	DILLON C	ONSUL	TING												
TITLE	TREATED V	VATER D	DISSOLVED	OXYGE	N					DISSOLVED	THI ORTHE				
CLIENT	THE GOVER							1							
						11001	11	1	Al	NALYZER TRA	ANSMITTE	:K			
PROJECT	WATER	WUR	KS AND	VVAI	EK S	UPPL	_ Y								
	WATER TRE	EATMEN	T PLANT - C	CONTRA	CT 1			1	TAG No.			P	REVISIO	V	
PROJECT No.	02-0602								AIT-1						
SITE	Indoor	X	Heated	2				Remarks: Ch	LORINE M	ETER					
CONDITIONS	Outdoor		Unheated	i l	5-			1,000,100,000,000				_			
	Name:	100.0		W	ATER					Calibratio	on Kit	X	YES		NO
	Temperature									Mounting 8	Bracket	X	YES	100	NO
	Minimur	n		0			?uo?0uC		31	6 S.S. Tag		X	YES		NO
	Maximu	m		30			?uo?0uC		E	Ball Float			YES	X	NO
	Pressure								Self	Clean'g Pkg.		X	YES		NO
SERVICE	Minimur	n		-	mos.		kPa	OPTIONS		Type			Water	X	Air
	Maximu	m		Pri	ess.		kPa	1	Con	trol Heater		X	YES		NO
	Free and total	d chlorin	ie				1/	1	Spare	Membranes		X	YES		NO
	Minimur	n		0			mg/I			Quantity		- 7	3 per Elei	nent	
	Maximu			9.0)		mg/I		Eler	nent Cable		-	Field Veri	y	Meters
	Suspended S	olids													
	Minimun	n					mg/I								
	Maximur	m			-		mg/l								
	Туре			Me	mbrane					Range					
	Membrane Ty			-	perometri	ic				20 mA			15		mg/l
	Replaceable (Cartridge		X	YES		No	CALIBRATION		4 mA		1	0		mg/l
	Material							ĮĮ.				1			
	Measurin	-			ld/Sliver										
	Reference	_	ode	-	ver					Notes:	To be factor			-	
	Wetted	Parts		PV	C						calibration o	hec	ked in th	s field	12.11
ELEMENT	Temp Compe	nsation		X	YES		No	and the second							
	Calibration M	ethod		Air				NOTES:							
	Process Conn	ection			2.752			1. Confirm	all details	and sizing before	e ordering.				
	Size			50	mm		Thread	Self clea	ning kit sh	all include air co	mpressor, co	ontr	ols, tubin	g,	
	Type			X	Subm.		Float	fittings a	and all com	ponents for a co	omplete syst	em.			
	Mounting	g		Pai	nel										
	Notes:														
	Power Supply			12			VAC								
	Output			4-2			mA								
	Isolated Outp	ut		X	YES		No								
	Range		23.0												
	Adjustab			X	YES		No								
	Minimum			0			mg/l								
	Maximur			20			mg/l								
	Relay Contact	S		X	YES		· No								
	Quantity			3											
	Rating			5 a	mp@ 12	OVAC									
TRANSMITTER	Display														
	Type				ital LCD										
	Units			mg											
	Range				0 ppm										
	Calibration			_	Manual	X	Self								
	Resolution			0.0	01 ppm										
	Mounting			_	ndrail										
	Approvals			CS											
	Area Classifica	ition	1999	C:	NON C		D: *								
	Enclosure Rat				NEMA	4X				-					
4	Notes:											VIS			
Manufac	turer			del No.			Spec By	ACN		No.		Dat	e		Ву
OSEMOUNT		_	-011024				Checked								
		499ACL	.0154	SENSOR			Approved								
		1					Date	MARCH	21 2003	II .					

