	DILLON CONSULTING		
TITLE	TREATED WATER DISSOLVED OXYGEN	**DISSOLVED CHLORINE ANALYZER TRANSMITTER**	
CLIENT	THE GOVERNMENT OF NUNAVUT P W & S		
PROJECT	WATER WORKS AND WATER SUPPLY		
	WATER TREATMENT PLANT - CONTRACT 1	TAG No. AIT-1	REVISION
PROJECT No.	02-0602		

SITE CONDITIONS	Indoor	X	Heated	X	Remarks:	CHLORINE METER	
	Outdoor		Unheated				

SERVICE	Name:	WATER		
	Temperature			
	Minimum	0	?uo?0uC	
	Maximum	30	?uo?0uC	
	Pressure			
	Minimum	Atmos.	kPa	
	Maximum	Press.	kPa	
	Free and total chlorine			
	Minimum	0.2	mg/l	
	Maximum	9.0	mg/l	
	Suspended Solids			
	Minimum		mg/l	
	Maximum		mg/l	

OPTIONS	Calibration Kit	X	YES		NO	
	Mounting Bracket	X	YES		NO	
	316 S.S. Tag	X	YES		NO	
	Ball Float		YES	X	NO	
	Self Clean'g Pkg.	X	YES		NO	
	Type		Water	X	Air	
	Control Heater	X	YES		NO	
	Spare Membranes	X	YES		NO	
	Quantity	3 per Element				
	Element Cable	Field Verify		Meters		

ELEMENT	Type	Membrane			
	Membrane Type	Amperometric			
	Replaceable Cartridge	X	YES		No
	Material				
	Measuring Electrode	Gold/Sliver			
	Reference Electrode	Sliver			
	Wetted Parts	PVC			
	Temp Compensation	X	YES		No
	Calibration Method	Air			
	Process Connection				
	Size	50 mm		Thread	
	Type	X	Subm.		Float
	Mounting	Panel			
	Notes:				

CALIBRATION	Range			
	20 mA	15	mg/l	
	4 mA	0	mg/l	
	Notes:	To be factory calibrated and calibration checked in the field.		

TRANSMITTER	Power Supply	120	VAC		
	Output	4-20	mA		
	Isolated Output	X	YES		No
	Range				
	Adjustable	X	YES		No
	Minimum	0	mg/l		
	Maximum	20	mg/l		
	Relay Contacts	X	YES		No
	Quantity	3			
	Rating	5 amp@ 120VAC			
	Display				
	Type	Digital LCD			
	Units	mg/l			
	Range	0-20 ppm			
	Calibration		Manual	X	Self
	Resolution	0.001 ppm			
	Mounting	Handrail			
	Approvals	CSA			
	Area Classification	C: NON G: * D: *			
	Enclosure Rating	NEMA 4X			
	Notes:				

NOTES:

1. Confirm all details and sizing before ordering.
2. Self cleaning kit shall include air compressor, controls, tubing, fittings and all components for a complete system.

Manufacturer	Model No.	Spec By	ACN
ROSEMOUNT	105501-011024	Checked	
	499ACL0154 SENSOR	Approved	GS
		Date	MARCH 21, 2003

REVISION		
No.	Date	By

Vendor To Complete all applicable information not given and submit with Shop Drawings

	DILLON CONSULTING	**TURBIDITY ANALYZER TRANSMITTER**	
TITLE	TREATED WATER TURBIDITY		
CLIENT	THE GOVERNMENT OF NUNAVUT P W & S		
PROJECT	WATER WORKS AND WATER SUPPLY		
	WATER TREATMENT PLANT - CONTRACT 1	TAG No.	REVISION
PROJECT No.	02-0602	AIT-2	

SITE CONDITIONS	Indoor	X	Heated	X	Remarks:	TURBIDITY METER	
	Outdoor		Unheated				

SERVICE	Name:	WATER		
	Temperature			
	Minimum	0		?uo?0uC
	Maximum	30		?uo?0uC
	Pressure			
	Minimum	Atmos.		kPa
	Maximum	Press.		kPa
	Turbidity			
	Minimum			mg/l
	Maximum			mg/l
	Suspended Solids			
	Minimum			mg/l
	Maximum			mg/l

OPTIONS:	Calibration Kit	X	YES		NO
	Mounting Bracket	X	YES		NO
	316 S.S. Tag	X	YES		NO
	Ball Float		YES	X	NO
	Self Clean'g Pkg.	X	YES		NO
	Type		Water	X	Air
	Control Heater	X	YES		NO
	Spare Membranes	X	YES		NO
	Quantity	3 per Element			
	Element Cable	Field Verify			Meters

ELEMENT	Type	light sensor			
	Membrane Type				
	Replaceable Cartridge	X	YES		No
	Material				
	Measuring Electrode	Gold/Sliver			
	Reference Electrode	Sliver			
	Wetted Parts	PVC			
	Temp Compensation	X	YES		No
	Calibration Method	Air			
	Process Connection				
	Size	50 mm			Thread
	Type	X	Subm.		Float
	Mounting	Handrail Kit			
	Notes:				

CALIBRATION	Range		
	20 mA	15	mg/l
	4 mA	0	mg/l
	Notes:	To be factory calibrated and calibration checked in the field.	

