CAPE DORSET

TRUCKFILL STATION

OPERATION AND MAINTENANCE MANUAL

Volume 1 - MECHANICAL

CHAPTER 1

CAPE DORSET TRUCKFILL STATION

INTRODUCTION

OPERATION AND MAINTENANCE MANUAL
VOLUME 1
TRUCKFILL STATION
AT
CAPE DORSET - N.W.T.

CHAPTER 1
INTRODUCTION

Year of Completion - 1993

Original Scope - Truckfill Station, Storage Tank Filling and Heating, Water Chlorination

This manual has been updated to include:

Date	Description of Change

This project involved the following participants:

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CHAPTER 2

CAPE DORSET TRUCKFILL STATION

GENERAL INDEX

CHAPTER 2

INDEX

CAPE DORSET TRUCKFILL STATION
INDEX OF DRAWINGS USED IN THIS MANUAL

CHAPTER 3

CAPE DORSET TRUCKFILL STATION

BACKGROUND AND DESIGN DATA

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CHAPTER 2

CAPE DORSET TRUCKFILL STATION

GENERAL INDEX

CAPE DORSET WATER SUPPLY SYSTEM

FLOW DIAGRAM

W. L. WARDROP & ASSOC. LTD.
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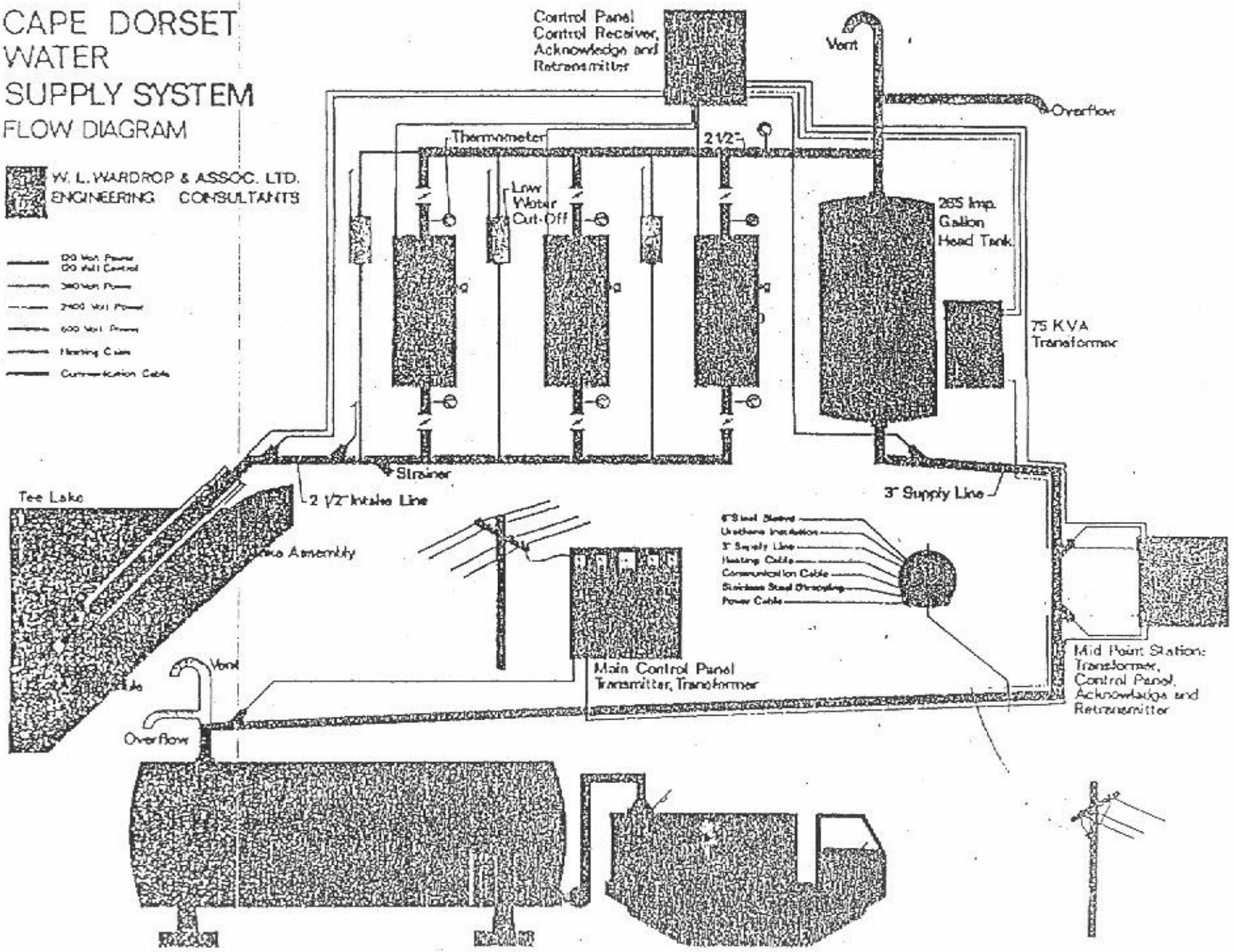


SOURCE: OPERATION & MAINTENANCE MANUAL (SECTION 2)

FIGURE 1

1.2.2 Water Supply Pipeline

General

The supply line, built in 1973, carries water by gravity from the 1,200 L (265 Ig) head tank in the heater building, (refer to Figure 1).

The line is on a continuously falling grade between the heater house and the truckfill station. It consists of approximately 1,040 m of 75 mm victaulic coupled insulated steel pipe, complete with a heating cable installed inside the line.

1.2.3 In-Town Water Storage Tank/Truckfill Building

General

A 91 m^3 (20,000 Ig) storage tank was located in the truckfill building, south of the downtown core of the Community (refer to Figure 2). Both the tank and building were constructed in 1973 and were made obsolete by the new truckfill station and water storage tank.

1.2.4 Delivery Infrastructure

A Consultant's report indicated that the present delivery infrastructure comprising trucked services, is more cost effective than pipe services. The report indicated that trucked services will continue to be the more cost effective option for many years to come.

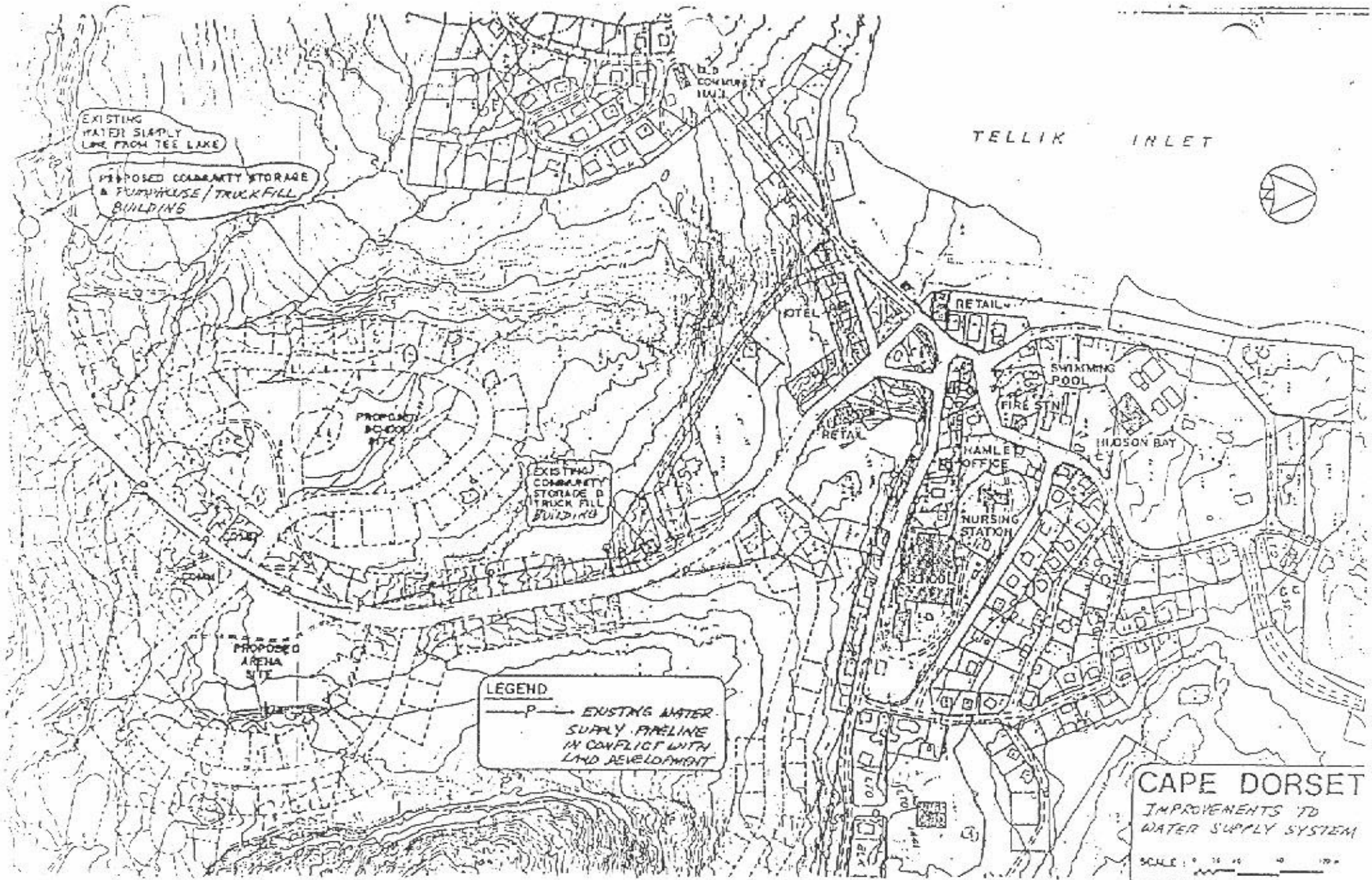

EXISTING WATER SUPPLY LAKE FROM TEE LAKE
PROPOSED COMMUNITY STORAGE & PUMPHOUSE / TRUCK FILL BUILDING
OLD COMMUNITY HALL
TELLIK INLET
HOTEL
RETAIL
SWIMMING POOL
FIRE STN
HAMLET OFFICE
HUDSON BAY
NURSING STATION
PROPOSED SCHOOL SITE
EXISTING COMMUNITY STORAGE & TRUCK FILL BUILDING
PROPOSED ARENA SITE
LEGEND
P EXISTING WATER SUPPLY PIPELINE IN CONFLICT WITH LAND DEVELOPMENT
CAPE DORSET
IMPROVEMENTS TO WATER SUPPLY SYSTEM
SCALE

FIGURE 2

2.0 OBJECTIVES

The objectives of the truckfill station and water storage tank project are outlined below.

Construct new facilities in accordance with the recommendation made in a Consultant's report, to incorporate the following improvements:

a) Provide a new storage tank and truckfill building at a location outside the limit of the new subdivision. The location proposed in this alternative is west of the southern tip of the subdivision at or near the location recommended in the Consultant's report (refer to Figure 2); and

b) Dismantle and remove the lower section of the supply line, to resolve the conflict with new land development activities.

It is suggested that the dualing of the supply line from Tee Lake be excluded from this project and be deferred until the time comes to replace the 1973 vintage supply line (perhaps in 3 to 10 years). The issue can then be addressed at that time. The grades for this portion of the line are steep, and anchoring of the line has resulted in a relatively stable structure. Moreover, experience has shown that most of the maintenance problems have occurred along the lower section of the supply line.

3.0 DESIGN PARAMETERS

3.1 General

All design decisions were based on the application of relevant MACA Guidelines/Standards and Criteria in consultation with MACA officials.

3.2 Planning Horizons

The planning horizon for design purposes was 10 years for sizing water storage facilities, and 20 years for all other components of the water supply system.

The current 5-Year Capital Plan provided for completion of construction in 1993. Therefore, the planning periods being considered are 1993 to 2003 for sizing the storage tank, and 1993 to 2013 for all other system components.

3.3 Projected Populations

Projected Populations are presented below:

- 1993 (year 0) = 1,076 persons
- 2003 (year 10) = 1,356 persons
- 2013 (year 20) = 1,641 persons

Source: GNWT Bureau of Statistics, February 21, 1990

3.4 Projected Water Consumption

Projected water consumption rates, based on MACA Planning Buildings for populations between 0 and 2000 persons, are presented below:

- 1993 (year 0) = 112.3 L/c/d = 120.8 m^3/d
- 2003 (year 10) = 118.1 L/c/d = 160.1 m^3/d
- 2013 (year 20) = 124.0 L/c/d = 203.5 m^3/d

Note: Design Water = (90 L/c/d) x [1.0 + (0.00023 x population)] Consumption

3.5 In-Town Water Storage Capacity

The net accessible in-town storage capacity comprises three components, viz. operating storage, emergency "loss of supply" storage, and fire storage.

Operating Storage

Daily trucked demand in year 2003 (10 year planning horizon):

= 118.1 L/c/d x 1,356 persons x 10^{-3} L/m^3

= 160.1 m^3

The Operation and Maintenance Manual indicates that with continuous pumping from Tee Lake, the maximum capacity of the system is approximately 454 m^3/d (100,000 gpd).

A one day operating storage of 160.1 m^3 is generally considered adequate. This will result in a pumping/filling cycle of approximately 6.5 hours per day in 1993, and 8.5 hours per day in 2003.

An increase in the operating storage (say 2-day or 3-day) will provide no economic benefit. However, if no operating storage is provided, then possibly costly modifications to the intake/heating system and ill control system will be required, to enable almost continuous pumping/filling of the storage tank.

Emergency "Loss of Supply" Storage

MACA Standards and Criteria indicate that the amount of emergency storage is based on the "longest inoperable period in days", in the event of a loss of supply. Generally, a 2-day emergency storage is considered adequate. System reliability will be enhanced significantly when the single water supply line from Tee Lake is dualed in the future (See Section 2.0).

A 2-day emergency "loss of supply" storage at year 2003 demand amounts to 160.1 m x 2 days = 320.2 m^3

Fire Storage

According to the Cold Climate Utilities Manual (Edited by D. Smith, 1986), the minimum storage required for an adequate truck relay fire protection system is about 54 m^3. This amounts to a truckfilling capacity of 900 L/min for 1 hour.

Total Storage Capacity

The total net accessible water storage capacity required is 535.3 m^3.

CHAPTER 4

CAPE DORSET TRUCKFILL STATION

SCHEMATICS AND FUNCTIONAL DATA

WATER SUPPLY IMPROVEMENTS
CAPE DORSET, NORTHWEST TERRITORIES
COMPONENTS AND SYSTEMS

1.0 INTRODUCTION

The Terms of Reference for the Department of Public Works Project 90-4306 for Water Supply Improvements in Cape Dorset includes a new water storage, truckfill station and any necessary interconnection for the existing system. A previous report has considered the layout of various features on the site. This report presents the various components and systems which are required in the new water storage and truckfill facility in Cape Dorset. The Terms of Reference for this project excludes the existing Tee Lake pump house and water supply main.

The general site layout which has been established is depicted in the attached Figure 3.

The functions which must be carried out at this facility include storage of water, delivery truck filling, water storage replenishment and prevention of freezing of the stored water. The systems required to provide these functions include:

- interconnecting piping joining the fill line, storage tank and truckfill station building;
- water storage tank;
- freeze prevention;
- the truck loading system;
- chemical storage mixing and feed system;
- instrumentation and control systems;
- support services including electrical power, fuel storage and communications.

The following sections of this report provides the methodology incorporation into the final design.

