



FR:

**Cripple Creek & Victor Gold Mining**

A Joint Venture · ANGLOGOLD ASHANTI (COLORADO) CORP., Manager

**Operations Office**

P.O. Box 191 · 100 North 3<sup>rd</sup> Street  
Victor, Colorado 80860  
(719) 689-2977 – Fax (719) 689-3254



SENT CERTIFIED, RETURN RECEIPT REQUESTED  
7014-2870-0001-3417-5947

22 June 2015

TO: Mr. Timothy Cazier, P.E.  
Environmental Protection Specialist  
Colorado Department of Natural Resources  
Division of Reclamation, Mining and Safety  
Office of Mined Land Reclamation  
1313 Sherman Street, Room 215  
Denver, Colorado 80203

**RECEIVED**

✓ JUN 24 2015  
DIVISION OF RECLAMATION  
MINING AND SAFETY

Re: Permit No. M-1980-244; Cripple Creek & Victor Gold Mining Company ("CC&V");  
Cresson Project; – Request for Technical Revision ("TR-74") Squaw Gulch Valley Leach  
Facility Toe Berm Underdrain Pump-back (SGVLFU), Responses to the DRMS Preliminary  
Adequacy Review Comments Correspondence of 6/3/2015

Dear Mr. Cazier:

CC&V has reviewed the DRMS comments regarding the above referenced topic and offer the following:

1) *Drawings 30-800-19 and 600-800-20:*

- a. *Theses drawings were submitted with a significantly reduced scale and are difficult to read. Please provide drawings at a reasonable scale in accordance with Rule 6.2.1(2) (e).*

CC&V Response - Enclosed are the referenced drawings at a larger scale to facilitate your review.

- b. *No specific information could be discerned from these drawings regarding the pipeline between the pump station and the SGADR. Please provide drawings and specifications to ensure the Division the pipeline and pump are designed appropriately for the significant total dynamic head to be experienced by this system*

CC&V Response – Enclosed is an additional drawing (30-800-10) that provides profile information for the proposed pipeline. Also, enclosed are the pump and pipe specifications, as well as, the pump calculations.

2) *During the meeting with CC&V Projects and AMEC on March 11, 2015 the Division requested information be included in the TR addressing the pump-back system modifications that are not included in the current submittal. The Division requires the following information:*

a. *Total dynamic head hydraulic analysis of the pump-back system and pipe specifications to ensure the pipe has an adequate pressure rating. (Note: Patrick Marley discussed this with me and assured me it would be included in the TR.)*

CC&V Response – Enclosed, as mentioned previously, are the specifications for the pumps and pipe, as well as, the pump calculations. Regarding an analysis, CC&V requested pursuant to the referenced conversation, from AMEC Foster Wheeler the design consultants, a brief confirmation that the system design adequately addressed the head/pressure requirements. AMEC Foster Wheeler provided the following:

- DR 11 HDPE pressure rating = 189 psig @ 73 degrees
- Pump-back operating pressure = 131 psig
- The 4YR piping is open to the atmosphere at its high point and will not allow pressure build up in excess of what is required to pump up the hill – i.e. 131 psig

Therefore, DR-11 piping is adequate for this service.

b. *A monitoring plan for the regular inspection of the pump-back ponds for the purpose of monitoring the integrity of the concrete, GCL and Geomembrane liner.*

CC&V Response – At completion of pump-back and associated concrete sump lining installation activities, CC&V will visually inspect the integrity of the liner during on-going routine collection of pump-back data (inflow rate, volume pumped back to the SGADR area, etc.).

c. *A commitment to provide as-constructed and/or record drawings of the pump-back system as part of the SGVLF Phase I CQA certification report.*

CC&V Response – At completion of pump-back and associated concrete sump lining installation activities, within the SGVLF Phase I CQA report, CC&V will provide as-constructed information for the concrete sump lining activities. The as-built pump-back and associated pipeline locations will also be provided.



- 3) *The Division does not expect significant sediment in the pump-back ponds from the underdrain system, but due to winds, sediment will accumulate over time in these ponds. Please provide a maintenance summary that addresses sediment removal that will prevent damage to the proposed liner system.*

CC&V Response – If significant sedimentation occurs in the lined ponds, CC&V will add sufficient water to the deposited sediment to allow for the mixture to be pumped out of the ponds and returned to the SGADR area.

- 4) *The latest version of the site specifications provided to the Division does not include specifications for any GCL product. Please provide a GCL specification applicable to the underdrain project.*  
*a. This specification should be referenced on Drawing U100.*

CC&V Response – Enclosed are Drawings U100 (Sheet 1 of 2) and U105 (Sheet 2 of 2). Drawing U105 provides specification information for the GCL liner.

Please contact me at (719)-689-4048 should you have additional questions or wish to discuss our responses.