NOTES:

1. Confirm all details and sizing before ordering.
2. Self cleaning kit shall include air compressor, controls, tubing, fittings and all components for a complete system.

TRANSMITTER	Power Supply	120			VAC
	Output	4-20			mA
	Isolated Output	X	YES		No
	Range				
	Adjustable	X	YES		No
	Minimum	0			mg/l
	Maximum	15			mg/l
	Relay Contacts	X	YES		No
	Quantity	3			
	Rating	5 amp@ 120VAC			
	Display				
	Type	Digital LCD			
	Units	mg/l			
	Range	0-15			
	Calibration		Manual	X	Self
	Accuracy	0.10 % of FSD			
	Mounting	Handrail			
	Approvals	CSA			
	Area Classification	C: NON G: * D: *			
	Enclosure Rating	NEMA 4X			
	Notes:				

Manufacturer	Model No.		
ROSEMOUNT	T-1054A 2120	Spec By	ACN
PROBE	TFTM2	Checked	
		Approved	GS
		Date	MARCH 21, 2003

REVISION		
No.	Date	By

Vendor To Complete all applicable information not given and submit with Shop Drawings

File: @CELLPOINTER("filename"); J:\PROJECTS\DRAFT\020602\Electrical\I&C\Ait-2.123

REV. 02/97

TITLE	DILLON CONSULTING PUMP ROOM TEMPERATURE SENSOR	**TEMPERATURE CONTROLLER** (THERMOSTAT)
CLIENT	THE GOVERNMENT OF NUNAVUT P W & S	
PROJECT	WATER WORKS AND WATER SUPPLY WATER TREATMENT PLANT - CONTRACT 1	TAG No. TSL-01 / REVISION
PROJECT No.	02-0602	

SITE CONDITIONS

Indoor	X	Heated	X	Remarks:	LOW TEMPERATURE ALARM
Outdoor		Unheated			

SERVICE

		Min.	Norm.	Max.
Name:			AMBIENT	
Vessel Type			Pump Room	
Pressure	kPa			
Temperature	?uo?0uC	10	27	40

Thermowell

Type				
Process Connection				
Type				
Size				mm
Immersion Length				mm
Extension Fitting			YES	NO
Type				
Length				mm
Material			316 S.S.	
Notes:				

PRIMARY ELEMENT

Type			Platinum	
Sensor Type			THERMISTOR	
Lead Wire Configuration				
Remote		X	YES	No
Connection				
Threaded				mm
Length			By supplier	
Material				
Sheath			316 S.S.	
Lead Wires			Telfon-insulated, Nickel-coated, 22 ga. copper.	
Temperature Range			-29 to +116C	
Notes:				

OPTIONS

Calibrator			YES	X NO
Mounting Bracket		X	YES	NO
316 S.S. Tag		X	YES	NO

TRANSMITTER

Type:			Single Input	
Power Supply			24	Vac
Output			One relay output	
Isolated Output		X	YES	No
Range				
Minimum			-40 C	
Maximum			60 C	
Zero Suppression				
Zero Elevation				
Display				
Type			Digital LCD	
Units			1C	
Range			-34 -60	
Accuracy			+/- 0.6 C	
Repeatability			0.05 %	
Approvals			CSA	
Area Classification			C: NON G: D:	
Enclosure Rating			NEMA 4X	
Notes:				

CALIBRATION

Range	
20 mA	50 degrees C
0 Ma	0 Degrees C
Notes:	To be factory calibrated and calibration checked in the field.

NOTES:

1. Confirm all details and sizing before ordering.
2. Installation shall be in strict accordance with instrument mfg.'s instructions, particularly elevations.

Manufacturer	Model No.	Spec By	ACN
HONEYWELL	T775A1001	Checked	
	C7130A	Approved	
		Date	March 25, 2003

REVISION		
No.	Date	By

Vendor To Complete all applicable information not given and submit with Shop Drawings

File: @CELLPOINTER("filename"); J:\PROJECTS\DRAFT\020602\Electrical\I&C\TSI-01.123

REV. 11/96

TITLE	DILLON CONSULTING FLOW FROM STORAGE TANK VALVE	**MOTORIZED CONTROL VALVE** **VALVE & ACTUATOR**
CLIENT	THE GOVERNMENT OF NUNAVUT P W & S	
PROJECT	WATER WORKS AND WATER SUPPLY WATER TREATMENT PLANT - CONTRACT 1	TAG No. GHWTP - MV7 / REVISION 0
PROJECT NO.	02-0602	

SITE CONDITIONS

Indoor	X	Heated	X	Remarks:	CONTROL EFFLUENT WATER FLOW
Outdoor		Unheated			

SERVICE

Name:		Water			
Flowdata		Minimum	Average	Peek	Ultimate Peak
Flow	(l/s)	0	20		40
Inlet Pressure	(kPa)	0	70	689	689
Temperature	(kPa. C.)	0	4	10	*
Specific Gravity		1.0	1.0		1.0
Line Size		100 mm			
Line Material		GALVANIZED STEEL			

BODY

Type		Butterfly			
Size		100 mm			
End Connection	X	Flange		Thread	
Rating		125# ANSI B16.1 AWWA			
Material					
Body		Cast Iron	Rev.1		
Seat		Buna N			
Disc		C.I. w/ Nii-Chrome			
Shaft		316 SS			
Pressure Rating		1034 kPa			
Notes:	Pratt Model 2FII				

OPTIONS

Calibrator		YES	X	NO	
316 S.S. Tag	X	YES		NO	
Actuator Sett"g Tool		YES	X	NO	

CALIBRATION

Range	
Limits	Open
Limits	Closed
Notes:	To be calibrated in the factory, and and checked in the field.

