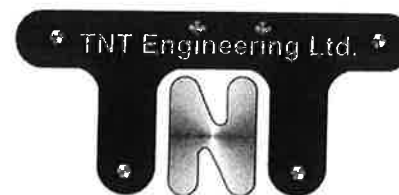




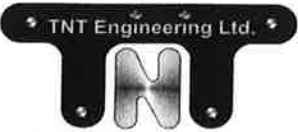
PARKLAND
8-18-81-16 W6M
PUMP & RISER INSTALLATION
MECHANICAL DRAWINGS
PROJECT # 1360



TNT ENGINEERING LTD.
SUITE 600, 639 - 5TH AVE SW
CALGARY, AB, T2P 0M9
PHONE (403) 387-2500
FAX (403) 387-2535

ISSUED FOR
CONSTRUCTION

DRAWING INDEX



STRIKE AREA	SURFACE LOCATION	BOTTOM HOLE LOCATION	DRAWING	DRAWING TYPE	COMMENTS	REV.
PARKLAND	08-18-081-16 W6M	-	-	COVER PAGE	PUMP & RISER INSTALLATION	-
-	-	-	-	ARC RESOURCES LTD. PIPING SPECIFICATION NOTES	ASME PIPING NOTES	1
-	-	-	-	ARC RESOURCES LTD. PIPING SPECIFICATION	ASME PIPING CLASS AL	1
-	-	-	-	ARC RESOURCES LTD. PIPING SPECIFICATION	ASME PIPING CLASS C	1
-	-	-	-	TNT ENGINEERING LTD. PIPING SPECIFICATION	ASME PIPING CLASS CSLZ	8
PARKLAND	08-18-081-16 W6M	-	0818081166.1500/01	LINE LIST	8-18 PUMP INSTALLATION	0
-	-	-	-	TNT ENGINEERING LTD. SYMBOL SHEET	TYPICAL FLOW SHEET SYMBOL AND STANDARDS	C
PARKLAND	08-18-081-16 W6M	-	0818081166.2098/01	P&ID	SUBMERSIBLE PUMP AREA	0
PARKLAND	08-18-081-16 W6M	-	0818081166.2099/01	P&ID	PUMP SKID	0
PARKLAND	08-18-081-16 W6M	-	0818081166.2100/01	P&ID	PIPELINE RISER AREA	0
PARKLAND	08-18-081-16 W6M	-	3989-01	VENDOR - CANDYNE PUMP SERVICES INC.	FRESH WATER INJECTION PUMP PACKAGE - P&ID	3

SPEC N
REVISION 01
DATE July 18, 2007

ASME PIPING SPECIFICATIONS
NOTES

The following NOTES apply to all ASME Piping Specifications	
1	corrosion allowances for threaded connections are reduced if utilizing minimum of Sch 80, threaded connections not recommended in vibrating or sour service applications
2	short radius elbow and returns shall not be used unless they satisfy the specification of the pipe and pressure rating restrictions imposed by ASME B16.28, Paragraph 2 (derated to 80% max. allowable stress value)
3	forged steel fitting to ASME B16.11
4	buttwelding fitting to ASME B16.9
5	forged C.S. branch outlet fittings to MSS SP-97
6	swage(d) nipples and bull plugs to MSS SP-95
7	steel pipe unions to MSS SP-83
8	blanks to API Std. 580
9	all valves shall meet ASME B16.34 requirements
10	for > 1/2" all thickness pipe and fittings A 106 B / A 234 WPB require additional testing to meet ASME B31.3 requirements for MDMT. A 333 6 / A 420 WPL6 are acceptable alternatives (as applicable) to meet MDMT requirements
11	use PWHT for production welds if WPS was qualified with PWHT to control hardness. Evidence of hardness control consisting of third party inspections on sample welds shall be included in the contractor's quality control manual. In particular, all weld procedures for sour piping systems must demonstrate that the weld metal, heat affected zone and parent metal through-thickness hardness levels will not exceed 22 HRC or 200 HBW (at 500 kg) as defined in NACE MR0175. Welds that do not comply with the above requirements or that do not have evidence of hardness control must be post-weld heat treated
12	on calculated pipe wall thickness, fitting wall thickness to match calculated pipe value.
13	trunnion mounted ball valve
14	in sour service CSA Z662 applications, materials shall conform to the applicable CSA specification - that is: CSA Z245.1, Section 16 for linepipe - CSA Z245.11, Section 13 for fittings - CSA Z245.12, Section 13 for flanges - CSA Z245.15, Section 13 for valves - NACE approved fittings, flanges and valves meet the corresponding CSA code - it is acceptable to utilize NACE approved pipe provided that the microhardness is confirmed at a maximum of 248 Vickers
15	Low Temperature refers to systems based on A333-6 pipe (L and SL series) and is restricted by the A352 LCB flanges on the valves.
16	SFRF= Slip-on Flange Raised Face, TFRF = Threaded Flange Raised Face To be used in "Sweet Service" 150 and 300 ANSI Only
17	Stud length must accommodate nut and at a minimum 2 exposed threads on each end
18	Consult Asset Integrity Group for correct material selection. Valves with specific corrosion resistant properties may be required
<div><div><div><div>SPEC</div><div>ANSI Rating</div></div><div>A= 150 B= 300 C= 600 D= 900 E= 1500</div></div></div>	

ARC RESOURCES LTD. PIPE, VALVE AND FITTING SPECIFICATIONS
REVISED: JULY 18, 2007
REVISION NUMBER: 1.0



SPEC AL ASME PIPING SPECIFICATIONS
REVISION 01
DATE July 18, 2007

SERVICE:	LOW TEMP - SWEET HYDROCARBONS			ANSI CLASS:	150 RF
DESIGN PRESSURE:	1828 kPag (265 psig) @ 38 C (100 F) - See Note 15			CODE:	ASME B31.3
TEST PRESSURE:	2742 kPag (397 psig)				
TEMPERATURE LIMITS:	-45 to 149 C (-50 to 300 F)	RATING:	ASME/ANSI B16.5		
CORROSION ALLOWANCE:	1.6 mm	PWHT:	if pipe wall thickness > 19 mm - see Note 11 also		
NDT:	Visual, 10% of all butt welds for each welder to be 100% radiographed				

GENERAL: all piping components require proven notch toughness properties - test shall be conducted at -45 C (-50 F) in accordance with ASME B31.3 code
see ASME PIPING SPECIFICATON 'N' for a description of relevant NOTES
PV&F Specs not to be used for amine, cryogenic, CO2, acid gas, caustic, HVP or LPG services.

PIPE	NPS	RATING	CONN	DESCRIPTION	NOTES
	1/2 to 2	Sch 80	SW / Scrd	ASTM A 333 Gr.6 (SMLS) PE / TBE	1
	2 to 10	Sch 40	BW	ASTM A 333 Gr.6 (SMLS) BE	
	12	STD	BW	ASTM A 333 Gr.6 (SMLS) BE	

FITTINGS						
ITEM	NPS	RATING	CONN	DESCRIPTION	NOTES	
CAP	1/2 to 2	Class 3000	Scrd	ASTM A 350 LF2	3	
	2 to 10	Sch 40	BW	ASTM A 420 WPL6	4	
	12	STD	BW	ASTM A 420 WPL6	4	
COUPLING	1/2 to 2	Class 3000	Scrd	ASTM A 350 LF2, full & half	3	
CROSS	1/2 to 2	Class 3000	Scrd	ASTM A 350 LF2	3	
ELBOW	1/2 to 2	Class 3000	Scrd	ASTM A 350 LF2, 45 & 90	3	
	2 to 10	Sch 40	LRBW	ASTM A 420 WPL6, 45 & 90, straight & reducing	2, 4	
	12	STD	LRBW	ASTM A 420 WPL6, 45 & 90, straight & reducing	2, 4	
ELBOLET	1/2 to 2	Class 3000	Scrd	ASTM A 350 LF2	5	
FLANGE	1/2 to 1 1/2	Class 150	SW	ASTM A 350 LF2, bore to Sch 80 pipe	16	
	1 to 2	Class 150	SFRF or TFRF	ASTM A 350 LF2		
	2 to 10	Class 150	RFWN	ASTM A 350 LF2, bored to Sch 40 pipe		
	12	Class 150	RFWN	ASTM A 350 LF2, bored to STD pipe		
NIPPLE	1/2 to 2	Sch 80	Scrd	ASTM A 333 Gr.6 (SMLS), 100 mm long min. TBE	1	
REDUCER	2 to 10	Sch 40	BW	ASTM A 420 WPL6, concentric / eccentric	4	
	12	STD	BW	ASTM A 420 WPL6, concentric / eccentric	4	
SOCKOLET	1/2 to 1 1/2	Class 3000	SW	ASTM A 350 LF2	5	
SWAGE	1/2 to 2	Sch 80	Scrd or PE	ASTM A 350 LF2 or A 333 Gr.6 (SMLS), match pipe & conn	6	
TEE	1/2 to 2	Class 3000	Scrd	ASTM A 350 LF2	3	
	2 to 10	Sch 40	BW	ASTM A 420 WPL6, straight & reducing	4	
	12	STD	BW	ASTM A 420 WPL6, straight & reducing	4	
THREADOLET	1/2 to 2	Class 3000	Scrd	ASTM A 350 LF2	5	
UNION	1/2 to 2	Class 3000	Scrd	ASTM A 350 LF2	7	
WELDOLET	2 to 4	Sch 40	BW	ASTM A 350 LF2	5	

VALVES						
ITEM	NPS	RATING	CONN	DESCRIPTION	NOTES	
BALL	≤ 2	WOG 2000	Scrd	A 350 LF2 body, 316 SS trim, API 602/607	9	
	2 to 6	Class 150	RF	LCC body, 316 SS trim to API 607/608, lever operator	9	
	8 to 12	Class 150	RF	LCC body, 316 SS trim to API 607/608, gear op ≥ 8"	9, 13	
CHECK	≤ 1 1/2	800 API	Scrd	A 350 LF2 body, trim No. 8 to API 602	9	
	2 to 12	Class 150	RF	LCC body, trim No. 8 to API 600	9	
GATE	≤ 1 1/2	800 API	Scrd	A 350 LF2 body, trim No. 8 to API 602, handwheel	9	
	2 to 12	Class 150	RF	LCC body, trim No. 8 to API 600, gear op ≥ 8"	9	
GLOBE	≤ 1 1/2	800 API	Scrd	A 350 LF2 body, trim No. 8 to API 602, handwheel	9	
	2 to 12	Class 150	RF	LCC body, trim No. 8 to API 600, gear op ≥ 8"	9	
NEEDLE	1/2 to 3/4	Class 6000	Scrd	A350 LF2 body & 316 SS trim	9	

MISCELLANEOUS						
ITEM	NPS	RATING	CONN	DESCRIPTION	NOTES	
BLIND	1 to 12	Class 150	RF	ASTM A 350 LF2	8	
GASKET	1 to 12	Class 150	RF	spiral wound, flexible graphite filler, 304 SS windings, API 601, carbon steel centering ring		
NUTS				ASTM A 194 2H, heavy hexagon		
STUD				ASTM A 193 B7, threaded full length	17	
PLUG	1/2 to 2	Sch 80	Scrd	Bull, ASTM A 350 LF2 or A 333 Gr.6 (SMLS)	6	
	1/2 to 2	Class 3000	Scrd	Hex Head, ASTM A 350 LF2	3	

ARC RESOURCES LTD. PIPE, VALVE AND FITTING SPECIFICATIONS
REVISED: JULY 18, 2007
REVISION NUMBER: 1.0



SPEC C ASME PIPING SPECIFICATIONS
REVISION 01
DATE July 18, 2007

SERVICE:	SWEET HYDROCARBONS	ANSI CLASS:	600 RF
DESIGN PRESSURE:	10,205 kPag (1,480 psig) @ 38 C (100 F)	CODE:	ASME B31.3
TEST PRESSURE:	15,307 kPag (2,220 psig)		
TEMPERATURE LIMITS:	-29 to 149 C (-20 to 300 F)	RATING:	ASME/ANSI B16.5
CORROSION ALLOWANCE:	1.6 mm	PWHT:	if pipe wall thickness > 19 mm - see Note 11 also
NDT:	Visual, 10% of all butt welds for each welder to be 100% radiographed		

GENERAL: see ASME PIPING SPECIFICATON 'N' for a description of relevant NOTES
PV&F Specs not to be used for amine, cryogenic, CO2, acid gas, caustic, HVP or LPG services.