Sincerely,



Chris Hanks  
Chief Environmental Coordinator

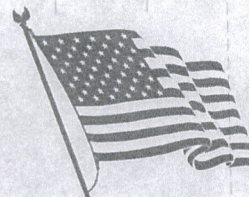
CC: Johnathan Gorman  
XC: Lynda Morgan, Teller County Planning  
Byron Hakes, Mayor, City of Victor

Enclosures: Referenced Drawings, Specifications, and Calculations





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**Cripple Creek &  
Victor Gold Mining  
Company**

A Joint Venture - **ANGLOGOLD** (COLORADO) CORP., Manager

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# PIPING MATERIAL SPECIFICATION FOR CRIPPLE CREEK & VICTOR GOLD MINING COMPANY 4YR

## HDPE DR 11

SERVICE:	Barren Solution Pregnant Solution Underground Fresh Water Underground Natural Gas Hydrochloric Acid
CONSTRUCTION AND MATERIALS:	2" to 30" Butt Fusion Welded and Flanged
ALLOWANCE FOR CORROSION:	None
GENERAL MATERIAL:	High Density Polyethylene PE4710 ASTM D3350 Cell Classification PE 445474C
MAXIMUM DESIGN PRESSURE:	189 psig @ 73°F, 153 psig @ 100°F, 124 psig @ 120°F, 94 psig @ 140°F
TEMPERATURE RANGE:	-20°F to 140°F
MAXIMUM HYDROSTATIC TEST PRESSURE:	284 psig (Test below 100°F) See piping line list for specific test pressures

### NOTES:

- Piping materials must be manufactured under ASTM D3350 with a cell classification PE 445474C.
- Gaskets are required for all flanged connections between HDPE and Non-HDPE flanges (i.e. steel). Gaskets are not required for HDPE to HDPE flanged connections.
- Piping systems in natural gas service shall comply with ASTM D2513
- Maximum design pressure is based on the use of specific fittings listed below, fittings shall be purchased that meet the maximum design pressure. Other fittings shall not be used without written approval from the Owner. Crosses and Wyes are not allowed without approval from piping engineer.
- Where joining fittings of different DR, taper to match.
- Molded fitting and Flanged / Mechanical Joint Adapters shall meet ASTM D3261 standards. Fabricated fittings shall be fabricated using Data Loggers.
- Electrofusion fittings shall only be used under the direction of the piping engineer. Electrofusion fittings shall meet the design pressure rating of this specification and ASTM F1055.
- Lug style valves are preferred over wafer style valves.
- For Hydrochloric Acid service valves, blinds and bleed rings shall be selected and approved by the piping engineer.
-  All flange connections in Hydrochloric Acid Service shall be installed with flexible flange safety shields. Shields shall be, PVC Safety Spray Shields as manufactured by Advanced Product & Systems for an operating temperature of 140°F maximum.
-  Purchase flange bolts with lugged butterfly valves.
-  All flange fit-up between HDPE and flat face flanges on piping and equipment shall use an SP-035 filler ring.
-  Viton gaskets shall be used in Hydrochloric Acid Service "HCL"

### Instrument Connection



Thermowell:  
Pressure Gage:  
Orifice Taps:  
Line Vents/Drains:

2" flanged connection  
2" flanged ball valve VB-131T (VB-1371TG in HCL service only)  
None allowed  
2" flanged ball valve VB-131T

4YR





SPECIFICATION FOR  
PIPING MATERIALS  
SPEC 4YR

REV. 4  
03/2015  
PAGE 2 OF 5

Pipe	Description	Code
2" to 30"	HDPE IPS DR 11 PE-4710 ASTM D3350 cell class	Note 3

Flanges	Description	Code
1" to 1-1/2"	Class 150 bolt pattern HDPE Flange Adapter, DR 11, w/ steel or ductile iron back-up ring	Allowed at equipment only Note 10
2" to 30" Flange	Class 150 bolt pattern HDPE Flange Adapter, DR 11, w/ steel or ductile iron back-up ring	Note 10
2" to 30" Blind Flange	Class 150 Raised Face Forged Steel, ASTM A105	Note 10

