocopy additional forms when they are required.

6.12.1 <u>Daily Operation Records</u>

For Week Beginning Monday: ______________________

ITEM NAME	ITEM NO.	M	T	W	T	S	S	COMMENTS
Boiler No. 1		X	X	X	X	X	X	
a) Temperature	gauge on boiler							
b) Pressure								
Boiler No. 2		X	X	X	X	X	X	
a) Temperature	gauge on boiler							
b) Pressure								
Heating Fluid at Heat Exchanger	B-1 or B-2 running	X	X	X	X	X	X	
a) Temp. In	20							
b) Temp. Out	27							
c) Pressure In	25							
d) Pressure Out	30							
Water at Heat Exchanger	P-1 or P-2 running	X	X	X	X	X	X	
a) Temp. In	44							
b) Temp. Out	47							
c) Pressure In	43							
d) Pressure Out	48							

6.12.1 Daily Operation Records - continued

For Week Beginning Monday: ____________________

ITEM NAME	ITEM NO.	M	T	W	T	S	S	COMMENTS
Flow Rate Panel	P-1 or P-2 running							
a) Tank No. 1	60							
b) Tank No. 2	60							
Delivery Pumps (pumps must be running & truck being filled)	Pump flow to be taken P.C.P.							
a) P-6 suction	77							
b) P-6 discharge	82							
c) P-6 flow rate	108							
d) P-7 suction	79							
e) P-7 discharge	86							
f) P-7 flow rate	108							
Residual Chlorine								
a) Truck fill	--							
b) Tank No. 1	97							
c) Tank No. 2	94							

6.12.2 DAILY WATER CONSUMPTION AND TANK LEVEL RECORD

For Week Beginning Monday: ____________________

DAILY RECORDINGS

	MON.	TUES.	WED	THUR	FRI	SAT	SUN	COMMENTS
1. Flow Totalizer - Located on plant control panel - Records in litres								
2. Tank No. 1 level a) Tank gauge - Shows water level in FT/IN (Item No. 54)								
b) Tank gauge - Shows water level in metres (Item No. 56)								
3. Tank No. 2 Level - Tank gauge (Item No. 69) - Show water level in metres								

CHAPTER 7 - LUBRICATION AND MAINTENANCE SCHEDULES

CHAPTER 7 - LUBRICATION AND MAINTENANCE SCHEDULES

7.1 General

Maintenance and lubrication shall be accordance with manufacturers' recommendations. For detailed requirements and procedures, refer to manufacturers' brochures in Chapter 10 in Volume 2 of the Operation and Maintenance Manual.

It is expected that qualified electrical technician(s) will inspect the electrical systems a minimum of once a year. Due to the complex nature of this equipment and concern for human injury only **qualified personnel** should service this equipment.

7.2 LUBRICATION SCHEDULE

ITEM	LOCATION	PART TO BE LUBRICATED	LUBRICANT	FREQUENCY	REMARKS
Boiler B-1 circulating pump (9)	Boiler B-1	Pump Shaft	SAE-20 oil non detergent	6 months	Stop pump to oil. Do not overfill.
		Motor . 2 locations	SAE-20 oil non detergent	6 months	Stop pump to oil. Do not overfill.
Boiler B-2 circulating pump (13)	Boiler B-1	Same as B-1	Same as B-1	Same as B-1	Same as B-1
Recirculation Pumps P-1 & P-2 (39, 35)	Pump room	Same as B-1	Same as B-1	Same as B-1	Same as B-1
Boiler B-1 oil burner motor (11)	Boiler B-1	Motor . 2 locations	SAE-20 oil non detergent	6 months	Stop motor to oil. 5 drops to each location.
Boiler B-2 oil burner motor (12)	Boiler B-2	Same as B-1	Same as B-1	Same as B-1	Same as B-1
Emergency Generator Engine	Garage Area	Engine	As recommended by engine manufacturer	As required. Check every week	Change oil and filter every 6 months

7.2 LUBRICATION SCHEDULE - continued

ITEM	LOCATION	PART TO BE LUBRICATED	LUBRICANT	FREQUENCY	REMARKS
Hypochlorinator Pumps P-4 & P-5 (98, 99)	Pump room wall	Motor	SAE 10W-40 Motor Oil	Yearly	Refer to brochure 10.6 pg. 4.2.
Flow Sensor FM-1 & FM-2 (50, 59)	Pump room on recirculation piping	O-Rings and barrel	G.E. Silicone Compound #G660	6 months	Refer to brochure 10.18 pg. 9. Shut valves to isolate water flow.
Flow Sensor FT-1 (91)	Above pump room ceiling on Delivery Pumps discharge piping	O-Rings and barrel	G.E. Silicone Compound #G660	6 months	Refer to brochure 10.18 pg. 9. Shut valves to isolate water flow.
Transfer Switch	Garage Area	Refer to brochure 10.29	Refer to brochure 10.29	Yearly	To be done by qualilfied electrical personnel only.

7.3 MAINTENANCE SCHEDULE

ITEM	FREQUENCY					
	DAILY	WEEKLY	MONTHLY	6 MONTHS	ANNUAL	OTHER
FILL LINE & IMPOUNDMENT POND 1. Check impoundment pond slopes and regrade as necessary.					*	
2. Remove floatable litter from impoundment pond when fill line in use.	*					
3. Inspect fill line pipe for leaks: a) at start of season					*	
b) when in use	*					
c) at end of season					*	
4. Check floating intake and hoses for damage at start of filling season					*	

7.3 MAINTENANCE SCHEDULE - continued

ITEM	FREQUENCY					
	DAILY	WEEKLY	MONTHLY	6 MONTHS	ANNUAL	OTHER
HEATING SYSTEM						
1. Boilers B-1 & B-2 a) lubricate circulating pumps				*		
b) clean boiler flueways					*	
c) lubricate oil burner motor					*	
d) replace oil fuel filter					*	
e) replace oil burner nozzle					*	
f) check electrode settings on oil burner					*	
g) clean oil burner fan and blower housing					*	
h) check operation of safety pressure relief valve				*		
2. Check heating system piping for leaks	*					
3. Check operation of Valve MCV-2		*				
4. Check heat exchanger for leaks	*					
5. Check all temperature and pressure gauges	*					
6. Check that all valves operate freely.			*			

7.3 MAINTENANCE SCHEDULE - continued

ITEM	FREQUENCY					
	DAILY	WEEKLY	MONTHLY	6 MONTHS	ANNUAL	OTHER
RECIRCULATION SYSTEM 1. Circulating Pumps P-1 and P-2 a) lubricate pump and motor				*		
b) check for leaks in pump or abnormal noises	*					
2. Flow Sensors (FM-1 & FM-2) a) lubricate barrel and O-rings				*		
3. Heat Exchanger a) check pressure drop across heat exchanger	*					
b) check for leaks	*					
4. Check all temperature and pressure gauges	*					

7.3 MAINTENANCE SCHEDULE - continued

ITEM	FREQUENCY					
	DAILY	WEEKLY	MONTHLY	6 MONTHS	ANNUAL	OTHER
WATER PUMPING SYSTEM (TRUCK FILL) 1. Check for leaks in piping	*					
2. Check that all valves (manual and motor driven) operate freely			*			
3. Check that Water Hammer Arrestor has proper internal air pressure			*			
4. Check for leaks or abnormal noises in Delivery Pumps P-6 and P-7	*					

7.3 MAINTENANCE SCHEDULE - continued

ITEM	FREQUENCY					
	DAILY	WEEKLY	MONTHLY	6 MONTHS	ANNUAL	OTHER
HYPOCHLORINATION SYSTEM 1. Clean mixing and holding tanks						As required
2. Check injection tubing for leaks	*					
3. Hypochlorinator Pumps P-1 & P-2 a) check and add lubricating oil					*	
b) check and replace if necessary pump diaphragm and valve					*	
4. Check that pumps are pumping chlorine solution	*					

7.3 MAINTENANCE SCHEDULE - continued

ITEM	FREQUENCY					
	DAILY	WEEKLY	MONTHLY	6 MONTHS	ANNUAL	OTHER
STORAGE TANKS NO. 1 & 2 1. Clean tank interior surfaces					*	
2. Check all manholes and shell nozzles for leaks: a) while filling	*					
b) other than filling		*				
3. Check exterior painted metal surfaces and touch-up if required					*	
4. Check insulation protective coating on tank roofs and repair if damaged					*	
5. Check tank interior protective coatings for damage and signs of rusting					*	
6. Check and regrade as necessary tank pad fill slopes and Tank No. 2 Yard Piping Berm					*	

7.3 MAINTENANCE SCHEDULE - continued

ITEM	FREQUENCY					
	DAILY	WEEKLY	MONTHLY	6 MONTHS	ANNUAL	OTHER
EMERGENCY GENERATOR 1. Diesel Engine a) check oil level		*				
b) change oil and filter				*		
c) change fuel filter					*	
d) check coolant level		*				
e) check battery fluid level			*			
f) check exhaust system for leaks		*				
g) check for loose parts, leaks, etc.		*				
h) tune-up engine					*	
2. Generator a) check output of generator					*	
3. Battery Charger a) clean components					*	
b) check and recalibrate voltmeter					*	
4. Transfer Switch a) clean and lubricate internal components					*	
b) test internal components					*	
5. Operate generator as part of routine operational procedures		*				

7.3 MAINTENANCE SCHEDULE - continued

ITEM	FREQUENCY					
	DAILY	WEEKLY	MONTHLY	6 MONTHS	ANNUAL	OTHER
ELECTRICAL SYSTEMS 1. Plant Control Panel a) test indicator lights		*				
b) test all alarm functions (simulate alarm conditions if necessary)					*	
c) check operation of equipment with use of controls on P.C.P.					*	
d) check exterior status lights on maintenance garage roof (simulate alarm to check red status light)		*				
2. Truck Control Panel a) test indicator lights		*				
b) check panel heaters are on			*			
c) check operation of equipment with use of T.C.P.					*	
3. Boiler Controls a) check that selector switch and cut-off switches function properly			*			

7.3 MAINTENANCE SCHEDULE - continued

ITEM	FREQUENCY					
	DAILY	WEEKLY	MONTHLY	6 MONTHS	ANNUAL	OTHER
ELECTRICAL SYSTEMS - continued 4. Check that temperature and flow switches function properly					*	
5. Check motorized valves for function					*	
6. Check that Tank No. 2 yard piping heat trace functions				*		
7. Check that Tank No. 2 vent/overflow heat trace functions				*		

7.4 Tank Maintenance

Is is expected that on a yearly basis the interior of the water storage tanks will be cleaned to remove the dirt which has settled out of the water.

To prevent damage to the tank internal protective coatings the operations staff should have the following equipment available for use.

Staff Equipment

1. Rubber soled footwear.

   - This footwear should not be used for any other purpose than tank cleaning.

   - Footwear should be washed and checked that the soles are free of gravel or any other hard material which could damage the tank coating.

2. Rain suits, goggles etc. to protect staff.

3. Any other equipment as required by the G.N.W.T..

Cleaning Equipment

1. Pressure pump and hose with nozzle capable of spraying tank walls. Pump to be outside of tank.

2. Rubber squeegees.

3. Soft bristle brooms.

4. Vacuum suitable for use with water.

Entry into tanks should be minimized and no personnel or equipment which may damage coatings be allowed to enter.

CHAPTER 8 - TESTING AND CERTIFICATION DATA

8.1 Tank No. 2 Welding Inspection

NOTE: Radiographic film of welding inspection has been included in the master O & M manual which is retained by the G.N.W.T. - D.P.W. & H in Iqaluit, N.W.T..

HORTON

CBI

GCG DILLON CONSULTING LIMITED
FILE NO. 9893-03
REC'D. AUG 14 1987
FILE

DATE:

CUSTOMER: Mr. Roland Welker (P. Eng.)
#23 Building B
17420 Stony Plain Road
Edmonton, Alberta
T5S 1K6

Dear Sir:

The following itemized film from Contract No. H60729

Tank/Vessel No. 2 are hereby turned over to

your representative for storage.

LOCATIONS AND NUMBERS OF FILM:

1 - 4V1A	9 - LV1B	2V1C
2 - 4V2A	10 - 2H3B	2VC4
3 - 4V3A	11 - LV3B	LVC4
4 - 4V4A	12 - 2V4B	2HC4
5 - 4V5A	13 - 2HB6	30"H2D
6 - 4V6A		LV2D
7 - 4V7A		
8 - 2V1B		

SIGNATURES:

D. J. Budge
HORTON/CBI, LIMITED

Please return one signed copy.

CUSTOMER

ev. 1., Nov.20/79
orm HOW-1A

RADIOGRAPHIC INSPECTION REPORT
HORTON C.B.I. LIMITED

CONTRACT NO. 4H60729 | [ ] SHOP | [✓] FIELD | REPORT # 1 | PAGE 1 OF 1

ILM TYPE AND: AA KODAK
SINGLE FILM ✓ / DOUBLE FILM
SCREEN-TYPE & THICKNESS: LEAD .010
RADIOGRAPHY DATE: APRIL 17-19-87

CUSTOMER: NOACO INDUSTRIES RE-EC.G DILLON
LOCATION: GRISE FIORD N.W.
DESCRIPTION: 1-70'x36' C.R.S.

SOTOPE	DIA.&LGTH.	CURIES	FOCAL FILM DIST.	TIME	FOCAL SPOT SIZE	MAT'L THICKNESS
-RAY ✓	KV	MH	21"	3. MIN 2.30		.355 .267

INSTRUCTIONS FOR SPOT RADIOGRAPHY: EACH RADIOGRAPH MUST CLEARLY SHOW THE FOLLOWING INFORMATION: COMPANY NAME, CONTRACT NUMBER, CUSTOMER'S NAME, WELDERS' INITIALS, DATE OF EXPOSURE, FILM LOCATION, TANK NUMBER, FILM NUMBER. THIS INFORMATION MUST ALSO APPEAR ON THE INSPECTION REPORT UNDER THEIR PROSPECTIVE HEADINGS. THE WELDERS NAMES MUST APPEAR IN FULL.

ALL RADIOGRAPHS MUST BE REPORTED INDIVIDUALLY. REPORT ALL WELD DEFECTS AND INDICATE BY ABBREVIATION: (NF) FOR NON-FUSION, (C) FOR CRACKS, (S) FOR SLAG, (P) FOR POROSITY, (U) FOR UNDERCUT. FILM SHOWING UNACCEPTABLE DEFECT MUST BE ACCOMPANIED BY A FILM OF REPAIRED SECTION. THIS FILM MUST SHOW SAME FILM NUMBER AS ORIGINAL FOLLOWED BY AN (R) ABBREVIATION FOR REPAIR. ALL PARTS OF THE REPORT MUST BE FULLY COMPLETED.

AGW AND/OR HAND WELDER(S) NAME	TANK NO.	FILM NO.	SEAM LOCATION	PLATE THICK	REMARKS	DEFECTS TYPE	DEFECTS INS	RESHOTS 1	2	3	4	O
GERRY WEISSE C.W. ~~W.G~~	2	1	4V1A	.355								✓
GEORGE POTHORIN G.P.	"	2	4V2A	"								✓
" " "	"	3	4V3A	"								✓
GERRY WEISS G.W.	"	4	4V4A	"								✓
" " "	"	5	4V5A	"								✓
" " "	"	6	4V6A	"								✓
" " "	"	7	4V7A	"								✓
GEORGE POTHORIN G.P	"	8	2V1B	.267								✓
" " BOB LUST G.P B.L	"	9	LV1B	.267 .355	POROSITY OK. P.A							✓
BRIAN BADRY " " B.L B.B		10	2H3B	"								✓
" " " " B.B-BL G.P.		11	LV3B	"	POROSITY OK. P.A							✓
GERRY WEISS G.W		12	2V4B	.267								✓
" " G.POTHORIN C.W. G.P.		13	2HB6	.267 .355								✓

THE RADIOGRAPHY COVERED BY THIS REPORT HAS BEEN PERFORMED IN ACCORDANCE WITH THE APPLICABLE PROCEDURE.

GCRDULIC 4-19-87
SUPERINTENDENT DATE

P. SEMONUK II 4-19-87
RADIOGRAPHER(S) TITLE DATE

ALL INDICATIONS HAVE BEEN EVALUATED IN TERMS OF APPLICABLE ACCEPTANCE STANDARDS.

QA/NDT GRADER DATE

REVIEWED AND ACCEPTED BY:

[signature] 24-4-87
CUSTOMER INSPECTOR DATE

[signature] 4-19-87
CODE INSPECTOR DATE

Copies to Fort Erie Welding [signature] 5-12-87

ev. 1., Nov.20/79
rm HOW-1A

RADIOGRAPHIC INSPECTION REPORT
HORTON C.B.I. LIMITED

ONTRACT NO. 4H60729 — [ ] SHOP — [✓] FIELD — REPORT # 2 — PAGE 1 OF 1

ILM TYPE AA / ND KODAK	SINGLE FILM ✓ / DOUBLE FILM	SCREEN-TYPE & THICKNESS: LEAD .010	RADIOGRAPHY DATE: APRIL 20-21-87
USTOMER: WORLD INDUSTRIES FOR GCG DILLON	LOCATION: GRISE FIORD N.W.T.		DESCRIPTION: 1-70' x 32' C.R.S.T.

SOTOPE	DIA.&LGTH.	CURIES	FOCAL FILM DIST.	TIME	FOCAL SPOT SIZE	MAT'L. THICKNESS
-RAY ✓	KV	MH	21"	2.30		.267 / 1/4

INSTRUCTIONS FOR SPOT RADIOGRAPHY: EACH RADIOGRAPH MUST CLEARLY SHOW THE FOLLOWING INFORMATION: COMPANY NAME, CONTRACT NUMBER, CUSTOMER'S NAME, WELDERS' INITIALS, DATE OF EXPOSURE, FILM LOCATION, TANK NUMBER, FILM NUMBER. THIS INFORMATION MUST ALSO APPEAR ON THE INSPECTION REPORT UNDER THEIR PROSPECTIVE HEADINGS. THE WELDERS NAMES MUST APPEAR IN FULL.

ALL RADIOGRAPHS MUST BE REPORTED INDIVIDUALLY. REPORT ALL WELD DEFECTS AND INDICATE BY ABBREVIATION: (NF) FOR NON-FUSION, (C) FOR CRACKS, (S) FOR SLAG, (P) FOR POROSITY, (U) FOR UNDERCUT. FILM SHOWING UNACCEPTABLE DEFECT MUST BE ACCOMPANIED BY A FILM OF REPAIRED SECTION. THIS FILM MUST SHOW SAME FILM NUMBER AS ORIGINAL FOLLOWED BY AN (R) ABBREVIATION FOR REPAIR. ALL PARTS OF THE REPORT MUST BE FULLY COMPLETED.

AGW AND/OR HAND WELDER(S) NAME		TANK NO.	FILM NO.	SEAM LOCATION	PLATE THICK	REMARKS	DEFECTS TYPE	DEFECTS INS	RESHOTS 1	2	3	4	O
C. WEISS / G. POTHORAIN	C.W. / G.P.	#2		2V1C	1/4"								✓
B. LUST / G. POTHORIN	B.L. / G.P.	"		2VC4	1/4"								✓
B. LUST / B. BADAY	B.L. / B.B.	"		LVC4	1/4"								✓
" / G. POTHORIN	B.B. / G.P.	"		2HC4	1/4								✓
C. WEISS / G. POTHORIN	C.W. / G.P.	"		30" H2D	1/4								✓
C. WEISS / G. POTHORIN / B. LUST	C.W. / G.P. / B.L.	"		LV2D	"								✓

RETURN FILM & SIGNED REPORT TO
GCG DILLON CONSULTING LIMITED
ATTENTION
ROLAND WELKER P.ENG.
#23 BUILDING B
17420 STONY PLAIN RD
EDMT ALTA
T5S 1K6

THE RADIOGRAPHY COVERED BY THIS REPORT HAS BEEN PERFORMED IN ACCORDANCE WITH THE APPLICABLE PROCEDURE.	ALL INDICATIONS HAVE BEEN EVALUATED IN TERMS OF APPLICABLE ACCEPTANCE STANDARDS.	REVIEWED AND ACCEPTED BY:
G. ORDULIC 4-20-87 — SUPERINTENDENT / DATE		[signature] 24-4-87 — CUSTOMER INSPECTOR / DATE
P. SEMONICK II 4-20-87 — RADIOGRAPHER(S) / TITLE / DATE	QA/NDT GRADER / DATE	[signature] 4.20.87 — CODE INSPECTOR / DATE

Copies to Fort Erie Welding

[signature] III 5-12-87

INDUSTRIAL STRESS LTD.
7615 - 132 AVENUE, EDMONTON, ALBERTA T5C 2B2 • PH. 476-0563

May 12, 1987

GCG Dillon
Consulting Engineers & Planners
No. 23, Building B,
17420 Stony Plain Road
Edmonton, Alberta
T5S 1K6

GCG DILLON CONSULTING LIMITED			
FILE NO. 9893-03			
REC'D. MAY 13 1987			
	WWI		
	MW.		
E	DON		
			FILE

Attention: Roland Welker, P. Eng.
Project Engineer

Reference: QUALITY CONTROL INSPECTION
GRISE FIORD, N.W.T.

Dear Sir:

Enclosed is Shell Stretchout of #2 Tank at Grise Fiord, the information it contains is self-explanatory.

I took x-rays and did visual checks of the welding during the course of erecting this tank. All welding was done in accordance to API 650 Code.

I Magnafluxed and Soap Air Tested with no visual defects found. The outer shell and bottom corner-weld were tested with diesel fuel being applied to the welded area, no visual defects were found of the shell, three leaks were found in the corner-weld, these were gouged out, re-welded and re-tested all tested O.K..

The roof and floor were Soap Air Vacuum tested at approximately 5 - 10 PSI and no leaks were found.

Your Field Representative on site - Mr. Dave O'Niel, witnessed the above testing.

Thank you for the opportunity to handle this work, I remain,

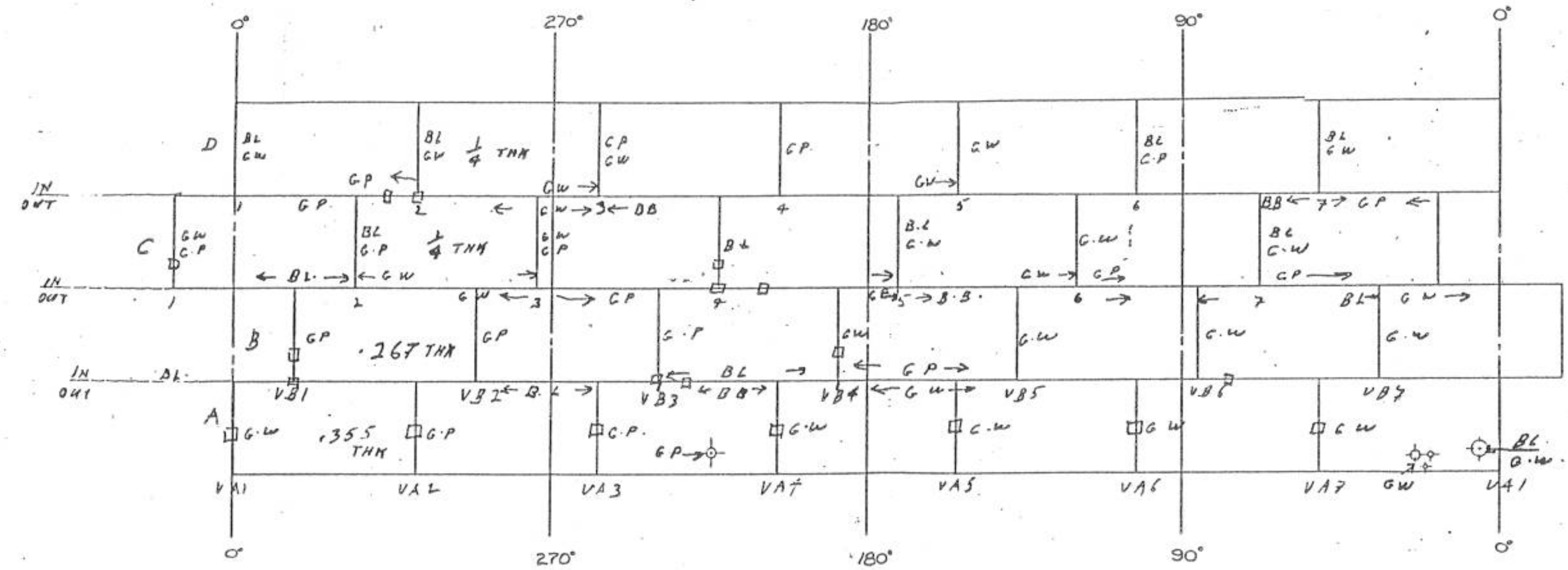
Yours truly,
INDUSTRIAL STRESS LTD.

P. Semonick

P. Semonick

WELDERS & SYMBOLS

GERRY WEISS	G.W.
BOB LUST	B.L
GEORGE POTHORIN	G.P.
BRIAN BADRY	B.B.



19 – □ GOOD X RAY
0 – ■ REPAIR X RAY
TOP INITIAL WELDED IN
BOT INITIAL WELDED OUT
ONE INITIAL BOTH SIDES

STRETCHOUT
(OUTSIDE VIEW)

COMPLETED 5-1-87
PROJ. No. 85-4506
L. GORDULIC

B. Semonick for Industrial Steel

HORTON CBI, LIMITED

SHELL STRETCHOUT
70'-0" ø x 36'-0" HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOV'T N.W.T.
GRISE FIORD — N.W.T.

CONTRACT NO. H60729
DWG NO. 250 REV 0
CO-ORDINATOR RLH

PLANS MADE AT FORT ERIE

Rev. 1., Nov.20/79
Form HOW-1A

RADIOGRAPHIC INSPECTION REPORT
HORTON C.B.I. LIMITED

CONTRACT NO. 4H60729

[ ] SHOP [✓] FIELD

REPORT # 1 | PAGE 1 OF 1

FILM TYPE AA / ND KODAK	SINGLE FILM ✓ / DOUBLE FILM	SCREEN-TYPE & THICKNESS LEAD .010	RADIOGRAPHY DATE APRIL 17-19.87

CUSTOMER MONCO INDUSTRIES RE: S.C.S. DILLON
LOCATION GARISE FIARD N.W
DESCRIPTION 1-70 #36 C.R.S.T

ISOTOPE	DIA.&LGTH.	CURIES	FOCAL FILM DIST.	TIME	FOCAL SPOT SIZE	MAT'L THICKNESS
X-RAY ✓	KV	MH	21 "	3 MIN / 2 MIN		.355 / .267

INSTRUCTIONS FOR SPOT RADIOGRAPHY: EACH RADIOGRAPH MUST CLEARLY SHOW THE FOLLOWING INFORMATION: COMPANY NAME, CONTRACT NUMBER, CUSTOMER'S NAME, WELDERS' INITIALS, DATE OF EXPOSURE, FILM LOCATION, TANK NUMBER, FILM NUMBER. THIS INFORMATION MUST ALSO APPEAR ON THE INSPECTION REPORT UNDER THEIR PROSPECTIVE HEADINGS. THE WELDERS NAMES MUST APPEAR IN FULL.

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AGW AND/OR HAND WELDER(S) NAME		TANK NO.	FILM NO.	SEAM LOCATION	PLATE THICK	REMARKS	DEFECTS TYPE	DEFECTS INS	RESHOTS 1	2	3	4	OK
GERRY WEISS	G.W.	2	1	4V1A	.355								✓
GEORGE POTHORAIN	G.P.	"	2	4V2A	"								✓
" "	"	"	3	4V3A	"								✓
GERRY WEISS	G.W.	"	4	4V4A	"								✓
" "	"	"	5	4V5A	"								✓
" "	"	"	6	4V6A	"								✓
" "	"	"	7	4V7A	"								✓
GEORGE POTHORAIN	G.P	"	8	1V1B	.267								✓
" " BOB LUSI	G.P / B.L	"	9	LV1B	.267 / .355	POROSITY OK. [illegible]							✓
BRIAN BADRY " "	G.L / B.B		10	2H3B	"								✓
" " " "	G.B-G.L / G.P.		11	LV3B	"	POROSITY OK. [illegible]							✓
GERRY WEISS	G.W.		12	2V4B	.267								✓
" " G.POTHORAIN	G.W. / G.P.		13	2HB6	.267 / .355								✓

THE RADIOGRAPHY COVERED BY THIS REPORT HAS BEEN PERFORMED IN ACCORDANCE WITH THE APPLICABLE PROCEDURE.

GORDALIC 4-19-87
SUPERINTENDENT DATE

P. SEMINUK II 4-19.87
RADIOGRAPHER(S) TITLE DATE

ALL INDICATIONS HAVE BEEN EVALUATED IN TERMS OF APPLICABLE ACCEPTANCE STANDARDS.

QA/NDT GRADER DATE

REVIEWED AND ACCEPTED BY:

[signature] 24-4-87
CUSTOMER INSPECTOR DATE

[signature] 4/1-87
CODE INSPECTOR DATE

2 Copies to Fort Erie Welding

Rev. 1., Nov.20/79
Form HOW-1A

RADIOGRAPHIC INSPECTION REPORT
HORTON C.B.I. LIMITED

CONTRACT NO. 41160729 — [ ] SHOP [✓] FIELD — REPORT # 2 — PAGE 1 OF 1

FILM TYPE AA
BR KODAK

SINGLE FILM ✓
DOUBLE FILM

SCREEN-TYPE & THICKNESS: LEAD .010

RADIOGRAPHY DATE: APRIL 20-21-87

CUSTOMER WORLD INDUSTRIES FOR GCG-DILLON
LOCATION GRISE FIORD N.W.T.
DESCRIPTION 1-70/136 C.R.S.T.

ISOTOPE	DIA.&LGTH.	CURIES	FOCAL FILM DIST.	TIME	FOCAL SPOT SIZE	MAT'L THICKNESS
X-RAY ✓	KV	MH	21"	2.30		.267 / 1/4

INSTRUCTIONS FOR SPOT RADIOGRAPHY: EACH RADIOGRAPH MUST CLEARLY SHOW THE FOLLOWING INFORMATION: COMPANY NAME, CONTRACT NUMBER, CUSTOMER'S NAME, WELDERS' INITIALS, DATE OF EXPOSURE, FILM LOCATION, TANK NUMBER, FILM NUMBER. THIS INFORMATION MUST ALSO APPEAR ON THE INSPECTION REPORT UNDER THEIR PROSPECTIVE HEADINGS. THE WELDERS NAMES MUST APPEAR IN FULL.

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AGW AND/OR HAND WELDER(S) NAME		TANK NO.	FILM NO.	SEAM LOCATION	PLATE THICK	REMARKS	DEFECTS TYPE	DEFECTS INS	RESHOTS 1	RESHOTS 2	RESHOTS 3	RESHOTS 4	OK
E. WEISS C. POTHIORIN	C.W. C.P.	#2		2VIC	1/4								✓
B. LUST C. POTHIORIN	B.L. C.P.	"		2VC4	1/4								✓
B. LUST B. BADRY	B.L. B.B.	"		LVC4	1/4								✓
" C. POTHIORIN	B.B. C.P	"		2HC4	1/4								✓
E. WEISS C. POTHIORIN	C.W. C.P	"		30" H20	1/4								✓
E. WEISS C. POTHIORIN B. LUST	C.W. C.P B.L.	"		LV20	"								

RETURN FILM & SIGNED REPORT TO
GCG DILLON CONSULTING LIMITED

THE RADIOGRAPHY COVERED BY THIS REPORT HAS BEEN PERFORMED IN ACCORDANCE WITH THE APPLICABLE PROCEDURE.

L. CORBEILLE 4-20-87
SUPERINTENDENT DATE

P. LEMOINE II 4-20-87
RADIOGRAPHER(S) TITLE DATE

ALL INDICATIONS HAVE BEEN EVALUATED IN TERMS OF APPLICABLE ACCEPTANCE STANDARDS.

QA/NDT GRADER DATE

REVIEWED AND ACCEPTED BY:

[signature] 24-4-87
CUSTOMER INSPECTOR DATE

[signature] 4-20-87
CODE INSPECTOR DATE

2 Copies to Fort Erie Welding

HORTON
CBI

REPORT NO. SFT 1

SOLUTION FILM INSPECTION REPORT

PROCEDURE NO. S·F·I REGION WEST SHOP ☐ FIELD ☑

CONTRACT NO. 4H 60729 TANK OR VESSEL NO 2 DATE 5·2·87

METHOD USED

VACUUM ROOF & FLOOR DIRECT PRESSURE SHELL FITTINGS

PRESSURE ("Hg) 7 TO 8 LBS PRESSURE ("Hg) 4 TO 5 LBS
(1 psi = 2.04" Hg)

DESCRIBE EXACT PART, PIECE AND LOCATION THAT WAS CHECKED:

APRIL 29 VACUUM ROOF NO VISIABLE DEFFECTS FOUND

APRIL·30 VACUUM FLOOR NO VISIABLE DEFFECTS FOUND

3A SHELL MANHOLE
7C 2" SHEL NOZZLE
7A 6" DOUBLE FLG SHELL NOZZLE
5A 6" OVERFLOW NOZZLE

ALL SHELL NOZZLES WITH REPADS SOAP AIR TESTED NO VISIABLE DEFFECTS FOUND

SKETCH

RESULTS:
(RECORD ANY REPAIRED AREAS)

INSPECTED BY: P. Simonich [signature] DATE 5-2-87

ACCEPTED BY: [signature] DATE

HORTON

CBI

REPORT NO.MT. 1

MAGNETIC PARTICLE INSPECTION RECORD

PROCEDURE # M·T REGION WEST SHOP ☐ FIELD ☑

ISSUED BY HORTON C.B.I DATE

OPERATOR(S) P. SEMONICK DATE 4·26- 5-1- 87

CONTRACT MH60729 SECTION SHELL FITTINGS

MCH. NO. Y5 PROD.SPACING 4" TO 6" AMP DC

DESCRIBE EXACT PART, PIECE AND LOCATION THAT WAS CHECKED

M.T. FITTINGS INSIDE AND OUTSIDE
3 A SHELL MANHOLE
7·B SHELL COUPLING
5·A " 6" VENTING OVERFLOW
7·C " 2" NOZZLE
7·A " 6" "

NO VISIABLE DEFECTS FOUND

ALSO, DIESEL TEST OUTSIDE CORNER WELD AND OUTSIDE SHELL INCLUDING RIML TO SHELL
3 LEAKS FOUND IN CORNER WELD REPAIR AND RE TESTED OK - SHELL NO VISIABLE DEFFECTS FOUND

REMARKS

DISPOSITION FT. SASK. - G.L.C. DILLON

EVALUATED BY P. Semonick - for [signature] DATE 5-2-87

RECEIVED BY [signature] DATE

HORTO CBI

PERFORMANCE QUALIFICATION TEST

In Accordance With Section IX of the ASME Code - Latest Edition

SHIELDED METAL ARC PROCESS

Material – Specification 573.58 to 573.58 of P No. 1 to P No. 1

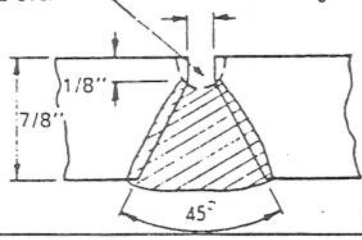
Weld Procedure Specification Number (WPS) E 7018/H70705 · E6010

Filler Metal (F No.) F 4 Filler Metal (A No. Ref.) A 1

Filler Metal (SFA) Specification SFA 5.1

RECORD OF UTILIZATION		
Month Year	Type Insp.	Initials
3/87	√	B.B

Back gouge to clean metal and weld overhead

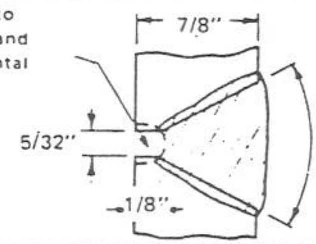


This test qualifies all thickness ranges to be welded.

OVERHEAD – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1	Result
	OK
Result 2	

Back gouge to clean metal and weld horizontal

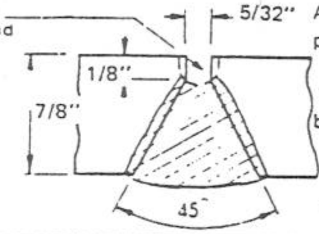


This test qualifies all thickness ranges to be welded.

HORIZONTAL – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1	Result
	OK
Result 2	

Back gouge to clean metal and weld vertical



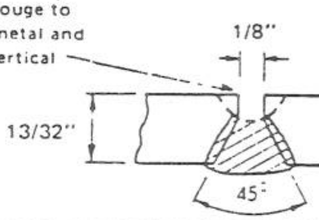
All passes uphill except first pass and wash passes which may be run downhill or uphill

This test qualifies all thickness ranges to be welded.

VERTICAL – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1	Result
	ok
Result 2	

Back gouge to clean metal and weld vertical



All passes are to be run downhill

This test qualifies range 0" to 13/16".

E.6010
E 7018

13/32" SINGLE BEVEL BUTT VERTICAL

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1	Result
	ok
Result 2	

1 Qualification on butt welds also qualifies welder for fillet welds and butt welds with back-up bars.
2 Qualification with F-5, F-42 & F-43 electrodes may be made on P-1 test plates.
3 Radiography of 6" section of plate may be used in lieu of bend test.
4 Qualification with F-4 electrode also qualifies for F-3, F-2, and F-1.

X = X-Ray
R = Requal.
V = Visual

Date	Location	Soc.Ins.No.	Birth Date	Started HCBI Year	Specimen Mark
02/09/87	FT. SASK ALTA	617-383-742	2-11-50	72	B.B

WE CERTIFY THAT THE STATEMENTS MADE IN THIS RECORD ARE CORRECT AND THAT THE TEST WELDS WERE PREPARED, WELDED AND TESTED IN ACCORDANCE WITH SECTION IX OF THE ASME CODE - LATEST EDITION/AND MAINTAINED FROM THE TIME OF TEST TO THIS DATE.

Paul Bamville 02/09/87

HCBI Representative DATE

Home Address 39 ALDERWOOD CRES.

City SHERWOOD P.K Prov. ALTA

Full Name

BRIAN BADRY

First Middle Last

Provincial Inspector

Date

WL 111 (FRONT) REV JUN 84

Rec'd 8-7-87

HORTON CBI

PERFORMANCE QUALIFICATION TEST

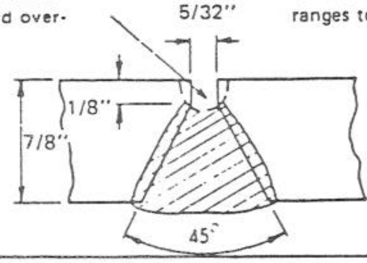
In Accordance With Section IX of the ASME Code - Latest Edition
SHIELDED METAL ARC PROCESS

Material – Specification 283C to 283C of P No. ______ to P No. ______
Weld Procedure Specification Number (WPS) E7018/H70705 E6010
Filler Metal (F No.) F 4 · F3 Filler Metal (A No. Ref.) A I
Filler Metal (SFA) Specification SFA 5.1

RECORD OF UTILIZATION		
Month Year	Type Insp.	Initials

Back gouge to clean metal and weld overhead

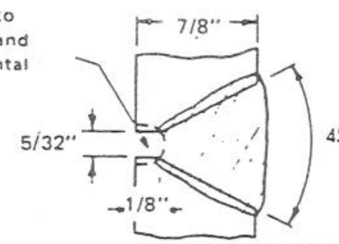
This test qualifies all thickness ranges to be welded.



OVERHEAD – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1	Result
Result 2	Ok

Back gouge to clean metal and weld horizontal



This test qualifies all thickness ranges to be welded.

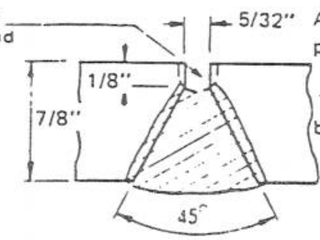
HORIZONTAL – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1	Result
Result 2	Ok

Back gouge to clean metal and weld vertical

All passes uphill except first pass and wash passes which may be run downhill or uphill

This test qualifies all thickness ranges to be welded.



VERTICAL – BOTH SIDES

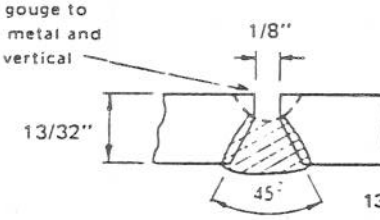
TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1	Result
Result 2	Ok

Back gouge to clean metal and weld vertical

All passes are to be run downhill

This test qualifies range 0" to 13/16".

E6010
E7018



13/32" SINGLE BEVEL BUTT VERTICAL

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1	Result
Result 2	Ok

1 Qualification on butt welds also qualifies welder for fillet welds and butt welds with back-up bars.
2 Qualification with F-5, F-42 & F-43 electrodes may be made on P-1 test plates.
3 Radiography of 6" section of plate may be used in lieu of bend test.
4 Qualification with F-4 electrode also qualifies for F-3, F-2, and F-1.

X = X-Ray
R = Requal.
V = Visual

Date	Location	Soc.Ins.No.	Birth Date	Started HCBI Year	Specimen Mark
02/09/87	FT. SASK ALTA	617-383-742	2-11-50	72	B.B.

WE CERTIFY THAT THE STATEMENTS MADE IN THIS RECORD ARE CORRECT AND THAT THE TEST WELDS WERE PREPARED, WELDED AND TESTED IN ACCORDANCE WITH SECTION IX OF THE ASME CODE - LATEST EDITION/AND MAINTAINED FROM THE TIME OF TEST TO THIS DATE.

Paul Danielle 03/23/87
HCBI Representative DATE

Home Address 39 Alderwood CRS
City Sherwood. PK Prov. ALTA
Full Name
Brian Badry
First Middle Last

Provincial Inspector

Date ______

HORTON CBI

PERFORMANCE QUALIFICATION TEST

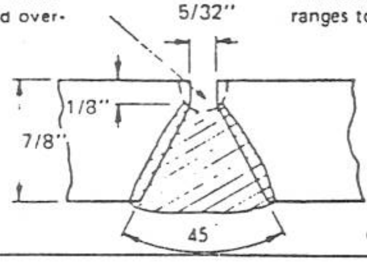
In Accordance With Section IX of the ASME Code - Latest Edition
SHIELDED METAL ARC PROCESS

Material – Specification 283C to 283C of P No. 1 to P No. 1
Weld Procedure Specification Number (WPS) E-6010 - E 7018 / H70705
Filler Metal (F No.) F 4 Filler Metal (A No. Ref.) A I
Filler Metal (SFA) Specification SFA 5.1

RECORD OF UTILIZATION

Month Year	Type Insp.	Initials
3/87	X	P.B

Back gouge to clean metal and weld overhead

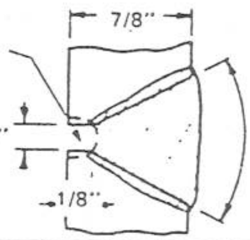


This test qualifies all thickness ranges to be welded.

OVERHEAD – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1:	Result: OK
Result 2:	

Back gouge to clean metal and weld horizontal

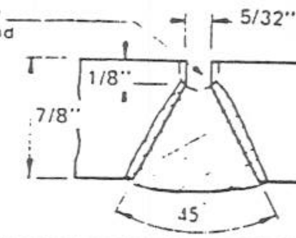


This test qualifies all thickness ranges to be welded.

HORIZONTAL – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1:	Result: OK
Result 2:	

Back gouge to clean metal and weld vertical



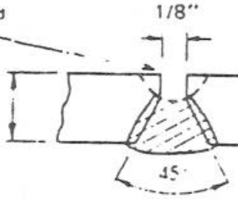
All passes uphill except first pass and wash passes which may be run downhill or uphill

This test qualifies all thickness ranges to be welded.

VERTICAL – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1:	Result: OK
Result 2:	

Back gouge to clean metal and weld vertical



All passes are to be run downhill

This test qualifies range 0" to 13/16".

E. 7018
E. 6010

13/32" SINGLE BEVEL BUTT VERTICAL

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1:	Result: OK
Result 2:	

1 Qualification on butt welds also qualifies welder for fillet welds and butt welds with back-up bars.
2 Qualification with F-5, F-42 & F-43 electrodes may be made on P-1 test plates.
3 Radiography of 6" section of plate may be used in lieu of bend test.
4 Qualification with F-4 electrode also qualifies for F-3, F-2, and F-1.

X = X-Ray
R = Requal.
V = Visual

Date	Location	Soc.Ins.No.	Birth Date	Started HCBI Year	Specimen Mark
02/09/87	FT. SASK ALTA	402-131-049	2/28/32	65	G.W

WE CERTIFY THAT THE STATEMENTS MADE IN THIS RECORD ARE CORRECT AND THAT THE TEST WELDS WERE PREPARED, WELDED AND TESTED IN ACCORDANCE WITH SECTION IX OF THE ASME CODE - LATEST EDITION AND MAINTAINED FROM THE TIME OF TEST TO THIS DATE.

Paul Samville 02/09/87
HCBI Representative DATE

Home Address 3804 - 110 AVE
City EDMONTON Prov. ALTA
Full Name
GERRY WEISS
First Middle Last

Provincial Inspector

Date

WL 111 (FRONT) REV JUN 84

HORTON CBI

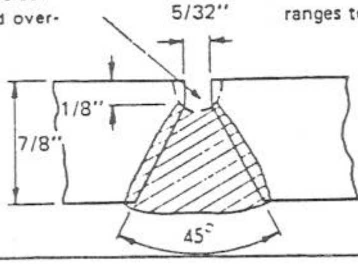
PERFORMANCE QUALIFICATION TEST

In Accordance With Section IX of the ASME Code - Latest Edition
SHIELDED METAL ARC PROCESS

Material – Specification 283C to 283C of P No. 1 to P No. 1
Weld Procedure Specification Number (WPS) E6010-E7018/H70705
Filler Metal (F No.) F 4-F3 Filler Metal (A No. Ref.) A I
Filler Metal (SFA) Specification SFA 5.1

RECORD OF UTILIZATION		
Month Year	Type Insp.	Initials

Back gouge to clean metal and weld overhead

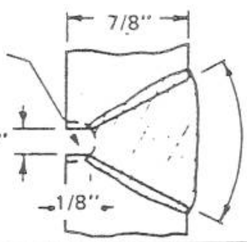


This test qualifies all thickness ranges to be welded.

OVERHEAD – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1	Result
Result 2	OK

Back gouge to clean metal and weld horizontal

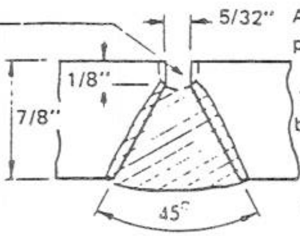


This test qualifies all thickness ranges to be welded.

HORIZONTAL – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1	Result
Result 2	OK

Back gouge to clean metal and weld vertical



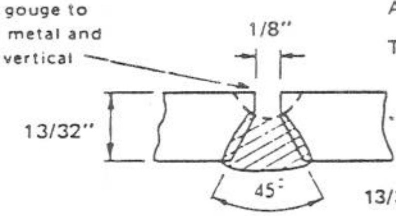
All passes uphill except first pass and wash passes which may be run downhill or uphill

This test qualifies all thickness ranges to be welded.

VERTICAL – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1	Result
Result 2	OK

Back gouge to clean metal and weld vertical



All passes are to be run downhill

This test qualifies range 0" to 13/16".

E7018
E6010

13/32" SINGLE BEVEL BUTT VERTICAL

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1	Result
Result 2	OK

1 Qualification on butt welds also qualifies welder for fillet welds and butt welds with back-up bars.
2 Qualification with F-5, F-42 & F-43 electrodes may be made on P-1 test plates.
3 Radiography of 6" section of plate may be used in lieu of bend test.
4 Qualification with F-4 electrode also qualifies for F-3, F-2, and F-1.

X = X-Ray
R = Requal.
V = Visual

Date	Location	Soc.Ins.No.	Birth Date	Started HCBI Year	Specimen Mark
02/09/87	FT. SASK ALTA	402-131-049	2/28/32	65	G.W

WE CERTIFY THAT THE STATEMENTS MADE IN THIS RECORD ARE CORRECT AND THAT THE TEST WELDS WERE PREPARED, WELDED AND TESTED IN ACCORDANCE WITH SECTION IX OF THE ASME CODE - LATEST EDITION/AND MAINTAINED FROM THE TIME OF TEST TO THIS DATE.

Paul Somville 03/23/87
HCBI Representative DATE

Home Address 3804-110 AVE
City Edmonton Prov. ALTA
Full Name
GERRY WEISS
First Middle Last

Provincial Inspector

Date ______

HORTON CBI

PERFORMANCE QUALIFICATION TEST

In Accordance With Section IX of the ASME Code - Latest Edition
SHIELDED METAL ARC PROCESS

Material – Specification 283C to 283C of P No. 1 to P No. 1

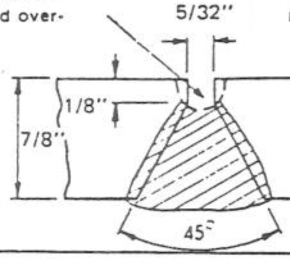
Weld Procedure Specification Number (WPS) E 7018 / H60729

Filler Metal (F No.) F 4 Filler Metal (A No. Ref.) A I

Filler Metal (SFA) Specification SFA 5.1

RECORD OF UTILIZATION		
Month Year	Type Insp.	Initials

Back gouge to clean metal and weld overhead

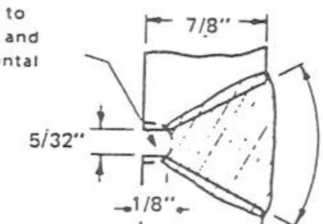


This test qualifies all thickness ranges to be welded.

OVERHEAD – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1: OK	Result:
Result 2: OK	

Back gouge to clean metal and weld horizontal

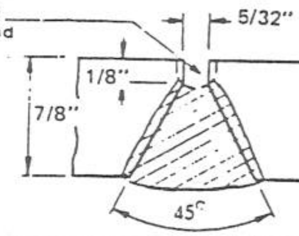


This test qualifies all thickness ranges to be welded.

HORIZONTAL – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1: OK	Result:
Result 2: OK	

Back gouge to clean metal and weld vertical



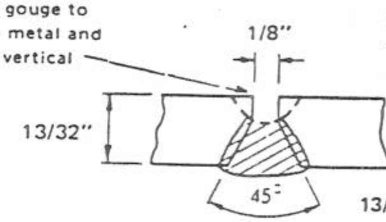
All passes uphill except first pass and wash passes which may be run downhill or uphill

This test qualifies all thickness ranges to be welded.

VERTICAL – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1: OK	Result:
Result 2: OK	

Back gouge to clean metal and weld vertical



All passes are to be run downhill

This test qualifies range 0" to 13/16".

E 7018

13/32" SINGLE BEVEL BUTT VERTICAL

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1: OK	Result:
Result 2: OK	

1. Qualification on butt welds also qualifies welder for fillet welds and butt welds with back-up bars.
2. Qualification with F-5, F-42 & F-43 electrodes may be made on P-1 test plates.
3. Radiography of 6" section of plate may be used in lieu of bend test.
4. Qualification with F-4 electrode also qualifies for F-3, F-2, and F-1.

X = X-Ray
R = Requal.
V = Visual

Date	Location	Soc.Ins.No.	Birth Date	Started HCBI Year	Specimen Mark
03/31/87	FT. SASK ALTA	418-759-122	5/12/39	70	G.P

WE CERTIFY THAT THE STATEMENTS MADE IN THIS RECORD ARE CORRECT AND THAT THE TEST WELDS WERE PREPARED, WELDED AND TESTED IN ACCORDANCE WITH SECTION IX OF THE ASME CODE - LATEST EDITION/AND MAINTAINED FROM THE TIME OF TEST TO THIS DATE.

Paul Bouville 03/31/87

HCBI Representative DATE

Home Address 27 GLACIER CRES.

City SHERWOOD PK Prov. ALTA

Full Name

GEORGE POTHORIN

First Middle Last

Provincial Inspector

Date

HORTON CBI

PERFORMANCE QUALIFICATION TEST

In Accordance With Section IX of the ASME Code - Latest Edition

SHIELDED METAL ARC PROCESS

Material – Specification 283C to 283C of P No. 1 to P No. 1

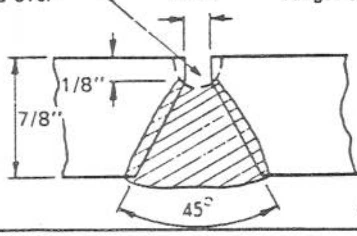
Weld Procedure Specification Number (WPS) E7018/H60729

Filler Metal (F No.) F 4 Filler Metal (A No. Ref.) A I

Filler Metal (SFA) Specification SFA 5.1

RECORD OF UTILIZATION		
Month Year	Type Insp.	Initials

Back gouge to clean metal and weld overhead

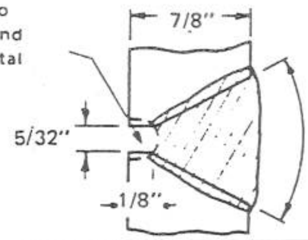


This test qualifies all thickness ranges to be welded.

OVERHEAD – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1: OK	Result
Result 2: OK	

Back gouge to clean metal and weld horizontal

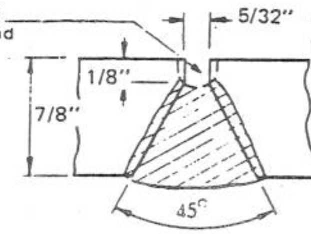


This test qualifies all thickness ranges to be welded.

HORIZONTAL – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1: OK	Result
Result 2: OK	

Back gouge to clean metal and weld vertical



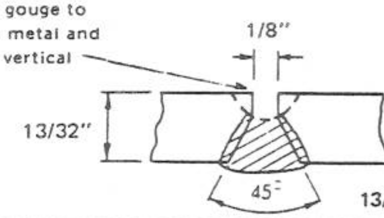
All passes uphill except first pass and wash passes which may be run downhill or uphill

This test qualifies all thickness ranges to be welded.

VERTICAL – BOTH SIDES

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1: OK	Result
Result 2: OK	

Back gouge to clean metal and weld vertical



All passes are to be run downhill

This test qualifies range 0" to 13/16".

E 7018

13/32" SINGLE BEVEL BUTT VERTICAL

TEST METHOD	
Two bends per QW-462.2	Radiography of 6" of test plate.
Result 1: OK	Result
Result 2: OK	

1 Qualification on butt welds also qualifies welder for fillet welds and butt welds with back-up bars.
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3 Radiography of 6" section of plate may be used in lieu of bend test.
4 Qualification with F-4 electrode also qualifies for F-3, F-2, and F-1.

X = X-Ray
R = Requal.
V = Visual

Date	Location	Soc.Ins.No.	Birth Date	Started HCBI Year	Specimen Mark
03/31/87	FT. SASK ALTA	615-520-111	03/01/50	72	B.L

WE CERTIFY THAT THE STATEMENTS MADE IN THIS RECORD ARE CORRECT AND THAT THE TEST WELDS WERE PREPARED, WELDED AND TESTED IN ACCORDANCE WITH SECTION IX OF THE ASME CODE - LATEST EDITION/AND MAINTAINED FROM THE TIME OF TEST TO THIS DATE.

Paul Bonville

HCBI Representative DATE

Home Address

City DIDSBURY Prov. ALTA

Full Name

ROBERT LUST

First Middle Last

Provincial Inspector

Date

WL 111 (FRONT) REV JUN 84

8.2 Tank No. 2 Internal Protective Coating Inspection

RAE INSPECTION SERVICE (1979) LTD.
Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA
AUTHORIZED BY R. Welker
P.O.
PHONE
PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK
INSPECTOR L. Erickson
DATE OF INSPECTION June 2, 1987

CONTRACTOR
PERSON CONTACTED
UNIT/TAG

FILE DESCRIPTION
DESTINATION

CRN.
PROV. #
INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ______ % COMPLETE
ESTIMATED DATE OF COMP.

08:00 Left Edmonton to travel to Grise Fiord via Canadian Airlines.

10:00 Arrived Yellowknife.

10:45 Depart Yellowknife for Resolute Bay.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

ANY OMISSION OR FAILURE ON THE PART OF THE INSPECTOR TO DISAPPROVE OR REJECT ANY WORK OR MATERIALS SHALL NOT BE CONSTRUED AS AN ACCEPTANCE OF ANY DEFECTIVE WORK OR MATERIALS.

RAE INSPECTION SERVICE (1979) LTD.
Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
P.O.
PHONE PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 3, 1987

CONTRACTOR Western S.B. PERSON CONTACTED UNIT/TAG

FILE DESCRIPTION Sandblast and Coat Water Tank DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS % COMPLETE ESTIMATED DATE OF COMP.

02:00 Arrive Resolute Bay.
13:30 Depart Resolute Bay for Grise Fiord via Kern Boerk Airlines.
15:00 Arrived Grise Fiord.

Reviewed job specifications and toured job site with Dave O'Neal of Dillon Consultants, -
- tank fabrication complete.
- two-thirds of tank and roof and shell completed, also insulation.
- three coats of Diathon Elastomeric Acrylic Waterproofing complete.

16:00 Dave O'Neal left for Edmonton.

A meeting was held with the following Contractors:
General Contractor - Norland Construction: two men on site.
Painting Contractor - Western Sandblasting, Winnipeg: two men on site.

Job progress was discussed - Coating Contractor expects external work to be completed by Saturday, June 6th. Internal sandblasting will be started immediately after completion of external work. No work is being done at this time, as Contractor has just completed first coat of Diathon on roof.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

ANY OMISSION OR FAILURE ON THE PART OF THE INSPECTOR TO DISAPPROVE OR REJECT ANY WORK OR MATERIALS SHALL NOT BE CONSTRUED AS AN ACCEPTANCE OF ANY DEFECTIVE WORK OR MATERIALS.

CLIENT GCG DILLON CONSULTANTS,

ADDRESS EDMONTON, ALBERTA,

AUTHORIZED BY R. WELKER

P.O.

PHONE

RAE INSPECTION SERVICE (1979) LTD.
Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 4, 1987

CONTRACTOR Western Sand. PERSON CONTACTED Joe UNIT/TAG

FILE DESCRIPTION Sandblast & Coat Water Tank DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ______ % COMPLETE ESTIMATED DATE OF COMP.

07:00 Contractor setting up spray equipment to apply foam.

09:30 Inspected blast area in preparation for application of foam.
Outside temperature +3, R.H. 70%, sky is clear.
Surface temperature of tank under hoarding 20°C. Surface preparation conforms to SSPC-SP6.

Equipment on Site:

3 - 350,000 BTU frost fighter heaters.
1 - compressor 600 CFM
1 - Gusman foam application system.
1 - 600 lb. sandblasting pot.
1 - King Graco airless paint equipment.

13:00 Outside temperature +6, clear sky, R.H. 60%.
Tank surface temperature +20°C.
Foam application is proceeding with no problems.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

RAE INSPECTION SERVICE (1979) LTD.
Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS
ADDRESS: EDMONTON, ALBERTA,
AUTHORIZED BY: R. WELKER
P.O.:
PHONE:

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK: Grise Fiord
INSPECTOR: L. Erickson
DATE OF INSPECTION: June 4, 1987

CONTRACTOR:
PERSON CONTACTED:
UNIT/TAG:

FILE DESCRIPTION:
DESTINATION:

CRN.:
PROV. #:
INSTRUMENTS USED:

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP. ____

18:00 Foam application completed on this section.

19:00 Inspected foam application in preparation for first coat of Diathon.

19:30 Application of Diathon started.

21:00 Diathon applications completed.
20 gallons used on roof, 23 gallons used on shell.

(3heaters will be kept working overnight).

L. Erickson RE

SIGNATURE OF INSPECTOR

APPROVED

ANY OMISSION OR FAILURE ON THE PART OF THE INSPECTOR TO DISAPPROVE OR REJECT ANY WORK OR MATERIALS SHALL NOT BE CONSTRUED AS AN ACCEPTANCE OF ANY DEFECTIVE WORK OR MATERIALS.

RAE INSPECTION SERVICE (1979) LTD.
Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY ROLAND WELKER
P.O.
PHONE

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 5, 1987

CONTRACTOR Western Sand. PERSON CONTACTED UNIT/TAG

FILE DESCRIPTION Sandblast & Coat Water Tank 36x70 DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ________ % COMPLETE ESTIMATED DATE OF COMP.

09:00 Clear sky, temperature +1°, R.H. 65%.
Tank surface temperature under hoarding +16°C.
09:30 Sandblasting started on last portion of tank - approximately 1300 sq. ft.
10:00 Garbage was taken by Norland Construction.
11:00 Inspected sandblast.

Visual Observation: Some mil scale was evident in two areas, also along the base of the tank and required a better blast. Contractor agreed to touchup these and areas inside intake box.

13:00 Temperature +8°C, clear sky, R.H. 60%.
Inspected sandblast and in our opinion blast now conforms to SSPC-SP6.
Contractor preparing to apply foam.

15:30 Foam application started.

18:00 Foam application completed for the day. Government truck was used for one hour to remove garbage.

18:30 End of inspection.

(Three heaters will be used to keep tack warm).

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

RAE INSPECTION SERVICE (1979) LTD.
Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS
ADDRESS: EDMONTON, ALBERTA,
AUTHORIZED BY: R. WELKER
P.O.:
PHONE: PAGE 1 OF 1

OUR FILE NO.: DC 87-001-RW

LOCATION OF WORK: Grise Fiord INSPECTOR: L. Erickson DATE OF INSPECTION: June 6, 1987
CONTRACTOR: Western Sand. PERSON CONTACTED: Joe UNIT/TAG:
FILE DESCRIPTION: Sandblast and Coat Tank 36 x 70 DESTINATION:
CRN.: PROV. #: INSTRUMENTS USED:

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP. ____

09:00 Temperature +1, overcast, R.H. 86%, Dew Point -3°.
Tank surface temperature +20°C under hoarding.

Inspected sandblast area in preparation for completion of foam application. No rust bloom is evident. Blast still conforms to SSPC-SP6, and in our opinion is acceptable to receive insulation.

10:30 Foam application started.

12:30 Contractor ran out of foaming material, approximately 500 sq. ft. remains to be foamed. Contractor has more material on order and expects material to arrive on Wednesday, June 10th.

13:30 Temperature +1, R.H. 86%, surface temperature of tank 18°C.
Contractor beginning application of Diathon.

17:00 Application of Diathon complete.
Roof area is complete except where scaffold is located.
Shell is complete until more foam arrives.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

RAE INSPECTION SERVICE (1979) LTD.
Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
P.O.
PHONE
PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 7, 1987

CONTRACTOR Western Sand. PERSON CONTACTED Joe UNIT/TAG

FILE DESCRIPTION Sandblast & Coat Water Tank DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

09:00 Temperature 0°- Dew Point, R.H. 94%, overcast.

Contractor preparing to prime ladder and valve protection box under hoarding. Surface temperature of steel 20°C. Inspected surface preparation of ladder and protection box.

Visual Observation: Steel was blasted to SSPC-SP6. Some foam overspray was evident in some areas. This inspector requested Contractor to scrape off prior to application of prime coat.

Material: Primer Northern Paint 300414, red zinc chromate primer quick dry.

13:00 $+2^{\circ}$,Dew Point -4, R.H. 63%, scattered cloud

Contractor continuing priming exterior steel.

15:30 Priming complete.

Checked interior coating material.

Inter-Guard EXA120/2 Base Medium 2E521018

Curing Agent ZE99193, Thinner 07/012 ZE073407

19:00 Contractor applying first coat of enamel to ladder and protection box.

(Northern Paint All Purpose Alkyd 250144 slate blue)

21:00 First coat complete.

No blasting was done today.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

ANY OMISSION OR FAILURE ON THE PART OF THE INSPECTOR TO DISAPPROVE OR REJECT ANY WORK OR MATERIALS SHALL NOT BE CONSTRUED AS AN ACCEPTANCE OF ANY DEFECTIVE WORK OR MATERIALS.

RAE INSPECTION SERVICE (1979) LTD.

Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
P.O.
PHONE PAGE 1 OF 2

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 8, 1987

CONTRACTOR Western Sand. PERSON CONTACTED Joe UNIT/TAG

FILE DESCRIPTION Sandblast & Coat Tank 36 x 70. DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP. ____

18:00 Temperature -2°, R.H. 80%, light overcast, steel temperature +18°.
Contractor applying final coat of enamel to ladder and protection box.
Three heaters working.

10:00 Telephone call was placed to Rae Inspection office.

10:15 Telephone call was placed to Dillon office re approval for International Paint. This inspector was informed by R. Welker that International Paint was approved for the internal coating.

10:30 Sandblasting started inside tank on the ceiling. Temperature +1, R.H. 80% surface temperature of tank +18°.

11:00 Inspected sample blast and agreed on standard for SSPC SP10 - near white. Profile measured with testex tape up to 2.5 mil profile.

13:00 Temperature +4, overcast, 80% R.H. tank surface temperature +18°.

Contractor said due to fabrication, it is impossible to achieve a holiday free coating on the interior of the tank roof. Contractor requested this inspector to inspect blasted area.

Visual Observation: Sharp edges on most roof plates, weld spatter along weld seams, porosity in weld. Inaccessible areas where roof plates lie on the rafters. This inspector confirms that it is next to impossible to achieve a holiday free coating on the roof. Five photographs were taken.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

CLIENT GCG DILLON CONSULTANTS
ADDRESS ~~EDMONTON, ALBERTA.~~
AUTHORIZED BY R. WELKER
P.O.
PHONE

RAE INSPECTION SERVICE (1979) LTD.
Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. ERickson DATE OF INSPECTION June 8, 1987

CONTRACTOR Western Sand. PERSON CONTACTED UNIT/TAG

FILE DESCRIPTION Sandlbast & Coat Water Tank 36 c 70 DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ______ % COMPLETE ESTIMATED DATE OF COMP.

A telephone call was placed to Roland Welker of Dillon Consultants regarding the procedure for blasting and coating. This inspector was informed by Mr. Welker to advise the Contractor to do the best possible in the inaccessible areas. Radius all sharp edges, remove all weld spatter prior to coating.

Joe Desmarais, foreman for Western Sandblasting, was advised by memo of the above.

15:00 At this point, Joe the foreman shut down sandblasting and called his office. He was informed to carry on sandblasting and no grinding would be done.

Tony of Norland Construction was informed on the above and advised he would contact his office and get further instructions.

L. Erickson RO
SIGNATURE OF INSPECTOR

APPROVED

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA.
AUTHORIZED BY R. WELKER
P.O.
PHONE PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW
LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 9, 1987
CONTRACTOR Western Sand. PERSON CONTACTED Joe UNIT/TAG
FILE DESCRIPTION Sandblast & Coat Water Tank DESTINATION
CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS % COMPLETE ESTIMATED DATE OF COMP.

07:30 Temperature +2, overcast, R.H. 80%, surface temperature of tank +12°C.
Heaters went out during the night.
Sandblasting on inside of roof was started. This inspector advised the Contractor to wear safety belt while working off the scaffolding.

Verification was received from International Paint on the coating material and all checked out.

11:00 Ton y of Norland Construction called his office and Horton C.P.I. This inspector was present and informed both parties that the welding and grinding was not satisfactory for coating.

11:30 Telephone call was placed to R. Welker to inform him of the above. Mr. Welker's instructions were to let them carry on, inspect the work and document our findings.

13:30 Temperature +4, overcast, R.H. 75%.
Sandblasting underway, no problems at this time. Norland Construction removing tank hoarding. Two heaters are being used to keep the tank interior warm.

19:30 Sandblasting finished for the day, secure equipment, install recorder thermometer. Three heaters working, outside temperature +2°C, estimated blast surface 1200 square feet.

21:30 Checked site, three heaters working, inside tank temperature 21°C, surface temperature 18°C.

L. Erickson
SIGNATURE OF INSPECTOR

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CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
P.O.
PHONE

REPORT OF INSPECTIONS

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 10, 1987

CONTRACTOR Western Sand. PERSON CONTACTED Joe UNIT/TAG

FILE DESCRIPTION Sandblast & Coat Water Tank DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS % COMPLETE ESTIMATED DATE OF COMP.

07:30 Temperature +1, R.H. 80%, clear sky, inside tank temperature 27°C, surface temperature of tank 25°C, two heaters working at this time. Contractor continuing sandblasting on interior of the roof.

11:00 Completed sandblasting and touchup of previously blasted surface. Blowdown and removed dust.
Preparing to apply first coat. Material - Epoxy Intergard EXA120/2 Batch 2E521018CM, A231024 Gray.

13:30 Inspected sandblast, temperature +4°C, R.H. 70%, tank surface temperature 22°C.

Visual Observation: Sandblast appears uniform with only slight traces of stain evident. Profile up to 2.5 mils. Weld seams are very rough, with sharp edges and porosity. Weld spatter is also evident along the welds. Numerous in-accessible areas. In our opinion this roof is not acceptable for coating and Contractor was thus advised.
Witnessed mixing of material. Coating was mixed with a power mixer, not thinned. Application equipment Graco Airless King Pump with a #17 tip.

14:00 Application of first coat started.
Cladding Contractor from Westeel arrived on site.
Reviewed specifications with Frank Zacharias and Brad Krepps.

L. Erickson RE
SIGNATURE OF INSPECTOR

APPROVED

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REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS
ADDRESS: EDMONTON, ALBERTA,
AUTHORIZED BY: R. WELKER
P.O.
PHONE

OUR FILE NO.: DC 87-001-RW

LOCATION OF WORK: Grise Fiord
INSPECTOR: L. Erickson
DATE OF INSPECTION: June 10, 1987

CONTRACTOR
PERSON CONTACTED
UNIT/TAG

FILE DESCRIPTION
DESTINATION

CRN.
PROV. #
INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ________ % COMPLETE
ESTIMATED DATE OF COMP.

15:00 Cladding began on northeast side of tanks.

17:00 First coat of epoxy completed, approximately 1400 square feet.
Twelve gallons of product was used.

18:00 Install recorder thermometer and surface thermometer and secure
tanks. Three heaters working.

22:00 Checked tank, three heaters working, inside temperature 90°C

L. Erickson LE
SIGNATURE OF INSPECTOR

APPROVED

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CLIENT GCG DILLON CONSULTANTS

ADDRESS EDMONTON, ALBERTA.

AUTHORIZED BY R. WELKER

P.O.

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REPORT OF INSPECTIONS

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 11, 1987

CONTRACTOR Western Sand. PERSON CONTACTED Joe UNIT/TAG

FILE DESCRIPTION Sandblast & Coat Water Tank DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS % COMPLETE ESTIMATED DATE OF COMP.

07:30 Temperature +2°C, overcast, R.H. 80%, winds southeast 30 kph, inside tank temperature 32°C, surface temperature of tank 23°C. Sandblast was started. Winds too strong to erect cladding.

12:00 Temperature +2°, R.H. 80%, wind southeast 30 kph, wind still too strong to install cladding. Sandblasting continuing. Compressor appears to be causing problems, shutting down from time to to time. Wind still too strong to install cladding.

14:00 Received instructions from R. Welker to send inspection reports for blast inspection and coating forecast.

16:00 Sandblasting continuing, winds very strong and cladding could not proceed.

Inspection reports sent to Dillon Consultants for June 8th, 9th and 10th, plus blasting and coating forecast.

17:30 Sandblasting was discontinued at this time.

18:30 Contractor removing sand from inside tank. Wind has lessened, cladding was started.

20:15 Mike Manning was sent to Nursing Station as he received a cut on palm of right hand while pushing sand with a piece of plywood, inside the tank.

L. Erickson RE

SIGNATURE OF INSPECTOR

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REPORT OF INSPECTIONS

CLIENT GCG DILLONG CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
P.O.
PHONE PAGE 1 OF 2

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. ERickson DATE OF INSPECTION June 12, 1987

CONTRACTOR Western Sand. PERSON CONTACTED Joe UNIT/TAG

FILE DESCRIPTION Sandblast & Coat Water Tank DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS % COMPLETE ESTIMATED DATE OF COMP.

07:30 Temperature +3°, R.H. 75%, light overcast, winds calm.
Surface temperature of tank 18°C, inside temperature 24°C.
Contractor completing sand removal from tank.
08:00 Cladding Contractor continuing to install cladding.
The 600 CFM compressor broke, water in oil. Contractor preparing
Horton's 150 CFM compressor to apply coating to blasted surface.
11:30 Temperature +4°, R.H. 75%, inside tank temperature +15°, surface
temperature 18°C.
Inspect sandblast prior to first coat of epoxy.

Visual Observation: Sandblast appears uniform on all accessible areas, with profile up to 2.5 mils by comparator. Sandblast conforms to SSPC-SP10. Weld spatter along the welds and porosity in the welds, sharp edges. In our opinion these surfaces are not acceptable for coating.

12:00 Witnessed mixing of Material, Epoxy Intergard EXA120/3, batch 521018CM
A231024 gray - application started.
Tank surface temperature +18°C, outside temperature +4, R.H. 75%, clear sky.
13:30 Telephone call was placed to Mr. Welker to advise of the above.

L. ERickson RE
SIGNATURE OF INSPECTOR

APPROVED

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
P.O.
PHONE

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 12, 1987

CONTRACTOR PERSON CONTACTED UNIT/TAG

FILE DESCRIPTION DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ______ % COMPLETE ESTIMATED DATE OF COMP.

14:00 First coat on blasted surface complete, eight gallons used.
Approximately 50% of ceiling has received first coat of epoxy.

Sandblasting shut down until repairs are made to 600 CFM
compressor.

Cladding on exterior is progressing well, about 50% of tank
is now complete.

Three photographs taken of the tank cladding.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
P.O.
PHONE PAGE 1 OF 2

OUR FILE NO. DC 87-001-RW
LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 13, 1987
CONTRACTOR Western Sand. PERSON CONTACTED Joe UNIT/TAG
FILE DESCRIPTION Sandblast & Coat Water Tank DESTINATION
CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ____ ESTIMATED DATE OF COMP.

08:00 Temperature +2°, R.H. 80%, inside tank temperature 18°C, one heater on. Contractor working on compressor. Cladding is proceeding with no problems at this time.

11:00 Inspected first coat of epoxy on interior. Approximately 50% of roof area is blasted with first coat.

Visual Observation: Coating appears smooth and even on accessible areas - gray in colour. Weld spatter is evident along the weld seams, as well as porosity in the welds.

Holiday Test: holiday test was performed with wet sponge type holiday tester at 67½ VDC along weld seams; ends of rafters and along roof plate to rafter seams. Discontinuities or holidays were indicated in all areas.

Dry Film Thickness: DFT was measured with a magnetic type mil gauge calibrated to standard. Dry film thickness varied between 3.5 to 5 mils.

14:00 Contractor reblasted remaining exterior of the tank in preparation for foam insulation.

15:00 Sandblasting complete. Blast conforms to SSPC-SP6 and in our opinion is acceptable for foaming.

The area sandblasted was hoarded at this time.

L. Erickson
SIGNATURE OF INSPECTOR

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA.
AUTHORIZED BY R. WELKER
P.O.
PHONE

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 13, 1987

CONTRACTOR PERSON CONTACTED UNIT/TAG

FILE DESCRIPTION DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

20:00 Jim Melsted of Western Sandblasting (mechanic), arrived from Winnipeg to repair compressor, plus the foaming material.

21:00 Contractor completing the foaming on the exterior of the tank. He will apply Diathon after insulation is complete.

Temperature inside hoarding is 20°C, tank surface temperature 18°C. One heater will heat inside tank and one heater will heat hoarding overnight.

L. Erickson RQ
SIGNATURE OF INSPECTOR

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
P.O.
PHONE PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW
LOCATION OF WORK Grise Fiord INSPECTOR L. ERickson DATE OF INSPECTION June 14, 1987
CONTRACTOR Western Sand. PERSON CONTACTED UNIT/TAG
FILE DESCRIPTION Sandblast & Coat Water Tank DESTINATION
CRN. PROV. # INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

Contractor still working on 600 CFM compressor.
He expects to have unit operating sometime tomorrow.

Temperature +5°, R.H. 75%, clear sky.
No sandblasting or coating done today.

Cladding is proceeding at a good rate - 98% complete.

L. Erickson
SIGNATURE OF INSPECTOR

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REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS
ADDRESS: EDMONTON, ALBERTA,
AUTHORIZED BY: R. WELKER
P.O.:
PHONE: PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW
LOCATION OF WORK: Grise Fiord INSPECTOR: L. Erickson DATE OF INSPECTION: June 15, 1987
CONTRACTOR: Western Sand. PERSON CONTACTED: Joe UNIT/TAG:
FILE DESCRIPTION: Sandblast & Coat Water Tank DESTINATION:
CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

08:00 Temperature +1°C, clear sky, wind calm, R.H. 85%.
Contractor still working on compressor.

11:00 +4°, Fog, R.H. 95%.
Norland crew cleaning up around site.

15:00 Westeel crew have finished cladding. Job looks good and no problems are evident. (There are two sheets left over)

It was brought to the attention of the Coating Contractor that air dryers may be necessary in order to continue blasting, if the relative humidity continues to be high. According to the local people, this area can be in fog for long periods, at this time of the year.

21:00 The 600 CFM compressor now repaired and appears to be in operating condition.
Guy Delorme is flying out with the mechanics tomorrow, which only leaves one man on site. There will be no sandblasting until more crew is sent in. New crew is expected June 17th.

One heater is keeping the inside of the tank warm, until the work can continue.

LE

SIGNATURE OF INSPECTOR APPROVED

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS

ADDRESS EDMONTON, ALBERTA,

AUTHORIZED BY R. WELKER

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PHONE PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 15, 1987

CONTRACTOR Western Sand. PERSON CONTACTED UNIT/TAG

FILE DESCRIPTION Sandblast & Coat Water Tank DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ________ % COMPLETE ESTIMATED DATE OF COMP.

FAX TO ROLAND WELKER.

FROM: LES ERICKSON

GOOD MORNING ROLAND

I am sending copies of daily reports for June 11, 12, 13 and 14, along with a sketch of tank roof. I hope this will give you the information you are looking for. The cladding should be 100% complete by noon today.

Western Sandblasting are still working on the 600 CFM compressor and expect to have it operating sometime this afternoon.

In my opinion it is going to be very difficult to complete this project on time, unless two shifts are worked and no more breakdowns occur.