PIPE

	NPS	RATING	CONN	DESCRIPTION	NOTES
	1/2 to 3/4	Sch 160	SW / Scrd	ASTM A 106 B (SMLS) PE / TBE	
	1 to 1 1/2	Sch 80	SW / Scrd	ASTM A 106 B (SMLS) PE / TBE	1
	3	Sch 40	BW	ASTM A 106 B (SMLS) BE	
	2, 4 to 6	Sch 80	BW	ASTM A 106 B (SMLS) BE	
	8 to 12	Sch 80 min. (calc WT & MDMT)	BW	ASTM A 106 B (SMLS) BE	10

FITTINGS

ITEM	NPS	RATING	CONN	DESCRIPTION	NOTES
CAP	1/2 to 1 1/2	Class 3000	Scrd	ASTM A 105	3
	3	Sch 40	BW	ASTM A 234 WPB	4
	2, 4 to 12	Sch 80 min	BW	ASTM A 234 WPB	4, 10, 12
COUPLING	1/2 to 1 1/2	Class 3000	Scrd	ASTM A 105, full & half	3
CROSS	1/2 to 1 1/2	Class 3000	Scrd	ASTM A 105	3
ELBOW	1/2 to 1 1/2	Class 3000	Scrd	ASTM A 105, 45 & 90	3
	3	Sch 40	LRBW	ASTM A 234 WPB, 45 & 90, straight & reducing	2, 4
	2, 4 to 12	Sch 80 min	LRBW	ASTM A 234 WPB, 45 & 90, straight & reducing	2, 4, 10, 12
ELBOLET	1/2 to 1 1/2	Class 3000	Scrd	ASTM A 105	5
FLANGE	3	Class 600	RFWN	ASTM A 105, bored to Sch 40 pipe	
	2, 4 to 12	Class 600	RFWN	ASTM A 105, bored to Sch 80 min. pipe	12
NIPPLE	1/2 to 3/4	Sch 160	Scrd	ASTM A 106 B (SMLS) norm, 100 mm long min, TBE	
	1 to 1 1/2	Sch 80 min	Scrd	ASTM A 106 B (SMLS) norm, 100 mm long min, TBE	1
REDUCER	3	Sch 40	BW	ASTM A 234 WPB, concentric / eccentric	4
	2, 4 to 12	Sch 80 min	BW	ASTM A 234 WPB, concentric / eccentric	4, 10, 12
SOCKOLET	1/2 to 1 1/2	Class 3000	SW	ASTM A 105	5
SWAGE	1/2 to 3/4	Sch 160	Scrd or PE	ASTM A 105 or A 106 B (SMLS), match pipe & conn	6
	1 to 1 1/2	Sch 80 min	Scrd or PE	ASTM A 105 or A 106 B (SMLS), match pipe & conn	6
TEE	1/2 to 1 1/2	Class 3000	Scrd	ASTM A 105	3
	3	Sch 40	BW	ASTM A 234 WPB, straight & reducing	4
	2, 4 to 12	Sch 80 min	BW	ASTM A 234 WPB, straight & reducing	4, 10, 12
THREADOLET	1/2 to 1 1/2	Class 3000	Scrd	ASTM A 105	5
UNION	1/2 to 1 1/2	Class 3000	Scrd	ASTM A 105	7
WELDOLET	3	Sch 40	BW	ASTM A 105	5
	2, 4	Sch 80	BW	ASTM A 105	5

VALVES

ITEM	NPS	RATING	CONN	DESCRIPTION	NOTES
BALL	≤ 1 1/2	WOG 2000	Scrd	A 105 body, cr. plated trim, API 602/607	9
	2, 3	Class 600	RF	WCB body, cr. plated trim to API 607, lever op	9
	4 to 12	Class 600	RF	WCB body, cr. plated trim to API 607, gear op ≥ 4"	9, 13
CHECK	≤ 1 1/2	Class 800	Scrd	A 105 body, trim No. 8 to API 602	9
	2 to 12	Class 600	RF	WCB body, trim No. 8 to API 600	9
GATE	≤ 1 1/2	Class 800	Scrd	A 105 body, trim No. 8 to API 602, handwheel	9
	2 to 12	Class 600	RF	WCB body, trim No. 8 to API 600, gear op ≥ 6"	9
GLOBE	≤ 1 1/2	Class 800	Scrd	A 105 body, trim No. 8 to API 602, handwheel	9
	2 to 12	Class 600	RF	WCB body, trim No. 8 to API 600, gear op ≥ 6"	9
NEEDLE	1/2 to 3/4	Class 6000	Scrd	A 105 body & 316 SS trim	9

MISCELLANEOUS

ITEM	NPS	RATING	CONN	DESCRIPTION	NOTES
BLIND	2 to 12	Class 600	RF	ASTM A 105	8
GASKET	2 to 12	Class 600	RF	spiral wound, flexible graphite filler, 304 SS windings, API 601, carbon steel centering ring	
NUTS				ASTM A 194 2H, heavy hexagon	
STUD				ASTM A 193 B7, threaded full length	17
PLUG	1/2 to 1 1/2	Sch XXS	Scrd	Bull, ASTM A 105 or A 106 B (SMLS)	6
	1/2 to 1 1/2	Class 3000	Scrd	Hex Head, ASTM A 105	3



CSA Z662 PIPING SPECIFICATIONS

SPEC: CSLZ
ANSI CLASS: 600
REVISION: 08
REVISION DATE Mar 05/2013

SERVICE: SOUR PROCESS FLUIDS - LOW TEMP		CODE: CSA 2662		REVISION DATE: Mar 05/2013		
DESIGN PRESSURE: 9,930 kPag (1440 psig) @ 38 °C (100 F)		TEST PRESSURE: 13,902 kPag (2,016 psig)		CSA CLASS: PN 100		
TEMPERATURE LIMITS: -45 to 120 °C (-50 to 248 F)		RATING: CSA Z245.12				
CORROSION ALLOWANCE: 1.6 mm		PWHT: if pipe wall thickness > 31.8 mm				
LOCATION FACTOR: 0.625		HARDNESS: 10% min. on all welds - hardness must be < 200 BHN				
RADIOGRAPHY: 100% of all butt welds for each welder to be 100% radiographed						
ITEM	Sizes (NPS)	Rating	Connection	Material/Code	Notes	
Pipe	¼ to ¾	Sch 160	THD/SW	ASTM A 333 Gr. 6, Seamless, PE	3, 18	
	1 to 1½	Sch 160	THD/SW	ASTM A 333 Gr. 6, Seamless, PE	3, 18	
	2 to 6	Sch 40	BW	CSA Z245.1, Gr. 359, CAT II, M45C, SS, SMLS, BE		
	8 to 10	Sch 40 (calc WT)	BW	CSA Z245.1, Gr. 359, CAT II, M45C, SS, SMLS, BE		
	12	Sch XS (calc WT)	BW	CSA Z245.1, Gr. 359, CAT II, M45C, SS, SMLS, BE		
Fittings Cap	¼ to 1 ½	Class 3000	THD	ASTM A 350 LF2 CL1	3, 18	
	2 to 6	Sch 40	BW	CSA Z245.11, Gr. 359, CAT II, M45C, SS		
	8 to 10	Sch 40 min	BW	CSA Z245.11, Gr. 359, CAT II, M45C, SS	12	
	12	Sch XS min	BW	CSA Z245.11, Gr. 359, CAT II, M45C, SS	12	
Coupling	¼ to 1 ½	Class 3000	THD	ASTM A 350 LF2 CL1, full & half	3, 18	
Cross	¼ to 1 ½	Class 3000	THD	ASTM A 350 LF2 CL1	3, 18	
Elbow	¼ to 1 ½	Class 3000	THD	ASTM A 350 LF2 CL1, 45 & 90	3, 18	
	2 to 6	Sch 40	LRBW	CSA Z245.11, Gr. 359, CAT II, M45C, SS, 45 & 90, straight & reducing	2	
	8 to 10	Sch 40 min	LRBW	CSA Z245.11, Gr. 359, CAT II, M45C, SS, 45 & 90, straight & reducing	2, 12	
	12	Sch XS min	LRBW	CSA Z245.11, Gr. 359, CAT II, M45C, SS, 45 & 90, straight & reducing	2, 12	
Elbolet	¼ to 1 ½	Class 3000	THD	ASTM A 350 LF2 CL1	5, 18	
Flange	2 to 4	Class 600	RFWN	ASTM A 350 LF2 CL1, bored to Sch 80 pipe	16, 18	
	2 to 6	Class 600	RFWN	CSA Z245.12, Gr. 359, CAT II, M45C, SS, bored to Sch 40 pipe		
	8 to 10	Class 600	RFWN	CSA Z245.12, Gr. 359, CAT II, M45C, SS, bored to Sch 40 min. pipe	12	
	12	Class 600	RFWN	CSA Z245.12, Gr. 359, CAT II, M45C, SS, bored to Sch XS min. pipe	12	
Nipple	½ to ¾	Sch 160	THD	ASTM A 333 Gr 6. (SMLS) norm, 100 mm long min, TBE	18	
	1 to 1 ½	Sch 160	THD	ASTM A 333 Gr 6. (SMLS) norm, 100 mm long min, TBE	18	
Reducer	2 to 6	Sch 40	BW	CSA Z245.11, Gr. 359, CAT II, M45C, SS, concentric/eccentric	12	
	8 to 10	Sch 40 min	BW	CSA Z245.11, Gr. 359, CAT II, M45C, SS, concentric/eccentric	12	
	12	Sch XS min	BW	CSA Z245.11, Gr. 359, CAT II, M45C, SS, concentric/eccentric	12	
Socket	¼ to 1 ½	Class 3000	SW	ASTM A 350 LF2 CL1	5, 18	
Swage	¼ to ¾	Sch 160	THD or PE	ASTM A 350 LF2 CL1 or A 333 Gr. 6 (SMLS), match pipe & Conn	6, 18	
	1 to 1 ½	Sch 160	THD or PE	ASTM A 350 LF2 CL1 or A 333 Gr. 6 (SMLS), match pipe & Conn	6, 18	
Tee	¼ to 1 ½	Class 3000	THD	ASTM A 350 LF2 CL1	3, 18	
	2 to 6	Sch 40	BW	CSA Z245.11, Gr. 359, CAT II, M45C, SS, straight & reducing	15	
	8 to 10	Sch 40 min	BW	CSA Z245.11, Gr. 359, CAT II, M45C, SS, straight & reducing	12, 15	
	12	Sch XS min	BW	CSA Z245.11, Gr. 359, CAT II, M45C, SS, straight & reducing	12, 15	
Thredolet	¼ to 1 ½	Class 3000	THD	ASTM A 350 LF2 CL1	5, 18	
Union	¼ to 1 ½	Class 3000	THD	ASTM A 350 LF2 CL1	7, 18	
Weldolet	2 to 4	Sch 80	BW	ASTM A 350 LF2 CL1	5, 18	
Valves Ball	< 1 ½	Class 800	THD	A 350 LF2 CL1 body, 316 SS trim, 2000 # to API 607	9, 18	
	2	Class 600	RF	CSA Z245.15 or B16.34 LF2 or LCC body, 316 SS trim to API 607, lever operator	9	
	3, 4	Class 600	RF	CSA Z245.15 or B16.34 LF2 or LCC body, 316 SS trim to API 607, lever operator	9, 13	
	6 to 12	Class 600	RF	CSA Z245.15 or B16.34 LF2 or LCC body, 316 SS trim to API 607, gear op > 4"	9, 13	
Check	< 1 ½	Class 800	THD	A 350 LF2 CL1 body, trim No. 12 to API 602	9, 18	
	2 to 12	Class 600	RF	CSA Z245.15 or B16.34 LF2 or LCC body, trim No. 12 to API 600	9	
Gate	< 1 ½	Class 800	THD	A 350 LF2 CL1 body, trim No. 12 to API 602, hand wheel	9, 18	
	2 to 12	Class 600	RF	CSA Z245.15 or B16.34 LF2 or LCC body, trim No. 12 to API 600, gear op > 6"	9	
Globe	< 1 ½	Class 800	THD	A 350 LF2 CL1 body, trim No. 12 to API 602, hand wheel	9, 18	
	2 to 12	Class 600	RF	CSA Z245.15 or B16.34 LF2 or LCC body, trim No. 12 to API 600, gear op > 6"	9	
Needle	½ to ¾	Class 3000	THD	316 SS body & 316 SS trim	9, 18	
Misc.	Spectacle Blind	2 to 12	Class 600	RF	ASTM A 516 70 N (impact tested)	8, 18
	Gasket	2 to 12	Class 600	RF	spiral wound, flexible graphite filler, 316 SS windings, ASME B16.20, carbon steel centering ring	
	Nuts				ASTM A 194 2HM, heavy hexagon	
	Studs				ASTM A 193 B7M, threaded full length	
Plug	¼ to 1 ½	Sch XXS	THD	Bull, ASTM A 350 LF2 CL1 or A 333 Gr. 6 (SMLS)	6, 18	
	½ to 1 ½	Class 3000	THD	Hex Head, ASTM A 350 LF2 CL1	3, 18	
Notes:						
2. short radius elbow and returns shall not be used						
3. forged steel fitting to meet ASME B16.11						
5. forged C.S. branch outlet fittings to MSS SP-97						
6. swage(d) nipples and bull plugs to MSS SP-95						
7. steel pipe unions to MSS SP-83						
8. blanks to API Std. 590						
9. all valves shall meet ASME B16.34 requirements						
12. on calculated pipe wall thicknesses, fitting wall thickness to match calculated pipe value						
13. trunnion mounted ball valve						
15. barred tees shall be stress relieved and have MPI as per CSA Z245.11						
16. for use with weldolets at a branch connection						
18. all ASME carbon steel components shall meet the requirements of NACE MR0175 - ISO 15156-2 for SSC Region 3						