Fittings	Description	Code
2" to 12" Tee	Molded butt fusion, DR 11 IPS PE-4710 ASTM D3350 cell class	
14" to 30" Tee	3-Segment Fabricated butt fusion, DR 9 IPS PE-4710 ASTM D3350 cell class	
2" to 12" Reducing Tee	Manufactured Branch Saddle Reducing Tee, DR 11 IPS PE-4710 ASTM D3350 cell class	
2" to 12" Branch Saddle	Molded butt fusion, DR 11 IPS PE-4710 ASTM D3350 cell class	
2" to 12" 90° Ell	Molded butt fusion, DR 11 IPS PE-4710 ASTM D3350 cell class	
14" to 30" 90° Ell	5-Segmet Fabricated butt fusion, DR 9 IPS PE-4710 ASTM D3350 cell class	
2" to 12" 45° Ell	Molded butt fusion, DR 11 IPS PE-4710 ASTM D3350 cell class	
14" to 30" 45° Ell	3-Segmet Fabricated butt fusion, DR 9 IPS PE-4710 ASTM D3350 cell class	
2" to 30" 22.5° Ell	2-Segmet Fabricated butt fusion, DR 9 IPS PE-4710 ASTM D3350 cell class	
2" to 30" Sweep Bend	Manufactured butt fusion, DR 11 IPS PE-4710 ASTM D3350 cell class	
1" to 1-1/2" Reducer	Molded butt fusion, DR 11 IPS PE-4710 ASTM D3350 cell class	Allowed at equipment only
2" to 30" Reducer	Molded butt fusion, DR 11 IPS PE-4710 ASTM D3350 cell class	
2" to 30" Wall Anchor	Molded butt fusion, DR 11 IPS PE-4710 ASTM D3350 cell class	
2" to 30" Cap	Molded butt fusion, DR 11 IPS PE-4710 ASTM D3350 cell class	
2" to 6" HDPE-steel transitions	Butt fusion w/steel weld end or thread, DR 11 IPS PE-4710 ASTM D3350 cell class	

4YR



Valves	Description	Code
1/2" to 2" Ball	Socket Threaded CPVC Body & Ball, Teflon Seats & Seals, Viton O-Rings	V104
1/2" to 2" Ball	Socket Threaded CPVC Body & Ball, Teflon Seats & Seals, Viton O-Rings	V105
2 1/2" to 6" Ball	Socket or Flanged CPVC Body & Ball, Teflon Seats & Seals, Viton O-Rings	V105
1" to 6" Ball	Flanged 150# Dekarane 470 Vinyl Ester Resin Reinforced with Glass Fibers Body, Live Loaded Stem & Ball, Hast C276 Encapsulated Carbon Graphite Reinforced Vinyl Ester, PTFE Seats	V169
2" to 4" Ball	Raised Face 150# Steel Body, Wrench Operator	VB-131T
6" to 12" Ball	Raised Face 150# Steel Body, Gear Operator	VB-131T
1/2" to 2" Check	Socket Threaded CPVC Body & Ball, Teflon Seats & Seals, Viton O-Rings	V107
2 1/2" to 6" Check	Socket or Flanged CPVC Body & Ball, Teflon Seats & Seals, Viton O-Rings	V107
1" to 6" Check	Flanged 150# Dekarane 470 Vinyl Ester Resin Reinforced with Glass Fibers Body, Solid PTFE Ball & Seat, 1PSI Cracking Pressure	V170
2" to 30" Check	Raised Face 150# Steel Body, Stellite Trim, Bolted Cap	VC-131S
1" to 6" Ball (HCL service only)	Flat Face 150# 1/4 turn, thermoset plastic	VB 1371TG
1" to 6" Check (HCL service only)	Flat Face 150# Ball check, thermoset plastic	VC 1373BG
3" to 20" Check	Wafer 150# Steel Body, Dual Check	VC-171D
2" to 24" Knife Gate	Flat Face 150# Flanged, DI Body, 316 SS gate	VK-171U
2" to 4" Butterfly	Raised Face 150# Cast steel Body, Duplex SS Seats, Short Pattern, Wrench Operator	VF-134U
6" to 30" Butterfly	Raised Face 150# Cast steel Body, Duplex SS Seats, Short Pattern, Wrench Operator	VF-134U
2" to 24" Gate	Raised Face 150# Steel Body, Stellite Trim, Solid Wedge	VG-131R
2" to 8" Globe	Raised Face 150# Steel Body, Stellite Trim, Bolted Bonnet	VO-131R
1/2" to 2" Diaphragm	Flanged 150# PCV Body, EPDM O-Ring & Diaphragm	V118
2 1/2" to 4" Diaphragm	Flanged 150# PCV Body, EPDM O-Ring & Diaphragm	V118
6" Diaphragm	Flanged 150# PCV Body, EPDM O-Ring & Diaphragm	V118
8" Diaphragm	Flanged 150# PCV Body, EPDM O-Ring & Diaphragm	V118
1/2" to 3" Pinch	Flanged 125# Vinylester-Fiberglass Composite Body, Fabric Reinforced Elastomer o PTFE Lined Sleeve	V156





SPECIFICATION FOR  
PIPING MATERIALS  
SPEC 4YR

REV. 4  
03/2015  
PAGE 4 OF 5

Gaskets/Bolts	Description		Code
2" to 30" Gaskets	Raised Face 150# 1/8"	Garlock Blue Gard 3000 or equal	
2" to 30" Gaskets	Flat Face 150# 1/8"	Garlock Blue Gard 3000 or equal	
2" to 30" Gaskets	Raised Face 150# 1/8"	Garlock Style 9518 or equal – Viton <b>HYDROCHLORIC ACID SERVICE ONLY</b>	See Note 13
2" to 30" Gaskets	Flat Face 150# 1/8"	Garlock Style 9518 or equal – Viton <b>HYDROCHLORIC ACID SERVICE ONLY</b>	See Note 13
2" to 30" Stud	Stud	ASTM A193 GR B7 w/ A194 GR 2H Nuts	
2" to 30" Bolts	Bolts	ASTM A307 Gr. B	For tapped valves