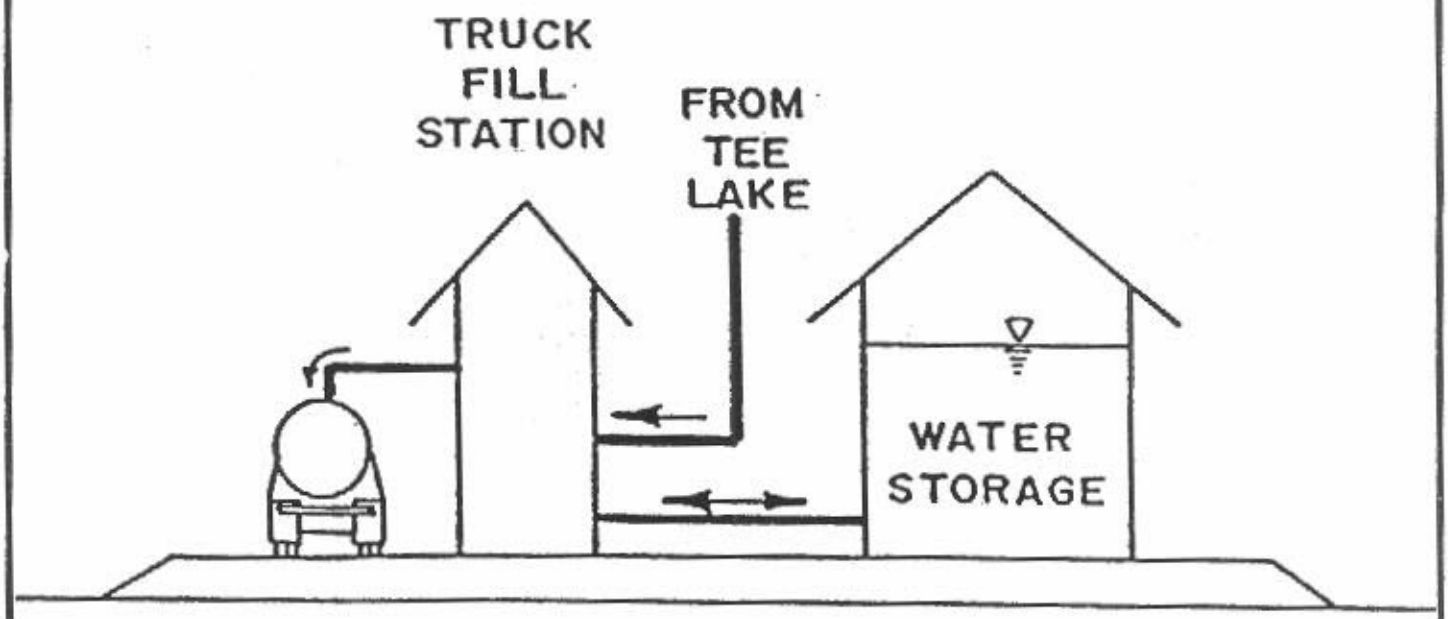
2.0 SITE PIPING

The storage refill main does not form part of this project. This main must, however make connection to this main. Thus, the piping arrangement which interconnects the water storage tank, truckfill station and water fill line from Tee Lake must be established. The arrangement of this interconnecting piping are depicted schematically in Figure 4. In Alternative 2, the fill line is connected to the truckfill station building. In this instance the interconnecting pipe between the tank and the building serves both the truckfill and water storage replenishment purposes.

Freeze prevention of the supply line from Tee Lake requires draining of this piping following each tank refill cycle. Within Alternative 2, a drain-down arrangement for the fill line from Tee Lake is required within the truckfill station building. The use of a drain sump and transfer pump, which permits the piping to remain near grade, requires that the necessary mechanical equipment be installed within the truckfill station building.

During replenishment of the reservoir, monitoring of incoming flows, temperature and heat trace operation. This places the equipment in an accessible and maintainable location and does not require transmission of signals from remote sensors. Routing the fill line through the building provides the opportunity to sample influent water from Tee Lake.

Current design standards require means for automatic chlorination of water supplies. This may be achieved through chemical application at various opportunities including during reservoir replenishment and during the water truck loading. Chlorination is discussed in detail in subsequent sections. Application during storage refill provides the appropriate contact time and ensures disinfection of all stored water. Because of the large quantity of water held in storage, it is easy to adjust the chlorine application rate to obtain the



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JANUARY, 1994	GOVERNMENT OF THE NORTHWEST TERRITORIES	91 - 8061
SCALE: N.T.S.	TITLE: CAPE DORSET TRUCKFILL STATION SITE PIPING	FIG. 4

desired concentration of the stored water. This becomes especially helpful if fluoridation is introduced in the future due to the low concentrations used and the narrow tolerance and dosage range used for this chemical.

3.0 WATER STORAGE TANK

Evaluation of the water storage tank requires consideration of the envelope to contain the stored water; an enclosure and thermal protection for this water storage and any required appurtenances.

A required stored volume of 534.3 cubic metres has been identified in the terms of reference. There are a family of tank dimensions which can accommodate the storage volume. Selection of a set of tank dimensions which minimizes the surface area of steel will lead to a lower purchase cost, lower shipping cost, a reduced quantity of field welding and tends to minimize the quantity of internal coating required. A tank which is 8.9 metres in diameter by 8.8 metres high possesses the minimum steel area required to enclose the required volume. These dimensions include a free board allowance of 0.2 metres.

It is desirable to minimize the external surface requiring insulation and cladding. This leads to reduced capital costs for these elements of the tank. Minimizing exposed surface area minimizes heat loss from the tank which has a strong effect upon the ongoing operating costs for the water storage tank. The above dimensions provide a tank which is within 3 percent of the minimum surface area requiring insulation and cladding.

A summary of analysis indicates that a tank which is 8.9 metres in diameter and 8.8 metres high contains the minimum quantity of steel and is near minimum in terms of area requiring insulation and cladding. For these reasons these tank dimensions have been selected as appropriate for the storage of 534 cubic metres of water.

From both the perspective of capital cost and operation cost, it has been determined that there is no advantage to providing additional storage volume at this date.

The operation cost were analyzed and were found to be insensitive to insulation thickness if the insulation is greater than 50 mm thick. On this basis, an insulation thickness of 62 mm has been selected. This selected insulation thickness compares well to that used in previous installations including Griese Fjord.

The tank insulation must be protected from moisture entry and mechanical damage. Moisture protection may be achieved using a spray on polyurethane coating. Mechanical protection in the form of metal cladding is required for the tank walls.

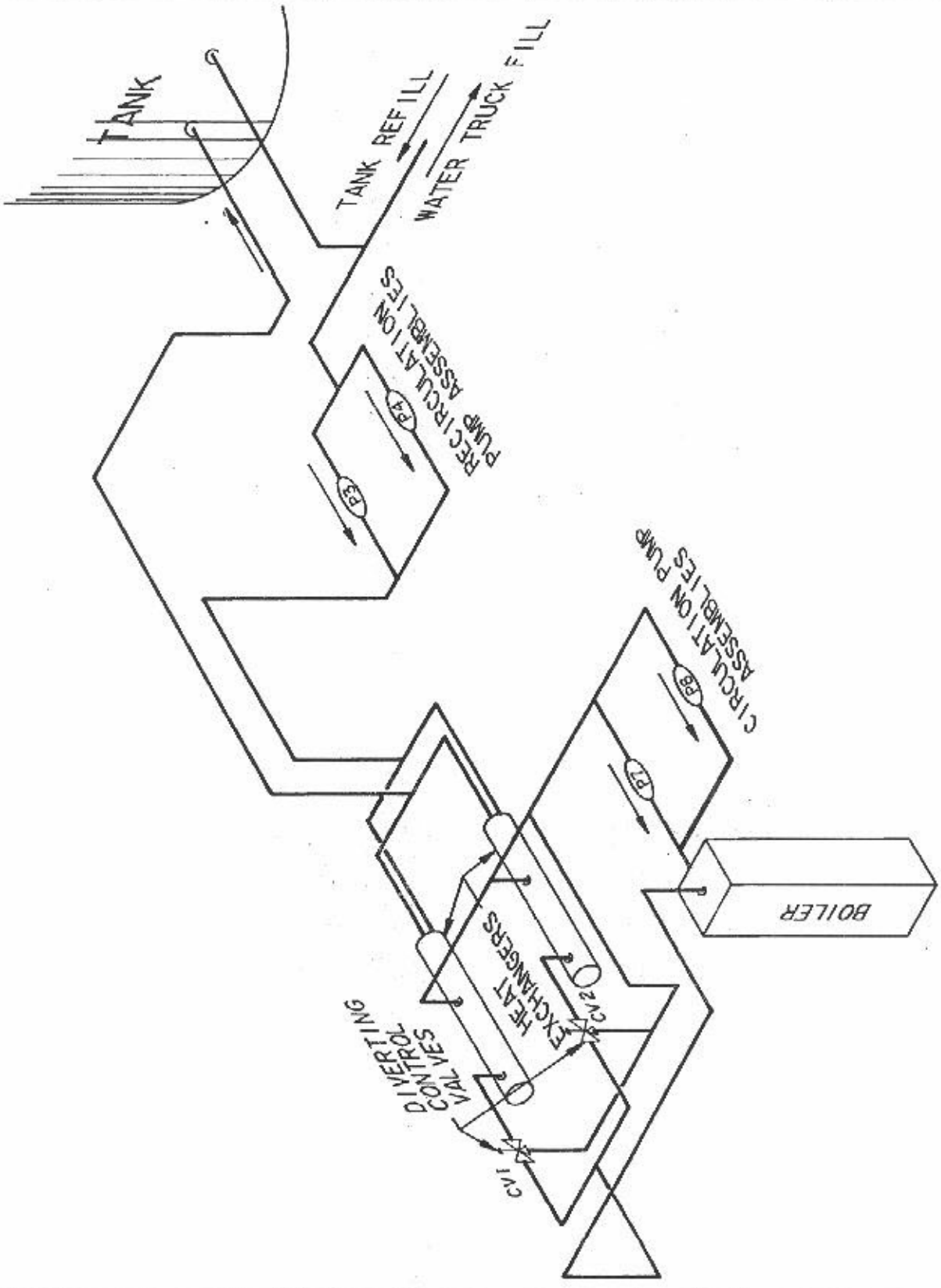
4.0 FREEZE PREVENTION

Freeze prevention measures must be provided for three key elements; these being the water storage tank, the tank refill line and the water truck loading arm.

Alternative methods of achieving freeze prevention have been evaluated and are presented in the following sections.

4.1 Freeze Prevention For The Water Storage Tank

Freeze prevention for the water storage tank is depicted schematically in Figure 5. With this arrangement, water is recirculated from the tank through a heat exchanger in the truckfill station building and is returned to the tank. This alternative requires that a tempered water return line be installed between the truckfill station and the tank. This arrangement permits the placement of all heating and control equipment within the building. This places the equipment away from hostile climates and causes it to be accessible for maintenance and repair. Positive circulation of the tank contents can be achieved within this arrangement through the use of a diffuser on the tempered water return line. This



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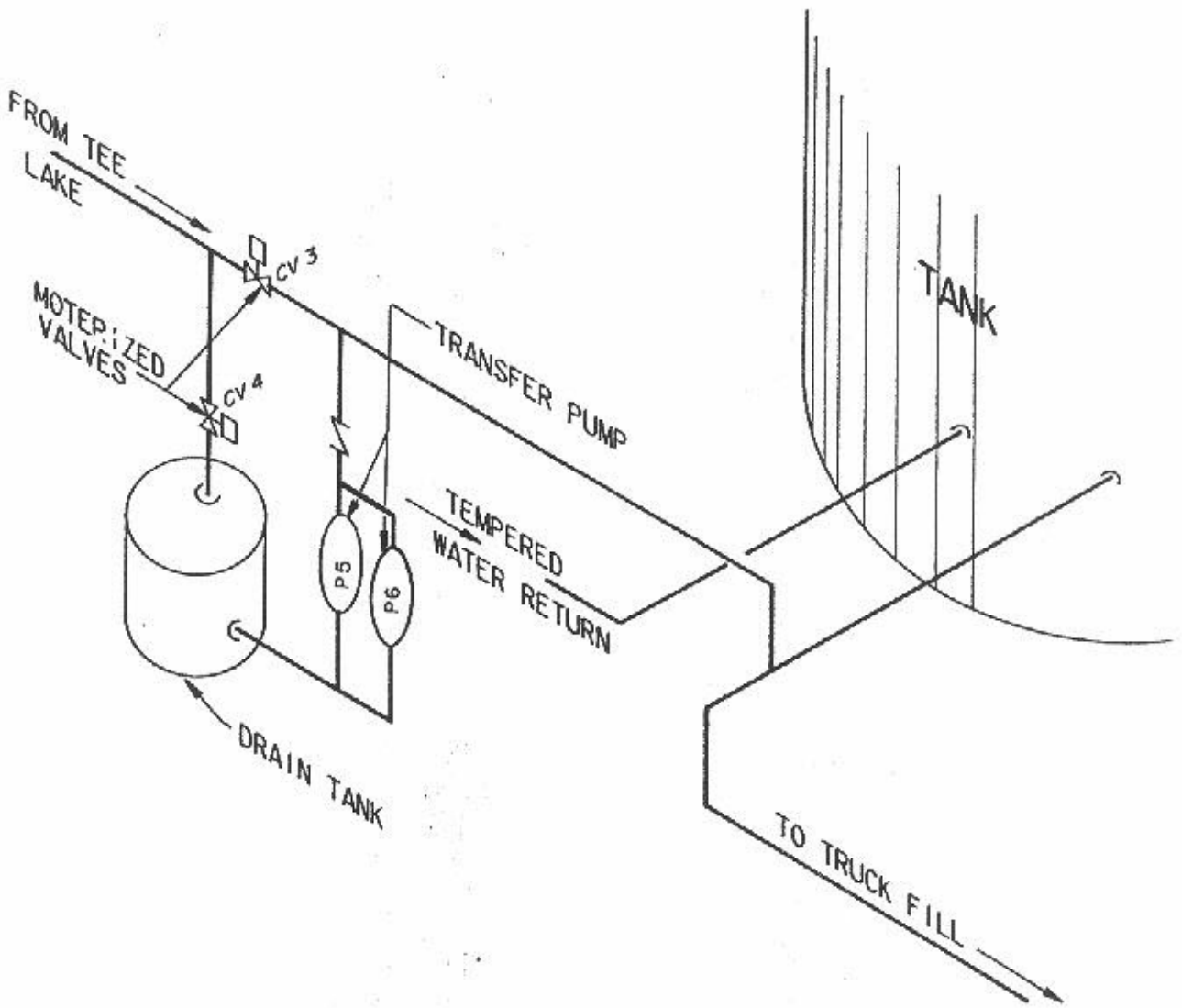
SCALE: N.T.S.	TITLE: CAPE DORSET TRUCKFILL STATION STORAGE TANK FREEZE PREVENTION - ALTERNATIVE I	FIG. 5



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SCALE: N.T.S.	TITLE: CAPE DORSET TRUCKFILL STATION REFILL LINE FREEZE PREVENTION—ALTERNATIVE I	FIG. 6

method of freeze prevention assures continuous flow through all piping connecting the tank to the truckfill station. Continuous circulation will prevent thermal stratification.