[illegible]

FIRST LETTER	INITIATING OR MEASURED VARIABLE	CONTROLLERS			READOUT DEVICES		SWITCHES					ALARM DEVICES					TRANSMITTER			SOLENOID, RELAYS COMPUTING DEVICES	PRIMARY ELEMENT	TEST POINT	WELL OR PROBE	VIEW DEVICE, GLASS	SAFETY DEVICE	FINAL ELEMENT
		RECORDER	INDICATOR	BLIND	SELF ACTUATED CONTROL VALVE	RECORDER	INDICATOR	HIGH	HIGH HIGH (SHUTDOWN)	LOW	LOW LOW (SHUTDOWN)	COMBINATION	HIGH	HIGH HIGH (SHUTDOWN)	LOW	LOW LOW (SHUTDOWN)	COMBINATION	RECORDER	INDICATOR							
A	ANALYSIS	ARC	AIC	AC		AR	AI	ASH	ASHH	ASL	ASLL	ASHL	AAH	AAHH	AAL	AALL	AAHL	ART	AIT	AT	AY	AE	AP	AW		AV
B	BURNER	BRC	BIC	BC		BR	BI	BSH	BSHH	BSL	BSLL	BSHL	BAH	BAHH	BAL	BALL	BAHL	BRT	BIT	BT	BY	BE		BW	BG	BZ
C	USERS CHOICE																									
D	USERS CHOICE																									
E	VOLTAGE	ERC	EIC	EC		ER	EI	ESH	ESHH	ESL	ESLL	ESHL	EAH	EAHH	EAL	EALL	EAHL	ERT	EIT	ET	EY	EE				EZ
F	FLOW	FRC	FIC	FC	FCV,FICV	FR	FI	FSH	FSHH	FSL	FSLL	FSHL	FAH	FAHH	FAL	FALL	FAHL	FRT	FIT	FT	FY	FE		FG		FV
FQ	FLOW QUANTITY	FQRC	FQIC	FQC		FQR	FQI	FQSH	FQSHH	FQSL	FQSLL	FQSHL	FQAH	FQAHH	FQAL	FQALL	FQAHL	FQRT	FQIT	FQT	FQY	FQE				FQV
FF	FLOW RATIO	FFRC	FFIC	FFC		FFR	FFI	FFSH	FFSHH	FFSL	FFSLL	FFSHL	FFAH	FFAHH	FFAL	FFALL	FFAHL	FFRT	FFIT	FFT	FFY					
G	USERS CHOICE																									
H	HAND		HIC	HC																						
I	CURRENT	IRC	IIC			IR	II	ISH	ISHH	ISL	ISLL	ISHL	IAH	IAHH	IAL	IALL	IAHL	IRT	IIT	IT	IY	IE				HV
J	POWER	JRC	JIC			JR	JI	JSH	JSHH	JSL	JSLL	JSHL	JAH	JAHH	JAL	JALL	JAHL	JRT	JIT	JT	JY	JE				JZ
K	TIME	KRC	KIC	KC	KCV	KR	KI	KSH	KSHH	KSL	KSLL	KSHL	KAH	KAHH	KAL	KALL	KAHL	KRT	KIT	KT	KY	KE				KV
L	LEVEL	LRC	LIC	LC	LCV	LR	LI	LSH	LSHH	LSL	LSLL	LSHL	LAH	LAHH	LAL	LALL	LAHL	LRT	LIT	LT	LY	LE		LG		LV
M	MOISTURE	MRC	MIC	MC		MR	MI	MSH	MSHH	MSL	MSLL	MSHL	MAH	MAHH	MAL	MALL	MAHL	MRT	MIT	MT	MY	ME	MP			
N	USERS CHOICE																									
O	USERS CHOICE																									
P	PRESSURE, VACUUM	PRC	PIC	PC	PCV	PR	PI	PSH	PSHH	PSL	PSLL	PSHL	PAH	PAHH	PAL	PALL	PAHL	PRT	PIT	PT	PY	PE	PP		PSV,PSE	PV
PD	PRESSURE, DIFFERENTIAL	PDR	PDI	PDC	PDCV	PDR	PDI	PDSH	PDSHH	PDSL	PDSL	PDSHL	PDH	PDHH	PDAL	PDALL	PDHL	PDR	PDI	PDT	PDY					PDV
Q	QUANTITY	QRC	QIC	QC		QR	QI	QSH	QSHH	QSL	QSLL	QSHL	QAH	QAHH	QAL	QALL	QAHL	QRT	QIT	QT	QY					QZ
R	RADIATION	RRC	RIC	RC		RR	RI	RSH	RSHH	RSL	RSLL	RSHL	RAH	RAHH	RAL	RALL	RAHL	RRT	RIT	RT	RY			RW		RZ
S	SPEED	SRC	SIC	SC		SR	SI	SSH	SSH	SSL	SSLL	SSL	SAH	SAHH	SAL	SALL	SAHL	SRT	SIT	ST	SY	SE				
T	TEMPERATURE	TRC	TIC	TC	TCV	TR	TI	TSH	TSHH	TSL	TSLL	TSHL	TAH	TAHH	TAL	TALL	TAHL	TRT	TIT	TT	TY	TE		TW	TSE	TV
TD	TEMPERATURE, DIFFERENTIAL	TDR	TDI	TDC	TDCV	TDR	TDI	TDSH	TDSHH	TDSL	TDSL	TDSHL	TDAH	TDAHH	TDAL	TDALL	TDAHL	TDR	TDI	TDT	TDY	TDE		TW		TDV
U	MULTI-VARIABLE																				UY					UV
V	VIBRATION, MECH. ANALYSIS					VR	VI	VSH	VSHH	VSL	VSLL	VSHL	VAH	VAHH	VAL	VALL	VAHL	VRT	VIT	VT	VY	VE				VZ
W	WEIGHT FORCE	WRC	WIC	WC		WR	WI	WSH	WSHH	WSL	WSLL	WSHL	WAH	WAHH	WAL	WALL	WAHL	WRT	WIT	WT	WY	WE				WZ
WD	WEIGHT FORCE, DIFFERENTIAL	WDR	WDI	WDC		WDR	WDI	WDSH	WDSHH	WDSL	WDSL	WDSHL	WDAH	WDAHH	WDAL	WDALL	WDAHL	WDR	WDI	WDT	WDY	WDE				WDZ
X	UNCLASSIFIED																									
Y	EVENT STATE, PRESENCE		YIC	YC		YR	YI	YSH	YSHH	YSL	YSLL		YAH	YAHH	YAL	YALL	YAHL			YT	YY	YE				
Z	POSITION	ZRC	ZIC	ZC		ZR	ZI	ZSH	ZSHH	ZSL	ZSLL		ZAH	ZAHH	ZAL	ZALL	ZAHL	ZRT	ZIT	ZT	ZY	ZE				
ZD	GAUGING DEVIATION	ZDR	ZDI	ZDC		ZDR	ZDI	ZDSH	ZDSHH	ZDSL	ZDSL		ZDAH	ZDAHH	ZDAL	ZDALL	ZDAHL	ZDR	ZDI	ZDT	ZDY	ZDE				

INSULATION THICKNESS AND DESIGNATION:

3-P-AS-001-38GT-IG

SIZE(IMPRIAL NPS)

INTERNAL COATING

NUMBER SPECIFICATION COMMODITY

H - HEAT CONSERVATION

C - COLD CONSERVATION

PP - PERSONAL PROTECTION

ET - ELECTRICAL TRACE

GT - GLYCOL TRACE

HO - HOT OIL TRACE

J - JACKETED

ST - STEAM TRACE

EQUIPMENT NUMBERING STARTS WITH A LETTER CHOSEN FROM THE EQUIPMENT TAGS THAT BEST SUITS THE EQUIPMENT TO BE DESCRIBED. FOLLOWING THE EQUIPMENT TAG ARE THREE DIGIT CATEGORY NUMBER FROM THE EQUIPMENT NUMBERING LIST.