in the second second	DILLON CO	ONSUL	TING			1 - 115										
TITLE	TREATED W	ATER T	TIRRIDITY								TURBI	DITY				
0.0000000000000000000000000000000000000				// IT D	Was								ATTTED			
CLIENT	THE GOVER					1001	1/			An	IALYZER TI	KANSI	TITLER			
PROJECT	WATER	WOR	KS ANL) VV	ATER SU	JPPL	_Y	-								
	WATER TRE	ATMEN	T PLANT -	CONT	RACT 1				TA	G No.				REVISIO	N	
PROJECT No.	02-0602								A	IT-2						
SITE	Indoor	X	Heated		X			Remarks:	TURB	IDITY M	ETER			176		
CONDITIONS	Outdoor		Unheate	d										22.5		
	Name:				WATER						Calibrat	tion Kit	X	YES		NO
	Temperature		H-1 1155000		100-100						Mounting	Bracke	t X	YES	1	NO:
	Minimum	1			0		?uo?0uC			316	S.S. Tag		X	YES		NO
	Maximur	n			30		?uo?0uC			В	all Float			YES	X	NO
	Pressure	000								Self C	lean'g Pkg.		X	YES		NO
SERVICE	Minimum				Atmos.		kPa	OPTIONS			Type			Water	X	Air
	Maximun	n		_	Press.		kPa				rol Heater		X	YES		NO
	Turbidity			-				-		Spare	Membranes		X	YES		NO
	Minimum			-			mg/l	-		-	Quantity	У	_	3 per Ele		
10	Maximum			-		_	mg/l	-		Elen	ent Cable		_	Field Ver	ify	Meters
	Suspended So							-		-			-		-	
	Minimum			-		_	mg/l	-		- 1		_	-		-	
	Maximun	1		-	light engage	_	mg/l	-			10.000					
	Type Membrane Ty	ma		-	light sensor	-		ii ii			Range 20 m	Α.		15		ma/l
	Replaceable C			X	YES	_	No	CALIBRAT	TON		4 m			0		mg/l
	Material	al a lage		1 ^ 1	ILS		140	CALIBRAI	1014	- 9	4 111	A		U		mg/l
	Measurin	a Flectr	nde		Gold/Sliver			1		9		-			_	
	Reference	_		-	Sliver			1			Notes:	To be	factory	alibrated	and	
	Wetted F			_	PVC			1			10103.	-		cked in th	-	
ELEMENT	Temp Comper			X	YES		No					Donar	OCIOIT DE IC	GQG.HT.GT	C Jaja	***
LLLPILMI	Calibration Me	-		-	Air		INO	NOTES:								
	Process Conne			-	All	_			onfirm all	dotails a	nd sizing befo	ore orde	ring			
	Size		1000		50 mm		Thread	1			Il include air o		-	rale tuhin	0.0	
	Type			X	Subm.	T	Float	11			onents for a				9,	
	Mounting	1		-	Handrail Kit	-	1.000		turigo arro	an comp	orients for a	compic	2/3(6)11			
	Notes:	Hilling														
	Power Supply				120		VAC	i								
	Output				4-20		mA									
	Isolated Outpu	ut		X	YES		No									
	Range															
	Adjustabl	e		X	YES		No									
	Minimum			(0	-1123	mg/l									
	Maximum				15		mg/l									
	Relay Contacts	S		X	YES		· No									
	Quantity				3											
TDANCHITTED	Rating				5 amp@ 120	VAC										
TRANSMITTER	Display															
	Туре				Digital LCD											
	Units			_	mg/l											
	Range			- (0-15	Tu	0.16									
	Calibration				Manual	X	Self									
	Accuracy				0.10 % of FS	20	1									
	Approvals				Handrail CSA											
	Area Classifica	tion		-	C: NON G		D: *									
	Enclosure Rati				NEMA 4		U.									
	Notes:				HENA N								DE//I	MOIZ		
Manufact			Mc	odel No	0.		Spec By	AC	CN		No		REVI:			Ву
ROSEMOUNT		T-1054	-				Checked				140	-	00		-	51
PROBE		TFTM2					Approved	GS	5							
				_			pp. orcu	- 0.							_	