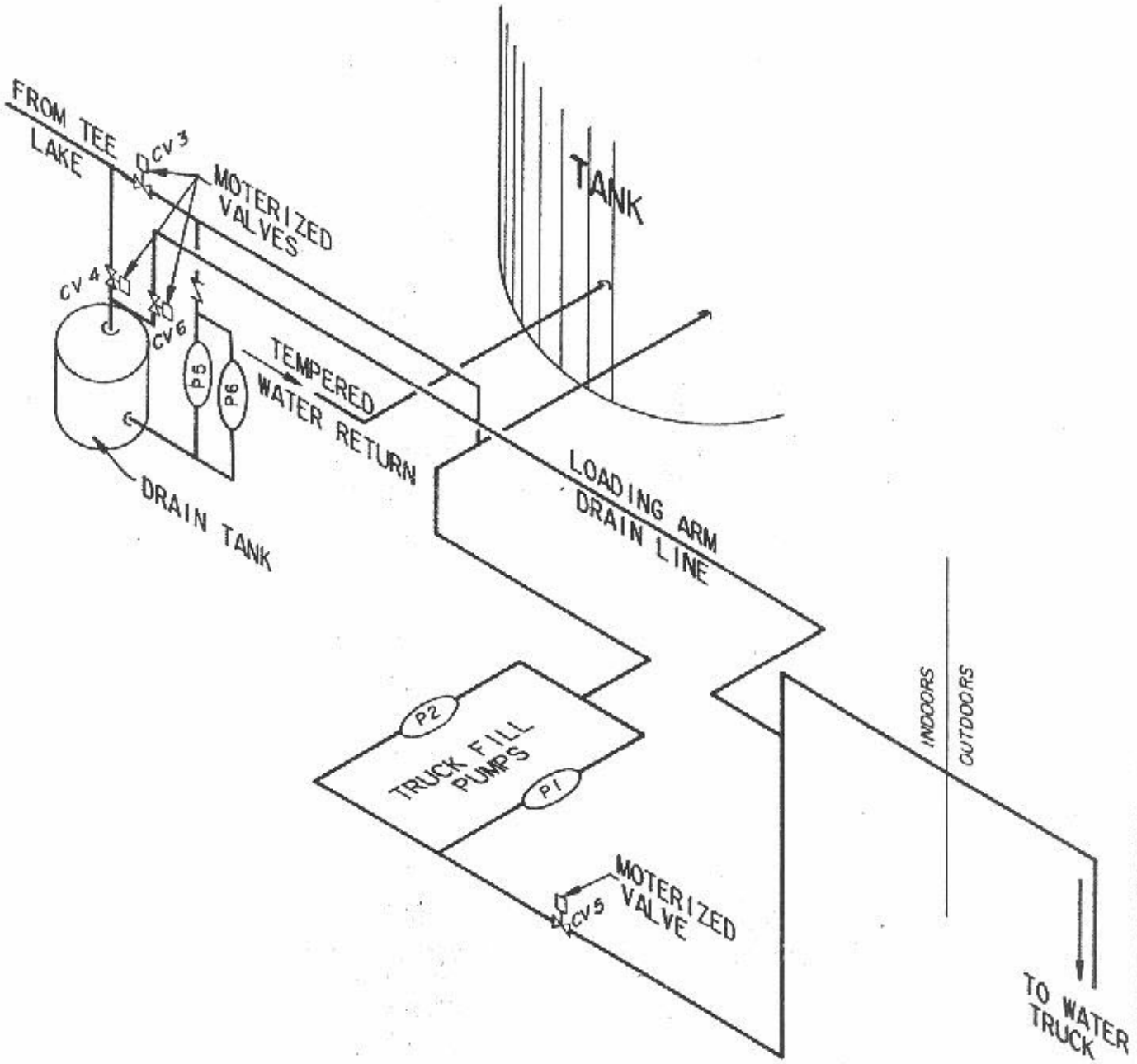
4.2 Refill Line Freeze Protection

Prevention of freeze-up of the refill line from Tee Lake requires that this main be drained at the end of each tank fill cycle. Due to the slope of this line, a large portion of the main will drain by gravity to the elevation of the high water level of the tank. At this point in time, the water must be removed from approximately 250 metres of the supply main.

The draining of the supply main is depicted schematically in Figure 6. With this arrangement, a drain tank is incorporated into the piping system. It is intended that after the level in the supply main has stabilized to the high water level of the tank, that a motorized valve open to drain the remaining segment of the supply main into the drain tank. The tank would then be emptied with a transfer pump into the storage tank. A tank which is approximately 1,500 litres in volume would provide a factor of safety of about 30 percent. With this drainage system, motorized valves may be selected which are self-opening on loss of power. This would assure drainage of the supply main following loss of power to the truckfill station. This arrangement as well provides a location where water may be drained for other operational purposes.

4.3 Truck Loading Arm

Truck loading arms are normally protected from freezing by permitting the contained water to drain by gravity back into the reservoir. This is not possible in this specific instance because the level in the storage tank will often be above the level of the loading arm. Thus a means for positive drain-down of this loading arm must be provided. The selection of a drain tank for the fill line from



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SCALE: N.T.S.	TITLE: CAPE DORSET TRUCKFILL STATION TRUCK LOADING ARM FREEZE PREVENTION	FIG. 7

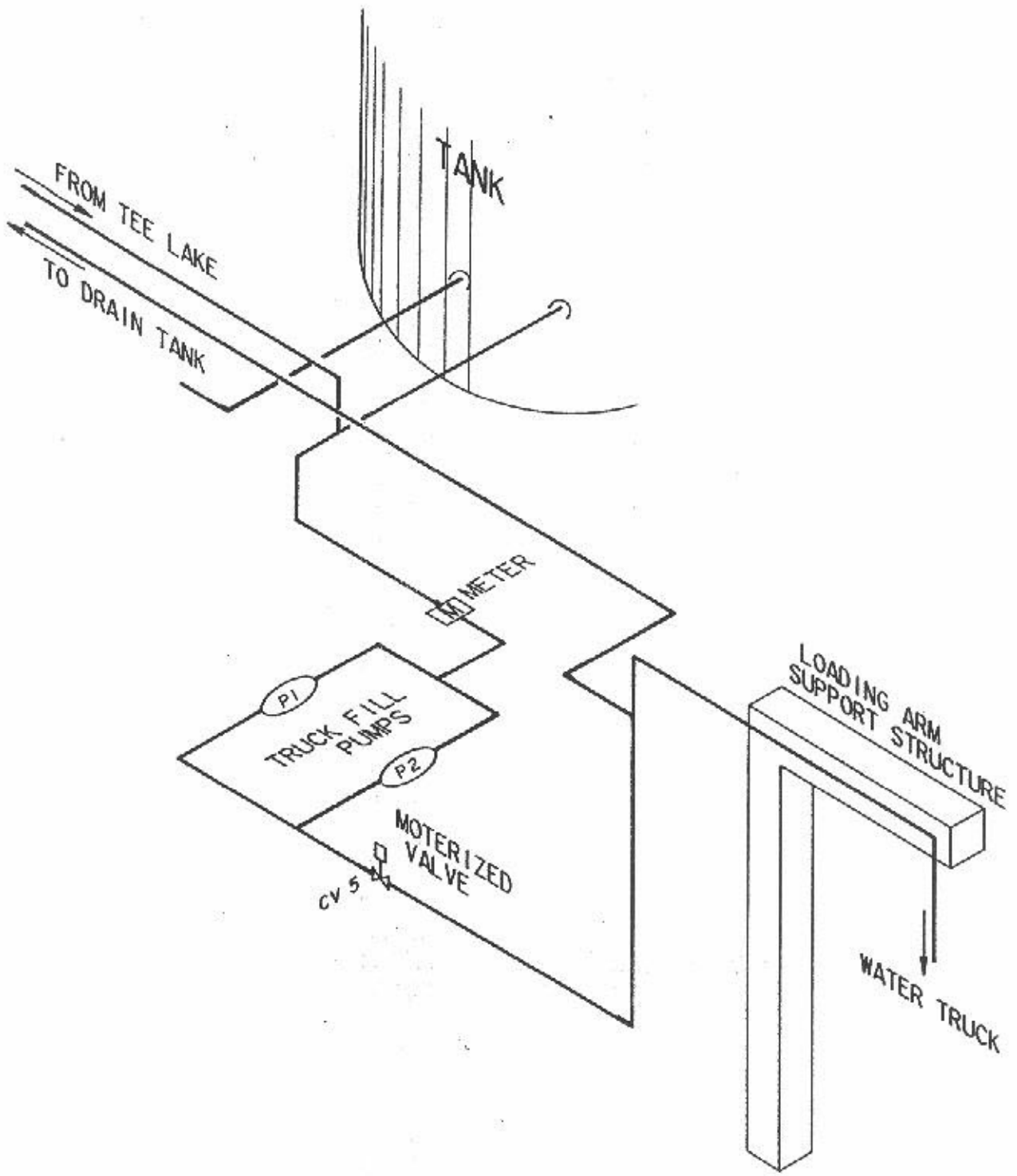
Tee Lake in the previous section provides a point where the loading arm may be drained by gravity through the addition of a limited amount of piping and motorized valves in a fashion as depicted schematically in Figure 7. As has been recommended for the drainage system for the fill line, the motorized valves should be selected with the feature of automatic operation on loss of power to assure draining of the loading arm and termination of water delivery following loss of electrical supply. Electrical heat trace must be provided on the truckfill piping.

5.0 TRUCK LOADING SYSTEM

The equipment required to load water delivery trucks includes transfer pumps, control valves, metering equipment and a loading arm. The following summarizes the equipment requirements for these purposes. The terms of reference require a truckfill rate of 1,000 litres per minute. There is a further requirement within the Terms of Reference for the provision of one duty and one standby transfer pumps to provide the continuous availability of service. Close coupled end suction centrifugal pumps of approximately 5 horsepower would be well suited for this service.

During normal operation, the storage tank level will be above the elevation of the truck loading arm. This will require a motorized valve downstream from the transfer pumps to provide positive shut-off of flow from the water storage tank. This valve must be selected to automatically close in the event of loss of electrical power.

Water meters are normally provided in truckfill stations to measure current flow rate, volume in current delivery and the total quantity of water which has been consumed. Commonly, paddle wheel type flow meters are used as they present no restriction to return flows for drainage purposes. The paddle wheel type flow meters present low head loss and provide both instantaneous flow rate and flow totalization. These meters as well provide information which is of use within the control systems including proof of flow and flow rate output which may be used to pace other equipment such as chemical feed.



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SCALE: N.T.S.	TITLE: CAPE DORSET TRUCKFILL STATION TRUCK LOADING SYSTEM	FIG. 8

The loading arm penetrates the truckfill station wall and extends vertically and horizontally to reach the fill point on the water delivery truck. In that a pre-engineered building will be used for the truckfill station, additional building members are installed to provide sufficient support for the truck loading arm. Difficulties with long-term weatherproofing of a roof penetration dictate a wall penetration by the piping. This arrangement does provide for simplicity in the interconnections to the piping within the truckfill station.

Figure 8 depicts schematically the truck loading system.

6.0 CHEMICAL FEED

There is the requirement for chlorination and a potential for the application of fluoride to the drinking water supply in Cape Dorset. The selection of an appropriate application point and the equipment required to dispense chemicals is considered in the following sections.

6.1 Fluoride

Fluoridation of the drinking water in Cape Dorset is not within the scope of the current project. The terms of reference do, however, require provision for the future installation of fluoridation equipment. The point for future fluoride feed is into the water storage tank refill line.

6.2 Chlorination

Chlorination equipment is provided within the proposed truckfill station so as to assure disinfection of all drinking water prior to delivery.

Chlorine addition into the tank refill line has been provided

6.3 Chlorination Equipment

The water distribution and sewage disposal system standards as prepared by the Department of Public Works recommend the use of hypochlorite metering pumps together with a pair of solution storage tanks. One of these setups is provided in the proposed truckfill station. The hypochlorite feeder which is connected to the storage tank refill line has a capacity of approximately 100 litres per hour against a 10 metre head.

The installation includes a hypochlorite metering pump, a pair of polyethylene solution storage tanks, a solution mixer, low level shut-off switch, injector, back pressure valve and all necessary piping.

7.0 INSTRUMENTATION AND CONTROL

7.1 Introduction

Instrumentation and control is required for the various systems within the water truckfill station. These controls are required to cause sequences of events to occur; to provide information to the operator; to annunciate alarm conditions and to permit maintenance and repairs of the equipment within the building. The necessary controls include both manual and automated equipment.

The instrumentation and control systems satisfies the following broad principles:

- The desired sequence of events should be reliably executed.
- The control should be as simple and understandable as possible to operate.
- All necessary operational information should be annunciated to the operator.
- The selected system should be repairable by personnel in the Region.
- Standardized components should be selected where possible to minimize inventory and ease acquisition of spare parts.

The systems requiring instrumentation and control include the following:

- water storage freeze prevention
- storage tank refill
- truckfill system
- drain tank operation
- alarms including local and remote

The Water System Piping Schematic illustrates the various required controls which are discussed and should be reviewed in conjunction with the following sections.

7.2 Water Storage Freeze Prevention

The following section considers maintenance of the desired water temperature within the water storage tank. Freeze prevention of the tank refill line and the water truck loading system will be considered in subsequent sections.

The temperature of 5°C has been selected for the stored water. This temperature represents a compromise in that a higher temperature will lead to greater heat loss for the tank while reducing the stored water temperature, will reduce the time period available to respond to any equipment failures in the stored water reheat system. The heated return water normal operating temperature of 25°C and a high temperature limit of 30°C have been selected to prevent damage to high density polyethylene piping from high temperature.

To prevent freeze-up of the piping between the water storage tank and truckfill station, continuous flow will be maintained through the heat exchangers by the circulation pumps P3 and P4. These pumps will be manually alternated with one pump continuously available, with automatic start, as a standby.

Continuous operation of the circulation pumps has been selected for several reasons. Firstly, continuous assures ongoing mixing of the tank contents which assures ongoing water quality and prevents thermal stratification. Continuous circulation maintains flow past the temperature sensors which assures continuous accurate measurements. Finally, the risk of freeze-up due to operational error is reduced.

Control valves CV1 and CV2 will be modulated in response to the stored water temperature. The following sequence of operations will be required.

- Sensing temperature drop at aquistat T1 below 5°C permits heating fluid flow from boilers through control valve CV1 and CV2 into heat exchangers.

- Aquistat T2 modulates control valve CV1 and CV2 to maintain 25°C return temperature.

- Temperature rise above 5°C at aquistat T1 ceases heating fluid flow through heat exchangers.

- Temperature rise above 30°C at aquistat T5 ceases heating fluid flow through heat exchanger and annunciates alarm.

- Loss of circulation flow opens flow switch FS1, and annunciating alarm.

7.3 Water Storage Tank Refill

Prior to each storage tank fill cycle, the heat trace cable within the fill main must be operated for a period of one to two hours. This is followed by a tank refill period of approximately seven hours. Following completion of tank filling, a second heat trace cycle is required for drying of the piping system.

Automatic termination of the refill cycle has been provided because it leads to fewer timing restrictions to ensure termination of the fill cycle within the working day. Automatic termination reduces the risk of overflow should the operator forget that tank refill is in progress. This method as well reduces the risks of fill main freeze-up by ensuring that the appropriate sequence of events occurs. The principal disadvantage to terminating the reservoir fill cycle automatically is that the controls are more complex to ensure the correct sequences of events occur with the required time delays.

The large diameter connection which is used for tank refill and water truckfill experiences four operating circumstances. These are recirculation flow, tank refill, truck filling and simultaneous tank and truckfill. Each of these conditions represents different hydraulic conditions of velocity and friction head. Thus, any sensors connected to this pipe would be subject to erroneous measurements due to head variations.

The reheated water return line operate continuously at constant flow. Thus, head varies only in response to the storage tank level. Sensors do not experience errors due to changing hydraulic conditions. This pipe has been selected as the condition point for tank level sensors.