Inline	Description		Code
2" to 30" Paddle Blind	Raised Face 150#	ASTM 516 GR70 per API 590	
2" to 30" Spec. Blind	Raised Face 150#	ASTM 516 GR70 per API 590	
2" to 30" Bleed Ring	Raised Face 150#	ASTM 516 GR70 per API 590	

4YR





SPECIFICATION FOR  
PIPING MATERIALS  
SPEC 4YR

REV. 4  
03/2015  
PAGE 5 OF 5

90° Branch Connection Table

		Branch Size												
Header Size		2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"
2"	-	TEE	.	.	.	.	.	.	.	.	.	.	.	.
3"	-	RT	TEE	.	.	.	.	.	.	.	.	.	.	.
4"	-	RT	RT	TEE	.	.	.	.	.	.	.	.	.	.
6"	-	RT	RT	RT	TEE	.	.	.	.	.	.	.	.	.
8"	-	RT	RT	RT	RT	TEE	.	.	.	.	.	.	.	.
10"	-	RT	RT	RT	RT	RT	TEE	.	.	.	.	.	.	.
12"	-	RT	RT	RT	RT	RT	RT	TEE	.	.	.	.	.	.
14"	-	RT	RT	RT	RT	RT	RT	RT	FAB	.	.	.	.	.
16"	-	RT	RT	RT	RT	RT	RT	RT	.	FAB	.	.	.	.
18"	-	RT	RT	RT	RT	RT	RT	RT	.	.	FAB	.	.	.
20"	-	RT	RT	RT	RT	RT	RT	RT	.	FAB	.	FAB	.	.
24"	-	RT	RT	RT	RT	RT	RT	RT	.	FAB	.	.	FAB	.
30"	-	RT	RT	RT	RT	RT	RT	RT	.	FAB	.	.	.	FAB
Header Size		3"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"
		Branch Size												

NOTES:

TEE = Molded Tees  
RT = Reducing Tee / Branch Saddle  
FAB = Fabricated Tee



# CALCULATION COVER SHEET

<b>JOB NO:</b> <b>186-134031</b>	<b>PROJECT:</b> <b>CC&amp;V Squaw Gulch ADR2</b>	<b>SITE OR PHASE:</b>	<b>CALC:</b> <b>134031-ME31-CALC-024</b>
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<b>TITLE/SUBJECT:</b> Pump Back Pumps
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<b>STATEMENT OF PROBLEM:</b>  Calculate the head required for two pumps (each operating at 25 gpm in parallel) to deliver 50 gpm of water from the Pump Back Pond to the leach pad.  Assumptions: <ol style="list-style-type: none"><li>1. The lengths/routing of pipe from the pump header to the discharge onto the pad</li><li>2. All distances/elevations inserted on the drawings were estimated by measuring the drawing with the scale given.</li><li>3. Pump will discharge 15' above grade onto the pad</li><li>4. Viscosity is 1.2 cP</li></ol>	<b>P.E. SEAL</b>
--	------------------

<b>SOURCES OF DATA, FORMULA &amp; REFERENCES:</b> <ol style="list-style-type: none"><li>1. Response to RFI-FW-129</li><li>2. CC&amp;V comments to Model Review 3 Notes</li><li>3. PFD 10-846-01 Rev C, 10-800-28 Rev B</li><li>4. P&amp;ID 11-846-80 Rev D</li><li>5. Drawing 30-800-22</li><li>6. "MLE2 VLF Pumpback Pond As-Built" drawing</li><li>7. Pipe Specification 4YR</li></ol>
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<b>CONCLUSIONS &amp; RECOMMENDATIONS:</b>  The calculated head for at 50 gpm is @ 288 ft. TDH Recommended safety factor is 3%  Both pumps shall be sized for 25 gpm @ 297 ft. TDH
--

<b>B</b>	<b>12/9/2014</b>	<b>Updated flow rate per CC&amp;V direction</b>	<b>BBL</b>		
<b>A</b>	<b>9/23/2014</b>	<b>Detail Engineering</b>	<b>CLC</b>	<b>BBL</b>	
<b>REV</b>	<b>DATE</b>	<b>DESCRIPTION/STATUS</b>	<b>BY</b>	<b>CHKD</b>	<b>QA</b>