	DILLON C	ONSUL	TING											
TITLE	PUMP ROOF	M TEMP	ERATURE S	ENSOR				TEI	MPERATURE	CONTRO	LLEF	3		
CLIENT	THE GOVER	NMENT	OF NUNAV	UTPW	& S				(THERM	IOSTAT)				
			KS AND			DIV	1							
PROJECT	WATER TRE					1 -1	-	TAG No.				CACTO	N/	
DO O I COT III		LAIME	II PLANT -	LONTRA	CII						H	REVISIO	N	
PROJECT No.	02-0602	-					_	TSL-01					-	
SITE	Indoor	X	Heated	X			Remarks:	LOW TEMPE	RATURE ALARI	1				
CONDITIONS	Outdoor		Unheated								_			
	Name:			AME	BIENT				Type					
	Vessel Type			Pur	p Room				Process Con	nection			23300	
				MIn.	Norm.	Max.			Type					
	Pressure		kPa					•	Size					mm
	Temperature	7	?uo?0uC	10	27	40	Thermov	veli	Immersion L	enath	1			mm
	ranparacara				-		-		Extension Fi	-		YES		NO
SERVICE		_			1		-		Type	cury	+	100		110
SERVICE	-		-				-1		Length		-			mm
											-	21666		mm
							-		Material	-	-	316 S.S.		
							_							
											<u> </u>			
									Notes:					
	Type			Plati	num				Calib	rator	T	YES	X	NO
	Sensor Type			THE	RMISTOR				Mounting	Bracket	X	YES		NO
	Lead Wire Co	nfigurat	ion				7	3:	6 S.S. Tag		X	YES		NO
	Remote			X	YES	No								
	Connection		-	~	100	110					-			
PRIMARY	Threade	4				mm	-				-		_	
		u			By supplier		OPTIONS	=			-		_	
ELEMENT	Length				by supplier		OF HORS	•			-			
	Material				244.00		-1				-			
	Sheath				316 S.S.		_				-			
	Lead Wi	res			insulated, I		1		1		-			
				coated	d, 22 ga. co	opper.								
	Temperature	Range		-2	9 to +1160	C							100	
	Notes:								Notes:					
	Type:			Sing	le Input				Range		T			
	Power Supply			24		Vac			20 m	A		50 c	legre	es C
	Output				relay outpu		CALIBRA	TION	0 M			0 Deg	-	
	Isolated Outp	u et		X	YES	No	-				\neg			_
		rut .		^	100	140	-		-		-			
	Range			-40 (^				Notes:	To be far	****	i tile i said i d	and:	
	Minimun						-1		Notes.	1 - 1 × 1 × 1 × 1 × 1 × 1		24242424242		
	Maximur			60 (calibratio	H: Diec	Ked in th	e res	Average
	Zero Suppres						_							
	Zero Elevation	n		- Program			NOTES:							
							_	Confirm all details			-			
TRANSMITTER	(-1					1,000	2.	Installation shall b	e in strict acco	ordance with	h instn	ument		
	Display							mfg.'s instructions	, particularly e	levations.				
	Type			Digit	al LCD									
	Units			1C										
	Range			-34 -	-60		-							
	Accuracy				0.6 C		-							
				0.05		-	-1							
	Repeatability				70									
	Approvals			CSA		-								
	Area Classific			C:	NON G:	D:								
	Enclosure Rat	ing			NEMA 4X		_							
	Notes:	14:11									REVIS			
Manufacturer			Mo	del No.		Spec By	У	ACN	No),	Dat	te		Ву
HONEYWELL		T775A	1001		S.— S.	Checke						1-877		
		C7130	A			Approv	ed							
						Date		March 25, 2003						