Actuator

Type		Electric			
Travel		90 Deg.			
Power		120 VAC			
Control Signal		24 VDC			
Control Switches	X	Remote	X	Local	
Input torque					
Speed		rpm			
Shaft					
Size		mm			
Material					
Material					
Housing		Aluminum			
Piston		Cast Aluminum			
Handwheel Override	X	Yes		No	
Mounting		Direct			
Folomatic Controller		Yes	X	No	
Output Signals					
Position		NA			
Status Contacts		2			
Alarm Relays		1			
Area Classification		C: NON G:		D:	
Enclosure Rating		NEMA 4			
Notes:	Rotork AQ				

NOTES:

1. Confirm all details and sizing before ordering.
2. See specification section 13110 Valves for valve spec.
3. CONTROL EFFLUENT WATER FLOW
4. MV7 MUST BE FULLY OPEN BEFORE TWP1 AND/OR TWP2 START
   MV7 CLOSES AFTER TWP1 AND/OR TWP2 STOPPED

Manufacture		Model No.	Spec By	ACN
Pratt	(Valve)	Model 2FII	Checked	
Rotork	(Actuator)	Model AQ	Approved	GS
			Date	FEB. 11, 2003

REVISION		
No.	Date	By

Vendor To Complete all applicable information not given and submit with Shop Drawings

File: @CELLPOINTER("filename"); J:\PROJECTS\DRAFT\020602\Electrical\I&C\Mv7.123

REV. 09/98

TITLE	DILLON CONSULTING TRUCK FILL 1 VALVE	**MOTORIZED CONTROL VALVE** **VALVE & ACTUATOR**
CLIENT	THE GOVERNMENT OF NUNAVUT P W & S	
PROJECT	WATER WORKS AND WATER SUPPLY WATER TREATMENT PLANT - CONTRACT 1	TAG No. GHWTP-MV8 / REVISION 0
PROJECT No.	02-0602	

SITE CONDITIONS	Indoor	X	Heated	X	Remarks:	
	Outdoor		Unheated			

SERVICE

Name:		Water			
Flowdata		Minimum	Average	Peek	Ultimate Peak
Flow	(l/s)	0	20		40
Inlet Pressure	(kPa)	0	70	689	689
Temperature	(kPa. C.)	0	4	10	*
Specific Gravity		1.0	1.0		1.0
Line Size		100 mm			
Line Material		GALVANIZED STEEL			

BODY

Type		Butterfly		
Size		100	mm	
End Connection	X	Flange		Thread
Rating		125# ANSI B16.1 AWWA		
Material				
Body		Cast Iron	Rev.1	
Seat		Buna N		
Disc		C.I. w/ Nii-Chrome		
Shaft		316 SS		
Pressure Rating		1034	kPa	
Notes:	Pratt Model 2FII			

OPTIONS

Calibrator		YES	X	NO
316 S.S. Tag	X	YES		NO
Actuator Sett"g Tool		YES	X	NO

CALIBRATION

Range	
Limits	Open
Limits	Closed
Notes:	To be calibrated in the factory, and and checked in the field.

Actuator

Type		Electric		
Travel		90	Deg.	
Power		120	VAC	
Control Signal		24	VDC	
Control Switches	X	Remote	X	Local
Input torque				
Speed			rpm	
Shaft				
Size			mm	
Material				
Material				
Housing		Aluminum		
Piston		Cast Aluminum		
Handwheel Override	X	Yes		No
Mounting		Direct		
Foiomatic Controller		Yes	X	No
Output Signals				
Position		NA		
Status Contacts		2		
Alarm Relays		1		
Area Classification		C: NON G:	D:	
Enclosure Rating		NEMA 4		
Notes:	Rotork AQ			

NOTES:

1. Confirm all details and sizing before ordering.
2. See specification section 13110 Valves for valve spec.

Manufacturer		Model No.
Pratt	(Valve)	Model 2FII
Rotork	(Actuator)	Model AQ

		REVISION No.	Date	By
Spec By	ACN			
Checked				
Approved	GS			
Date	FEB. 11, 2003			

Vendor To Complete all applicable information not given and submit with Shop Drawings

File: @CELLPOINTER("filename"); J:\PROJECTS\DRAFT\020602\Electrical\I&C\Mv8.123

REV. 09/98

TITLE	DILLON CONSULTING TRUCK FILL 2 VALVE	**MOTORIZED CONTROL VALVE VALVE & ACTUATOR**
CLIENT	THE GOVERNMENT OF NUNAVUT P W & S	
PROJECT	WATER WORKS AND WATER SUPPLY WATER TREATMENT PLANT - CONTRACT 1	TAG No. GHWTP-MV9 / REVISION 0
PROJECT No.	02-0602	

