CLYDE RIVER TRUCKFILL
CLYDE RIVER, NT

POWER DISTRIBUTION SYSTEM
TABLE 4.2

Figure	No.	Section 9 Tab	Component	Function	Remarks
4.2	1	-	N.W.T Power Corp. Overhead line	Supplies power to pumphouse.	-
4.2	2	-	Transformers	Converts utility and power to 120/240V, 1 phase, 3W for pumphouse use.	Owned by N.W.T. Power Corp.
4.2	3	-	Power Mast	Provides entrance of converted power line into conduit.	-
4.2	5	-	Meter	Measures power used by facility.	Owned by N.W.T. Power Corp.
4.2	10	-	Ground Rod	Provides ground for circuits in pumphouse.	19mm x 3048 long ground rod.
4.2	11	-	Ground Bus	Provides grounding connections for breaker panel and intake pump.	On isolation standoffs 25mm long.
4.2	12	9.2	Motor Starter	Starter for intake pump.	-
4.2	13	-	Wire	Connects intake pump to motor starter.	-
4.2	14	9.2	Intake Pump	Pump water from reservoir to water truck.	-
4.2	15	-	Wire	Connects combination main disconnect/breaker panel to utility power.	-
4.2	16	9.6	Combination Disconnect/Breaker Panel	Facilitates circuit connections for pumphouse.	-
4.2	17	-	Breaker	20 Amp Breaker for UPS circuit.	-
4.2	18	9.7	UPS Controller Switch	The controller switch allows bypassing of the UPS, disconnecting AC or DC current.	-
4.2	19	9.7	Uninterruptible Power System (UPS)	Provides power to system when main power is interrupted.	-

CLYDE RIVER TRUCKFILL
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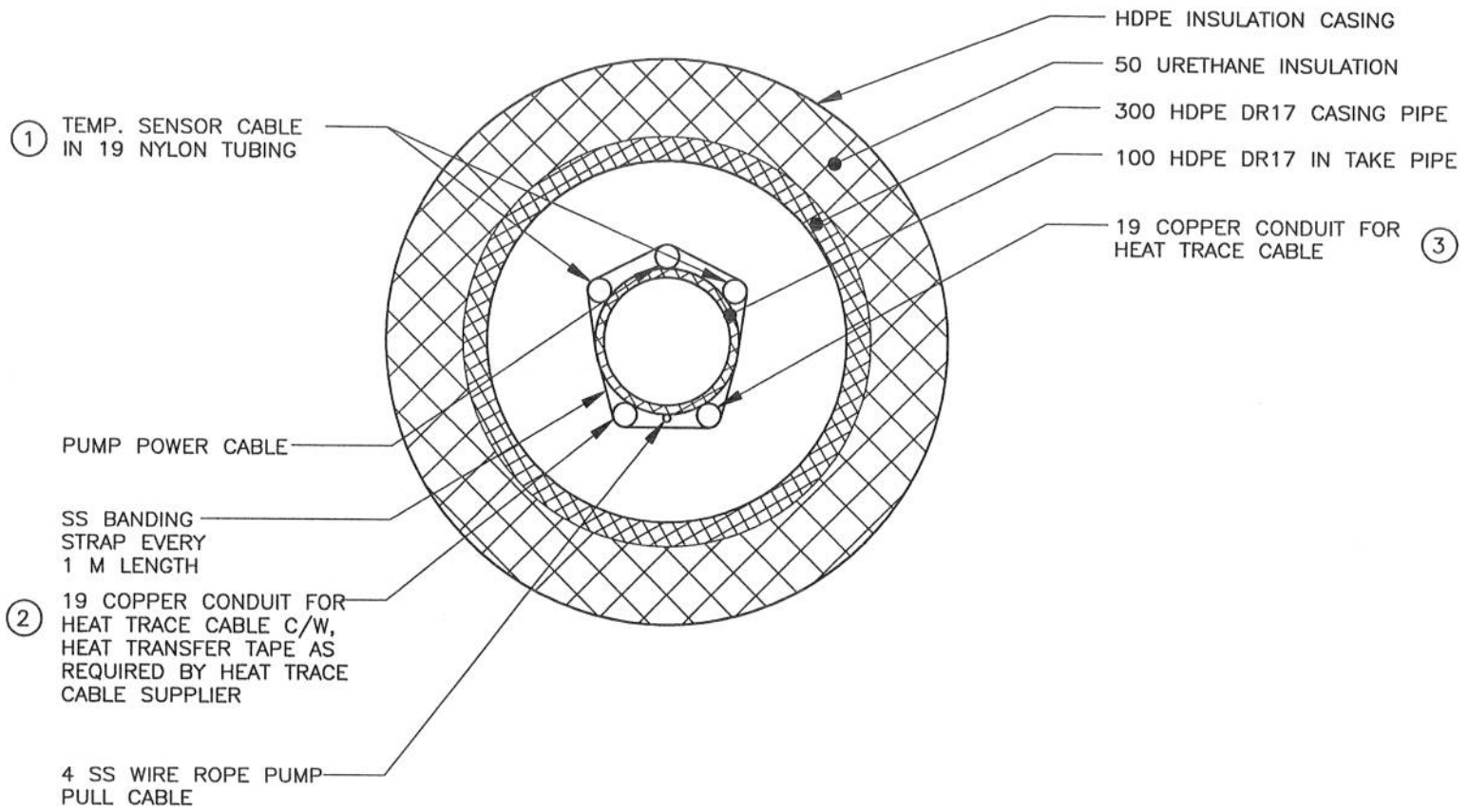
CONTROLS AND ALARMS
TABLE 4.3