L. Erickson

SIGNATURE OF INSPECTOR

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REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS
ADDRESS: EDMONTON, ALBERTA,
AUTHORIZED BY: R. WELKER
P.O.:
PHONE: PAGE 1 OF 1

OUR FILE NO.: DC 87-001-RW
LOCATION OF WORK: Grise Fiord INSPECTOR: L. Erickson DATE OF INSPECTION: June 16, 1987
CONTRACTOR: Western Sand. PERSON CONTACTED: UNIT/TAG:
FILE DESCRIPTION: Sandblast & Coat Water Tank DESTINATION:
CRN.: PROV. #: INSTRUMENTS USED:

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.:

8:00 +2°C, R.H. 84%, overcast, tank temperature inside +15°C.
One heater working.

No sandblasting today (no crew).
Mike of Norland Construction cleaning up around tank.

11:00 Guy Delorme, the mechanic with Western Sandblasting and Tony with Norland Construction left for home. There is now only two people on site, Joe with Western Sandblasting and Mike with Norland Construction.

A new crew is expected to arrive tomorrow, June 17th.

L. ERickson
SIGNATURE OF INSPECTOR

APPROVED

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
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PHONE PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW
LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 17, 1987
CONTRACTOR Western Sand. PERSON CONTACTED Joe UNIT/TAG
FILE DESCRIPTION Sandblast & Coat Water Tank DESTINATION
CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ___ % COMPLETE ESTIMATED DATE OF COMP.

No sandblasting or coating today.

08:00 Temperature +4°C, light rain, R.H. 98%.
Inside tank temperature was maintained at 15°C, with one heater working.

12:00 Checked site.
Temperature +5°C, scattered cloud, R.H. 80%.
Inside tank temperature +17°C, surface temperature +15°C.

17:00 Two more people arrived for sandblasting crew, accompanied by Dave O'Neal.

Sandblasting and coating will begin tomorrow morning.

L. Erickson RE
SIGNATURE OF INSPECTOR

APPROVED

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
P.O.
PHONE PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW
LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 18, 1987
CONTRACTOR Western Sand. PERSON CONTACTED Joe UNIT/TAG
FILE DESCRIPTION Sandblast & Coat Water Tank DESTINATION
CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

07:30 Temperature +1, Wet 0, R.H. 81%.
Three man crew on site preparing to resume sandblasting.
Inspected compressor air - air appears dry with no sign of oil or water.

08:00 Sandblasting started.

11:00 Temperature +1, Wet +.5, R.H. 92%, with fog. Sandblasting stopped.

12:30 Temperature +1, Wet +.7°C, R.H. 98%.
A discussion was held between this inspector, the Contractor and Dave O'Neal regarding what could be done so sandblasting could continue with the relative humidity so high. The Contractor did not appear interested in bringing in an air dryer. The Contractor advised he would continue blasting, since the temperature inside the tank was high along with the surface temperature of the tank, and felt the air from the compressor would not rust the tank. He agreed to reblast is necessary.

14:00 Temperature +1, low fog, R.H. 98%, inside tank temperature +16°.
Surface temperature of tank 15°C. Inspected compressor air - no sign of moisture was evident. Sandblasting resumed. Inspected sandblast as requested by Contractor. Dark spots evident on the blasted surface, probably due to moisture in the compressor air. Contractor agreed to touch up, but unable to do so at this time and agreed that something had to be done to dry up compressor air.

17:00 Foam application around tank base was started.

20:30 Application of foam completed. Secured equipment.

L. Erickson [signature]
SIGNATURE OF INSPECTOR

APPROVED

RAE INSPECTION SERVICE (1979) LTD.

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Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS
ADDRESS: EDMONTON, ALBERTA,
AUTHORIZED BY: R. WELKER
P.O.:
PHONE: PAGE 1 OF 1

OUR FILE NO.: DC 87-001-RW
LOCATION OF WORK: Grise Fiord INSPECTOR: L. Erickson DATE OF INSPECTION: June 19, 1987
CONTRACTOR: Western Sand. PERSON CONTACTED: Joe UNIT/TAG:
FILE DESCRIPTION: Sandblast & Coat Water Tank DESTINATION:
CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP. ____

07:30 Temperature +0, Wet -.2, overcast, low cloud, 98% R.H.
One heater working inside tank, surface temperature +15°C.
08:00 Sandblasting started - not recommended by this inspector. Moisture around fittings was evident, indicative of high moisture in the blasting air.
08:30 Temperature 0°C, Wet -.2, R.H. 98%, fog patches and overcast.
Blasting continued.
10:30 Temperature _1.5°, Wet _1°, R.H. 90%.

Discussion between this inspector, Dave O'Neal and the Contractor. The Contractor agreed to have an air dryer system shipped to site. Client agreed that sandblasting could continue as long as no visible evidence of contamination was left on the surface.
14:00 +1°C, Wet .5, R.H. 95%, inside tank temperature +15°, Wet 8, R.H. 35%, surface temperature +12°, dew point 0°.
15:30 +1°C, Wet +.8, R.H. 98%, fog.
16:00 Sandblasting stopped - contamination evident on surface. Contractor prepared to Diathon the foam around the base of the tank.
18:00 Diathon completed.
19:00 Contractor cleaned out sand from tank.
One heater maintained inside tank.

L. Erickson
SIGNATURE OF INSPECTOR

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY ROLAND WELKER
P.O.
PHONE PAGE 1 OF 1

OUR FILE NO. DC 87-001-RH

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 20, 1987

CONTRACTOR Western Sandblasting PERSON CONTACTED UNIT/TAG

FILE DESCRIPTION Sandblast & Coat Water Tank DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

08:00 Temperature +1, WT. 9°C, 99% R.H., low cloud, light rain.

09:30 Temperature +2°C, WT 1.8°C, R.H. 99%, inside tank 20°, surface temperature +17°C.

13:00 Temperature +2.5 Wet 2, R.H. 95%.

17:00 Temperature 3.5, WT. 3.0°C, R.H. 95%.

No sandblasting or coating was done. Relative humidity was too high, moisture contamination in compressor air.

One heater to maintain temperature inside tank.

L. Erickson [signature]
SIGNATURE OF INSPECTOR

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REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS
ADDRESS: EDMONTON, ALBERTA.
AUTHORIZED BY: R. WELKER
P.O.
PHONE
PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW
LOCATION OF WORK: Grise Fiord
INSPECTOR: L. Erickson
DATE OF INSPECTION: June 21, 1987
CONTRACTOR: Western Sand.
PERSON CONTACTED: Joe
UNIT/TAG
FILE DESCRIPTION: Sandblast & Coat Water Tank
DESTINATION
CRN.
PROV. #
INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ______ % COMPLETE
ESTIMATED DATE OF COMP.

08:30 Temperature +2, Wet +1°C, R.H. 84%, clear sky.
Inside tank temperature +18°C, surface temperature +16°C.

Sandblasting was continued with no visible sign of contamination in blast air.

12:00 Temperature +2°, Wet 1°C, R.H. 84%.
Sandblasting continuing.

15:00 Air drying equipment arrived on site - water and oil knockout with two discs, filter vessel capacity 300 CFM.

16:00 Temperature +3, Wet 2.5, R.H. 90%.
Blasting air now shows no sign of moisture contamination.
Sandblasting was continued.

22:00 Sandblasting shut down for the day.
Two heaters to maintain heat inside tank overnight.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA.
AUTHORIZED BY R. WELKER
P.O.
PHONE PAGE 1 OF 2

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 22, 1987
CONTRACTOR Western S.B. PERSON CONTACTED Joe UNIT/TAG
FILE DESCRIPTION Sandblast & Coat Water Tank DESTINATION
CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ______ % COMPLETE ESTIMATED DATE OF COMP.

08:00 Temperature +3, Wet +2, R.H. 84%, overcast, wind calm, inside tank temperature 20°, tank shell 20°C.
Three man crew on site.
Contractor reblasting previously blasted surface. Blasting air appears to be free of any moisture or contaminants.

10:30 Temperature +3, Wet +2, R.H. 84%.

12:30 Sandblasting on roof complete.

13:30 Inspected sandblast in preparation for first coat, as requested by Contractor.

Visual Observation

Dark areas were evident in four areas and require a touchup. Profile measured 2.3 mils. No sign of contamination was evident on the blasted surface. The Contractor agreed to touchup blast.

In our opinion blast now conforms to SSPC SP10 and is acceptable for coating, after removal of some light dust.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA.
AUTHORIZED BY R. WELKER
P.O.
PHONE PAGE 2 OF 2

OUR FILE NO. DC 87-001-RW
LOCATION OF WORK Gise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 22, 1987
CONTRACTOR PERSON CONTACTED UNIT/TAG
FILE DESCRIPTION DESTINATION
CRN. PROV. # INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ________ % COMPLETE ESTIMATED DATE OF COMP.

16:00 Witnessed mixing of material:
Power mixer was used, no sign of heavy material on bottom of cans after mixing.
Material: ZE521018 CMA231024 6C Intergard EXA 120/S Base Medium Gray in colour. Cure Agent ZE990193 EXA 208. No. V17 Airless tip.

16:30 Coating application started.
Tank temperature +17°.

21:30 Coating completed.
19 gallons used.

Clean up equipment.
Three heaters used to heat inside tank.
Install surface temperature gauge and recorder thermometer.

L. Erickson

SIGNATURE OF INSPECTOR

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REPORT OF INSPECTIONS

CLIENT ~~GCG DILLON CONSULTANTS~~
ADDRESS ~~EDMONTON, ALBERTA,~~
AUTHORIZED BY R. WELKER
P.O.
PHONE
PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 23, 1987

CONTRACTOR Western S.B. PERSON CONTACTED Joe UNIT/TAG

FILE DESCRIPTION Sandblast and Coat Water Tank DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

09:30 Temperature +3°C, Wet 2.5, R.H. 94%, overcast.
Inside tank temperature 37°C, surface temperature of roof 40°C.

10:30 Witnessed mixing of material for second coat on roof.
2C521018 CMA2 310246C Intergard EXA 120/S white.

11:00 Application of second coat started.

13:30 Temperature +2, Wet 1.5, R.H. 90%.
Monitor application - no problems at this time.

16:00 Temperature +1, Wet .5, R.H. 90%.

21:30 Completed second coat - 30 gallons used.

Three heaters to maintain heat inside tank.
Install recorder thermometer.

L. Erickson

SIGNATURE OF INSPECTOR

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA.
AUTHORIZED BY R. WELKER
P.O.
PHONE PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW
LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 24, 1987
CONTRACTOR Western S.B. PERSON CONTACTED Joe UNIT/TAG
FILE DESCRIPTION Sandblast and Coat Water Tank DESTINATION
CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS % COMPLETE ESTIMATED DATE OF COMP.

08:00 Temperature 0, Wet -.5, Scattered Cloud, R.H. 88%.
Inside temperature 38°, Surface temperature 40°C.
Inspected intermediate coat. Coating appears smooth and quite even. Spot check dry film thickness - 50 spots measured.
DFT varied between 8 and 12 mils. The weld seams are still very rough, even after two brush applications.

10:00 Temperature +1, Wet 0, R.H. 80%,
Contractor is preparing to apply final coat - gray.

Witnessed mixing of products: ZE521018 CMA 2 31024 6C Intergard EXA 120/s Catalyst 990193.

10:30 Coating application was started.

14:00 Temperature +4, Wet 2.5, R.H. 75%.

20:00 Completed application of final coat - 37 gallons used.
Install recorder thermometer.
Three heaters used to maintain heat inside tank.

No problems today.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

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REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS
ADDRESS: EDMONTON, ALBERTA,
AUTHORIZED BY: R. WELKER
P.O.
PHONE

OUR FILE NO.: DC 87-001-RW

LOCATION OF WORK: Grise Fiord INSPECTOR: L. Erickson DATE OF INSPECTION: June 25, 1987
CONTRACTOR: Western S.B. PERSON CONTACTED: Joe UNIT/TAG:
FILE DESCRIPTION: Sandblast and Coat Water Tank DESTINATION:
CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

07:30 Temperature +3, Wet 2, R.H. 85%, temperature inside tank 38°C.
Clear skies, wind calm.

Final coating inspection on roof.

Visual Observation

Coating appears smooth and even. All weld and seams appear to have been brushed in well. Coating is gray in colour.

Dry Film Thickness: DFT was measured with a magnetic type mil gauge calibrated to standard to SSPC PA2. Reading varied between 13.5 and 20 mils, with an overall average of 16 mils.

Holiday Test: Holiday test was performed with wet sponge at 67½ VDC. Discontinuities were indicated along weld seams and on end of rafters. All accessible areas appear to be holiday free.

09:30 Contractor preparing to start sandblasting shell. Fifty-six drums of sand on site.
Compressor air pressure is between 80 - 85 psi.
This inspector recommended more air pressure as this would cut down on blasting time and sand consumption.

L. Erickson
SIGNATURE OF INSPECTOR

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA.
AUTHORIZED BY R. WELKER
P.O.
PHONE

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 25, 1987

CONTRACTOR Western S.B. PERSON CONTACTED Joe UNIT/TAG

FILE DESCRIPTION Sandblast and Coat Water Tank DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

The Contractor advised this inspector that the compressor was not working properly to maintain 125 psi, which is required to maintain enough air at the blaster nozzle.

10:30 Sandblasting on shell started.
Temperature 3.5, Wet 2.5, R.H. 85%.
Air dryer filter changed, compressor 85 psi.
Air pressure at sand pot 80 psi.

13:00 Temperature +5°C, Wet 3, R.H. 71%.
Contractor re-adjusted the compressor. Air pressure now at sand pot is 90 psi.

17:00 Sandblasting is proceeding - no problems at this time.

21:00 Shift change.

22:00 Temperature +2°C, Wet .5°C, R.H 60%, clear skies, wind calm.

Sandblasting will continue around the clock until the shell is blasted.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

CLIENT GCG DILLON CONSULTANTS

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ADDRESS EDMONTON, ALBERTA,

AUTHORIZED BY R. WELKER

P.O.

REPORT OF INSPECTIONS

PHONE

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION ~~July~~ June 25, 1987

CONTRACTOR PERSON CONTACTED UNIT/TAG

FILE DESCRIPTION DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS % COMPLETE ESTIMATED DATE OF COMP.

ROOF 14 Average 16 mils overall.

15

14 14 15

15 13.5

14 16

18

19 Pipe Support

16 17 17

18

17 15

18 14

20 16

18 14

16

16

14 18 17

15 16

18 14

15 17 14

16

14 15

14 15

18

15 14 17 Manhole

17

Roof Hatch

L. Erickson

SIGNATURE OF INSPECTOR

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REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS
ADDRESS: EDMONTON, ALBERTA,
AUTHORIZED BY: R. WELKER
P.O.:
PHONE:
PAGE 1 OF 1

OUR FILE NO.: DC 87-001-RW

LOCATION OF WORK: Grise Fiord
INSPECTOR: L. Erickson
DATE OF INSPECTION: June 26, 1987

CONTRACTOR: Western S.B.
PERSON CONTACTED: Joe
UNIT/TAG:

FILE DESCRIPTION: Sandblast and Coat Water Tank
DESTINATION:

CRN.: PROV. #: INSTRUMENTS USED:

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS 50 % COMPLETE
ESTIMATED DATE OF COMP.:

07:30 Temperature +4, Wet 2.5, R.H. 79%.
Inside tank temperature +14°C.

Contractor advised that pin holes had been found along some of the horizontal welds. These will be inspected thoroughly on completion of blast.

9:30 Day shift began.

10:00 Temperature +4°C, Wet 2.5, R.H. 79%.
Sandblasting proceeding - no problems at this time.

14:00 Contractor changed filter in air dryer.
Temperature +10°C, Wet 6.5, R.H. 60%.
Sandblasting proceeding.

19:00 +4°C.

21:30 Completed first blast on shell.

22:00 Secure tank = two heaters inside, install recorder thermometer, temperature 0°C.
No night shift.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

GCG DILLON CONSULTING

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REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS,
ADDRESS: Edmonton, Alberta,
AUTHORIZED BY: R. Welker
P.O.:
PHONE:
PAGE 1 OF 1

OUR FILE NO. GC 87-001-RW

LOCATION OF WORK: Grise Fiord
INSPECTOR: L. Erickson
DATE OF INSPECTION: June 27, 1987

CONTRACTOR: Western S.B.
PERSON CONTACTED: Joe
UNIT/TAG:

FILE DESCRIPTION: Sandblast & Coat Water Tank
DESTINATION:

CRN.
PROV. #
INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE
ESTIMATED DATE OF COMP.

07:00 Temperature +1°C, Wet 0, Clear Sky, R.H. 80%.

Night shift informed this inspector the water pump on the compressor had broken down, inside Tank Temperature +17°C.
Day shift are making repairs.

10:00 Compressor now working.
Temperature +6°C, Wet 4, Inside Tank Temperature +15°C.
Sandblasting underway, relative humidity 70%.

14:00 This inspector advised the Contractor to change dessicant filters in air dryer. Contractor agreed and filters were changed.
Temperature +10, Wet 8, R.H. 75%.

15:00 Sandblasting continuing with no problems.

19:00 Temperature +4°C, Wet 2, R.H. 70%, inside Tank Temperature +16°C.
Sandblasting continuing with no problems.

21:30 Completed first blast on shell.

22:00 Secure tank, two heaters used to maintain heat inside tank.
(Outside Temperature 0)
No night shift.

L. Erickson LE
SIGNATURE OF INSPECTOR

APPROVED

CLIENT GCG DILLON CONSULTANTS

ADDRESS EDMONTON, ALBERTA,

AUTHORIZED BY R. WELKER

P.O.

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REPORT OF INSPECTIONS

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 28, 1987

CONTRACTOR Western S.B. PERSON CONTACTED Joe UNIT/TAG

FILE DESCRIPTION Sandblast and Coat Water Tank DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ______ % COMPLETE ESTIMATED DATE OF COMP.

07:30 Temperature +3, Wet +2, Clear Sky, Wind Calm, R.H. 85%.
Inside Tank 18^{O}C, Surface Temperature 18^{O}C.
Four man crew removing sand from tank.

10:00 Temperature +5^{O}C, Wet 3.5, R.H. 75%.
Sand removal continuing.

13:30 Sand removal complete.
Inspected sandblast as requested by Contractor. Weld spatter and some sharp edges were evident along horizontal welds in four areas. Grinding was required to eliminate minor pin holes. Contractor agreed to grind these areas. Dark spots were also evident in areas on every course, these areas were marked off with chalk. Profile measured 2.5 mils.
Contractor agreed to reblast.

15:30 Reblast started.
Temperature +10^{O}C, Clear sky, wind calm, R.H. 65%.

19:00 Temperature +10^{O}C.
Sandblast continuing.

20:30 Sandblast complete. Contractor will blowdown and coat tomorrow morning, as crew was too tired to continue tonight.

16 drums of sand left to blast the floor.
3 heaters were used to maintain heat inside tank.

L. Erickson [signature]
SIGNATURE OF INSPECTOR

APPROVED

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
P.O.
PHONE

OUR FILE NO. DC 87-001-RW
LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 26, 1987
CONTRACTOR PERSON CONTACTED UNIT/TAG
FILE DESCRIPTION DESTINATION
CRN. PROV. # INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ______ % COMPLETE ESTIMATED DATE OF COMP.

It was the opinion of this inspector that there may be a shortage of sand to complete the floor, and the Contractor was so advised. This was discussed with Dave O'Neal of Dillon Consultants.

28:30 A telephone call was placed to R. Tatz of Rae Inspection Service to advise on the above. It was agreed that under the circumstances, used sand could be used to extend the initial blast, as long as new sand was used for the final clean up and if the Contractor agreed to stand behind the job.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
P.O.
PHONE

OUR FILE NO. DC 87-001-RW
LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 29, 1987
CONTRACTOR Western S.B. PERSON CONTACTED Joe UNIT/TAG
FILE DESCRIPTION Sandblast and Coat Water Tank DESTINATION
CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ______ % COMPLETE ESTIMATED DATE OF COMP.

01:00 Checked heaters - all three working.
07:30 Temperature +4°C, Wet 2°, R.H. 70%.
Inside tank temperature +32°C, surface temperature of shell 30°C.
Three man crew removing sand from tank.
10:00 Temperature +8°C, Wet 6, R.H. 75%.
Contractor in process of removing dust.
11:00 Inspected blast touchup and grinding.

Visual Observation: Sandblast now appears much more uniform, no sharp edges or weld spatter and no sign of rust bloom. In our opinion the blast now conforms to SSPC SP10 and is acceptable to receive first coat.

13:30 Application of first coat was started with two airless spray guns with #21 tips.
14:00 Contractor removed one gun. The paint pump unable to supply enough paint for both guns.
Temperature +6, Wet 4, R.H. 70%.
ZE521018 CM A2 31024 6C Intergard EXA 120/S Base Medium
Catalyst 25990193 EXA 208/2 - colour gray.
23:30 First coat complete, all welds brushed in - 38 gallons of paint used.
Secure tank - three heaters maintained inside tank.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

ANY OMISSION OR FAILURE ON THE PART OF THE INSPECTOR TO DISAPPROVE OR REJECT ANY WORK OR MATERIALS SHALL NOT BE CONSTRUED AS AN ACCEPTANCE OF ANY DEFECTIVE WORK OR MATERIALS.

CLIENT GCG DILLON CONSULTANTS

ADDRESS EDMONTON, ALBERTA,

AUTHORIZED BY R. WELKER

P.O.

PHONE PAGE 1 OF 1

RAE INSPECTION SERVICE (1979) LTD.

Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION June 30, 1987

CONTRACTOR Western Sand. PERSON CONTACTED UNIT/TAG

FILE DESCRIPTION Sandblast and Coat Water Tank DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS % COMPLETE ESTIMATED DATE OF COMP.

10:00 Temperature +5°C, Wet +3°C, R.H. 74%.
Clear sky, wind calm.
One heater shut down during night. Inside tank temperature 90°C.
13:00 Inspected first coat.

Visual Observation: Coating appears smooth and even, some welds require third brush. Dry film thickness varied from 4.8 to 5.8 mils. The Contractor agreed to brush in rough welds.
Witnessed mixing of product - 2E5L1018 CM A2 31024 Intergard EXA 120/S Base Medium white in colour, Catalyst 990193 EXA 208/2.
Temperature 7.5, Wet 4.5, R.H. 62%, surface temperature of tank 18°C.

14:00 Application of second coat started.
Two airless guns operating with #.021 tips.
17:00 Application of second coat complete - 35 gallons of paint used.
17:30 Secure equipment - three heaters working, to maintain temperature in tank.

L. Erickson RE

SIGNATURE OF INSPECTOR

APPROVED

RAE INSPECTION SERVICE (1979) LTD.

Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS
ADDRESS: EDMONTON, ALBERTA,
AUTHORIZED BY: R. WELKER
P.O.
PHONE

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK: Grise Fiord INSPECTOR: L. Erickson DATE OF INSPECTION: July 1, 1987

CONTRACTOR: Western Sand. PERSON CONTACTED: UNIT/TAG:

FILE DESCRIPTION: Sandblast and Coat Water Tank DESTINATION:

CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

09:00 Temperature +3°C, wet 1°C, R.H. 70%, clear sky, wind calm.
Temperature inside +100°C.
Inspected second coat.

Visual Observation

Coating appears smooth and even with only four areas of minor runs. Contractor agreed to sand out prior to application of third coat. Dry film thickness varied between 8.5 to 11 mils.
Witnessed mixing of product - colour gray.

10:30 Application of third coat started.
ZE521018 CM A2 31024 Intergard EXA 120/S base medium
Catalyst 990193 EXA 208/2.
Temperature +6, wet 4, R.H. 75%.
Two airless guns operating with #21 tips.

14:30 Complete application of third coat.
37 gallons used.
3 heaters inside tank.

19:00 Inspected final coat on shell, top three courses.
Coating was dry and hard to the touch.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

CLIENT GCG DILLON CONSULTANTS

ADDRESS EDMONTON, ALBERTA.

AUTHORIZED BY R. WELKER

P.O.

PHONE

RAE INSPECTION SERVICE (1979) LTD.
Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION July 1, 1987

CONTRACTOR Western Sand. PERSON CONTACTED UNIT/TAG

FILE DESCRIPTION DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

Visual Observation

Coating appears smooth and even with a high gloss.
No runs or inclusions evident.
Dry film thickness - DFT was measured with a magnetic type mil gauge calibrated to standard to SSPC PA2. Readings varied from 14 to 19 mils.

Holiday Test - 100% holiday test was performed with wet sponge at 67½ VDC. Two small discontinuities were located along the top weld. The Contractor repaired immediately.

In our opinion this portion of the coating is acceptable for service after cure.

21:00 Install overflow pipe, fill centre column with approximately 1100 pounds of spent sand.

Secured equipment and tank. Two heaters used to heat tank.

L. Erickson

SIGNATURE OF INSPECTOR

APPROVED

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RAE INSPECTION SERVICE (1979) LTD.

Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS
ADDRESS: EDMONTON, ALBERTA,
AUTHORIZED BY: R. WELKER
P.O.:
PHONE: PAGE 1 OF 1

OUR FILE NO.: DC 87-001-RW

LOCATION OF WORK: Grise Fiord INSPECTOR: L. Erickson DATE OF INSPECTION: July 2, 1987

CONTRACTOR: Western S.B. PERSON CONTACTED: UNIT/TAG:

FILE DESCRIPTION: Sandblast and Coat Water Tank DESTINATION:

CRN.: PROV. #: INSTRUMENTS USED:

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP. ____

07:30 Temperature +2, Wet 1, R.H. 85%, Inside Temperature 18°C, Scattered cloud.
Contractor removing scaffolding and preparing to sandblast floor.

11:00 Temperature +4, Wet 3, R.H. 85%.
Sandblasting started, blast abrasive used - 50% used sand, 50% new sand. Eighteen drums of new sand left on site. Contractor will complete initial blast with the 50/50 mix and finish blast with new sand.

13:00 Telephone call received from R. Tatz of Rae Inspection to discuss job status.

14:00 Inspected blast surface as requested by Contractor.

Visual Observation

Sandblast appears uniform. Profile measured 2.1 mils using testex tape.

16:00 Temperature 2.5, Wet 2, R.H. 90%.
Sandblasting continuing, air dryer working well, no sign of moisture at blast nozzle. No problems at this time.

19:00 Night shift started - 2 men on shift.

20:00 Light rain, moisture evident at blast nozzle. Contractor stopped sandblasting for the night. Secured tank. Two heaters inside tank to maintain heat.

SIGNATURE OF INSPECTOR APPROVED

ANY OMISSION OR FAILURE ON THE PART OF THE INSPECTOR TO DISAPPROVE OR REJECT ANY WORK OR MATERIALS SHALL NOT BE CONSTRUED AS AN ACCEPTANCE OF ANY DEFECTIVE WORK OR MATERIALS.

RAE INSPECTION SERVICE (1979) LTD.

Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS
ADDRESS: EDMONTON, ALBERTA.
AUTHORIZED BY: R. WELKER
P.O.:
PHONE: PAGE 1 OF 1

OUR FILE NO.: DC 87-001-RW
LOCATION OF WORK: Grise Fiord INSPECTOR: L. Erickson DATE OF INSPECTION: July 3, 1987
CONTRACTOR: Western S.B. PERSON CONTACTED: UNIT/TAG:
FILE DESCRIPTION: Sandblast and Coat Water Tank DESTINATION:
CRN.: PROV. #: INSTRUMENTS USED:

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

07:30 Temperature +3°C, Wet +2°C, R.H. 85%, Overcast.

Contractor replaced desiccant filters.
Sandblasting continued.

10:30 Temperature +3°C, Wet 2.5°C, R.H. 90%.

12:30 Replaced desiccant filter.
Sandblasting continuing - no problems.

16:00 Overcast, wind southwest 20 kph gusting to 40.
Temperature +6°C, Wet +2°C, R.H. 45%.

Contractor now using new abrasive to complete the sandblast.

19:00 Temperature 3.5°C, Wet 1.5°C, R.H. 70%, Overcast, Wind southwest lo kph.

23:00 Initial sandblast complete on tank floor. Contractor will leave sand in overnight. Secured tank, two heaters inside tank to maintain heat.

L. Erickson RE
SIGNATURE OF INSPECTOR

APPROVED

RAE INSPECTION SERVICE (1979) LTD.

Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS
ADDRESS: EDMONTON, ALBERTA,
AUTHORIZED BY: R. WELKER
P.O.:
PHONE:

OUR FILE NO.: DC 87-001-RW

LOCATION OF WORK: Grise Fiord INSPECTOR: L. Erickson DATE OF INSPECTION: July 4, 1987

CONTRACTOR: Western S.B. PERSON CONTACTED: UNIT/TAG:

FILE DESCRIPTION: Sandblast and Coat Water Tank DESTINATION:

CRN.: PROV. #: INSTRUMENTS USED:

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

07:30 Temperature +1°C, Wet 0, R.H. 82%, Overcast, Wind Calm.
Three man crew removing sand from tank.

Inspection of Blasted Surface: Some dark areas remain, surface profile 2 mils. Weld spatter and marked sharp edges evident along some weld seams. Contractor agreed to remove weld spatter and grind all sharp edges, also to remove all dark areas during finish blast.

13:00 Temperature +3°C, Wet 2°C, R.H. 85%.
Contractor completing finish blast with new abrasive.
18:00 Completed final blast.
19:30 Completed vacuuming of tank floor.

Blast Inspection - Visual Observation: Blast appears uniform, no weld spatter or sharp edges evident. Profile measured 2.3 mils and in our opinion is acceptable to receive second coat.

Witnessed mixing of product -2E521018 CH2 A231024 6C Intergard EXA 120/S medium base grey, Activator EAX 208/2 ZE990193.
00:30 First coat complete - 28 gallons used. Contractor had mechanical problems with paint pump. Secured tank and equipment, 3 heaters maintaining heat inside tank.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

RAE INSPECTION SERVICE (1979) LTD.
Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA.
AUTHORIZED BY R. WELKER
P.O.
PHONE PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION July 5, 1987
CONTRACTOR Western S.B. PERSON CONTACTED Joe UNIT/TAG
FILE DESCRIPTION Sandblast and Coat Water Tank DESTINATION
CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

11:00 Temperature +4°C, Wet +2°C, Clear Sky, R.H. 70%, Surface Temperature on Floor 20°C.

13:00 Inspected first coat.
Runs on lower course next to southeast nozzle vent overflow.
A few weld spatters were identified and removed. Dry film thickness measured 4 to 6.5 mils.

In our opinion surface is acceptable to receive intermediate coat after touchup.
Surface temperature +18°C.

17:00 Completed intermediate coat 22 gallons used.
Two heaters used to maintain heat inside tank.
Secured tank and equipment.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

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RAE INSPECTION SERVICE (1979) LTD.
Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS
ADDRESS: EDMONTON, ALBERTA,
AUTHORIZED BY: R. WELKER
P.O.
PHONE
PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK: Grise Fiord INSPECTOR: L. Erickson DATE OF INSPECTION: July 6, 1987

CONTRACTOR: Western S.B. PERSON CONTACTED: Joe UNIT/TAG:

FILE DESCRIPTION: Sandblast and Coat Water Tank DESTINATION:

CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

07:30 Temperature +3°C, Clear Sky, Wind Calm
Surface Temperature on Floor 22°C.
Inspected intermediate coat as requested by Contractor.

Visual Observation

Coating appeared smooth and even with a high gloss, white in colour. Inclusions evident near manway and around southeast vent nozzle. Contractor agreed to remove before application of third coat. Coating appeared hard and in our opinion acceptable to receive third coat. D.F.T. measured between 8 - 12 mils.

09:30 Witnessed mixing of product - 2E521018 CH2 A2 31024-6C Intergard EXA 12-/S medium gray base, Activiator EAX 208/2 ZE 990193

10:30 Application of third coat began - 2 spray guns (airless) used with #21 tips.

13:00 Application complete - 25 gallons of paint used.
Secured tank, 3 heaters maintaining heat inside tank.

L. Erickson LE
SIGNATURE OF INSPECTOR

APPROVED

RAE INSPECTION SERVICE (1979) LTD.
Ste. #2, 9734 - 51st Avenue, Edmonton, Alberta, Canada T6E 0A6
Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
P.O.
PHONE PAGE 1 OF 3

OUR FILE NO. DC 87-001-RW
LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION July 7, 1987
CONTRACTOR Western S.B. PERSON CONTACTED Joe UNIT/TAG
FILE DESCRIPTION Sandblast and Coat Water Tank DESTINATION
CRN. PROV. # INSTRUMENTS USED

1. ☒ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

09:30 Temperature +3°C, Clear Sky, Wind Calm.
Inspected floor and bottom 9' course as requested by Contractor.

Visual Observation

Coating appears smooth and even, with a high gloss. No runs or sags evident, no inclusions. Gray in colour.

Dry Film Thickness: D.F.T. was measured with magnetic type mil gauge tester calibrated to standard to SSPC PA2. Readings varied from low 13 to high 19, average 16.5 mils, and in our opinion is acceptable. For details see attached sheet.

Holiday Test: 100% holiday test was performed with wet sponge at 67½ VDC. Nine discontinuities were located, also small pin holes and weld spatter. Contractor sanded and repaired immediately. Contractor will retest these areas, accompanied by Dave O'Neal, at a later date.

In our opinion this coating will be acceptable for service on completion of these minor repairs and completion of cure.

A GOOD JOB!

L. Erickson LE
SIGNATURE OF INSPECTOR

APPROVED

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REPORT OF INSPECTIONS

CLIENT: GCG DILLON CONSULTANTS.
ADDRESS: EDMONTON, ALBERTA,
AUTHORIZED BY: R. WELKER
P.O.:
PHONE:

OUR FILE NO.: DC 87-001-RW

LOCATION OF WORK: Grise Fiord
INSPECTOR: L. Erickson
DATE OF INSPECTION: July 7, 1987

CONTRACTOR:
PERSON CONTACTED:
UNIT/TAG:

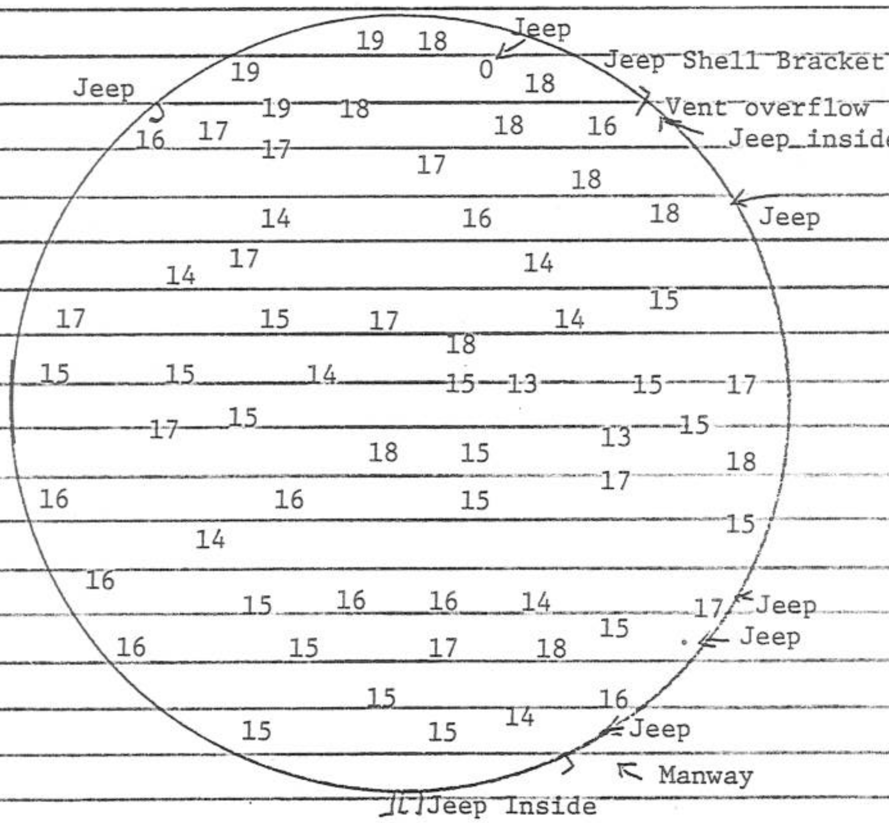
FILE DESCRIPTION:
DESTINATION:

CRN.:
PROV. #:
INSTRUMENTS USED:

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ______ % COMPLETE
ESTIMATED DATE OF COMP.

D.F.T. on Floor



Average 16. 5 mils

L. ERickson

SIGNATURE OF INSPECTOR

APPROVED

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REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA.
AUTHORIZED BY R. WELKER
P.O.
PHONE
PAGE 3 OF 3

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION July 7, 1987

CONTRACTOR Western S.B. PERSON CONTACTED UNIT/TAG

FILE DESCRIPTION Sandblast and Coat Water Tank DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ________ % COMPLETE ESTIMATED DATE OF COMP.

Note:

Recorder thermometer and surface temperature gauge left on site with Dave O'Neal.

14:00 Assisted Dave O'Neal and Mike Manning install valves inside insulation box.

Coating Contractor cleaning up around site and touching up paint on exterior of tank.

23:00 Left Grise Fiord to travel to Resolute Bay.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

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Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
P.O.
PHONE PAGE 1 OF 1

OUR FILE NO. DC 87-001-RW

LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION July 8, 1987

CONTRACTOR PERSON CONTACTED UNIT/TAG

FILE DESCRIPTION Sandblast and Coat Water Tank DESTINATION

CRN. PROV. # INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS ____ % COMPLETE ESTIMATED DATE OF COMP.

01:00 Standby in Resolute Bay for flight to Edmonton.

12:00 Left Resolute Bay for Edmonton.

07:00 Arrived Edmonton International Airport.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

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Phone (403) 434-8507

REPORT OF INSPECTIONS

CLIENT GCG DILLON CONSULTANTS
ADDRESS EDMONTON, ALBERTA,
AUTHORIZED BY R. WELKER
P.O.
PHONE PAGE OF

OUR FILE NO. DC 87-001-RW
LOCATION OF WORK Grise Fiord INSPECTOR L. Erickson DATE OF INSPECTION July 10, 1987
CONTRACTOR PERSON CONTACTED UNIT/TAG
FILE DESCRIPTION DESTINATION
CRN. PROV. # INSTRUMENTS USED

1. ☐ COATINGS/PAINTING 2. ☐ SHOP FABRICATION & PIPE MILLS 3. ☐ PLANT STEEL & MAINTENANCE 4. ☐ FIELD CONSTRUCTION 5. ☐ SUPERVISING 6. ☐ CONSULTING

WORK PROGRESS % COMPLETE ESTIMATED DATE OF COMP.

10:00 Prepare reports and photographs.

Clean up paper work for job at Grise Fiord.

12:00 Complete.

L. Erickson
SIGNATURE OF INSPECTOR

APPROVED

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8.3 Electrical Permit and Inspection Certificates

NOTE: Inspection Certificate will be forwarded to G.N.W.T. - D.P.W. & H. in Iqaluit at a later date.

rthwest Territories

ELECTRICAL PROTECTION ACT

PERMIT FOR WIRING INSTALLATIONS

FOR USE BY REGISTERED QUALIFIED ELECTRICAL WORKERS

PRESS HARD AS YOU ARE MAKING 5 COPIES

E... OSE TO INSTALL ELECTRICAL WIRING, APPARATUS, FITTINGS OR ALTERATIONS, THE PARTICULARS OF WHICH ARE SET OUT BELOW

IE OF CITY, TOWN, VILLAGE OR HAMLET Grise Fiord NWT

IERAL DESCRIPTION OR
EET LOCATION ________ LOT ____ BLOCK ____

OCCUPIED BY Sam

MISES OWNED BY Gov't of NWT

PHONE NO. —

RESS Dept of PublicWorks, Yellowknife DATE July 21-1987

ALL FIVE COPIES MUST BE SENT IN WITH PERMIT FEE

HEREBY CERTIFY THAT THIS INSTALLATION WILL BE COMPLETED IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE AND TERRITORIAL ELECTRICAL PROTECTION ACT.

IGNED [signature] N.W.T. REGISTRATION NO. H-666

DDRESS Box1285, Lloydminster, Alta

IRM NAME Universal Industries PHONE NO. 403 875-6161

MAKE REMITTANCE PAYABLE TO:
THE GOVERNMENT OF THE NORTHWEST TERRITORIES

MAIL TO:
MECH./ELECT. SECTION, SAFETY DIVISION
YELLOWKNIFE, N.W.T.

COST OF INSTALLATION INCLUDING LABOR, TRAVEL, BOARD & ROOM $ ____

PERMIT FEE $ ____

POWER CONNECTION REQUIRED (✓) YES ☐ NO ☑

NTIAL

NEW ___ SERVICE SIZE ___ ADDITIONS ___

LIST ADDITIONS: ________

COMMERCIAL AND INDUSTRIAL ISTALLATIONS

NEW ✓ REWIRE __ ADDITIONS __

INSTALLATION OR BUILDING TO BE WIRED:

Water Pumping System.

Please be free ... for ...

RATING OF SERVICE: VOLTAGE ____ AMPERES ____ PHASE ____

OUTLINE BASIC WIRING METHOD: conduit + wire

PLANS MAY BE REQUIRED ON ANY INSTALLATION. MUST BE SUPPLIED WHEN COST OVER $2,500.00.

TRAILER POLE SERVICE

RATING OF SERVICE: VOLTAGE ____ AMPERES ____ PHASE ____

TEMPORARY POWER ONLY

IF TEMPORARY POWER IS REQUIRED FOR A PERIOD NOT EXCEEDING 90 DAYS CHECK HERE ☐

FOR THE PURPOSE OF:

NOTE: SEPARATE PERMIT APPLICATIONS ARE REQUIRED TO COVER TEMPORARY INSTALLATIONS

(FOR OFFICE USE ONLY)

[date] /87 RECEIPT NO. [illegible] ISSUED BY [signature] PERMIT NO. 2341

ALL FOUR COPIES MUST BE SENT IN WITH PERMIT FEE

339-80/1186

RIBUTION: COPY 1 - POWER SUPPLY COMPANY COPY 2 - HEAD OFFICE INSPECTOR'S COPY
COPY 3 - HEAD OFFICE COPY COPY 4 - APPLICANT'S COPY
COPY 5 - REGIONAL INSPECTOR'S COPY

PERMISSION IS HEREBY GRANTED TO DO THE ABOVE WORK PROVIDED IT IS COMMENCED WITHIN 90 DAYS.

8.4 Soils Testing

NOTE: Testing was performed by resident inspector.

Sample: #1 Depth: SURFACE
Client:
Project: GRISE FIORD
Location: WEST OF OLD RWY.
Made by: D. O'N. Job. No. 9893-04
Ck'd by: Date: 7 AUG. 1986

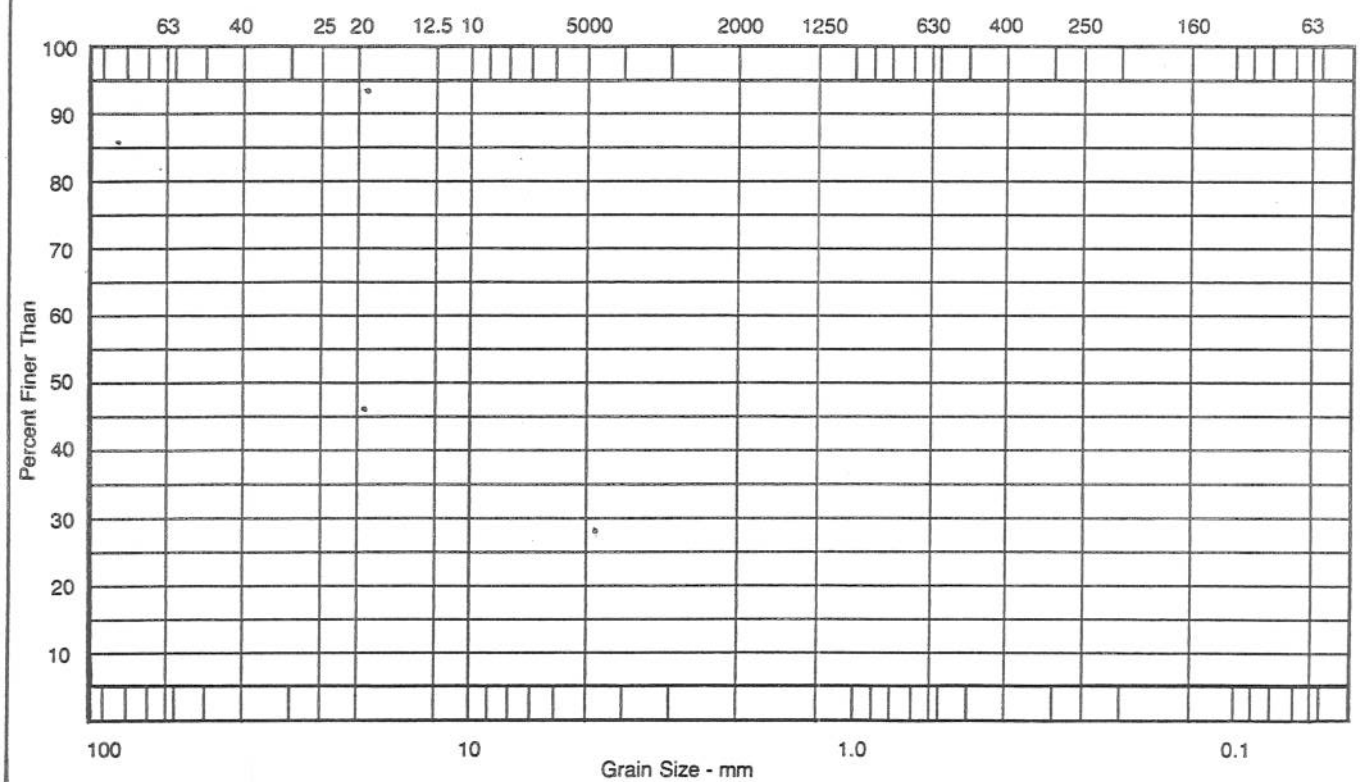
	Sieve No.	Size of Opening MM	Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
Initial dry Weight						
	63000	63.0				
1.575 lb.	40000	40.0				
=714g	25000	25.0				
	3/4 ~~20000~~	19 ~~20.0~~	45.4	668.6		93.6
	12500	12.5				
	10000	10.0				
	4 ~~5000~~	4.75 ~~5.0~~	469.5	199.1		27.9
	2000	2.0				
	1250	1.250				
	16 ~~630~~	~~0.630~~	140.1	59		8.3
	400	0.400				
	50 ~~250~~	.297 0.250	49.9	9.1		1.3
	160	0.160				
	200 ~~63~~	.074 0.063	6.8	2.3		0.3
	PAN					

Description of Sample
GRAVEL

% MOIS. = 1.97 %

Time of Sieving Min.

Method of Preparation ✓ Dry Washed
Remarks
WT. WET = 1.606 lb = 728.5 g
WT. DRY = 1.575 lb. = 714.4 g



SCREEN ANALYSIS

Client: ....

Sample: # 3 ..... Depth: SURFACE ..... Project: GRISE FIORD

Location: WEST EDGE OF OLD RWY. ..... Made by: D. O'N. ..... Job. No. 9893-04

.... Ck'd by: .... Date: 7 AUG. 1986

	Sieve No.	Size of Opening MM	Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig.Sample
Initial dry Weight						
1.69 lb.	63000	63.0				
= 767 g	40000	40.0				
	25000	25.0				
	3/4 ~~20000~~	19 ~~20.0~~	18.1	748.9		97.6
	12500	12.5				
	10000	10.0				
	4 ~~5000~~	4.75 ~~5.0~~	381	367.9		47.97
	2000	2.0				
	1250	1.250				
	16 ~~630~~	0.630	192.7	175.2		22.8
	400	0.400				
	50 ~~250~~	.297 0.250	131.5	43.7		5.7
	160	0.160				
	200 ~~63~~	.074 ~~0.063~~	22.7	21		2.74
	PAN					

Description of Sample ... GRAVEL .....

% MOIS. = 3.5 %

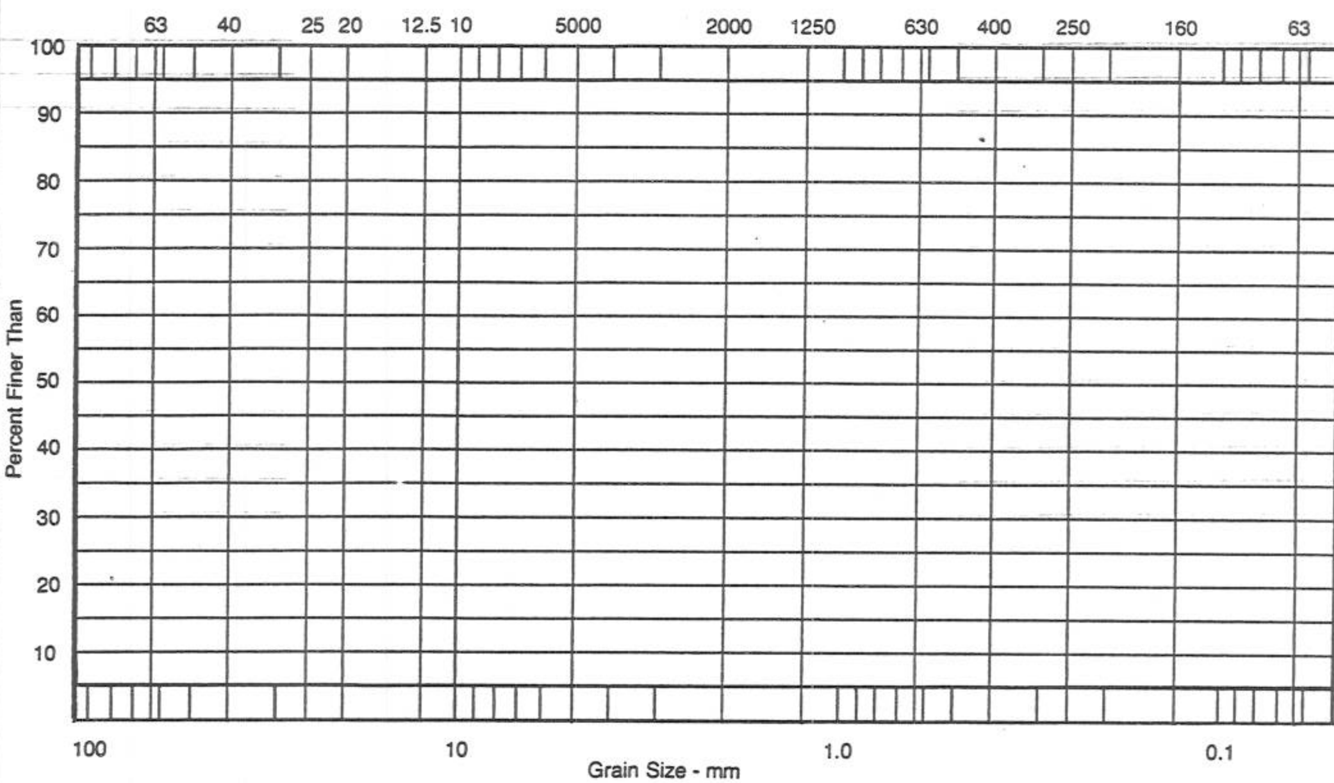
Time of Sieving .... Min. ....

Method of Preparation ... ✓ ... Dry .... Washed ....

Remarks ....

WT. WET = 1.75 lb. = 793.8 g

WT. DRY = 1.69 lb. = 766.6 g



SCREEN ANALYSIS

Sample: #4 Depth: SURFACE
Location: OLD RUNWAY STOCKPILE
Client:
Project: GRISE FIORD
Made by: D. O'N. Job. No. 9893-04
Ck'd by: Date: 8 AUG. 1986

	Sieve No.	Size of Opening MM	Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig.Sample
Initial dry Weight						
+ PAN (lb.)	63000	63.0				
DRY	40000	40.0				
WT	25000	25.0				
0.50/.285	3/4 ~~20000~~	20.0	129.3	1217.9		90.4
	12500	12.5				
	10000	10.0				
1.755/1.54	4 ~~5000~~	5.0	698.5	519.4		38.6
	2000	2.0				
	1250	1.250				
0.830/.615	16 ~~630~~	~~0.630~~	278.9	240.5		17.9
	400	0.400				
0.615/0.4	50 ~~250~~	0.250	181.4	59.1		4.4
	160	0.160				
0.300/.085	200 ~~63~~	~~0.063~~	38.6	20.5		1.5
	PAN					

.77

.085

Description of Sample GRAVEL

% MOIS. = 2.7 %

Time of Sieving .... Min.

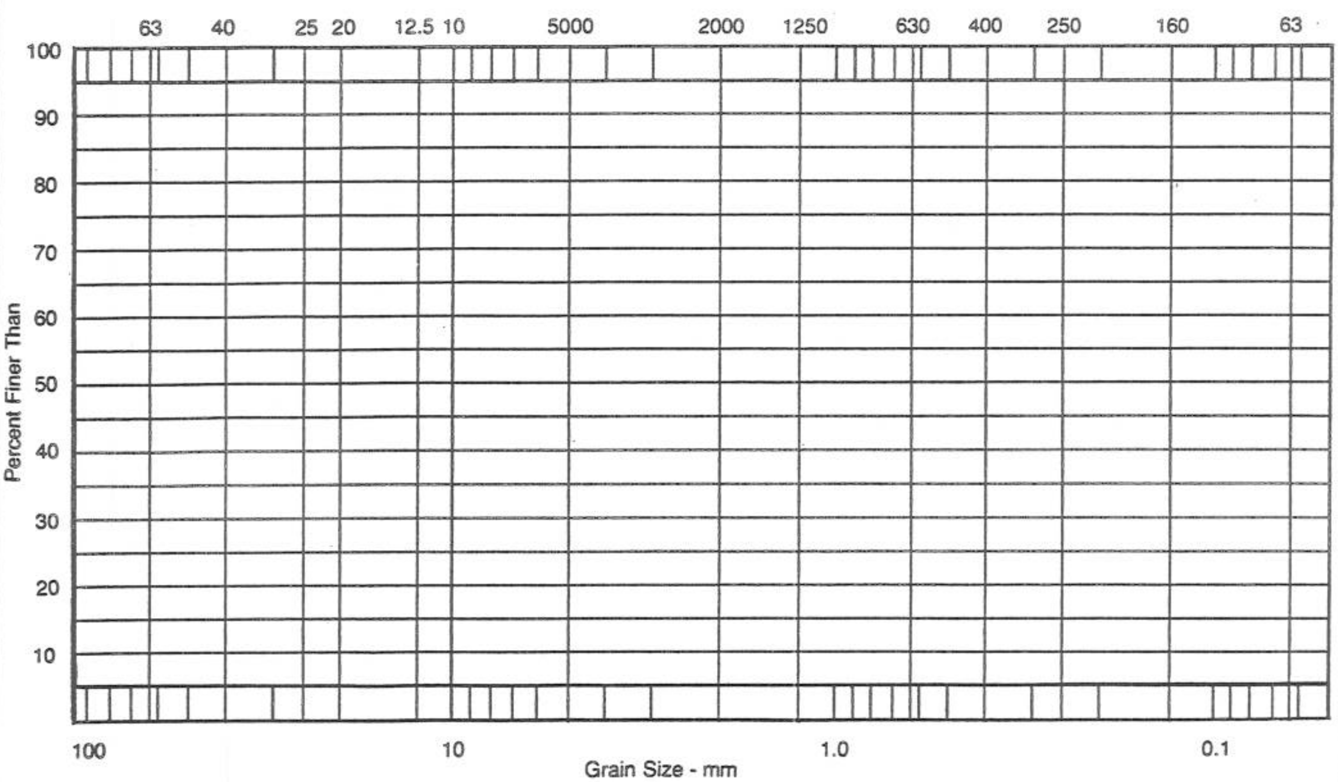
Method of Preparation ✓ Dry .... Washed ....

Remarks

WET 3.27 lb - 0.215 = 3.055 lb.

DRY 3.185 lb. = 0.215 ≅ 1347.2 g

PAN 0.215 lb.



SCREEN ANALYSIS

Sample: #5. Depth: .... Client: ....

Project: GRISE FIORD

Location: STOCKPILE Made by: D. O'N. Job. No. 9893-04

Ck'd by: .... Date: 10-08-86

	Sieve No.	Size of Opening MM	Weight Retained gms	Total Wt. Finer Than gms	~~Percent Finer Than~~	% Finer Than Basis Orig. Sample
Initial dry Weight					SPEC. %	
+PAN = 1.815	63000	63.0			PASSING	
= 1.6 lb Net	40000	40.0				
= 725.79	25000	25.0				
0.26 lb	3/4 ~~20000~~	19 ~~20.0~~	117.9	607.8	57-100	83.8
	12500	12.5				
	10000	10.0				
0.655 lb	4 ~~5000~~	4.75 ~~5.0~~	297.1	310.7	25-100	42.8
0.345	16 ~~2000~~	1.9 2.0	156.5	154.2	10-85	21.2
	1250	1.250				
	630	0.630				
	400	0.400				
0.255	50 ~~250~~	.297 ~~0.250~~	115.7	38.5	5-40	5.3
	160	0.160				
0.055	200 ~~63~~	.074 ~~0.063~~	24.9	13.6	0-5	1.9
	PAN					

Description of Sample ....

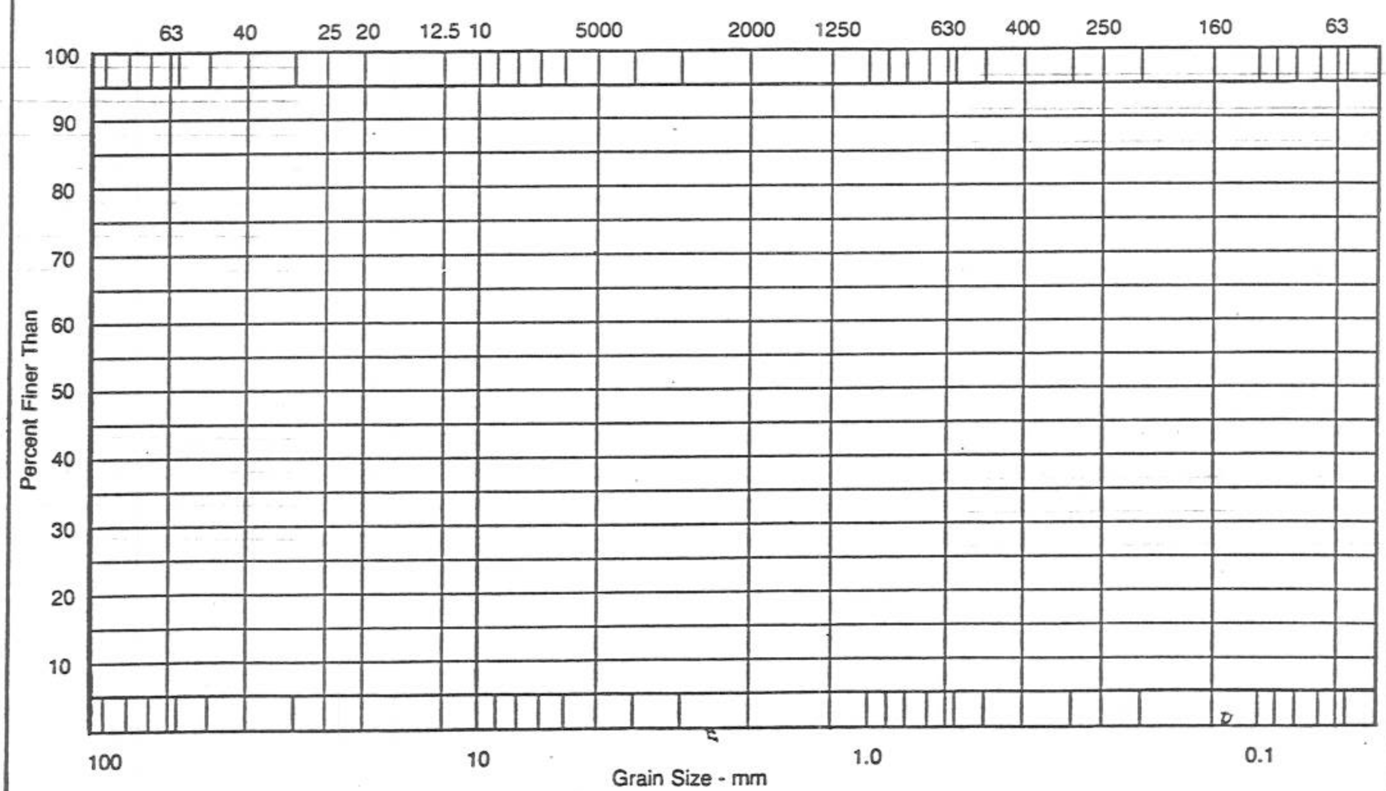
Time of Sieving .... Min. ....

Method of Preparation ✓ Dry .... Washed ....

Remarks PAN = 0.215 lb

WET = 1.87 lb - 0.215 = 1.655

DRY = 1.815 lb - 0.215 = 1.600 = 725.79



SCREEN ANALYSIS

Sample: #6 Depth: ......

Location: ......

Client: ......

Project: ......

Made by: D. O'N. Job. No. 9893-04

Ck'd by: ...... Date: 11-08-86

	Sieve No.	Size of Opening MM	Weight Retained gms	Total Wt. Finer Than gms	~~Percent Finer Than~~	% Finer Than Basis Orig.Sample
Initial dry Weight					% PASSING	
WT. + PAN / WT. (lb)	63000	63.0			BY SPEC	
	40000	40.0				
	25000	25.0				
⊗	3/4 ~~20000~~	20.0	⊗	1120.4	57-100	100
	12500	12.5				
	10000	10.0				
1.445 / 1.23	4 ~~5000~~	5.0	557.9	562.5	25-100	50.2
0.860 / .645	16 ~~2000~~	2.0	292.6	269.9	10-85	24.1
	1250	1.250				
	630	0.630				
	400	0.400				
0.590 / .375	50 ~~250~~	0.250	170.1	99.8	5-40	8.91
	160	0.160				
.305 / 0.09	200 ~~63~~	0.063	40.8	59	0-5	5.27
	PAN					

Description of Sample ......

GRAVEL

Time of Sieving ...... Min. ......

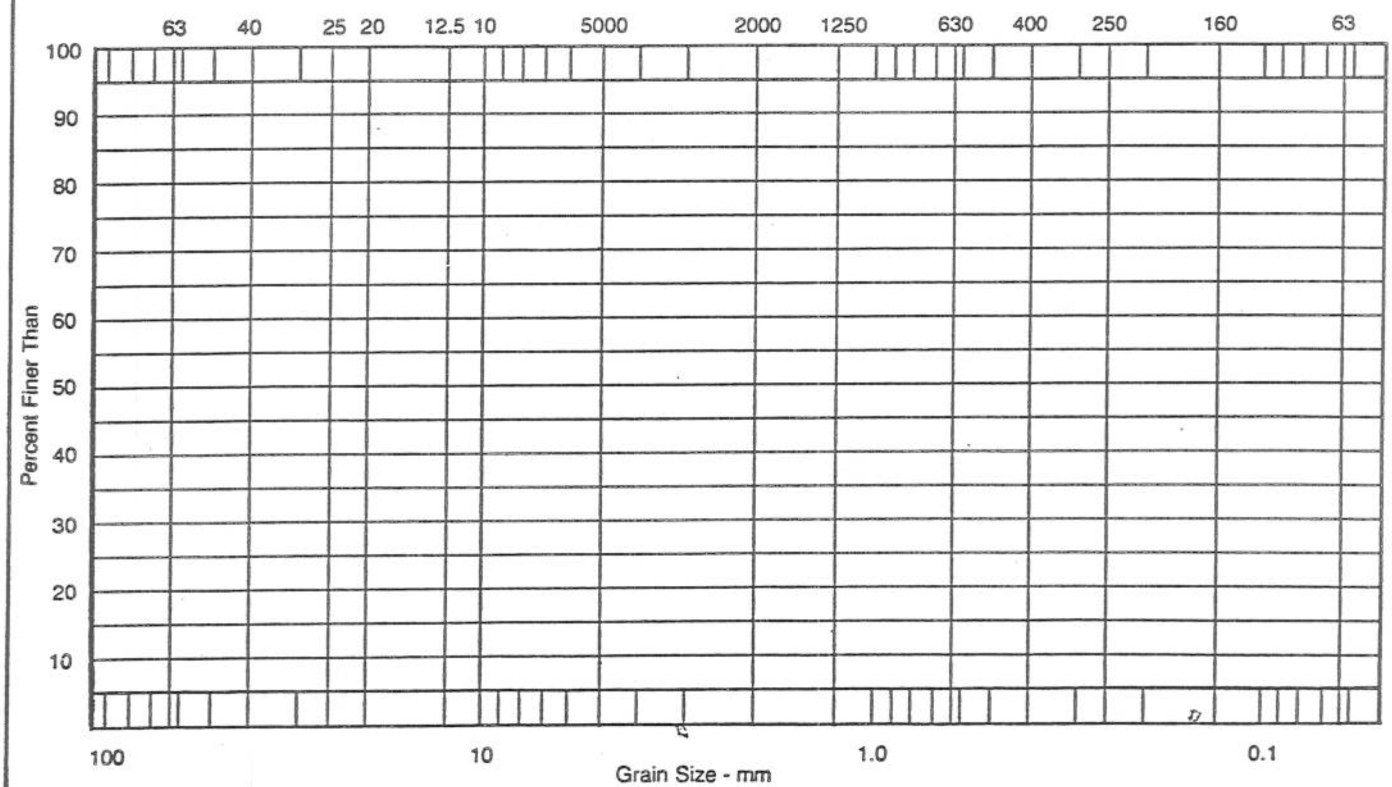
Method of Preparation ...... Dry ...... Washed ......

Remarks PAN. 0.215

WET = 2.77 - .215 = 2.555 = 1158.9g

DRY = 2.685 - .215 = 2.470 = 1120.4g

% MOIS. = 3.4%



SCREEN ANALYSIS

Sample: # 7 Depth:

Client:

Project:

Location: STOCKPILE - SELECT GRANULAR

Made by: D.O'N. Job. No. 9893-04

Ck'd by: Date: 12-8-86

	Sieve No.	Size of Opening MM	Weight Retained gms	Total Wt. Finer Than gms	~~Percent Finer Than~~	% Finer Than Basis Orig. Sample
Initial dry Weight					SPEC. %	
PAN = .215	63000	63.0			PASSING.	
	40000	40.0				
	25000	25.0				
⊗ 1	3/4 ~~20000~~	20.0	⊗	1145.3	57-100	100
	12500	12.5				
	10000	10.0				
1.105/0.89	4 ~~5000~~	5.0	403.7	741.6	25-100	64.6
1.055/0.84	16 ~~2000~~	2.0	381.0	360.6	10-85	31.5
	1250	1.250				
	630	0.630				
	400	0.400				
0.790/0.575	50 ~~250~~	0.250	260.8	99.8	5-40	8.7
	160	0.160				
0.325/0.110	200 ~~63~~	0.063	49.9	49.9	0-5	4.4
.3425	PAN					

Description of Sample

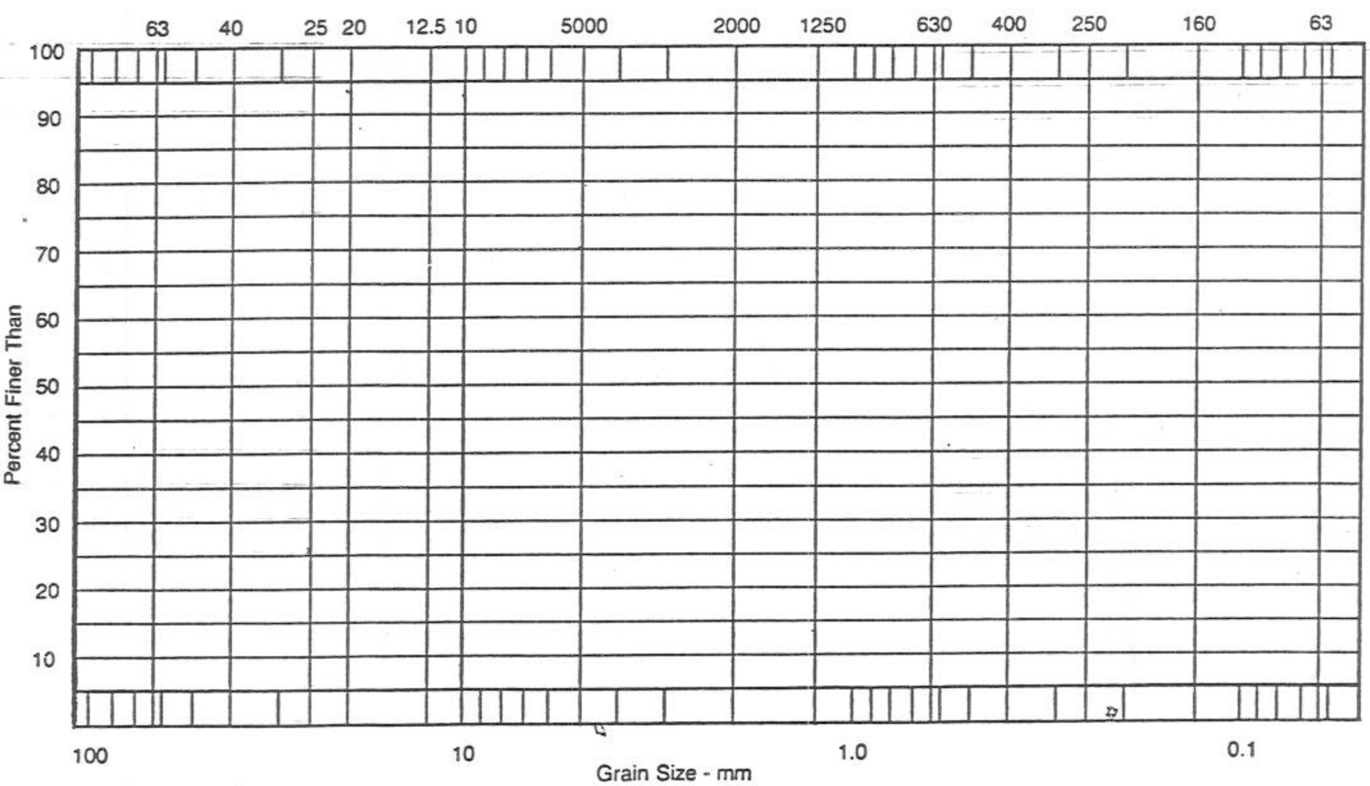
Time of Sieving Min.

Method of Preparation ✓ Dry Washed

Remarks

WET : 2.875 − 0.215 = 2.66 = 1206.5 g

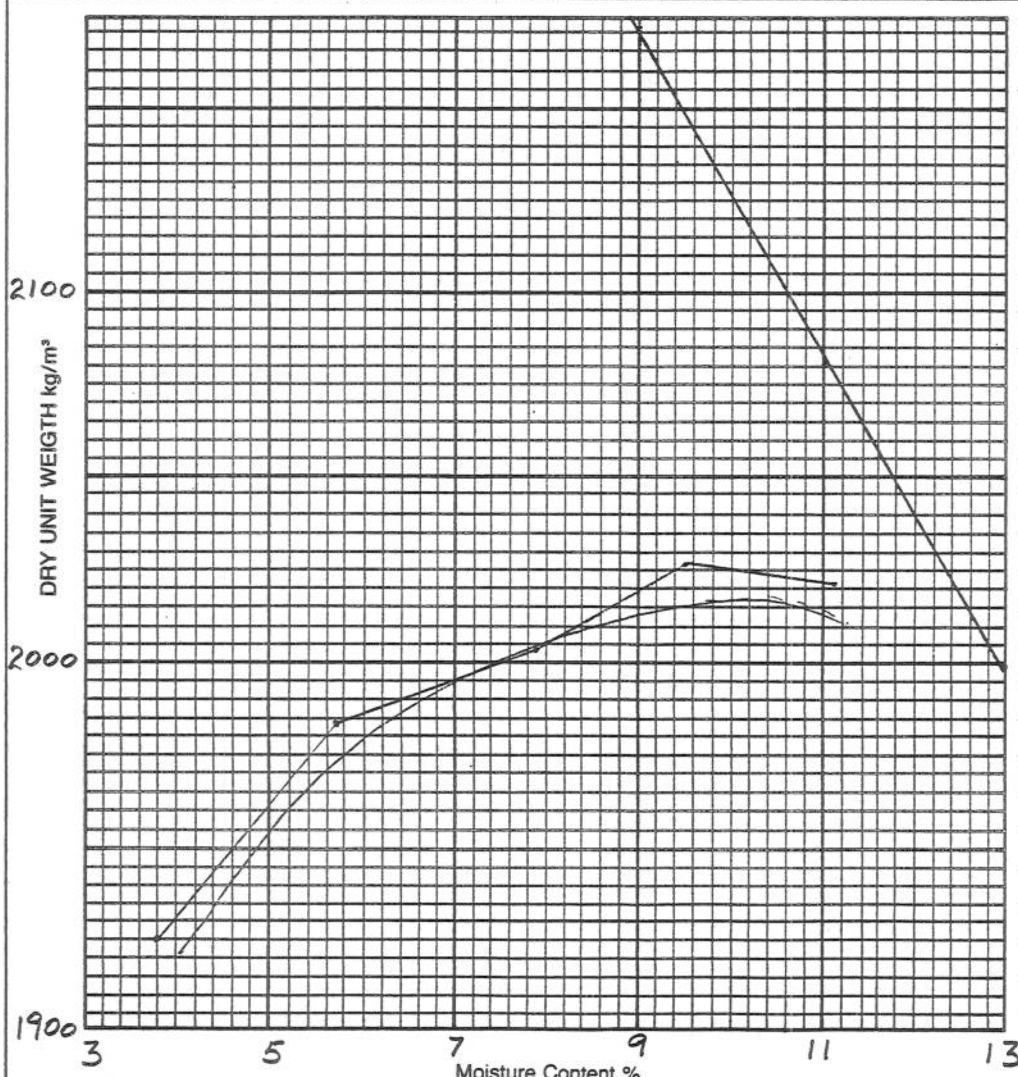
DRY : 3.725 − 1.200 = 2.525 = 1145.3 g



COMPACTION TEST

Project: GRISE FIORD Client:
Sample: # 1 Depth: Made By: D. O'N. Job No.: 9893-04
Location: STOCKPILE - SELECT GRANULAR Ck'd By: Date: 13-8-86

	TRIAL NUMBER	1	2	3	4	5		
UNIT WEIGHT DETERMINATION	Mold No.							
	Wt. Sample Wet + Mold	1991	2068	2132	2200	3023		
	Wt. ~~Mold~~ PAN	114	98	98	114	912		
	Wt. Sample Wet	1877	1970	2034	2086	2111		
	Volume Mold	.9396	.9396	.9396	.9396	.9396		
	Wet Unit Weight kg/m³	1998	2097	2165	2220	2247		
	Dry Unit Weight kg/m³	1925	1984	2003	2027	2022		
MOISTURE CONTENT DETERMINATION	Container No.							
	Wt. Sample Wet ~~+ Tare~~	1877	1970	2034	2086	2111		
	Wt. Sample Dry + Tare	1923	1962	2794	2817	2812		
	Wt. Water	68	106	152	181	211		
	Tare Container	114	98	912	912	912		
	Wt. Dry Soil	1809	1864	1882	1905	1900		
	Moisture Content	3.8	5.7	8.1	9.5	11.1		



MAXIMUN UNIT WEIGHT kg/m³
= 2025

OPTIMUM MOIST. CONTENT = 9 %

METHOD OF COMPACTION
STANDARD (✓)
MODIFIED ( )

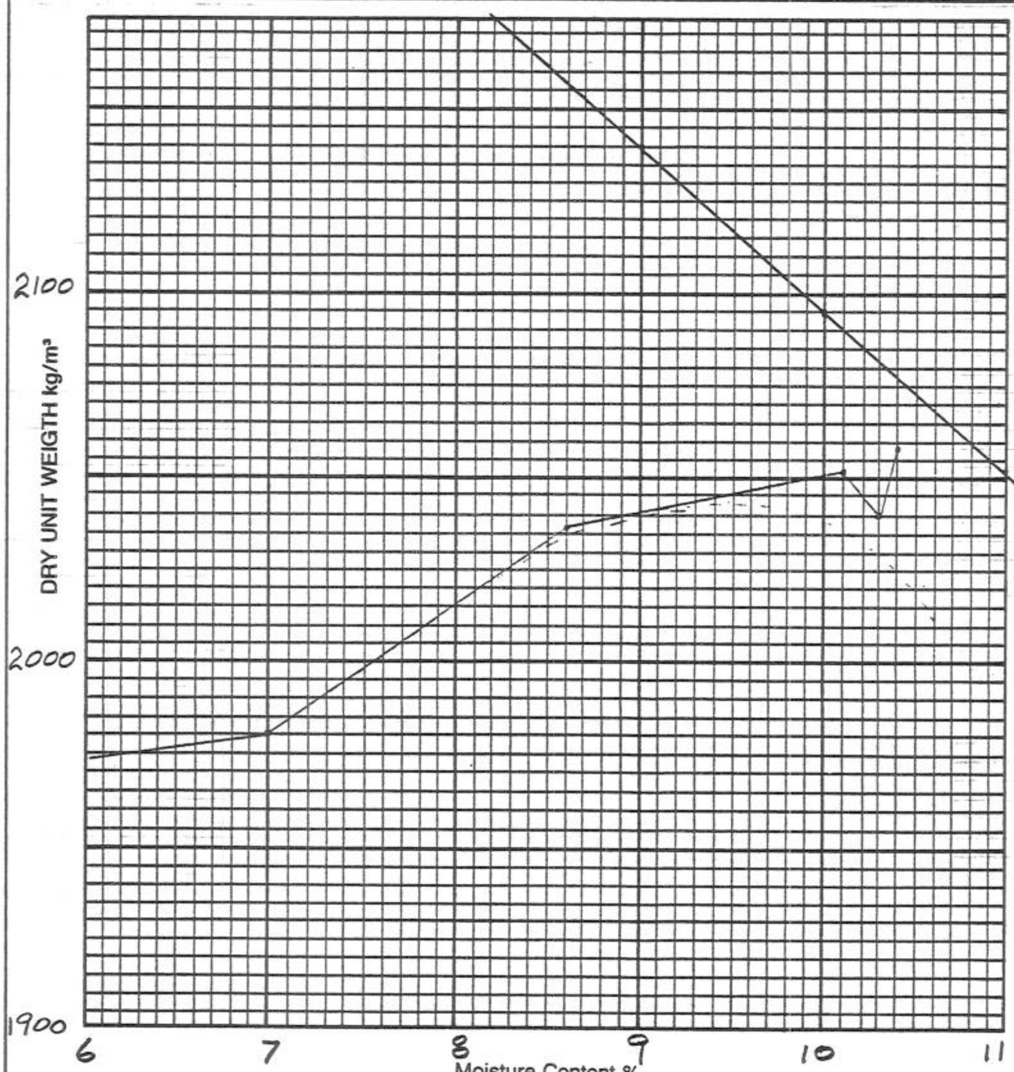
SAMPLE DESCRIPTION

REMARKS:

COMPACTION TEST

Project: GRISE FIORD   Client:
Sample: # 2   Depth: Made By: D. O'N.   Job No.: 9893-04
Location: STOCKPILE - SELECT GRANULAR   Ck'd By: Date: 13-8-86

TRIAL NUMBER		1	2	3	4	5	6	
UNIT WEIGHT DETERMINATION	Mold No.							
	Wt. Sample Wet + ~~Mold~~ PAN	2064	2179	2193	2302	2311	2325	
	Wt. ~~Mold~~ PAN	114	188	114	188	188	188	
	Wt. Sample Wet	1950	1991	2079	2114	2123	2137	
	Volume Mold	.9396	.9396	.9396	.9396	.9396	.9396	
	Wet Unit Weight kg/m³	2075	2119	2213	2250	2259	2274	
	Dry Unit Weight kg/m³	1969	1980	2037	2040	2052	2059	
MOISTURE CONTENT DETERMINATION	Container No.							
	Wt. Sample Wet + ~~Tare~~	1950	1991	2079	2114	2123	2137	
	Wt. Sample Dry + Tare	1964	2048	2028	2105	2116	2123	
	Wt. Water	100	131	165	197	195	202	
	Tare Container	114	188	114	188	188	188	
	Wt. Dry Soil	1850	1860	1914	1917	1928	1935	
	Moisture Content	5.4	7.0	8.6	10.3	10.1	10.4	



MAXIMUN UNIT WEIGHT kg/m³
= 2040

OPTIMUM MOIST. CONTENT = 9 %

METHOD OF COMPACTION
STANDARD (✓)
MODIFIED ( )

SAMPLE DESCRIPTION

REMARKS:
#5&6 - FREE H_2O

SCREEN ANALYSIS

Sample: #8 Depth: ....