SITE CONDITIONS

Indoor	X	Heated	X	Remarks:	
Outdoor		Unheated			

SERVICE

Name:		Water			
Flowdata		Minimum	Average	Peek	Ultimate Peak
Flow	(l/s)	0	20		20
Inlet Pressure	(kPa)	0	70	689	689
Temperature	(kPa. C.)	0	4	10	*
Specific Gravity		1.0	1.0		1.0
Line Size		100 mm			
Line Material		GALVANIZED STEEL			

BODY

Type		Butterfly	
Size		100	mm
End Connection	X	Flange	Thread
Rating		125# ANSI B16.1 AWWA	
Material			
Body		Cast Iron	Rev.1
Seat		Buna N	
Disc		C.I. w/ Nii-Chrome	
Shaft		316 SS	
Pressure Rating		1034	kPa
Notes:	Pratt Model 2FII		

OPTIONS

Calibrator		YES	X	NO
316 S.S. Tag	X	YES		NO
Actuator Sett"g Tool		YES	X	NO

CALIBRATION

Range	
Limits	Open
Limits	Closed
Notes:	To be calibrated in the factory, and and checked in the field.

Actuator

Type		Electric	
Travel		90	Deg.
Power		120	VAC
Control Signal		24	VDC
Control Switches	X	Remote	X Local
Input torque			
Speed			rpm
Shaft			
Size			mm
Material			
Material			
Housing		Aluminum	
Piston		Cast Aluminum	
Handwheel Override	X	Yes	No
Mounting		Direct	
Foiomatic Controller		Yes	X No
Output Signals			
Position		NA	
Status Contacts		2	
Alarm Relays		1	
Area Classification		C: NON G:	D:
Enclosure Rating		NEMA 4	
Notes:	Rotork AQ		

NOTES:

1. Confirm all details and sizing before ordering.
2. See specification section 13110 Valves for valve spec.

Manufacturer		Model No.	Spec By	ACN
Pratt	(Valve)	Model 2FII	Checked	
Rotork	(Actuator)	Model AQ	Approved	GS
			Date	FEB. 11, 2003

REVISION		
No.	Date	By

Vendor To Complete all applicable information not given and submit with Shop Drawings

TITLE	DILLON CONSULTING TRUCK FILL DRAIN VALVE	**SOLENOID CONTROL VALVE**	
CLIENT	THE GOVERNMENT OF NUNAVUT P W & S		
PROJECT	WATER WORKS AND WATER SUPPLY WATER TREATMENT PLANT - CONTRACT 1	TAG No. GHWTP-SV1	REVISION 0
PROJECT No.	02-0602		

SITE CONDITIONS	Indoor	X	Heated	X	Remarks:			
	Outdoor		Unheated					

SERVICE	Name:	Water			
	Flowdata	Minimum	Average	Peek	Ultimate Peak
	Flow (l/s)	0			20
	Inlet Pressure (kPa)	0	70	689	689
	Temperature (kPa. C.)	0	4	10	*
	Specific Gravity	1.0	1.0		1.0
	Line Size	?? mm			
	Line Material	GALVANIZED STEEL			

BODY	Type	Butterfly			**OPTIONS**	Calibrator		YES X NO
	Size	mm				316 S.S. Tag	X	YES NO
	End Connection	X Flange	Thread			Actuator Sett"g Tool		YES X NO
	Rating	125# ANSI B16.1 AWWA						
	Material							
	Body	Cast Iron	Rev.1					
	Seat	Buna N						
	Disc	C.I. w/ Nii-Chrome						
	Shaft	316 SS			**CALIBRATION**	Range Limits		Open
	Pressure Rating	1034 kPa				Limits		Closed
	Notes: Pratt Model 2FII					Notes:		To be calibrated in the factory, and and checked in the field.

Actuator	Type	Electric			**NOTES:**
	Travel	90 Deg.			1. Confirm all details and sizing before ordering.
	Power	600 VAC			2. See specification section 13110 Valves for valve spec.
	Control Signal	24 VDC			3. DRAIN WATER IN TRUCK FILL ARMS TO SUMP
	Control Switches	X Remote	X	Local	
	Input torque				
	Speed	rpm			
	Shaft				
	Size	mm			
	Material				
	Material				
	Housing	Aluminum			
	Piston	Cast Aluminum			
	Handwheel Override	X Yes		No	
	Mounting	Direct			
	Folomatic Controller	Yes	X	No	
	Output Signals				
	Position	NA			
	Status Contacts	2			
	Alarm Relays	1			
	Area Classification	C: NON G: D:			
	Enclosure Rating	NEMA 4			
	Notes: Rotork AQ				

Manufacturer	Model No.			REVISION No.	Date	By
(Valve)		Spec By	ACN			
		Checked				
		Approved	GS			
		Date	FEB. 11, 2003			

Vendor To Complete all applicable information not given and submit with Shop Drawings

TITLE	DILLON CONSULTING PUMP ROOM TEMPERATURE SENSOR	**TEMPERATURE CONTROLLER** (THERMOSTAT)
CLIENT	THE GOVERNMENT OF NUNAVUT P W & S	
PROJECT	WATER WORKS AND WATER SUPPLY WATER TREATMENT PLANT - CONTRACT 1	TAG No.: TSL-01 / REVISION
PROJECT No.	02-0602	