TITLE CLIENT PROJECT	FLOW FRO	ONSULTING M STORAGE TANK RNMENT OF NUNA WORKS AND	JPPLY		MOTORIZEI VALVE	CONTR		ALVE			
P. C.		EATMENT PLANT -	CONTRACT 1		N 107.5	AG No.			REVISI	NC	
PROJECT No.	02-0602	T	Tarl	-		TP - MV7	WATER ELE	2144	0		
CONDITIONS	Indoor	X Heated	X		Remarks: CON	TROL EFFLUENT V	VATER FLO	JW			
CONDITIONS	Outdoor Name:	Unheated	Water	-	1			_			
	Flowdata		Minimu	m I	Average	p	eek		Liltin	nate Per	ak .
	Flow	(l/s)	0	-	20		CCN	-	Oldi	40	an.
	Inlet Pr		0		70	-	89			689	
SERVICE	Temper	The state of the s			4		10			*	
DERTHOL	Tompo	()									
	Specific	Gravity	1.0		1.0					1.0	
	Line Size		100	mm				1			
	Line Material		GALVANIZED	SIEEL						-	
	Туре		Butterfly	-	1	Calibra	itor	T	YES	TXT	NO
	Size		100	mm	1	316 S.S. Tag	101	X	YES	1	NO
	End Connect	ion	X Flange	Thread	The second comment of	uator Sett"g Tool		1	YES	X	NO
	Rating		125# ANSI B16								
BODY	Material					S					
	Body		Cast Iron	Rev.1							
	Seat		Buna N			Range		T			
	Disc		C.I. w/ Nii-Q	hrome		Limits		- 2	(pen	
	Shaft		316 SS		CALIBRATION	Limits			C	losed	
	Pressure Rat		1034	kPa		Notes:			in the facto	ry, and	
	Notes:	Pratt Model 2FII					and thec	ked in	the field.		
	Type		Electric								
	Travel		90	Deg.	NOTES:						
	Power		120 24	VAC		details and sizing					
	Control Signal Control Switch		X Remote			cation section 131		for valv	ve spec.		
	Input torque	nes	X Remote	X Local		EFFLUENT WATER BE FULLY OPEN B		AIDT ABI	N/OR THE		
	Speed			rpm	START	BE FULLY UPEN B	EFURE IV	VPI AN	D/OR TWP2		
	Shaft			1 pin	-	ES AFTER TWP1 A	אד פרו/חוו	ופיז כדור	DDDED		
	Size			mm	1117 02051	LO ALTER THE A	10,010 111	1 2 310	N' I'LD		
	Material										
	Material				1						
Actuator	Housing		Aluminum		1						
	Piston		Cast Aluminur	m							
	Handwheel C	lverride	X Yes	No							
	Mounting		Direct								
	Folomatic Co		Yes	X No							
	Output Signa										
	Position		NA								
	Status C		2	-							
	Alarm R		1	-	1						
	Area Classific		C: NON G:		-						
	Enclosure Rai Notes:	Rotork AQ	NEMA 4					p.e	EVISION		-
Manufac			odel No.	Spec By	JLACN		No.	K	Date	T-	Dv
Fratt	(Valve)	Model 2FII	AIGI NO.	Checked	AUI		140.	-	Date	-	Ву
Rotork	(Actuator)	Model AQ		Approved	I GS		-			-	
	(-100101)	- issue my		Date	. 03	102		_		-	

