STATE OF COLORADO

DIVISION OF RECLAMATION, MINING AND SAFETY
Department of Natural Resources

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COLORADO DIVISION OF RECLAMATION MINING & SAFETY

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Director

September 6, 2013

Shannon P. Murphy
Providence Mining, LLC
100 W. Bennett Ave.
P.O. Box 661
Cripple Creek, CO 80813

Re: Providence Mine, Permit No. M-2012-052,
Third Adequacy Review – Environmental Protection Plan

Mr. Murphy:

The Division of Reclamation, Mining and Safety (DRMS) engineering staff has reviewed the August 27, 2013 "Responses to Division of Reclamation, Mining and Safety Adequacy Review of two Letters Dated August 16, 2013, prepared by C. A. Braun, dated August 27, 2013 and received by the DRMS on August 30, 2013. For the purpose of continuity, the DRMS adequacy review of these two letters will continue to be separate. The comments herein are related to the First Letter – Environmental Protection Plan. The original comment numbers have been retained for the purpose of tracking responses. Comments that were adequately addressed in the previous response have been omitted.

General Comments:

1. *The EPP discusses "unoxidized vein material …*
    a. *A discussion on potentially impacted water…* The response to Comment 1a is adequate.
    b. *Ore pad design drawings … basic specifications …* The Exhibit X, Stormwater Runoff drawing submitted lacks specifications for the construction and material used for the 1.5-ft berm to be used as secondary containment for stormwater retention. Please add basic specifications to address the material to be used and the construction method.
3. *Stormwater runoff estimates or analyses…* Based on the response to the original Comment #1 a stormwater management plan is required to demonstrate adequate run-on control to prevent upgradient runoff from becoming potentially impacted water in the vicinity of the dump bench stockpile(s). Please provide the following:
    a. *Maps delineating contributing subbasins…* The Exhibit X, Stormwater Runoff drawing submitted is incomplete and requires some clarification:
        i. The 5,100 sq ft Upgradient Runoff Area appears to contribute runoff to the north Run-on Control Diversion. However, the third row below the "Results of Calculations" – "Run-on exclusion from disturbed area (historic) – 0.12 acres" implies this area is not included in the area

contributing to the diversion channel. Please provide clarification as to whether the 5,100 sq ft area is included in the hydrologic analysis and if not, explain why.

ii. The Applicant needs to demonstrate the south run-on control diversion is adequate to divert run-on away from the "work area". Please delineate the contributing area in a manner similar to the area delineated for the North Run-on Control Diversion.

b. *Rationale for runoff estimation parameters*… There is a discrepancy between the North Run-on Control Diversion estimated 100-year peak flow shown in the Section B graphic (1.55 cfs) and that shown in the "Engineering and Design Notes" table (0.02 cfs). Furthermore, the SCS curve number (CN) value of 42 yields a ratio of initial abstraction to precipitation greater than the 0.5 limit suggested in the SCS TR-55 procedure for determining peak flows, thereby suggesting the method may not be appropriate for the conditions stated and analyzed. The DRMS engineering staff estimates the 1.55 cfs is more realistic. Please address the peak flow results discrepancy and substantiate the methodology used.

c. *Peak flow calculations/analyses*… The Applicant needs to demonstrate the south run-on control diversion is adequate to divert run-on away from the "work area". Please provide an estimated 100-year peak flow from the to-be-delineated south upgradient runoff area and demonstrate the existing diversion has sufficient capacity and erosional stability.

d. *Stockpile containmernt berm sizing*… The response to this comment is adequate.

4. *Stormwater hydraulic analyses and design drawings*…

a. Stockpile containment berm: The response to this comment is adequate.

b. Diversion Channels:

i. *Drawings*… Please include a dimensioned cross-section for the to-be-analyzed south run-on control diversion.

ii. *Hydraulic analyses*… There appears to be a steeper (~25% slope) reach of the North Run-on Control Diversion that should be analyzed for stability and capacity. Please include this reach and the necessary reaches for the South Run-on Control Diversion in the revised analyses. {Notes: 1) Please be aware the Manning's roughness values stated in the previous adequacy letter were examples and not intended by the DRMS engineering staff as either required or recommended for this project; 2) The requirement that drawing scales must be between 1 inch = 50 ft and 1 inch = 660 ft only applies to plan views. Please use a scale you deem appropriate for details and sections; 3) The DRMS engineering staf is in the process of developing a spreadsheet tool for analyzing channel stability and capacity. A hard copy of this spreadsheet is attached to demonstrate what we expect. The DRMS can provide an electronic copy of the spreadsheet (in beta testing) for your use if you request it}.