SITE CONDITIONS

Indoor	X	Heated	X	
Outdoor		Unheated		

Remarks: LOW TEMPERATURE ALARM

SERVICE

Name:	AMBIENT		
Vessel Type	Pump Room		
	MIn.	Norm.	Max.
Pressure kPa			
Temperature Deg C	10	27	40

Thermowell

Type		
Process Connection		
Type		
Size		mm
Immersion Length		mm
Extension Fitting	YES	NO
Type		
Length		mm
Material	316 S.S.	
Notes:		

PRIMARY ELEMENT

Type	Platinum				
Sensor Type	THERMISTOR				
Lead Wire Configuration					
Remote	X	YES		No	
Connection					
Threaded			mm		
Length	By supplier				
Material					
Sheath	316 S.S.				
Lead Wires	Telfon-insulated, Nickel-coated, 22 ga. copper.				
Temperature Range	-29 to +116C				
Notes:					

OPTIONS

Calibrator		YES	X	NO
Mounting Bracket	X	YES		NO
316 S.S. Tag	X	YES		NO
Notes:				

TRANSMITTER

Type:	Single Input				
Power Supply	24			Vac	
Output	One relay output				
Isolated Output	X	YES		No	
Range					
Minimum	-40 C				
Maximum	60 C				
Zero Suppression					
Zero Elevation					
Display					
Type	Digital LCD				
Units	1C				
Range	-34 -60				
Accuracy	+/- 0.6 C				
Repeatability	0.05 %				
Approvals	CSA				
Area Classification	C: NON G:		D:		
Enclosure Rating	NEMA 4X				
Notes:					

CALIBRATION

Range	
20 mA	50 degrees C
0 Ma	0 Degrees C
Notes:	To be factory calibrated and calibration checked in the field.

NOTES:

1. Confirm all details and sizing before ordering.
2. Installation shall be in strict accordance with instrument mfg.'s instructions, particularly elevations.

Manufacturer	Model No.	Spec By	ACN	REVISION No.	Date	By
HONEYWELL	T775A1001	Checked				
	C7130A	Approved				
		Date	March 25, 2003			

Vendor To Complete all applicable information not given and submit with Shop Drawings

TITLE	**DILLON CONSULTING** TANK ROOM TEMPERATURE SENSOR	**TEMPERATURE CONTROLLER** (THERMOSTAT)	
CLIENT	THE GOVERNMENT OF NUNAVUT P W & S		
PROJECT	WATER WORKS AND WATER SUPPLY WATER TREATMENT PLANT - CONTRACT 1	TAG No.	REVISION
PROJECT No.	02-0602	TSL-02	

SITE CONDITIONS				
Indoor	X	Heated	X	Remarks: LOW TEMPERATURE ALARM
Outdoor		Unheated		

SERVICE

		Min.	Norm.	Max.
Name:		AMBIENT		
Vessel Type		Tank Room		
Pressure	kPa			
Temperature	Deg C	10	27	40

Thermowell

Type	Straight			
Process Connection				
Type	Treaded (NPT)			
Size	20	mm		
Immersion Length	1066	mm		
Extension Fitting	X	YES		NO
Type	Union and Nipple			
Length	64	mm		
Material	316 S.S.			
Notes:				

PRIMARY ELEMENT

Type	Platinum			
Sensor Type	THERMISTOR			
Lead Wire Configuration				
Remote	X	YES		No
Connection				
Threaded	mm			
Length	By supplier			
Material				
Sheath	316 S.S.			
Lead Wires	Telfon-insulated, Nickel-coated, 22 ga. copper.			
Temperature Range	-29 to +116C			
Notes:				

OPTIONS

Calibrator		YES	x	NO
Mounting Bracket	X	YES		NO
316 S.S. Tag	X	YES		NO
Notes:				

TRANSMITTER

Type:	Single Input			
Power Supply	24	Vac		
Output	One relay output			
Isolated Output	X	YES		No
Range				
Minimum	-40 C			
Maximum	60 C			
Zero Suppression				
Zero Elevation				
Display				
Type	Digital LCD			
Units	1C			
Range	-34 -60			
Accuracy	+/- 0.6 C			
Repeatability	0.05 %			
Approvals	CSA			
Area Classification	C: NON	G:	D:	
Enclosure Rating	NEMA 4X			
Notes:				

CALIBRATION

Range	
20 mA	50 Deg C
4 mA	0 Deg C
Notes:	To be factory calibrated and calibration checked in the field.

NOTES:

1. Confirm all details and sizing before ordering.
2. Installation shall be in strict accordance with instrument mfg.'s instructions, particularly elevations.