<b>PROJECT:</b> CC&V ADR2			PROJ NO.: 134031 CALC NO.: 134031-ME31-CALC-024 BY: BBL      DATE: 12/9/2014 CHK:      DATE: REV: B		
<b>SUBJECT:</b> Pump Back Pumps					
1	2	3	4	5	Totals
Pump Suction	Pump Discharge	Point 2	Point 3		
TO	TO	TO	TO		
Pump Discharge	Point 2	Point 3	Discharge Point		
General Energy Equation: $P_1/g + z_1 + v_1^2/2*g + h_A + h_L = P_2/g + z_2 + v_2^2/2*g$					
	124.11	22.80	20.55	0.00	
4005.7	4005.7	4093.7	4093.7	4101.7	
0.00	0.20	0.20	0.20	0.20	
124.79					124.79
-0.49	-13.34	-2.24	-12.54		-28.61
124.11	22.80	20.55	0.00	0.00	0.00
4005.7	4093.7	4093.7	4101.7	4101.7	
0.20	0.20	0.20	0.20	0.20	
0.00					
0.00					
9244.00	9244.00	9447.00	9447.00	9465.50	
9244.00	9447.00	9447.00	9465.50	9465.50	
2	2	2	2	2	
HDPE DR 11.0	HDPE DR 11.0	HDPE DR 11.0	HDPE DR 11.0	HDPE DR 11.0	
0.16	0.16	0.16	0.16	0.16	
50	50	50	50	50	
0.11	0.11	0.11	0.11	0.11	
5.41	5.41	5.41	5.41	5.41	
0.45	0.45	0.45	0.45	0.45	
0.0196	0.0196	0.0196	0.0196	0.0196	
Glass, Plastic	Glass, Plastic	Glass, Plastic	Glass, Plastic	Glass, Plastic	
0.000005	0.000005	0.000005	0.000005	0.000005	
6.8E+04	6.8E+04	6.8E+04	6.8E+04	6.8E+04	
1.2	1.2	1.2	1.2	1.2	
2.51E-05	2.51E-05	2.51E-05	2.51E-05	2.51E-05	
1.20	1.20	1.20	1.20	1.20	
1.29E-05	1.29E-05	1.29E-05	1.29E-05	1.29E-05	
1	1	1	1	1	
62.40	62.40	62.40	62.40	62.40	
-1.12	-30.80	-5.17	-28.93		-66.02
	535.01	91.00	499.00		
126.32	160.00	20.00	172.63		
20.45	560.92	94.24	526.95		
-1.12	-30.80	-5.17	-28.93		-66.02
-0.49	-13.34	-2.24	-12.54		-28.61
	-203.00		-18.50		-221.50
	-87.97		-8.02		-95.98
-1.12	-233.80	-5.17	-47.43		-287.52
-0.49	-101.31	-2.24	-20.55		-124.59
287.98					287.98
124.79					124.79

Form Version: 0.1308

**Notes:**

Hydraulic power : 3.64 hp  
 estimated efficiency : 0.75  
 estimated motor power : 4.85 hp



Pipe Section:		1	2	3	4
Start:		Pump Suction	Pump Discharge	Point 2	Point 3
End:		Pump Discharge	Point 2	Point 3	Discharge Point
Pipe Size:	NPS	2	2	2	2
Pipe Schedule:		HDPE DR 11.0	HDPE DR 11.0	HDPE DR 11.0	HDPE DR 11.0
Pipe I.D. (ft):	ft	0.16	0.16	0.16	0.16
<b>Pumps</b> (list below)					
	ft	287.98			
<b>Valves</b>					
Type	L/D / Each	Quantity	Quantity	Quantity	Quantity
Gate Fully Open	8				
Check, Swing	100	1			
Ball Fully Open	3				
-					
-					
-					
Total L/D	L/D	100			
<b>Fittings</b>					
Type	L/D / Each	Quantity	Quantity	Quantity	Quantity
90 deg Elbow, r/d = 1.0	20		3	1	6
Standard Tee-Flow Thru Run	20		2		
Standard Tee-Flow Thru Branch	60		1		
45 deg Elbow, r/d = 1.5	7				
-					
-					
Total L/D	L/D		160	20	120
<b>Entrance &amp; Exit Losses</b>					
Entrance Conditions		Sharp Edge Inlet (r/D=	None	None	None
Exit Conditions		None	None	None	Sharp Edged
Total Value	L/D	26			53
<b>Reducer: Contraction</b>					
d <sub>2</sub> = Large Pipe Size	NPS				
d <sub>1</sub> = Small Pipe Size	NPS				
Angle	Deg				
Quantity		0	0	0	0
Total L/D	L/D				
<b>Reducer: Enlargement</b>					
d <sub>2</sub> = Large Pipe Size	NPS				
d <sub>1</sub> = Small Pipe Size	NPS				
Angle	Deg				
Quantity		0	0	0	0
Total L/D	L/D				
L/D for reducers is adjusted for line size.					
<b>Losses &amp; Equivalent Lengths</b>					
Valves & Fittings	L/D	126	160	20	173
	L/D				
	K Value				
	Cv				
Control Valve & Instruments	L/D				
	L/D				
	K Value				
	Cv				
Orifice	L/D				
Diameter	inch				
Type		-	-	-	-
Flow Coefficient = C					
Equipment	L/D				
	L/D				
	K Value				
	Cv				
Other Losses	ft				
Loss	ft				
Description					