The control system provides for the following sequence of operations during the tank refill cycle:

- Pressure switch PS4 closes on storage tank falling to refill level.
- Alternatively, operator initiates tank refill site manually by pressing start button. Fill cycle initiation annunciated by signal light.
- Motorized valve CV3 closes
- Drain tank level switch LS1 confirms is sufficient volume available in the transfer tank to permit fill line emptying at the end of the cycle.
- Heat trace cables in refill main energized and time delay started (time delay reset monthly based upon prevailing weather).
- At the end of the time delay, lake pump starts; heat trace timer resets for fill main drain at end of cycle. Heat trace will remain energized if T1 senses a temperature of 5°C or less (adjustable).
- The water cut-off in Tee Lake pump house closes following filling of the water heaters by the lake pump energizing water heaters.

At the completion of the tank filling cycle the following sequence of operations occurs.

- Pressure switch PS5 closes on storage tank reaching high water level
- Tee Lake pump and water heaters de-energized; fill line heat tracers energized
- Initiate time delay to permit fill line from Tee Lake to drain to storage tank static level
- Motorized valve CV3 closes
- Motorized valve CV4 opens
- Level switch LS2 starts lead transfer pump on filling of drain tank from the refill line, level switch LS3 will start lag pump.
- Level switch LS1 stops transfer pump P3 and P4 following drainage of the fill main

- Fill line heat trace de-energized at the end of time delay and timer resets for next cycle.
- Level switch LS4 on the transfer tank annunciates an overflow alarm.

The control system annunciates the following information:

HIGH LEVEL WATER STORAGE TANK
TWO-DAY ALARM WATER STORAGE TANK
FIRE RESERVE WATER STORAGE TANK
LOW LEVEL CUTOFF WATER STORAGE
LOW TEMPERATURE RECIRC. WATER
NO FLOW RECIRC. WATER
HIGH TEMPERATURE RECIRC. WATER
BOILER TROUBLE
GLYCOL SYSTEM TROUBLE
HIGH LEVEL TRANSFER TANK
NORMAL POWER FAILURE
GENERATOR TROUBLE
GENERATOR SWITCH "OFF"
LOW LEVEL FUEL OIL
LOW SPACE TEMPERATURE
HIGH SPACE TEMPERATURE
HIGH LEVEL FUEL OIL
UPPER HEAT TRACE FAILURE
TEE LAKE PUMP FAILURE
TEE LAKE HEAT TRACE FAILURE
LOWER HEAT TRACE FAILURE
SPARE

7.4 Water Truckfill System

The truckfill system controls include both the controls required for delivery truck refill and those controls required to restrict access to the volume which is assigned for daily operational use so as to retain loss of supply and fire storage.

7.4.1 Delivery Truck Refill

The delivery truck refill cycle is initiated by the driver and terminated by the dispensing of a suitable volume of water or by manual stop. The control system must as well include all equipment required to assure freeze prevention. The sequence of operations associated with this system may be summarized as follows:

- Driver initiates cycle using key lock switch
- Pressure switch PS3 confirms that the water storage tank level is above the low water level for daily storage
- Motorized valve CV6 closes
- Motorized valve CV5 opens
- Transfer pump P1 or P2 starts (pumps manually alternated)
- Truckfill timer starts
- At end of truckfill timer run time, pump P1 or P2 stops
- Motorized valve CV5 closes
- Motorized valve CV6 opens to drain loading arm
- Level switch LS2 initiates the transfer of drain down water from drain tank back to water storage.
- Time delay permits heat trace operation for 30 minutes if ambient temperature is below -5°C

During the course of truckfill, meter M1 measures flow rate and provides an indication of total water quantity delivered at the operators panel.

7.4.2 Storage Management

The terms of reference establish storage requirements for this facility of 160.1 m^3 for daily operating storage, 320.2 m^3 as a two day loss of supply storage and 54 m^3 for fire storage. Compartmentalizing the storage tank to provide for these volumes is both structurally difficult and causes significant problems in maintaining the required circulation within the tank. Thus control equipment which is based upon the tank water elevation is required to reserve these volumes for their intended purposes. The following summarizes the various level sensing functions which will be required.

Previously in Section 7.4.1 reference has been made to pressure switch PS4. This switch is intended to confirm that the water level is within the daily operating storage volume. This switch prevents delivery following depletion of the daily storage.

In the event of a loss of supply, water delivery is prevented by pressure switch PS4. Additional water deliveries under these circumstances would require that this level switch be overridden by manual control. A key lock switch is provided within the building for this purpose. Operation of this manual control permits the depletion of the next 320 m^3. When low water level for this portion of the storage is reached, pressure switch PS3 opens preventing further deliveries and retaining the required volume for fire storage purposes.

During fire, the above low level cut-off switches must be overridden to assure access to the full storage tank volume. It is recommended that a pair of key lock switches be provided. One of these would be situated within the building and the second one would be mounted on the truck loading arm control panel. A final low water cut-off switch (PS1) would open when the tank has been completely emptied so as to prevent damage to the mechanical equipment within the truckfill station.

As has been discussed in the previous section, pressure switch PS6 is provided as an overfill alarm. The switch would take the form of an emersion type sensor mounted on the top of the tank. Overfilling of the tank to this level would shut down the Tee Lake pump, annunciate an alarm and lock out refill of the water storage tank.

7.5 Alarms

Appendix "C" provides a summary of alarm points annunciated.

7.6 Additional Valving and Controls

Various valves and controls are required to isolate equipment for maintenance and repair purposes and to override automatic controls following failures. These take the form of various manually actuated valves.

8.0 SUPPORT SERVICES

Several support services are required to successfully operate the propose facility. These include electrical power, communications, fuel and heating storage.

8.1 Electrical Power

Three phase electrical supply is available from the existing overhead line at the site perimeter.

A standby power source which is capable of maintaining the facility for a prolonged period of time has been provided.

Loss of electrical supply to the site would as well lead to loss of power at the lake pump house. Thus refill would not be possible and the heat trace within the refill line would not be required. Standby electrical power source is not sized to serve the lake pump house or fill line heat trace system. All other electrical loads are carried by the standby equipment including the pumping and heating equipment.

8.2 Communications

Communication lines are installed to telemeter control signals from the truckfill station to the Tee Lake pump house and to the pipe line mid point station. Currently this is accomplished using Northwest Telephone lines which are carried

on the overhead pole line adjacent to the site. The continued use of this Bell cable represents a simple way to telemeter the required signals.

8.3 Fuel Storage

Sufficient fuel is stored at the truckfill station site so as to assure ongoing tempering of the stored water and to maintain the environment within the truckfill station building. Additional fuel is as well on hand to power the standby diesel generator. The fuel storage of approximately 5,000 litres is satisfactory to provide 10 days operating storage at this facility. This storage takes the form of an exterior tank with a spill containment structure.

8.4 Heating

Heating is essential to prevent freeze-up of the water storage tank and the piping within the truckfill station building. It is economically desirable to match as closely as possible the heating requirements with the boiler size while ensuring that there is sufficient capacity to provide for the full heating requirements following the failure of a boiler. This facility experiences large variations in heating load. A heavy heating demand arises following refill of the water storage tank when the added water must be raised from approximately 2°C to 5°C. Following the tempering of this refill, the heating load is limited to losses from the building and the water storage tank which are expected to be low due to the insulation and building systems which are used.

CHAPTER 5

CAPE DORSET TRUCKFILL STATION

COMPONENT DETAIL

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TRUCKFILL STATION CAPE DORSET, N.W.T.

VALVE TAG DIRECTORY

VALVE NO.	PURPOSE	MODE
	DOMESTIC WATER SUPPLY SYSTEM	
1	STORAGE TANK ISOLATION VALVE	N O
2	STORAGE TANK FILL VALVE CV-3 ISOLATION	N O
3	STORAGE TANK FILL VALVE CV-3 ISOLATION	N O
4	STORAGE TANK FILL VALVE CV-3 BY-PASS	N C
5	TRANSFER TANK FILL VALVE CV-4 ISOLATION	N O
6	TRANSFER TANK FILL VALVE CV-4 ISOLATION	N O
7	TRANSFER TANK FILL VALVE CV-4 BY-PASS	N C
8	TRANSFER PUMP P-5 ISOLATION	N O
9	TRANSFER PUMP P-5 ISOLATION	N O
10	TRANSFER PUMP P-6 ISOLATION	N O
11	TRANSFER PUMP P-6 ISOLATION	N O
12	TRANSFER TANK LEVEL CONTROLS ISOLATION	N O
13	MAIN AIR ELIMINATOR SHUT-OFF	N O
14	TRANSFER TANK DRAIN	N C
15	FILL PIPING AIR ELIMINATOR	N O
	DOMESTIC WATER HEATING SYSTEM	
16	CIRCULATION PUMP P-3 ISOLATION	N O
17	CIRCULATION PUMP P-3 ISOLATION	N O
18	CIRCULATION PUMP P-4 ISOLATION	N O
19	CIRCULATION PUMP P-4 ISOLATION	N O
20	HEAT EXCHANGER #1 SUPPLY	N O
21	HEAT EXCHANGER #1 RETURN	N O
22	HEAT EXCHANGER #2 SUPPLY	N O
23	HEAT EXCHANGER #2 RETURN	N O
24	STORAGE TANK ISOLATION	N O
	TRUCK FILL SYSTEM	
25	LOADING PUMP #1 ISOLATION	N O
26	LOADING PUMP #1 ISOLATION	N O
27	LOADING PUMP #2 ISOLATION	N O
28	LOADING PUMP #2 ISOLATION	N O
29	TRUCKFILL VALVE CV-5 ISOLATION	N O
30	TRUCKFILL VALVE CV-5 ISOLATION	N O
31	TRUCKFILL VALVE CV-5 BY-PASS	N C
32	FILL PIPE DRAIN VALVE CV-6 ISOLATION	N O
33	FILL PIPE DRAIN VALVE CV-6 ISOLATION	N O
34	FILL PIPE DRAIN VALVE CV-6 BY-PASS	N C
35	FUTURE	N C

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TRUCKFILL STATION CAPE DORSET, N.W.T.

VALVE TAG DIRECTORY

VALVE NO.	PURPOSE	MODE
	GLYCOL HEATING SYSTEM	
36	RETURN TO BOILER	N O
37	SUPPLY FROM BOILER	N O
38	LOW WATER CUT-OFF BLOW DOWN	N C
39	EXPANSION TANK ISOLATION AT BOILER	N O
40	EXPANSION TANK ISOLATION AT TANK	N O
41	BOILER DRAIN	N C
42	HEATING PUMP P-7 ISOLATION	N O
43	HEATING PUMP P-7 ISOLATION	N O
44	HEATING PUMP P-8 ISOLATION	N O
45	HEATING PUMP P-8 ISOLATION	N O
46	HEAT EXCHANGER #1 SUPPLY	N 0
47	HEAT EXCHANGER #1 RETURN	N O
48	HEAT EXCHANGER #2 SUPPLY	N O
49	HEAT EXCHANGER #2 RETURN	N O
50	UNIT HEATER #1 SUPPLY	N O
51	UNIT HEATER #1 RETURN	N O
52	UNIT HEATER #2 SUPPLY	N O
53	UNIT HEATER #2 RETURN	N O
54	GLYCOL FILL PUMP P-12 ISOLATION	N O
55	GLYCOL FILL PUMP P-12 ISOLATION	N O
56	GLYCOL SYSTEM PRESSURE SWITCH ISOLATION	N O
	INTERIOR DOMESTIC COLD WATER SYSTEM	
57	PRESSURE PUMP P-11 ISOLATION	N O
58	PRESSURE PUMP P-11 ISOLATION	N O
59	CHLORINE MIX TANK FILL VALVE	N C
60	EYEWASH ISOLATION	N O
61	GLYCOL FILL TANK FILL VALVE	N C
62	GLYCOL HEATING FEEDWATER SHUT-OFF	N O
	FUEL OIL SYSTEM	
63	OUTSIDE TANK DRAIN	N C
64	MAIN BUILDING SHUT-OFF	N O
65	OIL PUMP P-9 ISOLATION	N O
66	OIL PUMP P-9 ISOLATION	N O
67	OIL PUMP P-10 ISOLATION	N O
68	OIL PUMP P-10 ISOLATION	N O
69	DAY TANK DRAIN	N C
70	LEVEL CONTROLS ISOLATION	N O
71	SUPPLY TO APPLIANCES	N O
72	SUPPLY TO BOILER	N O
73	SUPPLY TO UNIT HEATER #1	N O
74	SUPPLY TO GENERATOR	N O
	CHLORINE SYSTEM	
75	STORAGE TANK CHLORINATION FLOW SWITCH	
76	STORAGE TANK CHLORINE INJECTOR	
77	TRUCKFILL CHLORINE INJECTOR	
78	CHLORINE TANK DRAIN	N C

CAPE DORSET TRUCKFILL STATION
TABLE OF MAJOR COMPONENT DETAILS

NUMBER	COMPONENT	DETAIL	SETTING	REMARKS
1, 2	Domestic Water Loading Pump P1, P2	Armstrong Model 4030 4x3x8	15.78 p/s 137.8 kPa	1800 RPM Base Mounted 575 V, 3 PH 7-5/8" Impeller
3, 4	Domestic Water Circulation Pumps P3, P4	Armstrong Model 4030 1½x1x6	1.89 l/s 68.9 kPa	1800 RPM Base Mounted 575 V, 3 PH 5½" Impeller
5, 6	Domestic Water Transfer Pumps P5, P6	Myers Model SW 4M5 HCM 50	9 GPM 30 psi	½ hp
7, 8	Boiler Water Circulation Pumps P7, P8	Armstrong Model 4380 2x2x6	3.79 l/s 89.57 kPa	1800 RPM Base Mounted 575 V, 3 PH 6-3/16" Impeller
9, 10	Fuel Transfer Pumps P9, P10	Vican Model FH	0.12 l/s	120 V, 1 PH
11	Domestic Water Pressure System Pump P11	Myers Model HJ33S	0.22 l/s	⅓ hp
12	Glycol Transfer Pump P12	Oberdorfer Model 991R	0.13 l/s	1725 RPM
13, 14	Heat Exchanger HE1, HE2	Size W-64-23-1, Armstrong		Shell 1.4 l/s Tubes 1.9 l/s
15	Domestic Transfer Tank	Westeel 1220 ODx1800 OAL		860 kPa
16	Boiler	Weil-McLain No. 1-BL488WF		7.0 GPH 810,000 BTUH See sheet for features
17	Exterior Fuel Tank	DTE Industries 4540L		Diked 110% Containment

CAPE DORSET TRUCKFILL STATION
TABLE OF MAJOR COMPONENT DETAILS

NUMBER	COMPONENT	DETAIL	SETTING	REMARKS
18	Unit Heater	Modine POH 145	42.5 kW	P-50 Fuel Oil 51.3 kW in 42.5 kW out
19, 20	Unit Heaters	Trane 60-S	7.9 kW @ 0.15 l/s	60% Propylene Glycol
21	Water Storage Tank	Universal Industries AWWA Tank		540 m^3 with recirculation piping
22	Truck Loading Arm	See As-Constructed Drawings		
23	Chemical Feed Tank	Liquid Metronics No. 26350 with 10590 Activator 1/20 hp	50 gal	Secondary mixing tank for calcium hypochlorite is required
24	Chemical Feed Pump	Liquid Metronic A751-191S	Variable to meet water requirements	Operator to monitor and log consumption vs. chlorine residual
25	Domestic Water Meter	Flow Sensor Signet P51530-P-O Batch Accumulator MK 578		
27	Pressure Switch PS1	UE-J402 Pressure 9838 Low Level Shutdown	200 mm water in tank	Coupled with PS2
28	Pressure Switch PS2	UE-J402 Pressure 9838 Fire Reserve Key	1120 mm of Water in Tank	Coupled with PS1
29	Pressure Switch PS3	UE-J402 Pressure 9838 Low Level Alarm and 2 Day Reserve Key	6210 mm of Water in Tank	Coupled with PS4
30	Pressure Switch PS4	UE-J402 Pressure 9839 Start of Fill Cycle	6500 mm of water in tank	Coupled with PS3