Date

FEB. 11, 2003

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TITLE	DILLON CO TRUCK FILL						MOTORIZED CON	TROL V	ALVE		
CLIENT		MENT OF NUNA	VUTPW&S		1		VALVE & ACT	UATOR			
PROJECT	WATER	WORKS AND	WATER SL	JPPLY	1						
/ NOSCCI		ATMENT PLANT -				TAG	No.	100.00	REVISI	NC	
PROJECT No.	02-0602		11.7		1	GHWTF	P-MV8		0		
SITE	Indoor	X Heated	IXI		Remarks:						
CONDITIONS	Outdoor	Unheated				1					
	Name:		Water								
	Flowdata		Minimu	m	Average		Peek		Ultin	nate Pe	ak
	Flow	(I/s)	0		20					40	
	Inlet Pres		0		70		689			689	
SERVICE	Temperat	ture (kPa. C.)	0		4		10				
	12										
	Specific G	Gravity	1.0		1.0					1.0	
						78.00					
		10.11									
	Line Size		100	mm							70-1
	Line Material		GALVANIZED	STEEL						0,500	
	Type		Butterfly				Calibrator		YES	X	NO
	Size		100	mm		31	6 S.S. Tag	X	YES		NO
	End Connection	n	X Flange	Thread	OPTIONS	Actuat	or Sett"g Tool		YES	X	NO
	Rating		125# ANSI B16	.1 AWWA							4
BODY	Material										
	Body		Cast Iren	n Rev.1			1000				
	Seat		Buna f	V			Range				
	Disc		C.I. w/ Nii-C	hrome			Limits			Open	0.1000
	Shaft		316 SS		CALIBRATIO	N	Limits		C	losed	
	Pressure Rating	g	1034	kPa					d in the facti	ary, and	4
	Notes:	Pratt Model 2FII			<u> </u>		and d	necked in	the field.		
	Туре		Electric			1-1-1-1					
	Travel		90	Deg.	NOTES:						
	Power		120	VAC			etails and sizing before				
	Control Signal		24	VDC	2. See s	pecificat	tion section 13110 Valv	es for va	Ive spec.		
	Control Switch	es	X Remote	X Local							
	Input torque										
	Speed			rpm							
	Shaft										
	Size			mm	-						
	Material				4						
	Material	3			-						
Actuator	Housing		Aluminum								
	Piston		Cast Aluminu		-						
	Handwheel Ov	erride	X Yes	No							
	Mounting		Direct		-						
	Folomatic Cont		Yes	X No	-						
	Output Signals										
	Position		NA		1						
	Status Co		2		-						
	Alarm Rel		1		-						
	Area Classificat		C: NON G		4						
	Enclosure Ratin		NEMA ·	4	-				en maren	-	
	Notes:	Rotork AQ				-		F	REVISION	-	
Manufact			odel No.	Spec By			No.		Date	-	Ву
Pratt	1	Model 2FII		Checker			2 11			-	
Rotork	(Actuator)	Model AQ		Approve				-		-	
	rk (Actuator) Model AQ			Date	FEB.	11, 2003	3			1	

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	DILLON C	ONSULT	NG			-		1						
TITLE	TRUCK FIL	L 2 VALVE	Ē						1	MOTORIZED COM	TROL V	ALVE		
CLIENT	THE GOVE	RNMENT C	F NUNA	VUTPW8	S					VALVE & AC	TUATOR			
PROJECT	WATER	WORK	SAND	WATE	RSU	PPL	Y							
161	WATER TR	EATMENT	PLANT -	CONTRAC	Γ1				TAG N	lo.		REVISI	ON	
PROJECT No.	02-0602		E ALEGANIA.						GHWTP	-MV9	M.	0		
SITE	Indoor	X	Heated	X				Remarks:						
CONDITIONS	Outdoor		Unheated	d \square										
	Name:			Water										
	Flowdata				Minimun	n		Averag	e	Peek		Ultin	nate Pe	ak
	Flow		(l/s)		0	-0.97		20					20	
	Inlet Pro	essure	(kPa)	9	0			70		689			689	
SERVICE	Temper	ature	(kPa. C.)		0			4		10			*	
				V										
	Specific	Gravity		1200	1.0			1.0					1.0	
				A 20-20-200					0.00					
													23-701-1	-0.000.000
	Line Size			100		mm								
	Line Material			GALVA	NIZED	STEEL								
											-			
	Type			Butter						Calibrator	1	YES	X	NO
	Size		_	VI n	100		mm	OPTTONG		S.S. Tag	X	YES	-	NO
	End Connecti	ion			ange	_	Thread	OPTIONS	Actuato	r Sett"g Tool		YES	X	NO
nany.	Rating			125# AN	SI B16.	1 AWW	VA.							
BODY	Material			-			D1	1						
	Body				st Iron	_	Rev.1		-	2				
	Seat				Buna N			-	- 61	Range	-			
	Disc				/ Nii-Ch 6 SS	irome		CALVEDATE	ON	Limits	-		Open	
	Shaft	ng.			034	_	kPa	CALIBRATIO		Limits	- Maria Nation		losed	100000
	Pressure Rati	Pratt: Mod	Macre	-1-1-1-1-1-1-1-1	J34	1000000	кРа			4242424	*********	in the facto	ory, and	
	Notes:	Pratt-Mod	er2r.11; ; ;	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)		.000000	0000000		-	Jano c	hecked in	the hela.::	0000	
	Type		_	90	ctric		Deg.	NOTES:						
	Power			120			VAC		ofirm all dat	ails and sizing before	ordarina			
	Control Signa	1		24			VDC			on section 13110 Val	-	to cooc		
	Control Switc			-	note	-	Local	2. 300	specificati	NI SCCOOL 13110 AGI	ves for var	ve sper		
	Input torque	1163		A NE	INCE	1 ^ 1	Lucai							
	Speed						rpm							
	Shaft				-	-	pin							
	Size					-	mm							
	Material													
	Material			-										
Actuator	Housing			Alumin	um	_								
	Piston			Cast A	uminun	n								
	Handwheel O	verride		X Y	es	TI	No							
	Mounting			Direct			-							
	Folomatic Cor	ntroller			es	X	No							
	Output Signal	s												
	Position	18-17 Turn No.		NA										
	Status C	ontacts	SESTIONS:	2										
	Alarm Re	elays		1										
	Area Classifica	ation		C: N	ON G:		D:							
	Enclosure Rat	ing		1	EMA 4					M2.770.27				
	Notes:	Rotork AQ									RI	EVISION		
Manufac	turer		The second second second second	idel No.		Is	рес Ву	ACN	1	No.	1	Date	T	Ву
Pratt	(Valve)	Model 2FI	I	-		-	Checked					20 70 70 1		
Rotork	(Actuator)	Model AQ				A	Approved	GS	Di Jennes			Nat (5)-4-5-0:537		
	(record) rissering					I	Date	FFB	. 11, 2003					