Manufacturer	Model No.			REVISION No.	Date	By
HONEYWELL	T775A1001	Spec By	ACN			
	C7130A	Checked				
		Approved				
		Date	March 25, 2003			

Vendor To Complete all applicable information not given and submit with Shop Drawings

File: @CELLPOINTER("filename"); J:\PROJECTS\DRAFT\020602\Electrical\I&C\Tsl-02.123

REV. 11/96

TITLE	DILLON CONSULTING GENERATOR ROOM TEMPERATURE SENSOR	**TEMPERATURE CONTROLLER** (THERMOSTAT)
CLIENT	THE GOVERNMENT OF NUNAVUT P W & S	
PROJECT	WATER WORKS AND WATER SUPPLY WATER TREATMENT PLANT - CONTRACT 1	TAG No. TSL/TSH-02 / REVISION
PROJECT No.	02-0602	

SITE CONDITIONS

Indoor	X	Heated	X	
Outdoor		Unheated		

Remarks: LOW AND HIGH TEMPERATURE ALARM

SERVICE

		Min.	Norm.	Max.
Name:		Ambient		
Vessel Type		Generator Room		
Pressure	kPa			
Temperature	Deg C	10	27	40

Thermowell

Type		Straight		
Process Connection				
Type		Treaded (NPT)		
Size		20		mm
Immersion Length		1066		mm
Extension Fitting	X	YES		NO
Type		Union and Nipple		
Length		64		mm
Material		316 S.S.		
Notes:				

PRIMARY ELEMENT

Type		Platinum		
Sensor Type		Thermistor		
Lead Wire Configuration				
Remote	X	YES		No
Connection				
Threaded				mm
Length		By supplier		
Material				
Sheath		316 S.S.		
Lead Wires		Telfon-insulated, Nickel-coated, 22 ga. copper.		
Temperature Range		-29 to +116		Deg C
Notes:				

OPTIONS

Calibrator		YES	X	NO
Mounting Bracket	X	YES		NO
316 S.S. Tag	X	YES		NO
Notes:				

TRANSMITTER

Type:		Two Input		
Power Supply		24		VAC
Output		2 Relay Output		
Isolated Output	X	YES		No
Range				
Minimum		-40		?uo?0uC
Maximum		60		?uo?0uC
Zero Suppression				
Zero Elevation				
Display				
Type		Digital LCD		
Units		1F or 1C		
Range		-34 to 60 C		
Accuracy		+/- 0.6C		
Repeatability				
Approvals		CSA		
Area Classification		C: NON G:		D:
Enclosure Rating		NEMA 4X		
Notes:		Provide 24CAV power		

CALIBRATION

Range			
20	mA	50	Deg C
4	mA	0	Deg C
Notes:		To be factory calibrated and calibration checked in the field.	

NOTES:

1. Confirm all details and sizing before ordering.
2. Installation shall be in strict accordance with instrument mfg.'s instructions, particularly elevations.

Manufacturer	Model No.	Spec By	ACN	REVISION No.	Date	By
HONEYWELL	T775B 1000	Checked				
	C7130A	Approved				
		Date	March 25, 2003			

Vendor To Complete all applicable information not given and submit with Shop Drawings

Contents

PART 1 GENERAL

1.1 General

.1 This section covers items common to all sections of Division 15000.

.2 Only qualified journeymen and their apprentices are permitted to do work on this project. Follow the requirements of the current "Apprenticeship, Trade and Occupations Certification Act" with regards to the number of apprentices permitted per journeyman tradesperson. Provide resumes of every journeyman to work on this project for review prior to construction.

1.2 Equipment Installation

.1 Unions or flanges: provide for ease of maintenance and disassembly.

.2 Space for servicing, disassembly, and removal of equipment and components: provide as recommended by manufacturer or as indicated.

.3 Equipment drains: pipe to floor drains.

.4 Install equipment, rectangular cleanouts and similar items parallel to or perpendicular to building lines.

1.3 Equipment List

.1 Complete list of equipment and materials to be used on this project and forming part of tender documents by adding manufacturer's name, model number and details of materials, and submit for approval.

.2 Submit for approval at time of tender..

1.4 Anchor Bolts and Templates

.1 Supply anchor bolts and templates for installation by other divisions.

1.5 Trial Usage

.1 Engineer Owner may use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

.2 Trial usage to apply to following equipment and systems:

.1 Pumps

.2 All control systems

.3 All air handling systems

.4 Hydronic heating systems

.5 Boilers

1.6 Protection of Openings

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

1.7 Equipment Supports

.1 +Standard of acceptance for all hanger components shall be Huntl or approved equal.

1.8 Pipe Sleeves

.1 Pipe sleeves: at points where pipes pass through masonry, concrete or fire rated assemblies and as indicated.

.2 Schedule 40 stainless steel pipe.

.3 Sizes: minimum 6 mm (1/4") clearance all around, between sleeve and uninsulated pipe or between sleeve and insulation.

.4 Terminate sleeves flush with surface of of concrete and masonry walls, concrete floors on grade and 25 mm (1") above other floors.

.5 Fill voids around pipes.

.6 Where sleeves pass through walls or floors, provide space for firestopping:

.1 Where pipes/ducts pass through fire rated walls, floors and partitions, maintain fire rating integrity.

.7 Ensure no contact between copper tube or pip and ferrous sleeve.

1.9 Excutcheons

.1 Provide on pipes under 100 mm in size passing through walls, partitions, floors and ceilings.

.2 Outside diameter to cover opening or sleeve.

.3 Inside diameter to fit around finished pipe.

.4 Caulk between excutcheon and walls for exterior applications with silicone sealant.

.5 Standard of Acceptance: Grinnel.

1.10 Testing

.1 Give five (5) days written notice of date for tests.

.2 Insulate or conceal work (including welds) only after testing has been completed and approved by the Engineer.

.3 Engineer or Public works Representative reserves the right to be present during testing.