CAPE DORSET TRUCKFILL STATION
TABLE OF MAJOR COMPONENT DETAILS

NUMBER	COMPONENT	DETAIL	SETTING	REMARKS
31	Pressure Switch PS5	UE-J402 Pressure 9839 Stop of Fill Cycle	8840 mm of Water in Tank	Coupled with PS6
32	Pressure Switch PS6	UE-J402 Pressure 9839 Overfill Alarm	8890 mm of Water in Tank	Coupled with PS5
33, 34	CV1 CV2	Honeywell V5013 - Three Wax with Modutrol IV Motor	Modulating Through T2 and T5	Diverting heating fluid to heat exchange on Den and for heat.
35	CV3	Keystone F-1000 complete with Electric Actuator F-777	Open for tank fill cycle	
36	CV4	Keystone F-100 complete with Electric Actuator F-777	Open upon closing of CV3 to drain pipeline to transfer tank	
37	CV5	Keystone F-1000 complete with Electric Actutor F-777	Open to fill truck CV6 closed during filling	
38	CV6	Honeywell V5011 two way	Open to drain truk loading arm CV5 closed	
39, 40	Gerund Ball Valve indicators	Primary HE 1½" - 1E Secondary 1¼" - 2D	22.2 USGPM 14" WC 30 USGPM 49" WC	Circuit Setters for Tank Reheat
41, 42	CV7 CV8	Honeywell V5013 - Three Way with Proportional Control T921 Thermostat	Unit Heater	

CAPE DORSET TRUCKFILL STATION
TABLE OF MAJOR COMPONENT DETAILS

NUMBER	COMPONENT	DETAIL	SETTING	REMARKS
43 - 46	Level Switch LS1 Transfer Tank	McDonnell No. 64	See Remarks	LS1 Pump off (lead lag) LS2 Pump on (lead) Pump off (lag) LS3 Pump on (lag) LS4 High Level Alarm
47	FS1	McDonnell FS4-3 3" 30 GPM		Indicate positive flow in domestic circulation system
48	Temperature Control T1	Honeywell T675	5°C Adjustable	Contols lower heat trace cable
49	Temperature Control T2	Honeywell T991A	Maintain +25°C Return T2 set at 5°C	Controls CV1 CV2 when T2 is below 5°C
50	Temperature Control T3	Honeywell T675	Set at 3°C	Low temperature alarm on circulation domestic return
51	Temperature Control T4	Honeywell T675	+32°C	High temperature alarm on return of heated domestic circulation
52	Temperature Control T5	Honeywell T991 A	30°C	If return circulation temperature of 30°C is reached this control modulates CV1 and CV2
53	Fuel Day Tank			
54 - 58	Fuel Tank Switches	McDonnell and Miller Model No. 80	See remarks	54 Low Fuel 55 Lag Pump on 56 Lead Pump on 57 Pump off 58 High Level Alarm

CAPE DORSET TRUCKFILL STATION
TABLE OF MAJOR COMPONENT DETAILS

NUMBER	COMPONENT	DETAIL	SETTING	REMARKS
59	Exterior Tank Levelometer	Midget Model 277	N/A	See literature for supplier
60	Fuel Filter Typical	General Model 1A-25A	N/A	Used on boiler, standby generator, and unit heater
61	Fuel Fusible Link	General Model N-100-F		Vent Cap #4021 2"
62	Generator	Kohler 20ROZJ		See literature complete with John Deere Engine
63	Battery Chargin Rectifier	Mechran Model CR2F		
64	Automatic Transfer Switch	ASCO Model 940		See literature
65	Domestic Water Transfer Panel	TIC Electric		See literature
66	Fule Transfer Pump Control Panel	TIC Electric		
67	Glycol Feed Pump Panel	TIC Electric		See literature
68	System Control Panel	Honeywell Job #42-0509		See As-Built drawings - system control - alarm panel

CAPE DORSET TRUCKFILL STATION
TABLE OF MAJOR COMPONENT DETAILS
(ADDITIONAL COMPONENTS ADDED OR DESCRIBED)

NUMBER	COMPONENT	DETAIL	SETTING	REMARKS

CAPE DORSET TRUCKFILL STATION
TABLE OF MAJOR COMPONENT DETAILS
(ADDITIONAL COMPONENTS ADDED OR DESCRIBED)

NUMBER	COMPONENT	DETAIL	SETTING	REMARKS

CAPE DORSET TRUCKFILL STATION
TABLE OF MAJOR COMPONENT DETAILS
(ADDITIONAL COMPONENTS ADDED OR DESCRIBED)

NUMBER	COMPONENT	DETAIL	SETTING	REMARKS

CHAPTER 6

CAPE DORSET TRUCKFILL STATION

OPERATING PROCEDURES

CHAPTER 6
OPERATION

This chapter contains:

1. Start Up Procedures
2. Normal Operations Procedures
3. Trouble Shooting
4. Special Conditions

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START-UP PROCEDURES

GENERAL

These start-up procedures are based on all switches being in the "OFF" position with no water in the storage tank or boiler/circulation system. The outside fuel tank is to be filled to start.

STEP 1 Go to the main electrical service switch in the main room.
Open cover and verify fuses are installed and are the correct rating. The fuses should be 70 amp HRC-1 type J - Time Delay. Replace fuses if required.
Close cover of switch and turn operating handle to "ON".

STEP 2 Go to automatic power transfer switch.
Locate switch which reads "TEST - NORMAL".
Turn switch to "NORMAL".

STEP 3 Go to 30 amp disconnect switch labelled "PANEL A".
Open cover and verify fuses are installed and are correctly rated at 20 amps HRC-1 type J - Time Delay.
Close cover of switch and turn operating handle to "ON".

STEP 4 Go to panel A.
Turn all circuit breakers "ON" except do not turn on:
- system control panel
- pressure pump P-11

STEP 5 Go to disconnect switches feeding heat tracing transformer and MCC (motor control centre). Verify fuses as in Step 1. Heat tracing transformer disocnnect should be fused at 30A time delay and MCC should be fused at 50A time delay. Turn both switches "ON" now.

STEP 6 Verify fuel in outdoor fuel storage tank.

STEP 7 Fill day tank with fuel as follows:
Go to fuel pump control panel in generator room.
Turn on main power switch.
Turn all H.O.A. switches to "ON".
Confirm fuel flow into day tank by observing site glass.

STEP 8 Refer to Tag Directory.
Open or close all valves to normal operating mode.

STEP 9 Start boiler (refer to boiler start-up in boiler manufacturers' manual in Chapter 9).

STEP 10 Turn on power for domestic water transfer pumps P5 and P6.

STEP 11 Start filling outside water storage tank as follows:
Go to electrical panel A turn breaker for system control to "ON".
Go to system control panel and turn all H.O.A. switches to "AUTO".
Alarm should sound for: "Low Water Level", "Water Circulation", "2 Day Reserve", "Fire Reserve" and "Low Cutoff".
Push silence button to silence alarms.

STEP 12 Automatic tank fill system will fill tank. See sequence of events in Appendix (page 10 - 1).
Observe water level rise in tank by looking at tank level gauge.
If any further alarms take place refer to Trouble Shooting, (page 6 - 8).

STEP 13 When water level in tank reaches the "Fire Reserve Level", which will be indicated on the level gauge and by the alarm light for "Fire Reserve Level" going out, turn on water circulation pump P-3 as follows:
- go to Motor Control Centre
- locate starter for P-3
- locate "HAND-OFF-AUTO" switch on starter
- turn switch to "AUTO"

Do not turn on circ. pump P-4. P-3 and P-4 will be alternated manually once weekly.

STEP 14 When water level reaches the "STOP FILL" level (PS-5), the control system will stop the fill operation automatically. The pipeline heat tracing will remain on for up to two hours.
- confirm water level at level gauge
- if water level is not at top of tank, check for further alarms on alarm panel.

STEP 15 Start domestic water pressure pump P-11 by turning breaker "ON" and bleeding air from system.

STEP 16 Go to the system control panel and observe which green lights are on. It should look like this.

SYSTEM CONTROL PANEL

STORAGE TANK LEVEL
- TRUCK FILL ENABLE
- TWO DAY RESERVE ENABLE
- FIRE RESERVE ENABLE

AMPS — UPPER HEAT TRACING

AMPS — LOWER HEAT TRACING

TANK FILL — OPERATION — ON
- START FILL CYCLE
- TRACE HEAT LOWER
- TRACE HEAT UPPER
- LAKE PUMP
- IMMERSION HEATER
- TANK FILL ABORT

STORAGE TANK HEAT
- NORMAL
- WATER CIRCULATION

TRUCK FILL
- CYCLE IN PROGRESS
- PUMP P1 STATUS
  - RUN TIME — HRS
- PUMP P2 STATUS
  - RUN TIME — HRS

PUMP SELECTOR — P1 P2

EMERGENCY GENERATOR
- RUNNING

UH-1 FUEL FIRED UNIT HEATER

Refer to unit heater start-up in unit heater manufacturers' manual in Chapter 9.

UH-2 & 3 HOT WATER UNIT HEATER

STEP 1 Locate manual switch and thermostat on wall under unit heater.

STEP 2 Turn manual switch "ON". Set thermostat to 18° C.

TRUCK FILL

STEP 1 Truck fill pumps are alternated manually every week at the system control panel as follows:
- go to Motor Control Centre
- locate starter for P-1
- locate H.O.A. switch
- turn H.O.A. switch to "AUTO"
- locate starter for P-2

Start chlorine feed pump (see Page 6 -27).
The truck fill system is ready for operation. See page 6 - 5 for truck fill procedure.

STANDBY GENERATOR

STEP 1 Refer to Prestart Checklist in Operation Manual Chapter 9.

STEP 2 Go to generator control panel located on back of standby generator.
Turn master "RUN-OFF/RESET-AUTO" switch to "AUTO" position.

STEP 3 The generator ventilation system is operated automatically by a space thermostat which modulates fresh air and return air dampers. For a description of the operating see Appendix A in Chapter 10.

NORMAL OPERATING PROCEDURES

WATER STORAGE TANK FILL

The water level in the outdoor storage tank is regulated by the automatic control system which operates on pure pressure switches mounted on the main recirculation return line. For a description of the automatic control sequence, refer to Automatic control sequence in Appendix.

To observe the fill system in operation, it is possible to initiate the automatic fill sequence manually. This should be done periodically (every 3 months) to ensure all the steps are working.

To initiate the automatic fill sequence:

- Go to the water level gauge
- If the water level is between ?? and ??, the fill sequence may be initiated.
- If the water level is above ??, then the fill sequence will be too short. Wait until the water level drops.
- To initiate the fill sequence, push the button labelled "start fill cycle".
- the system Control Panel should be checked for green operating lights.
- if an alarm buzzer comes on at the system alarm panel refer to TROUBLE SHOOTING.

TRUCK FILL SYSTEM

The truck fill sequence is started at the truck fill control panel located in the weatherproof, heated enclosure next to the door on the outside of the building.

To fill a truck:

STEP 1 Go to the main system control panel located inside the building by the Main Entrance.
Locate the key switch "TRUCK FILL ENABLE".
Turn key switch to "ON".

STEP 2 Drive truck under loading arm and insert spout into truck water tank.

STEP 3 Go to the truck fill control panel on the outside of the building or the swtich at the end of truck fill arm. Locate the push button which reads "START FILL" and push the button.

STEP 4 The fill cycle can be stopped at the truck fill system control panel or at the truck fill arm by pushing the red stop pushbutton.

STEP 5 The fill cycle will automatically stop after ten minutes if it is not stopped manually.

STEP 6 If the filling sequence stops before the truck is full, the filling sequence can be started again by pushing the green start button on the loading arm. The operator should watch the level of the water rise in the tank to the truck and push the red stop pushbutton on the end of the loading arm when the tank is full. To see a description of the automatic truck fill sequence, see Appendix A - Chapter 10.
The fill pumps P-1 and P-2 should be alternated weekly by selecting P-1 or P-2 on the pump selector switch located on the main system control panel. A running time meter keeps track of the total hours each pump has run. These time meters should be kept approximately the same to balance the wear on the two fill pumps.

WATER HEATING AND CIRCULATION

When the temperature outside is below 2° C. It is very important that the water heating and circulation system stay in operation. Refer to Appendix A in Chapter 10 for explanation of automatic temperature control system. When the water tank and trucks are not being filled, check the control panel for the appropriate operating status lights.

The temperature of the water should be checked periodically (once per week minimum, daily if outside temperature drops below -15° C.) Check the thermostat located on the secondary water loop. It should read between 3° - 5°. If it is lower than 3° C.:

- check if boiler is working (see Boiler Manual in Chapter 9)
- check that either P-3 or P-4, circulation pump is running
- check alarm panel for alarms. See Alarm Point Legend Appendix C - Chapter 10.

STANDBY GENERATOR

The standby generator should be tested every week. Refer to the weekly testing and maintenance procedure in the manufacturers' maintenance manual in Chapter 9.

The standard weekly run test should be done without transferring the building load to the generator, by turning the "RUN-OFF/RESET-AUTO" switch on the generator control panel to "RUN".

The transfer switch should be checked for operation at least once per month at the same time as one of the weekly run tests as follows:

STEP 1 Perform weekly pre-test maintenance and inspections normally done. Leave the generator "RUN-OFF/RESET-AUTO" switch in the "AUTO" position.

STEP 2 Go to the automatic transfer switch near the main entrance electrical to Generator Room.
- locate the "TEST-NORMAL" selector switch on the front of the transfer switch
- turn the switch to "TEST".
- the generator should start and after six seconds the transfer switch should transfer to the emergency source. The red light indicating emergency source should light.

CAPE DORSET TRUCKFILL STATION

TROUBLE SHOOTING

All abnormal conditions are annunciated on the system alarm annunciator located in the main room next to the system control panel. Alarm annunciation consists of:

(a) a system alarm panel with labelled indicator lights and alarm buzzer.
(b) strobe lights on top of building.
(c) auto dialler which transmits prerecorded message to preselected telephone number.

Alarm points indicated on the system alarm panel are as follows:

(a) high level water storage tank
(b) two-day alarm water storage tank
(c) fire reserve water storage tank
(d) low level cut-off water storage
(e) low temperature recirc. water
(f) no flow recirc. water
(g) high temperature recirc. water
(h) boiler trouble
(i) glycol system trouble
(j) high level transfer tank
(k) normal power failure
(l) generator trouble
(m) generator switch "OFF"
(n) low level fuel oil
(o) low space temperature
(p) high space temperature
(q) high level fuel oil
(r) upper heat trace failure
(s) Tee Lake pump failure
(t) Tee Lake trace heat failure
(u) lower heat trace failure
(v) upper heat trace transmission failure
(w) Tee Lake pump transmission failure
(x) immersion heater transmission failure
(y) tank fill abort transmission failure

ALARM SEQUENCING

When an alarm signal is received from a field contact, the appropriate red indicating light will flash and the buzzer will sound at the system alarm panel.

STEP 1 Go to the system alarm panel to determine which alarm has been activated.

STEP 2 The alarm panel buzzer may be stopped by depressing the "SILENCE" button on the system alarm panel. The red indicating light will remain on until the alarm condition has been corrected.

STEP 3 If another alarm signal is reported before current alarm(s) have been corrected, the buzzer alarm will sound again, and, the appropriate indicating light will flash. Silence these alarms in the same manner as Step 2.

WATER STORAGE TANK HIGH LEVEL ALARM

STEP 1 Silence the alarm buzzer as outlined in "Alarm Silencing"

STEP 2 Go to the manual level gauge on the water circulation main header.
Read the water level off the gauge.