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TITLE CLIENT PROJECT	TRUCK FILL DRAIN THE GOVERNMENT WATER WORK WATER TREATMENT	VALVE OF NUNAV	WATER SU	PPLY	TAG	SOLENOID	CONTRO	AV JC	LVE REVISIO	ON	
PROJECT No.	02-0602	LONITI	CONTIONE			TP-SV1			0		
SITE	Indoor X	Heated	I X I		Remarks:						
CONDITIONS	Outdoor	Unheated	_				Charles and	015			
	Name:		Water								
	Flowdata		Minimun	n	Average	F	eek		Ultin	nate Per	ak
	Flow	(l/s)	0							20	-
	Inlet Pressure	(kPa)	0		70		589			689	
SERVICE	Temperature	(kPa.C.)	0		4		10				
	Specific Gravity		1.0		1.0					1.0	
			V commence and								
										g== 70	0-30-70
	Line Size		??	mm				-57-73			
	Line Material		GALVANIZED	STEEL		- A					
	Type		Butterfly			Calibra	ator		YES	X	NO
	Size			mm	3	16 S.S. Tag		X	YES		NO
	End Connection		X Flange	Thread	OPTIONS Actua	tor Sett'g Tool		-	YES	X	NO
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BODY	Material										
	Body		Cast Iron	Rev.1							
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	Control Switches		X Remote	X Local	3. DRAIN WAT	ER IN TRUCK FI	LL ARMS T	O SUM	P		
	Input torque										
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	Handwheel Override		X Yes	No							
	Mounting		Direct		1						
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	DILLON C	ONSUL	TING												
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CONDITIONS	Outdoor		Unheated	1	1										
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SERVICE										Type		1			
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	Sensor Type			THE	RMISTOR		_			Mounting	Bracket	X	YES	_	NO
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	Remote			X	YES	No									
	Connection														
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	DILLON	CONSUL	TING											
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	Lead Wire Co	onfigurati	on	-	1 ma	-	-1	316	S.S. Tag		X	YES		NO
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Vendor To Complete all applicable information not given and submit with Shop Drawings