Figure	No.	Section 9 Tab	Component	Function	Remarks
4.3	1	9.8	Control Panel	Houses flow gauge/accumulator, alarm annunciator, pilot lights, pump control, and pump control switch.	-
4.3	2	9.8	Pump Control Switch	Switch is used to enable pumping mode — automatic, manual, or off.	-
4.3	3	9.8	Chlorine Pump Pilot Light	Turns on when chlorine pump is activated.	-
4.3	4	9.8	Water Intake Pump Pilot Light	Turns on when submersible intake pump is activated.	-
4.3	5	9.8	Push to Test	Tests the alarms circuit by activating the strobe light, and horn.	-
4.3	6	9.3	Flow Gauge/ Accumulator	Displays flow rate and cumulative flow of water pumped through system.	-
4.3	7	9.9	Panalarm Annunciator	Allows operator to respond and control alarm conditions that occur with truckfill station.	-
4.3	8	9.8	Remote Controller	Allows water truck operator to fill truck without having to enter pumphouse.	Located on truckfill arm. Comes with weatherproof sheath.
4.3	9	9.8	Key Switch	Closes circuit allowing operator to start or stop the truckfilling process.	-
4.3	10	9.8	Start Switch	Pushing button starts truckfilling process, provided that key switch is turned on.	
4.3	11	9.8	Stop Switch	Pushing button stops truckfilling process, provided that key switch is turned on.	
4.3	12	9.8	Pump Timer	Timer may be set to run pump for period of time. Stop switch will interrupt timer setting, and stop the filling process.	Automates filling process. Different sized trucks will have different fill times.



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DILLON CONSULTING

PROJECT	CLYDE RIVER TRUCKFILL CLYDE RIVER, NT
TITLE	INTAKE CASING, INTAKE PIPE, AND CABLES
PROJECT NUMBER	96-3817
DATE	JUNE 98
FIGURE NUMBER	4.4

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HEAT TRACE SYSTEM
TABLE 4.4

Figure	No.	Section 9 Tab	Component	Function	Remarks
4.4	1	9.11	Temperature Sensor Cable in Nylon Tubing	Sensor cable detects temperature against intake pipe. Heat trace control and alarms based on sensed temperatures.	-
4.4	2	-	Copper Conduit for Heat Transfer Cable	Encases heat trace cable and conducts heat to 100 HDPE intake pipe	19 copper conduit. Located at 7 O'clock.
4.4	3	-	Other Copper Conduit for Heat Transfer Tape	Encases heat trace cable and conducts heat to 100 HDPE intake pipe	19 copper conduit. Located at 5 O'clock.
4.5	1	9.11	Heat Trace Controller	Turns heat trace system on and off depending on sensed temperatures. Controls alarming of heat trace.	Accutron TS202 controller. Separate control for two heat trace cables.
4.5	2	9.11	Heat Trace Cable	Uses power to generate heat that will be transferred through copper conduit into intake pipe.	
4.5	3	-	Stainless Steel Strapping	Hold copper conduit against intake pipe.	
4.5	4	-	Copper Conduit for Heat Trace Cable	Encases heat trace cable, and conducts heat to 100 HDPE intake pipe	19 copper conduit. Located at 7 O'clock.
4.5	5	9.1	Intake Pipe	Carries water to steel piping system leading to water truck	100 HDPE DR17 pipe
4.5	6	9.1	Intake Casing and Insulation	Encloses intake pipe	50 Insulation
4.5	7	9.11	Heat Trace Cable	Identical circuit on other side of intake pipe	Circuit location at 5 O'clock