# ENGINEERING SPECIFICATION

JOB NO: 134031 SPEC. NO.: 134031-ME-010

FOR: PUMP BACK PUMPS

SQUAW GULCH ADR2 PROJECT

CRIPPLE CREEK AND VICTOR GOLD MINING COMPANY

VICTOR, COLORADO

PREPARED BY:	B. LARSON	DISCIPLINE:	MECHANICAL	DATE:	10 DEC 2014
PRIME REVIEW BY:		DISCIPLINE:		DATE:	
TECH.REVIEW BY:		DISCIPLINE:		DATE:	
TECH.REVIEW BY:		DISCIPLINE:		DATE:	
TECH.REVIEW BY:	A. HANSON	DISCIPLINE:	PROJECT ENGINEER	DATE:	11 DEC 2014
PROJ MGM. APPROV. BY:	C. TRAUTNER	TITLE:	PROJECT MANAGER	DATE:	
PROJ PROCESS SUPER:	D. DEEMER	TITLE:	PROJ PROCESS SUPER.	DATE:	
CLIENT APPROVAL BY:	R. ROBERTS / A. THABIT	TITLE:	PROJECT MANAGER	DATE:	
REVISION DESCRIPTION	SECT. OR PAGES	REV BY	APP BY	REV NO.	DATE
ISSUED FOR INTERNAL REVIEW	ALL	BL	AH	A	10 DEC 2014
ISSUED FOR CLIENT REVIEW	ALL	BL	AH	B	11 DEC 2014
ISSUED FOR QUOTE	ALL	BL	AH	C	17 DEC 2014
ISSUED FOR PURCHASE	ALL	BL	AH	0	19 JAN 2015

## 1.0 INTRODUCTION

- 1.1 This specification provides the requirements for design and fabrication of the Pump Back Pumps for the Cripple Creek and Victor Gold Mining Company (Owner) Squaw Gulch ADR2 Project located in Victor, Colorado.
- 1.2 The tag numbers for the equipment comprising the Pump Back Pumps are as listed below. All correspondence relating to this equipment shall refer to the equipment name and tag number.
- 1.3 All communications, drawings, or catalog information shall refer to the equipment numbers and names for the equipment listed below:

<u>Tag Number</u>	<u>Qty.</u>	<u>Equipment Name</u>
1210-846-019	1	Pump Back Pump 1
1210-846-020	1	Pump Back Pump 2

## 2.0 SCOPE OF SUPPLY

- 2.1 Vendor shall provide all engineering, design, materials, fabrication, labor, testing, packaging and shipping for the Pump Back Pumps.
- 2.2 The Vendor's scope of supply shall also include:
  - 2.2.1 Pumps, motors, suspension cables, etc
  - 2.2.2 Motor starters and integral control wiring
  - 2.2.3 Submersible power cables from pump to motor starter
  - 2.2.4 Pump controllers (on/off control)
  - 2.2.5 Submersible level sensors with leads to the control panel
  - 2.2.6 Control panels
  - 2.2.7 Green and red external mounted indicator lights
  - 2.2.8 All drawings, documents, manuals, certificates, etc. as specified in the attached Supplier Document Index
  - 2.2.9 Start-up and commissioning assistance (if needed)
- 2.3 The following equipment and services will be provided by others:
  - 2.3.1 All pump discharge piping
  - 2.3.2 Electrical wiring, power and signal, to building panels
  - 2.3.3 Installation

## 3.0 SUPPLEMENTARY DOCUMENTS

- 3.1 The following attached documents shall be considered part of this specification:

DS-134031-ME-010-1      Pump Back Pump Datasheet



134031-ME-100 General Equipment Specification

134031-ME-010-GF-118 Vendor Pricing Form

134031-ME-010-GF-SDI Supplier Document Index

#### **4.0 CODES, STANDARDS AND REGULATIONS**

- 4.1 The Pump Back Pumps shall be designed per the applicable codes and standards listed in the attached General Equipment Specification.

#### **5.0 PROCESS AND/OR CAPACITY REQUIREMENTS**

- 5.1 The Pump Back Pumps shall be capable of meeting the process and/or capacity requirements listed herein and on the attached data sheet(s) and the equipment shall be suitable for the intended use.
- 5.2 The pumps will be used to transfer liner underdrain flows to the ADR2 site.
- 5.3 Pumps will be on line 24 hours/day, 365 days/year.
- 5.4 Motors shall be capable of 100 starts per 24 hour period.
- 5.5 Pumps and motors shall be suitable for operation while completely submerged in a vertical position.