EXAMPLE: E-315

EQUIPMENT (HEAT EXCHANGER)

SERIAL NUMBERING (ASSIGNED TAG NUMBER)

COMMODITY	EQUIPMENT TAGS	ABBREVIATIONS
AGF - ACID GAS FLARE	A - AUXILIARY FACILITIES	AC - AIR TO CLOSE
AM - AMINE	B - BLOWER OR FAN (PROCESS)	AO - AIR TO OPEN
B - BUTANE	BH - BUILDING HEATER	CC - CORROSION COUPON
BA - BREATHING AIR	C - CRUSHERS, MILLS & GRINDERS	CO - CLEAN OUT
BFW - BOILER FEED WATER	D - DRIVERS	CP - CATHODIC PROTECTION
C - CONDENSATE (C4-C8)	E - EXCHANGERS, AERIAL COOLERS, PLATE, SHELL & TUBE EXCHANGERS	CSC - CAR SEAL CLOSED
CA - COMBUSTION AIR	F - FILTER SEPARATOR (PROCESS)	CSO - CAR SEAL OPEN
CH - CHEMICAL INJECTION (ANTI-FOAMING, METHANOL, ETC.)	FS - FLARE STACK	DCB - DOUBLE BLOCK & BLEED
CW - COOLING WATER	G - GENERATOR, ELECTRIC, GAS OR TEG UNIT	FC - FAIL CLOSED
D - DRAIN	H - FIRED HEATER OR BOILER	FL - FAIL LOCK
EX - EXHAUST	I - INCINERATOR	FLP - FAIL LAST POSITION
F - FLARE	J - CONVEYORS	FO - FAIL OPEN
FG - FUEL GAS	K - COMPRESSORS	FOB - FLAT ON BOTTOM
FO - FUEL OIL	M - MIXERS & AGITATORS	FOT - FLAT ON TOP
FW - FIRE WATER	P - PUMPS	FP - FULL PORT
G - GAS	R - REACTORS OR CONVERTER	HDPE - HIGH DENSITY POLYETHYLENE
GL - GLYCOL	S - STORAGE	HOA - HAND OFF AUTO
HM - HEAT MEDIUM	T - TANKS	IK - INSULATING KIT
IA - INSTRUMENT AIR	V - VESSEL	LEL - LOWER EXPLOSIVE LIMIT
JW - JACKET WATER	VS - VENT STACK	MV - MANWAY
LO - LUBE OIL	Z - MISC. PACKAGES, METER SKIDS	MCC - MOTOR CONTROL CENTRE
MP - MEDIUM PRESSURE STEAM		NC - NORMALLY CLOSED
N - NITROGEN		NO - NORMALLY OPEN
NGL - PETROLEUM LIQUIDS (C2-C4)		SP - SAMPLE POINT
O - OIL		S/S - SEAM TO SEAM
OE - OIL EMULSION		T/T - TANGENT TO TANGENT
OW - OIL & WATER		TH - THIEF HATCH
PW - PRODUCED WATER		TSS - TEMPORARY SUCTION STRAINER
R - RELIEF		WC - WAFER CHECK
RF - REFRIGERANT		
RW - RAW WATER		
S - STEAM		
SC - STEAM CONDENSATE		
SHS - SUPER HEATED STEAM		
SU - SULPHUR		
SW - SOURCE WATER		
V - VENT		
UA - UTILITY AIR		
UW - UTILITY WATER		

OTHER POSSIBLE INSTRUMENTATION COMBINATIONS

FO - RESTRICTION ORIFICE

FRK - FLOW CONTROL STATION

HIK - HAND CONTROL STATION

FX - ACCESSORIES

TJR - SCANNING RECORDER

LLH - PILOT LIGHT

PFR - RATIO

KQI - RUNNING TIME INDICATOR

QQI - INDICATING COUNTER

WKIC - RATE OF WEIGHT LOSS CONTROLLER

HMS - HAND MOMENTARY SWITCH

ESDV - EMERGENCY SHUTDOWN VALVE

INSULATION THICKNESS AND DESIGNATION:

3-P-AS-001-38GT-IC

NUMBER SPECIFICATION

COMMODITY

SIZE (IMPERIAL NPS)

INTERNAL COATING

H - HEAT CONSERVATION

C - COLD CONSERVATION

PP - PERSONAL PROTECTION

ET - ELECTRICAL TRACE

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EQUIPMENT NUMBERING

EQUIPMENT (HEAT EXCHANGER)

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(ANTI-FOAMING, METHANOL, ETC.)	F - FILTER SEPARATOR (PROCESS)	CSO - CAR SEAL OPEN
CW - COOLING WATER	FS - FLARE STACK	DBB - DOUBLE BLOCK & BLEED
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FO - FUEL OIL	K - COMPRESSORS	FOB - FLAT ON BOTTOM
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RF - REFRIGERANT		WC - WAFER CHECK
RW - RAW WATER		
S - STEAM		
SC - STEAM CONDENSATE		
SHS - SUPER HEATED STEAM		
SU - SULPHUR		
SW - SOURCE WATER		
V - VENT		
UA - UTILITY AIR		
UW - UTILITY WATER		

PIPING SYMBOLS

FLANGED METER

STRAIGHTENING VANES

ROTAMETER

VENTURI

FLOW NOZZLE

TURBINE METER

POSITIVE DISPLACEMENT METER

MAGNETIC FLOWMETER

VORTEX METER

PITOT TUBE (ANNUBAR)

METER RUN

METER RUN c/w STRAIGHTENING VANES

EDUCTOR

RUPTURE DISK

BLEED RING

PIG ENTRY TEE

CHEMICAL INJECTION POINT

VALVES & CONNECTIONS

FLANGED CONNECTION

THREADED CONNECTION

SOCKET WELD CONNECTION

GATE VALVE

GLOBE VALVE

BALL VALVE

SWING CHECK VALVE

PISTON CHECK VALVE

EXCESS FLOW VALVE

BUTTERFLY VALVE

NEEDLE VALVE

3-WAY VALVE

PLUG VALVE

PIGGING BALL VALVE

DIAPHRAGM

INLINE CHOKE

ANGLE VALVE

ANGLE CHOKE

PRESSURE RELIEF

PRESSURE & VACUUM RELIEF VALVE

3 WAY VALVE c/w PISTON ACTUATOR & RESET LATCH

ROTARY MOTOR VALVE

PRESSURE CONTROL VALVE (SELF-ACTUATED)

PISTON ACTUATED CONTROL VALVE

DIGITAL

SOLENOID VALVE

3-WAY SOLENOID VALVE

LINE TYPES

PNEUMATIC SIGNAL

PNEUMATIC BINARY SIGNAL

ELECTRIC SIGNAL

ELECTRIC BINARY SIGNAL

HYDRAULIC SIGNAL

CAPILLARY SIGNAL

ELECTROMAGNETIC/SONIC SIGNAL (GUIDED)

ELECTROMAGNETIC/SONIC SIGNAL (NOT GUIDED)

SOFTWARE SIGNAL (DATA LINK)

MECHANICAL LINK

UNDEFINED SIGNAL

TUBING

FUTURE

PROCESS PIPING

SECONDARY PIPING

PROCESS SKID LIMIT

INSTRUMENT SYMBOLS

DISCRETE INSTRUMENTS FIELD MOUNTED

DISCRETE INSTRUMENTS PRIMARY LOCATION

DISCRETE INSTRUMENTS AUXILIARY LOCATION

DISTRIBUTED CONTROL FIELD MOUNTED

DISTRIBUTED CONTROL PRIMARY LOCATION

DISTRIBUTED CONTROL AUXILIARY LOCATION

COMPUTER FUNCTION FIELD MOUNTED

COMPUTER FUNCTION PRIMARY LOCATION

COMPUTER FUNCTION AUXILIARY LOCATION

PROGRAMMABLE LOGIC CONTROL (PLC) FIELD MOUNTED

PROGRAMMABLE LOGIC CONTROL (PLC) PRIMARY LOCATION

PROGRAMMABLE LOGIC CONTROL (PLC) AUXILIARY LOCATION

INDICATOR LIGHT

BEACON

CONVERT** (SEE BELOW): ** THE FORM OF THE OUTPUT SIGNAL IS DIFFERENT FROM THAT OF THE INPUT SIGNAL.

E - VOLTAGE

I - CURRENT

P - PNEUMATIC

H - HYDRAULIC

O - ELECTROMAGNETIC, SONIC

R - RESISTANCE (ELECTRICAL)

A - ANALOG

B - BINARY

D - DIGITAL

EQUIPMENT NUMBERING

100 SERIES

VESSELS

SEPARATORS

PROPANE TANKS

F.G. SCRUBBERS

FLARE KO DRUMS

CHILLERS

CONTACTORS

SPHERES

BULLETS

200 SERIES

PUMPS & COMPRESSORS

SCREW COMP.

RECIP. COMP.

I.A. COMP.

PUMPS

300 SERIES

FIRE EQUIP. HEAT EXCHANGERS

LINE HEATERS

DEHY./AMINE REBOILERS

FIN COOLERS

SHELL & TUBE EXCHANGERS

PLATE EXCHANGERS

AERIAL COOLERS

BUILDING HEATERS

400 SERIES

TANKS

WATER, OIL & DRAIN TANKS

METHANOL TANKS

CORROSION INHIBITOR

CHEMICAL

500 SERIES

POWER SYSTEM/DRIVERS

TEG UNITS

SOLAR

GENERATORS

GAS/ELECTRIC MOTORS

600 SERIES

MISCELLANEOUS

EXHAUST FANS

METER SKIDS

700 SERIES

FLARE SYSTEM

FLARE STACK

VENT STACK

INCINERATOR

800 SERIES

FILTERS

900 SERIES

USERS CHOICE

DRAWING NUMBERING

0408081166.0000/01

SHEET NO.

DRAWING NO.

SURFACE LSD/NTS

ARC RESOURCES LTD.

TNT Engineering Ltd.

SUITE 600, 639 - 5TH AVE SW

CALGARY, AB, T2P 0M9

(403) 387-2500 PHONE

(403) 387-2535 FAX

TYPICAL FLOW SHEET SYMBOLS AND STANDARDS

DWG NO.