STEP 3 The High Level Alarm should only be activated when the tank reaches a level of 540 m^3. If the water level gauge shows less than this level, then manually check the level of the tank with a dip stick in the water storage tank.

STEP 4 If the water level gauge is showing that the tank is full, go to the system control panel.
Check to see if fill cycle is in progress. If green pilot lights next to "FILL CYCLE IN PROGRESS" and "TEE LAKE PUMP" is on, turn H.O.A. switch for Tee Lake Pump to "OFF".

STEP 5 Contact Honeywell to have control system checked.

STEP 6 Manually check water level in tank by using dip stick in manhole at top of tank.
If water level is full in tank, go back to system control panel and turn all remaining H.O.A. switches to "OFF".

TWO DAY RESERVE LEVEL

STEP 1 Silence the buzzer alarm as outlined in "Alarm Silencing".

STEP 2 Go to the water storage tank recirculation header. Read the manual level gauge to determine the volume of water in the water storage tank. The two day reserve level corresponds to 374 m^3.

STEP 3 If the water storage tank water level is near or below any of the points listed above, alarm will be activated. If this is the case, you must notify

NAME Mr. Jim Freeda
COMPANY Hamlet of Cape Dorset
ADDRESS Cape Dorest, N.W.T.
PHONE - WORK (819) 897-8981
- HOME (819) 897-8801

STEP 4 If the storage tank water level is above the level which is indicating by alarm condition then:

(a) Shut off the ball valve that feeds that particular level indicating device.

(b) Remove the level transmitting device and check to see if the snubber is clogged with sediment.

(c) If the snubber is dirty, clean and re-install the level indicating device.

(d) If the snubber is clean, install a new snubber and a new level indicating device from stock install and calibrate.

STEP 5 If the alarm condition continues, contact person outlined in STEP 3.

STEP 6 When the water falls below the two day reserve level, the truck fill pumps are disabled. See Special Conditions - Truck Fill Two Day Reserve (page 21).

FIRE RESERVE LEVEL

STEP 1 Silence the buzzer alarm as outlined in "Alarm Silencing".

STEP 2 Go to the water storage tank recirculation header. Read the manual level gauge to determine the volume of water in the water storage tank. The fire reserve level corresponds to 54 m^3.

STEP 3 If the water storage tank water level is near or below any of the points listed above, alarm will be activated. If this is the case, you must notify

NAME Mr. Jim Freeda
COMPANY Hamlet of Cape Dorset
ADDRESS Cape Dorset, N.W.T.
PHONE - WORK (819) 897-8981
- HOME (819) 897-8801

STEP 4 If the storage tank water level is above the level which is indicating an alarm then:

(a) Shut off the ball valve that feeds that particular level indicating device.

(b) Remove the level transmitting device and check to see if the snubber is clogged with algae or sediment.

(c) If the snubber is dirty, clean and re-install the level indicating device.

(d) If the snubber is clean, install a new snubber and a new level indicating device from stock.

STEP 5 If the alarm condition continues, contact person outlined in STEP 3.

STEP 6 When water falls below Fire Reserve Level, truck fill pumps are turned off. To fill fire truck in emergency fire condition only: See Special Conditions - Fire Reserve (page 21).

LOW WATER CUTOFF LEVEL

STEP 1 Silence the buzzer alarm as outlined in "Alarm Silencing".

STEP 2 Go to the water storage tank recirculation header. Read the manual level gauge to determine the volume of water in the water storage tank. The low water cutoff level corresponds to less than 12 m^3.

STEP 3 If the water storage tank water level is near or below any of the points listed above, alarm will be activated. If this is the case, you must notify

NAME Mr. Jim Freeda
COMPANY Hamlet of Cape Dorset
ADDRESS Cape Dorset, N.W.T.
PHONE - WORK (819) 897-8981
- HOME (819) 897-8801

STEP 4 If the storage tank water level is above the level which is indicating an alarm then:

(a) Shut off the ball valve that feeds that particular level indicating device.

(b) Remove the level transmitting device and check to see if the snubber is clogged with algae or sediment.

(c) If the snubber is dirty, clean and re-install the level indicating device.

(d) If the snubber is clean, install a new snubber and a new level indicating device from stock.

STEP 5 If the alarm condition continues, contact person outlined in STEP 3.

STEP 6 When water level falls below Low Water Cutoff Level, the truck fill pumps and the water heating circulation pumps are automatically turned off. If system cannot be rectified within a few hours, the system may have to be drained. See Special Conditions - Draining System (page 24)

RECIRCULATION WATER LOW TEMPERATURE

STEP 1 Find out if the alarm was tripped by:

(a) Water temperatures below 5° C. by checking the thermometer at the inlet of the heat exchangers.

(b) No flow in pipeline by checking operation of pump(s).

STEP 2 If water is flowing but below 5° C., check:

(a) If boiler is operating.

(b) If heat exchangers are hot.

STEP 3 If all of above are fine, check valves on heat exchangers to see they are open.

RECIRCULATION WATER NOT FLOWING

STEP 1 Go to recirculation pumps P-3 and P-4, check if one pump is running.

STEP 2 If the pump is not running, go to MCC, check that "H.O.A." switch is in "AUTO" position.

STEP 3 If a pump is running, check that all valves in recirculation loop are as listed in Valve Directory.

STEP 4 Clean one pump strainer by:

(a) Turn selected pump "H.O.A" switch to "OFF".
(b) Shut off valve on suction and discharge side of selected pump.
(c) Open basket strainer and clean thoroughly.
(d) Turn pump "H.O.A." switch to "AUTO".
(e) Open shut off valves on suction and discharge of selected pump.

STEP 5 Clean alternate pump strainer by method outline in Step 4.

RECIRCULATION WATER HIGH TEMPERATURE

STEP 1 Check the thermometer at the inlet of the heat exchangers.

STEP 2 Check the temperature setting of the valve control temperature sensor (T-2). This temperature should be 5° C.

STEP 3 Check the temperature setting of the boiler discharge temperature setpoint. This setpoint temperature should be 170° C.

STEP 4 If setpoint temperatures are "O.K.", close inlet and outlet valves to one heat exchanger.

BOILER TROUBLE

STEP 1 Go to boiler alarm panel located on boiler.

STEP 2 Refer to manufacturers' literature to remedy problem.

GLYCOL SYSTEM TROUBLE

STEP 1 Go to glycol system alarm panel located near glycol system.

STEP 2 Refer to manufacturers' "TROUBLE SHOOTING" literature to remedy problem.

TRANSFER TANK HIGH LEVEL

STEP 1 Go to transfer tank, view sight glass along outside of tank to determine water level. Confirm that transfer pumps are in operation.

STEP 2 If water level appears to be above transfer tank high level alarm switch:

(a) close valve at CV-4 manually.

STEP 3 When transfer tank water level has dropped to "PUMP CUT-OFF SWITCH":

(a) open valve at CV-4 and continue draining fire piping.

GENERATOR ALARMS

STEP 1 Go to generator alarm panel located on generator.

STEP 2 Refer to manufacturers' "TROUBLE SHOOTING" literature to remedy problem (See Chapter 9).

FUEL OIL LOW LEVEL

STEP 1 Go to fuel oil day tank, check level using Levelmeter Bubbler.

STEP 2 If day tank fuel oil level is low, check level of fuel in outdoor storage tank.

STEP 3 If outdoor storage tank is "O.K." check fuel oil transfer pumps. (P9 & P10)

STEP 4 Check to see if both pumps are running. Check lead and lag operation of pumps.

STEP 5 If pumps are running, check that all shut off valves in fuel oil supply line are open.

STEP 6 Clean pump fuel filters by:

(a) Turn selected pump "H.O.A." switch to "OFF" at fuel transfer pump control panel.

(b) Shut off valve on suction and discharge side of selected pump.

(c) Remove both fuel filters and clean.

(d) Re-install fuel filters and open pump shut-off valves.

(e) Check for leaks in fule filter assembly.

(f) Turn pump "H.O.A" switch to "AUTO".

FUEL OIL HIGH LEVEL

STEP 1 Go to fuel oil day tank, check level on level indicating gauge.

STEP 2 Check to see if either of fuel oil transfer pumps (P9 & P10) are running.

STEP 3 If either pump is running, turn "H.O.A" switch to "OFF".

STEP 4 Refer to manufacturers literature to remedy problem with pumps or pump control.

LOW/HIGH SPACE TEMPERATURE

STEP 1 Go to the control thermostat for each of UH-1, UH-2 and UH-3.

STEP 2 Verify that each unit heater thermostat is set at 18° C.

STEP 3 If the oil fired unit heater (UH-1) is not operating properly, refer to manufacturers' "TROUBLE SHOOTING" literature to remedy problem.

STEP 4 If the glycol unit heaters (UH-2 or UH-3) are not operating properly then

(a) Check supply and return valves are open.

(b) Close supply and return valves to unit.

(c) Clean strainer.

(d) Re-install strainer and open supply and return valves.

HEAT TRACE FAIL - UPPER/LOWER

STEP 1 Check heat trace electrical connections at:

(a) Truck fill station building.

(b) Each insulated junction box along Tee Lake supply line.

(c) Tee Lake heater house.

STEP 2 Repair any faulty connections.

STEP 3 If alarm persists, contact a service technician.

TEE LAKE PUMP FAIL

STEP 1 Go to Tee Lake heater house.

STEP 2 Verify that Tee Lake pump "H.O.A." switch is at "AUTO" and that Tee Lake pump is running.

STEP 3 If pump is running check for a frozen discharge line.

STEP 4 If pump is not running, remove pump for servincing and notify Hamlet if extended distruption in service is expected.

TEE LAKE IMMERSION HEATER FAIL

STEP 1 Go to Tee Lake Heater House.
Check power connection to immersion heaters.

STEP 2 If immersion not operational, contact a serviceman to find problem.

TRANSMISSION LINE FAIL

STEP 1 Visually inspect outside telephone lines from truck fill station building to Tee Lake heater house.

STEP 2 Contact Northwest Telecommunications to repair communication cable(s).

SPECIAL CONDITIONS

BUILT IN ALTERNATIVES

The following spare parts are located in the building and are labelled accordingly. Should a component fail where a spare part is available, isolate and drain that equipment and replace with spare. Maintain and inventory list of all spare parts on site.
Furnish spare parts in accordance with Sections 01250 and 15010 of specifications.

Pumps
- One set of packing or seal for each pump.
- One casing joint gasket for each size pump.
- One spare motor for each pair of pumps.

Valves:
- Valve Seats
- Valve Disks
- Stem Packing - Packaged
- Valve Handles - Two of each size
- Flange Gaskets

Strainers
- Two baskets for each type and size.

Jet pump pressure switch.

Transfer Tank
- Complete set of gauge glasses.
- One spare float switch
- Two dry contacts

Boilers
- Special tools for burners, manholes, handles
- Spare parts for one year of operation
- Spare gaskets
- Spare gauge glass inserts
- Probes and sealants for electronic indication
- Spare burner tips
- Spare burner gun
- Safety valve test gauge
- Transformer
- Operating Control
- Safety Valve
- Motor
- Fan Blower
- Motor Coupling
- Combustion Gauge
- Motor for hi/low

Oil System
- 4 spare filters
- 1 set gauge glasses
- Foot Valve - each type

Propylene Glycol
- Pump
- Operating Switch
- Low Level Switch
- One Set Auxiliary Contacts
- 340 Litres Glycol

Heat Exchangers
- Two gaskets per heat exchanger.

Fans
- One motor for each fan
- One set bearings for each fan

Controls
- Relays - one for each size and type
- Temperature sensors - one for each type
- Pressure switches - one for each type
- Flow switches - one for each type
- End switch - one for each type
- Audible alarm - one for each type
- Visual alarm - one for each type
- Level switches - one for each type
- Damper actuators - one for each type
- Valve actuators - one for each type
- Battery backup - one for each type

SPECIAL CONDITIONS

WATER STORAGE TANK MANUAL FILL (ALTERNATE METHOD)

STEP 1 Go to tank supply header, check level gauge to determine water level in outdoor storage tank.

STEP 2 Go to the system control panel and do the following:

(a) Turn immersion heater H.O.A. to "HAND".

(b) Turn pipe trace heat "H.O.A." switch to "HAND" and wait for one hour.

(c) Turn Tee Lake pump "H.O.A." switch to "HAND".

(d) Turn domestic water circulation pumps (P3 & P4) "H.O.A." switch to "HAND" when water has risen above intake piping.

STEP 3 Go to CV-4, close shut-off valves.

STEP 4 Go to CV-3, open shut-off valves.

STEP 5 Go to tank supply header, watch level gauge to approach level "PS-5-FILL STOP".

STEP 6 Go to the system control panel and do the following:

(a) Turn Tee Lake pump "H.O.A." switch to "AUTO" or to "OFF" to stay on manual.

(b) Turn immersion heater "H.O.A." switch to "AUTO" or to "OFF" to stay on manual.

STEP 7 All 10 - 15 minutes to drain line.

STEP 8 Go to CV-3, close shut-off valves.

STEP 9 Go to CV-4, open shut-off valves to start draining.

STEP 10 Go to the system control panel, turn the domestic water transfer pump (P-5) or (P-6) "H.O.A." switch to "HAND".

STEP 11 If the domestic water transfer tank water level approaches the "LAG PUMP START" level, go to the domestic transfer system control panel and turn the alternate domestic water transfer pump (P-6) "H.O.A." switch to "HAND".

STEP 12 When water stops flowing into the domestic water transfer tank from Tee Lake supply, go to the system control panel, turn the domestic water transfer pumps (P-5 & P-6) "H.O.A." switch to "AUTO" to "OFF" to remain on manual cycle.

STEP 13 After two hours have passed, go to the system control panel, turn the pipe trace heat "H.O.A." switch to "AUTO" or to "OFF" to remain on manual cycle.

TWO DAY RESERVE ACCESS

To operate the truck fill system after a Two Day Reserve alarm condition:

STEP 1 Go to system control panel.
Locate keyed switch labelled "TWO DAY RESERVE ENABLE".
Insert key and turn to "ON".

STEP 2 Proceed to fill trucks normally.

FIRE RESERVE ACCESS

To operate truck fill system after a Fire Reserve Level alarm condition:

STEP 1 Go to system control panel.
Locate keyed switch labelled "TWO DAY RESERVE ENABLE".
Insert key and turn to "ON".

STEP 2 Proceed to fill trucks using normal operating procedure.

NOTE: FIRE RESERVE WATER SHOULD ONLY BE USED FOR EMERGENCY.

MANUAL TRUCKFILL CYCLE

STEP 1 Close central valve CV6.

STEP 2 Open control valve CV5.

STEP 3 Manually start P1 or Pump P2.

STEP 4 Start chlorine pump manually.

STEP 5 Stop chlorine pump prior to STEP 6.

STEP 6 Shut off pump P1 or P2 when truck is near full.

STEP 7 Close control vavle CV5.

STEP 8 Open control vavle CV6 to drain truckfill arm and piping. Ensure domestic transfer pumps are operational on automatic or operate manually.

CHLORINATION SYSTEM OPERATION

STEP 1 In separate chemical mixing tank dilute calcium hypochlorite into water as indicated on the chemical containers.

STEP 2 After 24 hours drain top portion of chemical mixing tank into chemical feed tank. Ensure foot valve is installed and confirm discharge piping is connected to truckfill arm piping.

STEP 3 Go to Panel A and confirm breaker is turned on for chemical feed pump. Pump will operate automatically when truckfill arm is in use. Observe one cycle or truckfill to ensure proper operation.

NOTE: Chlorine injection into water system is dependant on water quality. Operator is to conduct jar test to determine initial chemical injection rates. See Appendix "B" for further information on chlorination and disinfection.