LE	GENERATO THE GOVE	GENERATOR ROOM TEMPERATURE SENSOR THE GOVERNMENT OF NUNAVUT P W & S WATER WORKS AND WATER SUPF									1	EM	PERATURE (THERM		OLLE	R		
PROJECT No.	WATER TO 02-0602						FFLI			Т	TAG N	71.		T	200	REVISIO	NC	
SITE	Indoor	7	X T	Heated	X				Remarks				H TEMPERA	TURE ALAF	MS			
CONDITIONS	Outdoor		_	Unheated			100											
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TRANSMITTER									2.	Installa	tion sha	II be	in strict acco	rdance wit	h inst	rument		
	Display						-			mfg.'s i	nstructio	ons,	particularly el	levations.				
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Vendor To Complete all applicable information not given and submit with Shop Drawings

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Section 15010	Mechanical General Requirements	1 to 6
Section 15011	Factory Pre-Insulated Piping Systems	1 to 12
Section 15062	Non-Process System Bases, Hangers and Supports	1 to 7
Section 15082	Thermal Insulation for Ducting	1 to 6
Section 15131	Pumps - Hydronic Systems	1 to 2
Section 15142	Domestic Water Piping Copper	1 to 4
Section 15152	Drainage Waste and Vent Piping - Plastic	1 to 2
Section 15181	Hydronic Specialities	1 to 3
Section 15183	Hydronic Systems: Steel	1 to 6
Section 15401	Plumbing Specialities and Accessories	1 to 5
Section 15510	Packaged Boilers	1 to 6
Section 15551	Breeching and Chimneys	1 to 3
Section 15762	Convectors and Finned Tube Radiation	1 to 2
Section 15765	Unit Heaters	1 to 2
Section 15820	Duct Accessories	1 to 3
Section 15821	Dampers - Balancing	1 to 2
Section 15822	Dampers - Operating	1 to 2
Section 15852	Grilles, Registers and Diffusers	1 to 2
Section 15950	Testing, Adjusting and Balancing (TAB) of Mechanical Systems	1 to 6

Government of Nunavut	Section 15010
Water Works & Water Supply,	Mechanical General Requirements
Water Treatment Plant	Page 1
Gjoa Haven, NU Contract #1	March 2003

PART 1 GENERAL

1.1 General

- .1 This section covers items common to all sections of Division 15000.
- 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:
 - .l Pumps
 - .2 All control systems
 - .3 All air handling systems
 - .4 Hydronic heating systems
 - .5 Boilers

Government of Nunavut Water Works & Water Supply, Water Treatment Plant Section 1: Mechanical General Requirem Page 2		
Gjoa	Haven,	NU Contract #1 March 2003
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.

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

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

.2

.3

- .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.
- 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.
- 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.

Government of Nunavut Water Works & Water Supply, Water Treatment Plant		s & Water Supply, Mechanical General Requirement Plant Page 5
Gjoa H	laven,	NU Contract #1 March 2003
	.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

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 ASTMD 1248- 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 Insulatio n

- .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/cm³.
- .5 Closed cell content: to ASTMD2856, 90 % minimum.
- .6 Water absorption: to ASTMD2842, 4.0 g/1000 cm³, 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). Density of HDPE jacket: to ASTMD1505, 0.940 g/cm3 minimum. .2 .3 Sealant: synthetic polymers or modified rubber mastic. Jacket thickness: 1.14 mm minimum. .4 Elongation: to ASTMD638, 400 % maximum 6 month test. .5 .6 Service temperature: minus 45 °C to plus 120 °C maximum. .7 Water vapour transmission rate: 3 g/m²/24 h average. Tensile strength: 25 kg/cm width minimum. .8 .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. Heat shrink sleeves: adhesive coated cross-linked polyethylene sleeve. .3 Sleeves: to cover entire exposed joint length plus overlap of about 100 mm of pipe .4 coating on either side. Waterproofing mastic sealant for coating exposed ends of insulation after field cutting or .5 trimming has been carried out: as described in paragraph 2.7.3. 2.5 Insulation Kits for Fittings Material: rigid urethane foam with fully bonded FRP glass reinforced polyester or .1 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. Rigid urethane foam insulation. . 2 Density: to ASTMD1622, 0.03 g/cm3 minimum. .1 Compressive strength: to ASTMD1621, 137 kPa minimum. .2

Closed cell content: 92 % minimum.

.3

- .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%.