#### **6.0 DESIGN REQUIREMENTS**

##### **6.1 Mechanical Requirements**

- 6.1.1 The manufacturer's standard equipment which, as a minimum, meets the process conditions shown on the attached data sheets shall be offered. Any items or options listed on the data sheets, which are not the manufacturer's standard, shall be listed and priced separately.
- 6.1.2 Pumps shall have a stable, continuously rising head curve. Head rise from the rating point to shutoff shall be at least 10% of the head at the rated capacity.
- 6.1.3 Each pump shall be mounted in a vertical HDPE carrier pipe.
- 6.1.4 Each pump shall be provided with an integral check valve with a weep hole drilled in the disc.
- 6.1.5 The pumps shall contain no copper, brass, aluminum, zinc, or bronze parts.
- 6.1.6 Any external carbon steel surfaces shall be painted with the vendor's standard finish coating. Aluminum, copper, or zinc based paint shall not be acceptable. Galvanized steel shall not be allowed.

##### **6.2 Electrical Requirements**

- 6.2.1 Motors shall meet the requirements of the attached General Equipment Specification.

- 6.2.2 Motors shall be submersible and hermetically sealed.
- 6.2.3 The electrical motor starter with disconnect shall be NEMA rated for pump horsepower and have NEMA 4X Enclosure. The enclosure shall be suitable for wall mounting with a 120-volt control transformer and wiring. Vendor shall provide the transformer.
- 6.2.4 The pump and motors shall be integrally grounded to the system ground.
- 6.2.5 Vendor shall supply submersible electrical power cable between each starter and motor. The cable length for each pump is listed on the attached datasheet.
- 6.2.6 The power cable shall include a ground conductor.
- 6.2.7 The pump controllers and control panels will be located in a heated pump house. The panels shall be NEMA 4X.
- 6.3 Instrumentation & Controls Requirements
  - 6.3.1 The vendor shall provide the controls and the wall mount control panel for each pump.
  - 6.3.2 The controls for the pumps shall be independent from each other allowing for a totally redundant control scheme. Controls for each pump shall have as a minimum:
    - a) Submersible 4-20 mA fluid level sensors
    - b) Submersible sensor cable from sensors to control panel
    - c) Auto start and stop from level sensors
    - d) One green light per pump mounted on the pump house outside wall to indicate the pump is running. Light shall be suitable for outdoor use
    - e) One blinking red light per pump mounted on the pump house outside wall to indicate the pump is malfunctioning. Light shall be suitable for outdoor use
    - f) Local indicator for pump operation (green light) and pump malfunction/error (red light)
    - g) Local hand-off-auto
- 6.4 SEQUENCE OF OPERATION
  - 6.4.1 The controls for each pump shall function as follows:
    - a) Fluid level sensor to detect fluid level in the sump
    - b) Level transmitter to send a 4-20 mA signal to the digital level indicator
    - c) First pump starts at high level – 5'-6" above pump suction



- d) Second pump starts at high-high level – 6'-0" above pump suction
- e) Both pumps stop at low level - corresponding to the pump's minimum required submergence
- f) Each pump's local hand-off-auto control switch shall override the level control

## **7.0 PERFORMANCE TEST AND INSPECTIONS**

- 7.1 A non-witnessed commercial test, for each motor shall be required.
- 7.2 All equipment shall be tested per the manufacturer's QA/QC procedures. Vendor shall provide, when requested, written copies of their QA/QC procedures and a listing of tests to be performed. The purchaser or his representative shall have access at all reasonable times to the work of the Vendor for the purpose of inspecting the work, the materials and workmanship.

## **8.0 MANUFACTURER'S STANDARDS, EXCEPTIONS AND ALTERNATES**

- 8.1 This specification is not intended to enforce any departure from the Vendor's standards of design, fabrication or construction. They are intended to indicate the degree of reliability, safety and economy required for the proposed installation. Nothing in this specification is to be interpreted as relieving the Vendor of his normal responsibility for the design, construction and performance of the equipment furnished.
- 8.2 Vendor's proposal shall state any exceptions to this specification. All exceptions shall be listed under the title, Exceptions to Specifications. Owner reserves the right to accept or reject any or all such exceptions.
- 8.3 The Vendor may propose an alternate design if a significant cost savings will be achieved without sacrificing performance, safety or reliability and/or improve the delivery of the equipment.