Client: ....

Project: ....

Location: STOCKPILE - SELECT GRANULAR

Made by: D.O'N. Job. No. 9893-04

Ck'd by: .... Date: 14-8-86

	Sieve No.	Size of Opening MM	Weight Retained gms	Total Wt. Finer Than gms	~~Percent Finer Than~~	% Finer Than Basis Orig.Sample
Initial dry Weight				1931.1		
DRY + PAN / DRY WT.	63000	63.0				
	40000	40.0				
	25000	25.0				
0.440/0.0275	3/4 ~~20000~~	19 ~~20.0~~	1.2	1929.9	57-100	99.9
	12500	12.5				
	10000	10.0				
2.415/2.0025	4 ~~5000~~	4.75 ~~5.0~~	908.1	1021.8	25-100	52.9
1.595/	16 ~~2000~~	1.9 ~~2.0~~	536.4	485.4	10-85	25.1
	1250	1.250				
	630	0.630				
	400	0.400				
1.190/.7775	50 ~~250~~	.297 ~~0.250~~	352.7	132.7	5-40	6.9
	160	0.160				
0.585/.1725	200 ~~63~~	.075 ~~0.063~~	78.2	54.5	0-5	2.8
	PAN					

Description of Sample ....

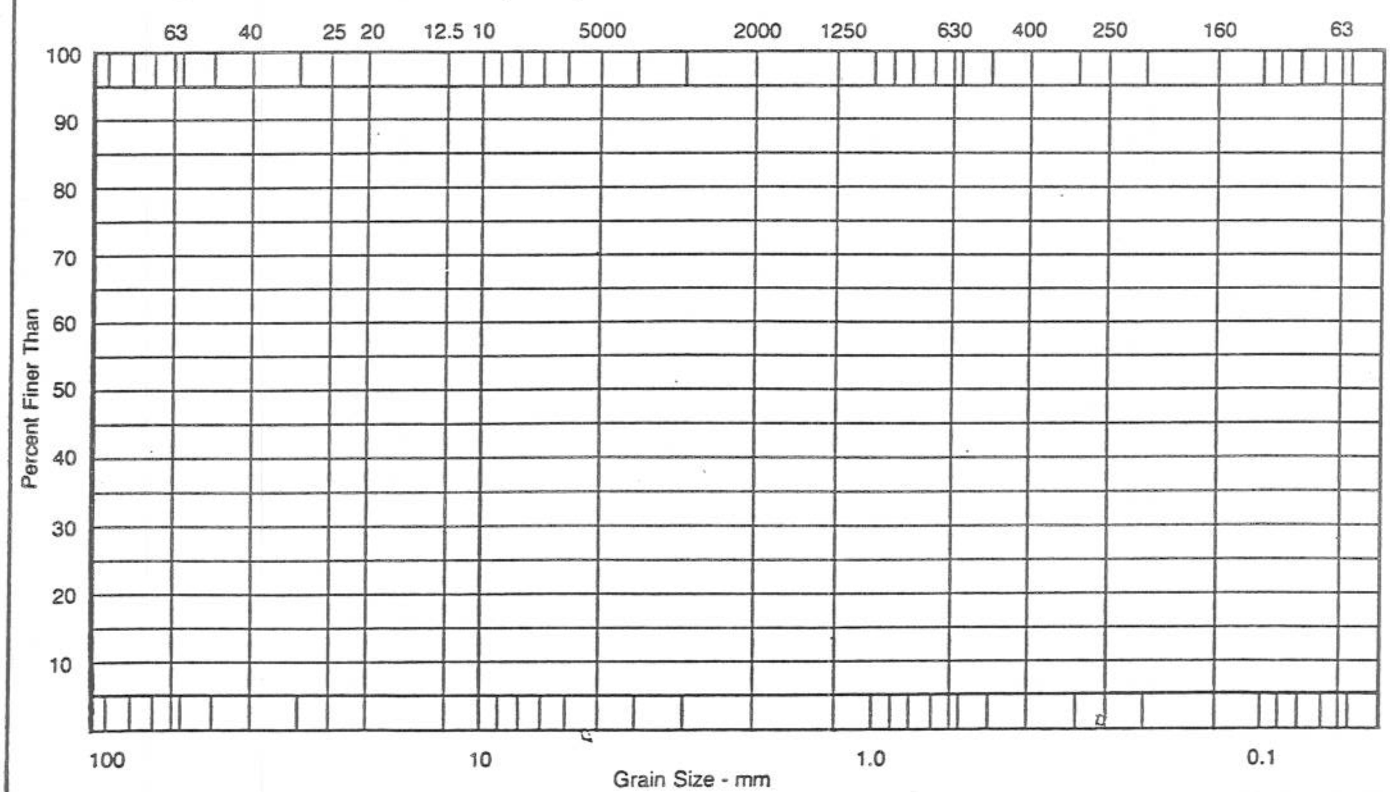
WET = 4.870 - .4125 = 4.4575

DRY = 4.670 - .4125 = 4.2575 = 1931.1g

Time of Sieving .... Min. ....

Method of Preparation .... Dry .... Washed ....

Remarks ....



SCREEN ANALYSIS

Sample: #.9 Depth:

Location: STOCKPILE @ TANK PAD

Client:

Project:

Made by: D. O'N. Job. No. 9893-04

Ck'd by: Date: 18-8-86

	Sieve No.	Size of Opening MM	Weight Retained gms	Total Wt. Finer Than gms	% ~~Percent~~ BY ~~Finer Than~~	% Finer Than Basis Orig. Sample
Initial dry Weight					SPEC.	
	63000	63.0				
	40000	40.0				
	25000	25.0				
∅ / ∅	3/4 ~~20000~~	19 ~~20.0~~	∅	1648	57-100	100
	12500	12.5				
	10000	10.0				
1.845 / 1.43	4 5000	4.75 ~~5.0~~	649	999	25-100	60.6
1.55 / 1.135	16 2000	1.9 ~~2.0~~	515	484	10-85	29.4
	1250	1.250				
	630	0.630				
	400	0.400				
1.215 / 0.8	50 ~~250~~	.297 ~~0.250~~	363	121	5-4	7.3
	160	0.160				
0.56 / .145	200 ~~63~~	.075 ~~0.063~~	66	55	0-5	3.3
	PAN					

Description of Sample

Time of Sieving Min.

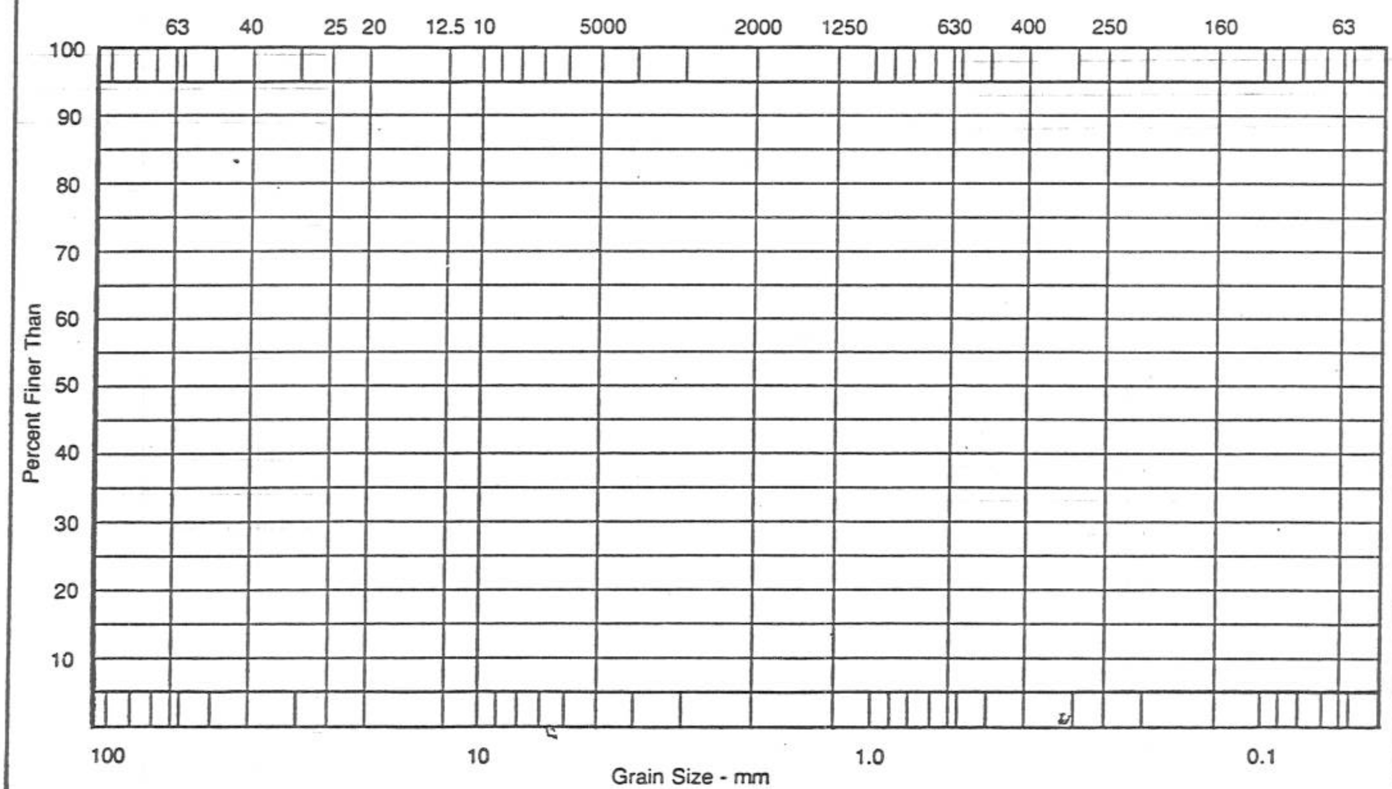
Method of Preparation ✓ Dry Washed

Remarks

WET = 3.825 lb. = 1735 g

DRY = 3.633 lb = 1648

% MOIS. = 5.3%



SUMMARY OF FIELD DENSITY TESTS

CLIENT

PROJECT GRISE FIORD TANK PAD

JOB NO 9893-04

DATE TESTED 17 & 18 AUG. 1986

DATE REPORTED

TEST NO.	LOCATION	DEPTH	DRY UNIT WT. kg/m³	FIELD MOIST.%	PROCTOR DENSITY	OPTIMUM MOISTURE	PROCTOR DENSITY %
1			2255	4.6	2025		111
2			2142	5.7	↑		106
3			2204	5.4			109
18-8-86							
4	4m N. of ℄ @ Y-AXIS	ELEV. 4.2±	2248	4.4			111
5	9m E " " @ X- "	"	2176	5.0	↓		107
6	7m S " " @ Y- " & 3m EAST	"	2247	5.2	2025		111
7	8m W " " @ X- "	"	2380	5.5	2025		118

CONTROL PROCTOR
- ONE POINT ☐
- STANDARD ☑
- MODIFIED ☐

REMARKS

CC MAILED TO

TESTED BY D. J. O'NEIL APPROVED BY

SUMMARY OF FIELD DENSITY TESTS

CLIENT ______

PROJECT GRISE FIORD TANK PAD

JOB NO 9893-04

DATE TESTED 19, 20, 21, 28

DATE REPORTED ______

TEST NO.	LOCATION	DEPTH	DRY UNIT WT. kg/m³	FIELD MOIST.%	PROCTOR DENSITY	OPTIMUM MOISTURE	PROCTOR DENSITY %
8	±22½° - 9m± N.W. of ℄		2362	5.3	2025		117
9	℄		2155	5.5	2025		106
20-8-86							
10	45°± - 8m S.W. of ℄		2236	4.3	2025		110
11	45°± - 5m N.E. of ℄		2058	4.5	2025		102
21-8-86							
12	8m W. of ℄ @ X-Axis		2152	4.8	2025		106
13	℄		2099	3.9	2025		104
14	45° - 6m S.E. of ℄		2169	3.4	2025		107
15		4.775	2375	6.3	2025		117
16		4.775	2049	5.6	2025		101

CONTROL PROCTOR

- ONE POINT ☐
- STANDARD ☑
- MODIFIED ☐

REMARKS SELECT GRANULAR.

CC MAILED TO ______

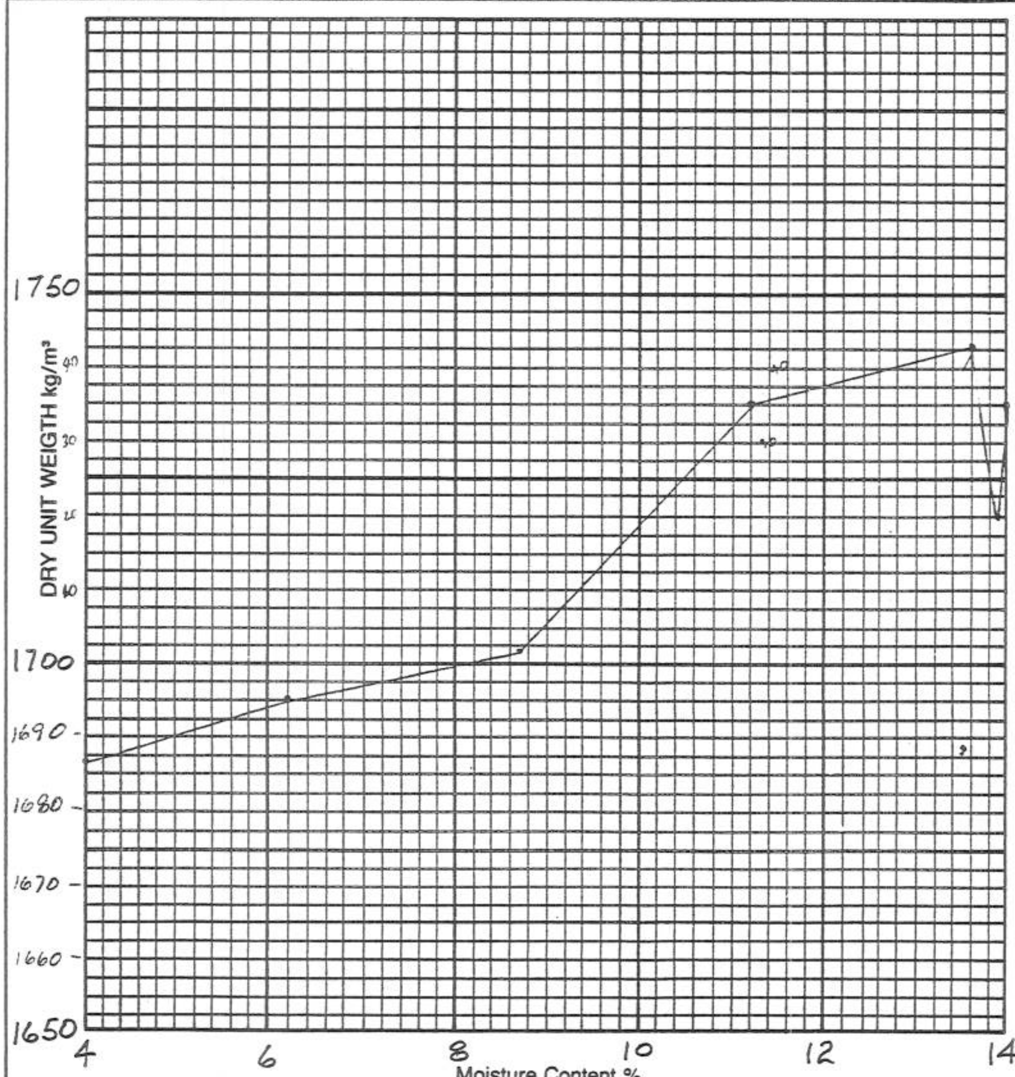
TESTED BY D. J. O'NEIL

APPROVED BY ______

COMPACTION TEST

Project: GRISE FIORD TANK PAD Client:
Sample: SAND Depth: Made By: D. J. O'N. Job No.: 9893 - 04
Location: STOCKPILE - SAND Ck'd By: Date: 5 SEPT. 1986

	TRIAL NUMBER	1	2	3	4	5	6	7	8
UNIT WEIGHT DETERMINATION	Mold No.	⌀	+60	+120	+180	+300	+300	+400	+180
	Wt. Sample Wet ~~+ Mold~~ PAN	1836	1880	1851	1944	1973	2028	2046	2000
	Wt. ~~Mold~~ PAN	188	188	113	188	113	188	188	188
	Wt. Sample Wet	1648	1692	1737	1756	1860	1840	1858	1812
	Volume Mold	.9396	.9396	.9396	.9396	.9396	.9396	.9396	.9396
	Wet Unit Weight kg/m³	1754	1801	1849	1869	1980	1958	1977	1929
	Dry Unit Weight kg/m³	1687	1695	1702	1684	1743	1720	1735	1735
MOISTURE CONTENT DETERMINATION	Container No.								
	Wt. Sample Wet + Tare								
	Wt. Sample Dry + Tare	2214	1781	1711	1770	1751	1804	1818	1818
	Wt. Water	63	99	139	174	222	224	228	182
	Tare Container	629	188	113	188	113	188	188	188
	Wt. Dry Soil	1585	1593	1599	1582	1638	1616	1630	1630
	Moisture Content	4	6.2	8.7	11	13.6	13.9	14	11.2



MAXIMUN UNIT WEIGHT kg/m³ = 1740

OPTIMUM MOIST. CONTENT = 12.6 %

METHOD OF COMPACTION
STANDARD (✓)
MODIFIED ( )

SAMPLE DESCRIPTION
SAND

REMARKS:
#5, 6 & 7 - FREE WATER (SATURATED)

SUMMARY OF FIELD DENSITY TESTS

CLIENT ____________________ JOB NO ____________________

PROJECT GRISE FIORD DATE TESTED ____________________

DATE REPORTED ____________________

TEST NO.	LOCATION	DEPTH	DRY UNIT WT. kg/m³	FIELD MOIST.%	PROCTOR DENSITY	OPTIMUM MOISTURE	PROCTOR DENSITY %
1	9-9-86		1715	4.8	1740		98.6
2	9-9-86		1772	4.0	1740		102
3	9-9-86		1730	4.1	1740		99.4
4	9-9-86		1642	5.8	1740		94.4
5	SURF. 10-9-86		1398	5.8	1740		80.3
6	SURFACE. 10-9-86		1549	5.1	1740		89
7	" 11-9-86		1654	5.04	"		95.1
8	" 11-9-86		1668	6.3	"		95.9
9	" 11-9-86		1600	4.8	"		92
10	" 13-9-86 (RE ✓ OF # 9)		1654	7.8	"		95.1

CONTROL PROCTOR

- ONE POINT ☐
- STANDARD ☑
- MODIFIED ☐

REMARKS SAND

CC MAILED TO ____________________

TESTED BY D. J. O'NEIL. APPROVED BY ____________________

8.5 Water Analysis

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

EDMONTON FORT ST. JOHN CALGARY

WATER CHEMISTRY ANALYSIS

COMPANY: M.M. DILLON LTD. LABORATORY No. E85-16892-1

LOCATION: GRISE FIORD NWT

SAMPLE POINT: SAMPLE #1 EXISTING FILL POINT SAMPLE DATE: JULY 13, 1985

SAMPLED BY: IAN DRINNAN OF UMA

OTHER SAMPLE DATA: ANALYST: A. LUCYK, R. COWDREY, S. TREFANENKO, B. SALAHUB

DATE RECEIVED: JULY 15, 1985 DATE REPORTED: JULY 31, 1985

ION	m. V-1 g.m.-3	as $CaCO_3$ g.m.-3
Na	1.1	
K	0.1	
Ca	1.71	4.27
Mg	0.63	2.59
TOTAL HARDNESS		6.86

ION	m. V-1 g.m.-3	as $CaCO_3$ g.m.-3
SO_4	<1.0	
Cl	1.1	
CO_3	NIL	
HCO_3	12.2	10.0
TOTAL ALKALINITY		10.0

TOTAL DISSOLVED SOLIDS g.m.-3

DRIED @ 105°C	IGNITED @ 550°C	CALCULATED
26.0	12.0	18.8

pH 6.6 @ 27 °C

CONDUCTIVITY 3.10 millisiemens/meter 25° C

$CaCO_3$ SATURATION INDEX -3.4 @ 27 °C

CALCIUM CARBONATE SCALE FORMATION UNLIKELY

TURBIDITY (NTU) 0.9 APHA COLOR 5

OTHER ANALYSIS EXPRESSED IN g.m.-3

SUSPENDED SOLIDS:	DRIED @ 105°C	2.4	SILICA:	TOTAL	
	IGNITED @ 550°C			REACTIVE	
OXYGEN DEMAND:	BIOCHEMICAL		IRON:	TOTAL	0.050
	CHEMICAL			SOLUBLE	
PHOSPHATE:	TOTAL as P	0.01	NITROGEN:	AMMONIA as N	< 0.05
	ORTHO		NITRITE &	NITRATE as N	0.03
TOTAL ORGANIC CARBON		<1.0	OIL & GREASE:		
FLUORIDE		< 0.10	PHENOLS		< 0.002
SULPHIDE		<0.05	CYANIDE		< 0.001

REMARKS

m. V-1 / g.m.-3 MASS PER UNIT VOLUME REPORTED AS GRAMS PER CUBIC METER (EQUIVALENT TO mg/L)

M.M. DILLON LTD. LABORATORY REPORT NO: E85-16892-1

TRACE METALS (TOTAL)

ARSENIC	<0.001	$g.m^{-3}$
BARIUM	0.001	"
CADMIUM	<0.002	"
COBALT	<0.002	"
COPPER	0.004	"
CHROMIUM	0.004	"
LEAD	<0.002	"
MANGANESE	<0.001	"
MOLYBDENUM	<0.004	"
MERCURY	<0.0001	"
NICKEL	<0.010	"
SELENIUM	<0.001	"
SILVER	<0.004	"
VANADIUM	<0.002	"
ZINC	0.008	"

MICROBIOLOGICAL ANALYSIS

TOTAL COLIFORM BACTERIA: NIL COLONIES / 100 ml
FECAL COLIFORM BACTERIA: NIL " " "

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

EDMONTON FORT ST. JOHN CALGARY

WATER CHEMISTRY ANALYSIS

COMPANY M.M. DILLON LTD. LABORATORY No. E85-16892-2

LOCATION GRISE FIORD NWT

SAMPLE POINT SAMPLE #1 EXISTING FILL POINT DO 10-12 . SAMPLE DATE JULY 13, 1985

SAMPLED BY IAN DRINNAN OF UMA

OTHER SAMPLE DATA ANALYST: A. LUCKY, R. COWDREY, S. TREFANENKO, B. SALAHUB

DATE RECEIVED: JULY 15, 1985 DATE REPORTED: JULY 31, 1985

ION	$\frac{m.V^{-1}}{g.m.^{-3}}$	as $CaCO_3$ g.m.$^{-3}$	ION	$\frac{m.V^{-1}}{g.m.^{-3}}$	as $CaCO_3$ g.m.$^{-3}$
Na	1.5		SO_4	< 1.0	
K	0.1		Cl	1.4	
Ca	1.88	4.69	CO_3	NIL	
Mg	0.70	2.88	HCO_3	9.8	8.0
TOTAL HARDNESS		7.57	TOTAL ALKALINITY		8.0

TOTAL DISSOLVED SOLIDS g.m.$^{-3}$

DRIED @ 105°C	IGNITED @ 550°C	CALCULATED
16.0	8.0	15.4

pH 6.8 @ 27 °C

CONDUCTIVITY 2.50 millisiemens/meter 25° C

$CaCO_3$ SATURATION INDEX -3.2 @ 27 °C

CALCIUM CARBONATE SCALE FORMATION UNLIKELY

TURBIDITY (NTU) 0.7 APHA COLOR 10

OTHER ANALYSIS EXPRESSED IN g m.$^{-3}$

SUSPENDED SOLIDS:	DRIED @ 105°C	2.6	SILICA:	TOTAL	
	IGNITED @ 550°C			REACTIVE	
OXYGEN DEMAND:	BIOCHEMICAL		IRON:	TOTAL	0.052
	CHEMICAL			SOLUBLE	
PHOSPHATE:	TOTAL as P	0.01	NITROGEN:	AMMONIA as N	< 0.05
	ORTHO		NITRITE &	NITRATE as N	0.03
TOTAL ORGANIC CARBON		< 1.0	OIL & GREASE:		
FLUORIDE		< 0.10	PHENOLS		< 0.002
SULPHIDE		<0.05	CYANIDE		< 0.001

REMARKS

$\frac{m.V^{-1}}{g.m.^{-3}}$ MASS PER UNIT VOLUME REPORTED AS GRAMS PER CUBIC METER (EQUIVALENT TO mg/L)

TRACE METALS (TOTAL)

ARSENIC	<0.001	$g.m^{-3}$
BARIUM	0.001	"
CADMIUM	<0.002	"
COBALT	<0.002	"
COPPER	0.004	"
CHROMIUM	<0.002	"
LEAD	<0.002	"
MANGANESE	<0.001	"
MOLYBDENUM	<0.004	"
MERCURY	<0.0001	"
NICKEL	<0.010	"
SELENIUM	<0.001	"
SILVER	<0.004	"
VANADIUM	<0.002	"
ZINC	0.010	"

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

EDMONTON FORT ST. JOHN CALGARY

WATER CHEMISTRY ANALYSIS

COMPANY M.M. DILLON LTD. LABORATORY No. E85-16892-3

LOCATION GRISE FIORD NWT

SAMPLE POINT SAMPLE #1A TRUCK FILL PIPING DO 8 mg/l SAMPLE DATE JULY 13, 1985

SAMPLED BY IAN DRINNAN OF UMA

OTHER SAMPLE DATA ANALYST: A. LUCYK, R. COWDREY, S. TREFANENKO, B. SALAHUB

DATE RECEIVED: JULY 15, 1985 DATE REPORTED: JULY 31, 1985

ION	$\frac{m.\ V^{-1}}{g.m.^{-3}}$	as $CaCO_3$ g.m.$^{-3}$	ION	$\frac{m.\ V^{-1}}{g.m.^{-3}}$	as $CaCO_3$ g.m.$^{-3}$
Na	1.6		SO_4	<1.0	
K	0.1		Cl	4.7	
Ca	3.20	8.00	CO_3	NIL	
Mg	0.61	2.51	HCO_3	11.7	9.6
TOTAL HARDNESS		10.51	TOTAL ALKALINITY		9.6

TOTAL DISSOLVED SOLIDS g.m.$^{-3}$

DRIED @ 105°C	IGNITED @ 550°C	CALCULATED
28.0	14.0	21.9

pH 6.7 @ 27 °C

CONDUCTIVITY 3.90 millisiemens/meter 25° C

$CaCO_3$ SATURATION INDEX -3.0 @ 27 °C

CALCIUM CARBONATE SCALE FORMATATION UNLIKELY

TURBIDITY (NTU) 32. APHA COLOR 5

OTHER ANALYSIS EXPRESSED IN g.m^{-3}

SUSPENDED SOLIDS:	DRIED @ 105°C	71.5	SILICA:	TOTAL	
	IGNITED @ 550°C			REACTIVE	
OXYGEN DEMAND:	BIOCHEMICAL		IRON:	TOTAL	31.7
	CHEMICAL			SOLUBLE	
PHOSPHATE:	TOTAL as P	0.01	NITROGEN:	AMMONIA as N	< 0.05
	ORTHO		NITRITE &	NITRATE as N	0.01
TOTAL ORGANIC CARBON		< 1.0	OIL & GREASE:		
FLUORIDE		< 0.10	PHENOLS		< 0.002
SULPHIDE		< 0.05	CYANIDE		< 0.001

REMARKS

The water had a black coloured suspension present.

$\frac{m\ V^{-1}}{g.m^{-3}}$ MASS PER UNIT VOLUME REPORTED AS GRAMS PER CUBIC METER (EQUIVALENT TO mg/L)

M.M. DILLON LTD. LABORATORY REPORT NO: E85-16892-3

TRACE METALS (TOTAL)

ARSENIC	∠ 0.001	$g.m^{-3}$
BARIUM	0.007	"
CADMIUM	0.007	"
COBALT	≤ 0.002	"
COPPER	0.120	"
CHROMIUM	0.033	"
LEAD	0.056	"
MANGANESE	0.022	"
MOLYBDENUM	0.008	"
MERCURY	< 0.0001	"
NICKEL	0.036	"
SELENIUM	< 0.001	"
SILVER	< 0.004	"
VANADIUM	0.003	"
ZINC	0.656	"

MICROBIOLOGICAL ANALYSIS

TOTAL COLIFORM BACTERIA: NIL

FECAL COLIFORM BACTERIA: NIL

SULPHATE REDUCING BACTERIA: NIL (7 DAY REPORT)

SULPHATE REDUCING BACTERIA: NIL (21 DAY FINAL REPORT)

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

EDMONTON FORT ST. JOHN CALGARY

WATER CHEMISTRY ANALYSIS

COMPANY M.M. DILLON LTD. LABORATORY No. E85-16892-4

LOCATION GRISE FIORD NWT

SAMPLE POINT SAMPLE # 2 PROPOSED ALTERNATE FILL POINT SAMPLE DATE JULY 13, 1985

SAMPLED BY IAN DRINNAN OF UMA

OTHER SAMPLE DATA ANALYST: A. LUCYK, R. COWDREY, S. TREFANENKO, B. SALAHUB

DATE RECEIVED: JULY 15, 1985 DATE REPORTED: JULY 31, 1985

ION	$\frac{m.\ V^{-1}}{g.m.^{-3}}$	as $CaCO_3$ g.m.$^{-3}$	ION	$\frac{m.\ V^{-1}}{g.m.^{-3}}$	as $CaCO_3$ g.m.$^{-3}$
Na	1.4		SO_4	< 1.0	
K	0.1		Cl	1.8	
Ca	4.83	12.06	CO_3	NIL	
Mg	1.32	5.43	HCO_3	26.4	21.7
TOTAL HARDNESS		17.49	TOTAL ALKALINITY		21.7

TOTAL DISSOLVED SOLIDS g.m.$^{-3}$

DRIED @ 105°C	IGNITED @ 550°C	CALCULATED
26.0	16.0	35.9

pH 7.0 @ 27 °C

CONDUCTIVITY 4.70 millisiemens/meter 25° C

$CaCO_3$ SATURATION INDEX -2.2 @ 27 °C

CALCIUM CARBONATE SCALE FORMATION UNLIKELY

TURBIDITY (NTU) 0.5 APHA COLOR 10

OTHER ANALYSIS EXPRESSED IN g.m^{-3}

SUSPENDED SOLIDS:	DRIED @ 105°C		SILICA:	TOTAL	
	IGNITED @ 550°C			REACTIVE	
OXYGEN DEMAND:	BIOCHEMICAL		IRON:	TOTAL	0.049
	CHEMICAL			SOLUBLE	
PHOSPHATE:	TOTAL as P	0.01	NITROGEN:	AMMONIA as N	< 0.05
	ORTHO		NITRITE &	NITRATE as N	< 0.01
TOTAL ORGANIC CARBON		< 1.0	OIL & GREASE:		
FLUORIDE		< 0.10	PHENOLS		< 0.002
SULPHIDE		< 0.05	CYANIDE		< 0.001

REMARKS

$\frac{m\ V^{-1}}{g\ m^{-3}}$ MASS PER UNIT VOLUME REPORTED AS GRAMS PER CUBIC METER (EQUIVALENT TO mg/L)

V

M.M. DILLON LTD. LABORATORY REPORT NO: E85-16892-4

TRACE METALS (TOTAL)

ARSENIC	<0.001	$g.m^{-3}$
BARIUM	<0.001	"
CADMIUM	<0.002	"
COBALT	<0.002	"
COPPER	0.003	"
CHROMIUM	<0.002	"
LEAD	<0.002	"
MANGANESE	<0.001	"
MOLYBDENUM	<0.004	"
MERCURY	<0.0001	"
NICKEL	<0.010	"
SELENIUM	<0.001	"
SILVER	<0.004	"
VANADIUM	<0.002	"
ZINC	0.007	"

MICROBIOLOGICAL ANALYSIS

TOTAL COLIFORM BACTERIA: NIL

FECAL COLIFORM BACTERIA: NIL

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

EDMONTON FORT ST. JOHN CALGARY

WATER CHEMISTRY ANALYSIS

COMPANY M.M. DILLON LTD. LABORATORY No. E85-16892-5

LOCATION GRISE FIORD NWT

SAMPLE POINT SAMPLE #3 WEST RIVER DO 10 mg/l SAMPLE DATE JULY 13, 1985

SAMPLED BY IAN DRINNAN OF UMA

OTHER SAMPLE DATA ANALYST: A. LUCYK, R. COWDREY, S. TREFANENKO, B. SALAHUB

DATE RECEIVED: DATE REPORTED:

ION	$m.\ V^{-1}$ $g.m.^{-3}$	as $CaCO_3$ $g.m.^{-3}$	ION	$m.\ V^{-1}$ $g.m.^{-3}$	as $CaCO_3$ $g.m.^{-3}$
Na	1.4		SO_4	<1.0	
K	0.2		Cl	1.9	
Ca	13.80	34.46	CO_3	NIL	
Mg	1.82	7.49	HCO_3	58.1	47.7
TOTAL HARDNESS		41.95	TOTAL ALKALINITY		47.7

TOTAL DISSOLVED SOLIDS $g.m.^{-3}$

DRIED @ 105°C	IGNITED @ 550°C	CALCULATED
64.0	34.0	77.2

pH 7.2 @ 27 °C

CONDUCTIVITY 9.40 millisiemens/meter 25° C

$CaCO_3$ SATURATION INDEX -1.3 @ 27 °C

CALCIUM CARBONATE SCALE FORMATION UNLIKELY

TURBIDITY (NTU) 1.4 APHA COLOR 5

OTHER ANALYSIS EXPRESSED IN $g.m^{-3}$

SUSPENDED SOLIDS:	DRIED @ 105°C		SILICA:	TOTAL	
	IGNITED @ 550°C			REACTIVE	
OXYGEN DEMAND:	BIOCHEMICAL		IRON:	TOTAL	0.060
	CHEMICAL			SOLUBLE	
PHOSPHATE:	TOTAL as P	0.01	NITROGEN:	AMMONIA as N	0.05
	ORTHO		NITRITE &	NITRATE as N	0.03
TOTAL ORGANIC CARBON		1.8	OIL & GREASE:		
FLUORIDE		< 0.10	PHENOLS		< 0.002
SULPHIDE		< 0.05	CYANIDE		< 0.001

REMARKS

$\frac{m\ V^{-1}}{g\ m^{-3}}$ MASS PER UNIT VOLUME REPORTED AS GRAMS PER CUBIC METER (EQUIVALENT TO mg/L)

M.M. DILLON LTD. LABORATORY REPORT NO: E85-16892-5

TRACE METALS (TOTAL)

ARSENIC	<0.001	$g.m^{-3}$
BARIUM	0.002	"
CADMIUM	<0.002	"
COBALT	<0.002	"
COPPER	0.006	"
CHROMIUM	0.002	"
LEAD	<0.002	"
MANGANESE	0.002	"
MOLYBDENUM	<0.004	"
MERCURY	<0.0001	"
NICKEL	<0.010	"
SELENIUM	<0.001	"
SILVER	<0.004	"
VANADIUM	<0.002	"
ZINC	0.013	"

MICROBIOLOGICAL ANALYSIS

TOTAL COLIFORM BACTERIA: NIL

FECAL COLIFORM BACTERIA: NIL

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

EDMONTON FORT ST. JOHN CALGARY

WATER CHEMISTRY ANALYSIS

COMPANY M.M. DILLON LTD. LABORATORY No. E85-16892-6

LOCATION GRISE FIORD NWT

SAMPLE POINT SAMPLE #4 EAST RIVER SAMPLE DATE JULY 13, 1985

SAMPLED BY IAN DRINNAN OF UMA

OTHER SAMPLE DATA ANALYST: A. LUCYK, R. COWDREY, S. TREFANENKO, B. SALAHUB

DATE RECEIVED: JULY 15, 1985 DATE REPORTED: JULY 31, 1985

ION	m. V-1 g.m.-3	as $CaCO_3$ g.m.-3	ION	m. V-1 g.m.-3	as $CaCO_3$ g.m.-3
Na	1.4		SO_4	< 1.0	
K	0.1		Cl	1.1	
Ca	1.15	2.87	CO_3	NIL	
Mg	0.61	2.51	HCO_3	6.6	5.2
TOTAL HARDNESS		5.38	TOTAL ALKALINITY		5.2

TOTAL DISSOLVED SOLIDS g.m.-3

DRIED @ 105°C	IGNITED @ 550°C	CALCULATED
15.0	7.0	11.0

pH 7.0 @ 27 °C

CONDUCTIVITY 1.90 millisiemens/meter 25° C

$CaCO_3$ SATURATION INDEX -3.5 @ 27 °C

CALCIUM CARBONATE SCALE FORMATION UNLIKELY

TURBIDITY (NTU) 2.8 APHA COLOR 5

OTHER ANALYSIS EXPRESSED IN g.m.-3

SUSPENDED SOLIDS:	DRIED @ 105°C	4.6	SILICA:	TOTAL	
	IGNITED @ 550°C			REACTIVE	
OXYGEN DEMAND:	BIOCHEMICAL		IRON:	TOTAL	0.432
	CHEMICAL			SOLUBLE	
PHOSPHATE:	TOTAL as P	0.1	NITROGEN:	AMMONIA as N	0.10
	ORTHO		NITRITE &	NITRATE as N	0.04
TOTAL ORGANIC CARBON		2.3	OIL & GREASE:		
FLUORIDE		< 0.1	PHENOLS		< 0.002
SULPHIDE		< 0.05	CYANIDE		< 0.001

REMARKS

m V-1 / g.m-3 MASS PER UNIT VOLUME REPORTED AS GRAMS PER CUBIC METER (EQUIVALENT TO mg/L)

TRACE METALS (TOTAL)

ARSENIC	< 0.001	$g.m^{-3}$
BARIUM	0.001	"
CADMIUM	< 0.002	"
COBALT	< 0.002	"
COPPER	0.003	"
CHROMIUM	< 0.002	"
LEAD	< 0.002	"
MANGANESE	0.007	"
MOLYBDENUM	< 0.004	"
MERCURY	< 0.0001	"
NICKEL	< 0.010	"
SELENIUM	< 0.001	"
SILVER	< 0.004	"
VANADIUM	< 0.002	"
ZINC	0.010	"

MICROBIOLOGICAL ANALYSIS

TOTAL COLIFORM BACTERIA: NIL

FECAL COLIFORM BACTERIA: NIL

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

EDMONTON FORT ST. JOHN CALGARY

WATER CHEMISTRY ANALYSIS

COMPANY: M.M. DILLON LTD. LABORATORY No. E85-16892-7

LOCATION: GRISE FIORD NWT

SAMPLE POINT: SAMPLE #5 NURSING STATION TAP SAMPLE DATE: JULY 13, 1985

SAMPLED BY: IAN DRINNAN OF UMA

OTHER SAMPLE DATA: ANALYST: A. LUCYK, R. COWDREY, S. TREFANENKO, B. SALAHUB

DATE RECEIVED: JULY 15, 1985 DATE REPORTED: JULY 31, 1985

ION	$\frac{m.V^{-1}}{g.m.^{-3}}$	as $CaCO_3$ $g.m.^{-3}$	ION	$\frac{m.V^{-1}}{g.m.^{-3}}$	as $CaCO_3$ $g.m.^{-3}$
Na	2.1		SO_4	<1.0	
K	0.1		Cl	3.1	
Ca	3.01	7.52	CO_3	NIL	
Mg	0.92	3.79	HCO_3	15.6	12.8
TOTAL HARDNESS		11.31	TOTAL ALKALINITY		12.8

TOTAL DISSOLVED SOLIDS $g.m.^{-3}$

DRIED @ 105°C	IGNITED @ 550°C	CALCULATED
23.0	14.0	24.8

pH 6.9 @ 27 °C

CONDUCTIVITY 3.90 millisiemens/meter 25° C

$CaCO_3$ SATURATION INDEX -3.2 @ 27 °C

CALCIUM CARBONATE SCALE FORMATION UNLIKELY

TURBIDITY (NTU) 0.5 APHA COLOR 5

OTHER ANALYSIS EXPRESSED IN $g.m^{-3}$

SUSPENDED SOLIDS:	DRIED @ 105°C	2.0	SILICA:	TOTAL	
	IGNITED @ 550°C			REACTIVE	
OXYGEN DEMAND:	BIOCHEMICAL		IRON:	TOTAL	0.079
	CHEMICAL			SOLUBLE	
PHOSPHATE:	TOTAL as P	0.01	NITROGEN:	AMMONIA as N	< 0.05
	ORTHO		NITRITE &	NITRATE as N	0.02
TOTAL ORGANIC CARBON		1.0	OIL & GREASE:		
FLUORIDE		< 0.10	PHENOLS		< 0.002
SULPHIDE		< 0.05	CYANIDE		< 0.001

REMARKS

$\frac{m.V^{-1}}{g.m.^{-3}}$: MASS PER UNIT VOLUME REPORTED AS GRAMS PER CUBIC METER (EQUIVALENT TO mg/L)

M.M. DILLON LTD. LABORATORY REPORT NO: E85-16892-7

TRACE METALS (TOTAL)

ARSENIC	< 0.001	$g.m^{-3}$
BARIUM	0.001	"
CADMIUM	< 0.002	"
COBALT	< 0.002	"
COPPER	0.676	"
CHROMIUM	< 0.002	"
LEAD	0.013	"
MANGANESE	0.001	"
MOLYBDENUM	< 0.004	"
MERCURY	< 0.0001	"
NICKEL	< 0.010	"
SELENIUM	< 0.001	"
SILVER	< 0.004	"
VANADIUM	< 0.002	"
ZINC	0.200	"

MICROBIOLOGICAL ANALYSIS

TOTAL COLIFORM BACTERIA: NIL

FECAL COLIFORM BACTERIA: NIL

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

EDMONTON CALGARY ESTEVAN
FORT ST. JOHN GRANDE PRAIRIE

DATE REPORTED: JULY 31, 1985

LABORATORY REPORT NUMBER: E85-16892-8

M.M. DILLON LTD.

LOCATION: GRISE FIORD NWT

SAMPLE POINT: HOTEL TAP

DATE RECEIVED: JULY 15, 1985

SAMPLED BY: IAN DRINNAN OF UMA

DATE SAMPLED: JULY 13, 1985

ANALYST: A. LUCYK, R.COWDREY, S.TREFANENKO AND B. SALAHUB

MICROBIOLOGICAL ANALYSIS

TOTAL COLIFORM BACTERIA: NIL

FECAL COLIFORM BACTERIA: NIL

DATE REPORTED: OCTOBER 29, 1985 LABORATORY REPORT NUMBER: E85-19462

M.M. DILLON LIMITED

WELL NAME: GRISE FIORD WATER SUPPLY SAMPLED BY: I.M. DRINNAN - M.M. DILLON LIMITED

SAMPLING POINT: TRUCK FILL PIPE DATE SAMPLED: OCTOBER 12, 1985 - 12:15 EDT

DATE RECEIVED: OCTOBER 15, 1985 - 1:05 PM MDT

ANALYST: B. SALAHUB

SULPHATE REDUCING BACTERIA	- 7 DAY OBSERVATION	- NIL
	- 21 DAY OBSERVATION	- NIL
IRON BACTERIA (by microscopic examination)		- NONE DETECTED

8.6 Tank No. 2 Insulation Protective Coating Warranty

(Original Warranty in Master O & M manual.)

#500-5PO

5 – YEAR WARRANTY

For The Sprayed Polyurethane Foam Roofing Industry

PRODUCT: DIATHON

GRISE FIORD WATER STORAGE TANK NO. 2

Name of Project

Crise Fiord, Northwest Territories, Canada

Address **City** **State** **Zip** **Phone**

Government of Northwest Territories, Public Works, Edmonton, AB

Owner's Representative **Contact Name** **Title**

Western Sandblasting (Man) Ltd.

Contractor

1475 Dugald Road, Winnipeg, Manitoba R2J 0H3 (204) 233-8118

Address **City** **State** **Zip** **Phone**

Universal Foam 320-4S, 325-4S, 2.0, 2.5

Polyurethane Foam Manufacturer **Product** **Density**

A. **United Paint Mfg. Co., dba United Coatings warrants to the Building Owner, hereinafter referred to as Owner, that for a period of 5 years from date of completion, said coating will not leak water due to deterioration as the result of ordinary weather conditions. If the coating leaks as a result of ordinary weather conditions, United agrees to supply to the Coatings Applicator at no charge all United material needed to repair said leaks. Coatings Applicator agrees to furnish all labor at no charge for repairing said water leaks. This shall be the exclusive remedy of the Coatings Applicator in the event of a breach of the foregoing Warranty by United Coatings. This Warranty is expressly conditioned upon Coatings Applicator's obligation to apply the coating material in strict accordance with United's current published instructions covering surface preparation, coating application and precautions.**

B. This Warranty is expressly conditioned upon:

1. United Coatings liability to the Owner for any defect, failure, or deficiency which is covered by this Warranty shall be expressly conditioned upon the Owner's obligation to notify United within five working days of the date that Owner discovers defect. United Coatings shall then have the right to immediately inspect the defect, and if not given this right, the Warranty shall be terminated.
2. United Coatings shall not be responsible for repairs made by others who are not authorized to make such repairs.

C. This Warranty does not cover failure of the coating due to:

1. Damage to the coating, property, building or contents caused by fire, settlement, faulty construction or design, movement, misuse of structure, or other failure of the structure.
2. Damage to the coating due to natural causes, including but not limited to floods, lightning, hail, windstorms, cyclones, hurricanes, tornadoes, earthquakes, or other extraordinary or unusual events.
3. Damage to the coating resulting from cracks or openings in the roof substrate, including defects in the polyurethane foam substrate.
4. Deficiencies in the polyurethane foam or in its application, improper preparation or defects in the substrate, errors in the roofing system, or any other latent defects.
5. Vandalism, penetration or damage, caused by third parties or foreign objects or agents, including plant or animal life.
6. Damage caused by repairs or alterations to, encroachment upon, or erection of structure on the roof or any use of the roof other than for its intended purpose at the time the Warranty was issued.
7. Color changes in the coating as the result of normal weathering or atmospheric conditions.

D. If Coatings Applicator fails to make payment to United Coatings and/or its Distributor, this Warranty shall be void.

E. **United Coatings will not be liable for any direct, indirect, consequential, incidental, special, or general damages of any kind from whatever cause which may arise as the result of deterioration of said coating, except to supply all United coating material in accordance with the Warranty. It is expressly understood and agreed that United Coatings shall in no way be deemed or held to be obligated, liable or accountable upon or under any guarantees or warranties, express or implied, including any implied Warranty of merchantability or fitness for a particular use, or otherwise beyond this express Warranty.**

F. Neither the issuance of the Product Warranty, nor any examination or inspection of the building or the plans and specifications thereof by United representatives or distributors, before or after completion of the roof system shall constitute approval of same or a waiver of any of the exclusions and/or conditions set forth herein.

G. **This Warranty is effective upon receipt of fully executed copy at United Coatings, E. 19011 Cataldo, Greenacres, Washington, 99016, and fully filled out including issue number and executed by an authorized officer of United Coatings, the Applicator, and the Owner.**

United Coatings

Terry Cossette

(Signature)

Terry J. Cossette, Exec. Vice President

Printed Name **Title**

Approved Contractor

(Signature)

Luc Turenne, Estimator/Co-Ordinator

Printed Name **Title**

Issue No. 500-5PO

Date: 6/87

10-83

~~Owner or~~ Owner's Representative

(Signature)

Tim Spurr SR. C.W.S. [illegible]

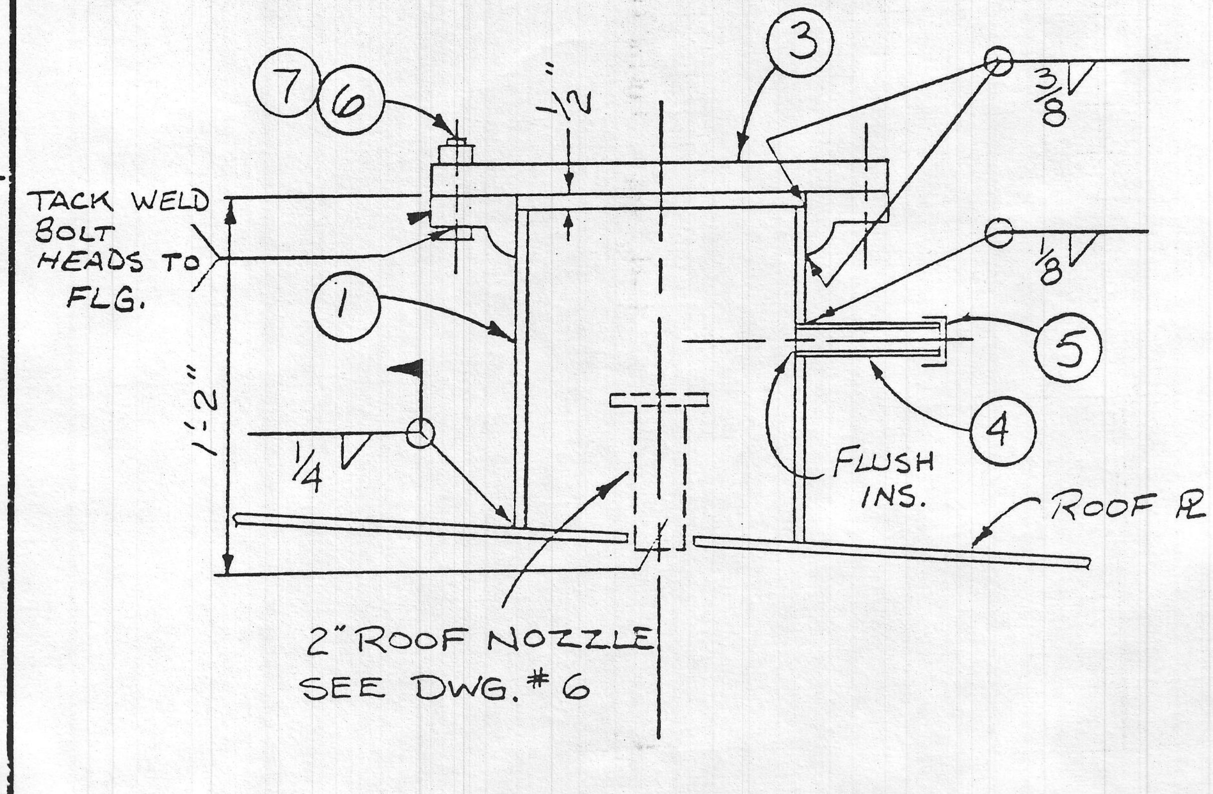
Printed Name **Title**

9.2 Tank No. 2 As-Builts

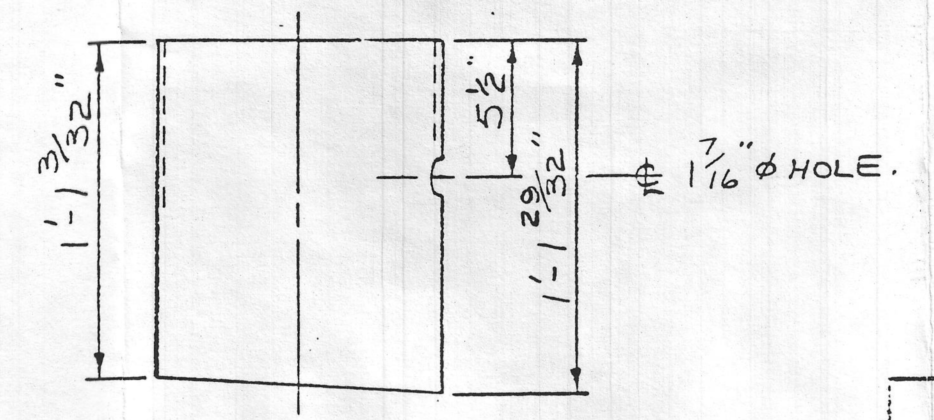
Horton CBI, Limited

Drawing No.	1	- General Plan
	2	- Orientation
	3	- Shell Manhole
	4	- Roof Manhole
	5	- Vent/Overflow Nozzle
	6	- Roof Nozzle
	7	- Miscellaneous Fitting Details
	8	- Pipe Supports
	9	- Name Plate
	10	- Roof Nozzle Housing
	11	- Ladder
	11A	- Ladder
	12	- Ladder
	13	- Ladder
	14	- Cladding Support System
	15	- Outer Rim Bottom Detail
	16	- Grounding Lug
	17	- Valve Enclosure
	18	- Valve Enclosure
	50	- Shell Details
	51	- Bottom Layout
	52	- Bottom Sketches
	53	- Roof Layout
	54	- Roof Sketches
	55	- Cone Roof Framing
	56	- Centre Column
	A29-2	- Scaffold Cable Support
	FR-1	- Rafter to Shell Clips
	1G4B-8	- Centre Column Top Ring

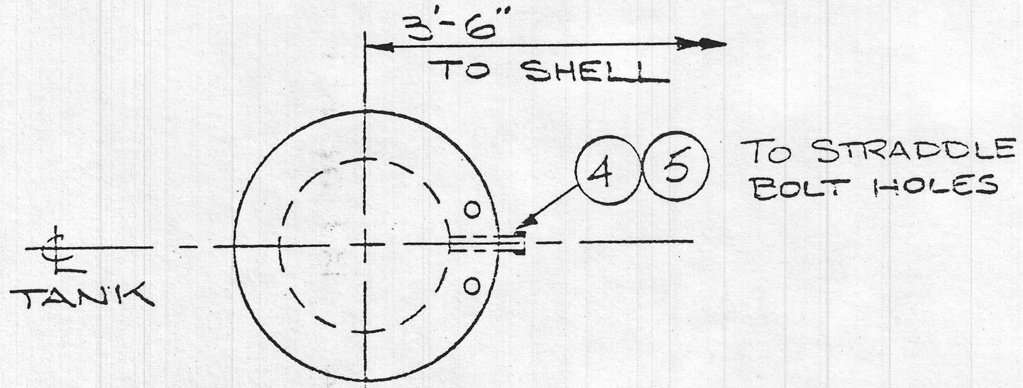
SHIP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	WT.
1	10-A		ROOF HOUSING ASS'Y				122
	10-1	1	Pc 12"ø STD.WT. PIPE M_{OE} P_{OE}	1	1 29/32	A53 B	56
	10-2	1	12"ø 150# S.O. FLG F.F.&D.			A105	64
	10-4	1	Pc 1"ø STD.WT. PIPE P_{OE} THD_{OE}	0	6	A53-B	1
	10-5	1	1"ø 3000# SCWD PIPE CAP			A105	1
1	10-3		12"ø 150# BLIND FLG FF&D			A105	110
1	10-8		GASKET 19"O.D. × 1/8 × 12 3/4" I.D. W/ HOLES			RED RUBBER	—
12	10-6		7/8"ø HEX HD. BOLTS	0	4	A307	10
12	10-7		7/8"ø HVY. HEX. NUTS			A563-A	3



ELEVATION



DETAIL Pc 1



PLAN

PROJ. NO. 85-4506

SHOP DRAWING REVIEW

THIS DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH THE GENERAL DESIGN CONCEPT ONLY. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS OR OMISSIONS OR OF MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

✓ NO COMMENT
SEE COMMENTS
AMEND & RESUBMIT

Submission No. 2
Project No. 9373
By [illegible]
Date 6-2-87

GCG DILLON CONSULTING LIMITED

HORTON CBI, LIMITED CBI

ROOF NOZZLE HOUSING

70'ø × 36' HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOV'T OF N.W.T.
GRISE FIORD — N.W.T.

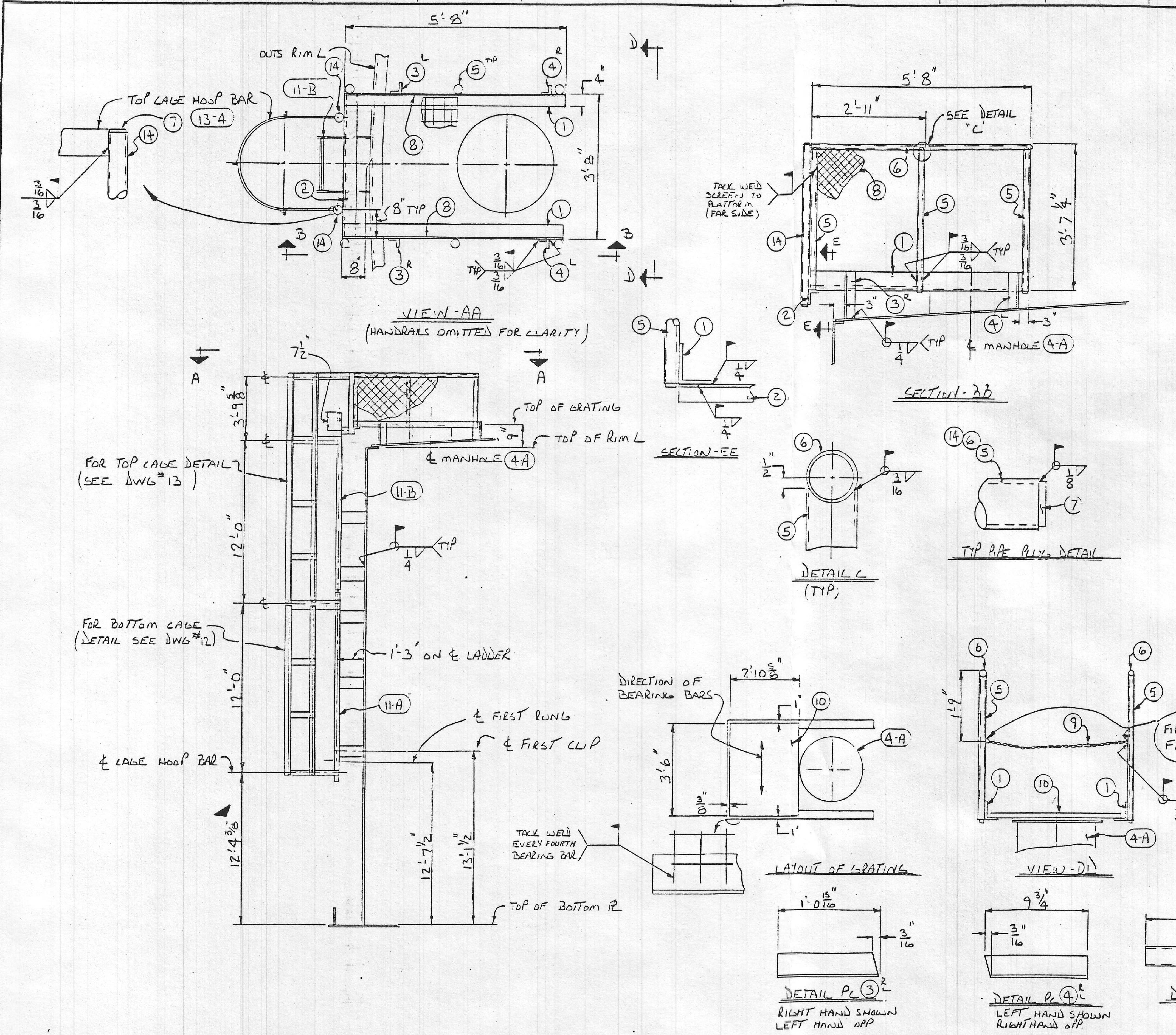
PURCHASER'S NO.	CONTRACT NO. H60729
DRAWN BY DRB DATE 6/10/86	
CHECKED BY [illegible] DATE 6.17.86	
ENGINEERING [illegible] 6/18/86	DWG. NO. 10 REV 0
CO-ORDINATOR RLH	

BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE

REVISIONS

T10-2

PLAN MADE AT FORT ERIE



SHIP PC.	MARK	ASSM. PC.	DESCRIPTION		LENGTH FT.	LENGTH IN.	SPEC.	WT.
1	11-A		WELDED LADDER ASS'Y		13	0		168
	1D17-13	2	BAR 2 1/2 x 3/8 W/SQ HOLES	PBE	12	11 3/4	A36	82
	11-12	13	BAR 3/4" Φ	PBE	1	4 1/2	A36	34
	11-13	6	BAR 6 x 3/8	PBE	1	1 13/16	A36	52
2	11-1		L6 x 4 x 3/8	PBE	5	8	G40.21-44W	139
1	11-2		L3 x 3 x 1/4	PBE	3	8	G40.21-44W	18
2	11-3 R/L		L3 x 3 x 1/4	PBE MOE	1	0 15/16	G40.21-44W	11
2	11-4 R/L		L3 x 3 x 1/4	PBE MOE	0	9 3/4	G40.21-44W	8
6	11-5		1 1/2" Φ STD WT. PIPE	PBE SKOE	3	5 13/16	A53-F	57
2	11-6		1 1/2" Φ STD WT. PIPE	PBE	5	8	A53-F	31
14	11-7		PL 1 5/8 Φ x 1/4				A283-C	1
2	11-8		SCREEN MESH 2"x2"x40" WIDE		5	8	C.S. GALV.	—
1	11-9		1/2" SIDE CHAIN W/ SNAP		4	0	C.S. GALV.	—
1	11-10		GRATING 34 5/8 x 1 1/4		3	6	*	92
2	11-14		PC 1 1/2" Φ STD WT. PIPE	PBE	3	10	A53-F	20
1	11-B		WELDED LADDER ASS'Y		12	0		145
	1D17-12	2	BAR 2 1/2 x 3/8 W/SQ HOLES	PBE	11	11 3/4	A36	76
	11-12	12	BAR 3/4" Φ	PBE	1	4 1/2	A36	31
	11-13	4	BAR 6 x 3/8	PBE	1	1 13/16	A36	34
	11-11	2	BAR 3 x 3/8	PBE	0	5 3/4	A36	4

*GRATING IS DOMINION BRIDGE TYPE 19-4 W/ 1 1/4 x 3/16 BEARING BARS - CARBON STEEL

SHOP DRAWING REVIEW

THIS DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH THE GENERAL DESIGN CONCEPT ONLY. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS OR OMISSIONS OR OF MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

✓ NO COMMENT — Submission No. 2
SEE COMMENTS — Project No. 9393
AMEND & RESUBMIT — By DM / WW
Date 6-2-87

GCG DILLON CONSULTING LIMITED

WORK THIS DWG W/ DWG # 11A, 12 & 13

PROJECT No. 85-4506

BY	CHKD	DATE	REVISIONS
MSTG.	RLH	11/20/86	1 CHANGED DIM.

HORTON CBI, LIMITED

LADDER & CAGE W/ TOP PLATFORM
70'-0" Φ x 36'-0" HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES LTD FOR GOVT. OF NW.T
GRISE FIORD ~ N.W.T

PURCHASER'S NO.:
DRAWN BY PC DATE 6.10.86
CHECKED BY [illegible] DATE 6.19.86
ENGINEERING [illegible] 6/19/86
CO-ORDINATOR RLH

CONTRACT NO. H60729

DWG. NO. 11 REV 1

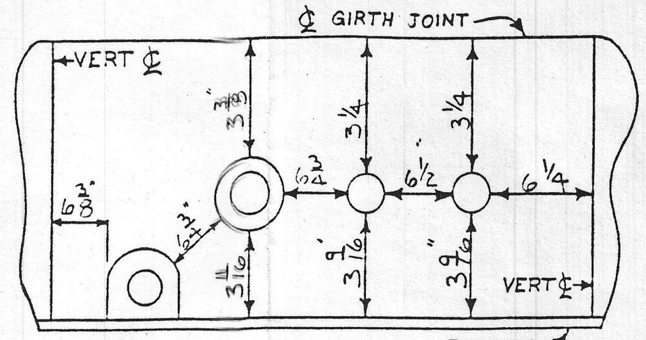
T11-2 PLANS MADE AT FORT ERIE

MATERIAL SPEC.	
SHELL	ASTM A36
ROOF	A36
BOTTOM	A36
STRUCTURALS	A36 OR G40.21-44W
SHELL REINF	A36
SHELL NOZ. NECK PL	A36
PIPE	A53 GR.B
SHELL NOZ. FLG. PL	—
FORGING	A105
SHELL MANHOLE FLG	A36 OR 516 GR70
NECK	A36
COVER	A283-C OR A36
GASKETS	1/8 RED RUBBER
BOLTS	A307 OR A194
MISC.	CPLG's A105

DESIGN DATA	
CODE	API 650 7TH EDITION REV. 1
CERTIFICATION	YES
CUST. SPEC	PROJ. 85-4506
DESIGN S. GRAVITY	1.0
CORROSION ALLOW.	1/16 SHELL, ROOF, BOTTOM, FRAMING
DES. METAL TEMP.	+40°F TO 80°F
DES. WIND VEL.	103 MPH
PUMPING RATE IN	BBL/HR.
OUT	
SERVICE	WATER STORAGE
ROOF DES. LOAD	25 Psf
P.W.H.T.	NONE
REMARKS	-LOWEST AMBIENT TEMP. -55°F

GENERAL NOTES

1. SHELL NOZZLE FLG BOLT HOLES TO STRADDLE VERTICAL CL OF TANK
2. MIN. DISTANCE OF SEE DETAIL "A" TO BE MAINTAINED BETWEEN REINF. PL'S AND BETWEEN CENTERLINE SHELL SEAMS AND REINF. PL'S
3. INSPECTION-RADIOGRAPH PER A.P.I 650 SECT. 6.1 & SECT. 5.3
4. TEST HYDROSTATIC BY NORCO (WITNESS BY HCBI) DURING WATER TEST DO NOT FILL TANK ABOVE MAXIMUM HEIGHT OF 35'-9", OVERFILLING MAY CAUSE DAMAGE.
5. PAINT - SHOP PRIME INSULATION GIRTS FIELD YES (OTHERS THEN HORTON CBI)
6. INSULATION YES BY OTHERS
7. WELD ELECTRODES TO BE LOW HYDROGEN

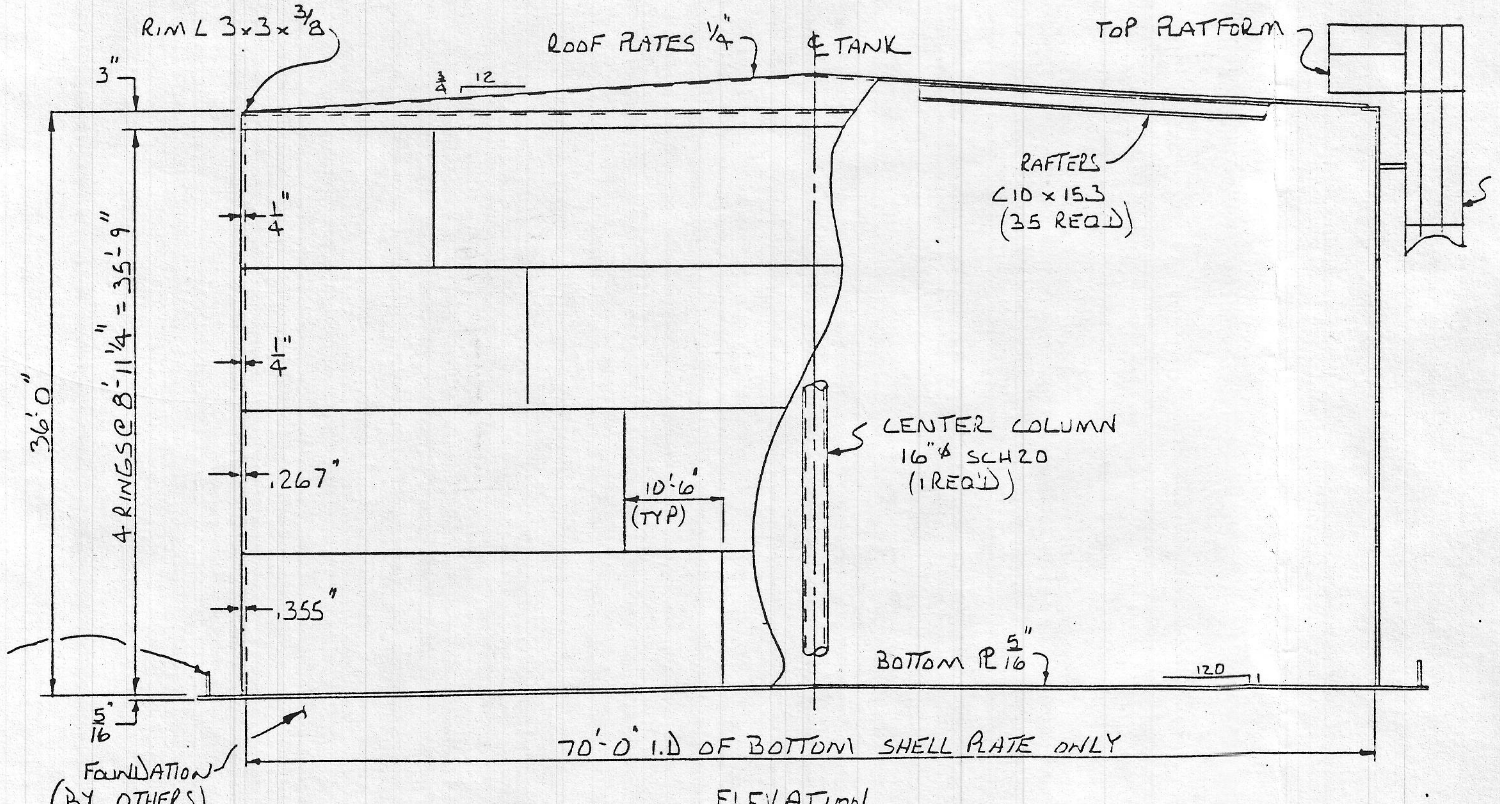


DETAIL "A"
(BOTTOM RING ONLY)

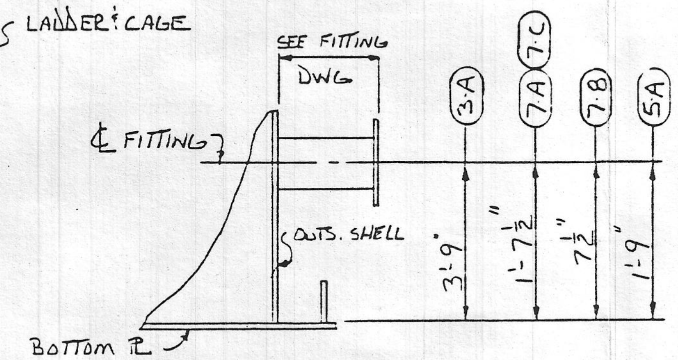
RING NO.	CORROSION ALLOWANCE (INCHES)	DESIGN FOR PRODUCT PRODUCT SG = 1.0 ALLOWABLE STRESS (PSI)	REQUIRED THICKNESS (INCHES)	DESIGN FOR TEST TEST SG = 1.0 ALLOWABLE STRESS (PSI)	REQUIRED THICKNESS (INCHES)	THICKNESS USED (INCHES)	MATERIAL SPECIFICATION	API MATERIAL GROUP NO.
1	1/16	21800	0.355	23200	0.275	0.355	A36	I
2	1/16	23200	0.267	24900	0.191	0.267	A36	I
3	1/16	23200	0.197	24900	0.125	1/4	A36	I
4	1/16	23200	0.127	24900	0.060	1/4	A36	I

LIST OF FITTINGS

CUST. MARK	HORTON MARK	QUANT	SIZE	RATING	DESCRIPTION
	3-A	1	24"	API 650	SHELL MANHOLE
	4-A	1	24"	API 650	ROOF MANHOLE
	A29-A	1	4"	API 650	SCAFFOLD CABLE SUPPORT
	7-B	1	1"	6000#	SHELL COUPLING
	6-A	1	2"	150# F.F	ROOF NOZZLE (LEVEL SWITCH)
	7-C	1	2"	150# F.F	DOUBLE FLG SHELL NOZZLE
	7-A	1	6"	150# F.F	DOUBLE FLG SHELL NOZZLE
	5-A	1	6"	150# FF	SHELL NOZZLE (VENTING/OVERFLOW)
	SEE DWG #11	1			LADDER W/ CAGE
	SEE DWG #11	1			ROOF PLATFORM
	9-A	1			NAME PLATE
	16-1	4			GROUNDING LUGS
	17-A	1			ISOLATION VALVE ENCLOSURE
	10-4	1	12	150# FF	ROOF NOZZLE HOUSING
	SEE DWG #15	1			OUTER RIM
	SEE DWG 3/4				CLADDING SUPPORTS
	8-1	2			PIPE SUPPORTS



ELEVATION
(FOR TRUE ORIENTATION SEE DWG #2)



SHELL FITTINGS ELEVATIONS

SHCP DRAWING REVIEW

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	NO COMMENT	Submission No.	2
✓	SEE COMMENTS	Project No.	9273
	AMEND & RESUBMIT	By	D.H./W.W.I
		Date	6 FEB 1987

GCG DILLON CONSULTING LIMITED

T1-2

PROJECT No. 85-4506

HORTON CBI, LIMITED

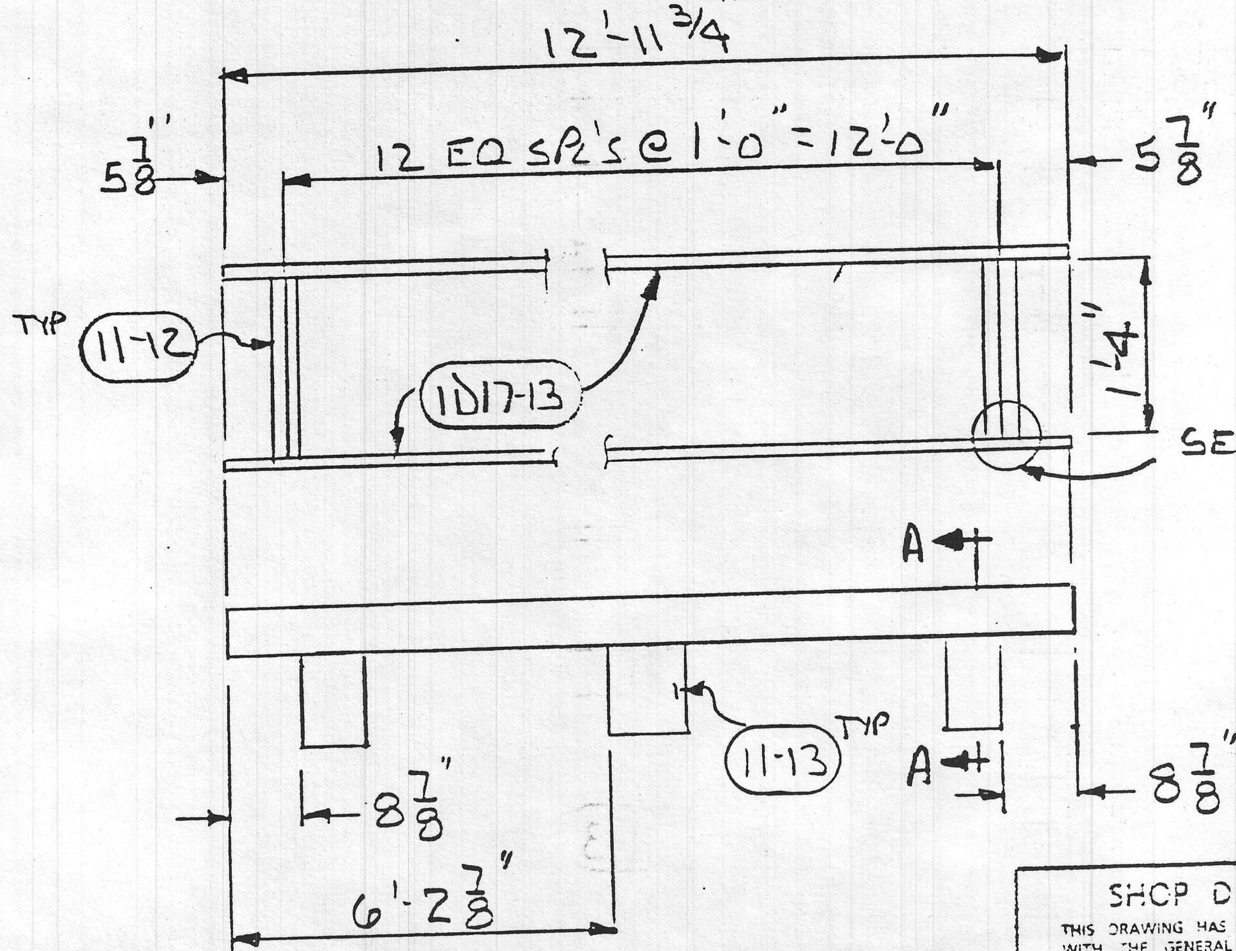
GENERAL PLAN
70'-0"Ø x 36'-0" HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOVT. OF N.W.T.
GRISE FIORD — N.W.T.