SYMBOL SHEET

REV. DATE: 07/19/2011

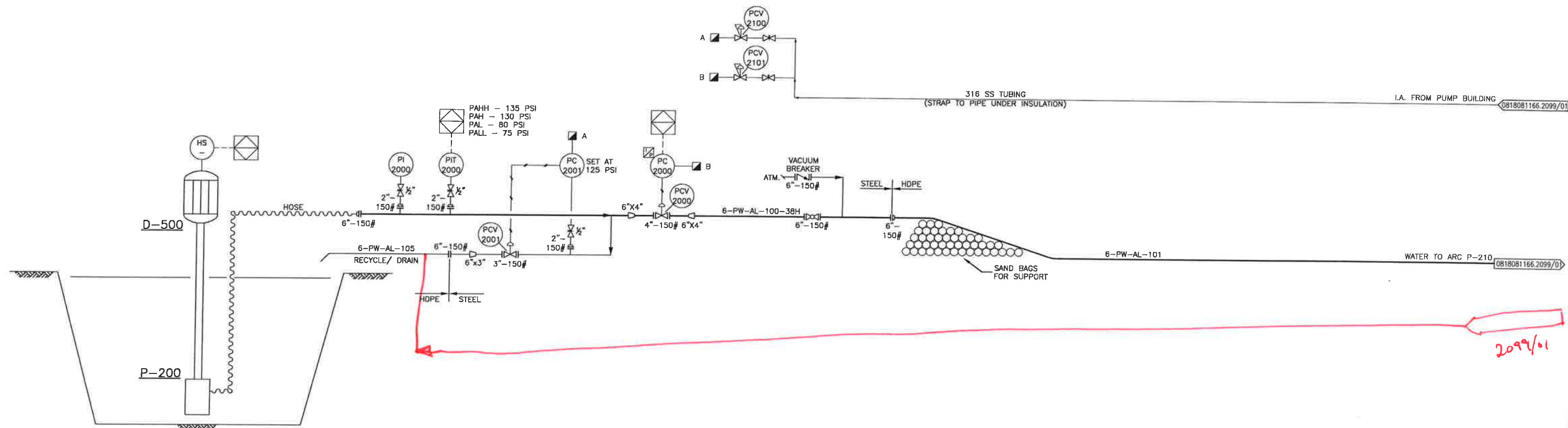
REV. C

PLOT BY: SKIM, 5/17/2013 11:58 AM

Z:\DRAFTING\JOBS\ARC RESOURCES LTD\PARKLAND\08-18-081-16 W6M\PAID\0818081166.2100 REV 0 - IFC (#1360) DWG

D-500
PUMP DRIVER

P-200
SUBMERSIBLE PUMP
VENDOR: CANDYNE
MODEL: TYCO SUBMERSIBLE PUMP
RATED: _____ GPM
DATE: 2013



DRAWING SHEET SIZE: 11" x 17"

REV	DESCRIPTION	BY	MM/DD/YYYY	CHKD	APPD	JOB No.
A	ISSUED FOR REVIEW - PUMP & RISER INSTALLATION	SK	05/09/2013	KR		1360
0	ISSUED FOR CONSTRUCTION - PUMP & RISER INSTALLATION	SK	05/13/2013	KR		1360

PERMIT

STAMP

PROFESSIONAL
ENGINEER
T.M. SKIPPEN
30770
BRITISH COLUMBIA
May 24/2013

ARC RESOURCES LTD.

ENGINEERING RECORD

DRAWN: S. KIM	DATE: 05/09/2013
CHECKED: K. ROBERTS	DATE: 05/09/2013
APPROVED:	DATE:
ENGINEER: T. SKIPPEN	DATE: 05/09/2013

PARKLAND
8-18-81-16 W6M
SUBMERSIBLE PUMP AREA
PIPING AND INSTRUMENTATION DIAGRAM

SCALE NTS DWG 0818081166.2098/01 REV. 0

PLOT BY: SKIM, 5/13/2013 11:06 AM

Z:\DRAFTING\JOBS\ARC RESOURCES LTD\PARKLAND\08-18-81-16 W6M\2100\01\0818081166.2100.DWG

DRAWING SHEET SIZE: 11" x 17"

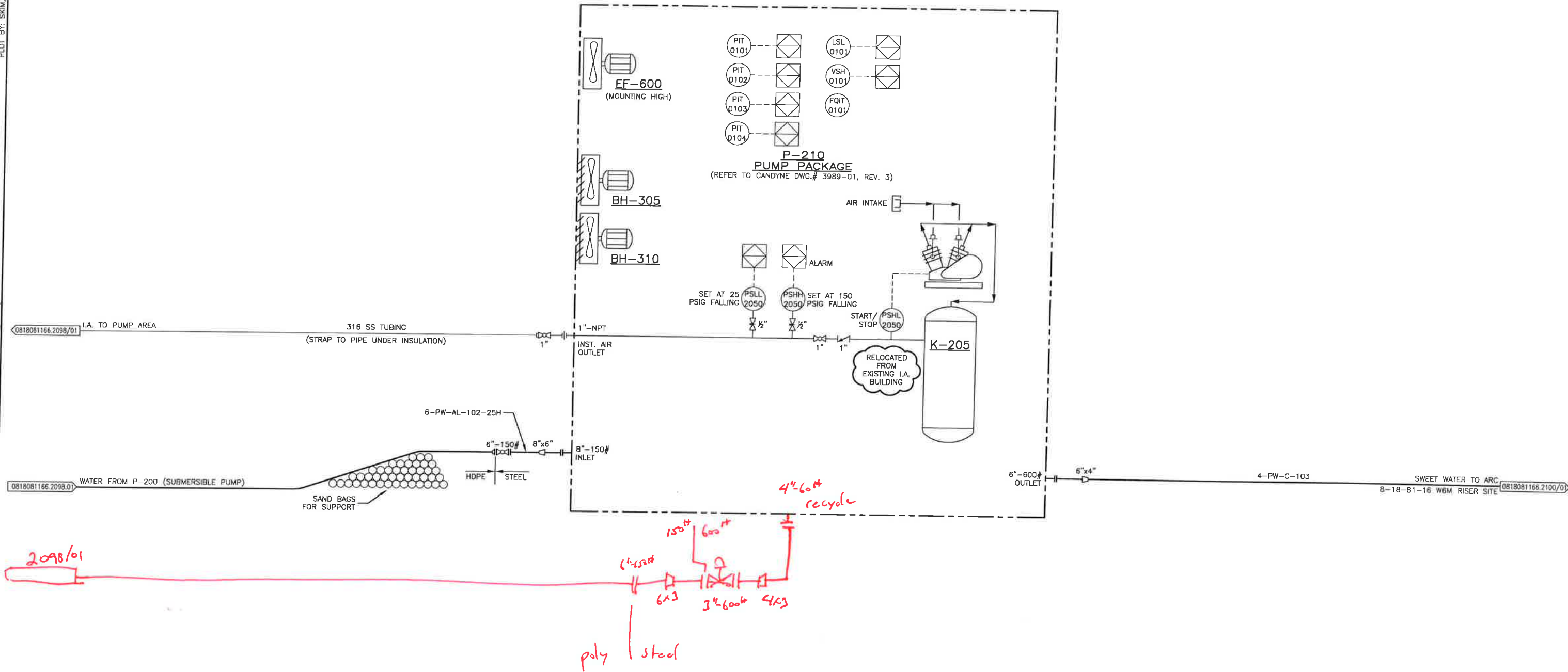
**P-210
PUMP**
VENDOR: CANDYNE
MODEL: WEATEHRFORD W300L
RATED: 400 GPM AT 720 PSI
DATE: 2013

**D-510
DRIVER**
VENDOR: TECO WESTING HOUSE INC.
OUTPUT: 5 HP AT 1745 RPM
DUTY: 3 PH, 60 Hz, 230/460 V
FRAME: 449T
CLASS 1, DIV 2

**K-205
I.A. COMPRESSOR PACKAGE**
(EXISTING RELOCATED)

**H-300/305
UNIT HEATER**
MFG.: ROUGHNECK
MODEL: FX5
OUTPUT: 7.5 KW
DUTY: 600V/3PH/60Hz

**EF-600
EXHAUST FAN**
MFG.: DAYTON 12"
RATE: 12 AIRCHANGES/HR
OUTPUT: 1/4 HP
DUTY: 120V/1PH/60Hz



REV	DESCRIPTION	BY	MM/DD/YYYY	CHKD	APPD	JOB No.
A	ISSUED FOR REVIEW	GW	05/06/2013	KR		1573
B	ISSUED FOR REVIEW - PUMP & RISER INSTALLATION	SK	05/09/2013	KR		1360
O	ISSUED FOR CONSTRUCTION - PUMP & RISER INSTALLATION	SK	05/13/2013	KR		1360

PERMIT

STAMP

PROFESSIONAL
PROVINCE OF
T. M. SKIPPEN
30770
BRITISH COLUMBIA
ENGINEER

May 20/2013

ARC RESOURCES LTD.

ENGINEERING RECORD

DRAWN: G. WONG	DATE: 05/06/2013
CHECKED: K. ROBERTS	DATE: 05/06/2013
APPROVED:	DATE:
ENGINEER: T. SKIPPEN	DATE: 05/06/2013

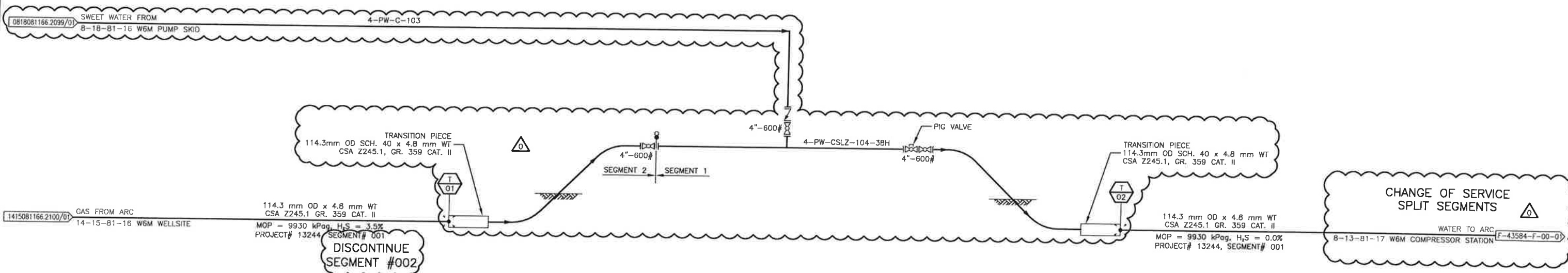
TNT Engineering Ltd.

SUITE 600, 639 - 5TH AVE SW
CALGARY, AB, T2P 0M9
(403) 387-2500 PHONE
(403) 387-2535 FAX

PARKLAND
8-18-81-16 W6M
PUMP SKID
PIPING AND INSTRUMENTATION DIAGRAM

SCALE	NTS	DWG	0818081166.2099/01	REV.	0
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PLOT BY: SKIM, 5/13/2013 11:07 AM
Z:\DRAFTING\JOBS\ARC RESOURCES LTD\PARKLAND\08-18-01-16 W6M PUMP\0818081166.2100 REV 0 - IFC (#1360).DWG
DRAWING SHEET SIZE: 11" x 17"



REV	DESCRIPTION	BY	MM/DD/YYYY	CHKD	APPD	JOB No.
A	ISSUED FOR APPROVAL	KR	04/30/2013	TS		1573
B	ISSUED FOR REVIEW - PUMP & RISER INSTALLATION	SK	05/09/2013	KR		1360
0	ISSUED FOR CONSTRUCTION - PUMP & RISER INSTALLATION	SK	05/13/2013	KR		1360

PERMIT

STAMP

PROFESSIONAL ENGINEER
T. M. SKIPPEN
30770
MAY 24/2013

ARC RESOURCES LTD.

ENGINEERING RECORD

DRAWN: K. ROBERTS	DATE: 04/30/2013
CHECKED:	DATE:
APPROVED:	DATE:
ENGINEER: T. SKIPPEN	DATE: 04/30/2013

SCALE: NTS

DWG: 0818081166.2100/01

REV: 0

PARKLAND
8-18-81-16 W6M
PIPELINE RISER AREA
PIPING AND INSTRUMENTATION DIAGRAM

TNT Engineering Ltd.
SUITE 600, 639 - 5TH AVE SW
CALGARY, AB, T2P 0M9
(403) 387-2500 PHONE
(403) 387-2535 FAX

P-101
TRIPLEX PLUNGER PUMP
MAKE: WEATHERFORD
MODEL: W300L
FLOW: 400 USGPM @ 310 RPM
PLUNGER SIZE: 4.000"
MAWP: 850 PSIG

M-101
ELECTRIC MOTOR (PLUNGER PUMP)
MAKE: TECO-WESTINGHOUSE
SIZE: 200 HP @ 1200 RPM
575V/60Hz/3 PHASE
FRAME: 449T
CLASS 1, DIV 2.