5.0 COMPONENT DATA

5.1 General

Chapter 5 contains information on equipment used, including the manufacturer, model, and size. Cross references to the manufacturers' data in Chapter 9, and functional data in Chapter 4 are included. The suppliers' names, addresses, and telephone numbers are also listed on this table.

CLYDE RIVER TRUCKFILL
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COMPONENTS, MANUFACTURERS, AND SUPPLIERS
TABLE 5.1

Section 9 Tab	Section 4 Tables and Figs	Description	Manufacturer and Model	Supplier
9.1	4.1, 4.4, 4.5	HDPE Insulated Pipe	Sclairpipe with Urecon Insulation	Perma Engineered Sales (1983) Limited P.O. Box 76 Group 200, R.R. #2 34 Roy Roche Drive Winnipeg, Manitoba R3C 2E6 Ph: (204) 633-7213 Fax: (204) 694-7228 Contact: David Sylvestre
9.1	4	Intake Screen	Screen Services StatiOrb Drum Screen	Screen Services 16748 - 110 Street Edmonton, Alberta T5X 2V1 Ph: (403)460-8043 Fax: (403) 460-8045 Contact: Kevin Whitham
9.1	-	Throttling Valve	Jenkins Lever Operated 100 mm	CCTF Quebec 1840 O'Gagnon Lahcine, Quebec H8T 3M6 Ph: (514) 636-1886 Fax: (514) 636-6022
9.1	4.1, 4.4	Pipe Fittings	Various Victaulic	CCTF Quebec 1840 O'Gagnon Lahcine, Quebec H8T 3M6 Ph: (514) 636-1886 Fax: (514) 636-6022
9.2	4.1, 4.2, 4.3, 4.4, 4.5	Intake Pump & Various Fittings	Berkley 6T250 150mm Submersible Pump	Deschesne 8335, St.. Michel Montreal, Quebec H1Z 3E6 Ph: (514) 374-3110 Fax: (514) 374-5141 Contact: Pierre Milot
9.2	4	Pump Starter	NEMA Combination 512	LUMEN 120 Dubois St.. Eustache, Quebec Ph: (514) 436-3225 Fax: (514) 436-2537 Contact: M. Collin

CLYDE RIVER TRUCKFILL
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COMPONENTS, MANUFACTURERS, AND SUPPLIERS
TABLE 5.1

Section 9 Tab	Section 4 Tables and Figs	Description	Manufacturer and Model	Supplier
-	-	Pump Skid	-	TAC 264 Montigny St.. Jerome, Quebec J7Z 5P9 Ph: (514) 438-1279 Fax: (514) 438-0813 Contact: D. Desjardins
9.3	4.1, 4.3	Flow Meter & Accumulator	Signet 5500 Flow Monitor	Brian Control 8600 St.. Patrick Ville Lasalle, Quebec H8N 1V1 Ph: (514) 366-5757 Fax: (514) 366-1134 Contact: Joe au Rolland
9.3	4.1	Pressure Gauge	Chevrier SG500	Chevrier Instruments Montreal, Quebec Ph: (514) 328-2550 Fax: (514) 327-0604
9.3	4.1	Thermometer	Ashcroft 30 EL 60 R040 0150 CENT	Chevrier Instruments Montreal, Quebec Ph: (514) 328-2550 Fax: (514) 327-0604
9.4	-	Chlorine	Calcium Hypochlorite 65%	Hall-Chem 11865 70 Ave Montreal, Quebec Ph: (514) 648-6050 Fax: (514) 648-9235
9.4	4.1, 4.3	Chlorine Injection Pump	Wallace & Tiernan Premia 75 Micro MPM4	US Filter 243 Bren, bur.210 Repentigny, Quebec J6A 6M4 Ph: (514) 585-5464 Fax: (514) 585-5464 Contact: Marcel Comtois
9.4	4.1	Chlorine Mixer	Neptune Flange Mount	US Filter 243 Bren, bur.210 Repentigny, Quebec J6A 6M4 Ph: (514) 585-5464 Fax: (514) 585-5464 Contact: Marcel Comtois