Pump Back Pumps  
DS-134031-ME-010-1

CLIENT: Cripple Creek & Victor Gold Mining Company	PROJECT NO: 134031	SHEET: 1 OF 1
PROJECT: Squaw Gulch ADR2	SPEC NO: 134031-ME-010	
LOCATION: Victor, Colorado	PREPARED BY: B. Larson	DATE: 9-Dec-14
EQUIP.NO: 1210-846-019, 1210-846-020	APPROVAL BY: A. Hanson	DATE:
Quantity: 2	CLIENT APP:	DATE:
EQUIP.NAME: Pump Back Pump 1 Pump Back Pump 2	P&ID NO: 11-846-80	PFD NO: 10-845-24

OPERATING CONDITION, EACH PUMP				PERFORMANCE			
1	LIQUID: SURFACE RUNOFF WATER		U.S. GPM AT PT. NOR: 25 GPM	RATED:	PROPOSAL CURVE NO: 05773-0003		
2	DISCH. PRESS. PSIG OR FT: 303 FT				NPSH REQ'D (FT OF WATER):		
3	TEMP. MAX: 50 °F		SUCT. PRESS. PSIG MAX:	RATED:	NO STAGES: 18 RPM: 3450		
4	SP. GR. AT PT: 1.00		DIFF. PRESS. PSI:		DES. EFF.: 60% %BHP: 77%		
5	VAP. PRESS AT PT: 0.178 PSIA		DIFF. HEAD FT:		MAX BHP DES. IMP:		
6	VISC. @ PT: 1.2 cP		NPSHA FT:		MAX HEAD DES. IMP. FT: 503'		
7	CORR./EROS. CAUSED BY:			HYD. HP:	MIN. CONTINUOUS GPM: 2		
8	MIN. LIQUID LEVEL FT:			SOLIDS: 0 %	ROTATION FACING COUPLING END:		
9	PUMP SETTING FT:			SOLIDS SIZE: NA	WATER COOLING:		
10	MATERIALS						
11			COMPONENT	MATERIAL	SHOP TESTS	REQ'D	WITNESSED
12			BOWLS	304 SS	RUNNING PERF.		
13			BOWL WEAR RINGS	NA	NPSH		
14			BOWL BEARINGS		HYDROTEST		
15			IMPELLER[S]	304 SS	HYDROTEST:		PSIG
16			DISCHARGE CASE	304 SS	MAWP:		PSIG @ F
17			SUCTION VESSEL	304 SS	WEIGHTS: PUMP: 29 lbs.		
18			SHAFT SLEEVE[S]	304 SS	MOTOR: 44 lbs.		
19			PUMP SHAFT	304 SS	COLUMN PIPING:		
20			MOTOR SHAFT				
21			INDUCER CAN				
22			STRAINER	304 SS			
22	COMPONENTS						
23	DESIGN DIA: 3.97"		MAX. DIA:	MIN. DIA:	<input checked="" type="checkbox"/> INTEGRAL CHECK VALVE:		
24	EYE AREA:		MAX. SPHERE SIZE:		<input type="checkbox"/> FLOAT & FLOAT SWITCH		
25	WEAR RINGS:		<input type="checkbox"/> YES <input type="checkbox"/> NO		<input type="checkbox"/> FOOT VALVE		
26					<input type="checkbox"/> VACUUM BREAKER		
27	SHAFT				COUPLING PIPE SIZE: 1.5" NPT		
28	DIAMETER THROUGH: COUPLING: *			IN	WELL CASING SIZE:	IN I.D.	
29	BEARINGS: *			IN	IMPELLER TYPE:	BEARINGS	
30	SLEEVE: *			IN			
31	<input type="checkbox"/> HOLLOW		<input checked="" type="checkbox"/> SOLID		RADIAL: MFR: *		
32					CAT. NO: *		
33	BOWLS				LUB: *		
34	MAX. W.P.: *		PSIG °F	TEST PRESS: *	PSIG	THRUST: MFR: *	
35	WEAR RINGS:		<input type="checkbox"/> YES <input type="checkbox"/> NO			CAT. NO: *	
36	MOTOR					LUB: *	
37	FURN. BY: Vendor		MTD BY: Vendor		SHAFT: MFR: *		
38	TAG NO: *		HP: 3	RPM: 3450	FRAME: CAT. NO: *		
39	MFR: Franklin Electric		TYPE: SUBMERSIBLE			LUB: *	
40	ENCL: INS:		SER. FACTOR: 1.15		BOWL: MFR: *		
41	V: 460		PH: 3	HZ: 60	TEMP. RISE: °C	CAT. NO: *	
42	F.L.A. 4.8		BEARINGS: E-Glide	LUBE:		LUB: *	
43	HAZARD CLASSIFICATION: CLASS: Non-Classified			DIV: GR:			
44	MOTOR SPEC. AS ABOVE <input type="checkbox"/>			ATTACHED <input type="checkbox"/>			
45	REMARKS:						
46	Wetted parts cannot contain red metals (copper, zinc, aluminum or their alloys)				Pond elevation is about 10,000 ft above sea level.		
47	The power cable length required for each pump is 30 ft.						
48							

REVISION DESCRIPTION	REV	REV BY	APP BY	DATE
ISSUE FOR REVIEW	A	BL	AH	9 DEC 2014
ISSUE FOR CLIENT REVIEW	B	BL	AH	11 DEC 2014
ISSUE FOR QUOTE	C	BL	AH	17 DEC 2014
ISSUE FOR PURCHASE	0	BL	AH	19 JAN 2015