PURCHASER'S NO.
DRAWN BY FK DATE 6-6-86
CHECKED BY GL DATE 6-13-86
ENGINEERING DATE 6-16-86
CO-ORDINATOR RLH
CONTRACT NO. H60729
DWG. NO. 1 REV 1

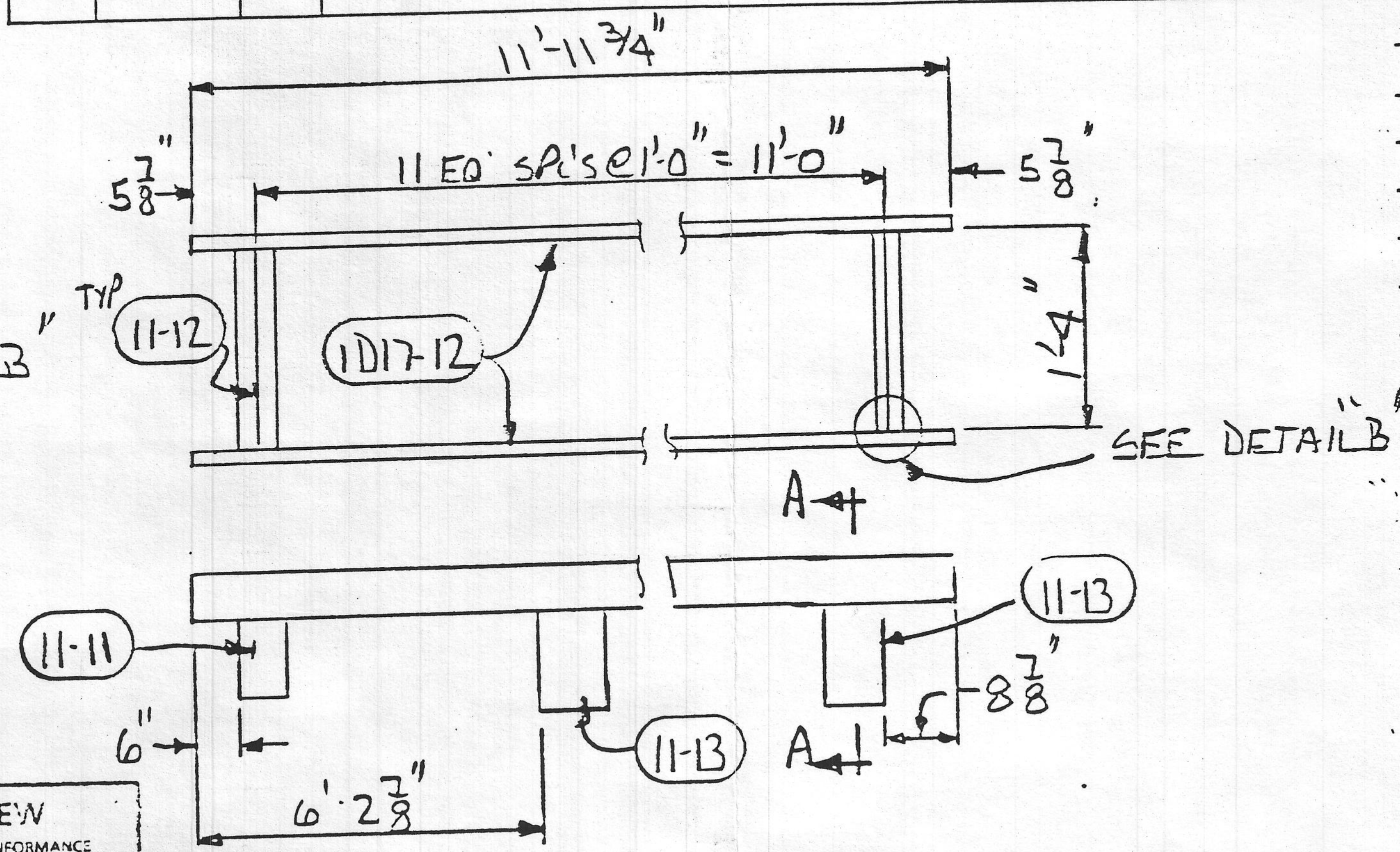
REVISIONS: BY MSTG CHKD RLH DATE 11/20/86 — 1 ADDED MISC. INFO.

PLANS MADE AT FORT ERIE

SHIP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	WT.



LADDER ASS'Y 11-A



LADDER ASS'Y 11-B

SHOP DRAWING REVIEW

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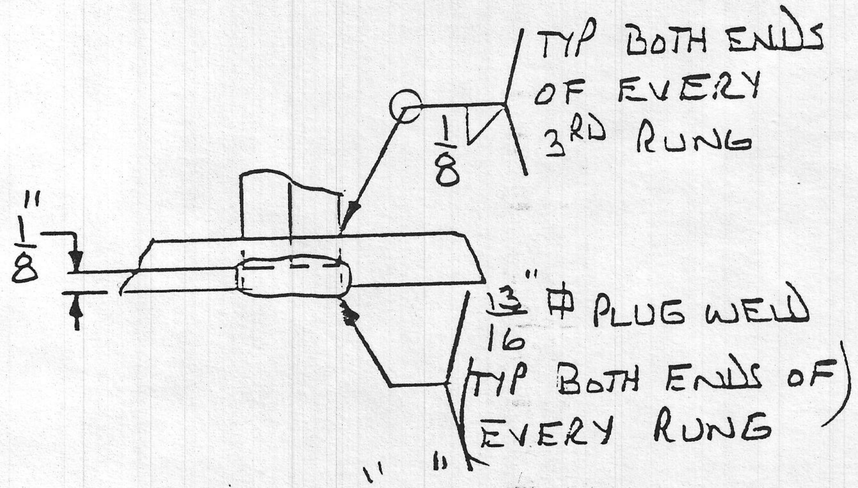
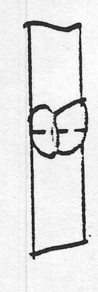
✓	NO COMMENT	Submission No. 2
	SEE COMMENTS	Project No. 9333
	AMEND & RESUBMIT	By [illegible]
		Date 6-3-87

GCG DILLON CONSULTING LIMITED



DETAIL "B"



SECTION-AA
(TYP)

WORK THIS DWG w/ DWG #11

PROJECT NO. 85-4506

HORTON CBI, LIMITED

LADDER ASS'Y DETAILS
70'-0" Ø x 36'-0" HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOVT. OF N.W.T.
GRISE FIORD ~ N.W.T.

PURCHASER'S NO.
DRAWN BY FC DATE 6.10.86
CHECKED BY [illegible] DATE 6.19.86
ENGINEERING [illegible] 6/19/86
CO-ORDINATOR RLH

CONTRACT NO. H60729

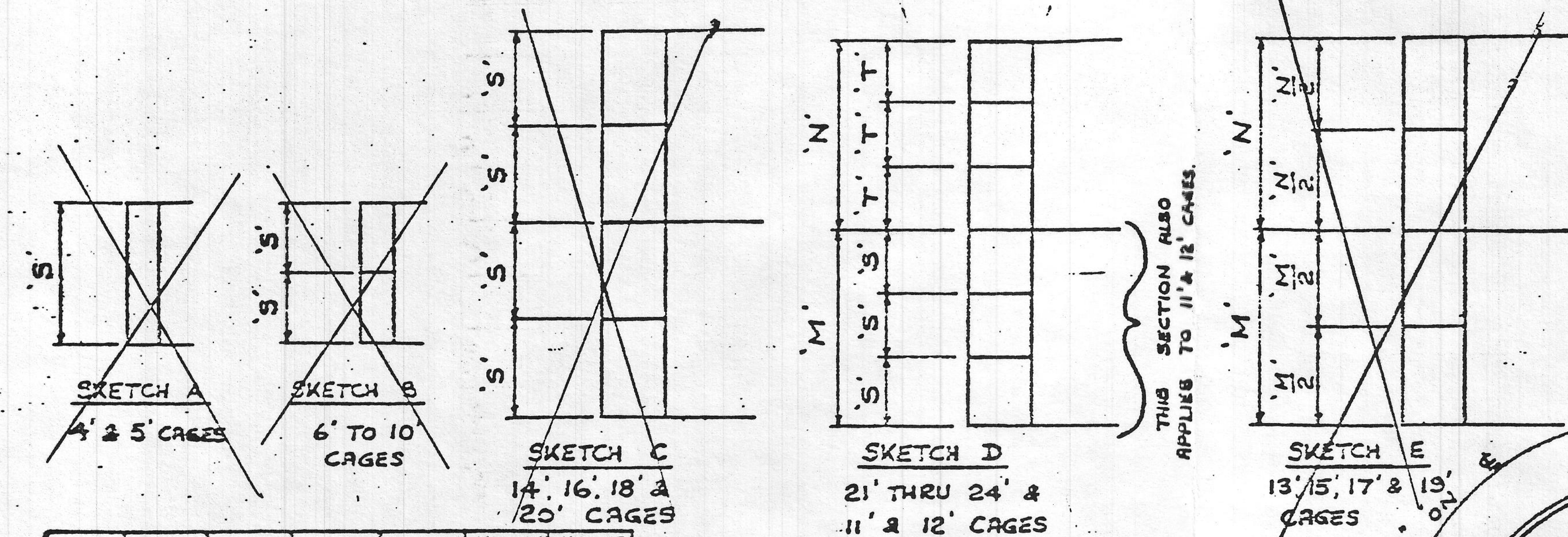
DWG. NO. 11A REV D

REVISIONS	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE

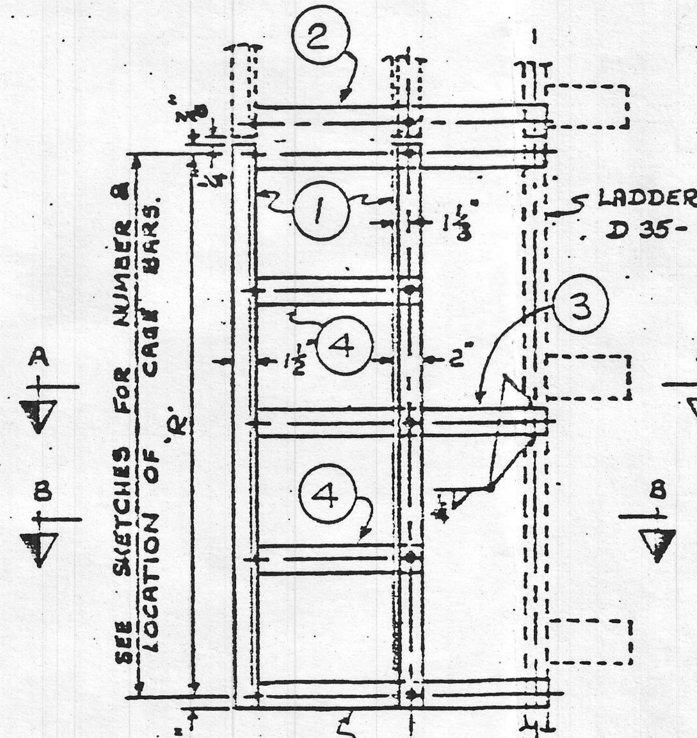
T12-2

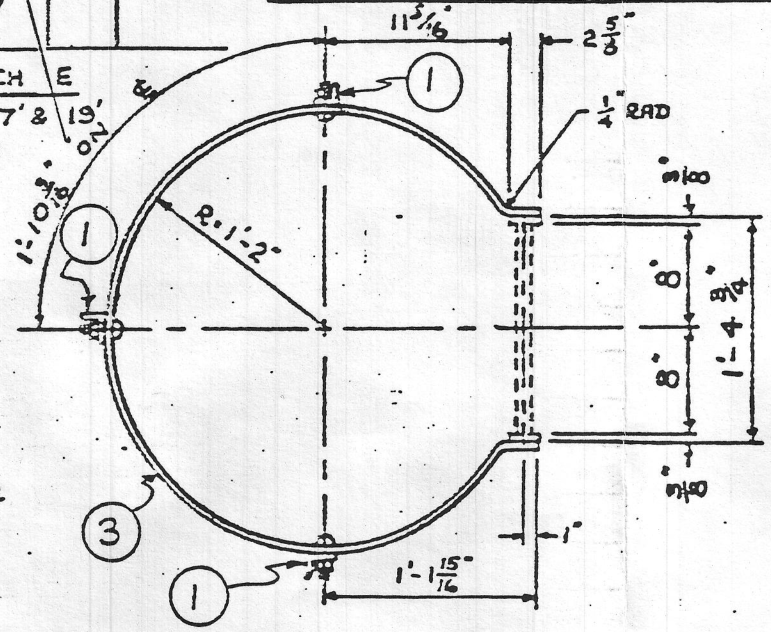
PLAN MADE AT FORT ERIE

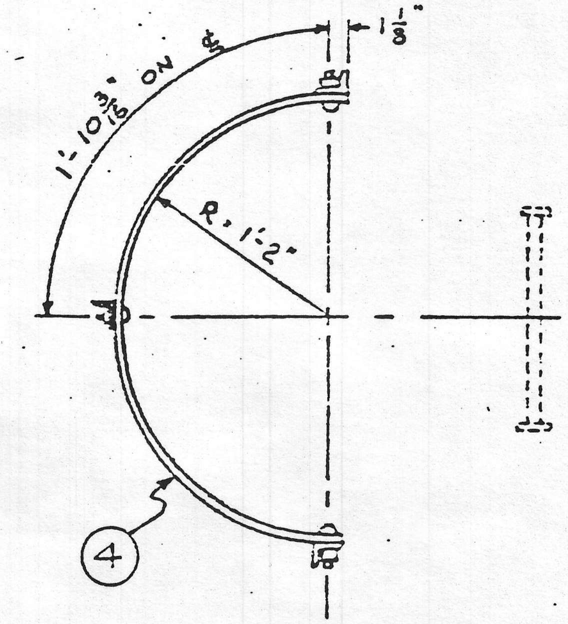
SHIP PC	MARK	ASSY PC	DESCRIPTION	LENGTH FT	LENGTH INS	SPEC
			LADDER CAGE			
3	12-1		∠2"×1½"×¼" P.B.E. W/HOLES	12	1 7/8	A36
1	12-2		CAGE BAR 4"×¼" ROLL W/HOLES	6	3 7/8	A36
SEE TABLE	12-3		CAGE BAR 2"×5/16" ROLL W/HOLES	6	3 7/8	A36
SEE TABLE	12-4		CAGE BAR 2"×5/16" ROLL W/HOLES	3	10 5/8	A36
SEE BILLS			5/8"φ CARRIAGE BOLTS (FIN HEX NUTS)	0	1½	A307-B



R	S	M	N	T	NO. OF -3	NO. OF -4
4'-0"	4'-0"	—	—	—	1	0
5'-0"	5'-0"	—	—	—	1	0
6'-0"	3'-0"	—	—	—	1	1
7'-0"	3'-6"	—	—	—	1	1
8'-0"	4'-0"	—	—	—	1	1
9'-0"	4'-6"	—	—	—	1	1
10'-0"	5'-0"	—	—	—	1	1
11'-0"	3'-8"	11'-0"	—	—	1	2
USE → 12'-0"	4'-0"	12'-0"	—	—	1	2
13'-0"	—	6'-0"	7'-0"	—	2	2
14'-0"	3'-6"	—	—	—	2	2
15'-0"	—	7'-0"	8'-0"	—	2	2
16'-0"	4'-0"	—	—	—	2	2
17'-0"	—	8'-0"	9'-0"	—	2	2
18'-0"	4'-6"	—	—	—	2	2
19'-0"	—	9'-0"	10'-0"	—	2	2
20'-0"	5'-0"	—	—	—	2	2
21'-0"	3'-4"	10'-0"	11'-0"	3'-8"	2	4
22'-0"	3'-8"	11'-0"	11'-0"	3'-3"	2	4
23'-0"	3'-8"	11'-0"	12'-0"	4'-0"	2	4
24'-0"	4'-0"	12'-0"	12'-0"	4'-0"	2	4





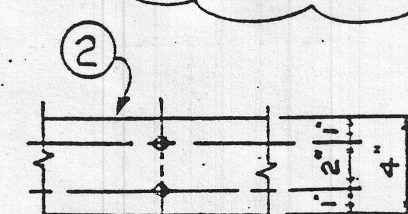


SHOP NOTE:

ALL HOLES IN -1 ARE 11/16"φ, PUNCHED IN 2" LEG.

ALL HOLES IN -2, -3 & -4 ARE 11/16" Φ, SET ON EDGE @ ℄ OF BAR.

WORK THIS DWG W/ DWG # 11



SHOP DRAWING REVIEW

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✓ NO COMMENT — Submission No. 2

SEE COMMENTS — Project No. 4583

Date 6-2-87

CCC DILLON CONSULTING LIMITED

Horton Steel Works, Limited

FORT ERIE, ONTARIO
VANCOUVER, B.C.

BOTTOM LADDER CAGE FOR CYLINDRICAL TANKS & TUBULAR COLUMN ELEV. TANKS.

70'-0" φ x 36'-HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOVT. OF N.W.T.
GRISE FIORD ~ N.W.T.

PURCHASER'S NO.
DRAWN BY FC DATE 6.10.86
CHECKED BY [illegible] DATE 6.19.86
ENGINEERING [illegible] 6/19/86
CO-ORDINATOR RLH

CONTRACT NO. H60729

DWG NO. 12 REV 0

REVISIONS	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE

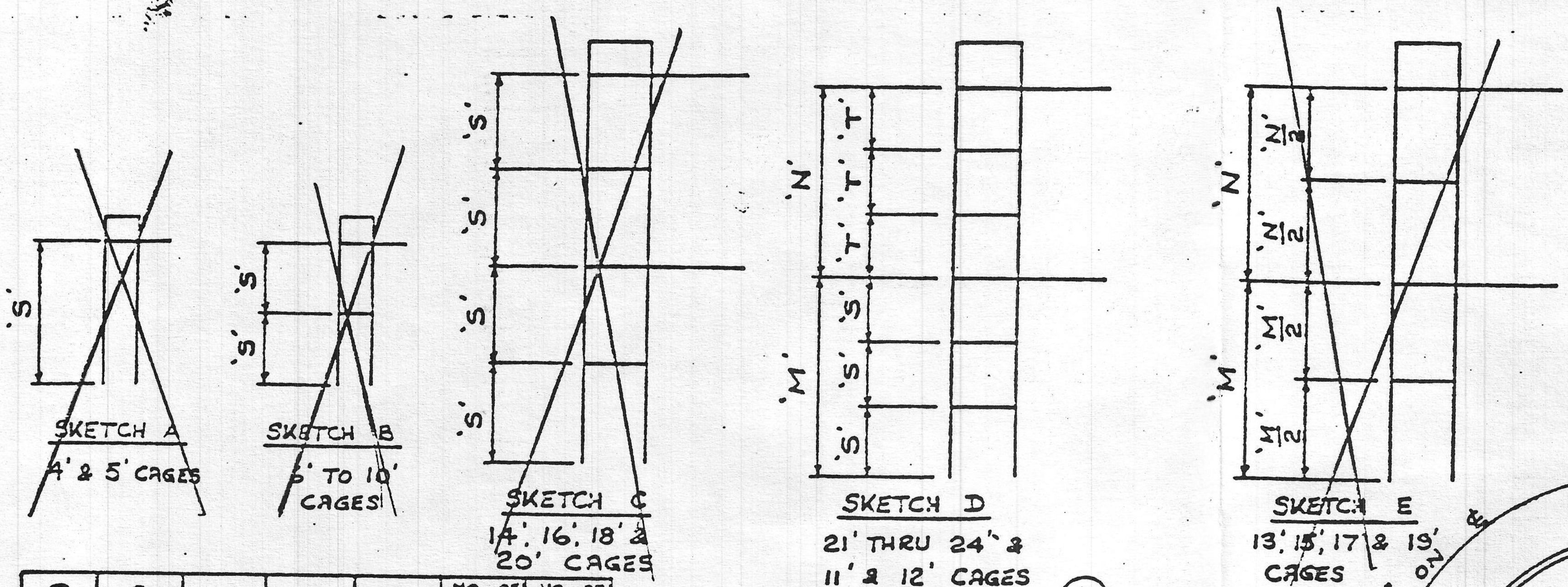
STD FORM No HS-E2

DRAWN BY E.G.H. DATE JUNE 1, 1973
CHECKED BY ROY D. DATE JUNE 8/73
APP'D BY DATE

TRANSTEX 15 1M-9-70

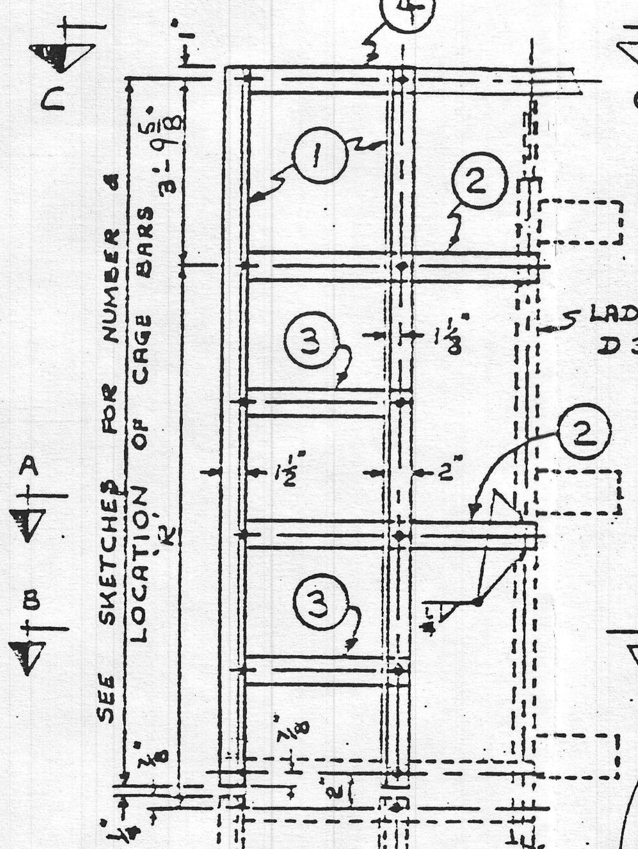
1 2 3 4 5 6

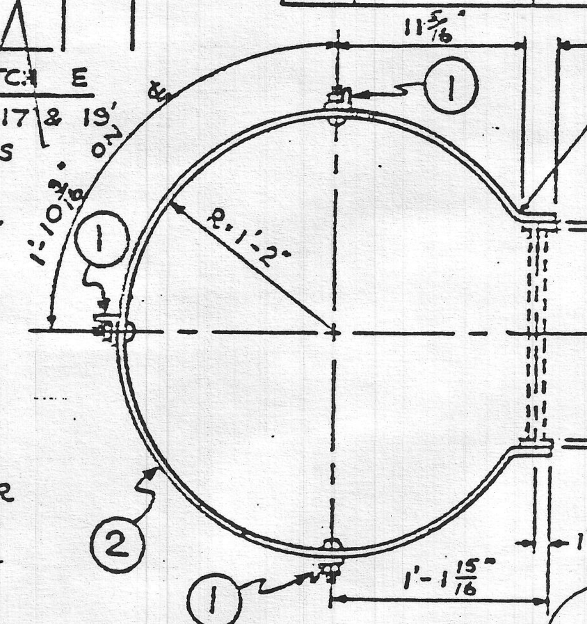
--T13-2

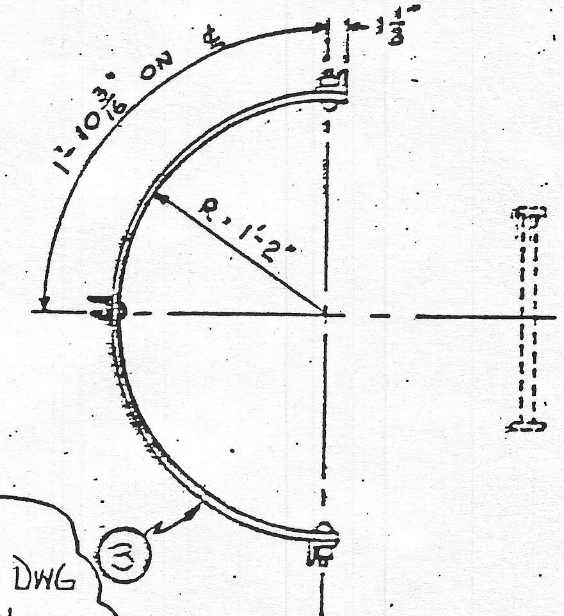


SHIP PC	MARK	ASSY PC	DESCRIPTION	LENGTH FT	LENGTH INS	SPEC
			VERTICAL CAGE ∠			
3	13 -1		∠ 2" x 1½" x ¼" P.B.E. w/HOLES	15	9½	A36
1	13 -4		CAGE BAR 2 x 5/16 ROLL w/HOLES	6	8	A36
SEE TABLE	13 -2		CAGE BAR 2" x 5/16" ROLL w/HOLES	6	3⅞	A36
SEE TABLE	13 -3		CAGE BAR 2" x 5/16" ROLL w/HOLES	3	10⅝	A36
SEE BILLS			⅝" ϕ CARRIAGE BOLTS (FIN HEX NUTS)	0	1½	A307 -B

R	S	M	N	T	NO. OF -2	NO. OF -3
4'-0"	4'-0"	—	—	—	1	1
5'-0"	5'-0"	—	—	—	1	1
6'-0"	3'-0"	—	—	—	1	2
7'-0"	3'-6"	—	—	—	1	2
8'-0"	4'-0"	—	—	—	1	2
9'-0"	4'-6"	—	—	—	1	2
10'-0"	5'-0"	—	—	—	1	2
11'-0"	—	—	11'-0"	3'-8"	1	3
12'-0"	—	—	12'-0"	4'-0"	1	2
13'-0"	—	6'-0"	7'-0"	—	2	3
14'-0"	3'-6"	—	—	—	2	3
15'-0"	—	7'-0"	8'-0"	—	2	3
16'-0"	4'-0"	—	—	—	2	3
17'-0"	—	8'-0"	9'-0"	—	2	3
18'-0"	4'-6"	—	—	—	2	3
19'-0"	—	9'-0"	10'-0"	—	2	3
20'-0"	5'-0"	—	—	—	2	3
21'-0"	3'-4"	10'-0"	11'-0"	3'-8"	2	5
22'-0"	3'-8"	11'-0"	11'-0"	3'-8"	2	5
23'-0"	3'-8"	11'-0"	12'-0"	4'-0"	2	5
24'-0"	4'-0"	12'-0"	12'-0"	4'-0"	2	5

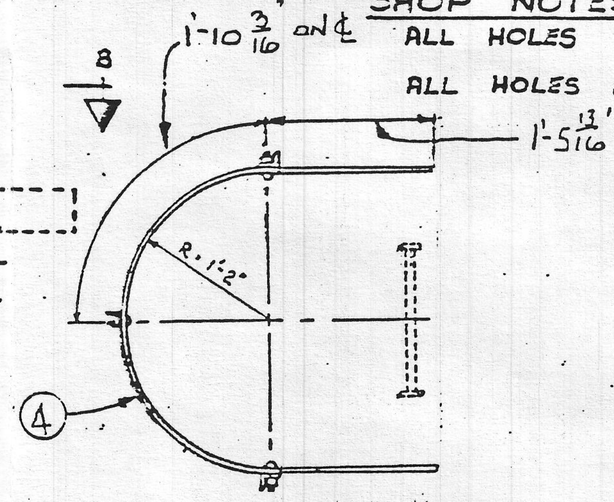






WORK THIS DWG w/ DWG #11

SHOP NOTE:
ALL HOLES IN -1 ARE 11/16" ϕ, PUNCHED IN 2" LEG.
ALL HOLES IN -2, -3, -4 ARE 11/16" ϕ, SET ON EDGE @ ℄ OF BAR.



SHOP DRAWING REVIEW

THIS DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH THE GENERAL DESIGN CONCEPT ONLY. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS OR OMISSIONS OR OF MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

✓ NO COMMENT
SEE COMMENTS

Submission No. 2
Project No. 9993
Date 6-2-87

GCG DILLON CONSULTING LIMITED

BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE

REVISIONS

STD FILE H5-E3

Horton Steel Works, Limited

FORT ERIE, ONTARIO
VANCOUVER, B.C.

TOP LADDER CAGE FOR CYLINDRICAL TANKS.

70' ϕ x 36' HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES. FOR GOV.T. OF N.W.T
GRISE FIORD ~ N.W.T

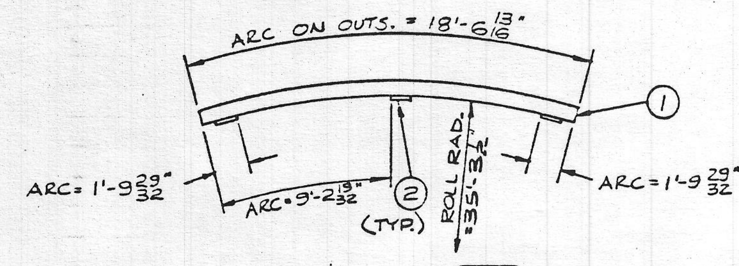
PURCHASER'S NO.
DRAWN BY FC DATE 6.18.86
CHECKED BY [illegible] DATE 6.19.86
ENGINEERING [illegible] 6/19/86
CO-ORDINATOR RLH

CONTRACT NO. H60729
DWG NO. 13 REV 0

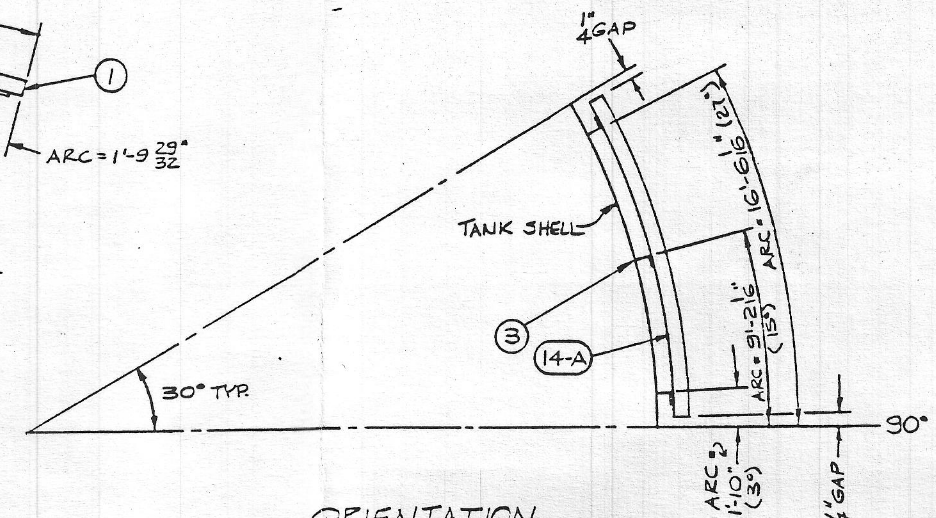
TRANSTEX 15 1M-9-70

T14-2

SHIP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	IN.	SPEC.	WT.
72	14-A		CLADDING SUPPORT				9346
	14-1	72	HSS 3"x3"x.188 ROLL	18	6 ±	G40.21 50W	9138
	14-2	216	BAR 3" x 1/4"	0	6 ±	A36	207
216	14-3		L 3x3x1/4" PBE	0	6	G40.21 44W	529
432	14-4		1/2"ϕ HEX HD BOLT	0	1 1/2	A307	55
432	14-5		1/2"ϕ HVY HEX NUT			A563-A	16



DETAIL OF 14-A



ORIENTATION

ARCS ON OUTSIDE OF BOTTOM RING

SHOP DRAWING REVIEW

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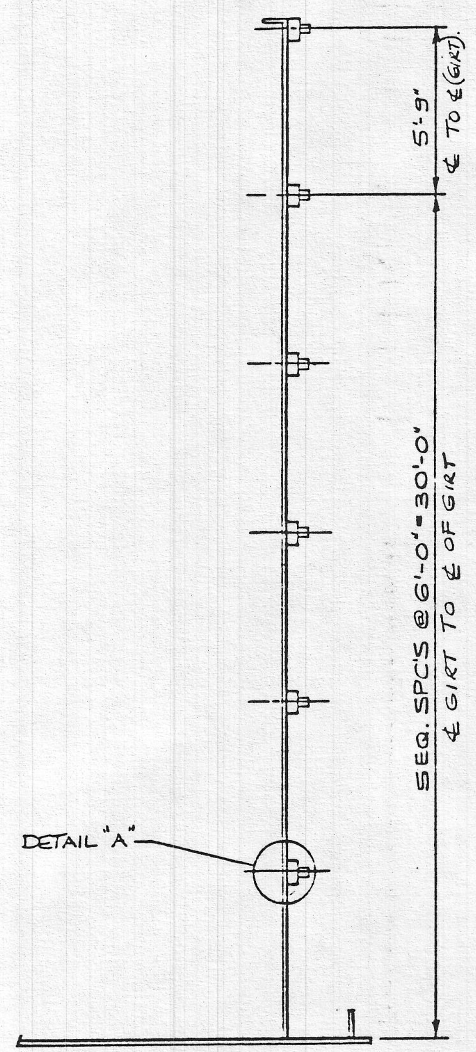
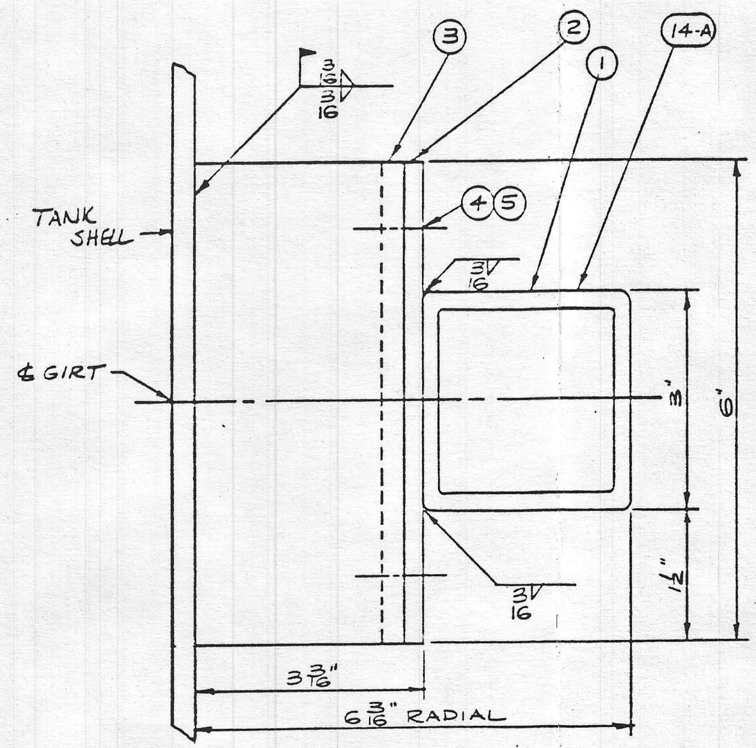
- ✓ NO COMMENT
- SEE COMMENTS
- AMEND & RESUBMIT

Submission: 2
Project No. 9373
By: [signature]
Date: 6-2-87

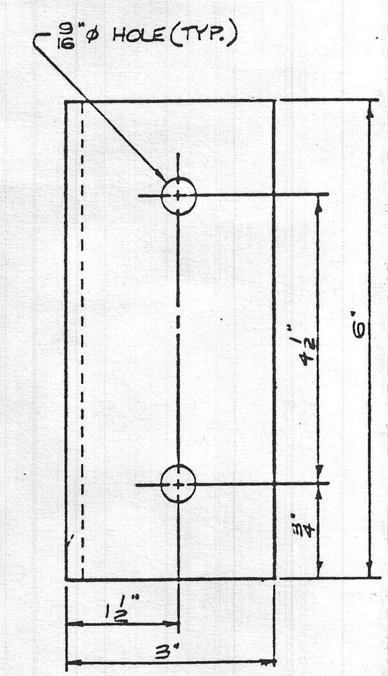
GCG DILLON CONSULTING LIMITED



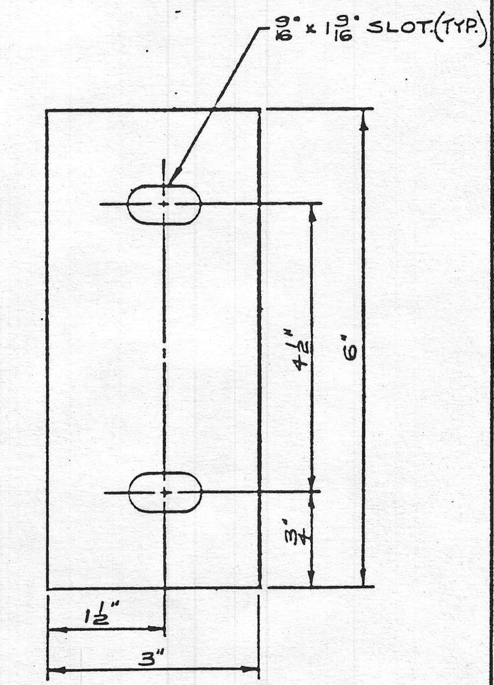
ELEVATION



DETAIL "A"



DETAIL OF 3



DETAIL OF 2

HORTON CBI, LIMITED CBI

CLADDING SUPPORT SYSTEM

70' ϕ x 36'-0" HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOVT. OF N.W.T
GRISE FIORD ~ N.W.T

PURCHASER'S NO.
DRAWN BY TDY DATE 06/10/86
CHECKED BY [signature] DATE 6.18.86
ENGINEERING [signature] 4/18/86
CO-ORDINATOR RLH

CONTRACT NO. H60729

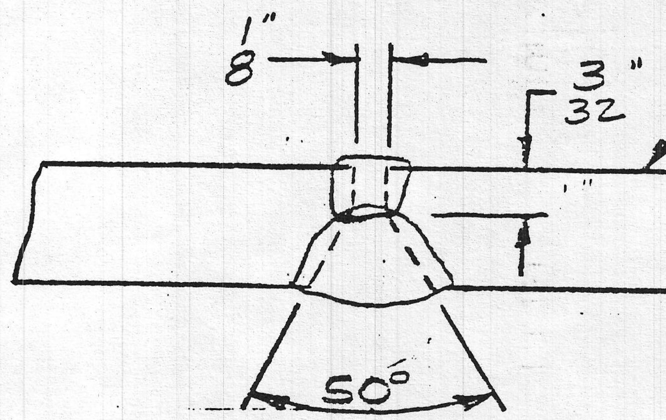
DWG. NO. 14 REV 1

REVISIONS	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE
																						RLH		9/19/86
																						1 ▶ -REV. # 14-2 TO BAR.		

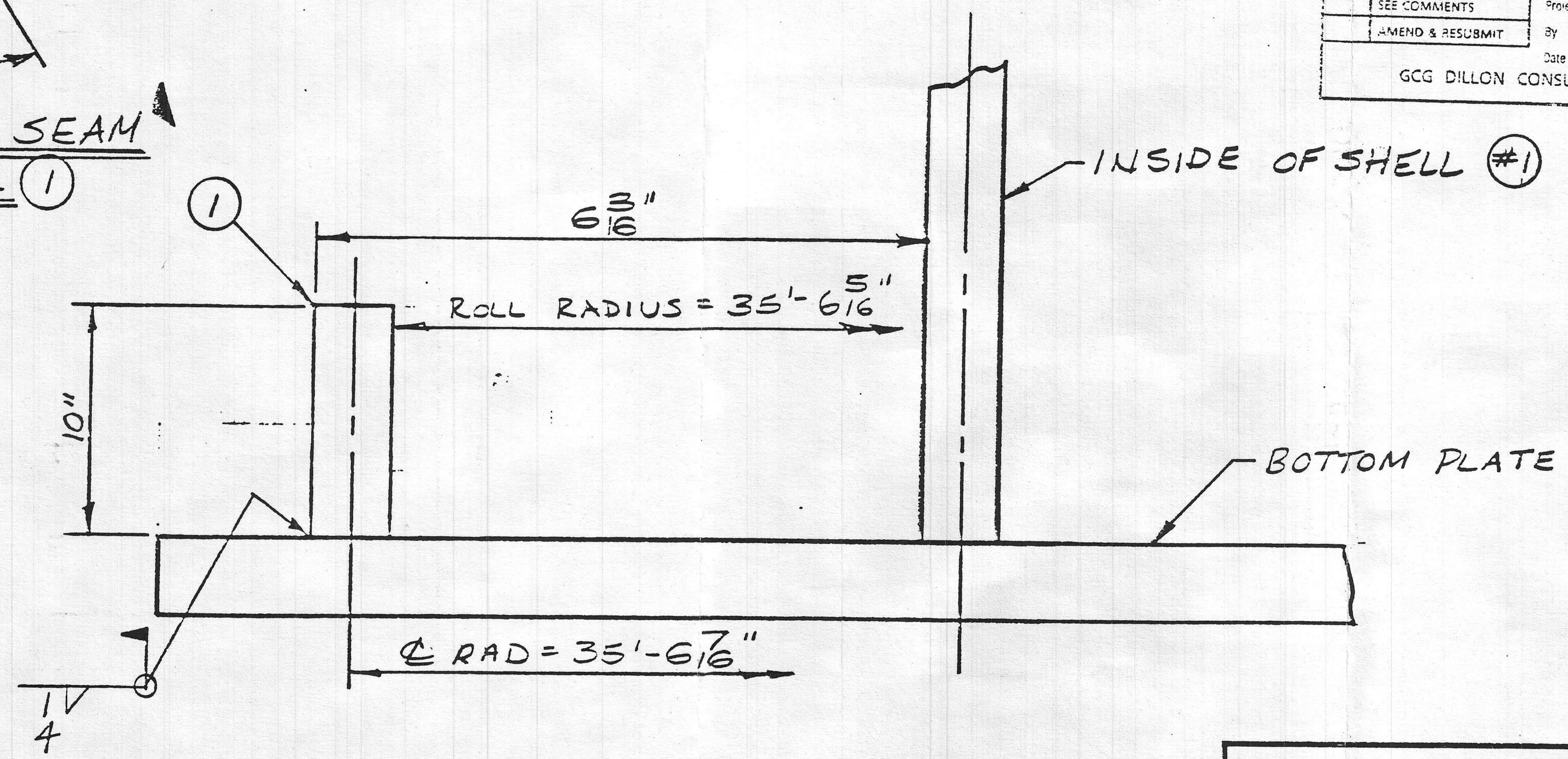
T15-2

PLANS MADE AT FORT ERIE

SHIP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	WT.
9	15-1		PL 10 × 1/4" W/EDGE PREP.	24	9 11/16	A36	1897
			ROLL RADIUS = 35'-6 5/16				



VERTICAL SEAM DETAIL (1)



SHOP DRAWING REVIEW

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✓	NO COMMENT	Submission No.	2
	SEE COMMENTS	Project No.	9373
	AMEND & RESUBMIT	By	DCN/WW
		Date	6-2-87

GCG DILLON CONSULTING LIMITED

PROJECT NO. 85-4506

HORTON CBI, LIMITED

OUTER RIM BOTTOM DETAIL
70'-0"⌀ × 36'-0" HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK.
NORCO INDUSTRIES FOR GOVT. OF N.W.T.
GRISE FIORD ~ N.W.T.

PURCHASER'S NO.
DRAWN BY TDY DATE 6/9/86
CHECKED BY FTC DATE 6.12.86
ENGINEERING [illegible] 6/12/86
CO-ORDINATOR R.L.H.

CONTRACT NO. H60729

DWG. NO. 15 REV 1

REVISIONS	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE
										TDY	FTC	6/17/86
										REVISE WELD DETAIL FOR E7018 WELD ELEC		

T/6-2

PLAN MADE AT FORT ERIE

SHIP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	WT.
4	16-1		PL 2" x 1/4" W/ HOLE	0	2	A36	1

SHOP DRAWING REVIEW

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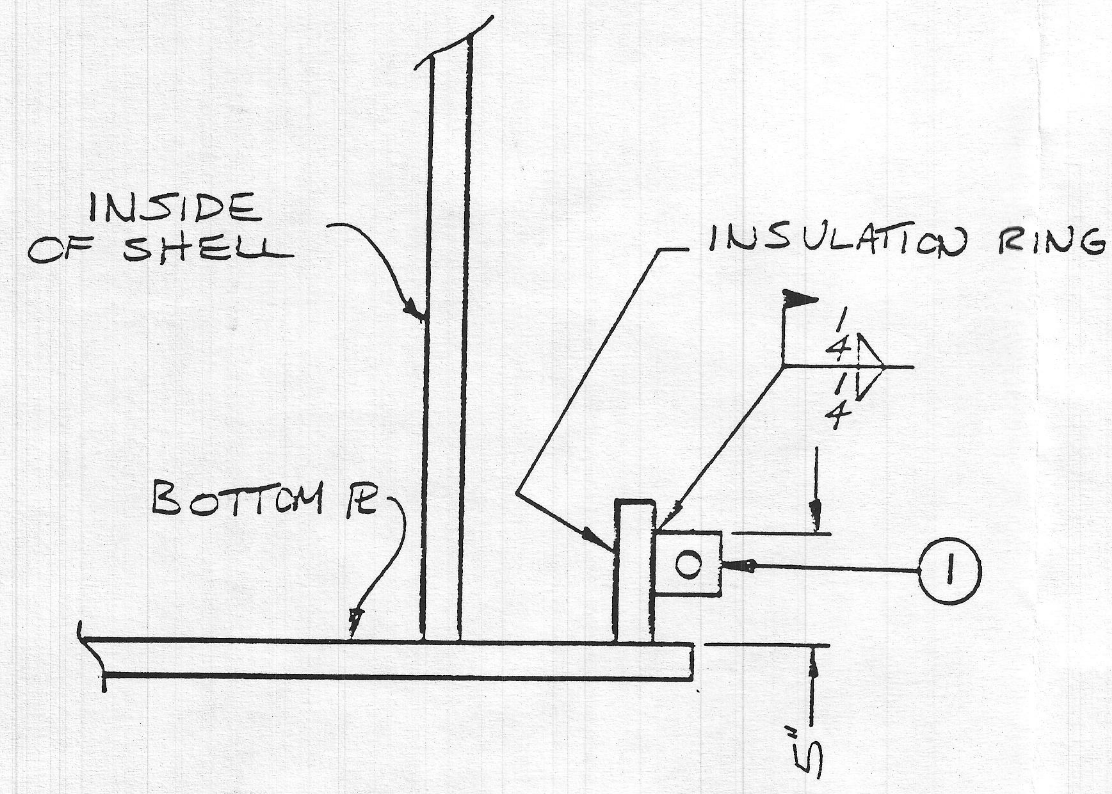
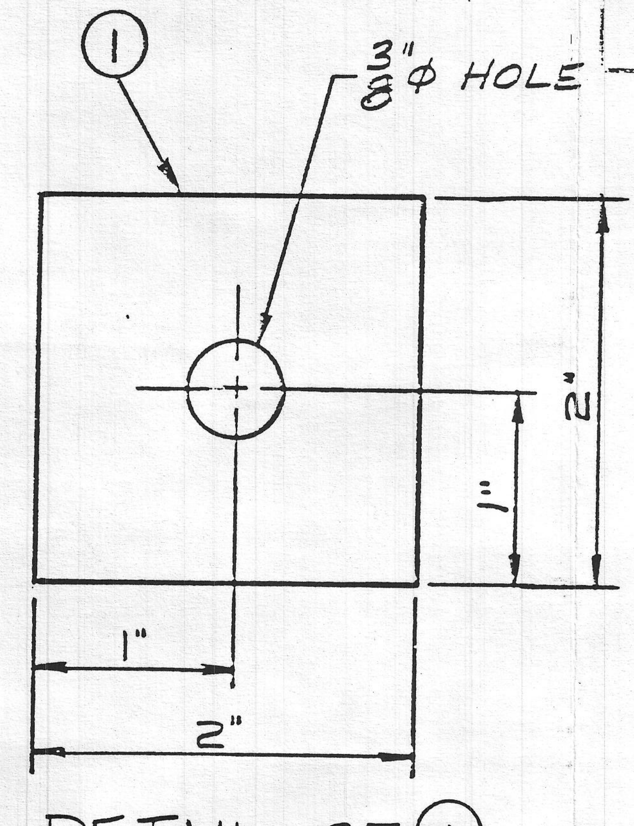
✓	NO COMMENT	Submission No.	2
	SEE COMMENTS	Project No.	9393
	AMEND & RESUBMIT	By	[illegible]
		Date	6-2-87

GCG DILLON CONSULTING LIMITED



ELEVATION



DETAIL OF 1

PROJECT NO. 85-4506

HORTON CBI, LIMITED

GROUNDING LUG

70'-0" ⌀ x 36'-0" HIGH CONE ROOF TK.
SECOND WATER STORAGE TANK.
NORCO INDUSTRIES FOR GOVT. OF N.W.T.
GRISE FIORD – N.W.T.

PURCHASER'S NO.
DRAWN BY TDY DATE 6/12/86
CHECKED BY [illegible] DATE 6-18-86
ENGINEERING [illegible]
CO-ORDINATOR K.G.T.

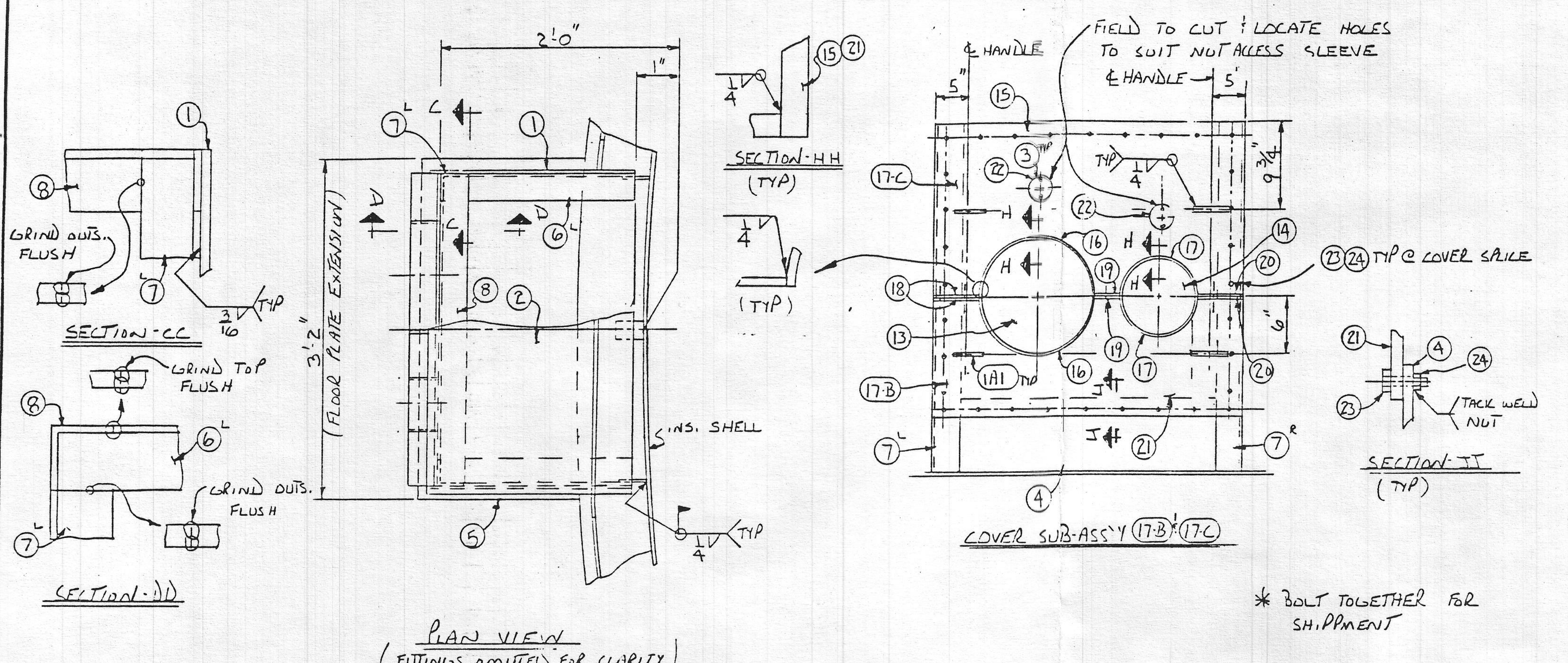
CONTRACT NO. H60729

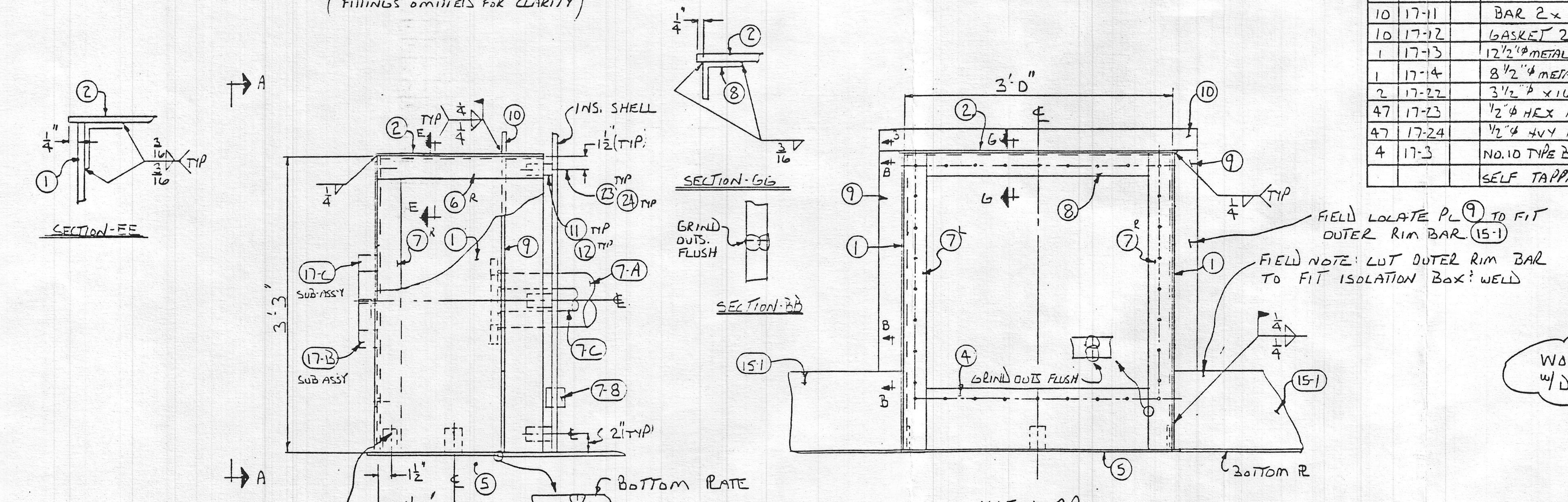
DWG. NO. 16 REV 0

REVISIONS	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE

T17-2

PLAN MADE AT FORT ERIE





FIELD NOTE: DRILL 5/8"φ BOLT HOLES IN ISOLATION BOX ASS'Y (17-A) TO MATCH CLIPS (11) AT INSTALLATION. TACK WELD NUT TO CLIP (11). MAKE SURE GASKET (12) IS BETWEEN CLIP & BOX.

WORK THIS DWG W/DWG #18

SHIP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	WT.
* 1	17-A		ISOLATION VALVE ENCLOSURE ASS'Y				(329)
	17-1	2	PL 23½ x ¼	3	3	A36	130
	17-2	1	PL 23½ x ¼	3	1	A36	64
	17-4	1	PL 8" x ¼ W/HOLES	2	6	A36	17
	17-5	1	PL SK. x ¼			A36	52
	17-6 R/L	2	L 3 x 3 x ¼ COPE OE PL OE	1	11	G40.21-44W	19
	17-7 R/L	2	L 3 x 3 x ¼ W/HOLES COPE OE PL OE	3	3	G40.21-44W	32
	17-8	1	L 3 x 3 x ¼ W/HOLES COPE BE	2	11½	G40.21-44W	15
*	17-B	1	COVER SUB-ASS'Y				(39)
	17-16	1	BAR 2 x ¼ ROLL	1	8	A36	3
	17-17	1	BAR 2 x ¼ ROLL	1	1¾	A36	2
	17-18	1	BAR 2 x ¼ W/HOLES	0	5⅜	A36	1
	17-19	1	BAR 2 x ¼ W/HOLE	0	3¼	A36	1
	17-20	1	BAR 2 x ¼ W/HOLES	0	5⅛	A36	1
	17-21	1	PL SK x ¼ W/HOLES & CUTOUTS			A36	29
	1A1	2	HANDLE ROD 5/8"φ (BENT)	1	0	A36	2
*	17-C	1	COVER SUB-ASS'Y				(52)
	17-15	1	PL SK x ¼ W/HOLES & CUTOUTS			A36	42
	17-16	1	BAR 2 x ¼ ROLL	1	8	A36	3
	17-17	1	BAR 2 x ¼ ROLL	1	1¾	A36	2
	17-18	1	BAR 2 x ¼ W/HOLES	0	5⅜	A36	1
	17-19	1	BAR 2 x ¼ W/HOLE	0	3¼	A36	1
	17-20	1	BAR 2 x ¼ W/HOLES	0	5⅛	A36	1.
	1A1	2	HANDLE ROD 5/8"φ BENT	1	0	A36	2
2	17-9		BAR 3 x ¼ SKOE PL OE	2	5¼	A36	(11)
1.	17-10		BAR 3 x ¼ PL BE	3	6½	A36	(9)
10	17-11		BAR 2 x ¼ W/HOLE	0	3	A36	(2)
10	17-12		GASKET 2 x ¼ W/HOLE	0	3	NEOPRENE	(–)
1	17-13		12½"φ METAL PLUG x 16 GA			SHEET METAL (GALV.)	(2)
1	17-14		8½"φ METAL PLUG x 16 GA			SHEET METAL GALV.	(1)
2	17-22		3½"φ x 16 GA W/HOLES			SHEET METAL GALV	(1)
47	17-23		½"φ HEX HD BOLT	0	1½	A307	(8)
47	17-24		½"φ HVY HEX NUT			A563A	(1)
4	17-3		NO.10 TYPE B HEX HEAD	0	0⅜	STEEL	(–)
			SELF TAPPING SCREWS				

PROJECT No. 85-4506

SHOP DRAWING REVIEW

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✓ NO COMMENT
SEE COMMENTS
AMEND & RESUBMIT

Submission No. 2
Project No 9393
By DCM/...
Date 6-2-87

GCG DILLON CONSULTING LIMITED

REVISIONS | BY | CHKD | DATE | BY | CHKD | DATE | BY | CHKD | DATE | BY | CHKD | DATE | BY | CHKD | DATE | BY | CHKD | DATE

HORTON CBI, LIMITED

ISOLATION VALVE ENCLOSURE DETAILS
70'φ x 36' HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOVT. OF N.W.T
GRISE FIORD ~ N.W.T

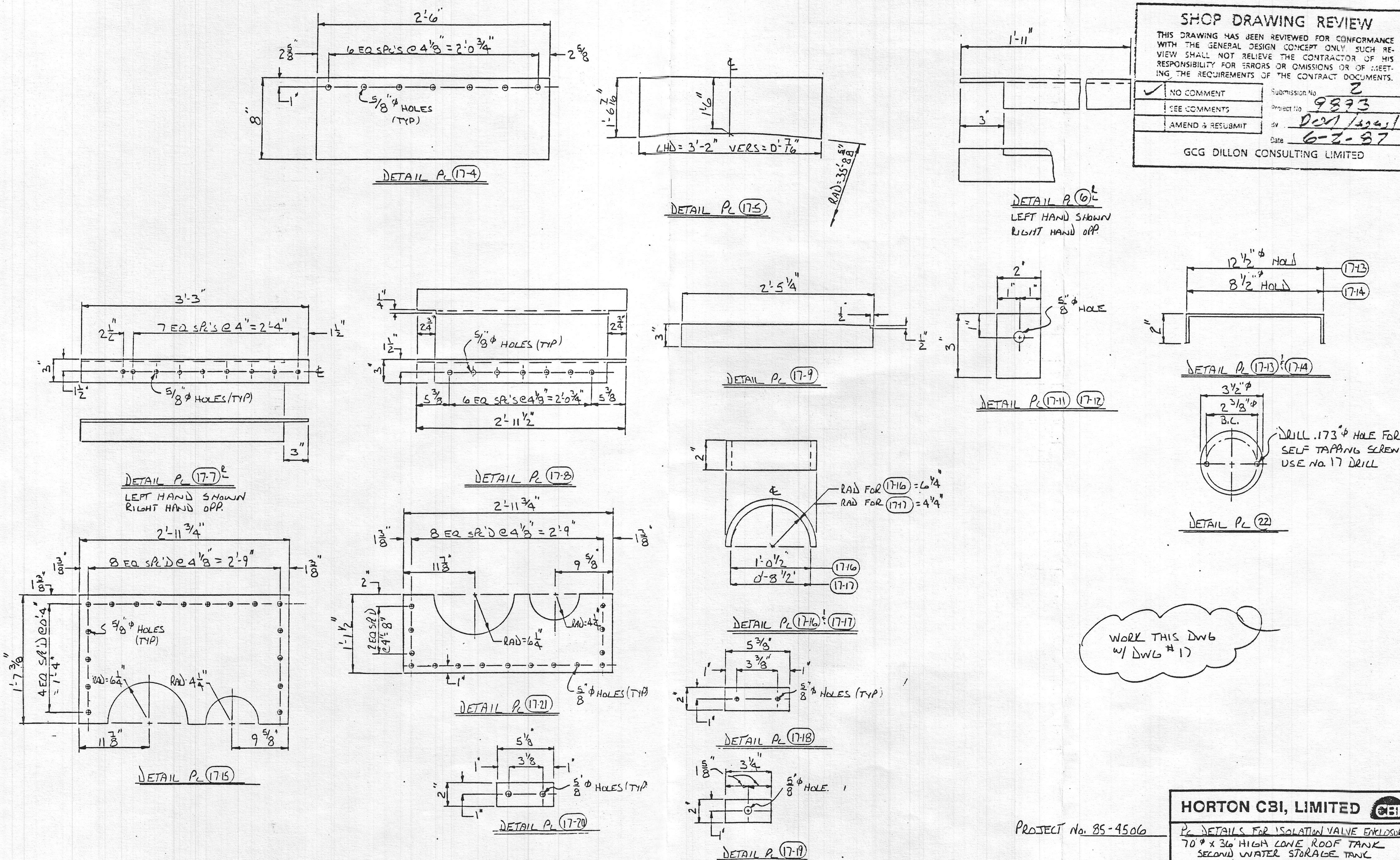
PURCHASER'S NO. ______
DRAWN BY PL DATE 6.17.86
CHECKED BY ... DATE 6.19.86
ENGINEERING ... 6/20/86
CO-ORDINATOR RLH

CONTRACT NO. H60729

DWG. NO. 17 REV 0

T18-2

PLANS MADE AT FORT ERIE



SHOP DRAWING REVIEW

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✓	NO COMMENT	Submission No 2
	SEE COMMENTS	Project No 9893
	AMEND & RESUBMIT	by
		Date 6-2-87

GCG DILLON CONSULTING LIMITED

PROJECT No. 85-4506

HORTON CBI, LIMITED

PL DETAILS FOR ISOLATION VALVE ENCLOSURE
70'ϕ x 36' HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOVT. OF N.W.T.
GRISE FIORD ~ N.W.T.

PURCHASER'S NO.
DRAWN BY DATE 6-16-86
CHECKED BY DATE 6-19-86
ENGINEERING
CO-ORDINATOR RLH

CONTRACT NO. H60729
DWG. NO. 18
REV 0

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REVISIONS	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE

T19-Z

PLANS MADE AT FORT ERIE

SHIP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	WT.
1	A29-A		SCAFFOLD CABLE SUPPORT				9
	A29-1	1	CAP PL 8 Φ x 1/4			A283-C	4
			C/F 8 1/4 x 0'-8 1/4				
	A29-2	1	PC 4 Φ SCH 40 PIPE PBE	0	5 3/4	A53	5
1	A29-3		REINF PL 9 O.D. x 3/8 x 5 1/4 I.D.			A283-C	5
			C/F 9 1/4 x 0'-9 1/4				

SHOP DRAWING REVIEW

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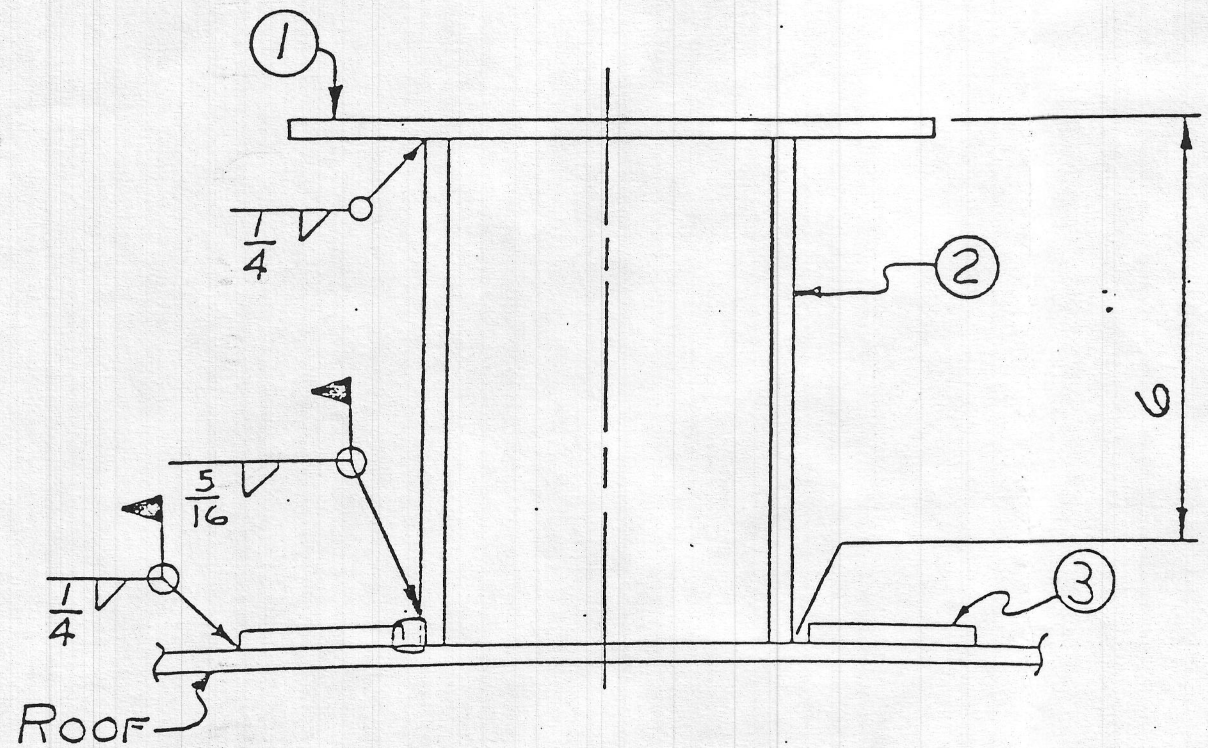
✓	NO COMMENT	Submission No.	2
	SEE COMMENTS	Project No.	9393
	AMEND & RESUBMIT	By	DCA / WWL
		Date	6-2-87

GCG DILLON CONSULTING LIMITED

CON'T H60729

FC 6.9.86 RLH



INDICATES CHANGE FROM PREVIOUS ISSUE

FORMERLY GM39-1

By	Chkd	Date	Remarks
TFT	FBF (2)	9-12-78	REVISED FIELD WELD SYMBOL
RJS	AJO (1)	10-9-70	INCREASE CAP PL TO 8 Φ

Revisions

Chicago Bridge & Iron Company (CBI)

SCAFFOLD CABLE SUPPORT

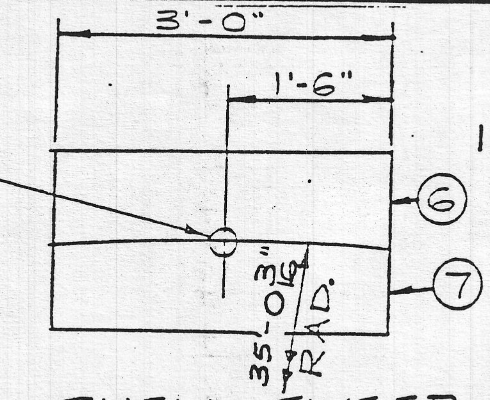
By RNM Chkd FBF Date 9-2-66

Approved By AJO Date 9-13-78

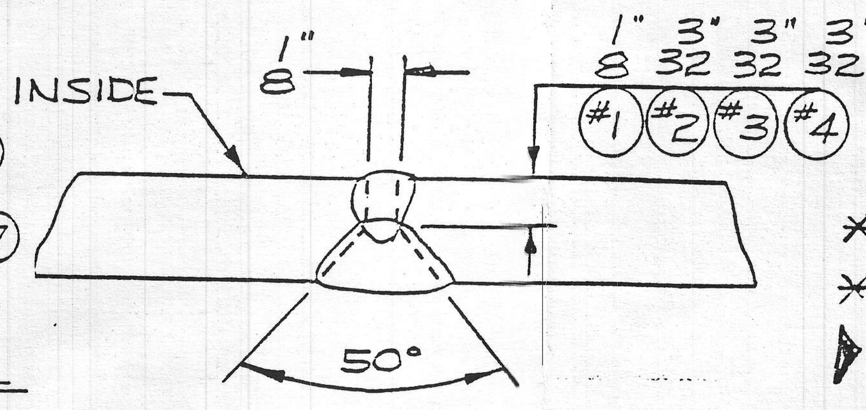
Standard Drawing No. A29-2

DR 73 OB

T21-2



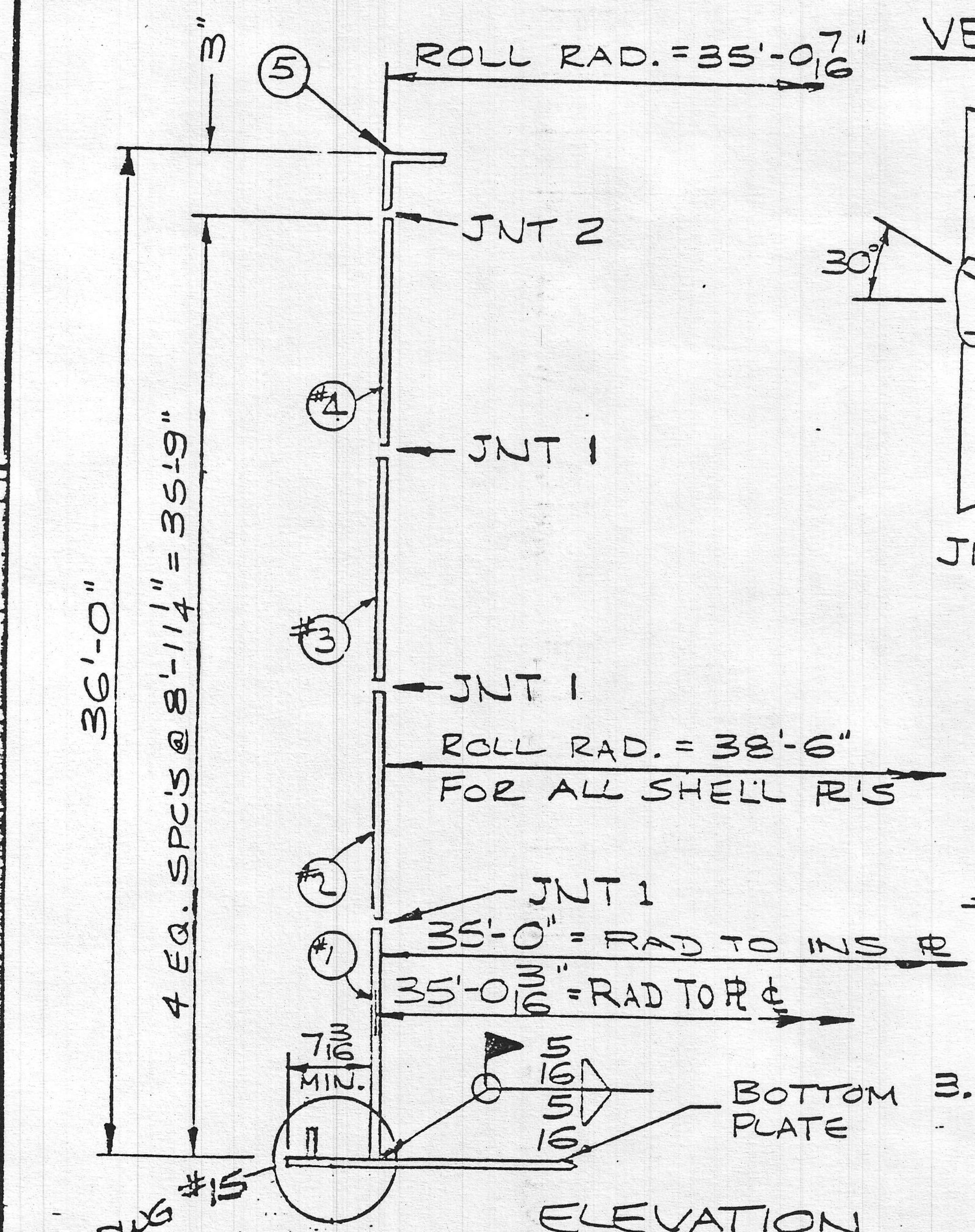
SHELL SWEEP



VERTICAL JOINTS

Ship Pc	Mark	Assn. Pc	Description	Length Ft	Length In.	Spec
7	#1		℞ 107 1/4" x .355 ROLL	31	5 1/16	A36
7	#2		℞ 107 1/4" x .267 ROLL	31	5 1/16	A36
* 7	#3		℞ 107 1/4" x 1/4" ROLL	31	5 1/16	A36
* 7	#4		℞ 107 1/4" x 1/4" ROLL	31	5 1/16	A36
1	50-5		RUN L 3x3x3/8" ROLL BBE W/EDGE PREP.	222	0	G40.21 44W
2	50-6		SHELL SWEEP (OUT.)	3	0	WOOD
2	50-7		SHELL SWEEP (INS)	3	0	WOOD

* THESE SHELL ℞S THEORETICALLY IDENTICAL

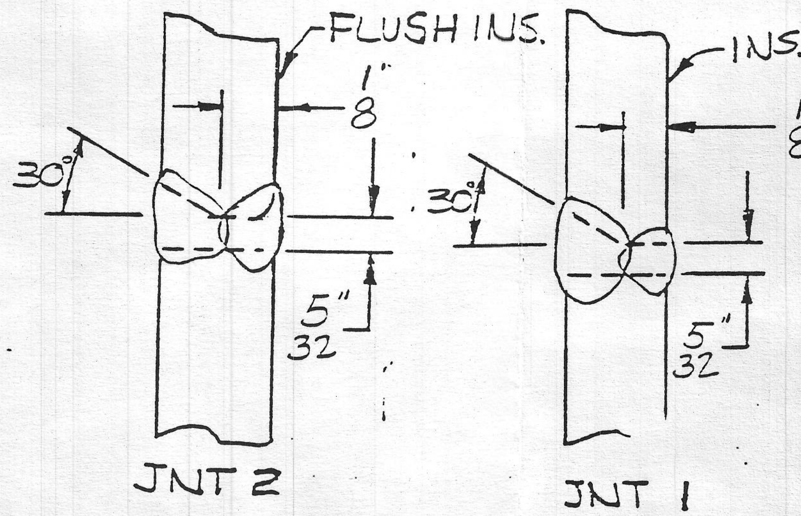


ELEVATION

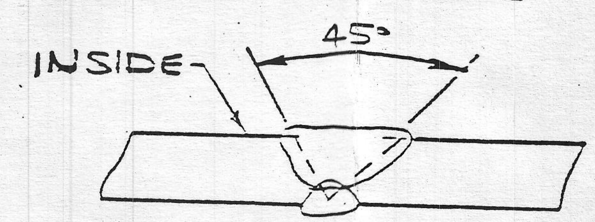
ALL ℞s ₵ STACKED

OUTS CIRC ON 1ST RING = 220'-1$\frac{5}{32}$"

OUTS CIRC ON TOP RING = 220'-0$\frac{27}{32}$"

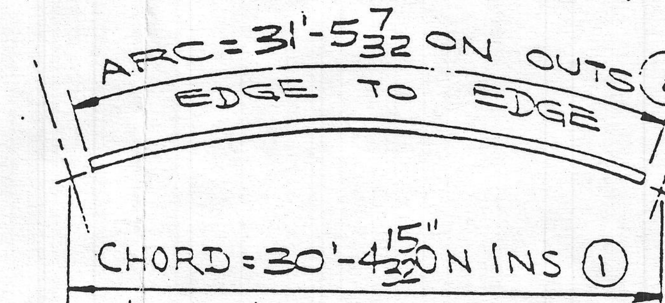


GIRTH JOINTS



TYPICAL SPLICE IN 5

(BOTH LEGS)



₵ TO ₵ OF VERTS

SHOP DRAWING REVIEW

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NO COMMENT ✓ — SEE COMMENTS — AMEND & RESUBMIT

Submittal No. 1 — Project No. 9893 — By — Date 7-2-87

GCG DILLON CONSULTING LIMITED

GENERAL NOTES

BILLED PLATE LENGTHS ARE FINISHED LENGTHS $\frac{3}{32}$" SHORTER THAN THEORETICAL LENGTHS.