SS-101
SUCTION STABILIZER
MAKE: STATUS FLOW
MODEL: SFTSAC-150B-F-600N
SIZE: 800 CUBIC INCH
MAX PRESSURE: 150 PSIG

DS-102
DISCHARGE STABILIZER
MAKE: STATUS FLOW
MODEL: SFTDAC-1440B-F-600N
SIZE: 800 CUBIC INCH
MAX PRESSURE: 1440 PSIG

F-101
SUCTION FILTER
MAKE: FIL-TREK CORP.
MODEL: LPA24-712-4F
BAGS: 7 @ 25 MICRON
MAWP: 150PSI @ 250°F
MDMT: -20°F/150 PSIG
(40-50 GPM PER BAG)

DT-101
DAY TANK
MAKE: KENCO
SIZE: 30 GAL

UH-101/102
UNIT HEATER
MAKE: RUFFNECK
MODEL: FX5
OUTPUT: 7.5 KW
600V/3PH/60 Hz

EF-101
EXHAUST FAN
MAKE: DAYTON 12"
12 AIR CHANGES/HOUR
120V/1 PHASE/60 Hz
1/4 HP

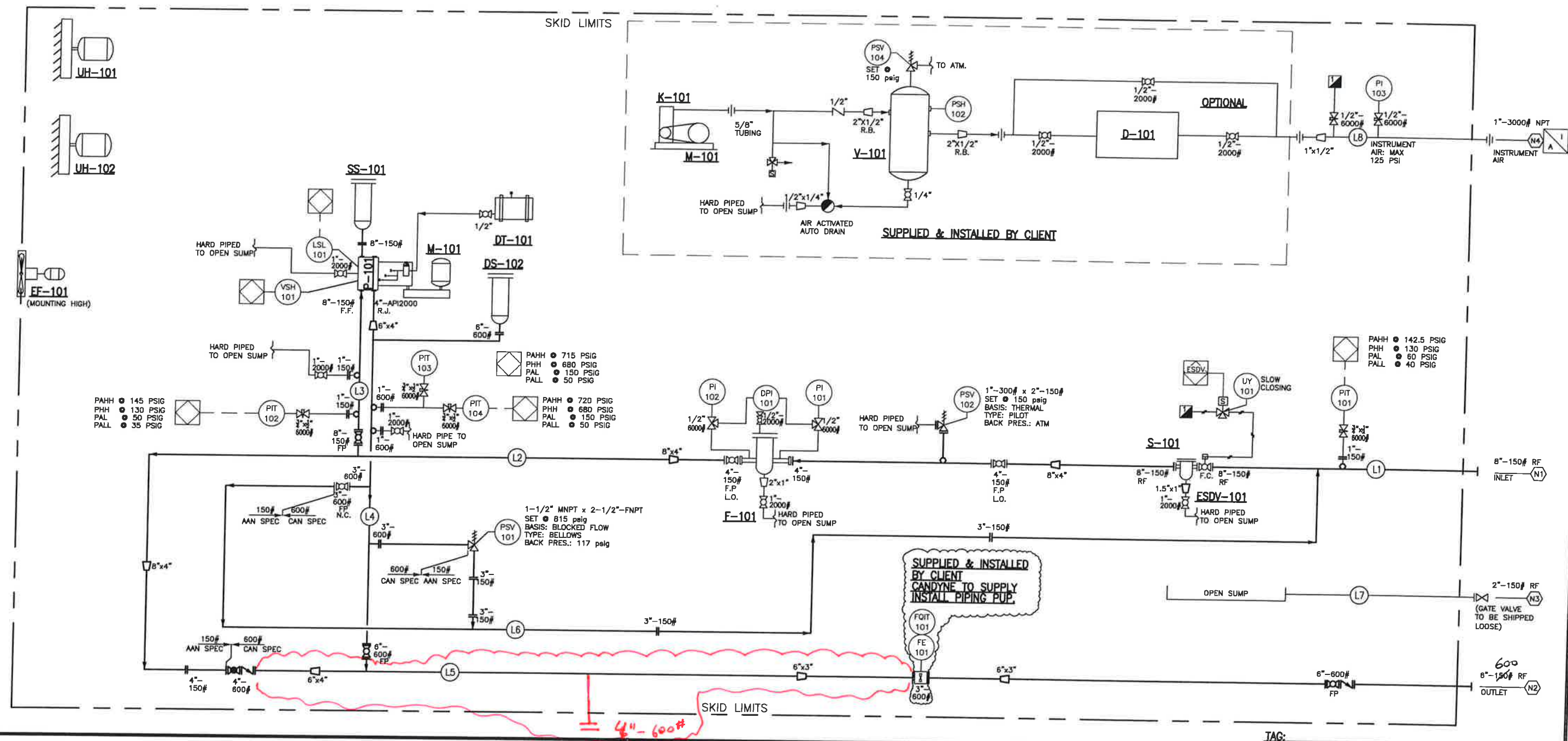
S-101
BASKET STRAINER
MAKE: ALTA
MODEL: BFS 150
MAWP: 285 PSIG @ 100°F

K-101
AIR COMPRESSORS
(CLIENT SUPPLIED)

M-101
ELECTRIC MOTOR (COMPRESSOR)
(CLIENT SUPPLIED)

V-101
WET AIR RECEIVER
(CLIENT SUPPLIED)

D-101
AIR MEMBRANE DRYER
(CLIENT SUPPLIED)



NOTES:

1. ALL TUBING TO BE 316 SS SEAMLESS TUBING & FITTINGS TO BE SWAGelok UNLESS REQUESTED OTHERWISE.
2. ALL INSTRUMENTATION COMPONENTS TO BE STAINLESS STEEL UNLESS INDICATED OTHERWISE.
3. ALL CONTROL/SHUTDOWN LOGIC IS TO BE SETUP BY THE CLIENT.
4. UNLESS NOTED OTHERWISE IT IS ASSUMED THAT VESSEL OVER PRESSURE PROTECTION HAS BEEN INCORPORATED IN THE CLIENT'S OPERATING PROCEDURE.
5. ALL PIPING IS DESIGNED TO ASME B31.3

REVISION SYMBOL =

REVISIONS:

REV	DATE	DESCRIPTION	DWN	CHK	APP
0	2013.04.03	IFC	AS	GP	-
1	2013.04.05	IFC	AS	GP	-
2	2013.04.10	IFC	AS	GP	-
3	2013.04.17	IFC	AS	GP	-

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APPROVALS:

APPROVED FOR CONSTRUCTION

DRAWINGS SHALL NOT BE USED FOR FABRICATION UNLESS THE THIS STAMP HAS BEEN SIGNED AND DATED BY CANDYNE PERSONNEL. WORK COMPLETED WITHOUT THIS APPROVAL IS AT THE RISK AND EXPENSE OF THE FABRICATOR. REFER TO NOTES BELOW

- ☐ APPROVED - PROCEED WITH CONSTRUCTION
☐ APPROVED AS NOTED - PROCEED WITH CONSTRUCTION

SIGNATURE

DATE

CanDyne
Pump Services Inc.

CLIENT: **ARC RESOURCES LTD.**

PACKAGE: **PROJECT 3989
FRESH WATER INJECTION PUMP PACKAGE
PROCESS & INSTRUMENTATION DIAGRAM**

DRAWN: 2013.02.20 DATE: AS DESIGN: GP SCALE: N.T.S. REV: 3

DRAWING NUMBER:

3989-01

LINE LIST																							
CLIENT PROJECT NO.: 3989				CLIENT: ARC RESOURCES LTD.				CUSTOMER PO/AFE NO.: 1360-36					ENGINEERING FIRM: TNT ENGINEERING LTD.						SKID LOCATION: TBD LSD: TBD				
LINE NO.	PIPE SPEC. NOTE 1	PIPE SIZE (in)	DESCRIPTION		PRESSURE (KPa)			TEMPERATURE (°C)		C.A (mm)	PIPE SCH.	X-RAY (%)	INT. COAT Y/N	MATL.	ANSI CLASS	INSULATION		SERVICE	FLUID	POST WELD TREATMENTS	TRACING	REFERENCE P&ID	COMMENTS
			FROM	TO	DESIGN	OPERATING	HYDRO TEST	DESIGN	OPERATING							TYPE	THK.						
L1	AAN (REV 3)	8"	SKID EDGE NOZZLE N1	F-101	1,965	ATM	2,948	-29 TO 38	21	1/16"	40	10	N	A106B	150	N	N	SWEET	WATER	NO	NO	3989-01	-
L2	AAN (REV 3)	8"/4"	F-101	L3/L5	1,965	ATM	2,948	-29 TO 38	21	1/16"	40	10	N	A106B	150	N	N	SWEET	WATER	NO	NO	3989-01	-
L3	AAN (REV 3)	8"	L2	P-101	1,965	ATM	2,948	-29 TO 38	21	1/16"	40	10	N	A106B	150	N	N	SWEET	WATER	NO	NO	3989-01	-
L4	CAN (REV 3)	6"	P-101	L5	10,204	4,965	15,306	-29 TO 38	21	1/16"	80	10	N	A106B	150	N	N	SWEET	WATER	NO	NO	3989-01	-
L5	CAN (REV 3)	6"	L2/L4	SKID EDGE NOZZLE N2	10,204	4,965	15,306	-29 TO 38	21	1/16"	80	10	N	A106B	150	N	N	SWEET	WATER	NO	NO	3989-01	-
L6	AAN (REV 3)	3"	L4	L1	1,965	ATM	2,948	-29 TO 38	21	1/16"	40	10	N	A106B	150	N	N	SWEET	WATER	NO	NO	3989-01	-
L7	AAN (REV 3)	2"	OPEN SUMP	SKID EDGE NOZZLE N3	N/A	ATM	N/A	N/A	21	N/A	80	N/A	N	A106B	150	N	N	SWEET	WATER	NO	NO	3989-01	NON CODE
L8	AAN (REV 3)	1"	I/A HEADER	SKID EDGE NOZZLE N4	1,965	ATM	N/A	-29 TO 38	21	1/16"	160	N/A	N	A106B	150	N	N	SWEET	WATER	NO	NO	3989-01	IN SERVICE TEST
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES:

1. REFER TO CANDYNE PUMP SERVICES PIPING SPECIFICATIONS "CPS AN01 REV. 3, AAN & CAN" (OCTOBER 2012)

REVISION SYMBOL =

REVISIONS:

REV	DATE	DESCRIPTION	DWN	CHK	APP
0	2013.04.03	IFC	AS	GP	-

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☐ APPROVED AS NOTED - PROCEED WITH CONSTRUCTION

SIGNATURE

DATE

TAG:

CanDyne
Pump Services Inc.