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COMPONENTS, MANUFACTURERS, AND SUPPLIERS
TABLE 5.1

Section 9 Tab	Section 4 Tables and Figs	Description	Manufacturer and Model	Supplier
9.4	4.1	Chlorine Mix and Feed Tanks	Wallace & Tiernan 55 gal	US Filter 243 Bren, bur.210 Repentigny, Quebec J6A 6M4 Ph: (514) 585-5464 Fax: (514) 585-5464 Contact: Marcel Comtois
9.4	4.1	PVC Ball Valves on Tanks and Injectors	Chemtrol 25 mm	Miller 10229 Cote de Liesse Dorval, Quebec H9P 1A3 Ph: (514) 631-4355 Fax: (514) 631-6695 Contact: Roy Seguin
-	4.1	Flex Tube for Chemical Tanks	-	Flexi-Tube 1116 Berlier Laval, Quebec H4S 1V8 Ph: (514) 384-6157 Fax: (514) 384-6157
9.5	-	Radiant Heaters	Chromalox CRT-3512	Binette 1231 Berri Montreal, Quebec H2J 4A2 Ph: (514) 274-2583 Fax: (514) 274-2583 Contact: J.M. Lambert
9.5	-	Electric Heater Thermostat	Tradeline T498B1678	Binette 1231 Berri Montreal, Quebec H2J 4A2 Ph: (514) 274-2583 Fax: (514) 274-2583 Contact: J.M. Lambert
9.5	-	Percentage Input Controller for Radiant Heaters	Caloritech Type OKT	Binette 1231 Berri Montreal, Quebec H2J 4A2 Ph: (514) 274-2583 Fax: (514) 274-2583 Contact: J.M. Lambert
9.6	4.2	Electrical Panel	Square D PS-1	CDE 2522 LeCorbusier Laval, Quebec H7S 2K3 Tel: (514) 438-1263 Fax: (514) 438-3728 Contact: Yvon Clement

CLYDE RIVER TRUCKFILL
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COMPONENTS, MANUFACTURERS, AND SUPPLIERS
TABLE 5.1

Section 9 Tab	Section 4 Tables and Figs	Description	Manufacturer and Model	Supplier
9.6	-	Receptacles	Hubbel 5252	CDE 2522 LeCorbusier Laval, Quebec H7S 2K3 Tel: (514) 438-1263 Fax: (514) 438-3728 Contact: Yvon Clement
9.6	-	Switches	Hubbel HBL 1201	CDE 2522 LeCorbusier Laval, Quebec H7S 2K3 Tel: (514) 438-1263 Fax: (514) 438-3728 Contact: Yvon Clement
9.6	-	Junction Boxes, and Unilets	Various	CDE 2522 LeCorbusier Laval, Quebec H7S 2K3 Tel: (514) 438-1263 Fax: (514) 438-3728 Contact: Yvon Clement
9.7	4.2	Uninterruptible Power Supply (UPS)	Best Ferrups Model FE2.1 KVA	Best Power Technology of Canada Limited 1555 Bonhill Road, Unit 11 Mississauga, Ontario L5T 1Y5 Ph: (905) 564-7655 Fax: (905) 564-7657
9.8	4.3	Control Panel	Optoinfo	Optoinfo Electric Inc. 542 Bran St.. Jerome, Quebec J7Z 2B1 Ph: (514) 436-6050 Fax: (514) 436-4846
9.8	4.3	Pilot Lights	Allen Bradly 800T-QH10G	Optoinfo Electric Inc. 542 Bran St.. Jerome, Quebec J7Z 2B1 Ph: (514) 436-6050 Fax: (514) 436-4846
9.8	4.3	Push Buttons	Allen Bradly 800T-ATA	Optoinfo Electric Inc. 542 Bran St.. Jerome, Quebec J7Z 2B1 Ph: (514) 436-6050 Fax: (514) 436-4846