SHOP PUNCH-MARK INSIDE TOP EDGE OF PLATES 10'-6" FROM EACH END. FOR ℞'S 1 THRU. 4

GENERAL NOTES (CONT'D)

3. SHOP TO COAT ALL PLATE EDGES WITH DI-OXALLIMINATE IMMEDIATELY AFTER REMOVING SCALE FOLLOWING BURNING. MUST BE APPLIED TO CLEAN, DRY SURFACES.

Indicates change from previous issue

Revisions	By	Chkd	Date	Remarks
1	TY	FR	6/17/86	REVISE GIRTH JTS FOR E7018 ELECTRODE (HIGH STRENGTH)
2	TY	UX	7.10.86	ADDED W/EDGE PREP TO 50-5 (ANGLE)

Chicago Bridge & Iron Company CBI

SHELL DETAILS
70'-0"ϕ x 36'-0" CONE ROOF TANK.

Purchaser's No. ____

By TDY Chkd FR Date 06/9/86

R.L.H. Engineering Supervisor

Contract No. H60729

Dwg 50 Rev 2

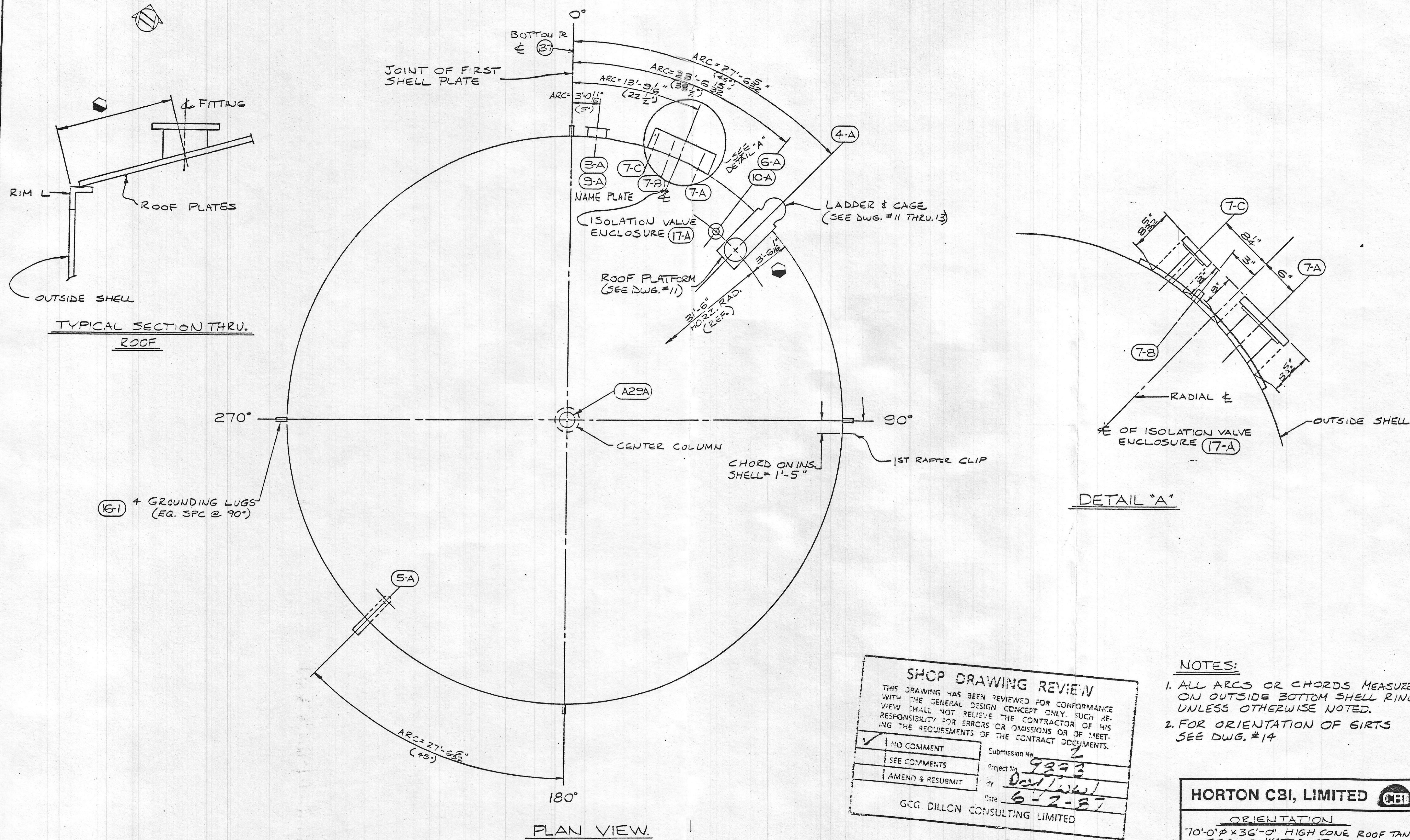
3000-13-1

DR 210 REV APR 77

By.	Chkd	Date		By	Chkd	Date	Approved	Date
ED	LK	9-6-78	1	F.S.	FBF	4-27-79	AJTO	5-1-79

Standard Form Drawing No. 3000-13-1

T22



SHOP DRAWING REVIEW

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✓ NO COMMENT	Submission No. 2
SEE COMMENTS	Project No. 9223
AMEND & RESUBMIT	By [signature]
	Date 6-2-87

GCG DILLON CONSULTING LIMITED

PROJECT NO. 85-4506

NOTES:

1. ALL ARCS OR CHORDS MEASURED ON OUTSIDE BOTTOM SHELL RING UNLESS OTHERWISE NOTED.
2. FOR ORIENTATION OF GIRTS SEE DWG. #14

HORTON CBI, LIMITED

ORIENTATION

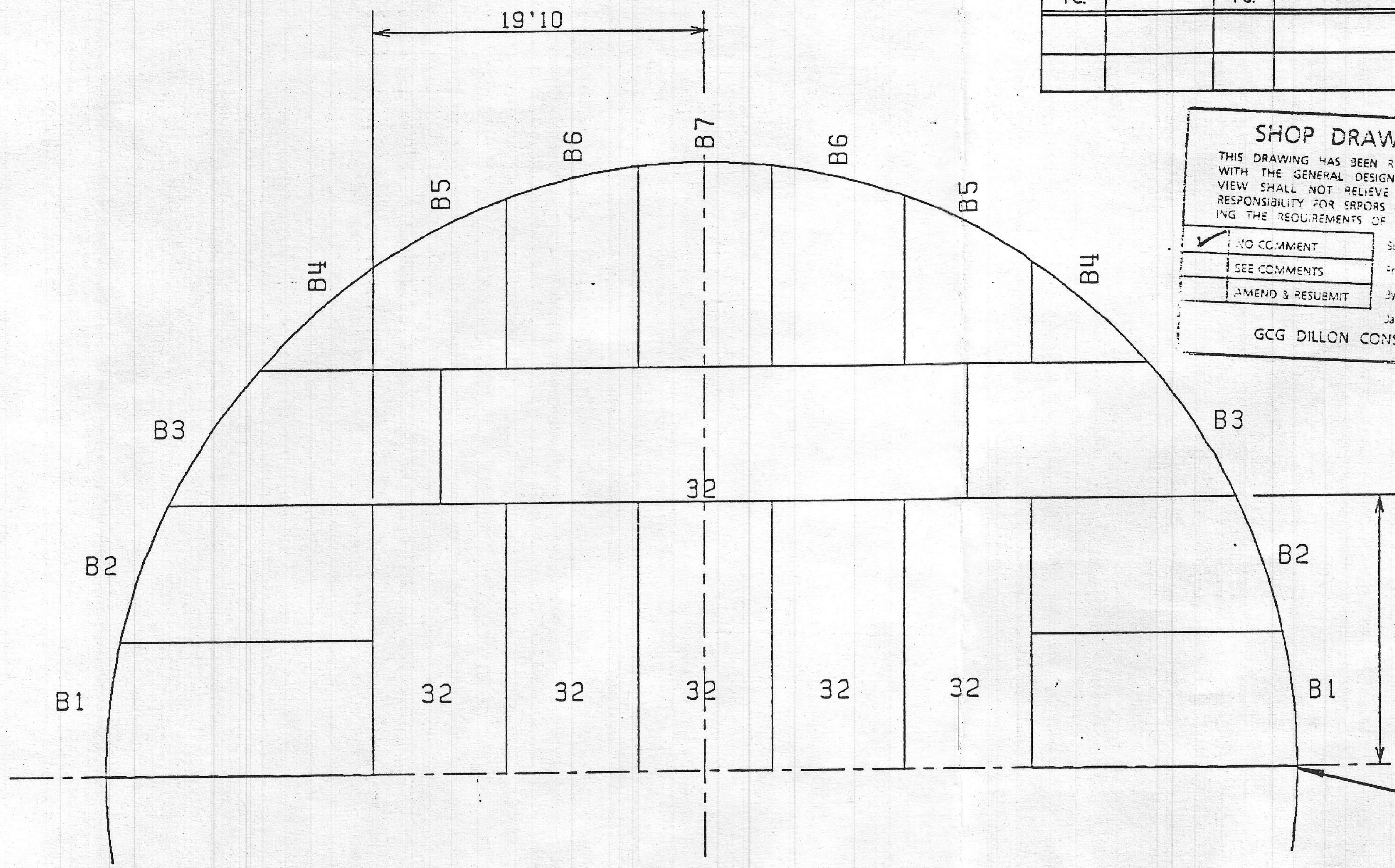
70'-0"Ø x 36'-0" HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOVT. OF N.W.T
GRISE FIORD ~ N.W.T

PURCHASER'S NO.	CONTRACT NO. H60729
DRAWN BY TDY DATE 06/12/86	
CHECKED BY [initials] DATE 6-18-86	
ENGINEERING [signature] 6/18/86	
CO-ORDINATOR R.LH	DWG. NO. 2 REV 0

REVISIONS	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE

PLANS MADE AT FORT ERIE

SHIP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	WT.



SYMMETRICAL ABOUT ℄

BURN & TAN RAD= 35'8 5/8

HALF PLAN OF BOTTOM
ALL LAPS 1 INCH
662 FT OF 5/16 LAP WELD
DIMENSIONS ARE TO EDGE OF PLATE ON WHICH THEY APPEAR

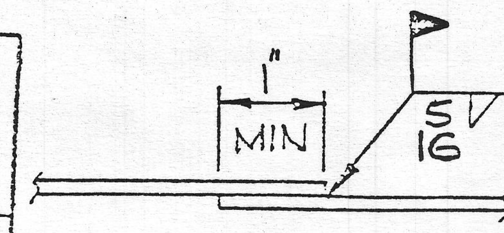
SHOP DRAWING REVIEW

THIS DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH THE GENERAL DESIGN CONCEPT ONLY. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS OR OMISSIONS OR OF MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

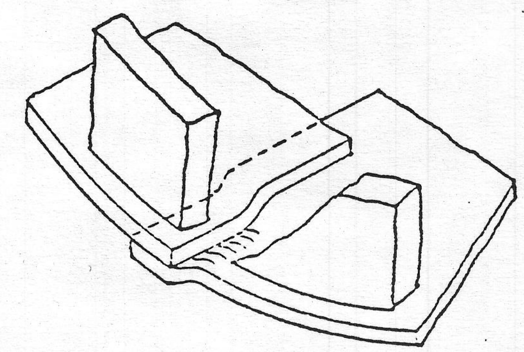
- ✓ NO COMMENT
- SEE COMMENTS
- AMEND & RESUBMIT

Submission No. 1
Project No. 9393
By D [illegible]
Date 6-2-87

GCG DILLON CONSULTING LIMITED



TYPICAL SECTION THRU LAP



BREAKDOWN LAP OF SKETCH PLATES

WORK THIS DWG. WITH DWG. #52

HORTON CBI, LIMITED

BOTTOM : LAYOUT
70'-0"φ X 36'-0" CONE ROOF TANK

PURCHASER'S NO.
DRAWN BY TDY DATE 6/9/86
CHECKED BY FP DATE 6.12.86
ENGINEERING [illegible] 6/12/86
CO-ORDINATOR R.L.H

CONTRACT NO. H60729

DWG. NO. 51 REV 0

REVISIONS	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE

T23

PLAN MADE AT FORT ERIE

SHIP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	WT.
7	32		PL. 96 × 5/16"	31	9	A36	22669
4	B1		PL. SK × 5/16"			A36	6393
4	B2		PL. SK. × 5/16"			A36	5648
4	B3		PL. SK × 5/16"			A36	5633
4	B4		PL. SK × 5/16"			A36	1167
4	B5		PL. SK × 5/16"			A36	3346
4	B6		PL. SK × 5/16"			A36	4503
2	B7		PL. SK × 5/16"			A36	2434

SHOP DRAWING REVIEW

THIS DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH THE GENERAL DESIGN CONCEPT ONLY. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS OR OMISSIONS OR OF MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

- ✓ NO COMMENT
- SEE COMMENTS
- AMEND & RESUBMIT

Submission No. 1
Project No. 9333
By
Date 6-2-87

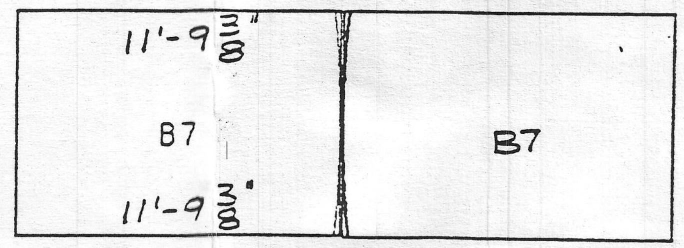
GCG DILLON CONSULTING LIMITED

PL 96" × 5/16" × 27'-11"

2 REQD

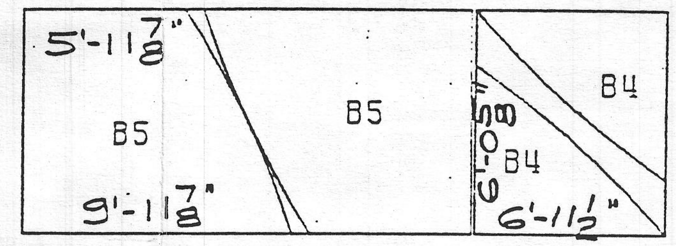
PL 96" × 5/16" × 31'-6 3/8"

2 REQD



PL 96" × 5/16" × 24'-1"

1 REQD

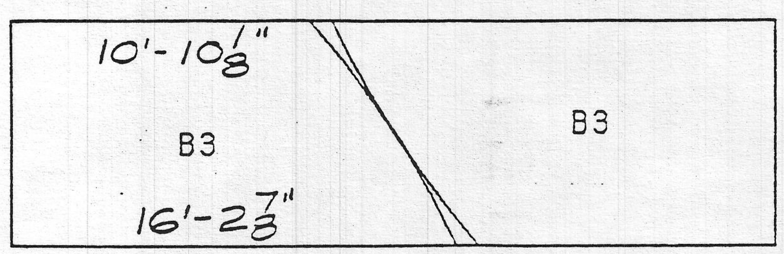


PL 96" × 5/16" × 23'-8 1/8"

2 REQD

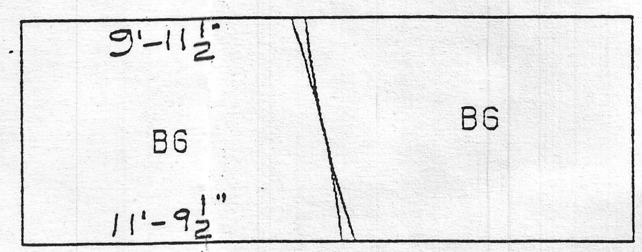
BURN RADIUS = 35'-8 5/8"

WORK THIS DWG. WITH DWG. #51



PL 96" × 5/16" × 27'-11"

2 REQD



PL 96' × 5/16" × 22'-3 1/8"

2 REQD

HORTON CBI, LIMITED CBI

BOTTOM : SKETCHES
70'-0"Ø × 36'-0" CONE ROOF TK.

PURCHASER'S NO.
DRAWN BY TDY DATE 6/9/86
CHECKED BY FZ DATE 6/12/86
ENGINEERING [illegible] 6/12/86
CO-ORDINATOR R.LH

CONTRACT NO. H60729

DWG. NO. 52 REV 0

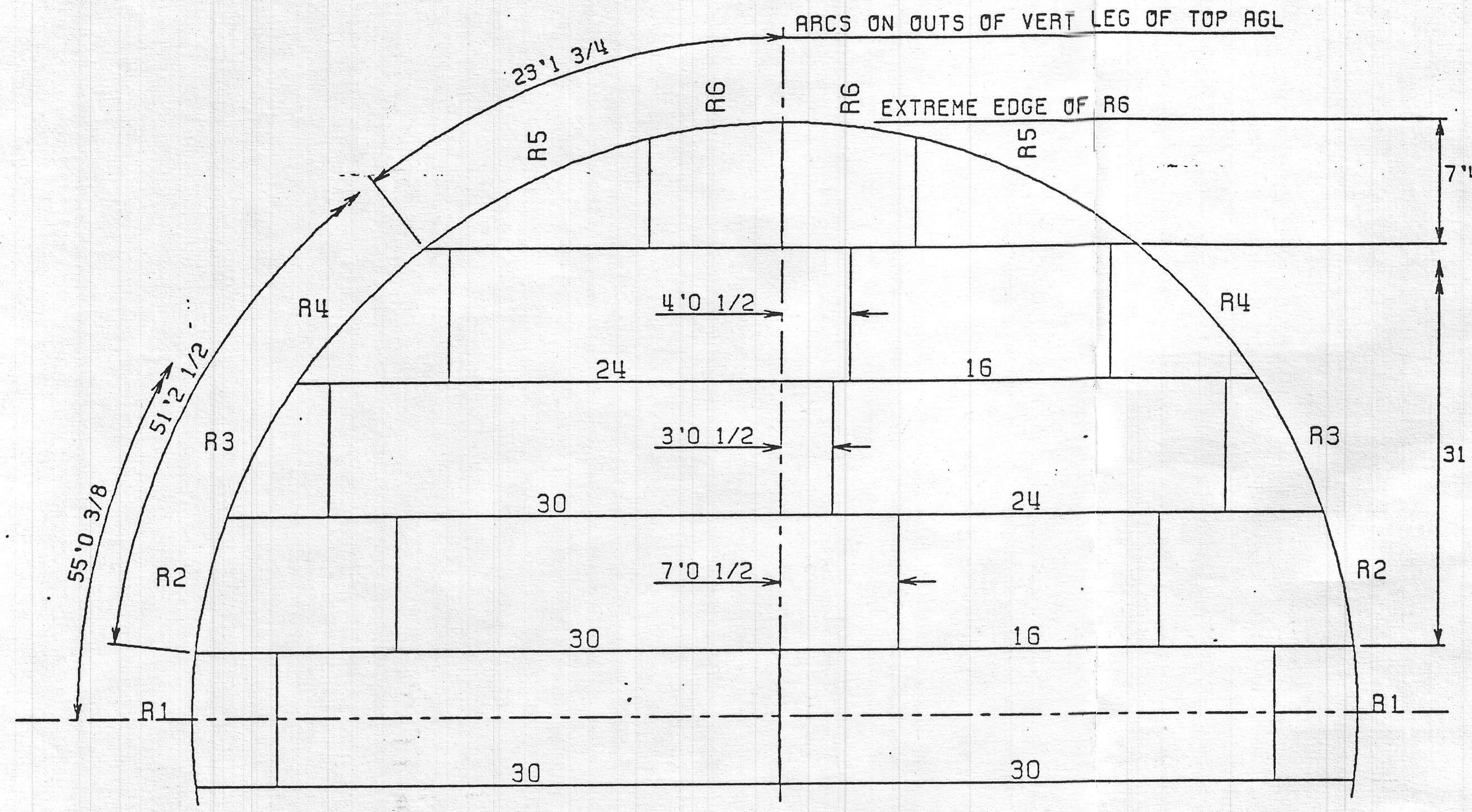
REVISIONS

BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE

T24

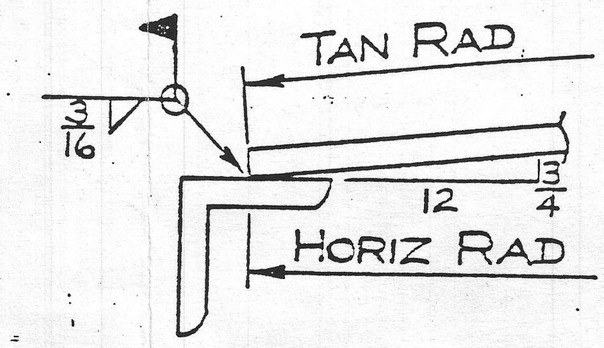
PLAN MADE AT FORT ERIE

SHIP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	WT.

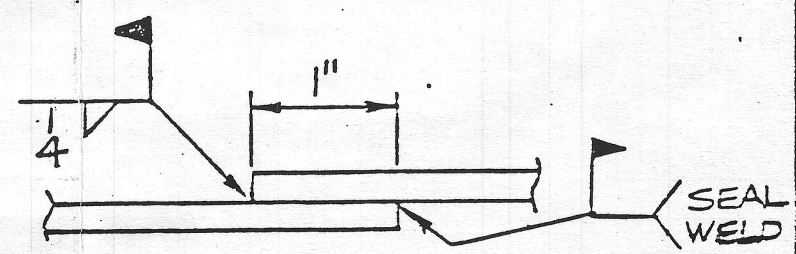


BURN & TAN RAD= 35'0
HORIZONTAL RAD= 34'11 1/4

HALF PLAN OF ROOF
ROOF SLOPE=3/4 :12
ALL LAPS 1 INCH
682 FT OF 1/4 LAP WELD (PLATES TOGETHER)
219 FT OF 3/16 LAP WELD (ROOF TO TOP ANGLE)
LAP DOWN TOWARD OUTS OF ROOF
DIMENSIONS ARE TO EDGE OF PLATE
ON WHICH THEY APPEAR



SECTION THRU TOP ANGLE



TYPICAL SECTION THRU. LAP

WORK THIS DWG. WITH DWG. # 54

SHOP DRAWING REVIEW

THIS DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH THE GENERAL DESIGN CONCEPT ONLY. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS OR OMISSIONS OR OF MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

- ✓ NO COMMENT
- SEE COMMENTS
- AMEND & RESUBMIT

Submission No 1
Project No 9393
By DCN / WWL
Date 6-2-87

GCG DILLON CONSULTING LIMITED

REVISIONS	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE

HORTON CBI, LIMITED

ROOF: LAYOUT
70'-0" ⌀ X 36'-0" CONE ROOF TANK

PURCHASER'S NO.
DRAWN BY IDT DATE 6/9/86
CHECKED BY FE DATE 6.12.86
ENGINEERING 6/12/86
CO-ORDINATOR RLH

CONTRACT NO. H60729

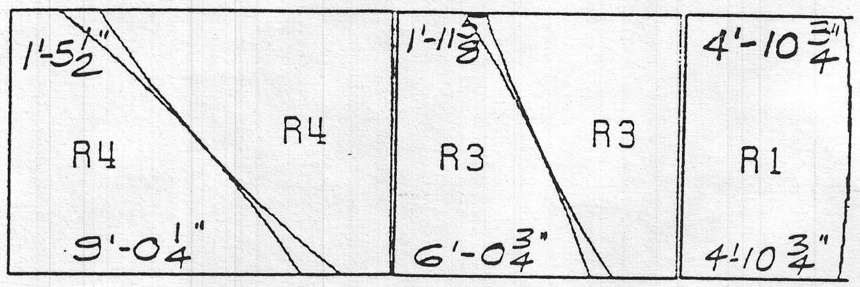
DWG. NO. 53 REV 0

T25

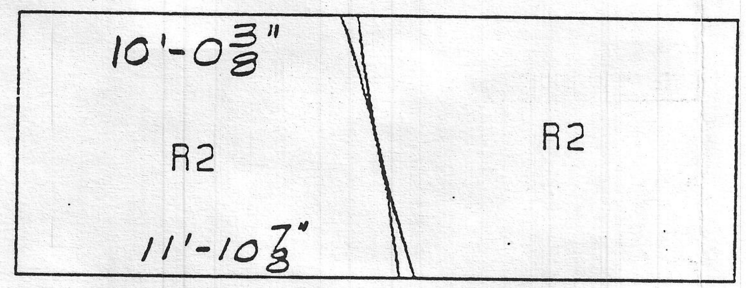
PLAN MADE AT FORT ERIE

SHIP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	WT.
6	30		PL. 96" x 1/4"	30	0	A36	14688
4	24		PL. 96" x 1/4"	24	0	A36	7833
4	16		PL 96" x 1/4"	16	0	A36	5222
2	R1		PL SK. x 1/4"			A36	824
4	R2		PL SK. x 1/4"			A36	3635
4	R3		PL SK. x 1/4"			A36	1331
4	R4		PL SK. x 1/4"			A36	1840
4	R5		PL SK. x 1/4"			A36	2114
4	R6		PL SK. x 1/4"			A36	2295

BURN RADIUS = 35'-0"



PL 96 x 1/4" x 25'-8"
2 REQ'D



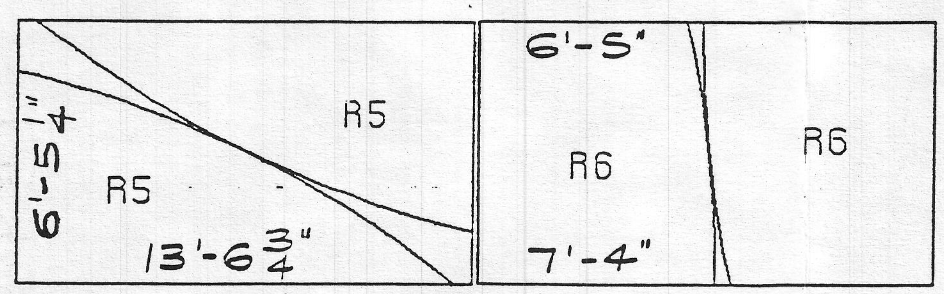
PL 96" x 1/4" x 22'-5 3/4"
2 REQ'D

SHOP DRAWING REVIEW

THIS DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH THE GENERAL DESIGN CONCEPT ONLY. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS OR OMISSIONS OR OF MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

✓	NO COMMENT	Submission No.	1
	SEE COMMENTS	Project No.	9373
	AMEND & RESUBMIT	By	[illegible]
		Date	3-3-87

GCG DILLON CONSULTING LIMITED



PL 96" x 1/4" x 28'-5 1/4"
2 REQ'D

WORK THIS DWG. WITH DWG #53

HORTON CBI, LIMITED

ROOF: SKETCHES
70'-0" ø 36'-0" CONE ROOF TANK.

PURCHASER'S NO.
DRAWN BY TDY DATE 6/9/86
CHECKED BY FR DATE 6.12.86
ENGINEERING [illegible] 6/12/86
CO-ORDINATOR RLH

CONTRACT NO. H60729

DWG. NO. 54 REV 0

REVISIONS BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE

T26

PLAN MADE AT FORT ERIE

SHIP PC	MARK	ASSM. PC	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.
1	1648-3		TOP RING (BILL COMPLETE			
			FROM STD DWG 1648)			
35	FR1-1		25K X 1/4 (9 FR 3 1/2 x 17")			A283c
4			1 1/4" HVY HEX BOLT & HVY HEX NUT	0	3 1/4	(3)
32	1R		C 10 x 15.3	31	2 1/3	G40.21-44W
3	1RA		C 10 x 15.3	32	10 1/2	G40.21-44W
7	55-2		BAR 3 x 3/8	18	7	A36
1	55-1A		L 3 1/2 x 3 1/2 x 1/4	20	11 1/4	G40.21-44W

(3)-BOLTS-A307B, NUTS-A563A

SHOP DRAWING REVIEW

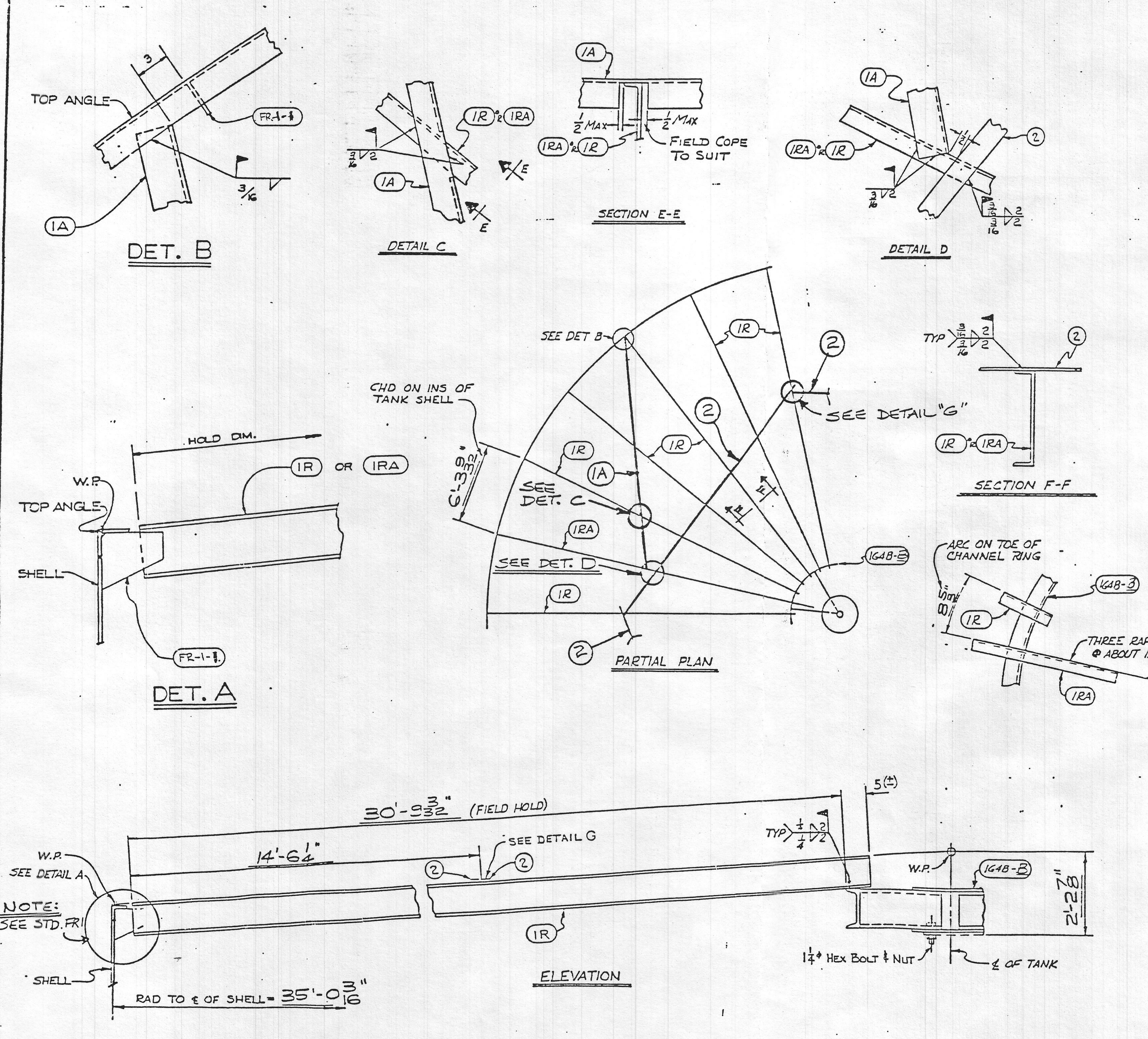
THIS DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH THE GENERAL DESIGN CONCEPT ONLY. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS OR OMISSIONS OR OF MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

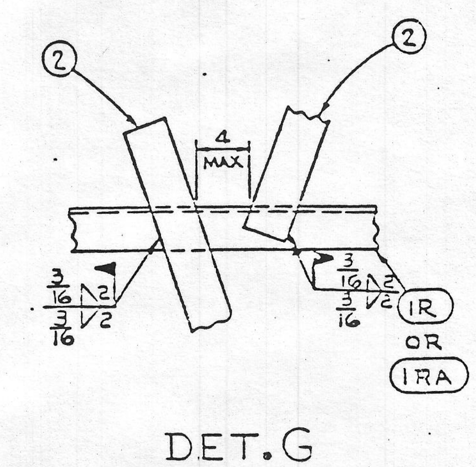
✓	NO COMMENT	Submission No.	1
	SEE COMMENTS	Project No.	9893
	AMEND & RESUBMIT	By	[illegible]
		Date	6-2-87

GCG DILLON CONSULTING LIMITED

NOTE

1. SEE COLUMN DWG FOR REMAINDER OF FRAMING.
2. SEE GENERAL PLAN OR ORIENTATION DWG FOR START OF FRAMING.
3. DIAGONAL BRACE MUST BE IN PLACE BEFORE INSTALLING LATERAL BRACES.





By	Chk'd	Date	By	Chk'd	Date	By	Chk'd	Date
CML	F.E.F	6-26-77	3	ST KL	3-25-85		ROR	11-18-85

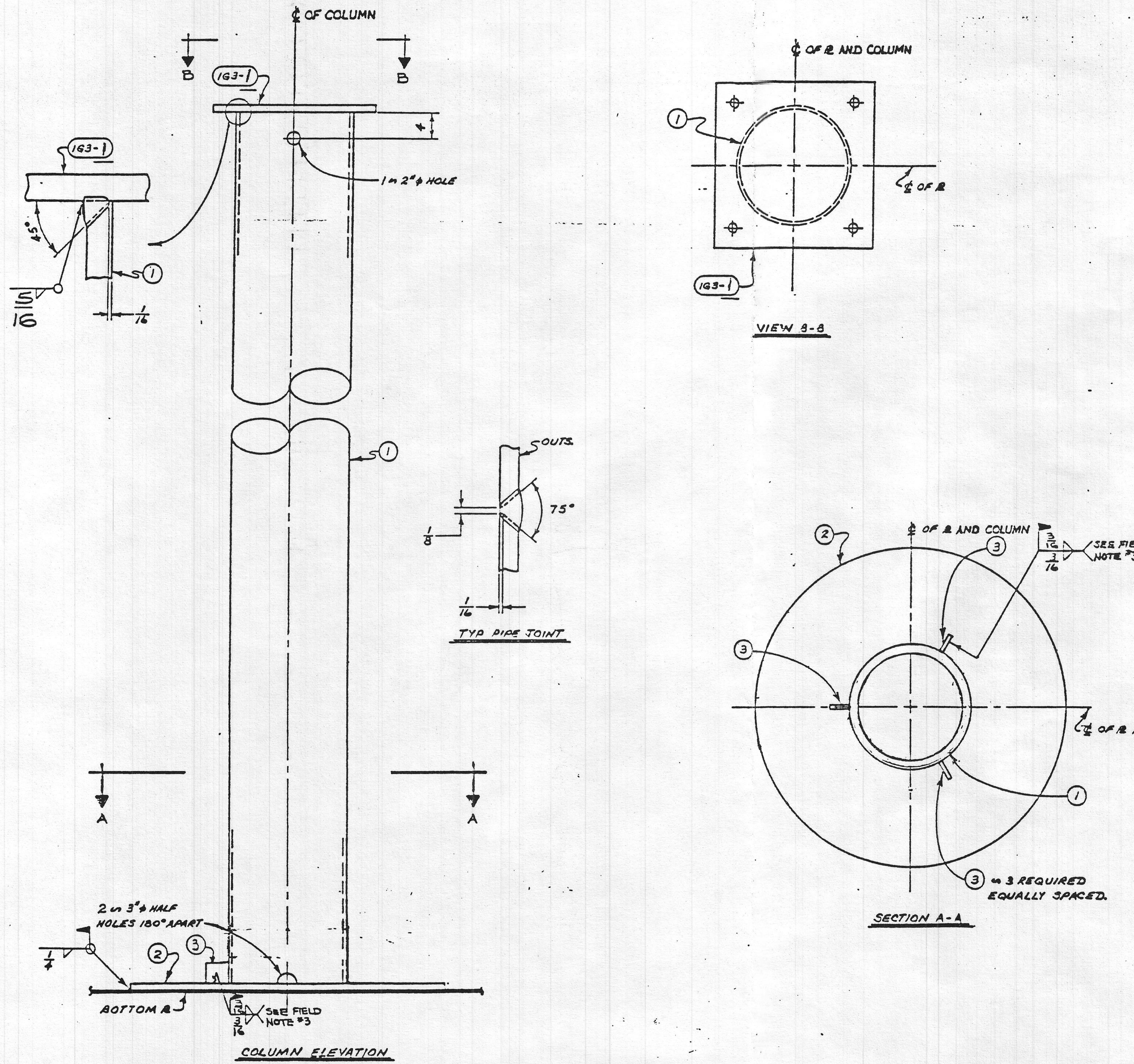
Standard Form Drawing No. 3310-12-3

Chicago Bridge & Iron Company CBI

CONE ROOF FRAMING
FOR 70'-0"ø TANK
3/4:12 ROOF SLOPE.

By TDY Chk'd [illegible] Date 06/1985
RLA
Contract No. H60729
Dwg. 55 Rev. 0

T27



SHP NO.	MARK	ASSM NO.	DESCRIPTION	LENGTH FT	LENGTH IN	SPEC
1	1C		CENTER COLUMN			
	56-1	1	16φ SCH. 20 PIPE	35	9 7/8	A53-B
			BOC SKOE			
	163-1	1	℞ 25 x 1 1/8"	2	1	A283-C
1	56-2		℞ 56"φ x 1 1/4"			A283-C
3	56-3		BAR 3 x 1/2	0	3	A36

SHOP NOTE:

1) ENDS OF COLUMN MUST BE FLUSH & SMOOTH.

2) IF COLUMN IS SHIPPED IN TWO (2) PIECES, WIRE SECTIONS TOGETHER FOR SHIPMENT.

FIELD NOTE:

3) DO NOT WELD 3 TO 1

SHOP DRAWING REVIEW

THIS DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH THE GENERAL DESIGN CONCEPT ONLY. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS OR OMISSIONS OR OF MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

✓	NO COMMENT	Submission No.	1
	SEE COMMENTS	Project No.	9393
	AMEND & RESUBMIT	By	DCM / [illegible]
		Date	6-2-87

GCG. DILLON CONSULTING LIMITED

By	Chkd	Date	Approved
DJS	3		
FBF			
10-11-77			
JDP			E?
FEF			
8-4-82			8-11-82

Standard Form Drawing No. 3310-6-3

▶ INDICATES CHANGE FROM PREVIOUS ISSUE

Chicago Bridge & Iron Company

16"φ CENTER COLUMN DETAILS

(PIPE SECTION W/BASE PLATE)

70'-0"φ x 36'-0" CRT.

Purchaser's No.

By JDY Chkd FC Date C6/11/86

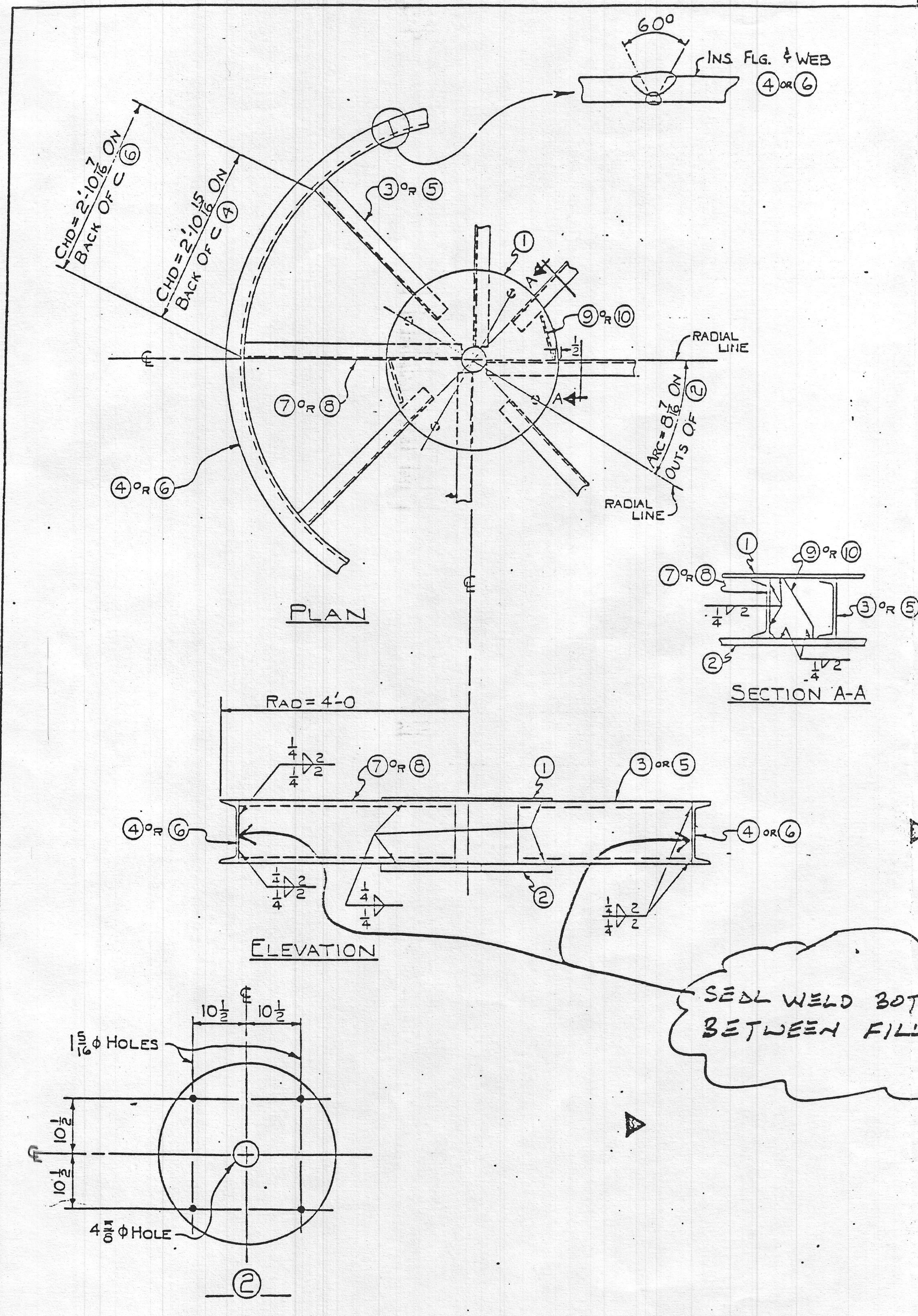
RLH

Contract No. H60729

Dwg. 56 Rev. 0

3310-6-3

T28



SHOP DRAWING REVIEW

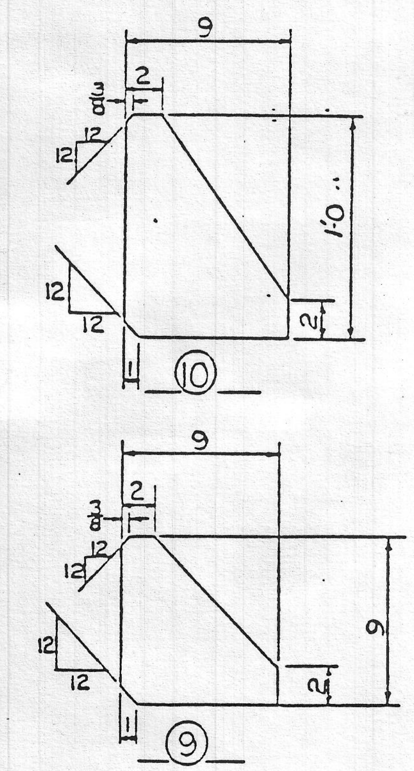
THIS DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH THE GENERAL DESIGN CONCEPT ONLY. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS OR OMISSIONS OR OF MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

	NO COMMENT	Submission No.	1
✓	SEE COMMENTS	Project No.	9893
	AMEND & RESUBMIT	By	PCN / WWL
		Date	6-2-87

GCG DILLON CONSULTING LIMITED

USE →

SHIP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	WT.
1	IG4B-B		"12" CHANNEL TOP RING				1312
	IG4B-1	1	PL 34 OD x 1/4 x 4 5/8 ID			A283C	63
	IG4B-2	1	PL 34 OD x 3/4 x 4 5/8 ID			A283C	189
	IG4B-5	4	C12 x 20.7	3	2	A36	262
	IG4B-8	4	Do.	3	6 5/8	A36	294
	IG4B-6	1	Do. BBE FIN	23	8 11/16	A36	491
			FIN ON RAD = 3'-9 5/16 SHR	25	9		
	IG4B-10	2	PLS SK x 5/16			A283C	13
			(CF PL 12 x 1'-0 3/8 C2)				



SHOP NOTE —

IG4B-4 AND IG4B-6 MAY BE MADE IN TWO PIECES IF DESIRED.

H60729
TDY 06/10/86
RLH
FC

T29

▷ INDICATES CHANGE FROM PREVIOUS ISSUE

Revisions	By	Chkd	Date
DELETED ALL DETAILS & BILLING CONTAINING SLIP PLS.	ST		3-25-85
SLOTTED HOLES IN (1) DIA. HOLES IN (2) SHOP TACK WELD...	AJC		7-14-76
CHANGED 7A19 TO MAR. 2 x 1/4 x 0'-2 NEW MK 13	FBF		8-12-76

Chicago Bridge & Iron Company

CENTER COLUMN TOP RING

FOR CONE ROOF FRAMING

By WEJ Chkd FBF Date 4-7-...

Approved By ROR Date 11-15-85

Standard Drawing No. IG4B-8

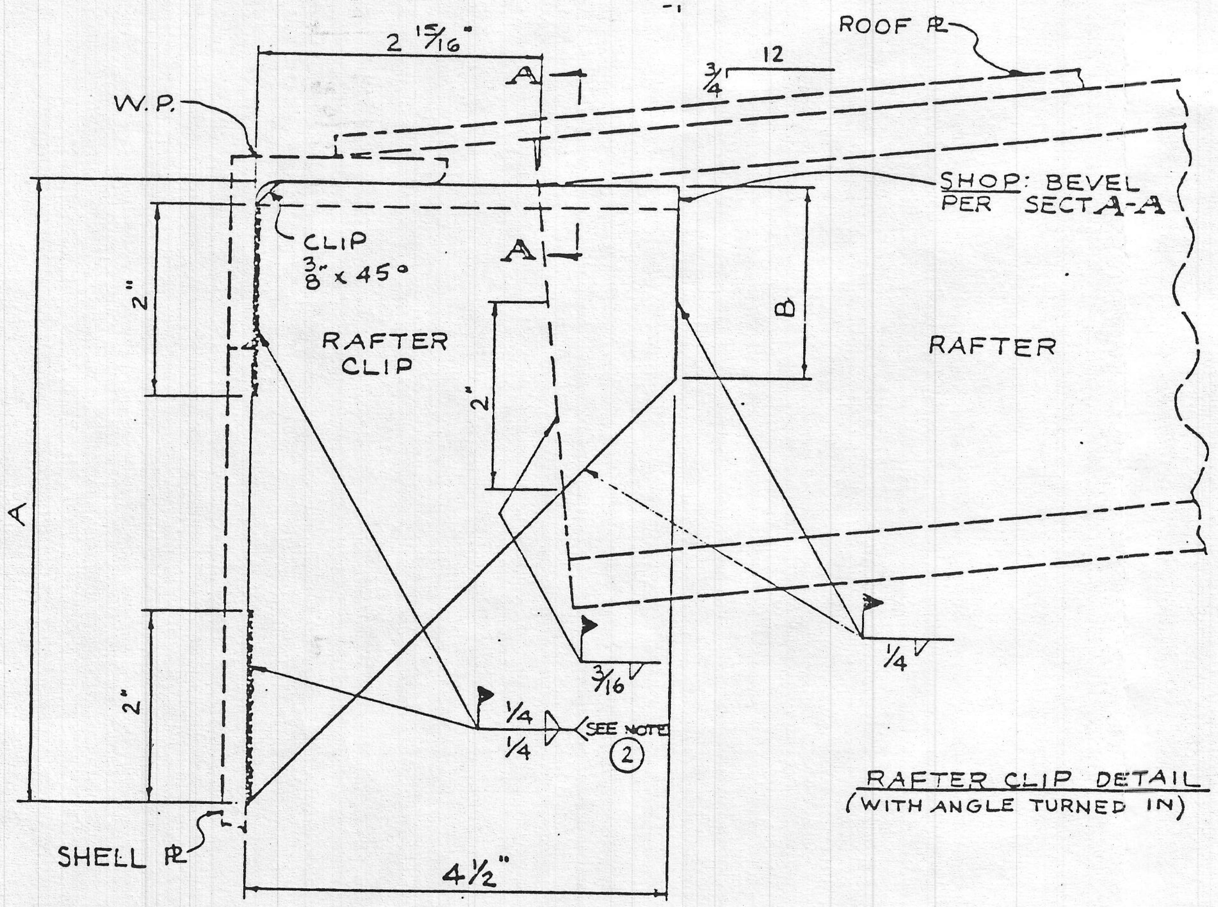
SHOP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	WT.
SEE BILLS	FR-1-[illegible]		℞ SK × ¼"			SEE BILLS	●
			(⁵⁄₈ ℞ 4½" × C ⁶⁄₂)				

USE →

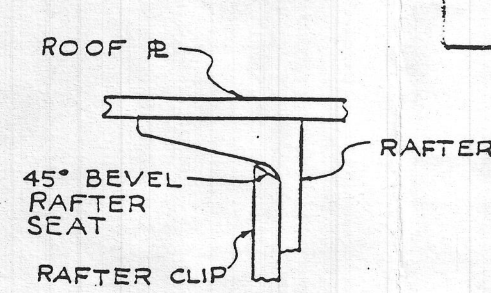
■	●	A	B	C	USE WITH
1	3	12"	7"	1'-7"	RAFTER DEPTH FROM 10" TO 12" INCLUSIVE
~~2~~	~~2.4~~	~~10"~~	~~5"~~	~~1'-3"~~	~~RAFTER DEPTH FROM 8" TO 9" INCLUSIVE~~
~~3~~	~~1.7~~	~~8"~~	~~2½"~~	~~10½"~~	~~RAFTER DEPTH FROM 6" TO 7" INCLUSIVE~~
~~4~~	~~1.1~~	~~6½~~	~~2"~~	~~8½"~~	~~RAFTER DEPTHS OF 5"~~

NOTE: (1) FOR 3" AND 4" DEEP RAFTERS LOCATE AND WELD BACK OF RAFTER TO CLIP.

USE THIS WELD → (2) FOR AWWA USE 3/16" FILLET WELD ALL AROUND SHELL CLIP.



RAFTER CLIP DETAIL
(WITH ANGLE TURNED IN)



SECTION A-A

SHOP DRAWING REVIEW

THIS DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH THE GENERAL DESIGN CONCEPT ONLY. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS OR OMISSIONS OR OF MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

NO COMMENT	Submission No. 1
✓ SEE COMMENTS	Project No. 9583
AMEND & RESUBMIT	By [illegible]
	Date 6-2-87

GCG DILLON CONSULTING LIMITED

T30

HORTON CBI, LIMITED

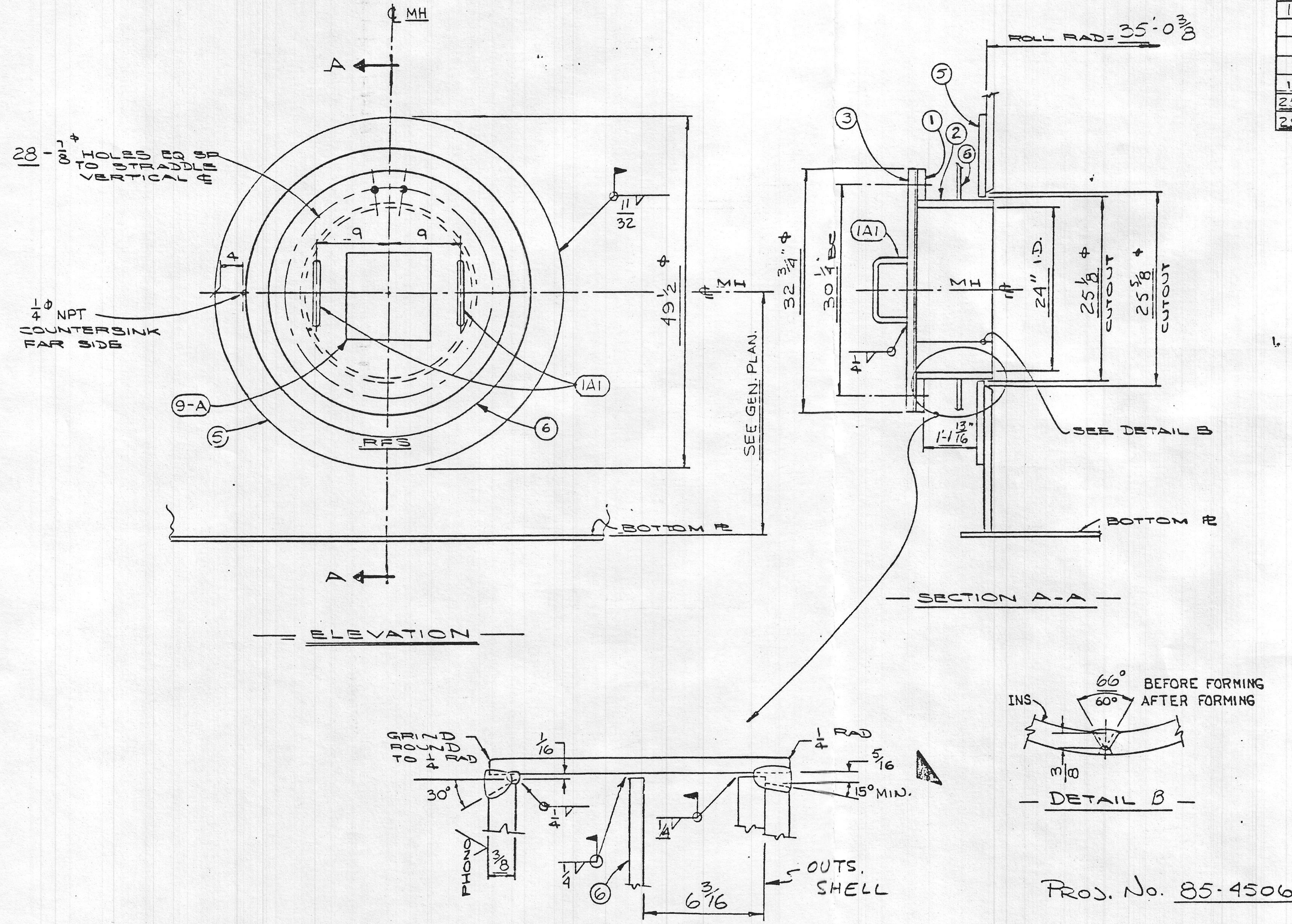
RAFTER TO SHELL CLIPS

70'-0"⌀ × 36'-0" CRT.

PURCHASER'S NO.	CONTRACT NO. H60729
DRAWN BY LSB DATE 09/07/79	
CHECKED BY P.HALL DATE 09/11/79	
ENGINEERING [illegible]	
CO-ORDINATOR ED HALL	DWG NO. FR-1 REV C

FORT ERIE ONT

SHIP PC	MARK	ASSM PC	DESCRIPTION	LENGTH FT	LENGTH IN	SPEC
1	3-A		24" ϕ SHELL MANHOLE			
	3-1	1	FLG ℞ 32¾ O.D. x ⅜(5/8) x 25⅓ I.D.			A36
	3-2	1	NECK ℞ 15" x ½ ROLL	6	5	A36
	9-A	1	NAME ℞ ASS'Y			
	3-3	1	COVER ℞ 32¾ ϕ x ½			A283-C
BOLT FOR SHIPMENT W/4 BOLTS						
	1A1	2	RODS ⅝ ϕ (BENT)	1	0	A36
1	3-5		℞ 49½ O.D. x .355 x 25⅓ I.D. ROLL			A36
1	3-6		℞ 45" O.D x ¼ x 25⅛ ID			A36
1	3-7		GASK. 29⅜ O.D x ⅛ x 24" I.D.			RED RUBBER
28			¾ ϕ HVY HEX HD BOLT	0	2¼	A307
29			¾ ϕ HVY HEX NUT			A563-A



GENERAL NOTES

1. LEAVE TELLTALE HOLE IN REINFORCING PLATE OPEN AFTER AIR TEST.

SHOP DRAWING REVIEW

THIS DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH THE GENERAL DESIGN CONCEPT ONLY. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS OR OMISSIONS OR OF MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

✓	NO COMMENT	Submission No.	2
	SEE COMMENTS	Project No.	9223
	AMEND & RESUBMIT	By	[illegible]
		Date	6-3-87

GCG DILLON CONSULTING LIMITED

PROJ. No. 85-4506

INDICATES CHANGE FROM PREVIOUS ISSUE

Chicago Bridge & Iron Company CBI

24 ϕ SHELL MANHOLE
70'-0 ϕ x 36'-0 HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOV'T OF N.W.T.
GRISE FIORD — N.W.T.

Remarks: ADDED 'MIN.'
Revisions: MSE [illegible] 11/20/[illegible]

Purchaser's No.
By DRB Chkd [illegible] Date 6/17/86
RLH
Engineering Supervisor
Contract No. H60729
Dwg. 3 Rev. 1

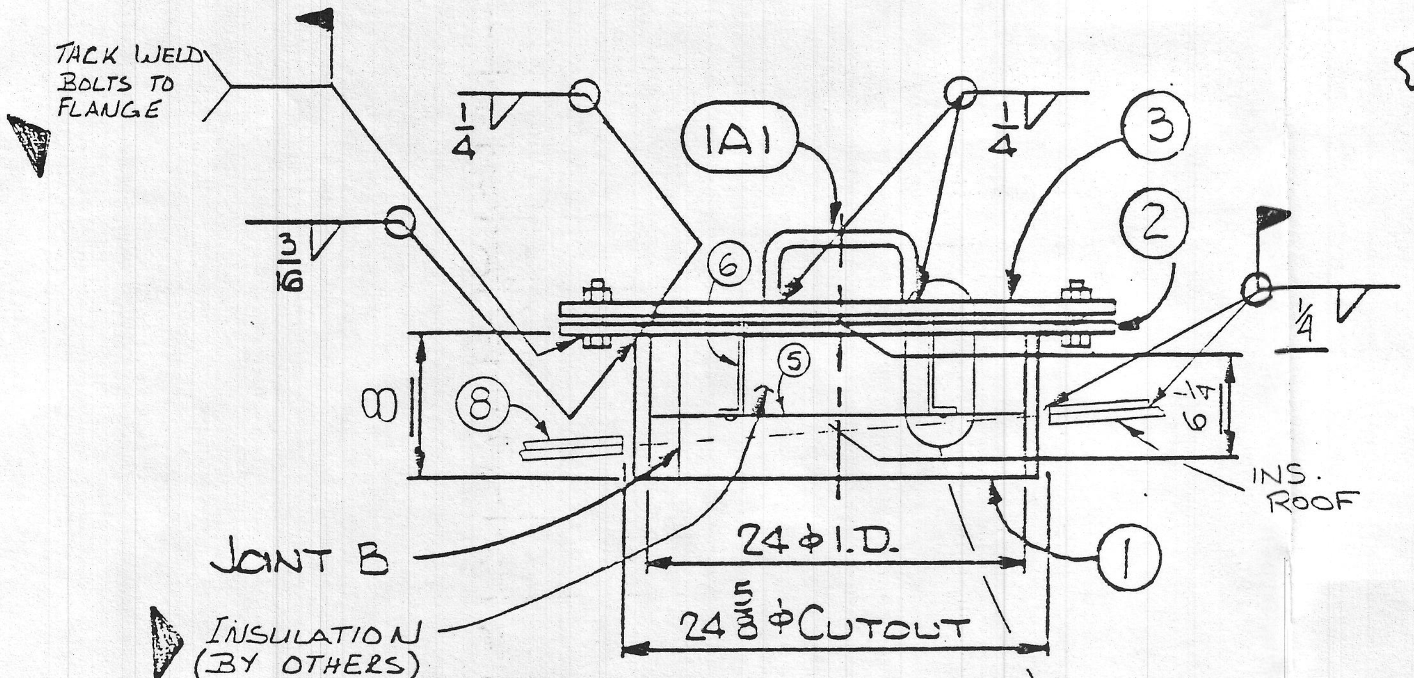
DR 272 [illegible] AUG 78

3000-B11-1

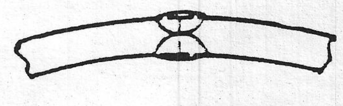
Standard Form Drawing No. 3000-B11-1

By	Chkd	Date	By	Chkd	Date
LK	FBF	3-28-80	JDP	EB	9-23-82
				Approved EB	9-23-82

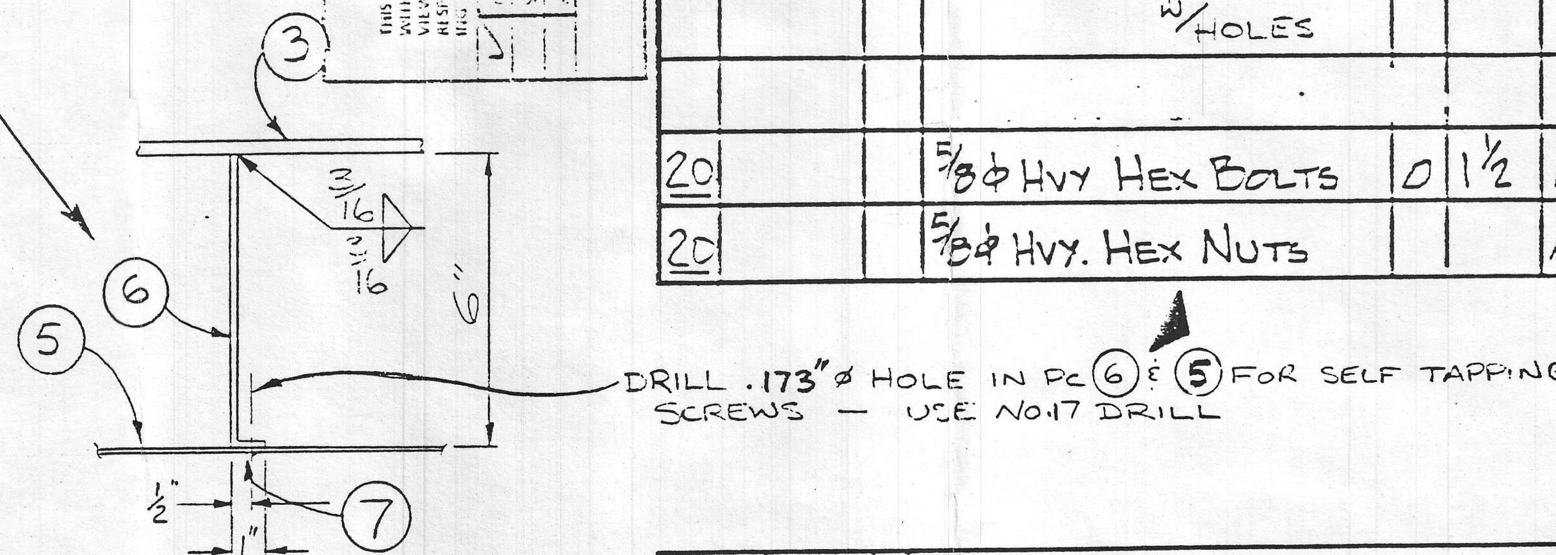
T3-2



SECTION A-A



JOINT B



SHOP DRAWING REVIEW

THIS DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH THE GENERAL DESIGN CONCEPT ONLY. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS OR OMISSIONS OR OF MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

NO COMMENT ✓ / SEE COMMENTS / AMEND & RESUBMIT

Submission No. 2

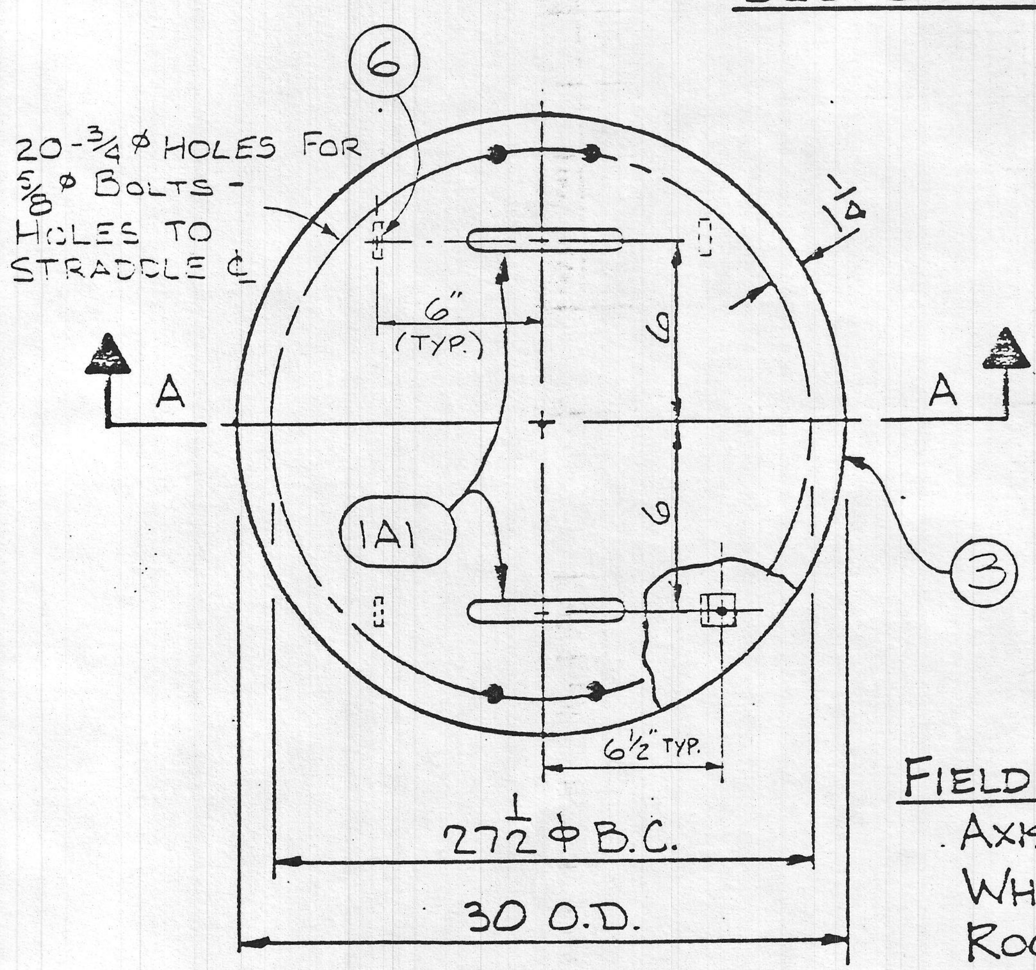
Project No. 2893

By

Date 2-2-87

GCG DILLON CONSULTING LIMITED

Ship Pc	Mark	Assm Pc	Description	Length Ft	Length In.	Spec
1	4-A		24 ϕ ROOF MANHOLE			
	4-1	1	NECK ℄ 8 × 1/4 (ROLL)	6	4 3/16	A36
	4-2	1	FLANGE ℄ 30 O.D. × 1/4 × 24 1/2 I.D.			A36
	4-3	1	COVER ℄ 30 ϕ × 1/4 (BOLT FOR SHIPMENT W/ 4 BOLTS)			A36
	IA1	2	HANDLES 5/8 ϕ ROD (BENT)	1	0	A36
	4-5	1	℄ 23 7/8 O.D. × 16 GA. W/ HOLES			GALV. STEEL
	4-6	4	BAR 1 × 1/4 BENT W/ HOLES	0	7	A36
	4-7	4	NO. 10 TYPE B HEX HD SELF TAPPING SCREWS	0	0 3/8	STEEL
1	4-8		REINF. ℄ 46" O.D. × 1/4 × 24 5/8" I.D.			A36
1	4-4		GASK. 30" O.D. × 1/8 × 24" I.D W/ HOLES			RED RUBBER
20			5/8 ϕ HVY HEX BOLTS	0	1 1/2	A307
20			5/8 ϕ HVY. HEX NUTS			A563A



PLAN VIEW

PROJ. NO. 85-4506

FIELD NOTES:

AXIS OF MANHOLE IS ALWAYS VERTICAL. WHEN LOCATING MANHOLE CUTOUT IN ROOF PLATES, AVOID THREE WAY LAPS.

Indicates change from previous issue

Revisions					
ADDED WELD & INSUL.	2	RLH	11/20/86		
REV. MARK	1	RLF	9/19/86		
Remarks		By / Chkd	Date	By / Chkd	Date

Chicago Bridge & Iron Company CBI

24" ϕ API 650 ROOF MANHOLE

70' ϕ × 36' HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOV'T N.W.T.
GRISE FIORD — N.W.T.

Purchaser's No.

By DRB Chkd Date 6/17/86

RLH

Engineering Supervisor

Contract No. H60729

Dwg 4 Rev 2

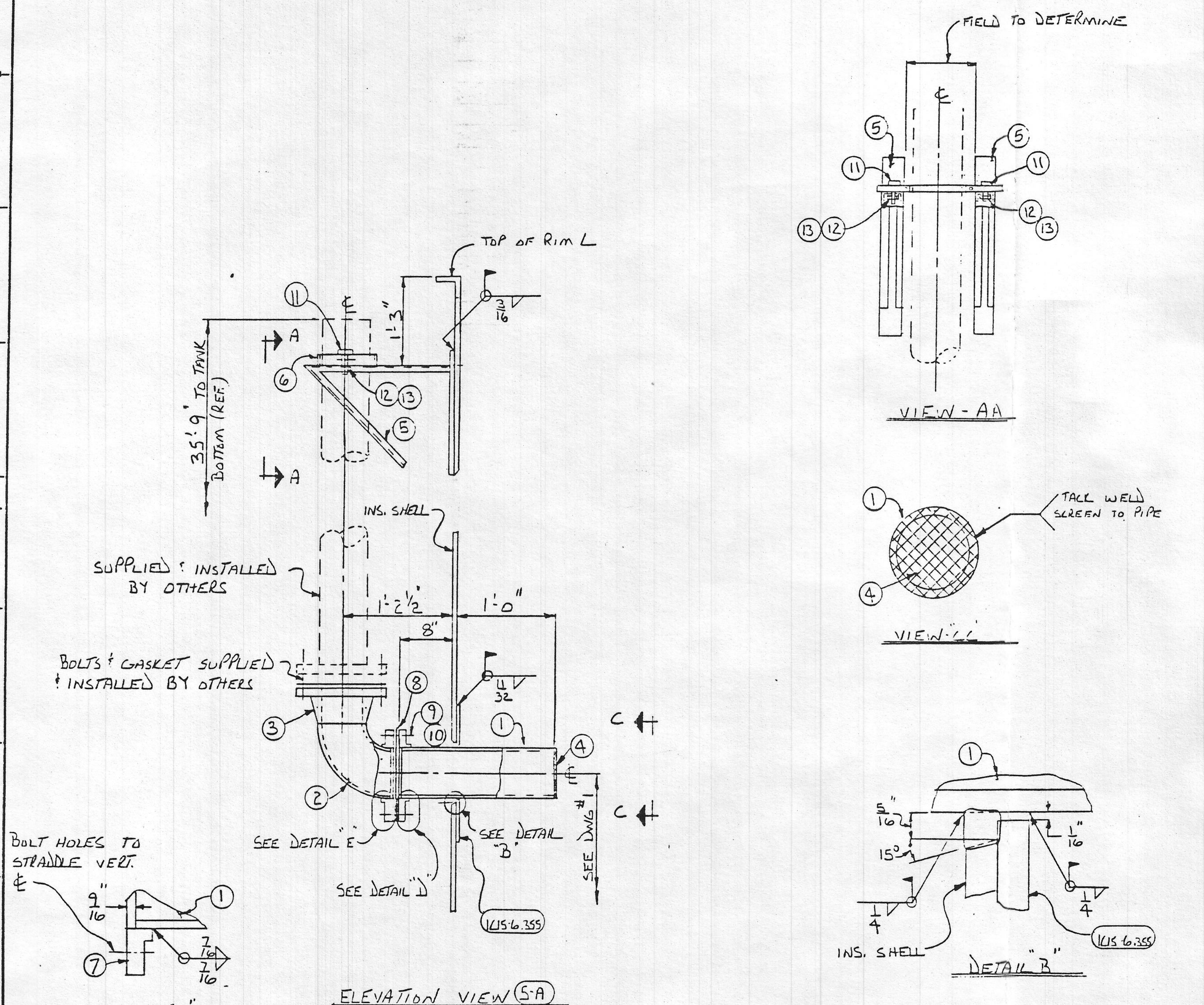
By	Chkd	Date	Appr	Date		By	Chkd	Date
MTE	FBF	3-16-81				JGH	FBF	9-3-81
						Approved EJB		9-15-81

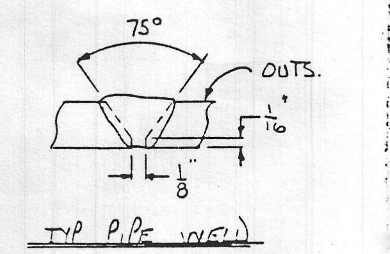
Form Drawing No. 3000-B29-1

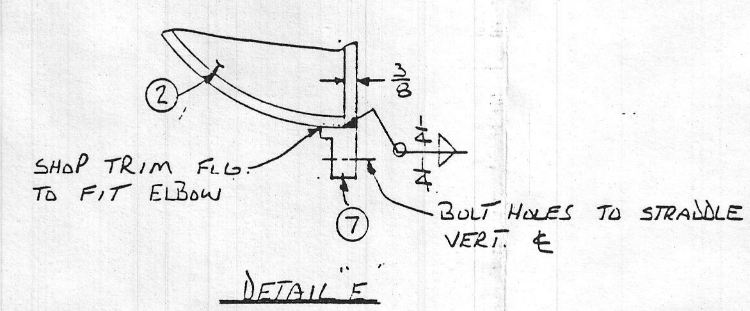
3000-B29-1

T4-Z

SHIP PC.	MARK	ASEM. PC.	DESCRIPTION	LENGTH FT	LENGTH IN.	SPEC.	WT
1	5-A		6"Φ SHELL NOZZLE				66
	5-1	1	6"Φ SCH 80 SMLS PIPE PBE	1	7 25/32	A53-B	47
	5-7	1	6"Φ 150# S.O FLG W/FF & D			A105	19
	5-4	1	6 5/8"Φ 1/2" SQ MESH SCREEN			C.S.	-
1	5-B		6" INTERNAL NOZZLE ASS'Y				60
	5-2	1	6"Φ SCH40 90° S.R WELD ELBOW			A234 ..PB	17
	5-3	1	6"Φ 150# W.N FLG W/SCH 40 BORE FF & D			A105	24
	5-7	1	6"Φ 150# S.O. FLG W/FF & D			A105	19
1	5-6		6"Φ RISER CLAMP W/BOLTS			C.S.	-
			GRINNELL FIG No. 261				
1	1C15-6(355)		REINF. PL. 15 3/4 O.D x .355 x 6 3/4 I.D			A36	16
			ROLL RAD = 35'-0 11/32				
2	5-5		HEAVY WELDED STEEL BRACKET			C.S	104
			GRINNELL FIG. 199				
			BRACKET No 1 W/NO HOLES				
8	5-9		3/4"Φ HEX HD BOLT	0	3	A307	5
8	5-10		3/4"Φ HVY HEX NUT			A563 A	1
1	5-8		6"Φ 150# ASA FULL FACE GASKET x 1/8			RED RUBBER	-
2	5-11		3/4"Φ T-BOLT	0	3	A307	-
2	5-12		3/4"Φ HVY HEX NUT			A563-A	-
2	5-13		3/4"Φ STD WASHER			C.S.	-







SHOP DRAWING REVIEW

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✓	NO COMMENT	Submission No	2
	SEE COMMENTS	Project No	9223
	AMEND & RESUBMIT	By	[illegible]
		Date	6-2-87

GCG DILLON CONSULTING LIMITED

GENERAL NOTES:

1. LEAVE TELLTALE HOLE IN REINFORCING PLATE OPEN AFTER AIR TEST

PROJECT No. 85-A506

HORTON CBI, LIMITED

6"Φ VENT/OVERFLOW NOZZLE
70'-0 Φ x 36'-0" HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOVT. OF N.W.T
GRISE FIORD — N.W.T

PURCHASER'S NO. ______
DRAWN BY FA DATE 6.9.86
CHECKED BY [illegible] DATE 6.18.86
ENGINEERING [illegible] 6/18/86
CO-ORDINATOR RLH

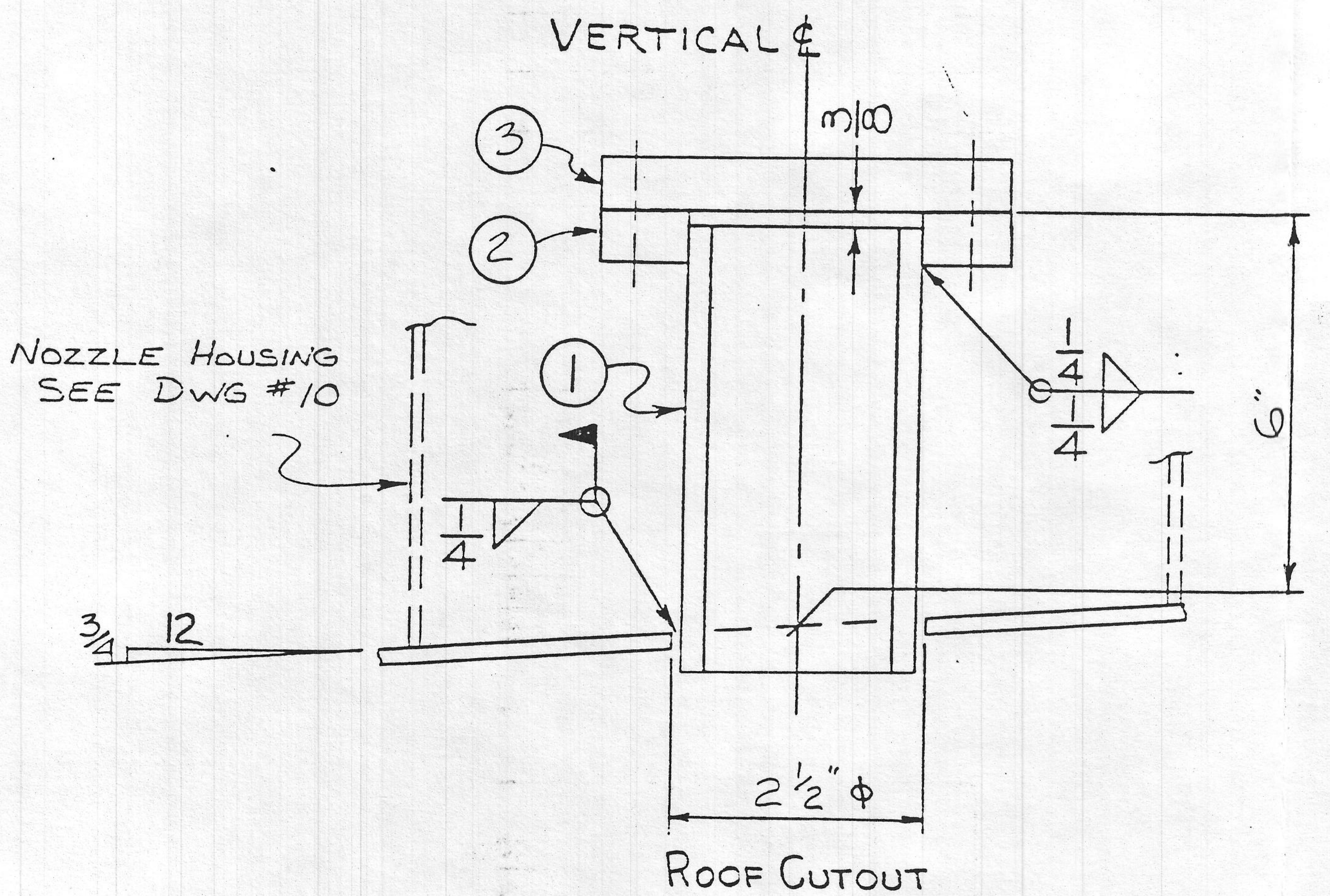
CONTRACT NO. H60729

DWG. NO. 5 REV 0

REVISIONS BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE

T5-2 PLANS MADE AT FORT ERIE

Ship Pc	Mark	Assm Pc	Description	Length Ft	Length In.	Spec
1	6-A		2" Ø ROOF NOZZLE			
	6-1	1	PIPE 2" Ø STD. WT. PBE	0	6	A53-B
	6-2	1	S.O. FLG 2" Ø 150# FF&D			A105
1	6-3		BLIND FLG. 2" Ø 150# FF&D			A105
4	6-4		5/8" Ø HEX HD BOLTS	0	2 1/2	A307
4	6-5		5/8" Ø HVY HEX NUTS			A563-A
1	6-6		GASK. 6" O.D. x 1/8 x 2 3/8 I.D. W/ HOLES			RED RUBBER



PROJ. NO. 85-4506

SHOP DRAWING REVIEW

THIS DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH THE GENERAL DESIGN CONCEPT ONLY. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS OR OMISSIONS OR OF MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

✓ NO COMMENT	Submission No. 2
SEE COMMENTS	Project No. 9373
AMEND & RESUBMIT	By GCN/...
	Date 5-2-87

GCG DILLON CONSULTING LIMITED

Standard Form Drawing No. 3300-C23-2

By	Chkd	Date	Asy	By	Chkd	Date	Approved	Date
RJL	FBF	9-2-76	2	MTK	FBF	5-18-79	ALTO	5-21-79

Revisions: RLH 1 3/19/86 — REV. PC'S. TO SHIP. PC'S.