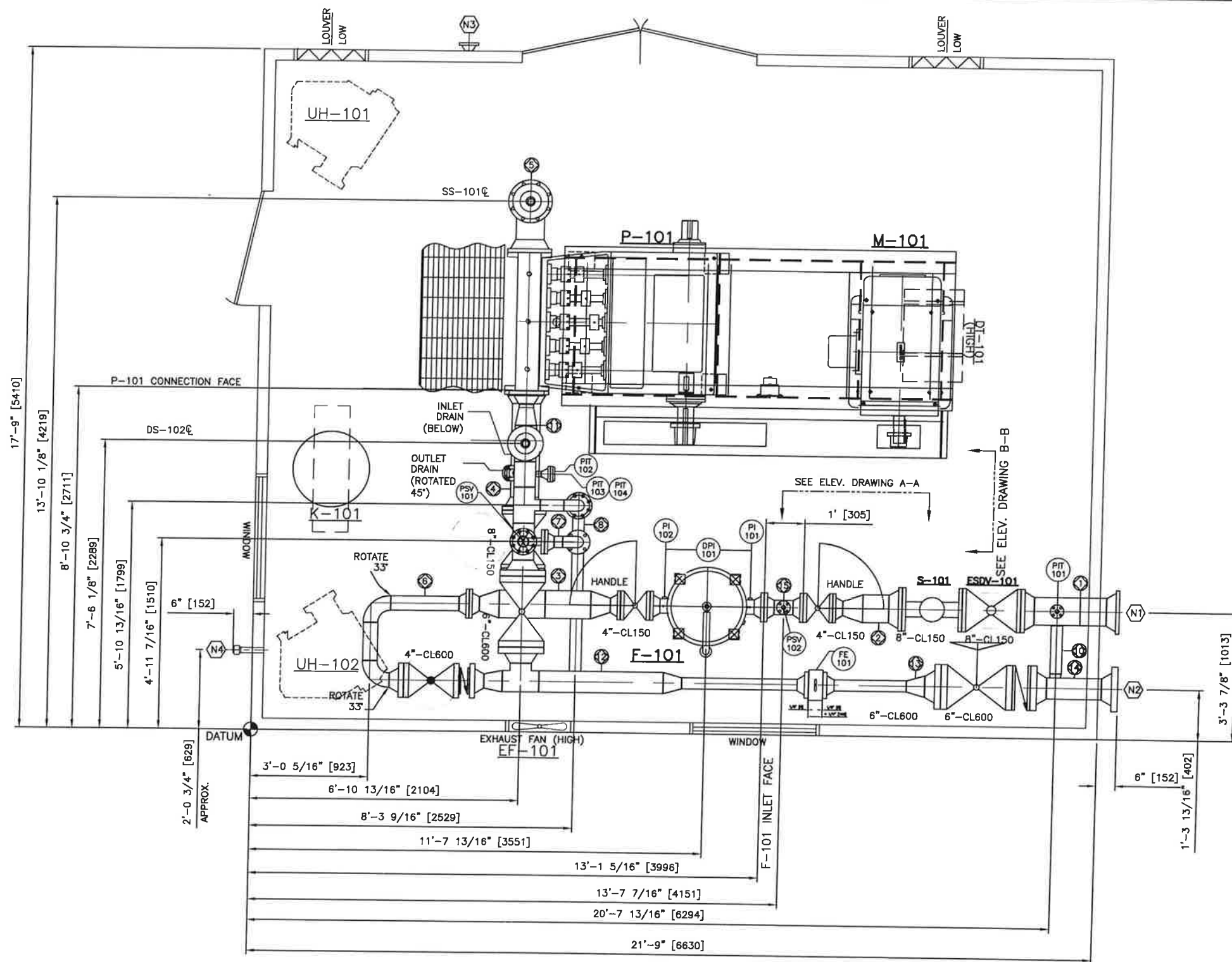
CLIENT: **ARC RESOURCES LTD.**
PACKAGE: **PROJECT 3989**
FRESH WATER INJECTION PUMP PACKAGE
LINE LIST

DRAWN: **AS** DATE: **2013.03.12** DESIGN: **LF** SCALE: **N.T.S.** REV: **0**

DRAWING NUMBER:

3989-02

REVISION SYMBOL =



TAG:

NOZZLE SCHEDULE

TAG	DESCRIPTION	SIZE (O.D.)	RATING	FACING	ELEV./F.O.F.	COMMENTS
N1	SUCTION INLET	8"	CL150	RF	-	-
N2	DISCHARGE OUTLET	6"	CL600	RF	-	-
N3	OPEN SUMP DRAIN	2"	CL150	RF	-	-
N4	INSTRUMENT AIR OUTLET	1"	3000#	NPT	-	-

REVISIONS:

REV	DATE	DESCRIPTION	DWN	CHK	APP
0	2013.04.03	IFC	AS	GP	-
1	2013.04.08	IFC	AS	GP	-
2	2013.04.17	IFC	AS	GP	-

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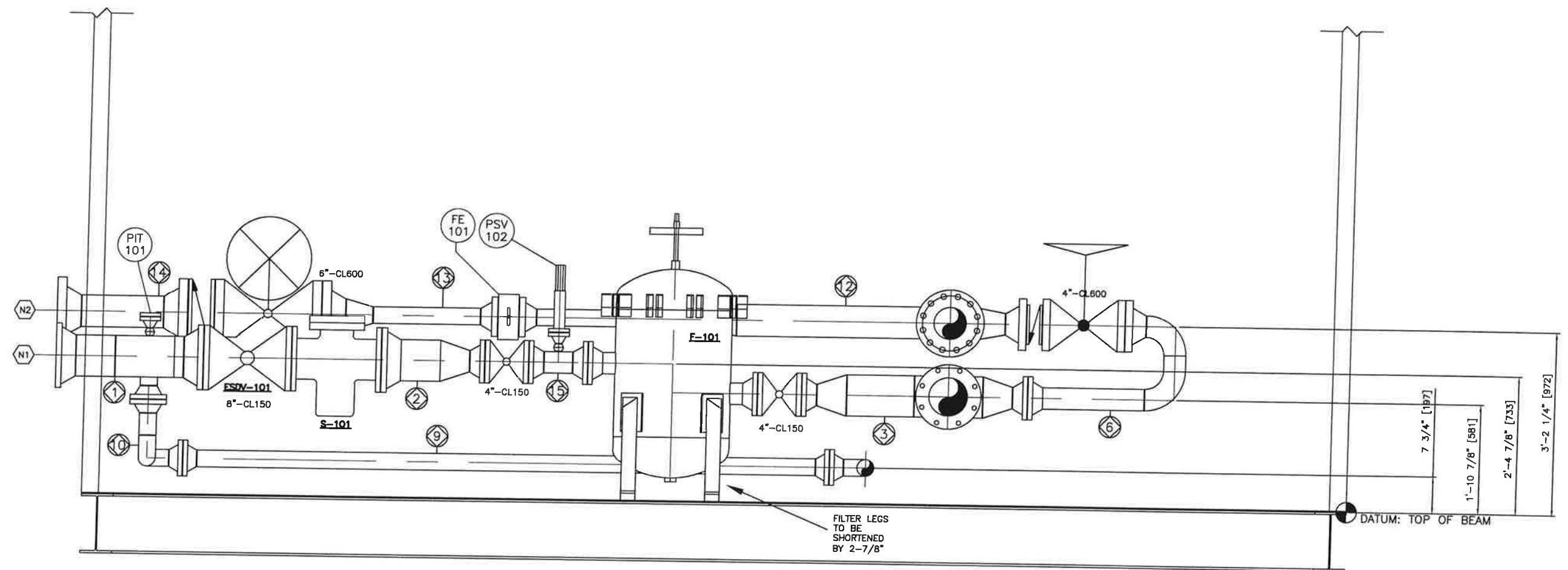
☐ APPROVED - PROCEED WITH CONSTRUCTION
☐ APPROVED AS NOTED - PROCEED WITH CONSTRUCTION

SIGNATURE _____ DATE _____

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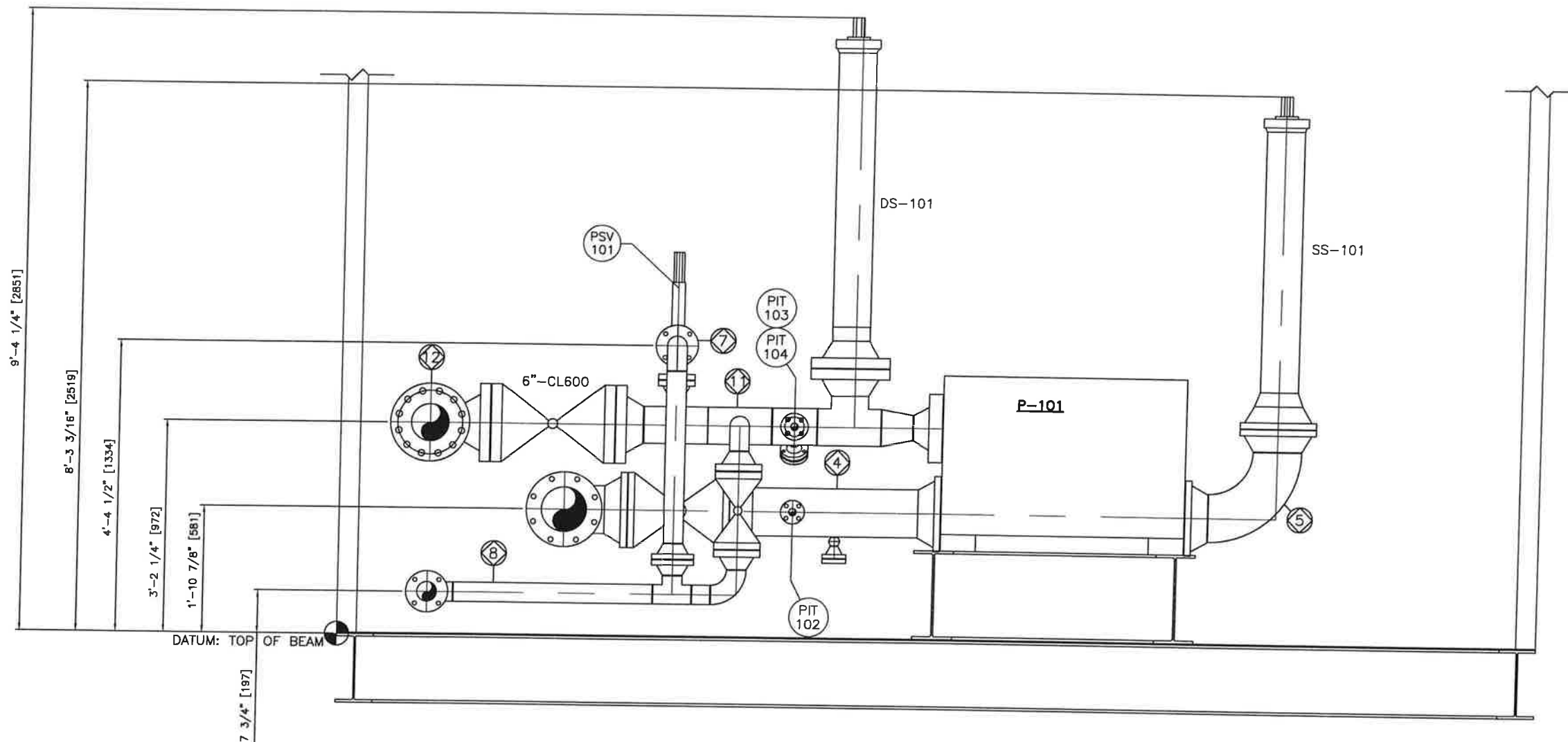
CLIENT: **ARC RESOURCES LTD.**
PACKAGE: **PROJECT 3989**
FRESH WATER INJECTION PUMP PACKAGE
GENERAL ARRANGEMENT DRAWING