CALIBRATION OF TANK LEVEL PRESSURE SWITCHES

GENERAL

Pressure switches mounted on the Tempered Domestic Water Return Line provide the level sensing of water in the water storage tank.

The pressure switches are designed to function with one Domestic Circulation Pump (P3 or P4) in operation. One pump must be operational to enable correct tank level sensing.

If the tank levels are not being correctly indicated (as confirmed by measuring into the water storage tank with a dip stick) the pressure snubbers installed at the pressure switches may require cleaning or changing.

If snubbers have been cleaned and problems with level sensing persist check calibration of pressure switches.

The following table summarizes the pressure switch settings.

PRESSURE SWITCH	WATER LEVEL IN WATER STORAGE TANK	PRESSURE SETTING MEASURED AT BUILDING HEADER	USEABLE STORAGE VALUE	DESCRIPTION
PS1	200 mm	0.0 psi	0	Low Level Shut Down Bottom of Fire Reserve
PS2	1120 mm	1.5 psi	54 m^3 Fire Reserve	Fire Reserve Key Top of Fire Reserve
PS3	6270 mm	8.8 psi	320 m^3 Two Day Emergency Storage	Two Day Reserve Key Top of Two Day Reserve
PS4	6500 mm	9.1 psi	N/A	Start of Fill Cycle
PS5	8835 mm	12.5 psi	160 m^3 Day Storage	Stop of Fill Cycle
PS6	8925 mm	12.6 psi	N/A	High Level Alarm

NOTE: PS5 is set at 8835 mm to allow for 50 mm water transfer from Tee Lane fill line.

The following steps are to be repeated for each of the pressure switches that require setting.

STEP 1: Ensure that automatic fill cycle has been disabled to avoid pressure switch adjustment from operating automatic fill operations.

STEP 2: Fill or drain the water level in the tank to the level indicated in the preceding table for the pressure switch that requires setting (i.e. The stop fill cycle is PS5 and the water level in the tank is set to 8840 mm). The filling or draining can be done manually as outlined in special operating procedures. The pressure switches should not be adjusted for at least 5 minutes following the setting of the tank level to allow the pressure at the pressure switch to completely stabilize due to the effects of the pressure snubbers.

STEP 3: Remove the enclosure for the pressure switch that requires setting. As the pressure switches are doubled up it is critical that the correct switch within the pressure switch enclosure be selected for adjustment (i.e. pressure switch PS6 is in the same pressure switch enclosure as PS5). The switches are labelled on the enclosure.

STEP 4: Ensure one domestic water circulation pump is operational.

STEP 5: With the water level set in step 2 adjust the pressure switch calibration screw; first counterclockwise then clockwise until the switch engages and disengages. This switch engaging and disengaging can be heard or the switch can be tested with a continuity tester.

STEP 6: Replace the pressure switch enclosure.

STEP 7: Return the system to an automatic mode and observe one full cycle of operation to ensure pressure switches are set properly.

CHAPTER 7

CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CHAPTER 7
MAINTENANCE

This chapter is intended to provide details of the maintenance activities essential for good operation and long life of components.

This information is not intended to replace the Manufacturer's literature but instead be read in conjunction with Manufacturer's literature. A comprehensive maintenance schedule should be developed by the operator and coordinated with the maintenance managements systems currently available within the Department of Public Works of the Government of the Northwest Territories. In the event of a conflict between listed maintenance activities and manufacturer's maintenance activities the manufacturer's information shall govern.

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P.O. Box 6, Iqaluit, N.W.T. X0A 0H0

CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - BUILDING	ACTIVITY - CUSTODIAL
COMPONENT	- N/A
FREQUENCY OF SERVICE	- Monthly
EQUIPMENT	- Buffing machine
CREW	- 1 person
PRODUCTIVITY	- 1.0 h/100 m^2

MONTHLY

- Remove stubborn stains from the floor.
- Dust mop floor.
- Wash floor.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - BUILDING	ACTIVITY - EQUIPMENT PREVENTATIVE MAINTENANCE
COMPONENT	- Exhaust Fans, Ventilation System
FREQUENCY OF SERVICE	- See below
EQUIPMENT	- Flashlight, oil, rags
CREW	- 1 person
PRODUCTIVITY	- See below

MONTHLY (0.33 h/unit)

- Visually inspect operation. Inspect drive, sheaves for wear and alignment.
- Inspect belts for wear and tension.
- Hold hand on motor. Check for overheating or unusual vibration.
- Check settings on space thermostats

QUARTERLY (0.33 h/unit)

- Lubricate motor with SAE #20 oil.
- Lubricate shaft bearings with SAE #50 oil.
- Wipe off excess oil.
- Check belt alignment.

ANNUALLY (1 h/unit)

- Clean all surfaces with damp cloth and mild detergent
- Check and clean fan blades, dampers and cover.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - BUILDING	ACTIVITY - EQUIPMENT PREVENTATIVE MAINTENANCE
COMPONENT	- Air Handling Unit (Supply Fan)
FREQUENCY OF SERVICE	- See below
EQUIPMENT	- Rags, oil, grease, spare belts, spare filter
CREW	- 1 person
PRODUCTIVITY	- See below

WEEKLY (0.083 h/unit)

- Visually inspect operation. Listen for unusual noises.
- Hold hand on motor. Check for overheating or excessive vibration.

MONTHLY (0.5 h/unit)

- Shut off fans and inspect drive assembly, alignment.
- Check belts for wear and tension. Belts should deflect 13 mm to 19 mm when pressed by hand. Replace belts as required.
- Check filters. Replace if necessary.
- Restart units.

QUARTERLY (0.5 h/unit)

- Add 2 squirts of grease to fan bearings.
- Lubricate fan motor with SAE #20 oil.
- Wipe off excess grease and oil.

ANNUALLY (1 h/unit)

- Clean all surfaces with damp cloth and mild detergent.
- Clean direct from heating coils with vacuum cleaner.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - BUILDING	**ACTIVITY** - EQUIPMENT PREVENTATIVE MAINTENANCE
COMPONENT	- Boiler - Oil Fired
FREQUENCY OF SERVICE	- See below
EQUIPMENT	- Oil, rags, spare gasket, filter, brush
CREW	- 1 person
PRODUCTIVITY	- See below

WEEKLY (0.1 h/unit)

- Visually check operation. Check boiler temperature 60° (140°F) minimum, 82.2°C (180°F) maximum.
- Check flame. If smoky, call servicer immediately.
- Check fuel lines and tanks for leakage.
- Check barometric draft regulator.

MONTHLY (0.25 h/unit)

- Open blow down valve for 10 seconds, close again.
- Observe colour of combustion flame. Call servicer immediately if smoky.
- Check for unusual noise or vibration.
- Check air supply opening and burner fan and remove any foreign particles.
- Check relief valve for leaks.
- Check oil supply.

QUARTERLY (0.083 h/unit)

- Fill oil cups on burner motor with SAE #20 oil.
- Wipe excess oil off motor.

ANNUALLY (8 h/unit)

- Shut down boiler. Shut water and oil supply valves. Shut off power at breaker panel.
- Allow boiler to cool down.
- Clean water strainers.
- Keep boiler room well ventilated during shutdown to prevent rusting and sweating.
- Remove oil line strainer. Replace oil line filter. Re-assemble using good gasket.
- Clean burner fan.
- Have servicer inspect boiler, adjust or replace electrodes and nozzles and inspect controls. Re-assemble and test system.
- Check condition of fire box and clean chimney.
- Verify that the Provincial Boiler Inspector has safety checked the boiler(s) within the previous year by checking the boiler certificate on the boiler room wall.

Refer to Manufacturer's literature for more detail.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY	- BUILDINGS	ACTIVITY	- EQUIPMENT PREVENTATIVE MAINTENANCE
COMPONENT	- Domestic Circulating Pumps, Glycol Pumps		
FREQUENCY OF SERVICE	- Shown below		
EQUIPMENT	- Rags, oil, wrench		
CREW	- 1 person		
PRODUCTIVITY	- See below		

WEEKLY (0.083 h/unit)

- Visually inspect operation. Place hand on motors. Feel for unusual vibration or high temperatures.
- Check oil level in pump oil cup. Fill to level indicator with SAE #20 oil if required.
- Wipe off excess oil.
- Inspect all piping and valves for leaks.

QUARTERLY (0.16 h/unit)

- Check pump seal for leakage.
- Check mounting bolts for tightness.
- Fill oil cups on motor with SAE #20 oil.
- Wipe off excess oil.
- Wipe pump and motor with clean dry cloth.

ANNUALLY (0.5 h/unit)

- Tighten all bolts.
- Check couplings and alignments.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY	- BUILDINGS	ACTIVITY	- EQUIPMENT PREVENTATIVE MAINTENANCE
COMPONENT	- Exits and Lighting		
FREQUENCY OF SERVICE	- Shown below		
EQUIPMENT	- N/A		
CREW	- 1 person		
PRODUCTIVITY	- 0.5 h/building		

DAILY (Exits)

- Exits are to be properly illuminated.
- Ensure exterior lighting is in proper working order.
- Exits are to be checked to ensure proper operation of doors and door hardware.
- Ensure doors open outwards in the same direction as exit travel.
- Ensure emergency hardware is working properly and that a pressure of not more than 9 kg is needed to open door.
- During winter months, ensure that snow and ice are not allowed to accumulate as to prevent the door opening.
- The chaining of doors is strictly forbidden.
- Corridors and passageways are to be kept clear at all times.
- Ensure that exterior landings, stairs and handrails have not deteriorated or become loose (on fuel tank access).

DAILY (Exit Lighting)

- Ensure lighting is in proper working order and replace bulbs as necessary.
- Ensure exit signs are clearly visible.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - GROUNDS	**ACTIVITY** - LITTER PICK-UP
COMPONENT	- Light Items; Collection & Disposal of Outdoor Litter
FREQUENCY OF SERVICE	- See below
EQUIPMENT	- Pick-up truck, fan rakes, trash bags
CREW	- 2 persons
PRODUCTIVITY	-

THE SPECIFIC OBJECTIVES OF THIS TASK ARE:

- to improve the visual appearance of the community;
- to reduce vandalism and fire hazards;
- to improve pedestrian safety and community pride; and
- to minimize litter.

WEEKLY (OR AS REQUIRED) (2.0 h/ha total time)

- Service public area waste receptacles.
- Dispose of waste via delivery to specified dumpsite.
- Report damaged or missing waste containers to supervisor.
- Systematically walk the area to be cleaned of litter.
- Pick up all cans, bottles, trash, stones, paper, tires or other objects that might interfere with grass mowing operations.
- As applicable, separate trash (e.g. tin cans, glass) and place in trash bags.

ANNUALLY (Such as for spring clean-up) (5.0 h/ha total time)

- Encourage private property owners to clean up their yards.
- Prior to clean-up operation, systematically walk up and down all sites within the community and identify areas requiring litter pick-up.
- Collect all miscellaneous trash, bottles, tires, boards and other litter items that might interfere with maintenance.
- Take note of all miscellaneous trash, bottles, tires, boards and other litter items that might interfere with grass mowing.
- Take note of all major debris such as abandoned furniture, stoves and car wrecks. Report these to supervisor for major debris removal task.
- Stockpile collected litter and trash bags in truck and dispose of them at specified dumpsite.

NOTES:

1. This task is not intended to replace routine municipal garbage collections.
2. For litter pick-up relating to roadsides - see roads category.
3. Community participation is highly recommended.
4. Schedule litter pick-up just prior to grass mowing.

MATERIAL USAGE: trash bags.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - BUILDINGS	ACTIVITY - EQUIPMENT PREVENTATIVE MAINTENANCE
COMPONENT	- Space Heaters - Oil Fired
FREQUENCY OF SERVICE	- As shown below
EQUIPMENT	- flashlight/rags/oil can
CREW	- 1 person
PRODUCTIVITY	- See Below

WEEKLY (0.1 h/unit)

- Visually inspect unit. Listen for unusual noise.
- Check for leakage or unusual operation.
- Check to see if the flue pipe is firmly attached.

MONTHLY (0.12 h/unit)

- Shut off fans.
- Place hand on motor to check for extremely high temperature and excessive vibration.

QUARTERLY (0.08 h/unit)

- Lubricate fan motor with SAE #20 oil.
- Wipe off excess oil.

ANNUALLY (1 h/unit)

- Check burners for soot.
- If dirty, get servicer to clean the burners and the oil filters and readjust.
- Clean chimney and flue box.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY	- GROUNDS	ACTIVITY	- MAJOR DEBRIS REMOVAL
COMPONENT	- Heavy/Bulky Abandoned Items		
FREQUENCY OF SERVICE	- See below		
EQUIPMENT	- Pick-up truck & possible rental of tow truck, flat bed trailer		
CREW	- 2 persons plus community volunteers		
PRODUCTIVITY	- 32 h		

THE SPECIFIC OBJECTIVES OF THIS TASK ARE:

- to improve the visual appearance of the community;
- to eliminate hazards, waste items and wrecks;
- to clean community areas, creek corridors, empty lots for other uses; and
- to reduce vandalism.

NOTE:

For best results, it is highly recommended that this task be made a special community event. Voluntary participation should be strongly encouraged. Seek an appropriate date or event to which this activity could best relate (e.g. fist day of spring; just prior to a religious/cultural event, etc.).

SEMI-ANNUALLY or ANNUALLY (as required)

- Seek community participation, assistance and cooperation.
- Locate and identify for removal all major abandoned or discarded bulky trash/debris items.
- If owner of items of questionable value can be identified, acquire permission and notify of intent to remove objects prior to actual removal.
- Arrange for proper removal equipment as required (e.g. tow truck for automobile wrecks).
- Check with local firms (such as scrap metal dealers) for potential resale value of debris to be removed.
- If appropriate, stock pile potentially re-useable materials at specified band storage areas (e.g.left over lumber, bricks, barrels). Also consider utilization of items with play value for children's play area.
- Dispose of all remaining debris at specified dump site.

NOTE: So as to avoid misunderstandings, it is advisable to post a notice and personally notify owners of "abandoned" items such as dilapidated cars, etc. of intention to remove same and to obtain their permission prior to commencement of disposal actions.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY	- GROUNDS	ACTIVITY	- WALKS AND HARD SURFACE AREAS UPKEEP
COMPONENT	- Gravel Parking Lot (Regrading and Topdressing)		
FREQUENCY OF SERVICE	- As below		
EQUIPMENT	- Grader, dump truck, rake, shovel, wheelbarrow, stakes & line levels		
CREW	- 2 persons		
PRODUCTIVITY	- See below		

THE SPECIFIC OBJECTIVES OF THIS TASK ARE:

- to improve surface drainage;
- to establish smooth grades & minimize pot-holes; and
- to maintain safe access to all components of system.

MONTHLY (OR AS REQUIRED) (0.5 h/mo/100 m^2)

- Ensure that litter and debris have been removed.
- Fill in minor depressions.

TWICE A YEAR (SPRING AND FALL) (1.6 h/100 m^2)

- Arrange for temporary/alternate parking and truckfill.
- Establish existing or improved drainage/slope criteria by setting level stakes or string lines as required.
- Protect existing culverts as required.
- Regrade, remove ridges, soft spots and boulders as required (as indicated by stakes or string lines).
- Fill holes and low areas with excess granular fill.
- Apply topdressing and spread uniformly to 75 mm.
- Roll/compact as required.
- Cross-check final levels and drainage.
- Smoothly "feather off" edges and ensure drainage.
- Apply dust proofing solution as required (calcium chloride or water/oil mix.)