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COMPONENTS, MANUFACTURERS, AND SUPPLIERS
TABLE 5.1

Section 9 Tab	Section 4 Tables and Figs	Description	Manufacturer and Model	Supplier
9.8	4.1	Flow Switch	McDonnel Miller FS4-3D	Optoinfo Electric Inc. 542 Bran St.. Jerome, Quebec J7Z 2B1 Ph: (514) 436-6050 Fax: (514) 436-4846
9.8	4.1	Flow Sensor	Signet 515 Rotor-X P51530-P0	Optoinfo Electric Inc. 542 Bran St.. Jerome, Quebec J7Z 2B1 Ph: (514) 436-6050 Fax: (514) 436-4846
9.8	-	Relays	Allen Bradley 700-HG45A1 and Potter & Brumfield KRPA-14AN-120	Optoinfo Electric Inc. 542 Bran St.. Jerome, Quebec J7Z 2B1 Ph: (514) 436-6050 Fax: (514) 436-4846
9.8	-	Time Delay Relays	Potter & Brumfield CNS-35-76	Optoinfo Electric Inc. 542 Bran St.. Jerome, Quebec J7Z 2B1 Ph: (514) 436-6050 Fax: (514) 436-4846
9.8	-	Terminal Blocks	Entrelec	Optoinfo Electric Inc. 542 Bran St.. Jerome, Quebec J7Z 2B1 Ph: (514) 436-6050 Fax: (514) 436-4846
9.8	4.3	Remote Control Enclosure	Telemecanique W913065520111	Optoinfo Electric Inc. 542 Bran St.. Jerome, Quebec J7Z 2B1 Ph: (514) 436-6050 Fax: (514) 436-4846
9.8	4.3	Key Switch	Allen Bradley 800T	Optoinfo Electric Inc. 542 Bran St.. Jerome, Quebec J7Z 2B1 Ph: (514) 436-6050 Fax: (514) 436-4846

CLYDE RIVER TRUCKFILL
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COMPONENTS, MANUFACTURERS, AND SUPPLIERS
TABLE 5.1

Section 9 Tab	Section 4 Tables and Figs	Description	Manufacturer and Model	Supplier
9.8	4.3	Fill Timer	Paragon SWP15M	Optoinfo Electric Inc. 542 Bran St.. Jerome, Quebec J7Z 2B1 Ph: (514) 436-6050 Fax: (514) 436-4846
9.9	4.3	Annunciator	Panalarm 910	Provan Meter 2011 Halpern Ville St.. Laurent H4S 1S3 Ph: (514) 332-3230 Fax: (514) 332-3552 Contact: M. Lachance
9.9	4.3	High/Low Temperature Thermostat	Honeywell Farm-O-Stat T631A	Denbec 9855 B.Hyp. Lafontaine Anjou, Montreal, Quebec H1J 2A3 Ph: 1-800-465-0950 or (514) 355-4540 Fax: (514) 355-4346
9.9	-	Horn	Panalarm	Provan Meter 2011 Halpern Ville St.. Laurent H4S 1S3 Ph: (514) 332-3230 Fax: (514) 332-3552 Contact: M. Lachance
9.9	-	Strobe Beacon	Adapta Beacon	Edwards Unit Of General Signal 625 6th St. E Owen Sound, Ontario N4K5P8 Ph: (519) 376-2430
9.10	-	Exterior Truckfill Light	Caretaker HPCT-35-120V-LL	Cooper Industries, Inc Crouse-Hinds Airport Lighting Canada 5925 McLaughlin Road Mississauga, Ontario L5R 1B8 Ph: (905) 507-4187 Fax: (905) 501-4078
9.10	-	High Pressure Sodium Lamps	Cermalux ED-231/2 Mog. 52V	Wesco 281 Traders Blvd. Mississauga, Ontario L4Z 2E5 Ph: (905) 890-3344 Fax: (905) 890-8533