.4 The Contractor shall bear costs including retesting and making good.

.5 Hydrostatic Pressure Test for HDPE Pipe:

.1 Prior to test, isolate all equipment or other parts which are not designed to withstand test pressures or test medium.

.2 See Section 15011 for test procedure on HDPE pipe.

.6 Hydronic piping systems: hydraulically test at 1-1/2 times system operating pressure or minimum 860 kPa, whichever is greater.

.7 Fuel-oil piping systems: test to CAN/SCA-B139-M91 "Installation Code for Oil Burning Equipment" and requirements of authorities having jurisdiction.

.8 Drainage, waste and vent piping: test to National Building Code and authorities having jurisdiction.

.9 Prior to tests, isolate all equipment or other parts which are not designed to withstand test pressures or test medium.

1.11 Painting

.1 To Section 13950 – Painting and Finishing.

.2 Apply at least one coat of corrosion resistant primer paint to ferrous supports and site fabricated work to protect against rusting. Finish paint in accordance with Section 09900.

.3 Prime and touch up marred finished paintwork to match original.

.4 Restore to new condition, finishes which have been damaged too extensively to be merely primed and touched up.

.5 Mechanical piping to be painted to "Standard Colour and Identification Schedule". Northwest Territories Public Works and Highways No. 15190. 101-1 issue 2 dated 01/06/88

.6 All painting is to be performed by a qualified journeyman painter to the requirements of Section 09900.

1.12 Flushing and Disinfecting Water Lines

.1 See section 13950

1.13 Access Doors

.1 Supply access doors to concealed mechanical equipment for operating, inspecting, adjusting and servicing.

.2 Installation:

.1 Locate so that concealed items are accessible.

.2 Locate sot that hand or body entry (as applicable) is achieved.

1.14 Drain Valves

.1 Locate at low points and at section isolating valves unless otherwise specified.

.2 Minimum NPS 19 unless otherwise specified: bronze, with hose end male thread and complete with cap and chain.

1.15 Dielectric Couplings

.1 General:

.1 To be compatible with and to suit pressure rating of piping system.

.2 Where pipes of dissimilar metals are joined.

.2 Pipes 50 mm and under: Use isolating unions.

.3 Pipes 63 mm and over: Use isolating flanges.

1.16 Spare Parts

.1 Furnish spare parts in accordance with Section 17000 – Spare Parts:

1.17 Demonstration and Operating and Maintenance Instructions

.1 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.

.2 Where specified elsewhere in Division 15, manufacturers to provide demonstrations and instructions.

.3 Use operation and maintenance manual, as-built drawings, audio visual aids, etc. as part of instruction materials.

.4 Instruction duration time requirements as specified in appropriate sections.

.5 Where deemed necessary, Engineer may record these demonstrations on video tape for future reference.

1.18 Shop Drawings and Product Data

.1 Submit shop drawings and product data in accordance with Section 01340 – Shop Drawings, Samples and Mock-Ups.

1.19 Cleaning

.1 Maintain mechanical building systems in clean condition to Engineer's satisfaction.

.2 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

.3 In preparation for final acceptance, clean and refurbish all equipment and leave in operating condition.

1.20 Record Drawings

.1 Maintain record drawing set as outline in section 01005 – General Instructions.

1.21 Identification of Equipment

.1 Manufacturer's nameplates:

.1 provide factory supplied and installed nameplate on each piece of equipment.

.2 Provide registration/approval nameplates (i.e. CSA, ULC, ASME) in accordance with requirements of authorities having jurisdiction.

1.22 Guarantee

.1 Furnish Owner with manufacturer's guarantees for all equipment.

PART 2 PRODUCTS

2.1 Not Used

.1 Not Used.

PART 3 EXECUTION

3.1 Not Used

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 Related Work

Section 02315 Excavating, Trenching and Backfilling

1.2 References

.1 ASTMC518- 91, Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

.2 ASTMD638M- 89, (D638-90), Test Method for Tensile Properties of Plastics.

.3 ASTMD1248- 84(1989), Specification for Polyethylene Plastics Molding and Extrusion Materials.

.4 ASTMD1505- 90, Test Method for Density of Plastics by the Density-Gradient Technique.

.5 ASTMD1621- 73(1979), Test Method for Compressive Properties of Rigid Cellular Plastics.

.6 ASTMD1622- 88, Test Method for Apparent Density of Rigid Cellular Plastics.

.7 ASTMD2657- 90, Practice for Heat Joining of Polyolefin Pipe and Fittings.

.8 ASTMD2837- 90, Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.

.9 ASTMD2856- 87, Test Method for Open Cell Content of Rigid Cellular Plastics by the air Pycnometer.

.10 ASTMF714- 90, Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

.11 ASTMG14- 83, Test Method for Impact Resistance of Pipeline Coatings (Falling Weight Test).

.12 CAN/CSA-B137.1- M89, Polyethylene Pipe, Tubing and Fittings for Cold Water Pressure Services.

1.3 Product Data

.1 Submit product data in accordance with Section 01330 - Submittal Procedures.

1.4 Material Certification

.1 At least 4 weeks prior to commencing work submit manufacturer's test data and certification that materials meet requirements of this section.