Chicago Bridge & Iron Company

2" Ø ROOF NOZZLE

70' Ø x 36' HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOV'T OF N.W.T.
GRISE FIORD — N.W.T.

Purchaser's No.
By DRB Chkd WH Date 6/17/86
RLH
Engineering Coordinator

Contract No. H60729

Dwg. 6 Rev 1

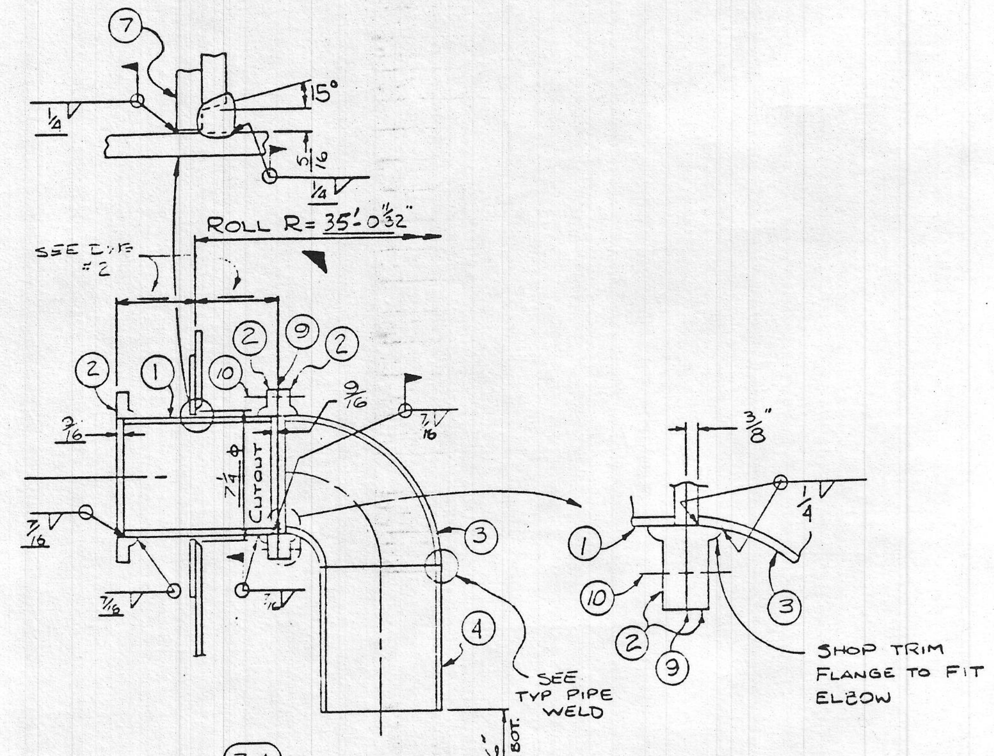
Indicates revision from previous issue

3300-C23-2

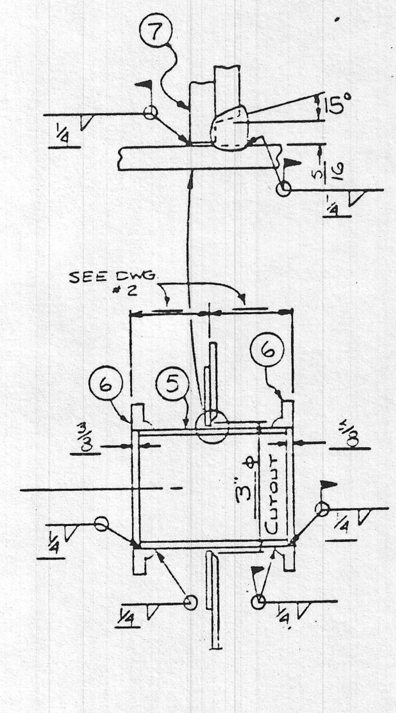
DR 72 REV 11-72

T6-2

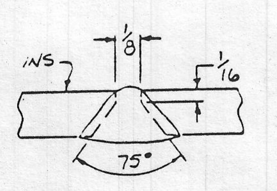
SHIP PC	MARK	ASSM. PC	DESCRIPTION	LENGTH FT	LENGTH IN	SPEC.	WT
1	7-A		6"ø NOZZLE ASS'Y				55
	7-1	1	Pc 6"ø SCH 80 SMLS PIPE PeE	1	3	A53-B	36
	7-2	1	6"ø S.O. FLG 150# FF&D			A105	19
1	7-2		6"ø S.O. FLG 150# FF&D			A105	19
1	7-9		GASK. 11"O.D × 1/8 × 6 5/8" I.D. W/HOLES			RED RUBBER	—
8	7-10		3/4"ø HEX HEAD BOLTS	0	3	A307	3
			W/HVY HEX NUTS			A563-A	2
1	7-B		6"ø ELBOW ASS'Y				43
	7-2	1	6"ø S.O. FLG 150# FF&D			A105	19
	7-3	1	6" ø SCH 40 S.R. WELD ELBOW (90°)			A234-WPB	12
	7-4	1	Pc 6"ø SCH 40 PIPE POE BOE	0	7 1/2	A53-B	12
1	7-C		2"ø NOZZLE ASS'Y				11
	7-5	1	Pc. 2"ø SCH 80 SMLS PIPE PBE	1	3 3/8	A53-B	6
	7-6	1	2"ø S.O. FLG 150# F.F.&D.			A105	5
1	7-6		2"ø S.O. FLG 150# F.F.&D.			A105	5
1	7-7		PL SK. × .355 (ROLL.)			A 36	26
1	7-8		1"ø 6000# SCWD. CPLG			A105	2



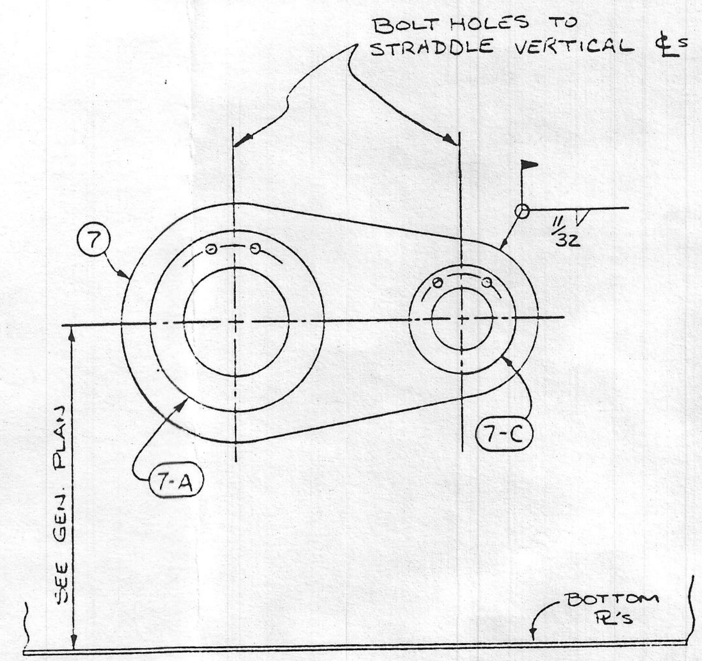
DETAIL 7-A



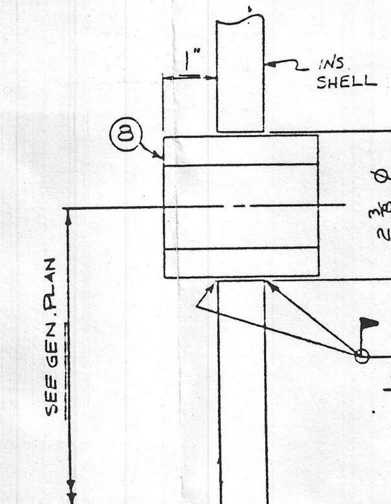
DETAIL 7-C



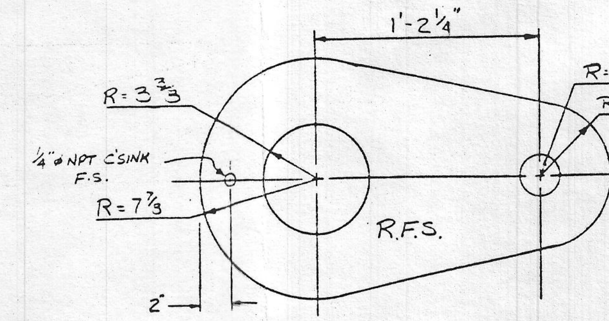
TYP. PIPE WELD



ELEVATION



DETAIL 8



DETAIL Pc. 7

GENERAL NOTES

1. LEAVE TELLTALE HOLE IN REINF. PL OPEN AFTER AIR TEST.

SHOP DRAWING REVIEW

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- ✓ NO COMMENT
- SEE COMMENTS
- AMEND & RESUBMIT

Submission No. 2
Project No. G-323
By D. ...
Date 6-2-87

GCG DILLON CONSULTING LIMITED

PROJ. No. 85-4506

REVISIONS: BY RLH — DATE 9/19/86 — 1 ▶ - MISC. ROLL R & DESC..

HORTON CBI, LIMITED

MISC. FITTING DETAILS
70'ø × 36' HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOV'T OF N.W.T.
GRISE FIORD — N.W.T.

PURCHASER'S NO.
DRAWN BY DRB DATE 6/9/86
CHECKED BY ... DATE 6.17.86
ENGINEERING ... 6/18/86
CO-ORDINATOR RLH

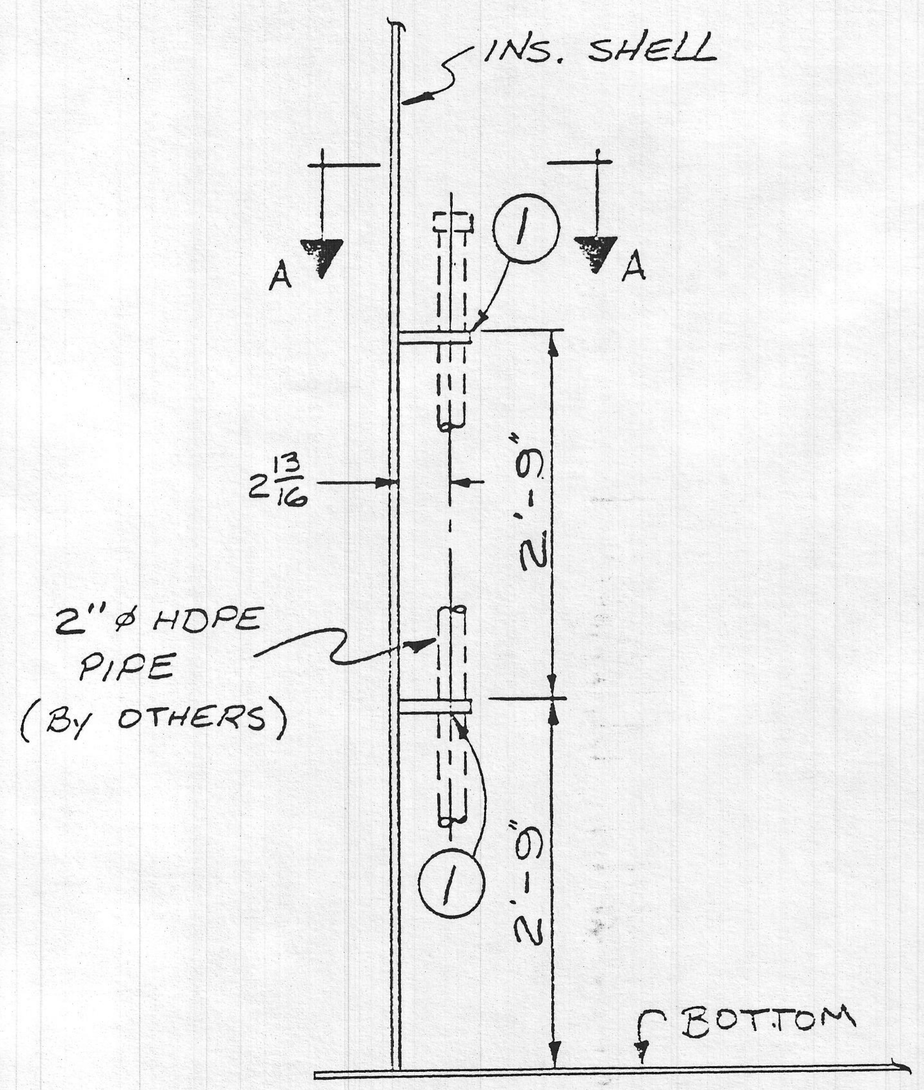
CONTRACT NO. H60729

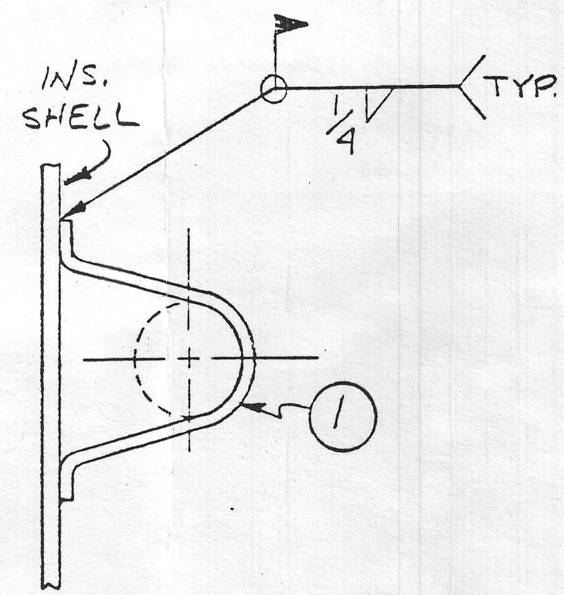
DWG. NO. 7 REV 1

T7-2

PLANS MADE AT FORT ERIE

SHIP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	WT.
2	8-1		2"ø LONG PIPE STRAPS			C.S.	2
			(GRINNELL FIG. 263)				





SECTION "A-A"

PROJ. No. 85-4506

SHOP DRAWING REVIEW

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✓	NO COMMENT	Submission No. 2
	SEE COMMENTS	Project No. 9393
	AMEND & RESUBMIT	By [illegible]
		Date 6-2-87

GCG DILLON CONSULTING LIMITED

HORTON CBI, LIMITED

PIPE SUPPORTS

70'ø x 36' HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOV'T OF N.W.T.
GRISE FIORD ~ N.W.T.

PURCHASER'S NO.
DRAWN BY DRB DATE 6/3/86
CHECKED BY [illegible] DATE 6.17.86
ENGINEERING [illegible] 6/17/86
CO-ORDINATOR RLH

CONTRACT NO. H60729

DWG. NO. 8 REV 0

BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE

REVISIONS

T8-2

PLAN MADE AT FORT ERIE

SHIP PC.	MARK	ASSM. PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	WT.
	9-A	1	NAME PL ASSEMBLY				10
	9-1	1	NAME PL NP-69-2			STLS. STL. TYP.304	2
	9-2	1	PL 9"x¼"	0	9	CARB. STL.	6
	9-3	1	PL 1½"x¼"	0	8	CARB. STL.	2
	9-4	4	PARKER KALON DRIVE SCREWS			STLS. STL.	—

8"

API STD 650 STORAGE TANK

API APPENDIX		CONTRACT NO.	H60729
API REVISION	1	TANK NO.	
API EDITION	7TH	YEAR BUILT	1987
NOMINAL DIAMETER	70'-0" (21336mm)	DESIGN LIQUID HEIGHT	36'-0" (10973 mm)
NOMINAL HEIGHT	36'-0" (10973mm)	DESIGN SPEC. GRAVITY	1.0
NOMINAL CAPACITY	857,000 GALS. IMP. 3896 CU. M.	DESIGN PRESSURE	ATMOS.
MAXIMUM OPERATING TEMP.	80°F 27°C	POST WELD HEAT TREATMENT	NONE

RING	APPENDIX	MATERIAL
1 2 3 4		ASTM A36

SHELL MATERIAL

HORTON CBI, LIMITED
FORT ERIE, ONTARIO

NP-69-2

8"

$\frac{3}{16}$" TYP.

SHOP DRAWING REVIEW

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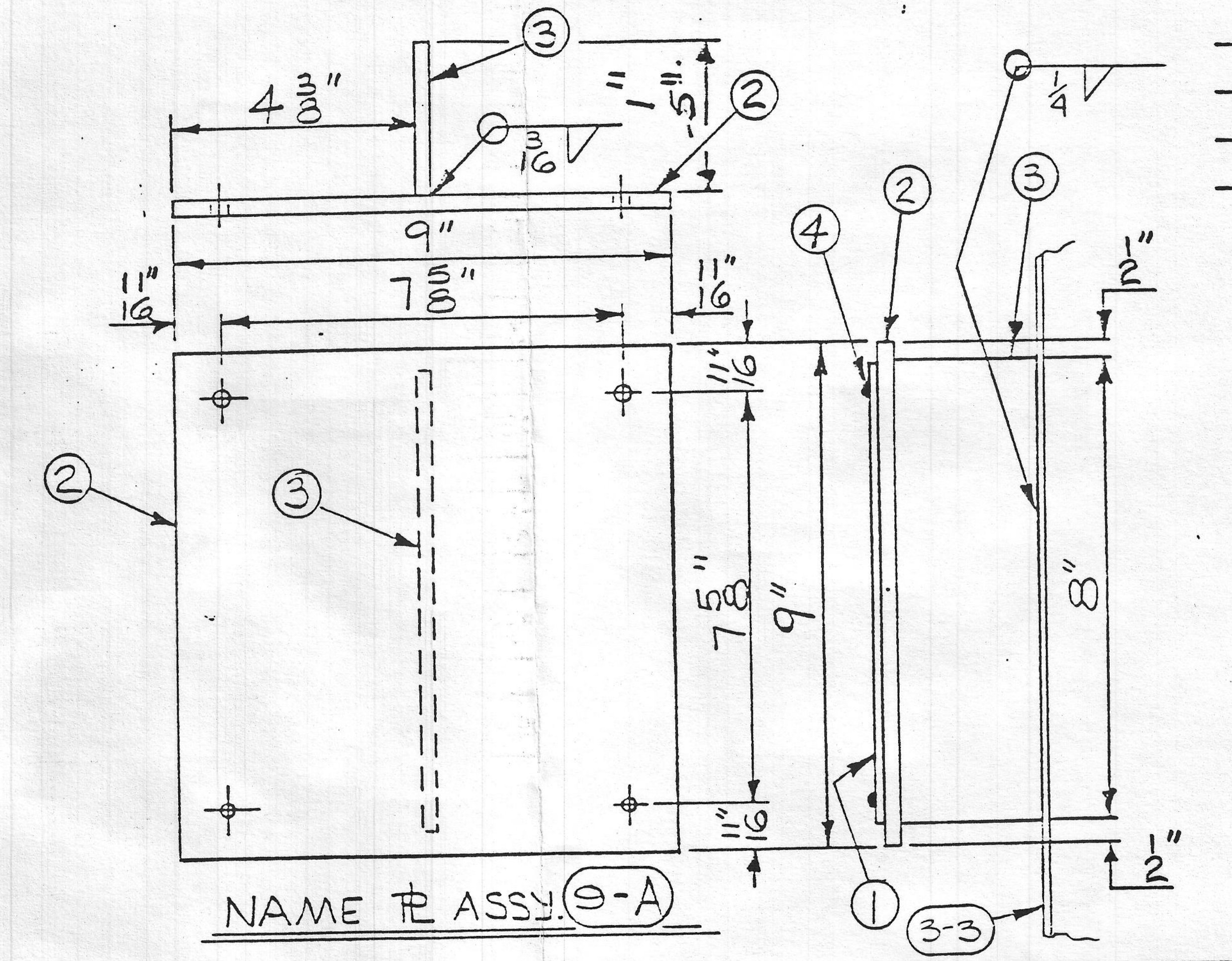
	NO COMMENT	Submission No. 2
✓	SEE COMMENTS	Project No. 7595
	AMEND & RESUBMIT	By [illegible]
		Date 6-2-87

GCG DILLON CONSULTING LIMITED



NAME PL ASSY. (9-A)

NOTE:
SHOP SAND BLAST ALL SIDES OF MOUNTING BRACKET & GIVE 2 COATS OF RED LEAD PRIMER.

PROJ NO.
85-4006

NAME PL NP-69-2 (1)
THK. = .125"
MAT'L. = TP. 304 STNLS. STL.

$\frac{5}{32}$" ⌀ HOLES
LETTERING = ETCHED & FILLED IN BLACK.

BY	CHKD	DATE

HORTON CBI, LIMITED

DETAILS FOR NAME PLATE NP-69-2
70'⌀ x 36' HIGH CONE ROOF TANK
SECOND WATER STORAGE TANK
NORCO INDUSTRIES FOR GOV'T OF N.W.T.
GRISE FIORD — N.W.T.

PURCHASER'S NO.
DRAWN BY DRB DATE 6/10/86
CHECKED BY [illegible] DATE 6-17-86
ENGINEERING [illegible] 6/17/86
CO-ORDINATOR RLH

CONTRACT NO. H60729
DWG NO. 9 REV 0

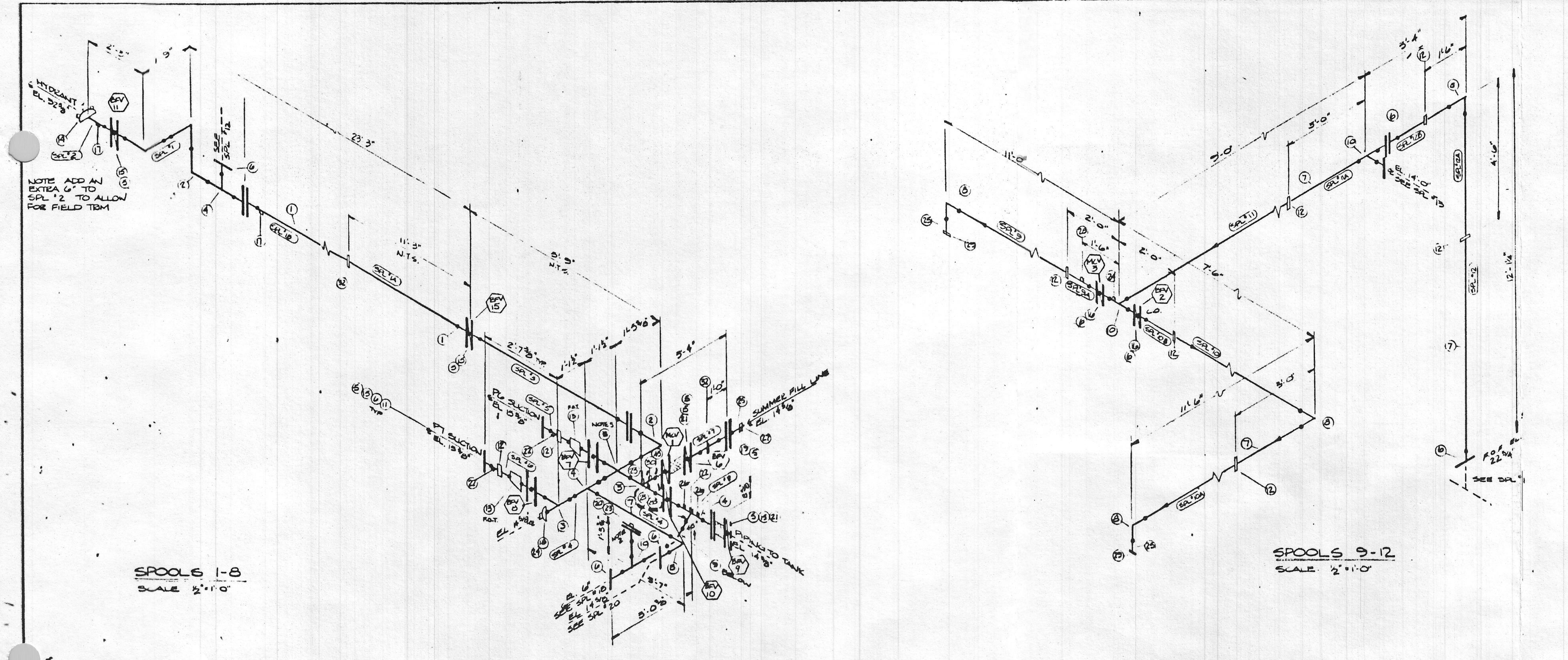
T9-2

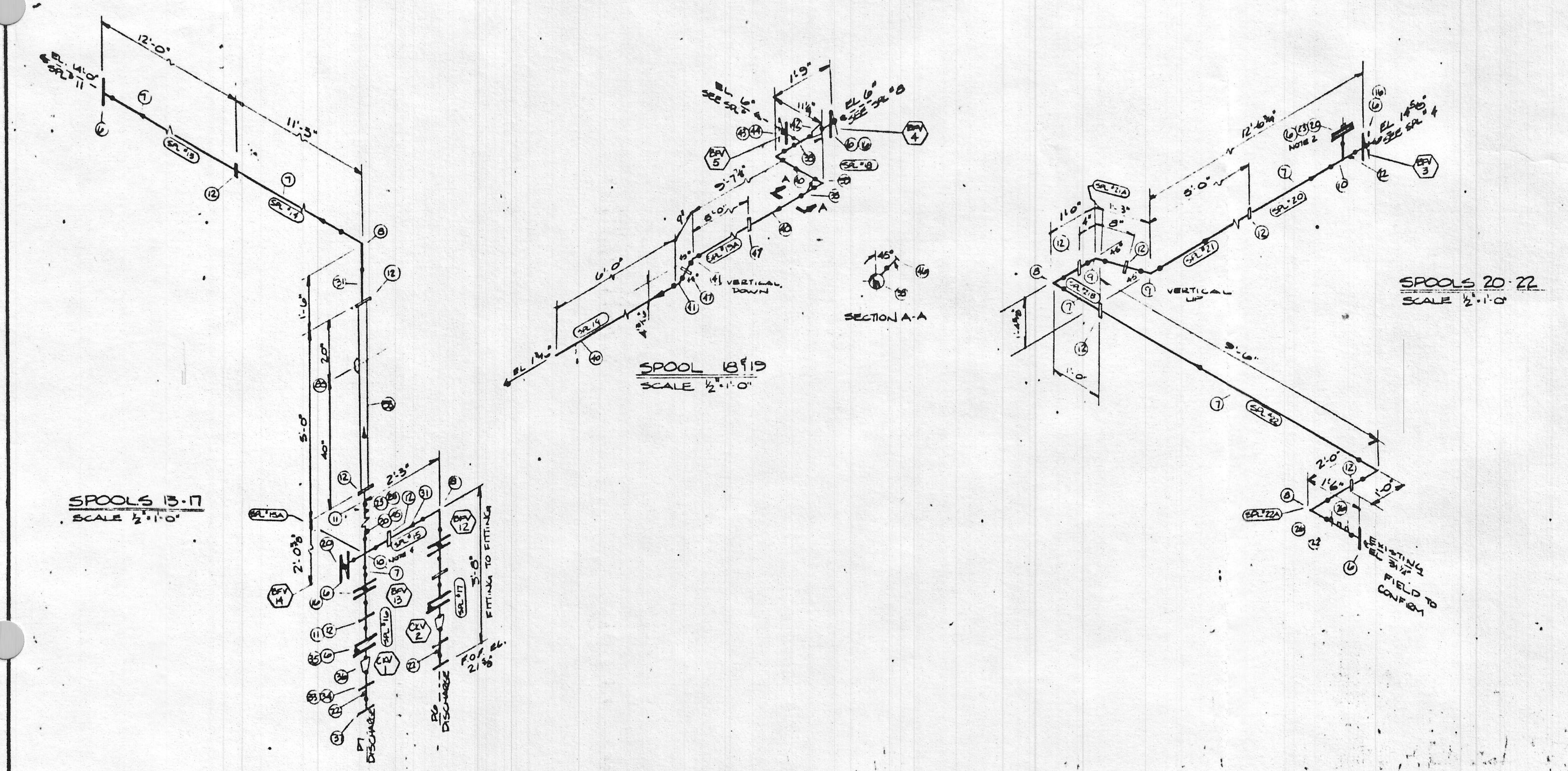
PLAN MADE AT FORT ERIE 2/80

9.3 Pumping System As-Builts

Universal Industries Ltd.

Drawing No. P1-133	-	Piping Spools 1/2
P1-134	-	Piping Spools 2/2
P1-135	-	Tempering Recirculating Piping
P1-136	-	Hot Water Piping
P1-150	-	Piping Overview
P1-151	-	Piping Details
P1-152	-	HDPE Piping
P1-167	-	Boiler Piping
AR-67	-	Miscellaneous Supports
EL-002	-	Plant Control Panel - A
EL-003	-	Plant Control Panel - B
EL-004	-	Truck Control Panel & Flow Rate Panel
EL-005	-	Distribution





MATERIAL LIST

STOCK NO	MK	AMOUNT	DESCRIPTION	MATERIAL
	1	35'-0"	PIPE: 6" x SCH 40 ERW	SA-53-B
	2	4	ELBOW: 6" x SCH 40 90° LR	SA-234-WPB
	3	4	TEE 6"x6"x6" x SCH 40	SA-234-WPB
	4	3	RED. TEE 6"x6"x4" x SCH 40	SA-234-WPB
	5	19	FLANGE 6"x 150# FFWN	SA-105
	6	28	FLANGE 4" x 150# FFWN	SA-105
	7	120'-0"	PIPE 4" x SCH 40 ERW	SA-53-B
	8	10	ELBOW 4" x SCH 40 90° LR	SA-234-WPB
	9	2	ELBOW 4" x SCH 40 45°	SA-234-WPB
	10	6	TEE 4"x4"x4" x SCH 40	SA-234-WPB
	11	8	NIPPLE 4" x SCH 40 x 4"LG VOE BOE	SA-53-B
	12	18	VICTAULIC CPLG 4" STYLE 77	—
	13	2	ECC. RED. 6"x4" x SCH 40	SA-234-WPB
	14	1	WALL HYDRANT ELKART # 153	—
	15	8	BFV 6" KEYSTONE FIG. # 1020	—
	16	7	BFV 4" KEYSTONE FIG. # 1020	—
	17	2	KING NIPPLE ¾" x SCH 40	—
	18	1	WELD CAP 6" x SCH 40 (NOTE 5)	SA-234-WPB
	19	1	BLIND 6"x150# FF (NOTE 1)	SA-105
	20	2	BLIND 4" x 150# FF	SA-105
	21	2	FLEX-CONNECTOR 6" x 6"LG	MAX JOINT STYLE 1015
	22	7	COUPLING ¼" x 3000# F.S. FULL	SA-105
	23	7	COUPLING ½" x 3000# F.S. FULL	SA-105
	24	2	COUPLING 2" x 3000# F.S. FULL	SA-105
	25	3	NIPPLE 4" x SCH 40 x 6"LG TOE BOE	SA-53-B
	26	6	COUPLING ¾" x 3000# F.S FULL	SA-105
	27	1	QUICK COUPLING ADAPTER 4" KAMLOK 633 F MNPT	—
	28	1	COUPLING 1" x 3000# F.S. FULL	SA-105
	29	2	QUICK COUPLING ADAPTER 4" KAMLOK 633 A FNPT	—
	30	2	COUPLING 1¼" x 3000# F.S. FULL	SA-105
	31	2	NIPPLE 4" x SCH 40 x 12"LG VOE BOE	SA-53-B
	32	2	VICTAULIC CPLG 6" STYLE 77	—
	33	4	NIPPLE 3" x SCH 40 x 4"LG VOE BOE	SA-53-B
	34	2	VICTAULIC CPLG 3" STYLE 77	—
	35	2	WAFER CHECK 4" x 150# APCO SERIES 300	—
	36	2	CONC. RED. 4"x3" x SCH 40	SA-234-WPB
	37	2	FLANGE 3" x 150# FFWN	SA-105
	38	2	TEE 2"x2"x2" x SCH 40	SA-234-WPB
	39	9	ELBOW 2" x SCH 40 90° LR	SA-234-WPB
	40	58'-0"	PIPE 2" x SCH 40 ERW	SA-53-B
	41	4	ELBOW 2" x SCH 40 45°	SA-234-WPB
	42	1	CONC RED 4"x2" x SCH 40	SA-234-WPB
	43	3	FLANGE 2" x 150# FFWN	SA-105
	44	2	BFV 2" KEYSTONE FIG # 1020	—
	45	2	BUSHINGS 1¼ x 1" x 3000# F.S.	GALV.
	46	1	NIPPLE 2" x SCH 40 x 3"LG TOE BOE	SA-53-B

NOTES

1. 6" BLIND HAS 4⅜" DIA HOLE CUT ON CENTERLINE TO ACCOMMODATE 4" NIPPLE WELDED TO BLIND.
2. 4" BLIND HAS ½" DIA HOLE ON CENTER c/w ½" CPLG WELDED TO BLIND.
3. 6" CROSS CONSISTS OF 2 - 6" TEES WITH RUN CUT IN HALF AND WELDED TOGETHER.
4. 4" CROSS CONSISTS OF 2 - 4" TEES WITH RUN CUT IN HALF AND WELDED TOGETHER.
5. WELD CAP HAS 2" CPLG WELDED INTO 3⅛" DIA HOLE.
6. ELEVATION FOR REFERENCE
7. REMAINING MATERIAL LISTED ON DWG PI-134
8. STAMP THE APPROPRIATE SPOOL NUMBER ON BOTH ENDS OF SPOOL.
9. VALVE TAGGING ON DWG PI-134

REVISIONS

NO	DATE	DESCRIPTION	BY	APP'D
4	88.01.07	FIELD AS BUILT	B.J.K.	
3	86.10.30	AS BUILT	J.S.S.	
2	86.07.07	DIMENSION CHANGE SPL #1B, 1A, 5, #8, 6A; ADDED VIC CPLG 4", ITEM 45	J.S.S.	
1	86.07.03	ADDED VICTAULIC CONNECTIONS AND NOTE FOR SPOOL #1B	J.S.S.	

REFERENCE DRAWINGS

NUMBER	TITLE
PI-134	PIPING SPOOLS 2/2

PRINT RECORD

ISSUED FOR	TO	DATE	REV
INFORMATION	CLIENT, FIELD	87.03.04	3
AS BUILT	CLIENT	87.02.12	3
CONSTRUCTION	OPERATIONS / CLIENT	86.07.07	2
CONSTRUCTION	OPERATIONS	86.07.03	1
CONSTRUCTION	OPERATIONS	86.06.27	0
FIELD AS BUILT	GCG DILLION	88.01.07	4

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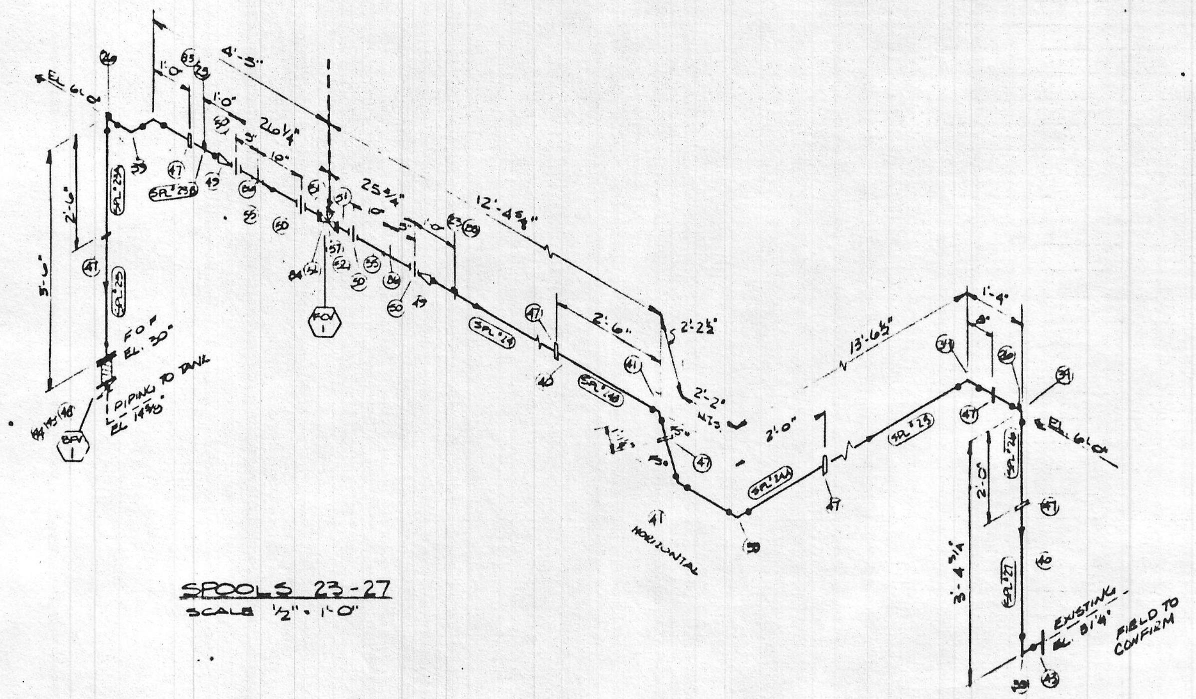
P.O. BOX 1590
LLOYDMINSTER, ALTA.

DESIGNED: C 3191 | DRAWN: J.S.S | CHECKED: [signature] | APPROVED:

CLIENT: GOV'T OF NORTHWEST TERRITORIES
DEP'T OF PUBLIC WORKS
GRISE FIORD WATER PUMPING SYSTEM

DWG TITLE: PIPING SPOOLS 1/2

SCALE: ½"=1'-0" | DATE: JUNE 22 · 86 | DRAWING NO. PI-133 | REV 4



SPOOLS 23-27
SCALE 1/2" = 1'-0"

VALVE TAGGING

VALVE TAG	TYPE	SIZE	RATE	DESCRIPTION	OPERATOR
FCV-1	3-WAY DIVERTER	1"	150#	WORCHESTER	HANDLE
MCV-1	BUTTERFLY	6"	150#	KEYSTONE FIG #1020	MOTOR RCS MAX-90 15 4
MCV-3	"	4"	150#	" " "	MOTOR RCS SURE-49-15
BFV-1	"	2"	150#	" " "	HANDLE
BFV-2	"	4"	150#	" " "	CHAIN
BFV-3	"	4"	150#	" " "	HANDLE
BFV-4	"	4"	150#	" " "	HANDLE
BFV-5	"	2"	150#	" " "	HANDLE
BFV-6	"	6"	150#	" " "	HANDLE
BFV-7	"	6"	150#	" " "	HANDLE
BFV-8	"	6"	150#	" " "	HANDLE
BFV-9	"	6"	150#	" " "	HANDLE
BFV-10	"	6"	150#	" " "	HANDLE
BFV-11	"	6"	150#	" " "	HANDLE
BFV-12	"	4"	150#	" " "	HANDLE
BFV-13	"	4"	150#	" " "	HANDLE
BFV-14	"	4"	150#	" " "	HANDLE
BFV-15	"	6"	150#	" " "	HANDLE
CKV-1	CHECK	4"	150#	APCO SERIES 300	—
CKV-2	CHECK	4"	150#	APCO SERIES 300	—

NOTE: VALVE TAG LISTS FOR HOT WATER PIPING AND TEMPERING RECIRCULATING PIPING ARE ON DWGS PI-136 & PI-135 RESPECTIVELY

MATERIAL LIST

	STOCK NO.	MK	AMOUNT	DESCRIPTION	MATERIAL
		47	9	VICTAULIC CPLG 2" STYLE 77	—
		48	1	FLEX-CONNECTOR 2" × 6" LG	MAY JOINT STYLE 1015
		49	2	CONC. SWAGE 2" × 1" × SCH 40 WXT	SA-53-B
		50	4	UNION 1" × 150# G.J.	M.I.
		51	3	NIPPLE 1" × SCH 40 × 4" LG TBE	SA-53-B
		52	3	FLANGE 1" × 150# RF THR'D	SA-105
		53	1	METER RUN 4" DIA × 60" LG VBE	—
				(USE SCH 40 PIPE)	
		55	2	METER RUN 1" DIA × 15" LG TBE	—
				(USE SCH 40 PIPE)	
		57	1	3-WAY VALVE 1" DIA × 150# FLG	WORCHESTER
		58	4	GASKET 6" × 150# FF × 1/8" THK	CLOTH INSERT. RUBBER
		59	13	GASKET 4" × 150# FF × 1/8" THK	CLOTH INSERT. RUBBER
		60	2	GASKET 2" × 150# FF × 1/8" THK	CLOTH INSERT. RUBBER
		70	3	GASKET 1" × 150# RF × 1/8" THK	CLOTH INSERT. RUBBER
6" FLG		71	32	STUDS 3/4" DIA × 4" LG	SA-193-B
4" & 3" FLG		72	72	STUDS 5/8" DIA × 3 1/2" LG	SA-193-B
2" FLG		73	8	STUDS 5/8" DIA × 3" LG	SA-193-B
1" FLG		74	12	STUDS 1/2" DIA × 2 1/2" LG	SA-193-B
6" FLG		75	64	HEX NUTS 3/4" DIA	SA-194-H
2" & 4" FLG		76	152	HEX NUTS 5/8" DIA	SA-194-H
1" FLG		77	24	HEX NUTS 1/2" DIA	SA-194-H
2" BFV		78	112	CAP SCREWS 5/8" DIA × 1 1/2" LG	—
4" BFV		79	16	CAP SCREWS 5/8" DIA × 1 3/4" LG	—
6" BFV		80	128	CAP SCREWS 3/4" DIA × 2" LG	—
4" CHK V		81	16	BOLTS 5/8" × 7" LG	GR. 5
		82	2	GASKET 3" × 150# FF × 1/8" THK	CLOTH INSERT. RUBBER
		83	4	HEX PLUG 1/2" × 3000# FS	GALVANIZED
		84	1	SWAGE 1" × 2" CONC. SCH 40 (TXT)	SA-53-B
		85	1	SPECIAL WELDOLET 4" SIGNET C24W040	C.S.
		86	2	SPECIAL TEE 1" × 1" × 1" SIGNET CS4T010	C.S.

REVISIONS

NO	DATE	DESCRIPTION	BY	APP'D
4	88-01-07	FIELD AS BUILT	B.J.K.	
3	86-10-30	AS BUILT	J.S.S.	
2	86-07-04	ADDED 2 VIC COUPLINGS & 2-1/2" CPLGS	J.S.S.	
1	86-07-02	ADDED VIC-COUPLINGS	J.S.S.	

REFERENCE DRAWINGS

NUMBER	TITLE
PI-150	PIPING OVERVIEW
PI-133	PIPING SPOOLS 1/2

PRINT RECORD

ISSUED FOR	TO	DATE	REV
INFORMATION	CLIENT, FIELD	87-03-04	5
AS BUILT	CLIENT	87-02-12	5
CONSTRUCTION	OPERATIONS / CLIENT	86-09-04	2
CONSTRUCTION	OPERATIONS	86-07-02	1
CONSTRUCTION	OPERATIONS	86-06-27	0
FIELD AS BUILT	OCG DILLION	88-01-07	4

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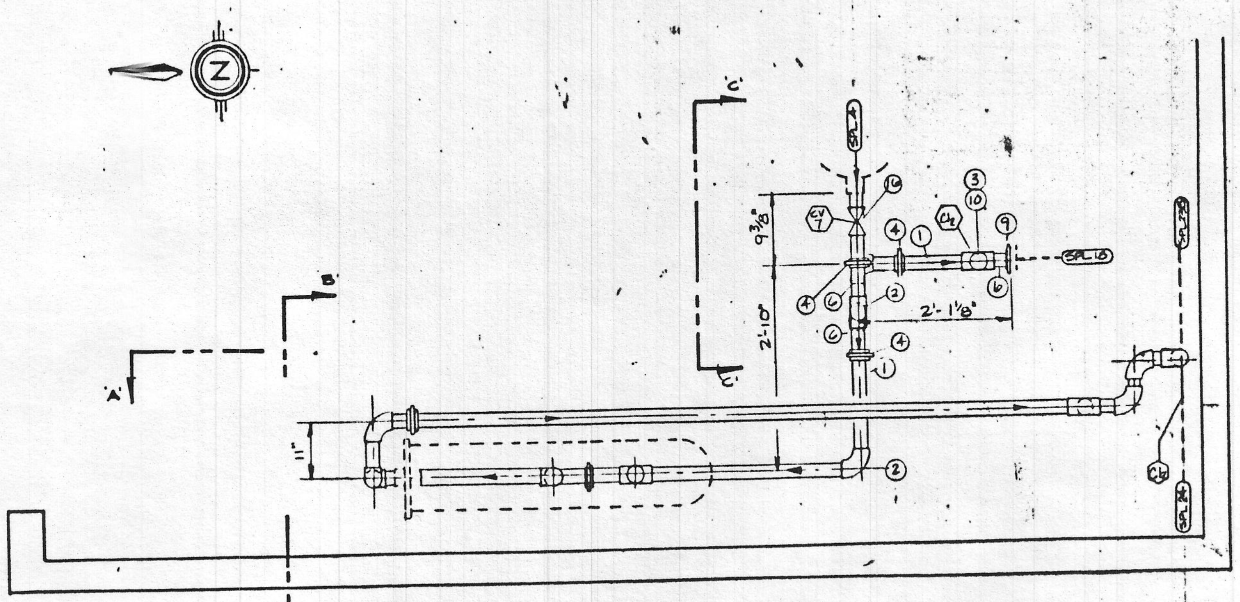
LLOYDMINSTER, ALTA.

DESIGNED: C3791 | DRAWN: J.S.S. | CHECKED: [signature] | APPROVED:

CLIENT:
GOV'T OF NORTHWEST TERRITORIES
DEP'T OF PUBLIC WORKS
GRISE FIORD WATER PUMPING SYSTEM

DWG. TITLE: PIPING SPOOLS 2/2

SCALE: AS SHOWN
DATE: JUNE 24 · 86
DRAWING NO.: PI-134
REV: 4

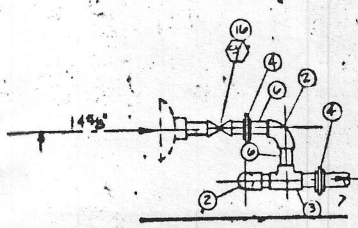


PLAN

VALVE TAGGING

	VALVE TAG	TYPE	SIZE	RATE	DESCRIPTION	OPERATOR
	CV-6	GATE	2"	125#	CRANE BRONZE NO. 428UB	HANDLE
	CV-7	"	2"	125#	" " "	"
	CV-8	"	2"	125#	" " "	"
	CV-9	"	2"	125#	" " "	"
	CV-10	"	2"	125#	" " "	"
	CV-11	"	2"	125#	" " "	"
	CV-12	"	2"	125#	" " "	"
	CKV-3	CHECK	2"	125#	APCO SERIES 300	—
	CKV-4	"	2"	125#	APCO SERIES 300	—
*	GBV-1	GLOBE	1/2"	125#	CRANE BRONZE NO. 1310	HANDLE
*	GBV-2	"	1/2"	125#	" " "	"

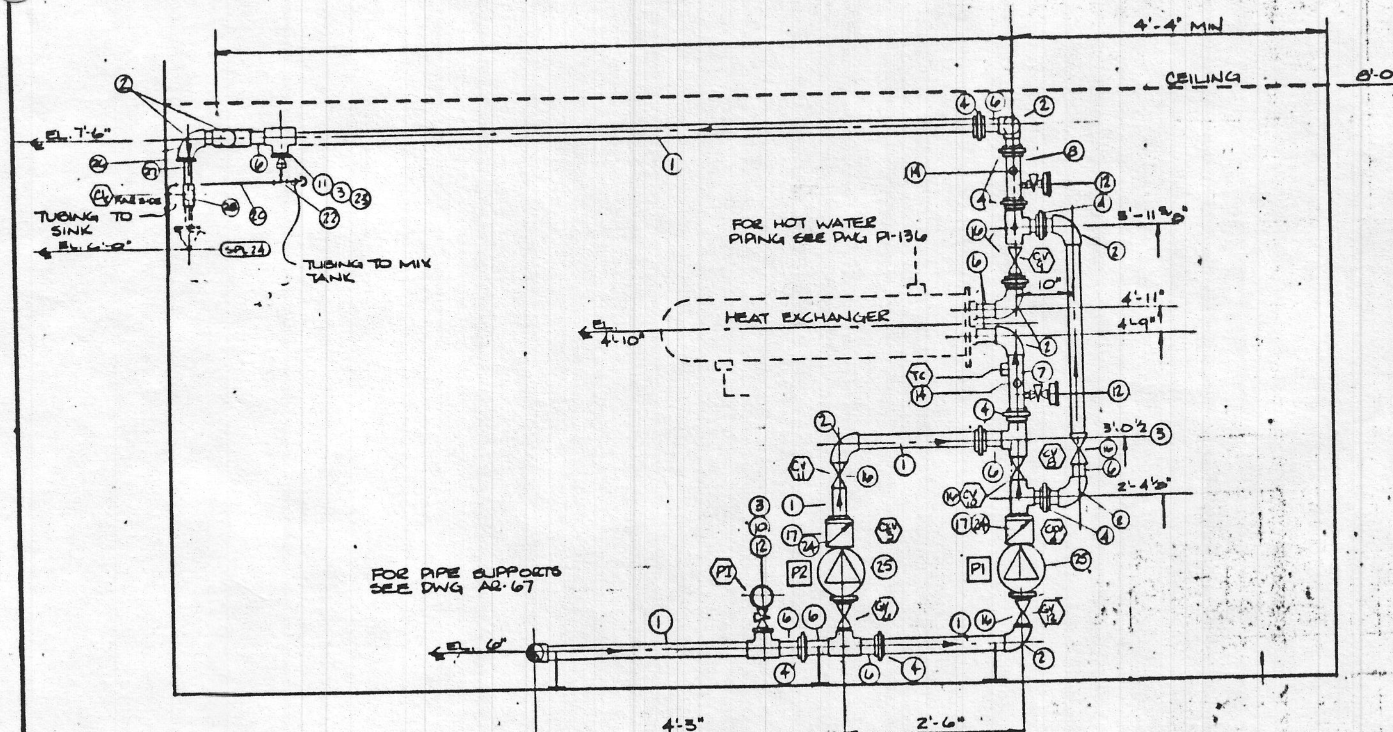
* NOTE : USED FOR WATER PIPING TO SINK & MIX TANK



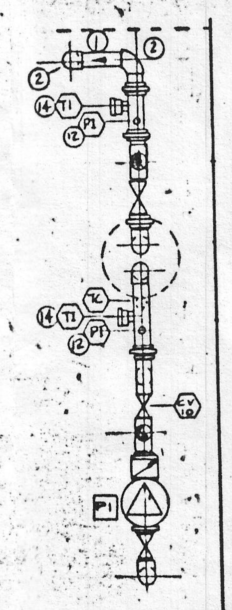
SECTION C-C

MATERIAL LIST

STOCK NO.	MK	AMOUNT	DESCRIPTION	MATERIAL
	1.	30'-0"	PIPE 2" x SCH 40 ERW A-53-B	GALV.
	2	12	ELBOW 2" x 150# x 90° M.I.	GALV.
	3	8	TEE 2" x 150# M.I	GALV.
	4	14	UNION 2" x 300# G.J.	GALV.
	5	24	NIPPLE 2" x SCH 40 CLOSE ERW	GALV.
	6	17	NIPPLE 2" x SCH 40 4"LG . ERW	GALV.
	7	1	NIPPLE 2" x SCH 40 10"LG	FAB'D
	8	1	NIPPLE 2" x SCH 40 8"LG	FAB'D
	9	1	FLANGE 2" x 150# THR'D	GALV.
	10	2	BUSHING 2" x 1/4" x 150# M.I	GALV
	11	1	BUSHING 2" x 1/2" x 150# M.I.	GALV.
	12	3	PRESS. GAUGE 0-400 KPa	MARSH NO. J5446
			S/W 1/4" NEEDLE VALVE M x F	MARSH NO. N1532
	14	2	TEMP. GAUGE 0-120°C x 5" FACE	MARSH NO. L5160
			S/W BRASS THERMOWELL 1/2" x 3/4"	MARSH NO. 31658 B-4
	16	7	GATE VALVE 2" BRONZE	CRANE NO. 428UB
	17	2	CHECK VALVE 2" CAST BODY BRONZE PLUG	APCO SERIES 300
	18	2	GLOBE VALVE 1/2" SOLDER END	CRANE NO. 1310
			S/W No. 12 DISC.	
	20	15'-0"	COPPER TUBE 1/2" SML'S	TYPE L
NOTE 8	21	6	COPPER ELBOWS 1/2"	TYPE L
	22	1	COPPER TEE 1/2"	TYPE L
	23	1	TUBING CONNECTOR 1/2" TUBE - 1/2" NPT.	—
	24	8	BOLTS 5/8" DIA x 5 1/4" LG S/W NUTS	GR.5
	25	2	PUMPS ARMSTRONG S35	—
	26	1	BUSHING 2" x 1" x 150# M.I.	GALV.
	27	1	NIPPLE 1" x SCH 40 x 6"LG ERW	SA-53-B
	28	1	TEE 1" x 1" x 3/4" x 150# M.I.	GALV.



SECTION 'A-A



SECTION B-B

NOTES
1. ALL DIMENSIONS ARE FOR REFERENCE; FIELD TO CONFIRM.
2. PIPING OVERVIEW IS ON DWG PI-150
3 ALL NIPPLES NOT IDENTIFIED ARE 2" x SCH 40 CLOSE (ITEM # 5)
6 SEE DILLION DWGS M2 & M1 FOR REFERENCE
7 (TC) - TEMPERATURE CONTROLLER BY ELEC. CONTRACTOR
8 COPPER ELBOWS ARE SUPPLIED FOR WATER PIPING TO SINK (NOT SHOWN)

REVISIONS

NO	DATE	DESCRIPTION	BY	APP'D
1	88.01.07	AS BUILT	B.J.K.	

REFERENCE DRAWINGS

NUMBER	TITLE
SKETCH	10" & 8" LG NIPPLES
PI-136	HOT WATER PIPING
AR-67	MISCELLANEOUS DETAILS
PI-150	PIPING OVERVIEW

PRINT RECORD

ISSUED FOR	TO	DATE	REV
AS BUILT	GCG DILLION	88.01.07	1
CONSTRUCTION	CLIENT, FIELD	87-03-04	0
INFORMATION	ELECTRICAL	87-09-03	0
APPROVAL	CLIENT	87-02-12	B
MATERIAL ONLY	OPERATIONS / CLIENT	86-09-01	A

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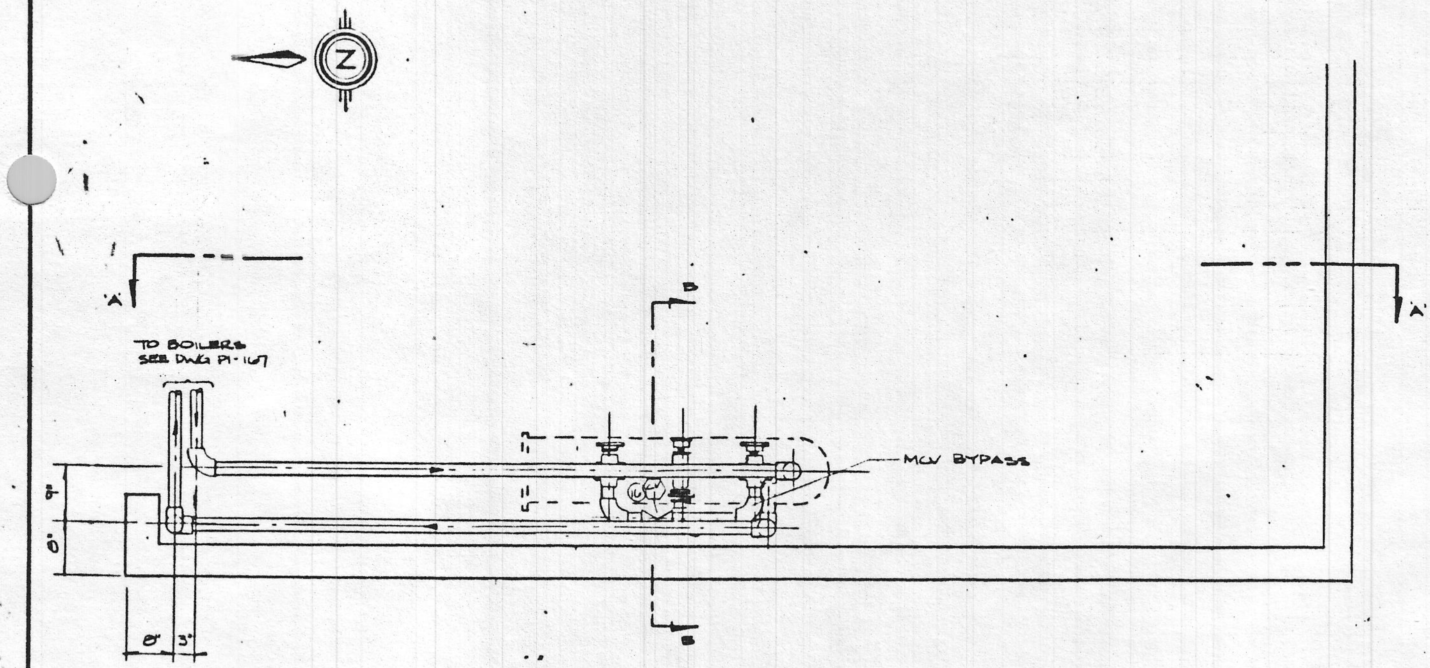
P.O. BOX 1590
LLOYDMINSTER, ALTA.

DESIGNED: C-3791 | DRAWN: J.S.S. | CHECKED: [signature] | APPROVED:

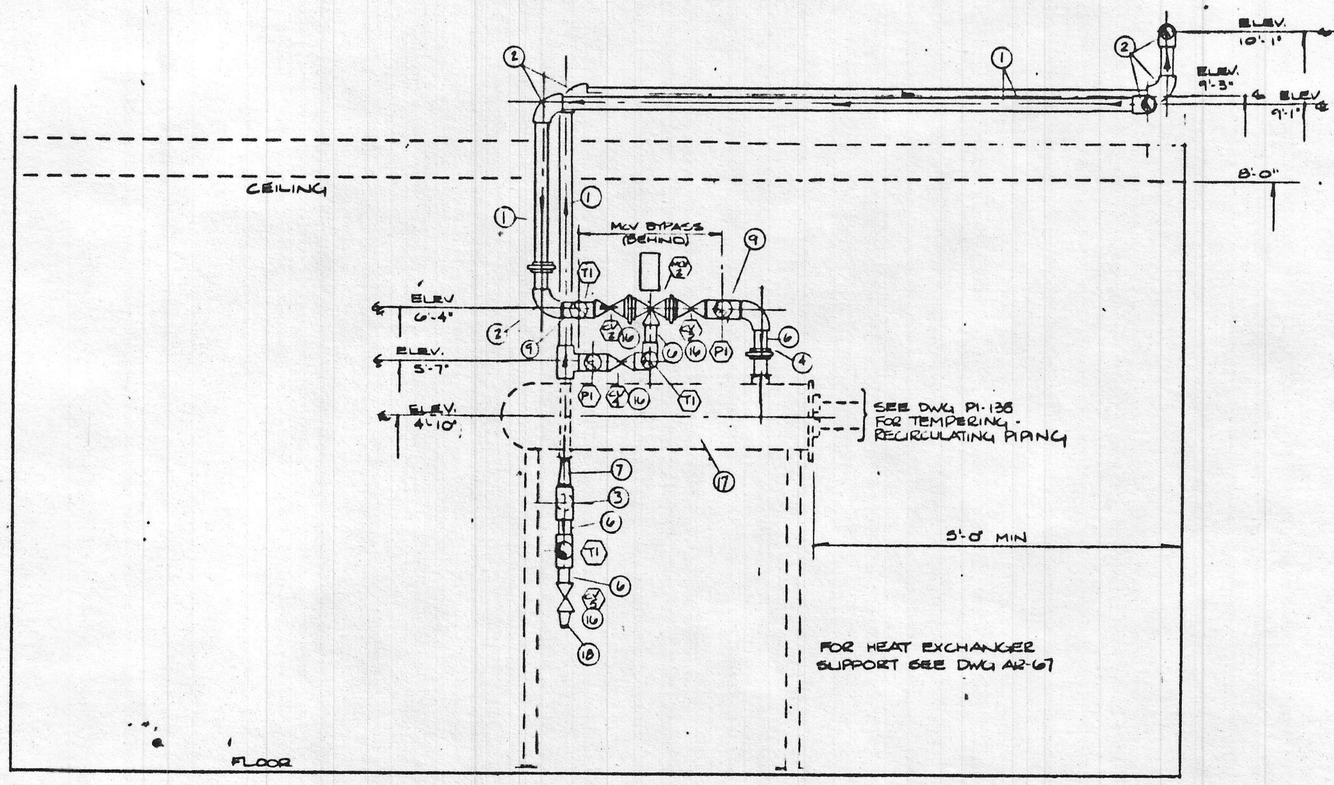
CLIENT: GOV'T NORTHWEST TERRITORIES
DEP'T OF PUBLIC WORKS
GRISE FIORD WATER PUMPING SYSTEM

DWG TITLE: TEMPERING RECIRCULATING PIPING

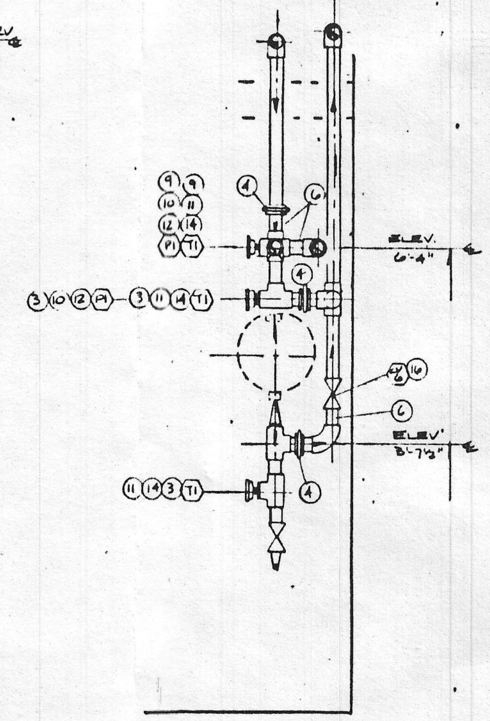
SCALE: 3/4" = 1'-0"
DATE: JULY 9 · 86
DRAWING NO.: PI-135
REV: 1



PLAN



SECTION A-A



SECTION B-B

VALVE TAGGING

VALVE TAG	TYPE	SIZE	RATE	DESCRIPTION	OPERATOR
MCV-2	3 WAY	2"	UN-KNOWN	UNKNOWN (EXISTING REUSED)	UNKNOWN
CV-1	GATE	2"	125#	CRANE BRONZE No. 428UB	HANDLE
CV-2	"	2"	125#	" " "	"
CV-3	"	2"	125#	" " "	"
CV-4	"	2"	125#	" " "	"
CV-5	"	2"	125#	" " "	"
CV-6	"	2"	125#	" " " "	"

MATERIAL LIST

STOCK NO.	MK	AMOUNT	DESCRIPTION	MATERIAL
	1	30'-0"	PIPE 2" x SCH 40 ERW A 53-B	GALV
	2	11	ELBOW 2" x 150# x 90° M.I.	GALV.
	3	5	TEE 2" x 150# M.I.	GALV.
	4	11	UNION 2" x 300# G.J.	GALV.
	5	13	NIPPLE 2" x SCH 40 CLOSE ERW	GALV.
	6	14	NIPPLE 2" x SCH 40 4" LG ERW	GALV.
	7	1	SWAGE ¾" x 2" x SCH 40 ERW	GALV.
	9	2	CROSS 2" x 150# M.I.	GALV
	10	2	BUSHING 2" x ¼" x 150# M.I.	GALV
	11	2	BUSHING 2" x ¾" x 150# M.I.	GALV
	12	2	PRESS. GAUGE 0-400 KPa	MARSH No. J3446
			C/W ¼" NEEDLE VALVE MxF	MARSH NO. N1332
	14	3	TEMP. GAUGE 0-120°C 5" FACE	MARSH NO. L5160
			C/W BRASS THERMOWELL ½" x ¾"	MARSH NO. 31650 B-4
	16	6	GATE VALVE 2" BRONZE	CRANE NO. 428UB
	17	1	HEAT EXCHANGER 140,000 BTU/H	
			ARMSTRONG MDL # WF 64-2	
	18	1	KING NIPPLE ¾" x 2" THRD	—

NOTES
1. ALL DIMENSIONS ARE FOR REFERENCE, FIELD TO CONFIRM
2. PIPING OVERVIEW IS ON DWG PI-150
3. ALL NIPPLES NOT IDENTIFIED ARE 2" x SCH 40 CLOSE (ITEM #5)
4. SEE DILLION DWGS M-2 & M-1 FOR REFERENCE

REVISIONS

NO	DATE	DESCRIPTION	BY	APP'D
1	88-01-07	AS BUILT	B.J.K.	

REFERENCE DRAWINGS

NUMBER	TITLE
PI-135	TEMPERING RECIRCULATING PIPING
AR-67	MISCELLANEOUS SUPPORTS
PI-150	PIPING OVERVIEW

PRINT RECORD

ISSUED FOR	TO	DATE	REV
AS BUILT	GCG DILLION	88.01.07	1
CONSTRUCTION	CLIENT, FIELD	87-03-04	0
INFORMATION	ELECTRICAL	87-08-08	0
APPROVAL	CLIENT	87-08-12	B
MATERIAL ONLY	OPERATIONS / CLIENT -	86-09-04	A

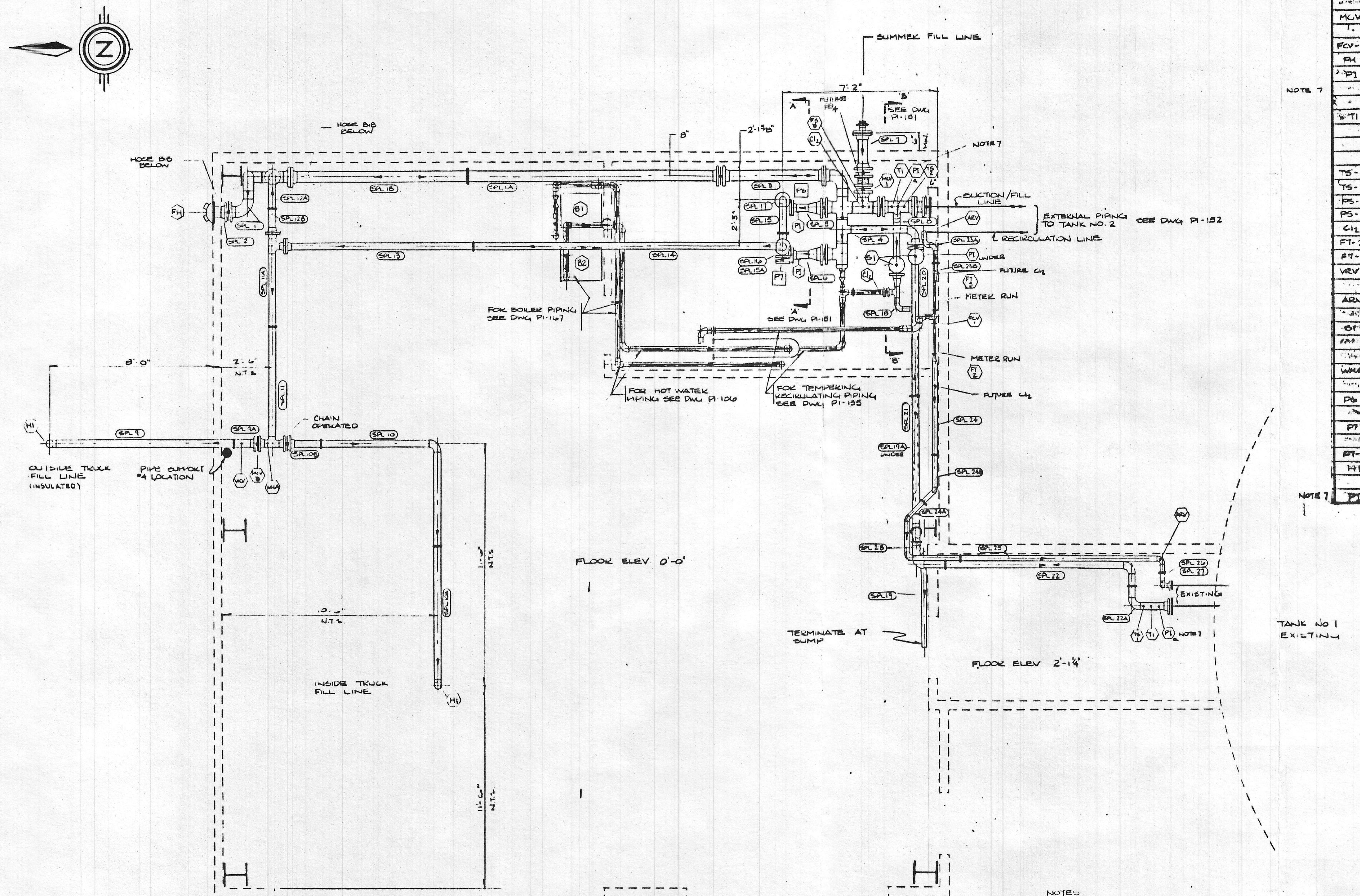
UNIVERSAL INDUSTRIES LTD.
P.O. BOX 1590
LLOYDMINSTER, ALTA.

DESIGNED: C-5791
DRAWN: J.S.B.
CHECKED: [signature]
APPROVED:

CLIENT
GOV'T OF NORTHWEST TERRITORIES
DEP'T OF PUBLIC WORKS
GRISE FIORD WATER PUMPING SYSTEM

DWG TITLE
HOT WATER PIPING

SCALE: ¾" = 1'-0"
DATE: JULY 10-86
DRAWING NO.: PI-136
REV: 1



MATERIAL LIST

EQUIP'T TAG	MK	AMOUNT	DESCRIPTION	MATERIAL
MCV-1	[illegible]	1	ACTUATOR – RCS MOTOR ACTUATOR	
			S/W BRAKE (120V/1/60)	
MCV-3	3	1	ACTUATOR - RCS SUPERPOWER II SERIES	
			S/W AUTO SPRING RETURN (120V/1/60)	
FCV-1	5	1	AS SHOWN ON SPOOL # 24	
FH	6	1	AS SHOWN ON SPOOL # 2	
PI	7	7	NEEDLE VALVE ¼" NPT MFG. MARSH N1532	STEEL
	8	5	PRESSURE GAUGE ¼" NPT 4½" DIAL	
			FACE 0-400 kPa MARSH J9446	
TI	10	2	TEMP. GAUGE ½" NPT 5" DIAL 4" STEM	
			-5-50°C MARSH # L3145	
	12	2	THERMOWELL ½" x ¾" x 4" LG	BRASS
			MARSH # 31658 B-4	
TS-1	14	1	TEMP. SWITCH (BY ELEC.)	
TS-2	15	1	TEMP. SWITCH (BY ELEC.)	
FS-3	16	1	FLOW SWITCH (BY ELEC.)	
FS-4	17	1	FLOW SWITCH (BY ELEC.)	
Cl_2	18	2	HYPOCHLORITE INJECTORS ½" NPT	
FT-2	19	1	FLOWTRANSMITTER (BY ELEC.)	
FT-3	20	1	FLOW TRANSMITTER (BY ELEC.)	
VRV	21	1	VACCUUM RELIEF VALVE 1" NPT	
			VALMATIC # 101 S/W GATE VALVE	
ARV	23	2	AIR RELIEF VALVE ¾" NPT	
			VALMATIC # 15 S/W GATE VALVE	
[illegible]	25	2	GATE VALVE ½" CRANE NO. 428 UB	BRONZE
[illegible]	26	2	ELBOW ½" x 150# MI 90°	GALV.
[illegible]	27	6	NIPPLE ½" x SCH 40 x 4" LG	GALV.
WHA	28	1	WATER HAMMER ARRESTOR 2" NPT	
			ACCUMUTROL SIZE 4000	
P6	30	1	SERVICE PUMP - PACO MODEL 3070-5	
			TYPE L S/W FAB'D BASE	
P7	32	1	SERVICE PUMP - PACO MODEL 3070-5	
			TYPE L S/W FAB'D BASE	
FT-1	34	1	FLOWTRANSMITTER (BY ELEC.)	
H1	35	2	TRUCK HOSE CP-82 FLEX ARCTIC	
			BLUE 4" DIA x 10' LG	
PIa	36	2	PRESSURE GAUGE ¼" NPT 4½" DIAL FACE 0-21 METRES MARSH SPECIAL ORDER	

NOTE 7

ISSUED FOR	TO	DATE	REV
AS BUILT	GKG DILLION	88-01-07	1
CONSTRUCTION	CLIENT, FIELD	87-08-04	0
INFORMATION	ELECTRICAL	87-03-05	0
APPROVAL	CLIENT	87-02-12	A

PRINT RECORD

NO	DATE	DESCRIPTION	BY	APP'D
1	88 01 07	AS BUILT	B.J K	

REVISIONS

NUMBER	TITLE
M-1 & M-2	DILLION DRAWINGS
AR 67	MISC SUPPORTS
PI-151	PIPING DETAILS
PI-136	HOT WATER PIPING
PI-135	TEMPERING RECIRCULATING PIPING
PI-134	PIPING SPOOLS 2/2
PI-133	PIPING SPOOLS 1/2

REFERENCE DRAWINGS

NOTES

1. ALL DIMENSIONS ARE FOR REFERENCE; FIELD TO CONFIRM.
2. PIPE ELEVATIONS ARE SHOWN ON THE SPOOL DWGS.
3. USE PIPE SUPPORTS AND HANGERS WHERE REQ'D.
4. SEE DILLION DWGS M-1 & M-2 FOR EXISTING PIPE THAT IS TO BE REMOVED OR MODIFIED.
5. ALL VALVE TAGGING (NOT SHOWN) IS ON THE SPOOL DWGS.
6. SHADED PIPING DETAILED ON REFERENCE DWGS
7. PRESSURE GAUGES PIa SIMILAR TO PI EXCEPT THAT GAUGE IS TO READ 0-21 METRES

UNIVERSAL INDUSTRIES LTD.
P.O. BOX 1590 LLOYDMINSTER, ALTA.
P.O. BOX 1468 CAMROSE, ALTA.