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COMPONENTS, MANUFACTURERS, AND SUPPLIERS
TABLE 5.1

Section 9 Tab	Section 4 Tables and Figs	Description	Manufacturer and Model	Supplier
9.10	-	Exterior Wall Light	Holopane Wallpackette WP2B	Lumen 500- Boul. Daniel Johnson St.-Jerome, Quebec J7Y 4C5 Ph: (514) 436-3225 or 1-800-363-3678 Fax: (514) 436-2537
9.10	-	Interior Fluorescent Lights	K172120	CDE 2522 LeCorbusier Laval, Quebec H7S 2K3 Tel: (514) 438-1263 Fax: (514) 438-3728 Contact: Yvon Clement
9.10	-	Exit Light	Emergi-Lite EX42WEM12R120V	Emergi-Lite 1800 Hymus Blvd Dorval, Quebec H9P 2N6 Ph: (514) 685-2270 Fax: (514) 685-2394
9.10	-	Emergency Lights	Emergi-Lite 12ESL250	Emergi-Lite 1800 Hymus Blvd Dorval, Quebec H9P 2N6 Ph: (514) 685-2270 Fax: (514) 685-2394
9.11	4.4, 4.5	Self Regulating Heat Trace Cable	Accutron SRL5-1	Accutron 6600 Trans.Can Pointe-Claire H9R 4S2 Ph: (514) 695-7032 Fax: (514) 695-4784
9.11	4.5	Heat Trace Control Panel	Accutron TS202 Controller	Accutron 6600 Trans.Can Pointe-Claire H9R 4S2 Ph: (514) 695-7032 Fax: (514) 695-4784
9.12	-	Chlorine Tester	HACH Pocket Colorimeter for Chlorine	Anachemia Science 15006-116 Avenue Edmonton, Alberta T5M 3T4 Ph: (403) 451-0665 Fax: (403) 452-2478
9.12	-	Fire Extinguisher	Flag 400-11155ULC 20lb Nitrogen	Fyremaster Equipment Sales 4101 49a Ave Yellowknife, NT X1A 1A3 Ph: (867) 873-6990

CLYDE RIVER TRUCKFILL
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COMPONENTS, MANUFACTURERS, AND SUPPLIERS
TABLE 5.1

Section 9 Tab	Section 4 Tables and Figs	Description	Manufacturer and Model	Supplier
9.12	-	Eyewash Station	Fisher Scientific EYE2	Fisher Scientific 112 Colonnade Road Nepean, Ontario K2E 7L6 Ph: 1-800-234-7437 Fax: 1-800-463-2996
9.12	-	Valved Respirators	NIOSH 8500 by 3M	Fisher Scientific 112 Colonnade Road Nepean, Ontario K2E 7L6 Ph: 1-800-234-7437 Fax: 1-800-463-2996
9.12	-	Safety Gloves	Trionic Special Blend	Fisher Scientific 112 Colonnade Road Nepean, Ontario K2E 7L6 Ph: 1-800-234-7437 Fax: 1-800-463-2996
9.12	-	Rubberized Safety Apron	Fisherbrand 01-357	Fisher Scientific 112 Colonnade Road Nepean, Ontario K2E 7L6 Ph: 1-800-234-7437 Fax: 1-800-463-2996
9.12	-	Face Shield	Nalgene 11-409-5	Fisher Scientific 112 Colonnade Road Nepean, Ontario K2E 7L6 Ph: 1-800-234-7437 Fax: 1-800-463-2996
9.13	-	Combination Storage Wardrobe Unit	Kleton Combination FB041	Tenaquip 20701 Ste-Marie Ste. Anne Bellevue, Quebec H9X 3L2 Ph: 1-800-263-7576 or (514) 457-7800 Fax: 1-800-263-3324 or (514) 457-9807
9.13	-	Cabinet Table	Kleton Model FF075	Tenaquip 20701 Ste-Marie Ste. Anne Bellevue, Quebec H9X 3L2 Ph: 1-800-263-7576 or (514) 457-7800 Fax: 1-800-263-3324 or (514) 457-9807