.2 Record Drawings

.3 Provide data necessary to produce record drawings on project completion in accordance with the following requirements:

.1 Give details of pipe material, location of fittings, maintenance and operating instructions.

PART 2 PRODUCTS

2.1 Carrier Core Pipe

.1 Polyethylene pressure pipes to CSAB137.1 ASTMF714:

.1 Type PE3408 for ASTMF714, DR 17.

.2 Pressure rating:

.1 DR 17 for ASTMF714.

.2 Polyethylene to polyethylene joints: thermal butt fusion joined to ASTMD2657.

.3 Polyethylene fittings: to AWWA C906 for pipe sizes NPS4 to NPS63.

2.2 Factory Applied Insulation

.1 Pipes to be cleaned of surface dust or dirt and treated if necessary to ensure positive bond of foam to entire pipe surface.

.2 Material: rigid polyurethane foam factory applied.

.3 Insulation thickness: 50 mm.

.4 Density: to ASTMD1622, 0.032 to 0.048g/cm^3.

.5 Closed cell content: to ASTMD2856, 90 % minimum.

.6 Water absorption: to ASTMD2842, 4.0 g/1000 cm^3, maximum 4.25% by volume.

.7 Compressive strength: to ASTMD1621, up to 240 kPa.

.8 Thermal conductivity: to ASTMC518, 0.022 to 4 W/m C°.

.9 Service Temperature: minus 45°C to plus 120°C.

.10 Centering of pipe within insulation: no more than plus or minus 6mm off center.

.11 Protect insulation on both ends of pipe from moisture and sunlight by 3mm thick continuous concentration of black asphalt mastic compound.

2.3 Outer Jacket for Buried Applications

.1 Material: factory applied high-density polyethylene jacket, black in colour (UV inhibited).

.2 Density of HDPE jacket: to ASTMD1505, 0.940 g/cm^3 minimum.

.3 Sealant: synthetic polymers or modified rubber mastic.

.4 Jacket thickness: 1.14 mm minimum.

.5 Elongation: to ASTMD638, 400 % maximum 6 month test.

.6 Service temperature: minus 45 °C to plus 120 °C maximum.

.7 Water vapour transmission rate: 3 g/m^2/24 h average.

.8 Tensile strength: 25 kg/cm width minimum.

.9 Impact strength: to ASTMG14, 7.79 N/m at minus 40 °C minimum.

2.4 Insulated Pipe Joints for Buried Applications

.1 Material: rigid polyurethane half shells with heat shrink sleeves and mastic sealant to provide moisture-proof seal.

.2 Pre-formed rigid polyurethane halves, as indicated, with properties as described in paragraph 2.2.

.3 Heat shrink sleeves: adhesive coated cross-linked polyethylene sleeve.

.4 Sleeves: to cover entire exposed joint length plus overlap of about 100 mm of pipe coating on either side.

.5 Waterproofing mastic sealant for coating exposed ends of insulation after field cutting or trimming has been carried out: as described in paragraph 2.7.3.

2.5 Insulation Kits for Fittings

.1 Material: rigid urethane foam with fully bonded FRP glass reinforced polyester or polymer protective coating on all exterior surfaces including ends. Kits to be supplied complete with silicone caulking for seams, stainless steel attachment straps and clips, and heat shrink sleeves to seal between pipe and insulation cover.

.2 Rigid urethane foam insulation.

.1 Density: to ASTMD1622, 0.03 g/cm^3 minimum.

.2 Compressive strength: to ASTMD1621, 137 kPa minimum.

.3 Closed cell content: 92 % minimum.

.4 Water absorption: to ASTMD2842, 0.02g/m².

.5 K Factor: to ASTMC518, 0.02 W/m°C maximum.

.3 FRP coating.

.1 Glass reinforced polyester fully bonded to insulation.

.2 Laminating resin black in colour, UV inhibited.

.3 Thickness: 2.54 mm minimum.

.4 Exterior surface: resin-rich hot coat of 0.25 mm minimum thickness.

.4 Polymer coating: to ASTMD3574.

.1 Two component high density polyurethane coating, black in colour.

.2 Density: 1170 kg/m 2 .

.3 Abrasion: durometer D scale: 60.

.4 Tensile strength: 11,000 kPa minimum.

.5 Tear strength: 26.5 N/mm minimum.

2.6 Insulation Accessories

.1 Heat shrink tape for sealing insulation half shells against moisture adaptable to flexible installations.

.1 Crosslinked polyolefin backing with a hot melt adhesive coating.

.2 Backing thickness: 0.35 mm minimum.

.3 Adhesive thickness: 0.51 mm.

.4 Service temperature: minus 18 to plus 20 °C maximum.

.5 Tensile strength: 16 N/mm.

.2 High density polyethylene tape for minor repair of the outer jacket or completion of straight insulation joints in field where irregular surfaces are not involved.

.1 Adhesive backed tape to be heated to approximately 50°C prior to installation.

.2 Backing thickness: 0.50 mm average.

.3 Adhesive thickness: 0.127 mm average.

.4 Service temperature: minus 34 to plus 82 °C.

.5 Tensile strength: 10 N/mm.

.6 Colour: black.

.3 Asphalt mastic vapour barrier coating to waterproof exterior surfaces of half shells or sprayed in place foam.

.1 Colour: black.

.2 Solids by volume: 62%.