DRAWN: AS DATE: 2013.02.21 DESIGN: LF SCALE: 1"=1' REV: 2
DRAWING NUMBER: **3989-10**



TAG: _____

NOTES: 1. -		REVISIONS: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV</th> <th>DATE</th> <th>DESCRIPTION</th> <th>DWN</th> <th>CHK</th> <th>APP</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>2013.04.04</td> <td>IFC</td> <td>AS</td> <td>GP</td> <td>-</td> </tr> <tr> <td>1</td> <td>2013.04.15</td> <td>IFC</td> <td>AS</td> <td>GP</td> <td>-</td> </tr> </tbody> </table>			REV	DATE	DESCRIPTION	DWN	CHK	APP	0	2013.04.04	IFC	AS	GP	-	1	2013.04.15	IFC	AS	GP	-	APPROVALS: <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; margin: 0;">APPROVED FOR CONSTRUCTION</p> <p style="font-size: 0.8em; margin: 0;">DRAWINGS SHALL NOT BE USED FOR FABRICATION UNLESS THE THIS STAMP HAS BEEN SIGNED AND DATED BY CANDYNE PERSONNEL. WORK COMPLETED WITHOUT THIS APPROVAL IS AT THE RISK AND EXPENSE OF THE FABRICATOR. REFER TO NOTES BELOW.</p> <p style="margin: 0;"> <input type="checkbox"/> APPROVED - PROCEED WITH CONSTRUCTION <input type="checkbox"/> APPROVED AS NOTED - PROCEED WITH CONSTRUCTION </p> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">SIGNATURE _____</div> <div style="width: 45%;">DATE _____</div> </div>																			
REV	DATE	DESCRIPTION	DWN	CHK	APP																																					
0	2013.04.04	IFC	AS	GP	-																																					
1	2013.04.15	IFC	AS	GP	-																																					
REVISION SYMBOL = THIRD ANGLE PROJECTION 		<div style="font-size: 0.8em;"> THIS DRAWING AND DATA EMBODY INFORMATION WHICH IS THE CONFIDENTIAL PROPERTY OF CANDYNE PUMP SERVICES INC. AND SHALL NOT BE COPIED, REPRODUCED, DISCLOSED TO OTHERS, OR USED IN WHOLE OR IN PART FOR ANY PURPOSE, WITHOUT THE EXPRESS WRITTEN CONSENT OF CANDYNE PUMP SERVICES INC. </div>			<div style="text-align: center;"> CanDyne Pump Services Inc. </div> <table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <tr> <td colspan="6">CLIENT: ARC RESOURCES LTD.</td> </tr> <tr> <td colspan="6">PACKAGE: PROJECT 3989</td> </tr> <tr> <td colspan="6">FRESH WATER INJECTION PUMP PACKAGE</td> </tr> <tr> <td colspan="6">ELEVATION A-A DRAWING</td> </tr> <tr> <td>DRAWN: AS</td> <td>DATE: 2013.03.12</td> <td>DESIGN: LF</td> <td>SCALE: 1'-1"</td> <td>REV: 1</td> <td></td> </tr> <tr> <td colspan="6">DRAWING NUMBER: 3989-11</td> </tr> </table>		CLIENT: ARC RESOURCES LTD.						PACKAGE: PROJECT 3989						FRESH WATER INJECTION PUMP PACKAGE						ELEVATION A-A DRAWING						DRAWN: AS	DATE: 2013.03.12	DESIGN: LF	SCALE: 1'-1"	REV: 1		DRAWING NUMBER: 3989-11					
CLIENT: ARC RESOURCES LTD.																																										
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DRAWN: AS	DATE: 2013.03.12	DESIGN: LF	SCALE: 1'-1"	REV: 1																																						
DRAWING NUMBER: 3989-11																																										



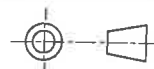
TAG: _____

NOTES:

1. -

REVISION SYMBOL =

THIRD ANGLE PROJECTION



REVISIONS:

REV	DATE	DESCRIPTION	DWN	CHK	APP
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1	2013.04.17	IFC	AS	GP	-

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DATE _____

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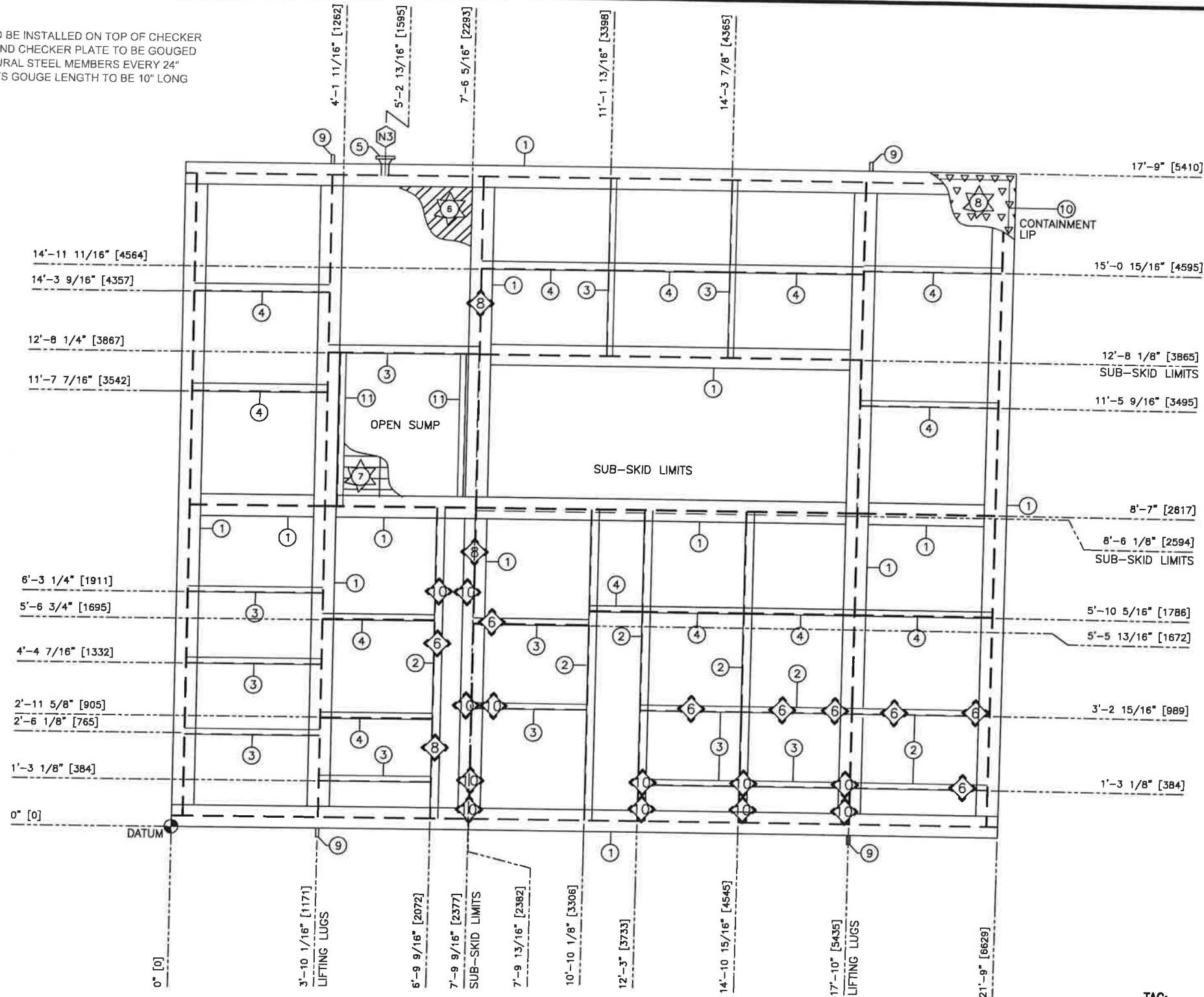
CLIENT: **ARC RESOURCES LTD.**

PACKAGE: **PROJECT 3989
 FRESH WATER INJECTION PUMP PACKAGE
 ELEVATION B-B DRAWING**





DRAWN: AS DATE: 2013.03.12 DESIGN: LF SCALE: 1'-1" REV: 1

DRAWING NUMBER:

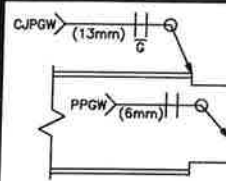
3989-12



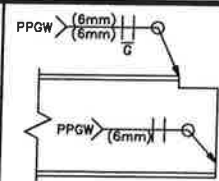
PIPE SUPPORT SYMBOLS

-  HSS: 6" x 6" x 1/4"
 HSS: 4" x 4" x 1/4"
 HSS: 3" x 3" x 1/4"
 HSS: 2" x 2" x 1/4"

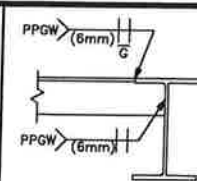
STRUCTURAL DETAILS



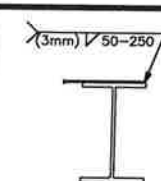
1.WPS: FCAW726
WPS: FCAW725
FULL COPE



2.WPS: FCAW725



3.WPS: FCAW725



4 WPS: ECAW970

REVISION SYMBOL = 

[illegible]

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SIGNATURE

DATE _____

[illegible]

1. STRUCTURAL STEEL MATERIAL SHALL CONFORM TO CSA G40.21 & G40.21-M (LATEST EDITION):
 - HOLLOW STRUCTURAL SECTIONS: 350W
 - WIDE FLANGE SECTIONS: 350W
 - PLATE & ROLLED SECTIONS: 300W
 - ALL OTHER SECTIONS: 300W
2. ALL STRUCTURAL STEEL FABRICATION & ASSEMBLY SHALL BE PERFORMED IN ACCORDANCE WITH CAN/CSA-S16-09 "DESIGN OF STEEL STRUCTURES", UNLESS STATED OTHERWISE.
3. ALL SHOP CONNECTIONS SHALL BE FULLY WELDED, UNLESS NOTED OR DETAILED OTHERWISE, WITH A 1/4" (6mm) CONTINUOUS FILLET WELD.
4. NDE REQUIREMENTS ARE AS PER PURCHASE ORDER.
5. ALL WELDED ASSEMBLIES HAVE TO MEET THE ACCEPTANCE CRITERIA OF CSA W59.
6. ALL KERF AND DROSS TO BE REMOVED FOR ALL GROOVE WELD ASSEMBLIES.
7. ALL STRUCTURAL STEEL SURFACES TO BE CLEANED IN ACCORDANCE WITH SSPC SPECIFICATION SP-6 "COMMERCIAL BLAST CLEANING".
8. FLOOR PLATE AND OUTSIDE VERTICAL FACE OF STRUCTURAL STEEL SHALL BE PRIMED WITH GREY PRIMER TO A DFT. OF 4-6mils AND TOP COATED WITH BLACK ENAMEL TO A DFT. OF 2-3mils, UNLESS CLIENT'S SPECIFICATIONS STATE OTHERWISE.
9. ALL PAINTING SHALL BE DONE IN ACCORDANCE WITH THE PAINT MANUFACTURER'S SPECIFICATIONS.
10. THE UNDERSIDE OF THE SKID SHALL BE INSULATED WITH SPRAY-ON URETHANE, 78mm THICK, WITH FIRE RETARDANT CONFORMING TO ASTM E84.
11. LIFTING LOGS ARE FOR VERTICAL LIFTING ONLY, UNLESS STATED OTHERWISE.
12. SKID IS DESIGNED FOR TRANSPORT WITH BUILDING, PIPING, AND EQUIPMENT INSTALLED.

CanDyne
Pump Services Inc.

CLIENT: **ARC RESOURCES LTD.**

PACKAGE: PROJECT 3989
FRESH WATER INJECTION PUMP PACKAGE
STRUCTURAL DRAWING

DRAWN:	DATE:	DESIGN:	SCALE:	REV:
AS	2013.02.21	LF	1'-1"	2
DRAWING NUMBER:				

3989-20