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COMPONENTS, MANUFACTURERS, AND SUPPLIERS
TABLE 5.1

Section 9 Tab	Section 4 Tables and Figs	Description	Manufacturer and Model	Supplier
9.13	-	Winch	Posi-Brake LA692 1500lb	Tenaquip 20701 Ste-Marie Ste. Anne Bellevue, Quebec H9X 3L2 Ph: 1-800-263-7576 or (514) 457-7800 Fax: 1-800-263-3324 or (514) 457-9807
9.13	-	Winch Cable	Stainless Steel 3.2 MM 2100 lb	General Bearing 789 St.. Georges St.. Jerome, Quebec Ph: (514) 438-3315 Fax: (514) 438-3315
9.13	-	Janitorial Equipment	Misc.	Belisle & Carriere 1313 St.. Antoine boul. St.-Antoine, Quebec H1P 1Y5 Ph: (514) 438-7834 Fax: (514) 438-2806
9.13	-	Interior Paint	Laurentide Interior Semi-gloss Latex 694-500	Cyr & Nepveu St.-Anne Des Plain 323, Monte Gagnon Montreal, Quebec J0N 1H0 Ph: (514) 478-0907

6.0 OPERATING PROCEDURES

6.1 General

The water supply system for Clyde River, N.W.T. consists of:

.1 An intake screen connected to a 300 mm diameter high density polyethylene (HDPE) intake casing. The casing accesses the water supply lake, and enters the pump house through a wall.

.2 A submersible pump connected to a 100 mm HDPE intake pipe is situated inside the 300 HDPE casing at a depth near the intake screen.

.3 A chlorine solution is made in a mix tank by mixing calcium hypochlorite with water. The chlorine solution is drained to a feed tank after mixing.

.4 A flow switch is activated when water is flowing through the truckfill line. This switch activates an injection pump.

.5 The injection pump pumps the chlorine solution from the feed tank into the truckfill line. The injection pump stops when a no-flow condition exists in the truckfill line.

6.2 Start-up Procedures

Throughout the normal life of the facility, it should rarely have to be started from an off condition. If, for some reason, all power to the truckfill station has been switched off, follow the procedure below to restore power.

6.2.1 Start-up from Utility Power

.1 **Location**: inside station at the truckfill pump starter.
Turn the pump starter to the OFF position.

.2 **Location**: inside station at the combination electrical panel. Turn the main disconnect on. Power should be connected to the station. If there is no power, call the utility company.

.3 Turn the truckfill pump starter to the AUTO position.

.4 Turn UPS AC Line disconnect switch to "On" if not already in this position.

6.3 Normal Operating Procedures

The normal operating procedures for the water supply system includes:

- Filling of water trucks.
- Chlorination system preparation.
- Main control panel operation.
- Intake screen backwashing.
- Heat trace system operation.
- Heating system operation.

Each of these procedures is discussed in the following sub-sections.

6.3.1 Truckfilling Procedure

Trucks are filled with chlorinated water from the truckfill station for delivery to houses in Clyde River. The trucks are filled by either using the truckfill controller hanging from the truckfill arm, or by using the "manual" position on the pump motor starter switch on the control panel inside the pumphouse. Normally the pump motor starter switch is set to "Auto" and the truckfill controller is used for filling trucks.

.1 **Location**: Under the truckfill arm.

Drive the truck under the truckfill arm so that the fill hole of the truck tank is directly under the pipe. Watch the arm to make sure that the truck does not hit it.

.2 **Location**: On top of the truck.

Open the fill hole and place the fill hose in the hole.

.3 **Location**: Hanging from truckfill arm.

Insert your key and turn the key switch to the 'on' position in the remote controller.

.4 There are two ways you can fill the truck with the truckfill controller:

1. Using the Timer

.1 Turn the timer to the desired time setting. Different water truck tank sizes will have different time settings.

.2 Press the 'Start' button on the truckfill controller.

.3 The pump will start pumping after a short delay. It will continue pumping until the timer completes its cycle.

.4 If the timer is set too long (i.e. tank overfilling), press the 'Stop' button on the truckfill controller. Please note that severe weather conditions may have an impact on the timer's accuracy.

.5 The 'Stop' button may be used any time during truckfilling to stop filling operations.

Manual Control

.1 To manually fill the truck, simply press the 'Start' button on the truckfill timer.

.2 The pump will start pumping after a short delay.

.3 When the truckfill tank is full, press the 'Stop' button on the

truckfill controller. The pump will stop.

.5 The filling is NOT automatic. The driver should observe the filling process, and be ready to stop the pump if the truck starts overfilling. Once the pumping rate is set, the operator should be able to time how long it takes the truck to fill.