DESIGNED	DRAWN	CHECKED	APPROVED
	J S S		

C-3791

CLIENT
GOV'T OF NORTHWEST TERRITORIES
DEP'T OF PUBLIC WORKS
GRISE FIORD WATER PUMPING SYSTEM

DWG TITLE

PIPING OVERVIEW

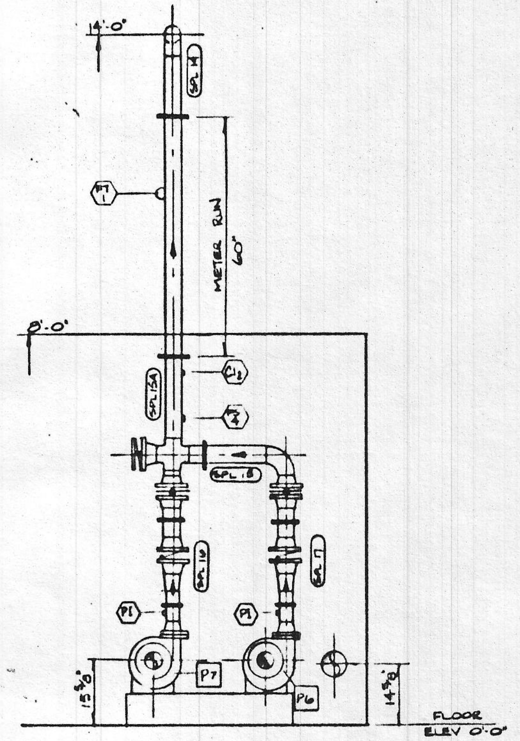
SCALE	DRAWING NO.	REV
3/8" = 1'-0"	PI-150	1

DATE FEB. 04. 87

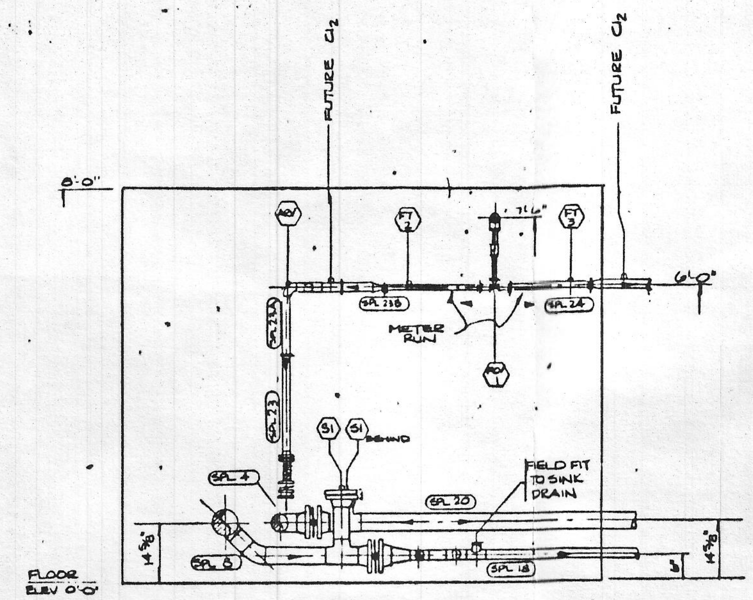
WALL SLEEVES

QTY	O.D.	PIPE JACKET	LOCATION
1	12"	YES	TK2 SUCTION LINE
1	8"	YES	TK2 RECIRCULATION LINE
1	6⅝"	NO	FIRE HYDRANT
1	6⅝"	NO	SUMMER FILL LINE

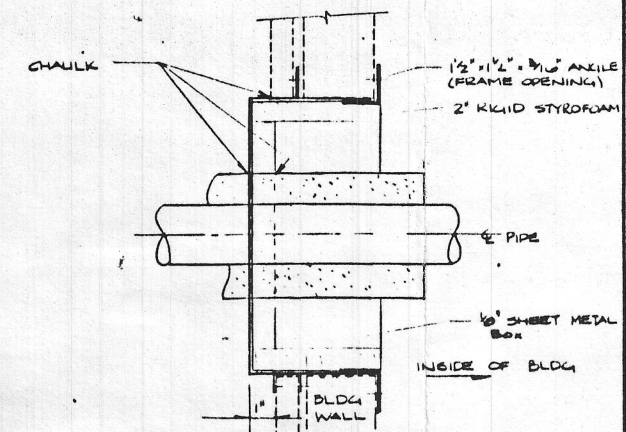
GENERAL NOTES
1. ALL DIMENSIONS ARE FOR REFERENCE; FIELD TO DETERMINE
2. EQUIPT. TAG DESCRIPTIONS ARE ON DWG PI-150
3. ALL VALVE TAGGING (NOT SHOWN) IS ON THE SPOOL DWGS.



SECTION A-A
SCALE ½" = 1'-0"



SECTION B-B
SCALE ½" = 1'-0"



VERTICAL SECTION

NOTES
1. ALL SHEET METAL TO BE PRE-FINISHED 22 GA.
2. FASTENERS TO BE GASKETED SCREWS OR SELF-SEALING POP RIVETS.
3. ALL JOINTS TO BE CAULKED.
4. WALL OPENING WIDTHS TO BE FIELD DETERMINED.

WALL SLEEVE DETAIL
SCALE ½" = 1'-0"

PRINT RECORD

ISSUED FOR	TO	DATE	REV.
AS BUILT	GCG DILLION	88-01-07	1
CONSTRUCTION	CLIENT, FIELD	87-03-04	0
INFORMATION	ELECTRICAL	87-03-03	0
APPROVAL	CLIENT	87-02-12	A

REVISIONS

NO	DATE	DESCRIPTION	BY	APP'D
1	88 01 07	AS BUILT	B.J.K.	

REFERENCE DRAWINGS

NUMBER	TITLE
PI-134	PIPING SPOOLS 2/2
PI-133	PIPING SPOOLS 1/2
PI-150	PIPING OVERVIEW

UNIVERSAL INDUSTRIES LTD.
P.O. BOX 1590
LLOYDMINSTER, ALTA.

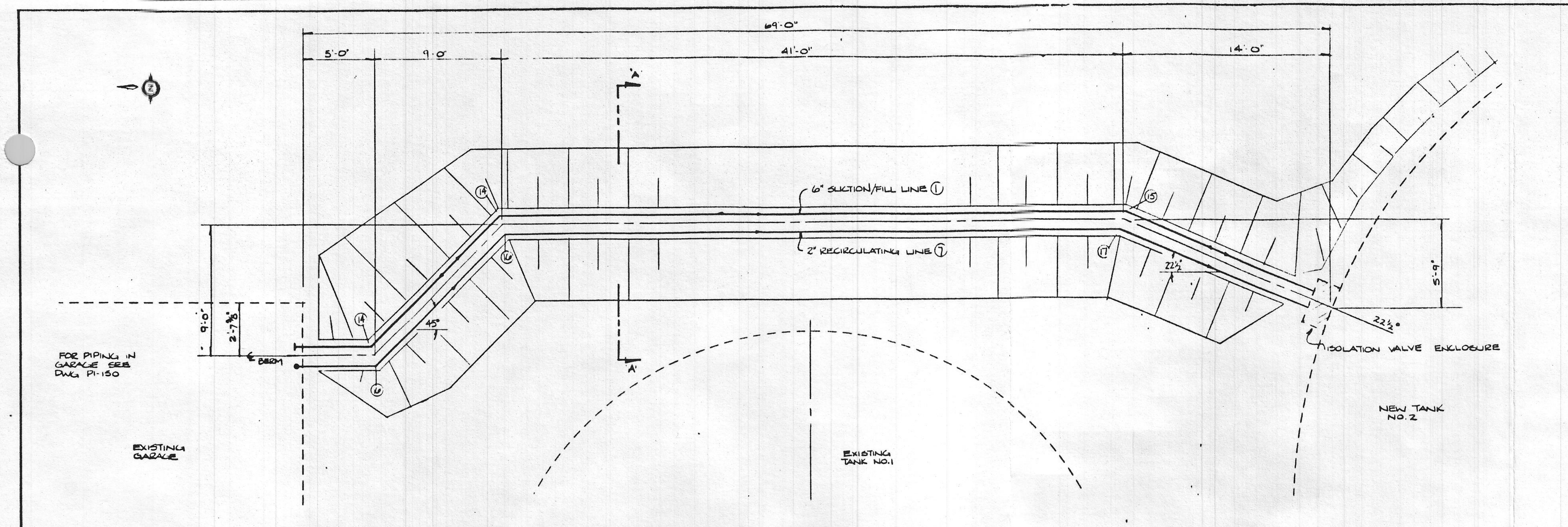
DESIGNED	DRAWN	CHECKED	APPROVED
C-3791	J.S.S.		

CLIENT
GOV'T OF NORTHWEST TERRITORIES
DEP'T OF PUBLIC WORKS
GRISE FIORD WATER PUMPING SYSTEM

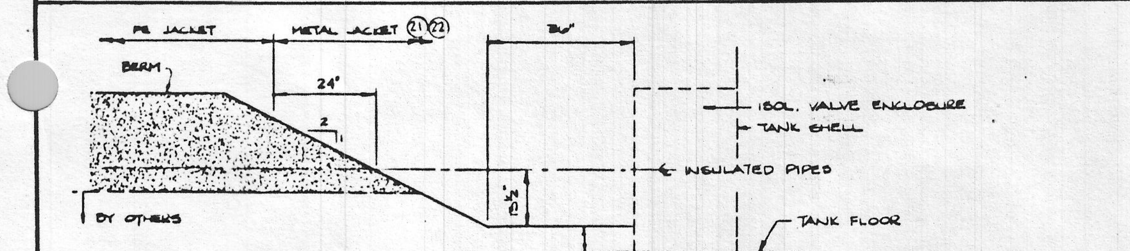
DWG TITLE
PIPING DETAILS

SCALE	DRAWING NO.	REV.
AS NOTED	PI-151	1

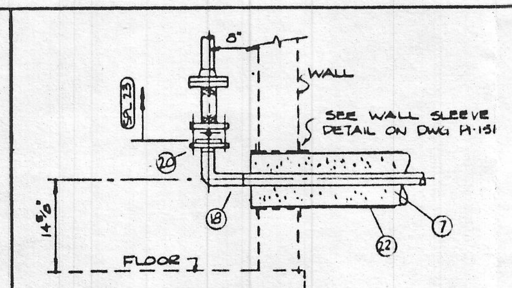
DATE
FEB 06 - 87



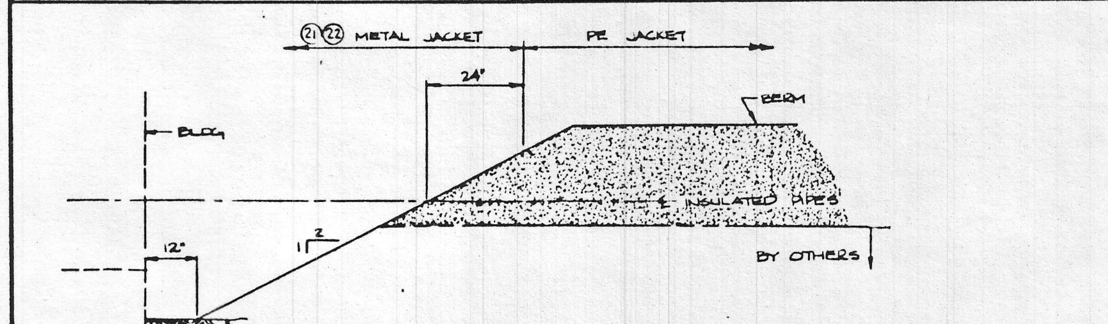
HDPE PIPING PLAN
SCALE ¼" = 1'-0"



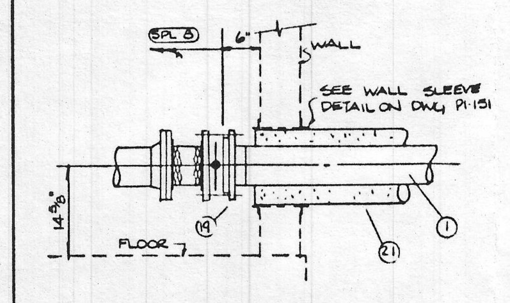
BERM TRANSITION AT TANK
N.T.S.



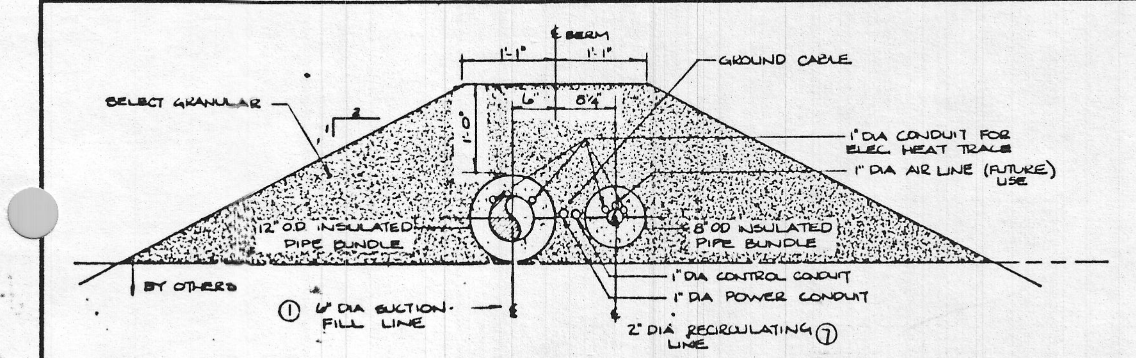
2" RECIRULATING LINE - INSIDE GARAGE DET.
SCALE ¾" = 1'-0"



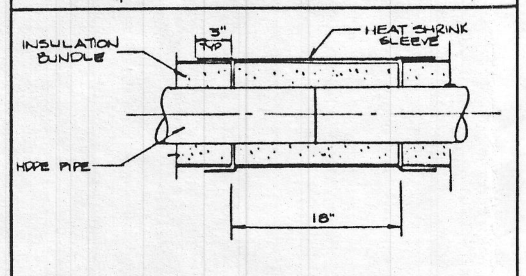
BERM TRANSITION AT BUILDING
N.T.S.



6" SUCTION/FILL LINE - INSIDE GARAGE DET
SCALE ¾" = 1'-0"



BERM CROSS SECTION A-A
N.T.S.



TYP. HDPE PIPE JOINT
N.T.S.

NOTES
1. ALL DIMENSIONS ARE FOR REFERENCE; FIELD TO CONFIRM.
2. ELECTRICAL CONDUIT, GND CABLE, HEAT TRACE TO BE PROVIDED BY ELECTRICIAN.
3. USE DILLION DWG T2-1 FOR REFERENCE.

MATERIAL LIST

STOCK NO	MK	AMOUNT	DESCRIPTION	MATERIAL
	1	76 0"	6" HDPE PIPE c/w 2 CHANNELS FOR HEAT TRACE; WRAPPED WITH 3" THK OF 90% CLOSE CELL INSULATION (ASTM-D-2856); AND JACKET OF UV INHIBITED BLACK HIGH DENSITY POLYETHYLENE	
	7	76'-0"	2" HDPE PIPE c/w 2 CHANNELS FOR HEAT TRACE AND 1 - 1" DIA HDPE PIPE; WRAPPED WITH 3" THK OF 90% CLOSE CELL INSULATION (ASTM-D-2856); AND JACKET OF UV INHIBITED BLACK HIGH DENSITY POLYETHYLENE	
	14	2	ELBOW 6" HDPE 45°	
	15	1	ELBOW 6" HDPE 22½°	
	16	2	ELBOW 2" HDPE 45°	
	17	1	ELBOW 2" HDPE 22½°	
	18	1	ELBOW 2" HDPE 90°	
	19	2	HDPE TO STEEL ADAPTOR 6" x 150#	
	20	2	HDPE TO STEEL ADADATOR 2" x 150#	
	21	20' 0"	METAL JACKETING 18 GA x 12" O.D	GALV
	22	20-0"	METAL JACKETING 18 GA x 8" O.D	GALV.

NO	DATE	DESCRIPTION	BY	APP'D
1	88-01-07	AS BUILT	B.J.K	

REVISIONS

NUMBER	TITLE
PI-151	PIPING DETAILS
PI-150	PIPING OVERVIEW
T2-1	DILLION TANK LAYOUT & DETAILS

REFERENCE DRAWINGS

ISSUED FOR	TO	DATE	REV.
AS BUILT	GCG DILLION	88-01-07	1
CONSTRUCTION	CLIENT, FIELD	87-03-04	0
INFORMATION	ELECTRICAL	87-03-03	0
APPROVAL	CLIENT	87-02-12	A

PRINT RECORD

UNIVERSAL INDUSTRIES LTD.
P.O. BOX 1590
LLOYDMINSTER, ALTA.

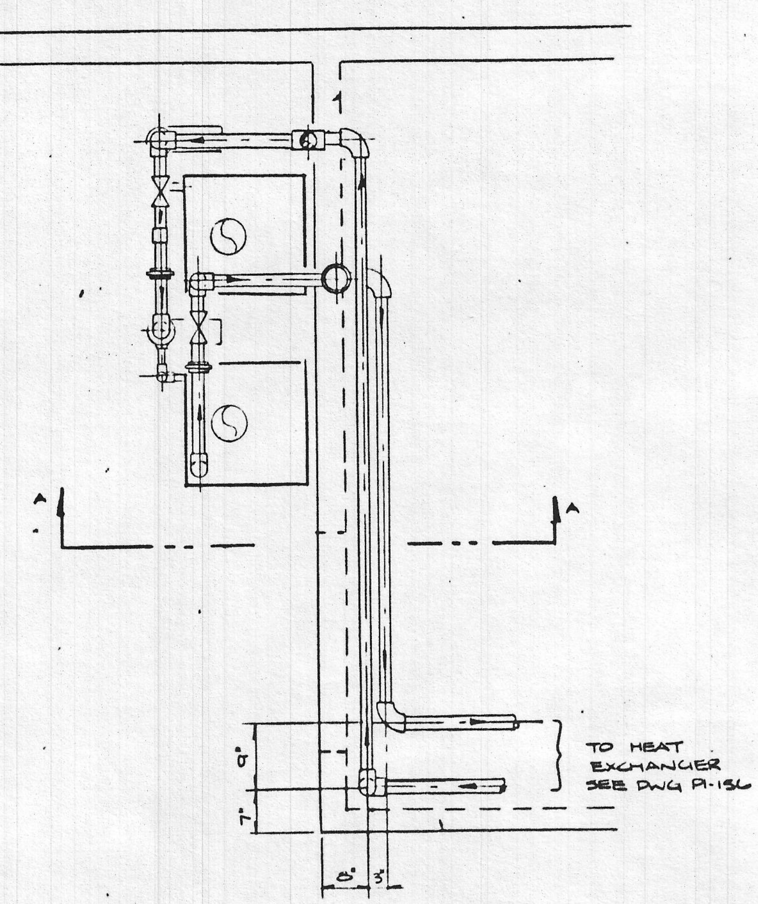
DESIGNED | DRAWN J.S.C. | CHECKED | APPROVED

C 3791

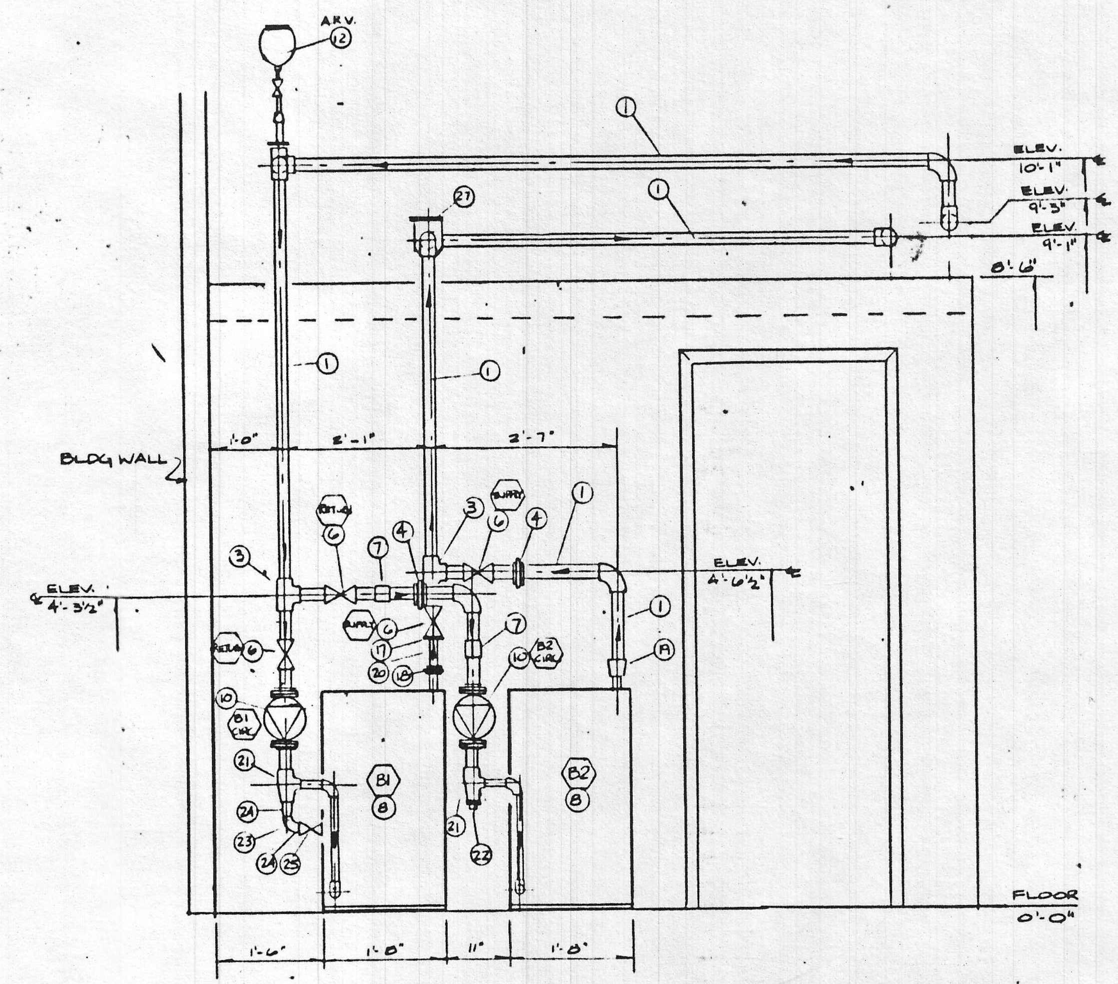
CLIENT
GOV'T OF NORTHWEST TERRITORIES
DEP'T OF PUBLIC WORKS
GRISE FIORD WATER PUMPING SYSTEM

DWG TITLE
HDPE PIPING

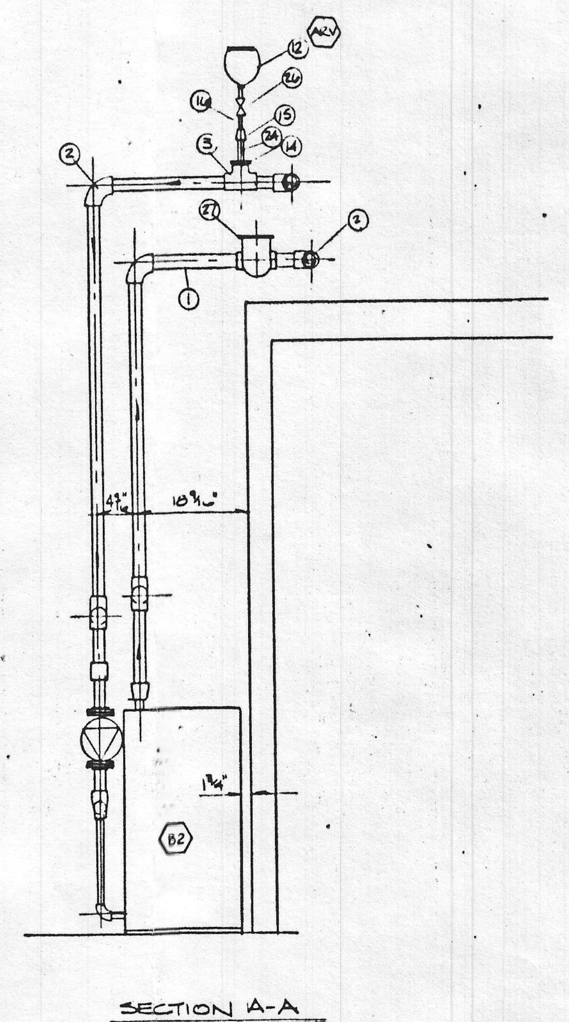
SCALE AS NOTED
DATE FEB-01-87
DRAWING NO. PI-152
REV 1



PLAN



ELEVATION



SECTION A-A

NOTES
1. ALL DIMENSIONS ARE FOR REFERENCE; FIELD TO CONFIRM
2. PIPING OVERVIEW IS ON DWG PI-150,
3. HOT WATER PIPING IS ON DWG PI-156
4. ALL NIPPLES ARE 2" x SCH 40 x 4" LG UNLESS OTHERWISE NOTED.

MATERIAL LIST

STOCK NO.	MK	AMOUNT	DESCRIPTION	MATERIAL
	1	30'-0"	PIPE 2" x SCH 40 ERW SA-53-B	GALV.
	2	6	ELBOW 2" x 150# M.I. 90°	GALV.
	3	3	TEE 2" x 150# M.I.	GALV.
	4	2	UNION 2" x 300# G.J.	GALV.
	5	13	NIPPLE 2" x SCH 40 x 4" LG ERW	GALV.
	6	4	GATE VALVE 2" BRONZE	CRANE No. 424UB
	7	2	COUPLING 2" x 150# M.I.	GALV.
	8	2	BOILER 238.2 MBA	–
			WELL-McLAIN MDL# 766 HEAT	
	10	2	CIRCULATING PUMP	–
			ARMSTRONG S 35	
	12	1	AIR RELEASE VALVE ½" NPT	–
			VALMATIC #15 c/w GATE VALVE	
	14	1	BUSHING 2" x ¾" x 150# M.I.	GALV.
	15	1	REDUCER ¾" x ½" x 150# M.I.	GALV.
	16	1	NIPPLE ½" x SCH 40 x 4" LG ERW	GALV.
	17	1	BUSHING 2" x 1½" x 150# M.I.	GALV.
	18	1	UNION 1½" x 150# M.I.	GALV.
	19	1	REDUCER 2" x 1½" x 150# M.I.	GALV.
	20	1'-0"	PIPE 1½" x SCH40 ERW	GALV.
	21	2	RED. TEE 2" x 1¼" x ¾" x 150# M.I.	GALV.
	22	1	HEX PLUG ¾" x 150# M.I.	GALV.
	23	1	ELBOW ¾" x 150# M.I. 90°	GALV.
	24	2	NIPPLE ¾" x SCH 40 x 4" LG ERW	GALV.
	25	1	GATE VALVE ¾" BRONZE	CRANE 428UB
	26	1	GATE VALVE ½" BRONZE	CRANE 428UB
	27	1	AIR SCOOP 2" THR'D	–
			(FURNISHED WITH BOILERS)	

NO.	DATE	DESCRIPTION	BY	APP'D
0	88.01.07	AS BUILT	B.J.K.	

REVISIONS

NUMBER	TITLE

REFERENCE DRAWINGS

UNIVERSAL INDUSTRIES LTD.
P.O. BOX 1590
LLOYDMINSTER, ALTA.

DESIGNED	DRAWN	CHECKED	APPROVED
	J.S.S.		

C 3791

CLIENT
GOV'T OF NORTHWEST TERRITORIES
DEP'T OF PUBLIC WORKS
GRISE FIORD WATER PUMPING SYSTEM

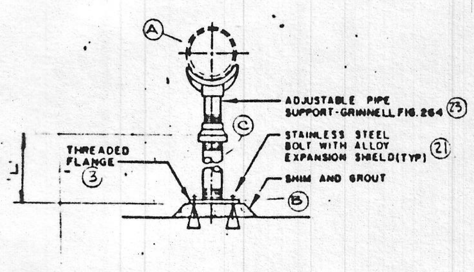
DWG TITLE
BOILER PIPING

ISSUED FOR	TO	DATE	REV.
AS BUILT	GLG DILLION	88.01.07	0

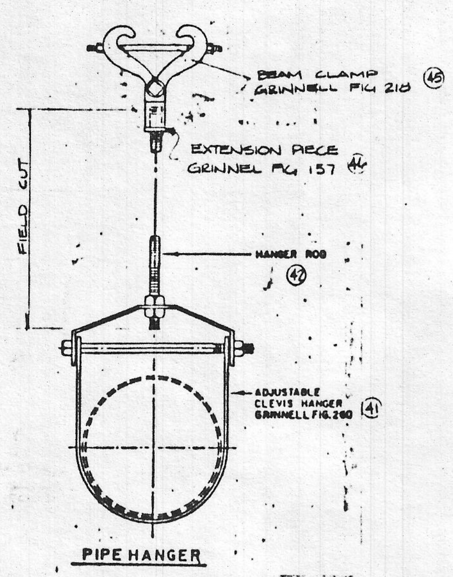
PRINT RECORD

SCALE ¾" = 1'-0"
DATE SEP 28 · 87
DRAWING NO. PI-167
REV 0

LINE SIZE (A)	QTY	FLANGE SIZE (B)	PIPE SIZE (C)	DIM. 'L'
6"	8	3"	3" (2)	0'-5"

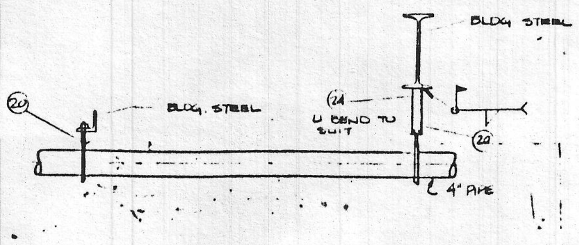


PIPE SUPPORT #1
N.T.S.

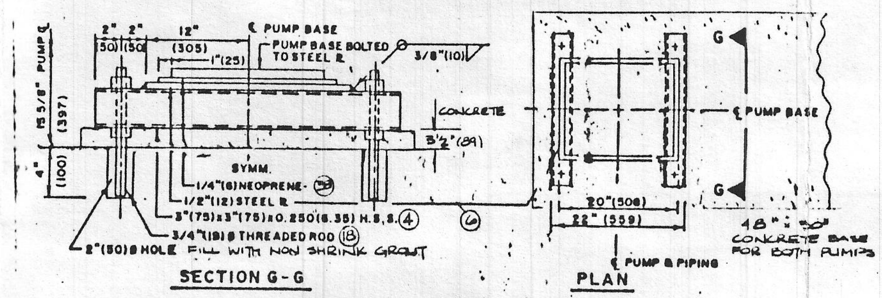


PIPE SUPPORT #2
N.T.S.

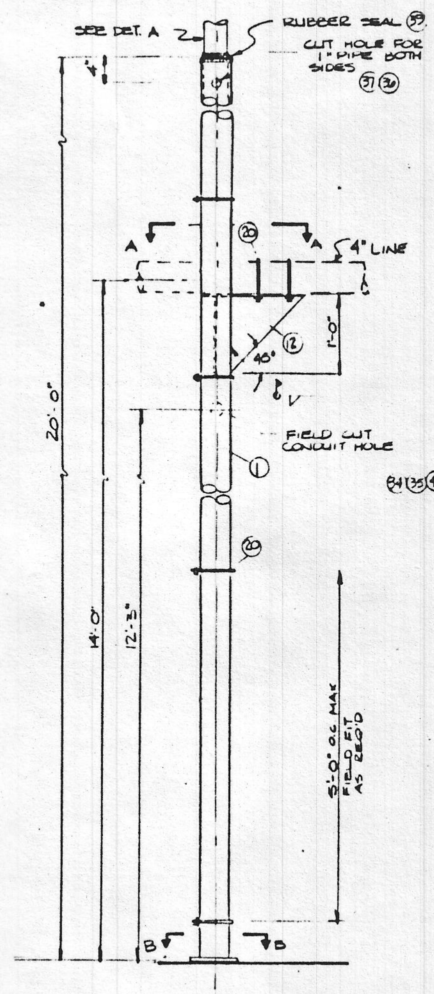
NOTE - 6 REQ'D FOR 4" WATER DELIVERY PIPE ALONG CEILING
- SOME ROD IS BOLTED DIRECTLY TO BUILDING STEEL FLANGES



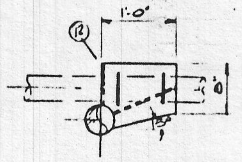
PIPE SUPPORT #3
N.T.S.
AS REQ'D



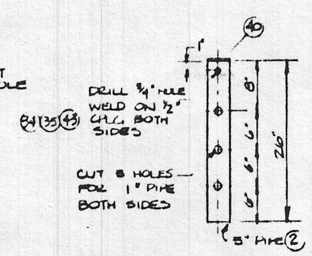
PUMP P6 & P7 BASE
N.T.S.
2 BASES REQ'D



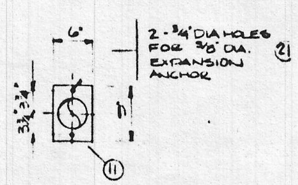
PIPE SUPPORT #4
SCALE 3/4" = 1'-0"
1 REQ'D



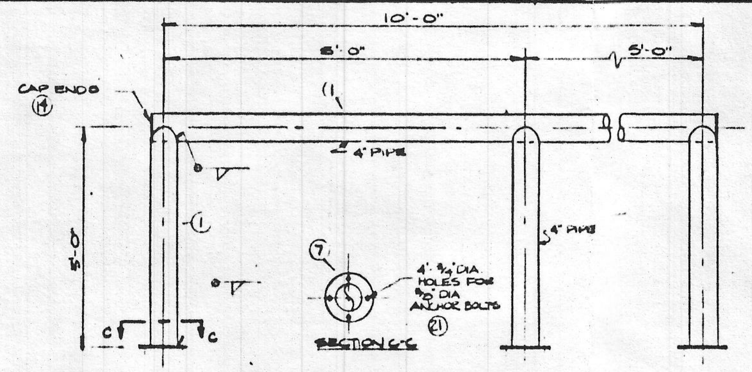
SECTION A-A



DETAIL A
N.T.S.

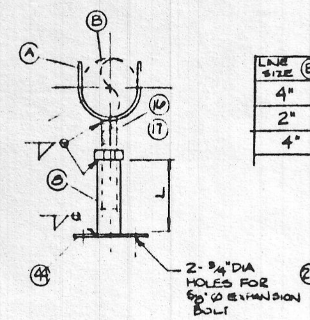


SECTION B-B

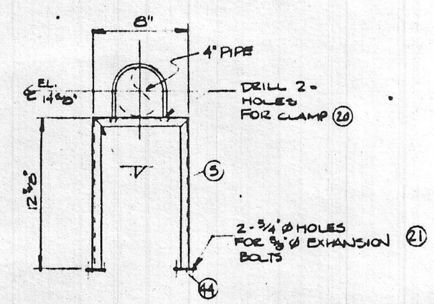


PIPE BARRIER
SCALE 3/4" = 1'-0"
1 REQ'D

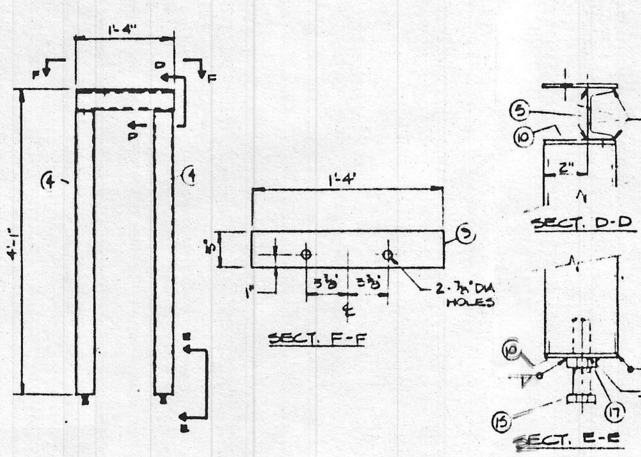
LINE SIZE (B)	QTY	U BOLT SIZE (A)	DIM. 'L'
4"	3	4"	2 1/2"
2"	10	2"	2 1/2"
4"	3	4"	10"



PIPE SUPPORT #5
SCALE 3" = 1'-0"



PIPE SUPPORT #6
SCALE 1/2" = 1'-0"
3 REQ'D



HEAT EXCHANGER SUPPORT
SCALE 3/4" = 1'-0"
2 REQ'D

MATERIAL LIST

STOCK NO.	MK	AMOUNT	DESCRIPTION	MATERIAL
	1	40'-0"	PIPE 4" x SCH 40 ERW	SA-53-B
	2	7'-0"	PIPE 3" x SCH 40 ERW	SA-53-B
	3	8	FLANGE 3" x 150# THREADED	SA-105
	4	25'-0"	HHS 3" x 3" x 3/16"	44W
	5	14'-0"	CHANNEL 2" x 2.57#	A-36
	6	2	PL 1/2" x 24" x 24"	SA-283-C
	7	3	PL 1/4" x 8" DIA	SA-283-C
	8	61'-0"	PIPE 1" x SCH 40 ERW	SA-53-B
	9	2	FLAT BAR 3" x 1/4" x 1'-4" LG	A-36
	10	8	PL 3/16" x 2 13/16" x 2 13/16"	SA-283-C
	11	1	PL 1/4" x 6" x 9"	SA-283-C
	12	3 FT²	PL 1/4"	SA-283-C
	14	2	PL 3/16" x 4 1/4" DIA	SA-283-C
	15	8	BOLTS 3/4" x 6" LG	GR. 5
	16	16	ALL THREAD ROD 3/4" x 4" LG	A-36
	17	40	HEX NUTS 3/4"	GR5
	18	8	ALL THREAD ROD 3/4" x 9" LG	A-36
	19	10	U BOLT 2" PIPE	—
	20	16	U BOLT 4" PIPE S/W NUTS	—
	21	30	EXPANSION BOLT 5/8" x 3" LG	—
	22	3	TURN BUCKLE GRINELL FIG 230	—
	23	8	ADJUSTABLE PIPE SUPPORT GRINELL FIG 264	—
	24	6'-0"	ANGLE 2" x 2" x 3/16"	A-36
	26	6	ALL THREAD ROD 5/8" x 18" LG	A-36
	28	1	STEEL CLEVIS 5/8" GRINELL FIG 299	
	29	6	BOLT 5/8" x 4" LG	GR.5
	30	6	HEX NUT 5/8"	GR.5
	31	12	WASHER 5/8" STD	GR.5
	32	8	BOLT 3/4" x 3" LG	GR5
	33	16	WASHER STD 3/4"	GR.5
	34	2	STREET ELBOW 1/2" x 150#	M.I
	35	2	NIPPLE 1/2" x 4" LG SCH 40 ERW	SA-53-B
	36	1	PIPE 1" x SCH 40 x 10' LG ERW TBE	SA-53-B
	37	2	PIPE CAPS 1" x 150# THR'D	M.I.
	38	2	NEOPRENE 1/4" x 22" x 22"	—
	39	1	RUBBER SEAL 3" PIPE → 4" PIPE	RUBBER
	40	1	PL 3/16" x 3 1/4" DIA	SA-283-B
	41	6	CLEVIS HANGER 4" GRINELL FIG 260	—
	42	16'-0"	ALL THREAD 5/8" DIA	A-36
	43	2	COUPLING 1/2" x 3000# F.S. HALF	SA-105
	44	22	PL 3/16" x 6" DIA	SA-283-C
	45	6	BEAM CLAMP GRINNEL FIG 218	-
	46	6	EXTENSION PIECE GRINNEL FIG 157	-

REVISIONS

NO	DATE	DESCRIPTION	BY	APP'D
3	88.01.07	FIELD AS BUILT	B.J.K	
2	87.08.03	ADDED MATERIAL FOR PIPE SUPPORT #2	J.S.S	
1	87.02.04	AS BUILT	J.S.S	

REFERENCE DRAWINGS

NUMBER	TITLE

PRINT RECORD

ISSUED FOR	TO	DATE	REV
FIELD AS BUILT	GCG DILLION	88.01.07	3
INFORMATION	CLIENT, FIELD	87.03.04	2
INFORMATION	ELECTRICAL	87.03.02	1
AS BUILT (SHOP)	CLIENT	87.02.12	1
CONSTRUCTION (SHOP)	OPERATIONS / CLIENT	86.09.04	0

UNIVERSAL INDUSTRIES LTD.
P.O. BOX 1590
LLOYDMINSTER, ALTA.

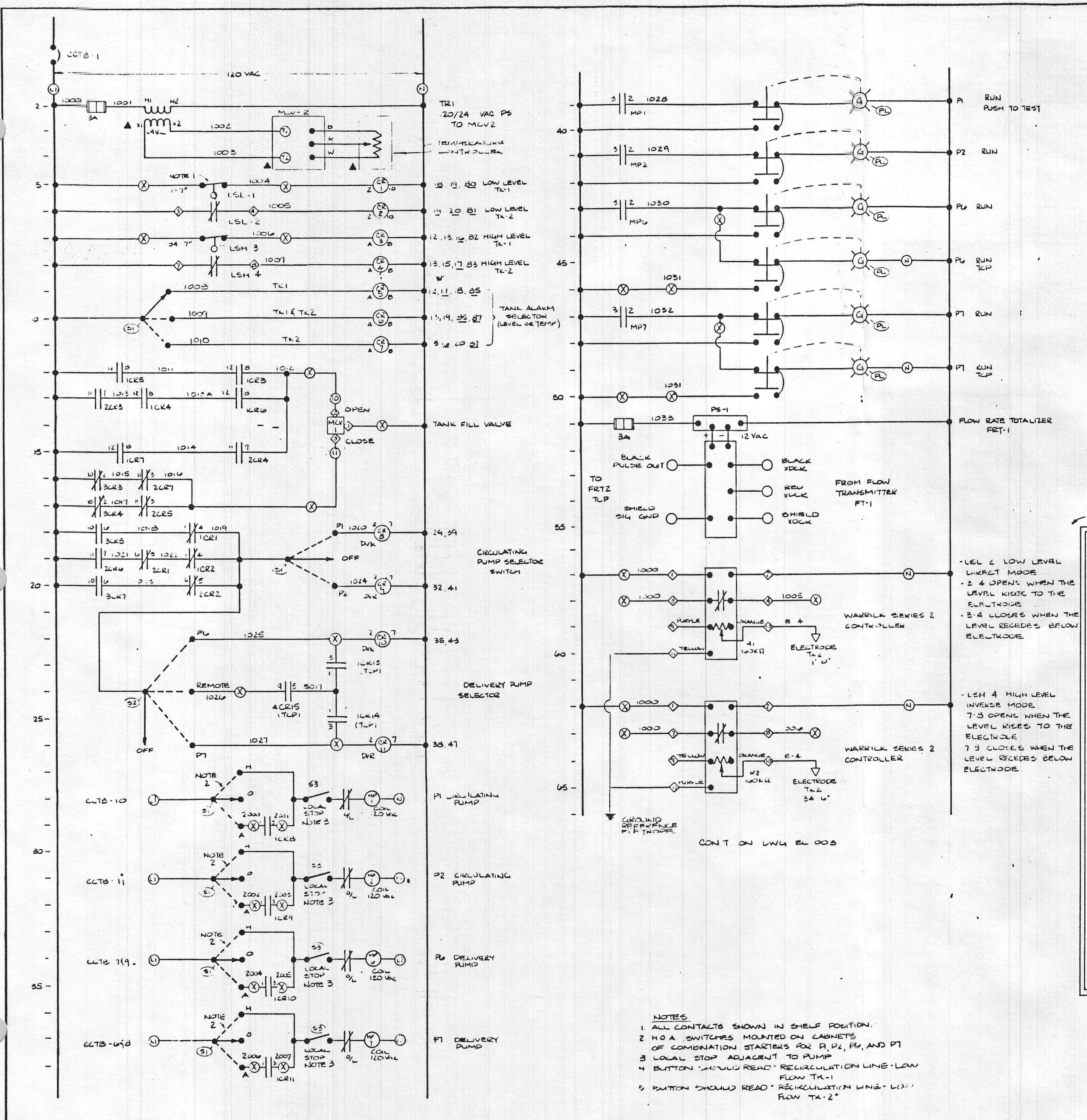
DESIGNED
DRAWN J.S.S.
CHECKED
APPROVED

C-3791

CLIENT
GOV'T OF NORTHWEST TERRITORIES
DEP'T OF PUBLIC WORKS
GRISE FIORD WATER PUMPING SYSTEM

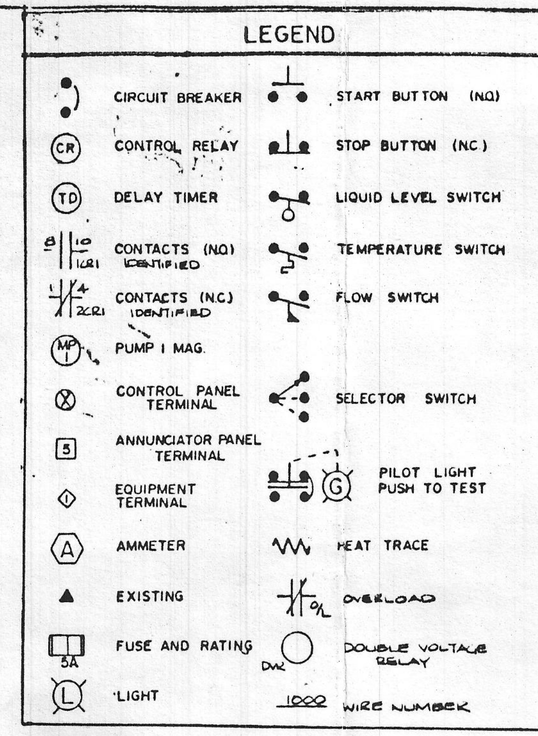
DWG TITLE
MISCELLANEOUS SUPPORTS

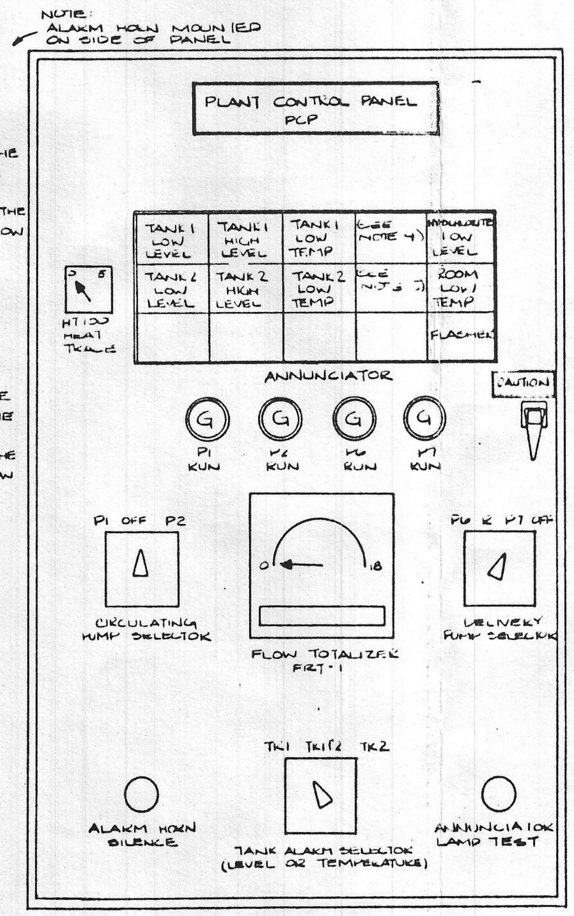
SCALE AS SHOWN
DATE JULY 11 1986
DRAWING NO. AR-67
REV. 3



NOTES

1. ALL CONTACTS SHOWN IN SHELF POSITION.
2. HOA SWITCHES MOUNTED ON CABINETS OF COMBINATION STARTERS FOR P1, P2, P6, AND P7
3. LOCAL STOP ADJACENT TO PUMP
4. BUTTON SHOULD READ "RECIRCULATION LINE - LOW FLOW TK-1"
5. BUTTON SHOULD READ "RECIRCULATION LINE - LOW FLOW TK-2"





MATERIAL LIST

MARK	DESCRIPTION
TR1	EXISTING (?)
LSL-1	VAREC *2557 BD PROGRAMMER
LSH-3	VAREC *2577 BD PROGRAMMER
S1	WESTINGHOUSE PB1JHH1A
S2	WESTINGHOUSE PB1JJH4E
S3	HUBBELL 1201 SWITCH C/W CROUSE HINDS DS185 COVER
CR1,2,	POTTER & BRUMFIELD KRPA-14AN 120 Vac 10A
	C/W 27E892 BASE
CR3-7	POTTER & BRUMFIELD KUP17A19 120 Vac 10A
	C/W 27E867 BASE
CR8-11	POTTER & BRUMFIELD KRPA-11AN 120 Vac 10A
	C/W 27E891 BASE
PL	WESTINGHOUSE PB1GVOLT 120Vac
A	WILBAC 18480 0-5 AMPS (3½")
HT100	CHEMULUX 10BTV1-CT 10W/FT 120Vac 13' LONG
MCV-1	RCS MAR-90-15-4-CSA 120Vac ACTUATOR
PRT-1	SIGNET MK575 ACCUM-U-FLO
	C/W POWER SUPPLY - 120Vac/12Vdc
	- 0-1800 Lpm SCALE
	- 7 DIGIT NON-RESETTABLE COUNTER
FT-1	SIGNET MK515 FLOSENSOR
LSL-2 &	WARRICK CONTROLS
LSH-4	C/W - 2 ONLY 2D1F4 CONTROLLER SERIES 2
	- SUSPENSION WIRE 321A TO SUIT
	- 1 ONLY 3F3C ELECTRODE FITTING
	- 3 ONLY 3W2 ELECTRODES
	- 3 ONLY 3218 ADAPTERS
R1	CLAROSTAT *53C1 5 MEG POTS 2 WATT
R2	CLAROSTAT *53C1 5 MEG POTS 2 WATT

ISSUED FOR	TO	DATE	REV
AS BUILT	GCG DILLION	88.01.07	1
PERMITS	ELEC. INSPECTION BRANCH	87.07.21	0
CONSTRUCTION	ELEC. DEPT.	87.06.11	0
APPROVAL	GCG DILLON	87.02.25	B
APPROVAL	GCG DILLON	87.01.26	A

PRINT RECORD

NO	DATE	DESCRIPTION	BY	APP'D
1	88.01.07	AS BUILT	B.J.K	

REVISIONS

NUMBER	TITLE

REFERENCE DRAWINGS

UNIVERSAL INDUSTRIES LTD.

P.O. BOX 1590 LLOYDMINSTER, ALTA. — P.O. BOX 1468 CAMROSE, ALTA.

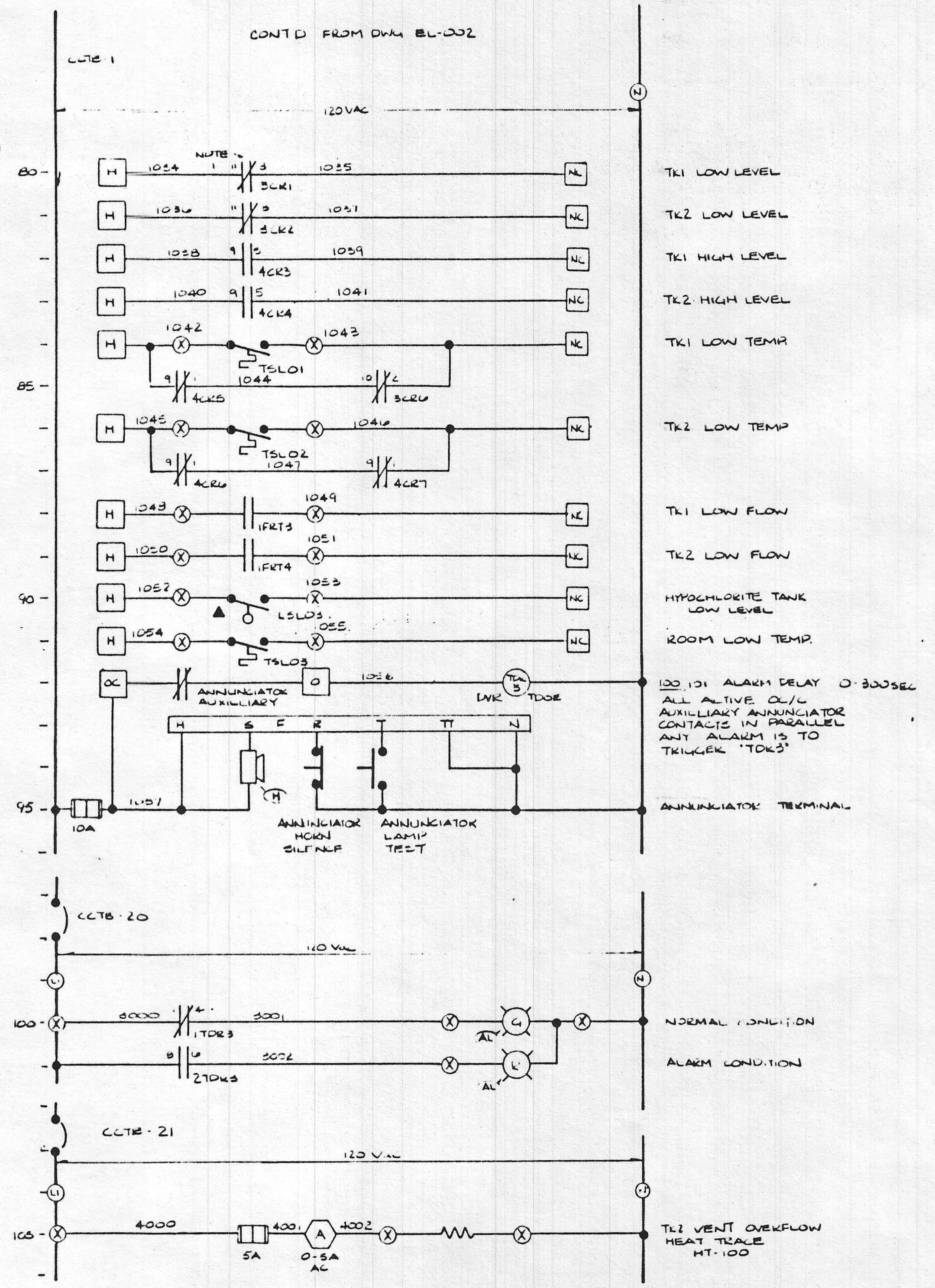
DESIGNED | DRAWN J.S.S. | CHECKED SP | APPROVED

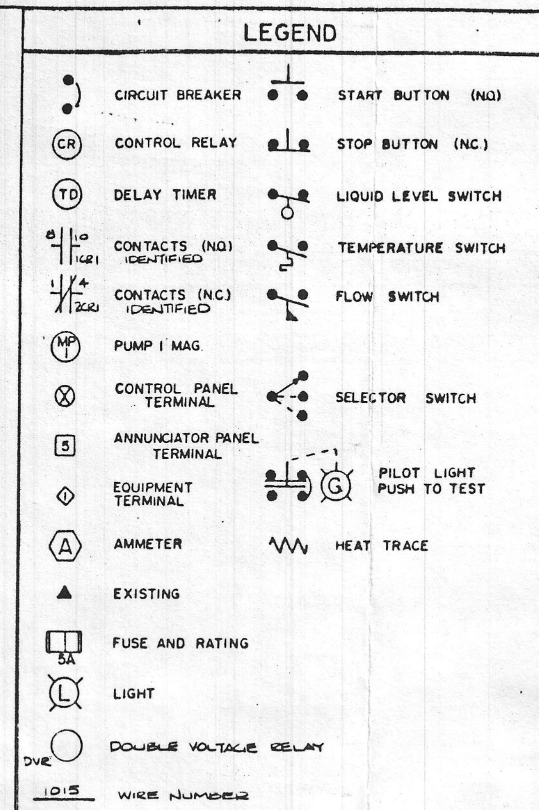
C-3791

CLIENT
GOV'T OF NORTHWEST TERRITORIES
DEP'T OF PUBLIC WORKS
GRISE FIORD WATER PUMPING SYSTEM

DWG TITLE
PLANT CONTROL PANEL - A

SCALE N.T.S. | DATE JAN 17.87 | DRAWING NO. EL-002 | REV 1





NOTES.

1. ALL CONTACTS SHOWN IN SHELF POSITION

MATERIAL LIST

MARK	DESCRIPTION
TSL01	UNITED ELECTRIC B300 MODEL 103 C/W 304SS WELL
TSL02	UNITED ELECTRIC B300 MODEL 103 C/W 304SS WELL
LSL03	EXISTING (?)
TSL03	HONEYWELL T6051B
LAMP TEST	WESTINGHOUSE PB1AFHA
SILENCE	WESTINGHOUSE PB1AFHB
TDR3	AGASTAT SCB TYPE 1 120Vac 10-300 SEC
AL	APPELTON TVA1200 2 LAMP FIXTURE
	C/W V660R RED GLOBE
	V660G GREEN GLOBE
	V770 GUARDS
ANNUNCIATOR	PAN ALARM SERIES 10 MODEL 11
	C/W 1 - MODEL 1035 ANNUNCIATOR CABINET
	3' HIGH 5' WIDE GP FLUSH MOUNT
	10 - MODEL ACS-8 RELAYS 120Vac/60Hz
	10 - MODEL BCS-M55 LIGHT BOXES
	15 - # M56-W COVERS
	1 - MODEL ACSF-1 FLASHER 120Vac/60Hz
H	EDWARDS 870-N5 FLUSH TYPE HORN 120Vac

ISSUED FOR	TO	DATE	REV
AS BUILT	GCG DILLION	88.01.07	1
PERMITS	ELEC. INSPECTION BRANCH	87.07.21	0
CONSTRUCTION	ELEC. DEPT'	87.06.11	0
APPROVAL	GCG DILLON	87.02.25	B
APPROVAL	GCG DILLON	87.01.26	A

PRINT RECORD

NO	DATE	DESCRIPTION	BY	APP'D
1	88 01 07	AS BUILT	B.J.K.	

REVISIONS

NUMBER	TITLE

REFERENCE DRAWINGS

UNIVERSAL INDUSTRIES LTD.

P.O. BOX 1590 LLOYDMINSTER, ALTA.

P.O. BOX 1468 CAMROSE, ALTA.

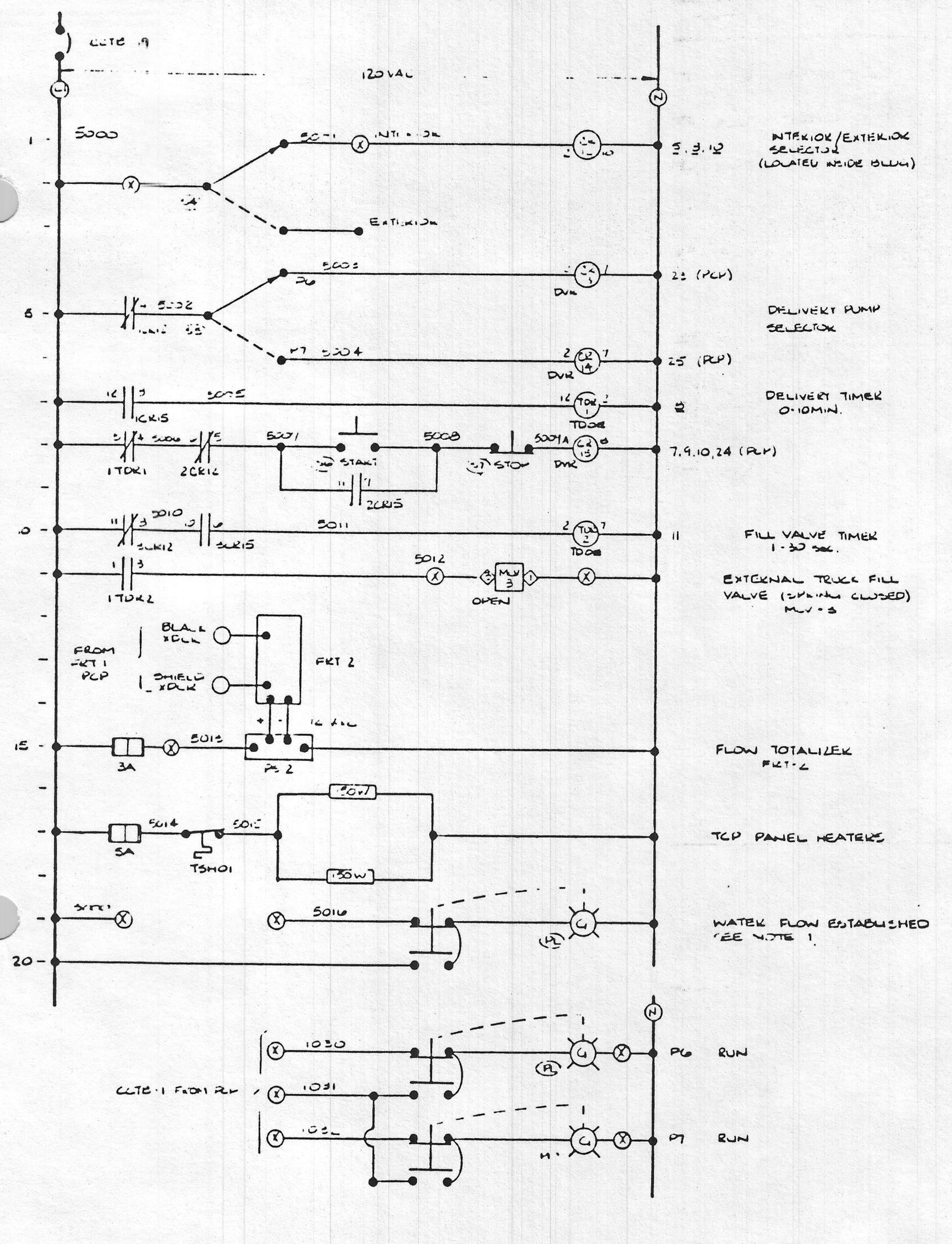
DESIGNED	DRAWN	CHECKED	APPROVED
C3791	JSS	GP	GP

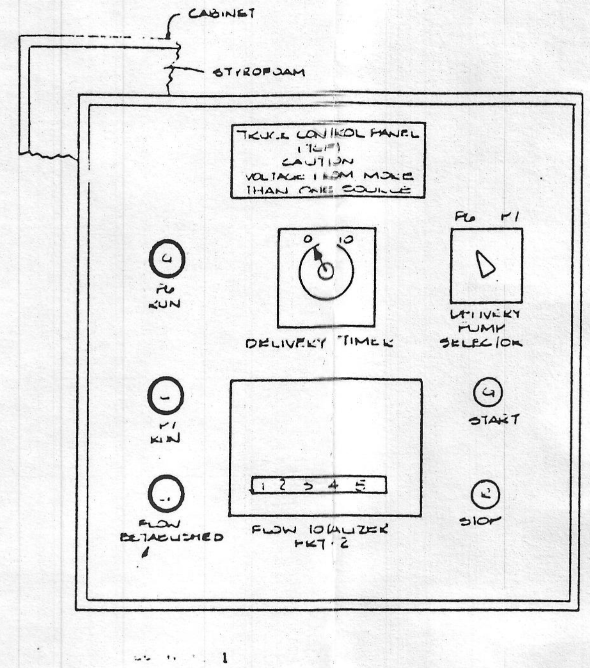
CLIENT
GOV'T OF NORTHWEST TERRITORIES
DEP'T OF PUBLIC WORKS
GRISE FIORD WATER PUMPING SYSTEM

DWG TITLE
PLANT CONTROL PANEL - B

SCALE	DRAWING NO.	REV
N.T.S	EL-003	1

DATE JAN 18-87





TRUCK CONTROL PANEL

LEGEND

Symbol		Symbol	
	CIRCUIT BREAKER		START BUTTON (NO)
CR	CONTROL RELAY		STOP BUTTON (NC)
TD	DELAY TIMER		LIQUID LEVEL SWITCH
1CR1	CONTACTS (NO) IDENTIFIED		TEMPERATURE SWITCH
2CR1	CONTACTS (NC) IDENTIFIED		FLOW SWITCH
MP	PUMP I MAG		
X	CONTROL PANEL TERMINAL		SELECTOR SWITCH
5	ANNUNCIATOR PANEL TERMINAL		
	EQUIPMENT TERMINAL	G	PILOT LIGHT PUSH TO TEST
A	AMMETER		HEAT TRACE
▲	EXISTING		
5A	FUSE AND RATING		
L	LIGHT		
DVR	DOUBLE VOLTAGE RELAY		
5000	WIRE NUMBER		

MATERIAL LIST

MARK	DESCRIPTION
S4	WESTINGHOUSE PB1JGH2A C/W ENCL
S5	WESTINGHOUSE PB1JGH2A
S6	WESTINGHOUSE PB1AFGA
S7	WESTINGHOUSE PB1AFRB
CR12	POTTER & BRUMFIELD KRPA-14AN 120Vac 10A
	C/W 27E892 BASE
CR13 & 14	POTTER & BRUMFIELD KRPA-11AN 120Vac 10A
	C/W 27E891 BASE
CR15	POTTER & BRUMFIELD KUP17A19 120Vac 10A
	C/W 27E867 BASE
TDR1	EAGLE CYCL-FLEX TIMER # HP5-4-A6-06
TDR2	AGASTAT SCB. TYPE 1 120Vac 1-30 sec.
	C/W 27E891 BASE
MCV-3	ELECTRIPOWER RCS SURE 49-15-CCW 120Vac
TSH01	CHROMALUX 12 amp # CB0235 THERMOSTAT
	CLOSE @ 2°C; OPEN @ 13°C
HEATERS	CHROMALUX # OT615 STRIP 150w 120Vac
FS4	MCDONNELL # FS4-3-D 120Vac PADDLE TYPE
PL	WESTINGHOUSE PB16VOLT 120Vac
FRT2	SIGNET MK579R ACCUMULATOR
	C/W - POWER SUPPLY 120Vac/12Vdc
	- 5 DIGIT RESETTABLE COUNTER
FRT3 & 4	SIGNET MK585 FLOW ALARM
	C/W - 0-180 lpm SCALE
	- SELECTABLE ALARM POINT
FM1 & 2	SIGNET MK515 FLOSENSOR

NOTES

1. THIS ITEM NO LONGER IN USE

ISSUED FOR	TO	DATE	REV
AS-BUILT	GLG DILLON	88-01-07	1
PERMITS	ELEC INSPECTION BRANCH	87-07-21	0
CONSTRUCTION	ELEC. DEPT.	87-06-11	0
APPROVAL	GLG DILLON	87-02-25	B
APPROVAL	GLG DILLON	87-02-26	A

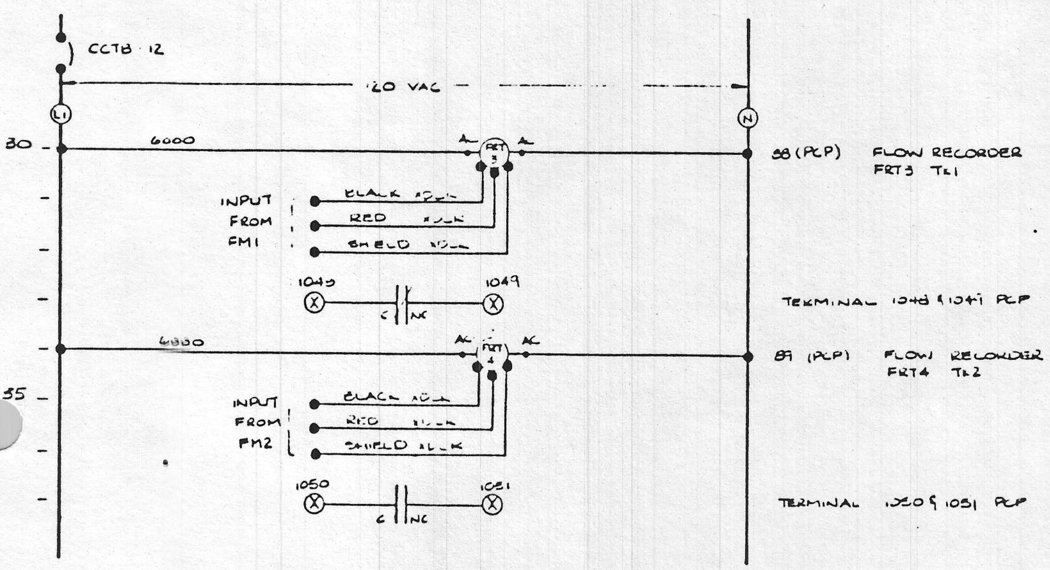
PRINT RECORD

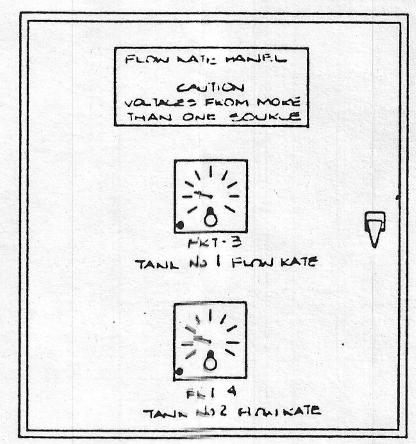
NO	DATE	DESCRIPTION	BY	APP'D

REVISIONS

NUMBER	TITLE

REFERENCE DRAWINGS





FLOW RATE PANEL

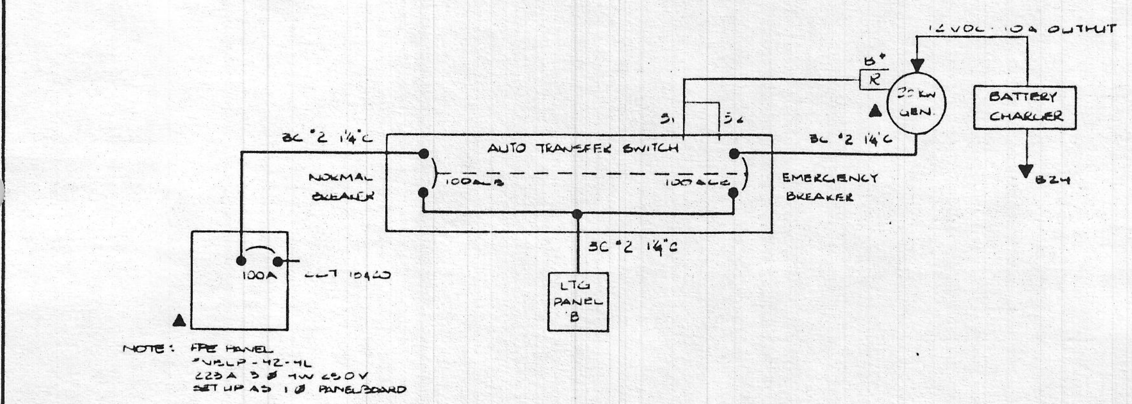
UNIVERSAL INDUSTRIES LTD.
P.O. BOX 1590 LLOYDMINSTER, ALTA.
P.O. BOX 1468 CAMROSE, ALTA.

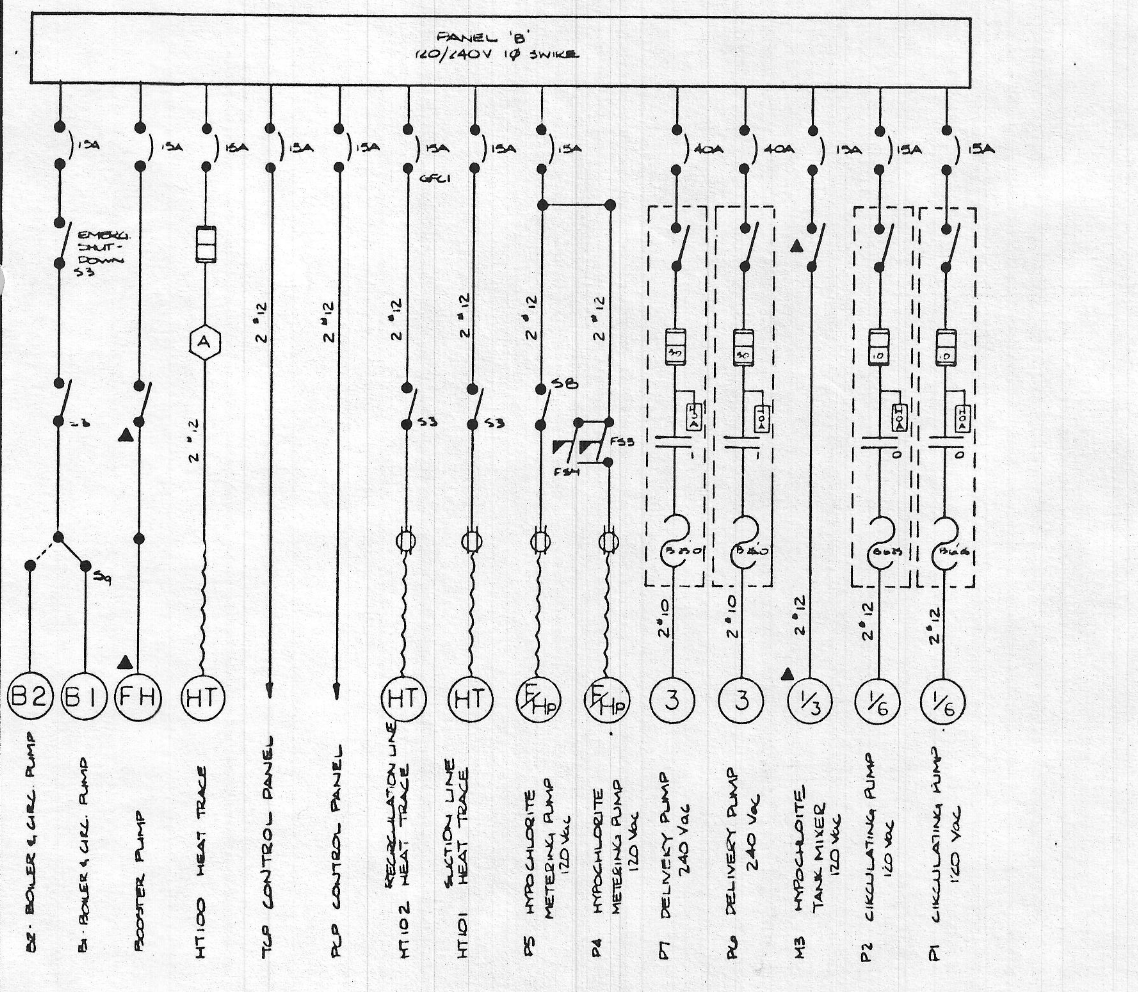
DESIGNED	DRAWN	CHECKED	APPROVED
C-3791	J.S.S	SP	SP

CLIENT
GOV'T OF NORTHWEST TERRITORIES
DEPT OF PUBLIC WORKS
GRISE FIORD WATER PUMPING SYSTEM

DWG TITLE
TRUCK CONTROL PANEL & FLOW RATE PANEL

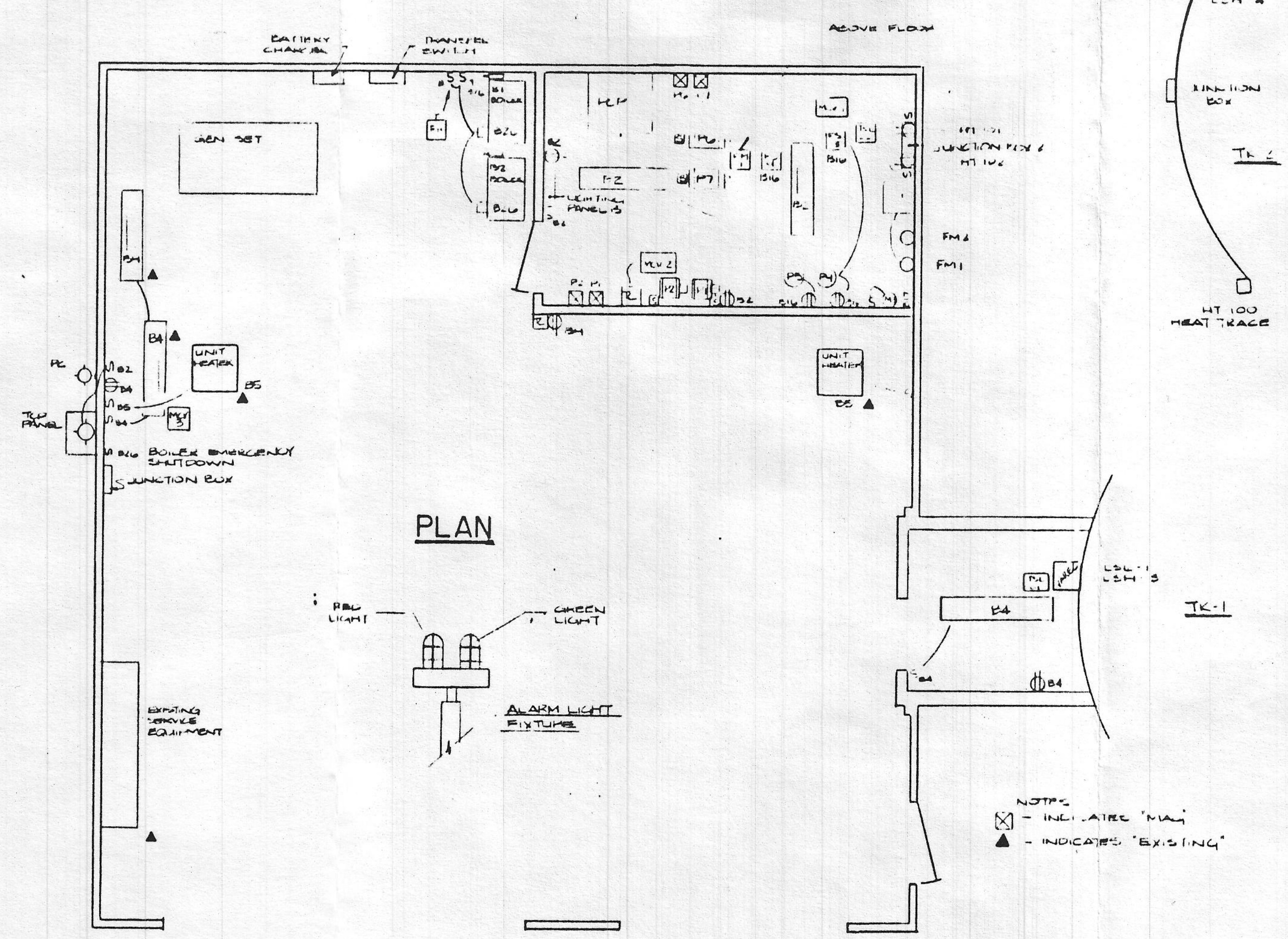
SCALE	DRAWING NO	REV
NTS	EL-004	1
DATE JAN 18-87		





CCT NO	BREAKER AMP	BREAKER POLES	LOAD DESCRITION	REMARKS
1	15	1	PLANT CONTROL PANEL	
3	15	1	CONTROL ROOM LIGHTING	
5	15	1	UNIT HEATERS	
7	40	2	DELIVERY PUMP P6	
9	40	2	DELIVERY PUMP P6	
11	15	1	CIRCULATING PUMP P2	
13	15	1	HEAT TRACE 101 (SUCTION LINE)	
15	15	1	SPARE	
17	15	1	HYPOCHLORITE MIX MOTOR M3	
19	15	1	TRUCK CONTROL PANEL	
21	15	1	SPARE	
23	15	1	SPARE	
25	15	1	SPARE	
27	15	1	SPARE	
29	15	1	SPARE	
31	15	1	HT100 HEAT TRACE (VENT)	TW GFCI
2	15	1	TCP EXTERIOR LIGHTING	
4	15	1	PLUGS, WALKWAY LIGHTING GENSET AREA LIGHTING	
6	40	2	DELIVERY PUMP P7	
8	40	2	DELIVERY PUMP P7	
10	15	1	CIRCULATING PUMP P1	
12	15	1	FLOW RECORDER PANEL	
14	15	1	HEAT TRACE 102 (RECIRCULATION LINE)	
16	15	1	HYPOCHLORITE MET PUMPS P4 & P5	
18	15	1	RECEPTICLE AT VALVE ENCLOSURE TK#2	TW GFCI
20	15	1	ALARM FIXTURE	
22	15	1	SPARE	
24	15	1	BATTERY CHARGER	
26	15	1	BOILERS & CIRCULATING PUMPS B1 & B2	
28	15	1	BOOSTER PUMP FH	
30	15	1	SPARE	

LIGHTING PANEL 'B' DIRECTORY



PLAN

NOTES
☒ - INDICATES 'NEW'
▲ - INDICATES 'EXISTING'

MATERIAL LIST

MARK	DESCRIPTION
LTG B	SQUARE D NQOD 42CCT 1Ø 120/240 VAC
	225A PANEL C/W HINGED DOOR & CHROME
	FLUSH LOCK, QOB STYLE BREAKERS
TRANSFER	WESTINGHOUSE #LR02100MB
SWITCH	C/W EEMAC 3 ENCLOSURE
	FEATURES INCLUDE:
	"EN" TIME DELAY ON RETRANSFER FROM
	EMERGENCY TO NORMAL AFTER RESTORATION
	OF NORMAL POWER
	ADJ 5-180 SEC.
	"EC" TIME DELAY FOR ENGINE COOL DOWN
	ADJ. 20 SEC - 10 MIN
	"NE" TIME DELAY NORMAL TO EMERGENCY
	ADJ. 5-180 SEC.
	"ES" TIME DELAY ON ENGINE START
	ADJ 1-300 SEC. PNEUMATIC
	"VS" VOLTAGE SENSING RELAYS
	DROP OUT @ 84 VOLTS
	PICK UP @ 104 VOLTS
	"TSS" SELECTOR SWITCH TEST/AUTO
	"CR" PREVENTS TRANSFER UNTIL VOLTAGE
	& FREQUENCY OF EMERGENCY SOURCE
	HAS REACHED PRESET VALUE
P1 & P2	SQUARE D COMBINATION STARTER
	C/W EEMAC TYPE 3 ENCLOSURE
	CLASS 8538 SBS12
	10 AMPS OVERLOADS & HOA 120 Vac COIL
P6 & P7	SQUARE D COMBINATION STARTER
	C/W EEMAC TYPE 3 ENCLOSURE
	CLASS 8538 SCS-12
	30 A FUSES OVERLOADS & HOA 240 Vac COIL
BATTERY	MECHRON CRIF 120Vac/12Vdc 10A
CHARGER	
FS3, FS4	McDONNELL #FS4-3-D 120Vac PADDLE TYPE
S3	HUBBELL' 1201 SWITCH
S8	LEVITON 5225/001 COMBINATION SWITCH
	AND REC.
S9	LEVITON 3 WAY SWITCH PART # 1453001

ISSUED FOR	TO	DATE	REV
AS BUILT	GCG DILLON	88.01.07	1
PERMITS	ELEC. INSPECTION BRANCH	87.01.21	0
CONSTRUCTION	ELEC. DEPT.	87.06.11	0
APPROVAL	GCG DILLON	87.02.25	B
APPROVAL	GCG DILLON	87.01.26	A

PRINT RECORD

NO	DATE	DESCRIPTION	BY	APP'D
1	88.01.07	AS BUILT		

REVISIONS

NUMBER	TITLE

REFERENCE DRAWINGS

UNIVERSAL INDUSTRIES LTD.
P.O. BOX 1590 LLOYDMINSTER, ALTA.
P.O. BOX 1468 CAMROSE, ALTA.