MATERIAL USAGE: Gravel topdressing and dust retardant solution.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - ROADS	ACTIVITY - SNOW PLOWING
COMPONENT	- N/A
FREQUENCY OF SERVICE	- Approximately 15 times per season
EQUIPMENT	- See below
CREW	- 1 Heavy equipment operator and winger if required
PRODUCTIVITY	- For grader, 50 km/day (8 hrs.); 200 km/day for dump truck

EQUIPMENT

Grader or grader c/w wing plow and/or dump truck c/w snow plow or dump truck c/w snow plow and wing plow.

DESCRIPTION

Plowing snow from the surface of roads using mechanical means to provide reasonable winter driving conditions and in a manner that provides as safe driving conditions as possible under the circumstances.

SCHEDULING

Generally schedule after a storm unless a blockage exists or accumulation exceeds those limits identified in Quality Standards.

METHOD

1. Commence plowing from centre of the road and out.
2. Continue plowing on outside traffic lane and shoulders.
3. Blue flashing or rotating beacons are a necessity.
4. Plowing should be done with the flow of traffic.
5. Approximately 1 to 2 cm of snow cushion to be left on gravel roads.
6. periodically stop to allow any accumulated traffic behind to pass, providing road ahead is in condition to travel on.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - UTILITIES	ACTIVITY - EQUIPMENT PREVENTATIVE MAINTENANCE - WATER SUPPLY
COMPONENT	- Domestic Piping and Valves
FREQUENCY OF SERVICE	- See below
EQUIPMENT	- Service Vehicle
CREW	- 2 persons
PRODUCTIVITY	- See Below

ANNUALLY (0.25 h/valve)

- Check all main valves.
- Check if valve stem is vertical. Movement of valves could indicate possible failure due to fracture or misalignment.
- Close and open valves.
- Check or sound for leaks.

SEASONALLY

- Check heat tracing operation prior to winter season.

AS REQUIRED (1 h/valve)

- Dismantle valve.
- Examine seat and stem; clean; replace or reseat as required.
- Repack valve and reassemble.
- Operate valve; check for leaks; adjust as required.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY	- UTILITIES	ACTIVITY	- EQUIPMENT PREVENTATIVE MAINTENANCE
COMPONENT	- Transfer Tanks and Chemical Storage Tanks		
FREQUENCY OF SERVICE	- Weekly		
EQUIPMENT	- Tool kit/spare parts		
CREW	- 1 person		
PRODUCTIVITY	- 2 h/unit (weekly) 2.3 h/unit (annually)		

WEEKLY

- Check tank for leaks; repair as required.
- Check pressure relief valve and air relief valve.
- Check pipes and joints; repair as required.
- Check solenoid pressure switches; repair as required.
- Check pressure gauges; record readings.
- Check and repack valves as required.

ANNUALLY

- Examine interior of tank, following territorial regulations.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - UTILITIES	ACTIVITY - EQUIPMENT PREVENTATIVE MAINTENANCE - WATER SUPPLY
COMPONENT	- Centrifugal Pumps
FREQUENCY OF SERVICE	- See below
EQUIPMENT	- Tool kit/spare parts/lubricants/rags
CREW	- 1 person
PRODUCTIVITY	- See below

DAILY (0.25 h/unit)

- Check pump for excessive heat, noise and vibration.
- Check mounting bolts and nuts; tighten as required.
- Check glands for leakage; take up as required.
- Check alignment.
- Check lubricant level; replenish as required.
- Prove Operation of standby pump.

QUARTERLY (0.25 h/unit)

- Change oil.

ANNUALLY (4 h/unit)

- Overhaul pump.
- Disconnect unit.
- Remove pump housing.
- Clean and inspect shaft and bearings.
- Replace badly worn and/or damaged parts.
- Clean oil ducts and weep holes.
- Inspect and clean impeller.
- Install new seals and gaskets.
- Replenish oil and lubricants.
- Replace pump housing.
- Reconnect unit.
- Check alignment.
- Test run pump; adjust as required.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - UTILITIES	ACTIVITY - EQUIPMENT PREVENTATIVE MAINTENANCE - WATER SUPPLY
COMPONENT	- Water Meter
FREQUENCY OF SERVICE	- As shown below
EQUIPMENT	- Tool kit
CREW	- 1 person
PRODUCTIVITY	- See below

WEEKLY (0.08 h/unit)

- Read meter; record readings.

MONTHLY (0.08 h/unit)

- Read meter, record readings.
- Check meter for damage and general condition.

AS REQUIRED (1 h/unit)

- Disconnect paddle wheel and inspect.
- Return to manufacturer for recalibration.
- Replace meter on return.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY	- UTILITIES	ACTIVITY	- EQUIPMENT PREVENTATIVE MAINTENANCE - WATER SUPPLY
COMPONENT	- Steel Water Tanks		
FREQUENCY OF SERVICE	- See below		
EQUIPMENT	- Flashlight		
CREW	- 1 person		
PRODUCTIVITY	- See below		

ANNUALLY (2 h/unit)

- Check general condition of tanks.
- Inspect tank foundations.
- Examine ladders.
- Check exposed piping and valves.
- Check condition of roof.
- Check tank roof hatch and lights.
- Check air vents.
- Chek heat trace operation

AS REQUIRED (annually 2 days/unit)

- If inspection shows a need, arrange for withdrawing the tank from service to permit repainting. Paint tank interior as frequently as the exterior. Follow safety precautions when painting interiors of closed tanks.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - UTILITIES	ACTIVITY - EQUIPMENT PREVENTATIVE MAINTENANCE - WATER SUPPLY
COMPONENT	- Hypochlorinator
FREQUENCY OF SERVICE	- As shown below
EQUIPMENT	- tool kit, spare parts, oil, rags, test kit
CREW	- 1 person
PRODUCTIVITY	- See Below

DAILY (0.18 h/unit)

- Check chlorine residual and record result.
- Check for leaks.
- Check pump operation.

WEEKLY (0.25 h/unit)

- Make up hypochlorite solution.
- Check foot valve for foreign objects.
- Secure any loose fittings.

MONTHLY (0.08 h/unit)

- Dismantle and remove scale from all check valves.
- Check oil level in unit. Top up if required.

SEMI-ANNUALLY (1 h/unit)

- Check and clear all parts, including the diaphragm. Replace any worn parts.

AS REQUIRED

- Purge metering system with muriatic acid to remove calcium deposits. Flush acid from the system before system is put back into use.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - UTILITIES	ACTIVITY - POWER GENERATION - PREVENTATIVE MAINTENANCE
COMPONENT	- Diesel Generator - Standby Unit - Electrical
FREQUENCY OF SERVICE	- As shown below
EQUIPMENT	- Mechanic's standard kit
CREW	- 1 power plant operator
PRODUCTIVITY	- See Below

WEEKLY (2 h)

- Visual inspection of unit (leaks).
- Verify oil levels (add more if necessary).
- Verify fuel level.
- See if there is any accumulation of particles or water in the bowl and if so, complete inspection of the fuel system (tanks, lines), correct problem and replace fuel filters.
- Verify intake and air filter.
- Verify cables and connection of accumulators, verify electrolyte level of batteries, top up with distilled water if necessary.
- Verify coolant level.
- Verify tension of belts.
- Run generator until it reaches operating temperature plus 30 minutes (only if unit is loaded to more than 40% of its rated capacity - if the unit is loaded to less than 40% of its rated capacity, 5 minutes will be sufficient).
- Check for any vibrations or strange noises.
- Check exhaust system for leaks.
- Check fuel tanks and connection system for leaks.
- Drain fuel water separator.

MONTHLY (0.5 h)

- Measure voltage of each cell - report bad cells.
- Examine battery poles and connections.
- Verify operation of block lube oil heaters.
- Verify oil level of:
  - governor, and
  - fuel pump
- Tighten starter connections, isolators, air filters, loose nuts and bolts.
- Report items requiring major repairs.
- Check operation of the unit as required by the supplier and certify the proper protection of each control and operating point.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY	- UTILITIES	ACTIVITY	- POWER GENERATION - PREVENTATIVE MAINTENANCE
COMPONENT	- Diesel Generator - Standby Unit - Electrical		
FREQUENCY OF SERVICE	- As shown below		
EQUIPMENT	- Mechanic's standard kit		
CREW	- 1 power plant operator		
PRODUCTIVITY	- See Below		

QUARTERLY (0.5 h)

- Do monthly maintenance
- Drain condensation points of fuel injection system.
- Clean oil filter and lube oil.
- Remove excess oil, clean unit.

SEMI-ANNUALLY (4 h)

- Tighten all bolts using a torque wrench.
- Lubricate idler.
- Check air filter.
- Clean radiator.

ANNUALLY (1.5 h)

- Check oil filters (clean or replace).
- Request specialized personnel for annual inspection.

EVERY TWO YEARS (1.5 h)

- Change coolant.
- Clean cooling system.

Refer to Manufacturer's literature for more detail.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - UTILITIES	ACTIVITY - ELECTRICAL SUPPLY
COMPONENT	- Diesel Generator - control panel assembly
FREQUENCY OF SERVICE	- As shown below
EQUIPMENT	- Electrician's standard dit and vacuum cleaner
CREW	- 1 - qualified electrician
PRODUCTIVITY	- 4 h

ANNUALLY

- Turn power to "OFF" position - operate engine "ON or "OFF" as required.
- Examine control wiring and tighten connections.
- Vacuum or soft flow switchgear interior free of dust, dirt, foreign objects.
- Examine, repair, replace and burnish contacts.
- Verify relays armature free movement.
- Verify "timing" component function in accordance with supplier's manual.
- Verify "timing' component function in accordance with supplier's manual.
- Verify over/under voltage relay operation on both time and instantaneous pick up in accordance with supplier's manual.
- Verify overcurrent devices settings are in accordance with supplier's instructions.
- Verify overcurrent devices operate in accordance with specifications.
- Verify diesel generator voltmeter and ammeter accuracy.
- Adjust diesel generator voltage to match a supply of 120 volt at load.
- Adjust diesel generator frequency at 60 hertz.
- Measure, date, record diesel generator power supply conductor insulation values - phase to phase and phase to ground.
- Wipe/clean switchgear exteriors.
- Turn power to "ON" position to verify operation.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - UTILITIES	ACTIVITY - ELECTRICAL DISTRIBUTION
COMPONENT	- Motors/Control/first upstream protection
FREQUENCY OF SERVICE	- As shown below
EQUIPMENT	- Electrician's standard kit/vacuum cleaner/volt-ohm meter
CREW	- 1 - qualified electrician
PRODUCTIVITY	- 0.13 h/relay

All sizes (excluding removable contact assemblies) including buss compartment.

ANNUALLY De-energize circuits

1. Vacuum/soft blow/otherwise remove dust, dirt and foreign objects from enclosure.
2. Closely examine interior for signs of overheat, moisture entry and if evidence correct cause.
3. Verify alignment and level correct to prevent mechanical twisting stresses.
4. Tighten loose insulators, buss braces and buss connections.
5. Tighten loose equipment ground connections.
6. Energize circuits to verify operation.

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CAPE DORSET TRUCKFILL STATION

MAINTENANCE

CATEGORY - UTILITIES	ACTIVITY - ELECTRICAL DISTRIBUTION
COMPONENT	- Motors/Control/first upstream protection (3 phase motors)
FREQUENCY OF SERVICE	- As shown below
EQUIPMENT	- Electrician's standard kit/vacuum cleaner
CREW	- 1 - qualified electrician
PRODUCTIVITY	- 0.33 h/motor - 0.17 h/control

Three phase motors - less than 20 H.P. - 750 volt or less - Squirrel cage/would rotor induction; synchronous; multiple, multiple speed - dual voltage motors.

ANNUALLY

MOTOR De-energize circuits

1. Vacuum/soft blow/remove dust, dirt and foreign objects, and verify ventilating passages and air gap unobstructed.
2. Uncouple motor drive belts and couplings, and test horizontal and vertical end play movement to determine excessive bearing wear; replace damaged bearings.
3. Examine for hot spots, solder throwing and commutator damage; and repair damaged parts.
4. Measure, date, record insulation resistance of windings - winding to winding and winding to ground.
5. Verify motor securely fastened.
6. Examine motor accessories replacing damaged parts.
7. Tighten loose accessories, connections and assemblies.
8. Repair damaged flex/lead entries and cable protection.
9. Tighten loose equipment ground connections.
10. Correct improper belt tension/drive.
11. Touch up paint job.
12. Energize circuits to verify operation.

ANNUALLY

CONTROL De-energize circuits

1. Vacuum/soft blow/remove foreign objects from control enclosure.
2. Clean/burnish/polish switch and motor starter contacts.
3. Tighten loose connections.
4. Replace/repair damaged wiring, flex or cable entries and cable protection.
5. Verify correct control function.
6. Verify correct protection size.
7. Verify contactor mechanisms operate smoothly and unobstructed.
8. Replace covers.
9. Energize circuits to verify operation.

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CHAPTER 8

CAPE DORSET TRUCKFILL STATION

TESTING AND CERTIFICATION DATA

#101, 15334 - 123 Ave
Edmonton, Alberta T5V 1K8
Phone: (403) 452-0174
Fax: (403) 452-0175

WHIPONIC WELLPUTER LTD.

General Contracting - Electrical and Mechanical

P.O. Box 278
Norman Wells, N.W.T.
X0E 0V0
Fax: (403) 587-2821

November 06, 1992

Government of N.W.T.
Dept of Public Works
Baffin Region
Iqaluit, N.W.T.
X0A 0H0

Attention: Dave McPherson

Re: Cape Dorset Truckfill
Cape Dorset, N.W.T.

G U A R A N T E E

WHIPONIC WELLPUTER LTD. guarantees that all work executed in this contract will be free from defective workmanship and materials for a period of one (1) year from the date of substantial completion on JUNE 23, 1993.

WHIPONIC WELLPUTER LTD. will, at its own expenses, repair and replace any defective work damaged thereby, which fails or becomes defective during the term of the guarantee, providing such work is not due to improper usage, or regular maintenance.

Your truly,
WHIPONIC WELLPUTER LTD.

Kevin Diebold
President

KD/js

TEST REPORTS

DATE Oct 29/92

JOB CAPE DORSET TRUCK FILL STATION

LOCATION CAPE DORSET NWT

SYSTEM BOILER

TYPE OF TEST HYDROSTATIC - 34 P.S.I.G.

TIME PERIOD OF TEST 2 HRS

MECHANICAL REP [signature] per - WHIPONIC WELLPUTER -

CONTRACTOR'S REP N/A

CONSULTANT'S REP - per -

for DPW [signature]
Mike Perry SM
29 Oct 92

TEST REPORTS

DATE NOV 18/92

JOB TRUCKFILL STATION

LOCATION CAPE DORSET NWT

SYSTEMS - DOMESTIC COLD WATER,
- PUMPS 1-4, HE1-2 DOMESTIC WATER HEATING SYSTEM
- HEATING PIPING - ENTIRE.
- MAIN PIPING OVER PUMPS P1-2

TYPE OF TEST WATER-AIR - 860 KPA

NOTE - HEATING PIPING TO BE RETESTED WITH GLYCOL.

TIME PERIOD OF TEST 3 HRS.

MECHANICAL REP [signature] per WHIPONIC WELLPUTER

CONTRACTOR'S REP N/A

CONSULTANT'S REP [signature] / OLIVER MANGIONE
MIKE ASSELIN / McCALLA & ASSOCIATES

TEST REPORTS

DATE NOV 21/92

JOB TRUCK FILL STATION

LOCATION CAPE DORSET NWT

SYSTEM WATER INLET HEADER AND TANK

TYPE OF TEST AIR - 50 PSI -

TIME PERIOD OF TEST 2 HRS

MECHANICAL REP [signature] - per - WHIPONK WELLPUTER

CONTRACTOR'S REP

CONSULTANT'S REP [signature] / O.P.L.V.