.6 Following the truckfill, turn the key switch to the 'off' position and remove the key.

.7 **Location**: On top of the truck.
Remove the fill hose from the truck and close the fill hole. Hang the hose on the hook at the end of the arm.

.9 Deliver water.

6.3.2 Chlorination Process

Chlorine is injected into the truckfill piping with a chemical injection pump. The injection pump is turned on by a flow switch when the water starts being pumped to the water truck. Chlorine kills bacteria and microorganisms in the water that might cause people to become sick. Chlorine MUST be added to all water leaving the truckfill station or residents may become sick. Never turn the chlorine system off, always ensure that it is working properly, and ensure there is sufficient solution for operation.

6.3.2.1 Chlorine Solution Mixing

Chlorine solution is mixed using calcium hypochlorite powder (65%) and water. The calcium hypochlorite powder is in 1 kg (liter) containers in the standing storage closet.

.1 **Location**: Tap for hose connection on truckfill pipe (close to temperature and pressure gauges).
Connect the water hose to the threads on tap. Put the other end of the hose into the top tank on the workbench.

.2 Close the butterfly valve on the truckfill pipe, or ensure there is a truck underneath the fill arm if the valve is open.

.3 Close the valve on the bottom of the mix tank, and feed tank.

.4 **IMPORTANT**: Open the 25 mm ball valve on the intake bypass hose. The open valve allows the pump to circulate the water without damaging the pump, and relieves some of the high pressure. Caution should be taken when filling the tanks as the pump does produce a very high pressure.

.5 **Location**: The control panel.
Turn the starter to the MANUAL position. The pump will start.

.6 Partially open the tap and fill the chemical tank on top of the bench to the 120 litre mark.

.7 Turn off tap.

.8 Turn the truckfill pump starter to the AUTO position. The pump will stop.

.9 Open the butterfly valve on the truckfill pipe.

.10 Close valve for the 25 mm bypass hose.

.11 **NEVER** operate the truckfill pump with all valves closed. Either the butterfly valve must be open and a truck placed under the truckfill arm, or the bypass valve must be open. Operating the pump with no flow **will damage** it, and **high pressures are dangerous** to personnel.

.12 Put on rubber apron, rubber gloves, and face shield.

.13 Read manufacturer's safety data sheet for Calcium Hypochlorite.

.14 Add five (5) liters (bottles) of Calcium Hypochlorite 65% to water. This will give a 1 bottle of Calcium Hypochlorite to 24 liters of water ratio.

.15 Plug in mixer for two (2) hours. Unplug mixer.

.16 Let the solution settle overnight if possible.

.17 Open the valve at the bottom of the chemical mixing tank. The chlorine solution will drain into the chemical feed tank.

.18 Close valve at bottom of mix tank. Disassemble piping by unscrewing collar after the mixing tank valve.

.19 Thoroughly rinse the agitator paddle and tank with water from hose to prevent corrosion of paddle.

.20 Reassemble mix tank piping.

.21 Test first truck of day for adequate chlorination by using the HACH Colorimeter test kit. See details in following section 6.3.2.2 Chlorine Testing.

.22 Adjust the stroke length and/or rate of the injection pump to either increase or decrease the chlorine dosage if required. Retest FREE CHLORINE after adjusting the stroke and/or rate.

This procedure mixes the chlorine stock to approximately 3% chlorine by volume. A higher chlorine ratio may be used if it is found that the injection pump can not achieve adequate chlorination. A lower chlorine ratio may be used if the pump's stroke and rate are set below 40%.

6.3.2.2 Chlorine Testing

Chlorine levels must be tested for the water in the delivery truck. For safety, chlorine should be delivered to homes with a minimum free chlorine level of 0.5 mg/L. However, as there may be bacteria in the storage tanks in homes, higher levels of chlorine to 1.0 mg/L would be safer to allow for some chlorine to kill the bacteria in the tanks. The chlorinated water should be sampled and tested daily prior to any deliveries. This will ensure that the following deliveries will be adequately chlorinated, provided that the chemical injection pump settings remain the same for that day.

The operator of the truck will have to balance the chlorine level to satisfy both the tastes of the people of the community and safety. Too much chlorine may result in the residents refusing to use the treated water. Not enough chlorine is unsafe.