DESIGNED	DRAWN	CHECKED	APPROVED
CSM	J.S.S	SP	JP

CLIENT
GOV'T OF NORTHWEST TERRITORIES
DEP'T OF PUBLIC WORKS
GRISE FIORD WATER PUMPING SYSTEM

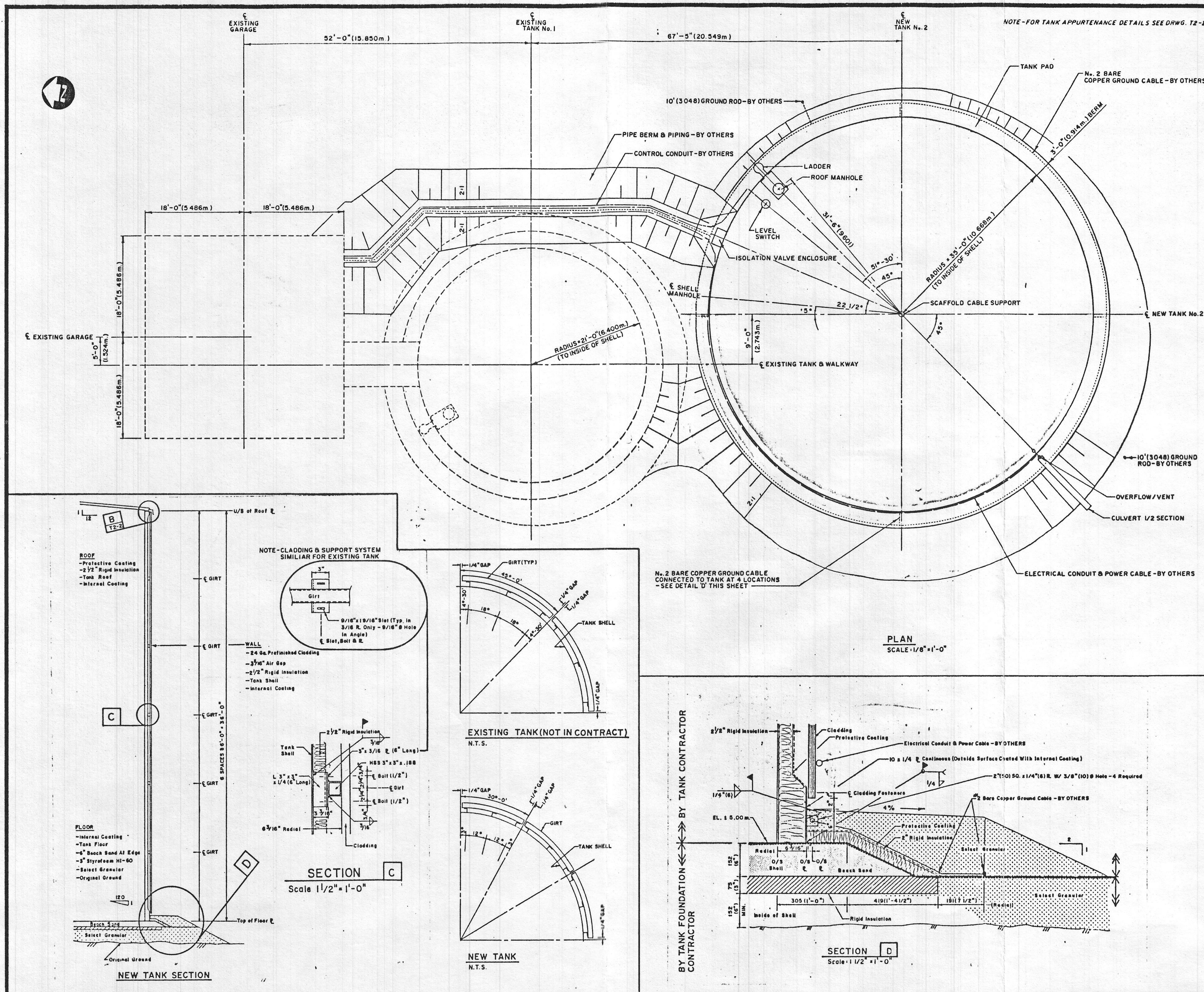
DWG TITLE
DISTRIBUTION

SCALE	DRAWING NO.	REV
N.T.S.	EL-005	1

DATE
JAN 19-87

9.4 Consultants Construction Record Drawings

Drawing No. T2-1	-	Tank Layout & Cladding Details
T2-2	-	Tank No. 2 Details
TF-1	-	Tank Foundation Pad and Pipe Berm
M-1	-	Piping Plan and Schematics
M-2	-	Piping Details
E-1	-	Electrical Details
T2-1	-	Tank Layout & Details
T2-2	-	Tank No. 2 Details



DILLON
Consulting Engineers & Planners

EDMONTON YELLOWKNIFE

THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
PERMIT NUMBER
P 010
M. M. DILLON LIMITED

REGISTERED PROFESSIONAL ENGINEER
W. WAYNE DAWIN
N.W.T.

LEGEND

- SPRAYED-IN-PLACE POLYURETHANE FOAM INSULATION
- RIGID (SHEET) STYROFOAM INSULATION

Change	Date	Description	Chkd
1	1-88	CONSTRUCTION RECORD DRAWING	
0	14-4-86	TENDER ISSUE	

REVISIONS

Northwest Territories Public Works

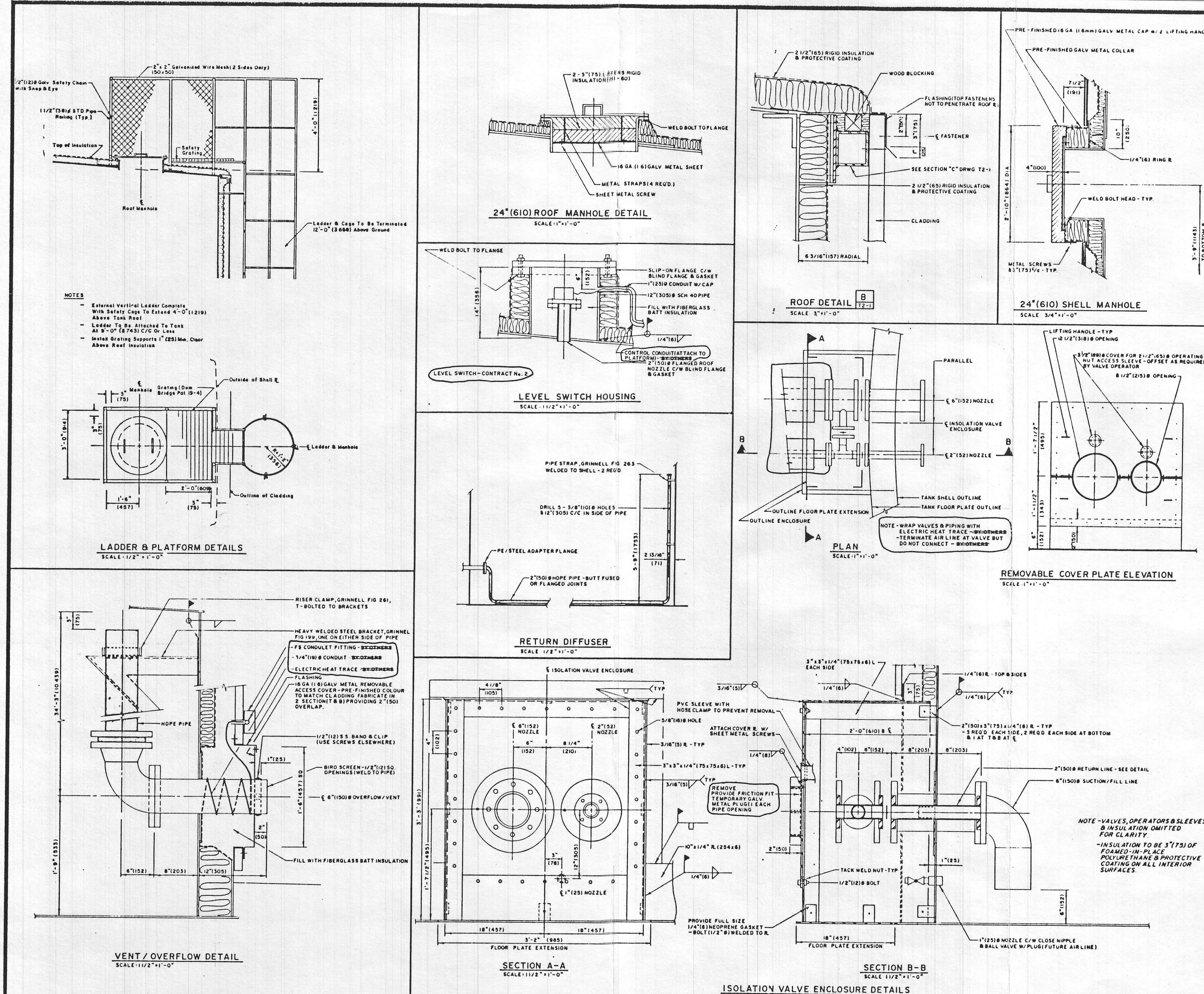
Design: R.W. / W.W.I.
Drawn: D.O'N.
Approved Chief:
Director:

Project Title
GRISE FIORD WATER STORAGE TANK No. 2 — CONTRACT No. 1

Drawing Title
TANK LAYOUT & CLADDING DETAILS

Scale: AS SHOWN
Project No.: 85-4506
Date: 04-04-86
Drawing No.: T2-1
Revision:

M.M.D. PROJECT No. 9893-02



DILLON
Consulting Engineers & Planners

EDMONTON YELLOWKNIFE

THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
PERMIT NUMBER P 010
M. M. DILLON LIMITED

REGISTERED PROFESSIONAL ENGINEER W. WAYNE IRWIN N.W.T.

PROFESSIONAL ENGINEER ALBERTA R. WELKER

NOTES
1. FOR APPURTENANCE LOCATIONS SEE DRWG T2-1.
2. THIS DRAWING ORIGINALLY ISSUED FOR CONT CONTRACT No. 1. WORK IN CONTRACT No. 3 IDENTIFIED AS SHOWN IN LEGEND.

LEGEND
SPRAYED-IN-PLACE POLYURETHANE FOAM INSULATION
RIGID (SHEET) STYROFOAM INSULATION
WORK IN CONTRACT No. 3

Change	Date	Description	Chkd
2	1-88		
1	16-5-86	CONTRACT No. 3 TENDER ISSUE	
0	14-4-86	TENDER ISSUE	

REVISIONS

Northwest Territories Public Works

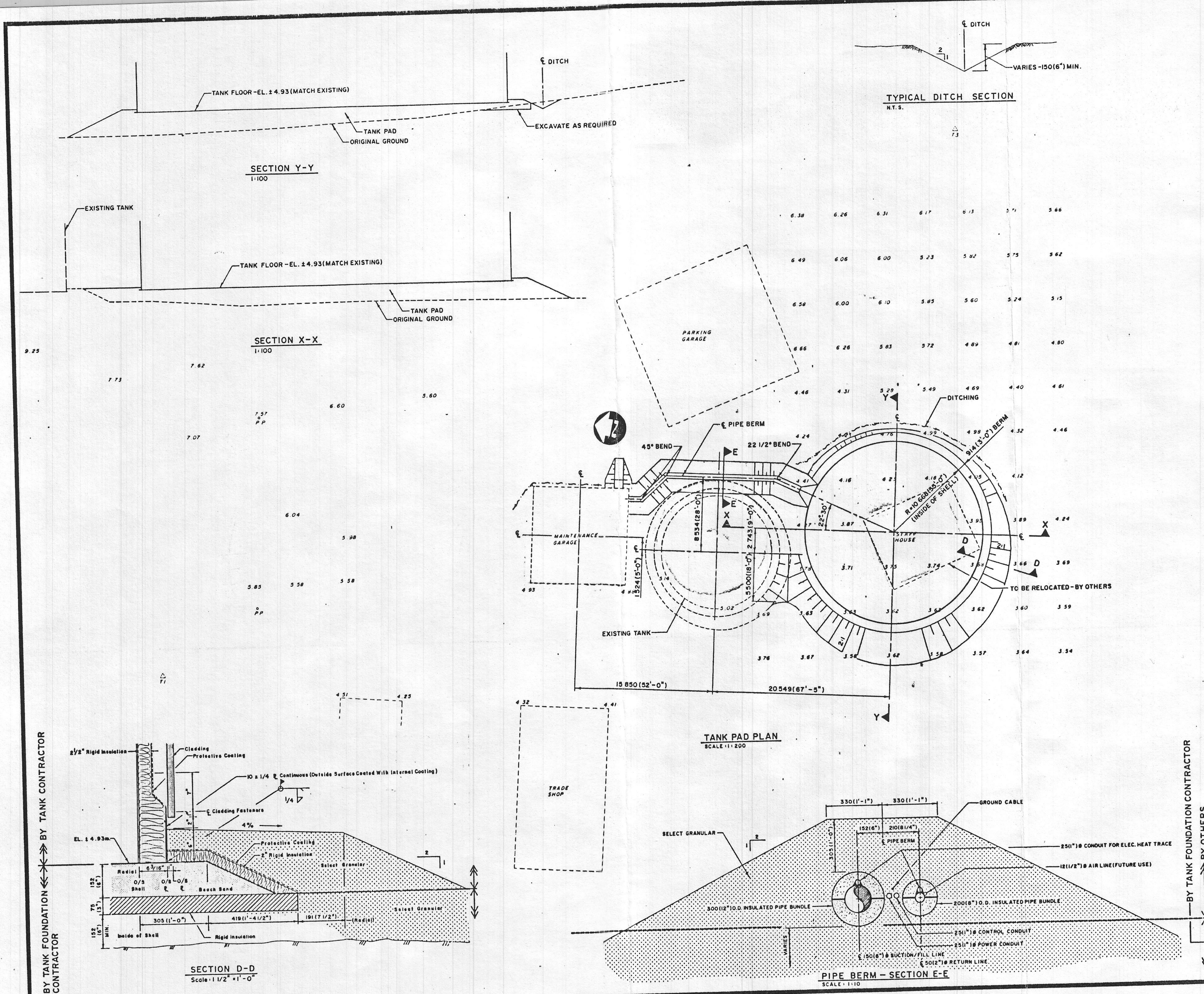
Design: R.W./W.W.I.
Drawn: D.O'N.
Approved
Chief
Director

Project Title
GRISE FIORD WATER STORAGE TANK No. 2 — CONTRACT No.

Drawing Title
TANK No. 2 DETAILS

Scale: AS SHOWN
Project No: 85-4506
Date: 04-04-86
Drawing No: T2-2
Revision

M M D PROJECT No 9893-02



DILLON
Consulting Engineers & Planners

EDMONTON YELLOWKNIFE

THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
PERMIT NUMBER P 010
M. M. DILLON LIMITED

REGISTERED PROFESSIONAL ENGINEER
W. WAYNE IRWIN
N.W.T.

LEGEND
SPRAYED-IN-PLACE POLYURETHANE FOAM INSULATION
RIGID(SHEET) STYROFOAM INSULATION

Change	Date	Description	Chkd
0	30-4-86	TENDER ISSUE	

REVISIONS

Northwest Territories Public Works

Design: R.W. / W.W.I.
Drawn: D.O'N.
Approved Chief
Director

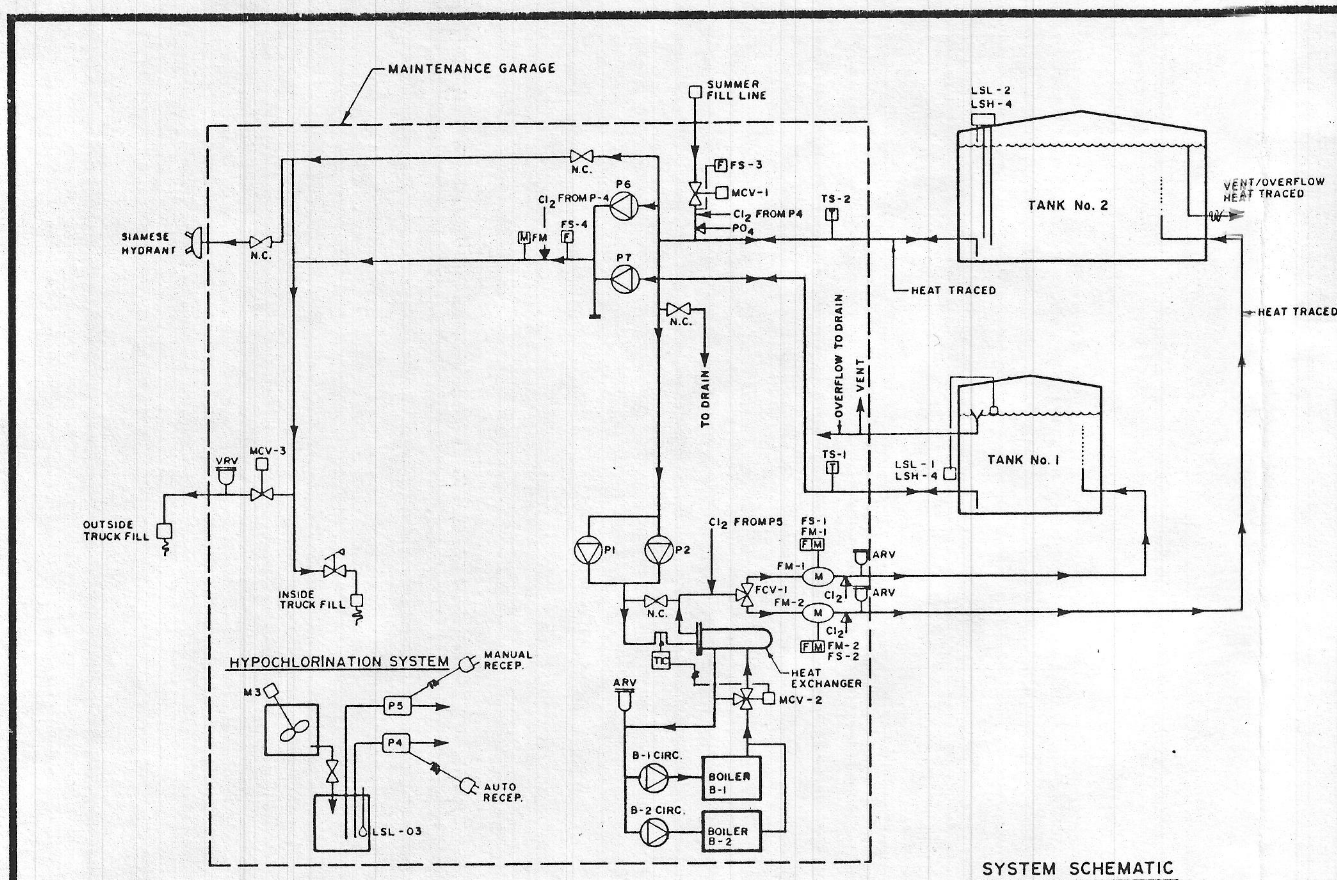
Project Title: GRISE FIORD WATER STORAGE TANK

Drawing Title: TANK FOUNDATION PAD AND PIPE BERM

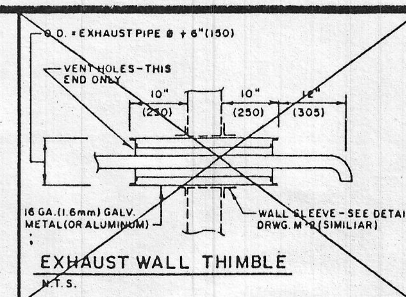
Scale: AS SHOWN

Project No.: 85-4506
Date: 08-04-86
Drawing No.: TF-1

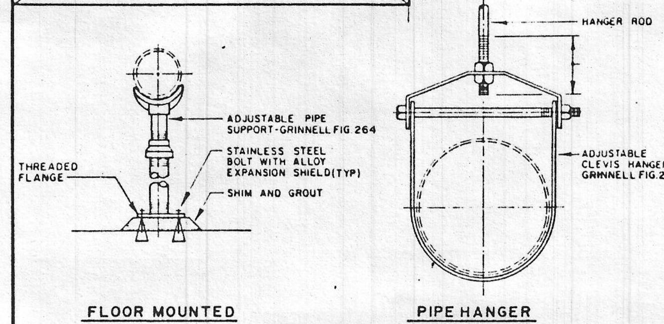
M.M.D. PROJECT No 89893-02



SYSTEM SCHEMATIC



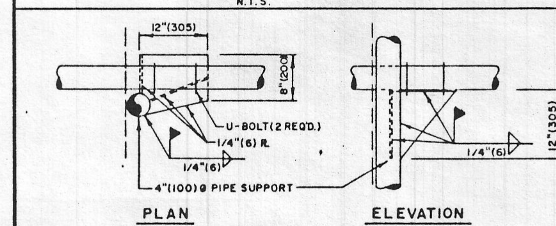
EXHAUST WALL THIMBLE
N.T.S.



PIPE SUPPORTS
N.T.S.

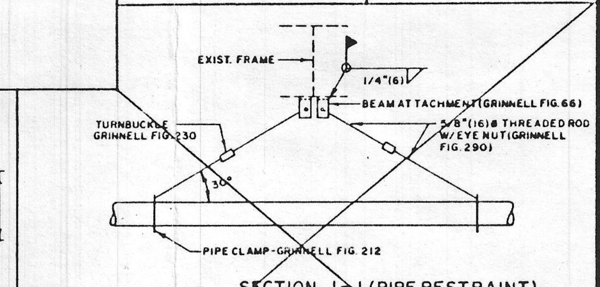
LEGEND

- BUTTERFLY VALVE
- CHECK VALVE
- VALVE
- 3-WAY VALVE
- QUICK OPENING VALVE
- DIAPHRAGM OPERATOR
- MOTORIZED OPERATOR
- FLANGE
- GROOVE PIPE COUPLING
- REDUCER/INCREASER
- UNION
- QUICK COUPLING
- EXPANSION JOINT
- AUTO VENT W/ISOLATION GATE VALVE
- HOSE BIB
- PRESSURE GAUGE W/ NEEDLE VALVE
- TEMPERATURE GAUGE W/ SEPARABLE WELL
- TEMPERATURE SWITCH
- LIQUID LEVEL SWITCH
- FLOW SWITCH
- FLOW METER
- FLOW METER WITH INTEGRAL LOW FLOW ALARM
- FUTURE CHEMICAL INJECTION POINT

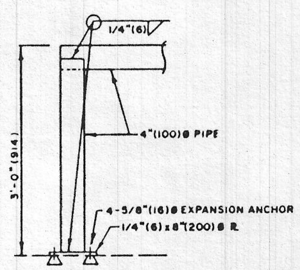


SEE SECTION 'E' DRWG. M-2

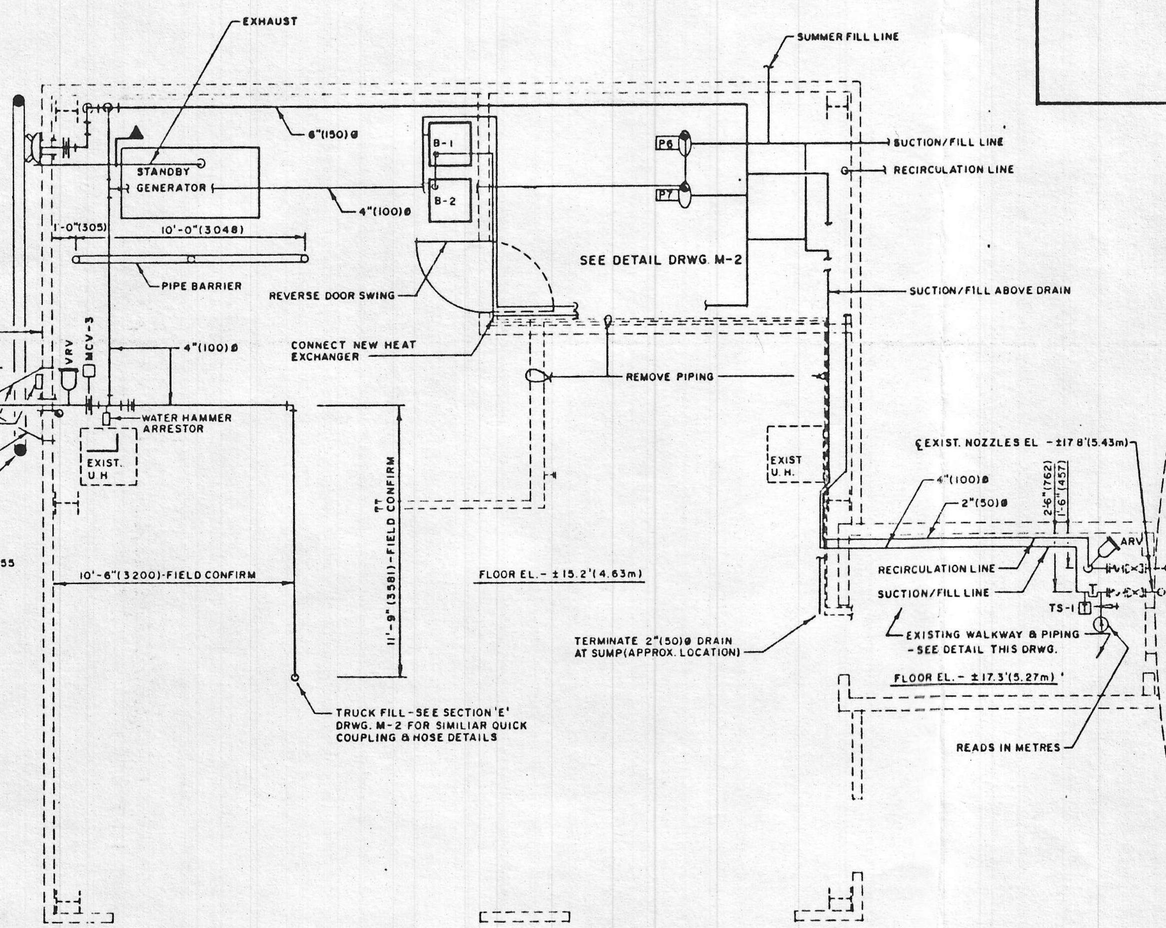
PIPE SUPPORT/RESTRAINT
N.T.S.



SECTION J-J (PIPE RESTRAINT)
N.T.S.



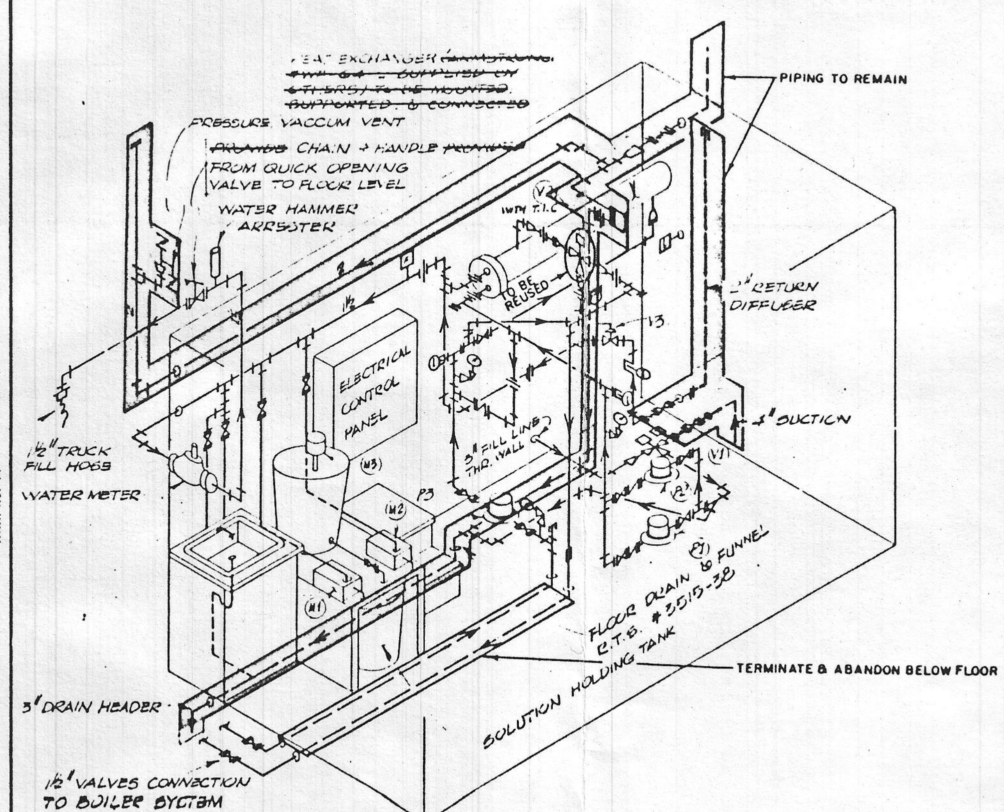
PIPE BARRIER DETAIL



PLAN
SCALE: 1/4" = 1'-0"

NOTES

1. GAUGES, VALVES, SWITCHES, ETC., SHOWN IN PLAN VIEW ARE FOR LOCATION PURPOSES ONLY AND ARE NOT INTENDED TO INDICATE ORIENTATION.
2. CONTRACTOR TO CONFIRM WITH THE ELECTRICAL CONTRACTOR THE SIZE OF WELD-O-LETS, NIPPLES ETC. REQUIRED FOR HIS WORK AND INSTALL SAME ON PIPING.



NOTES-HYPOCHLORINATOR MIXER & ASSOCIATED TANKAGE TO BE REUSED.
-PUMPS, VALVES, METER, GAUGES & ELECTRICAL COMPONENTS TO BE SALVAGED AND PUT IN DPWH STORAGE.
-PIPING TO BE DISPOSED

EXISTING WALKWAY & PIPING

DILLON
Consulting Engineers & Planners
EDMONTON YELLOWKNIFE

THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
PERMIT NUMBER
P 010
M. M. DILLON LIMITED

REGISTERED PROFESSIONAL ENGINEER
W. WAYNE IRWIN
N.W.T.

PROFESSIONAL ENGINEER
ALBERTA

1	1 88	CONSTRUCTION RECORD DRAWING	
0	16 5 86	TENDER ISSUE	
Change	Date	Description	Chkd

REVISIONS

Northwest Territories Public Works

Design R.W.
Drawn D.O'N.
Approved
Chief
Director

Project Title
GRISE FIORD WATER PUMPING SYSTEM CONTRACT No. 3

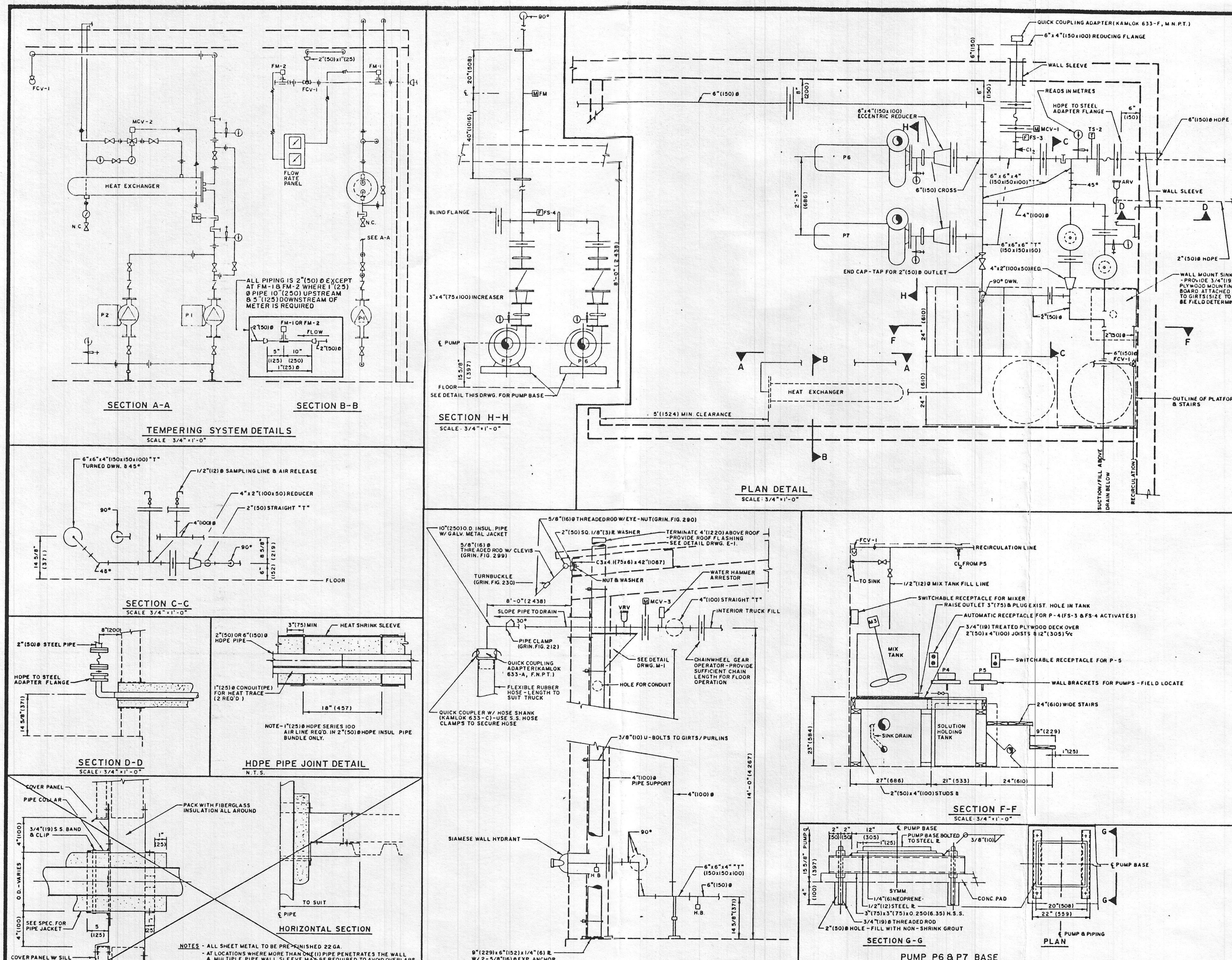
Drawing Title
PIPING PLAN AND SCHEMATICS

Scale AS SHOWN

Project No. 85-4506 Date 05.05.86

Drawing No. M-1 Revision

M.M.D. PROJECT No. 89893-02



NOTES

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2. CONTRACTOR TO CONFIRM WITH THE ELECTRICAL CONTRACTOR THE SIZE OF WELD-O-LETS, NIPPLES ETC. REQUIRED FOR HIS WORK AND INSTALL SAME IN PIPING.

DILLON
Consulting Engineers & Planners
EDMONTON YELLOWKNIFE

THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
PERMIT NUMBER
P 010
M. M. DILLON LIMITED

REGISTERED PROFESSIONAL ENGINEER W. WAYNE IRWIN N.W.T.

PROFESSIONAL ENGINEER B. WELKER ALBERTA

1	1.88	CONSTRUCTION RECORD DRAWING	
0	16.5.86	TENDER ISSUE	
Change	Date	Description	Chk'd

REVISIONS

Northwest Territories Public Works

Design R.W.
Drawn DON
Approved
Chief
Director
Project Title

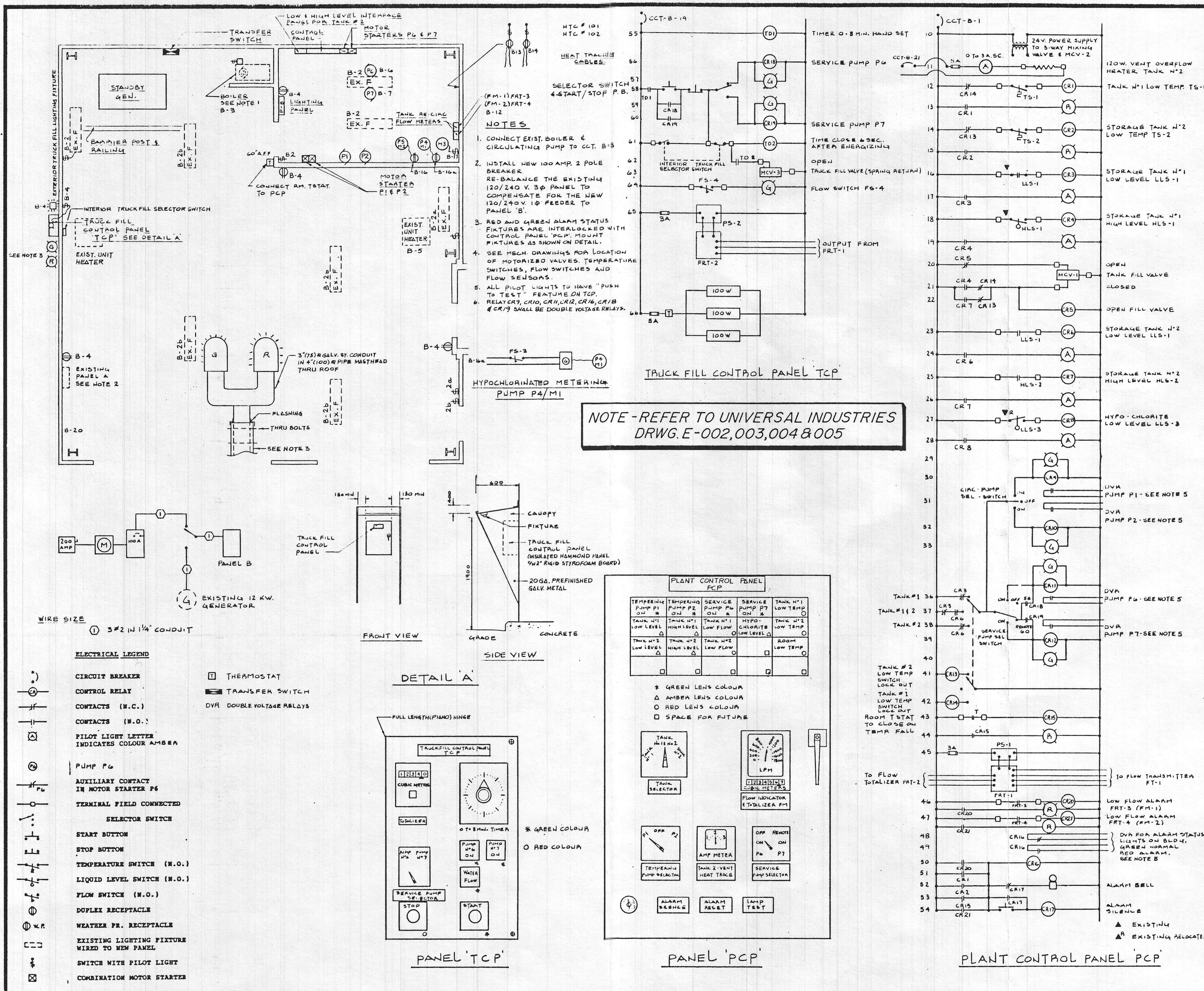
GRISE FIORD
WATER PUMPING SYSTEM
CONTRACT No. 3

Drawing Title

PIPING DETAILS

Scale AS SHOWN
Project No. 85-4506 Date 05.05.86
Drawing No. M-2 Revision

M.M.D. PROJECT No. 89893-02



DILLON
Consulting Engineers & Planners
EDMONTON YELLOWKNIFE

THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
PERMIT NUMBER P 010
M. M. DILLON LIMITED

REGISTERED PROFESSIONAL ENGINEER W. WAYNE IRWIN N.W.T.

PROFESSIONAL ENGINEER ALBERTA

PROFESSIONAL ENGINEER ALBERTA EMIL CZERKAWSKI May 86 LICENSED TO PRACTICE

NOTE - REFER TO UNIVERSAL INDUSTRIES LIMITED DRWG. E-002, E-003, E-004, E-005 FOR CONSTRUCTION RECORD INFORMATION.

Change	Date	Description	Chkd
0	16-5-86	TENDER ISSUE	

REVISIONS

Northwest Territories Public Works

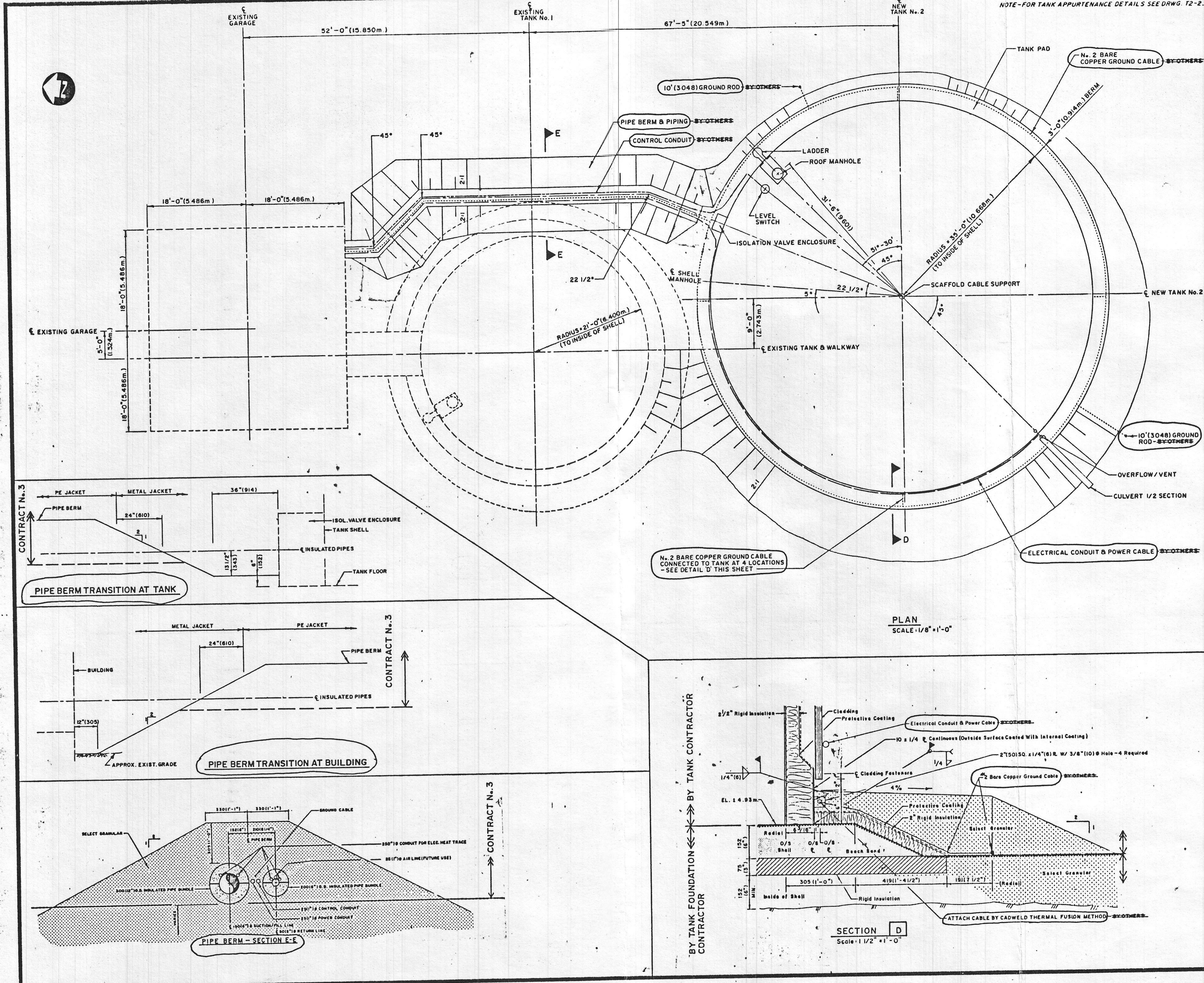
Design: H. M. S.
Drawn: J. P. M.
Approved
Chief
Director

Project Title: GRISE FIORD WATER PUMPING SYSTEM CONTRACT No. 3

Drawing Title: ELECTRICAL DETAILS

Scale: AS SHOWN
Project No: 85-4506 Date: 15.04.86
Drawing No: E-1 Revision

M M O PROJECT No 89893-02



DILLON

Consulting Engineers & Planners

EDMONTON YELLOWKNIFE

THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
PERMIT NUMBER
P 010
M. M. DILLON LIMITED 16/5/86

REGISTERED PROFESSIONAL ENGINEER
W. WAYNE IRWIN 16/5/86
N.W.T.

PROFESSIONAL ENGINEER
R. WELKER 16/5/86
ALBERTA

THIS DRAWING ORIGINALLY ISSUED FOR CONTRACT No. 1. WORK IN CONTRACT No. 3 IDENTIFIED AS SHOWN IN LEGEND.

LEGEND

- SPRAYED-IN-PLACE POLYURETHANE FOAM INSULATION
- RIGID (SHEET) STYROFOAM INSULATION
- WORK IN CONTRACT No. 3

Change	Date	Description	Chkd
2	1-88	CONSTRUCTION RECORD DRAWING	
1	16-5-86	CONTRACT No. 3 TENDER ISSUE	
0	14-4-86	TENDER ISSUE	

REVISIONS

Northwest Territories Public Works

Design R.W. / W.W.I.

Drawn D.O'N.

Approved

Chief

Director

Project Title

GRISE FIORD WATER STORAGE TANK No. 2 — CONTRACT No. 1

Drawing Title

TANK LAYOUT & DETAILS

Scale AS SHOWN

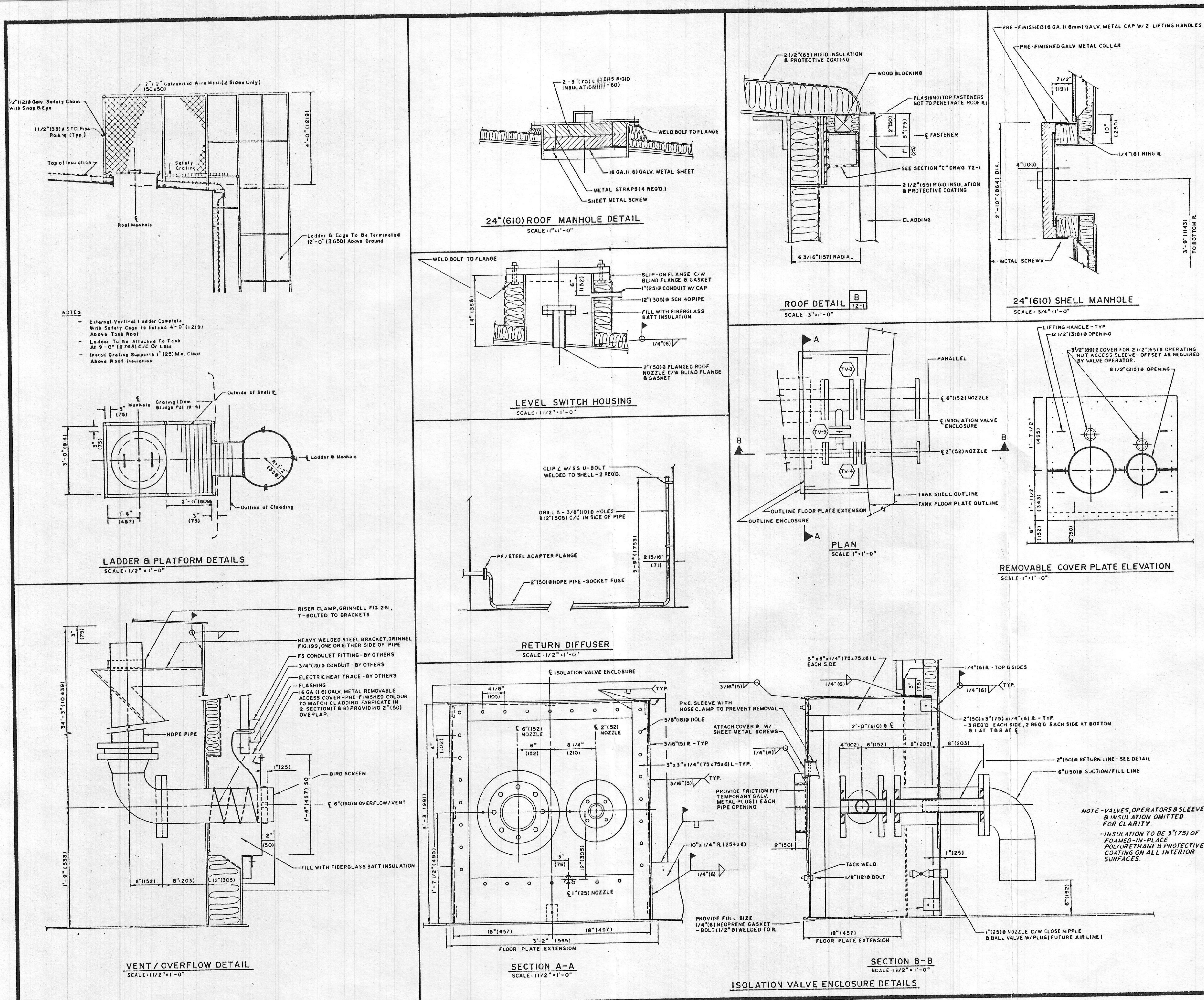
Project No 85-4506

Date 04-04-86

Drawing No T2-1

Revision

M M D PROJECT No. 9893-02



DILLON
Consulting Engineers & Planners

EDMONTON YELLOWKNIFE

THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
PERMIT NUMBER
P 010
M. M. DILLON LIMITED

REGISTERED PROFESSIONAL ENGINEER
W. WAYNE IRWIN
N.W.T.

NOTES
1. FOR APPURTENANCE LOCATIONS SEE DRWG. T2-1.

LEGEND
SPRAYED-IN-PLACE POLYURETHANE FOAM INSULATION
RIGID(SHEET) STYROFOAM INSULATION

Change	Date	Description	Chkd
1	1 88	CONSTRUCTION RECORD DRWG	
0	14-4-86	TENDER ISSUE	

REVISIONS

Northwest Territories Public Works

Design: R.W./W.W.I.
Drawn: D.O'N.
Approved Chief
Director
Project Title:

GRISE FIORD
WATER STORAGE TANK
No. 2 — CONTRACT No. 1

Drawing Title:

TANK No 2
DETAILS

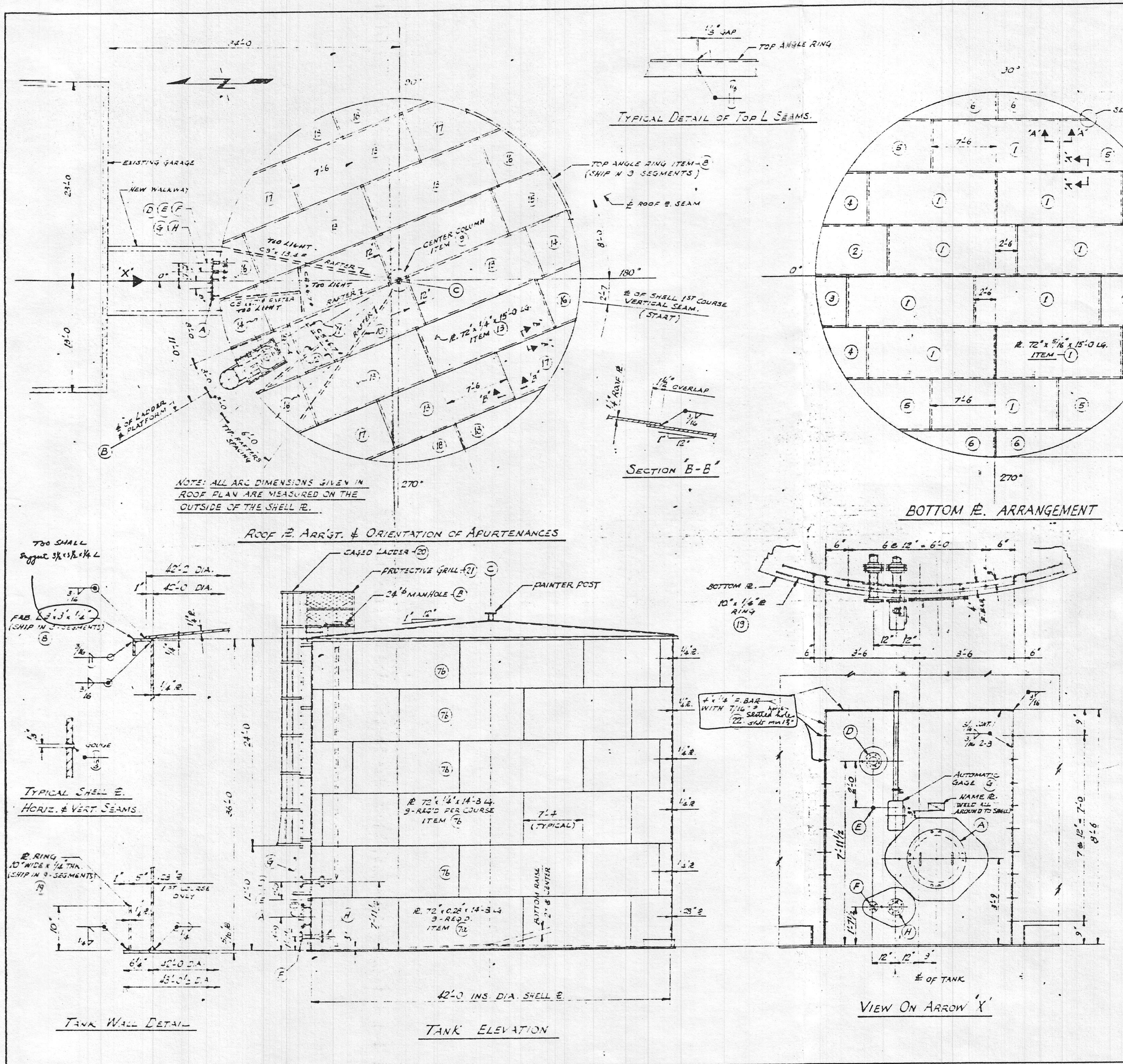
Scale: AS SHOWN
Project No: 85-4506
Date: 04 04 86
Drawing No: T2-2
Revision

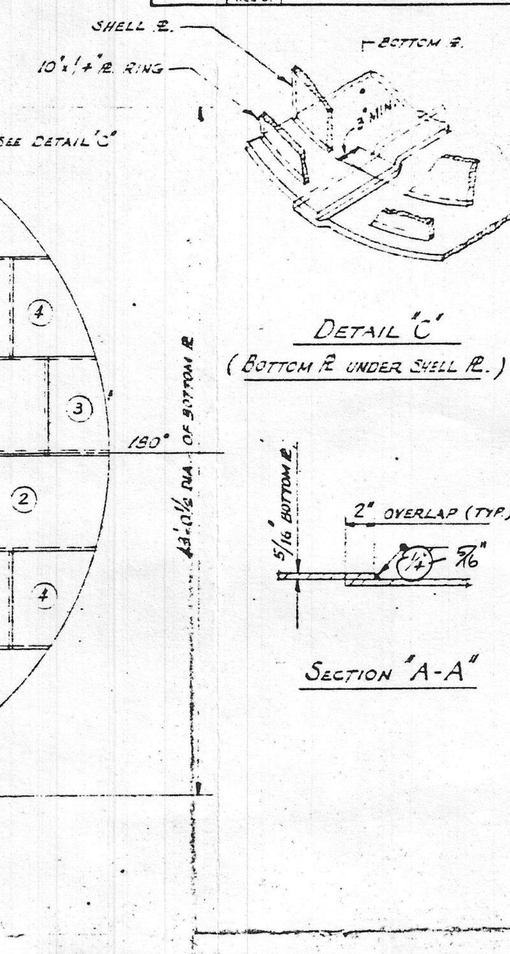
M.M.D. PROJECT No 9893-02

9.5 Tank No. 1 Drawings

Canadian Erectors Limited
(Shop Drawings)

Drawing No. CE-7386-1	-	Tank Arrangement & Details
CE-7386-2	-	Ladder, Platform & Structure Details
CE-7386-3	-	Nozzles, Insulation & Foundation Details





BILL OF MATERIAL

PIECE MK	No REQ'D	DESCRIPTION

BILL OF MATERIAL

PIECE MK	No REQ'D	DESCRIPTION
1	10	72" x 5/16" PL. (BOTT) x 15'-0
2	2	DO TO SUIT
3	2	DO DO
4	4	DO DO
5	4	DO DO
6	4	TO SUIT DO
7a	9	72" x .28" PL. (SHELL) x 14'-3
7b	45	72" x 1/4" PL. (SHELL) x 14'-3
8	9	L 3" x 3" x 1/4" TOP ANG RING SEGMENTS
9 A/B	ONE	10"Φ PIPE ROOF COLUMN
10	11	C3" x 13.4 RAFTER
11	11	C3" x 6.7 DO
12	11	C3" x 6.7 DO
13	10	72" x 1/4" PL. (ROOF) x 15'-0
14	2	DO TO SUIT
15	2	DO DO
16	4	DO DO
17	4	DO DO
18	4	TO SUIT DO
19	9	10" x 1/4" PL. (BOTTOM RING)
20 A/B	ONE	CAGED LADDER
21	ONE	PLATFORM & RAILING
22	ONE	4" x 1/4" F. BARS (SEE DETL.)
FIELD BOLTS		SEE DWG. NO. 2
23	ONE	API-650 NAME PL.
		NOZZLES SCHEDULE
A	ONE	24"Φ SHELL MANHOLE
B	ONE	24"Φ ROOF MANHOLE w/ DISC
C	ONE	PAINTER POST
D	ONE	4"Φ VENT & OVERFLOW
E	ONE	3/4"Φ LIQUID LEVEL CPLG.
F	ONE	2"Φ RETURN DIFFUSER
G	ONE	VAREC NO 2502-B GAGE
H	ONE	4"Φ SUCTION NOZZLE.

NOTES

DESIGN DATA

CODE: TANK TO BE FABRICATED, ERECTED & TESTED IN ACCORDANCE WITH API STANDARD 650.
CORROSION ALLOWANCE: 1/16" TO BE APPLIED TO ALL FLOOR, SHELL AND ROOF PL'S, STRUCTURALS AND CENTRE POST.
SPEC. GRAVITY OF STORED LIQUID: 1.0
DESIGN TEMPERATURE: +80°F TO -55°F
WIND & SNOW LOAD PER N.B.C. SUPP. 1 FOR ALERT N.W.T.

MATERIAL SPECIFICATIONS

SHELL PL & ROOF ANGLE SHALL BE CSA G40.21 GR. 33T WITH IMPACT TEST PROPERTIES (CHARPY V-NOTCH) OF 15 FOOT-LBS AT -20°F.

REMAINING PL'S. SHALL BE ASTM A-283 GR. C-

WELDING ELECTRODES TO BE E7018 LOW HYDROGEN.
PIPES: ASTM A53 GR. A OR B.
FLANGES: ASTM A 181 GR. I
BOLTS: A 307 FOR NOZZLES, A325 FOR STRUCT'L.
GASKETS: 1/8" COMPRESSED ASBESTOS

CONSTRUCTION NOTES

TANK FOUNDATION TO BE AS PER CAN. ERECTORS DWG. NO. C.E.-7336-3 & GOV'NT OF THE N.W.T. SPECIFICATION DIV. 2 SITE WORK.

INTERNAL COATING TO BE AS PER GOV'NT. OF THE N.W.T. SPEC. DIV. 5.4 b & 5.5 b.

EXTERNAL INSULATION & PROTECTIVE COATING TO BE AS PER SPEC. DIV. 5.4 C. & 5.5 C & d.

RADIOGRAPHIC INSPECTION OF SHELL SEAMS TO BE MADE AS PER API STD. 650 SECT. 6.1.
INSPECTION OF OTHER WELDS TO BE MADE AS PER API-650 SECT. 5.3

TEST: TANK SHELL TO BE HYDROSTATIC TESTED.
BOTTOM TO BE VACUUM & SOAP SUD TESTED.
ROOF TO BE VACUUM & SOAP SUD TESTED.
ALL TEST TO BE MADE IN ACCORDANCE WITH API-650 & GOV'NT OF THE N.W.T. SPEC. DIV. 5.5 d

ALL EXPOSED METAL NOT COVERED BY INSULATION TO BE BLAST CLEANED & GIVEN ONE COAT OF CGSB 1-GP-40 & TWO FINISH COATS OF CGSB 1-GP-59 COLOUR SAME AS TANK.

No	REVISIONS	DATE	BY
4			
3			
2			
1			

SHOP DRAWING REVIEW.
THIS DRAWING HAS BEEN REVIEWED FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS
M. M. DILLON LIMITED
PROJECT No 8170-01

REFERENCE DWGS.

CE-7336-2 & 3 FOR NOZZLES ETC.
GOV'NT. OF THE N.W.T. NO. T-1, T-2, T-3.

CUSTOMER: GOV'NT. OF THE NORTHWEST TERRITORIES
DEPT. OF PUBLIC WORKS - GRISE FIORD

REF. OR P.O. NO: P.O. NO.
REF. DWG. T-1, T-2, & T-3

EQUIPMENT: GRISE FIORD WATER SUPPLY SYSTEM
42 FT. DIA. x 36 FT. H. WATER RESERVOIR

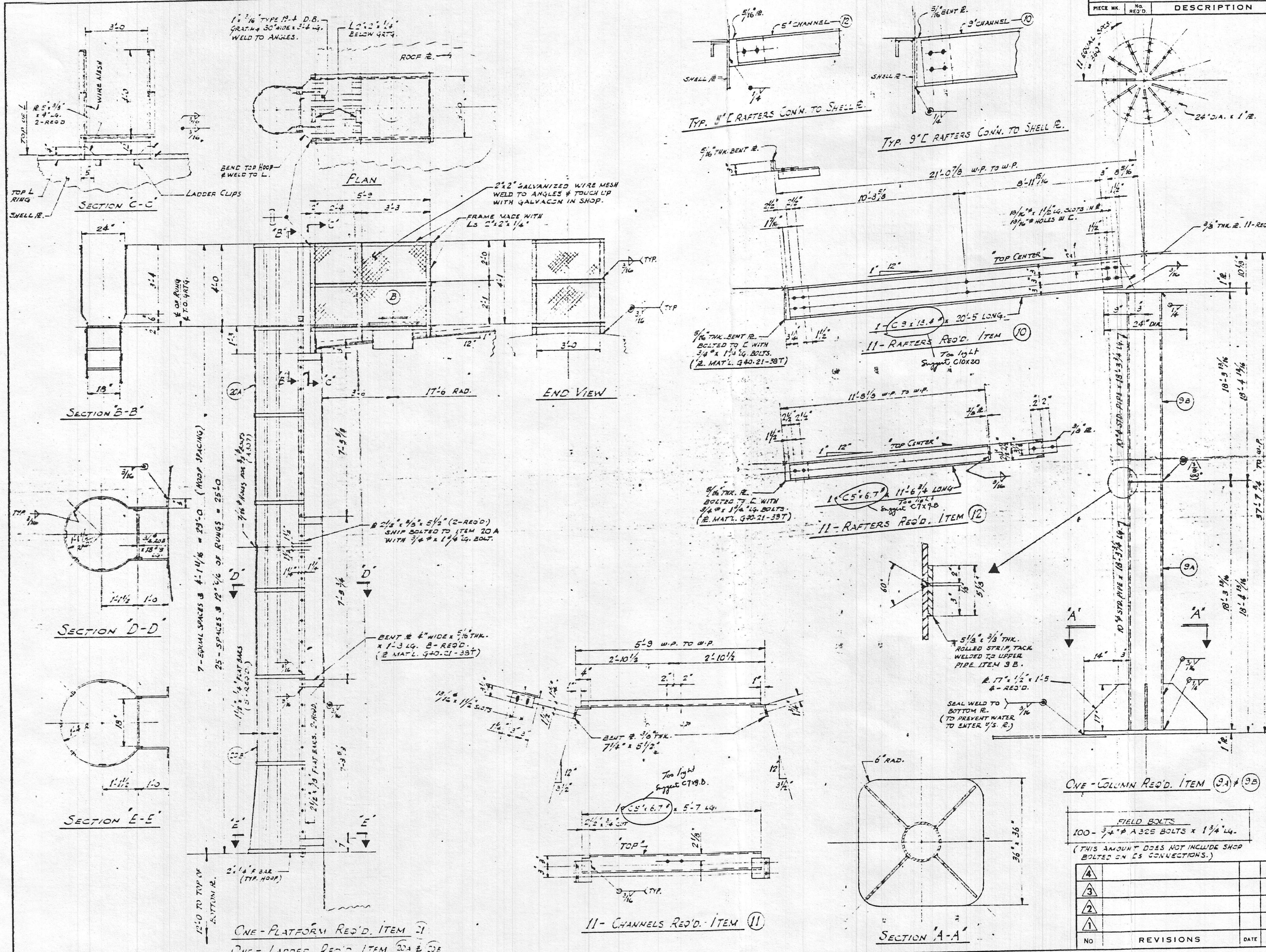
DESCRIPTION: TANK ARRANGEMENT & DETAILS.

LES ERECTEURS CANADIENS LTÉE.
CANADIAN ERECTORS LIMITED
5441 O RUE NOTRE DAME ST W MONTREAL 208 P.Q.

DRAWN BY:	CHECKED BY:	APPROVED BY:
G.M.		

SCALE: ______ DATE: FEB. 13-73

CONTRACT NO.	DRAWING NO:
7386	CE-7336-1



BILL OF MATERIAL		
PIECE MK.	No. REQ'D	DESCRIPTION

BILL OF MATERIAL		
PIECE MK.	No. REQ'D	DESCRIPTION

SHOP DRAWING REVIEW
THIS DRAWING HAS BEEN REVIEWED FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS.
NO COMMENT
✓ SEE COMMENTS
✓ AMEND & RESUBMIT
SUBMISSION No.
PROJECT No. 2170-01
BY KN
DATE Mar. 2/73
M. M. DILLON LIMITED
CONSULTING ENGINEERS — YELLOWKNIFE OFFICE

FIELD BOLTS
100 - 3/4" ϕ A325 BOLTS x 1 3/4" LG.
(THIS AMOUNT DOES NOT INCLUDE SHOP BOLTED ON CS CONNECTIONS.)

MATERIAL: A36 OR G40.12 (U.N.O.)
HOLES: 13/16" ϕ U.N.O.
BOLTS: H.S. A325
PAINT: SEE DWG. NO. CE-7386-1
ALL ITEMS TO BE IDENTIFIED WITH ITEM NO. & "TOP" OR "TOP CENTER"

CUSTOMER:
GOV'NT. OF THE NORTHWEST TERRITORIES
DEP'T. OF PUBLIC WORKS - GRISE FIORD

REF. OR P.O. NO:
P.O. NO.
REF. DWG. NO. T-1, T-2 & T-3.

EQUIPMENT:
GRISE FIORD WATER SUPPLY SYSTEM
42 FT. DIA. x 36 FT. H. WATER RESERVOIR

DESCRIPTION:
LADDER, PLATFORM & STRUCTURE DETAILS.

NO	REVISIONS	DATE	BY
4			
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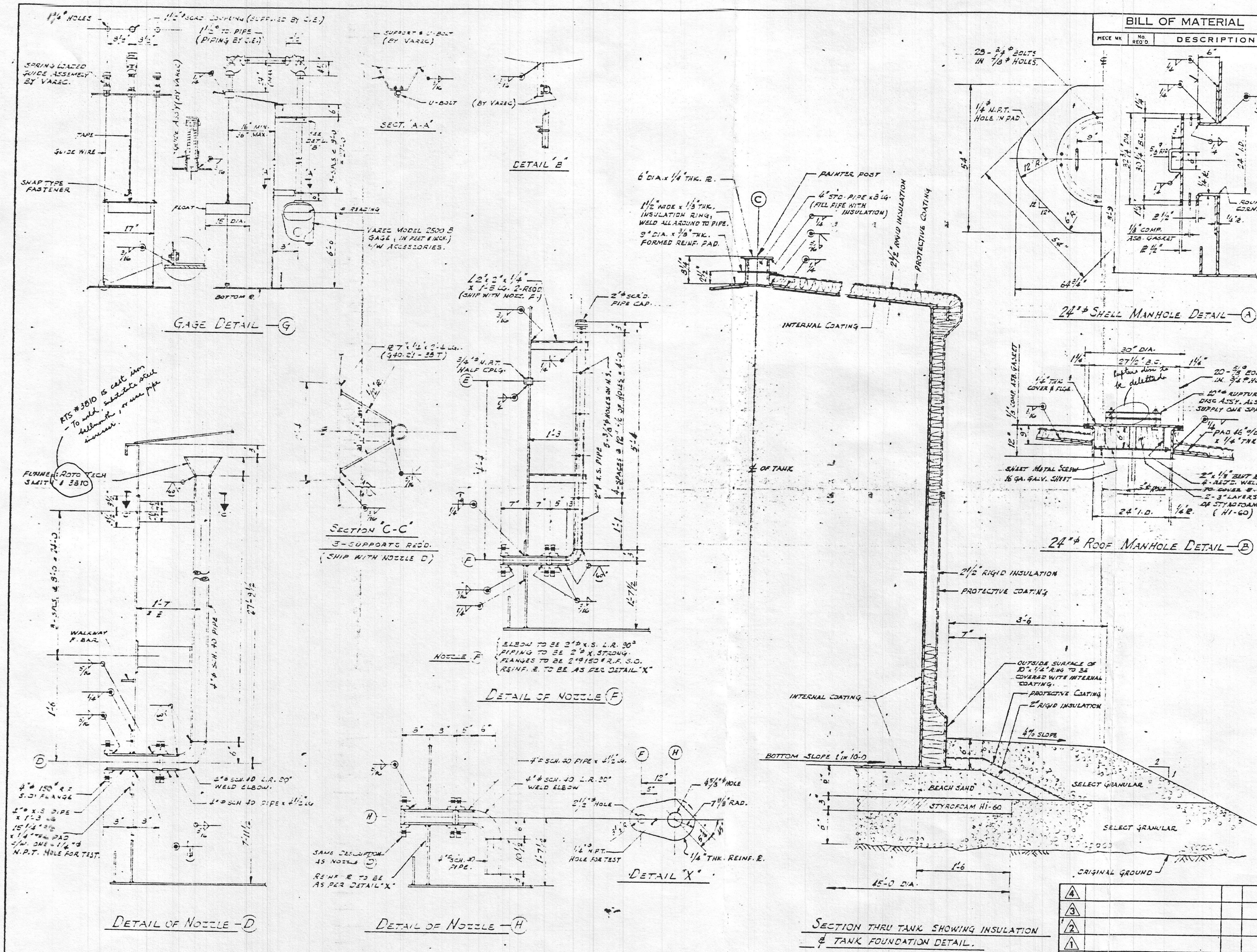
LES ÉRECTEURS CANADIENS LTÉE.
CANADIAN ERECTORS LIMITED
5441 O. RUE NOTRE DAME ST. W. MONTREAL 208, P.Q.

DRAWN BY: G.M. | CHECKED BY: | APPROVED BY:
SCALE: | DATE FEB. 16-73
CONTRACT NO: 7386 | DRAWING NO: CE-7386-2



BILL OF MATERIAL		
PIECE MK.	NO. REQ'D	DESCRIPTION

BILL OF MATERIAL		
PIECE MK.	NO. REQ'D	DESCRIPTION

SHOP DRAWING REVIEW
THIS DRAWING HAS BEEN REVIEWED FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS.
NO COMMENT / SEE COMMENTS / AMEND & RESUBMIT
PROJECT NO. 8170-01
BY EN / IMD
DATE Mar. 2 /78
M. M. DILLON LIMITED
CONSULTING ENGINEERS — YELLOWKNIFE OFFICE

FOR NOTES SEE DWG. NO. CE-7386-1

CUSTOMER: GOV'NT. OF THE NORTHWEST TERRITORIES DEPT. OF THE PUBLIC WORKS - GRISE FIORD.

REF. OR P.O. NO: P.O. NO. REF. DWG. NO. T-1, T-2 & T-3.

EQUIPMENT: GRISE FIORD WATER SUPPLY SYSTEM 45 FT. DIA. x 36 FT. H. WATER RESERVOIR

DESCRIPTION: NOZZLES, INSULATION & FOUNDATION DETAILS.

LES ERECTEURS CANADIENS LTEE.
CANADIAN ERECTORS LIMITED
5441 O. RUE NOTRE DAME ST. W. MONTREAL

NO	REVISIONS	DATE	BY
4			
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DRAWN BY: G. M. | CHECKED BY: | APPROVED BY:
SCALE: | DATE FEB. 17-78
CONTRACT NO: 7386 | DRAWING NO: CE-7386-3

9.6 Bibliography

The following reports and specifications are available should additional information be required in the future.

1. Geotechnical Evaluation
   Water Supply Study
   Grise Fiord, N.W.T.
   December 1971
   Elmer W. Brooker & Associates Ltd.

2. Water Supply Grise Fiord
   September 1977
   G.N.W.T. - D.P.W., Yellowknife

3. Grise Fiord Water Supply System
   Project Management Report
   August - 1978
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4. 1978 Water Supply System As-Built
   Drawings and Specifications
   M. M. Dillon Limited
   G.C.G. Dillon Consulting Limited, Edmonton

5. 1978 Water Supply System Operations
   and Maintenance Manual
   M. M. Dillon Limited
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6. Water Supply Study Grise Fiord, N.W.T.
   February 1985
   G.N.W.T. - Department of Local Government
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7. Water Supply System Supplementary
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8. Installation of Second Water Storage Tank
Grise Fiord, N.W.T.
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M. M. Dillon Limited
GCG Dillon Consulting Limited, Edmonton

9. Second Water Storage Tank (Contract #1)
Grise Fiord, N.W.T.
Contract Documents
GCG Dillon Consulting Limited, Edmonton

10. Inlet Structure, Fill Line and Tank Pad
Grise Fiord, N.W.T.
Contract No. 2 Documents
GCG Dillon Consulting Limited, Edmonton

11. Water Pumping System
Contract No. 3
Grise Fiord, N.W.T.
Contract Documents
GCG Dillon Consulting Limited, Edmonton