Please remember the required analyses, certified designs and specifications for the engineered elements associated with the EPP (including the cover page, if provided; all drawings and specifications) should be stamped and signed by the responsible engineer.

The DRMS has reviewed the responses to the related to the Second Letter – General Issues. You will be notified of any other inadequacies related to second letter responses under separate cover.

Please be advised the Providence Mine Application may be deemed inadequate and the application may be denied on **September 20, 2013** unless the abovementioned adequacy review items are addressed to the satisfaction of the DRMS. If you feel more time is needed to complete your reply, the DRMS can grant an extension to the decision date. This will be done upon receipt of a written waiver of your right to a decision by September 20, 2013 and request for additional time. This must be received no later than the deadline date.

If you have any questions, please contact me at (303) 866-3567, ext. 8169.

Sincerely,

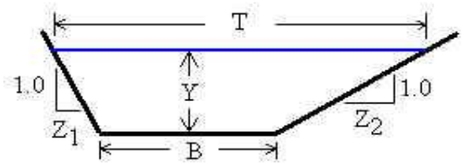
Timothy A. Cazier, P.E.
Environmental Protection Specialist

Enclosure

ec: Tony Waldron, DRMS
Tom Kaldenbach, DRMS
DRMS file
Art Braun, Braun Environmental, Inc.

COLORADO DIVISION OF RECLAMATION MINING & SAFETY

PRISMATIC CHANNEL DESIGN EVALUATION



Permittee: Providence Mining, LLC
Site Name: Providence Mine
Permit Number: M-2012-052

Date: 9/5/2013
Design by: Art Braun, P. E.
Checked by: T. Cazier, P.E.

Absolute Minimum Freeboard, F_{min} (ft) = 0.5

Channel Information		Channel Design Geometry & Materials								Hydraulic Parameters			Hydraulic Calculations												Channel Evaluations		
Channel Segment ID	Design Peak Flow, Q (cfs)	Approx. Channel Length, L (ft)	Bed Slope, S (ft/ft)	Left Side Slope, Z_1 (H:1V)	Right Side Slope, Z_2 (H:1V)	Bottom Width, B (ft)	Min. Channel Design Depth, D (ft)	SELECT Roughness Code from "Manning's n Table" below	Selected Channel Lining	SELECT Stability -OR- Capacity Parameters	Mannings 'n' for Stability (Velocity Calculation)	Mannings 'n' for Capacity (Depth Calculation)	Flow Depth, Y (ft)	Flow Area, A (ft^2)	Flow Velocity (ft/sec)	Velocity Head, H_v (ft)	Wetted Perimeter, P (ft)	Hydraulic Radius, R (ft)	Top Width of Flow, T (ft)	Hydraulic Depth, d_h=A/T (ft)	Froude Number, Fr	Shear Force, τ_0 (lb/ft^2)	Available Freeboard, F (ft)	1/2 Velocity Head (ft)	Allowable Shear Stress Exceeded?	Sufficient Freeboard?	Allowable Velocity Exceeded?
SECTION B	1.55	150	0.040	3.0	10.0	0.5	1.00	U2	Custom-Earth/Rock lined	Stability	0.030		0.26	0.57	**2.73**	0.12	3.93	0.14	3.87	0.15	1.26	0.36	0.74	0.06	OK	OK	OK
										Capacity		*0.040*	**0.29**	*0.70*	*2.20*	*0.08*	*4.37*	*0.16*	*4.30*	*0.16*	*0.96*	*0.40*	*0.71*	*0.04*	*OK*	*OK*	*OK*
									#N/A	Stability																OK	
										Capacity																*OK*	
Upper Section B, 25% slope, ~1/2Q	0.775	75	0.250	3.0	10.0	0.5	1.00	U2	Custom-Earth/Rock lined	Stability	0.030		0.13	0.17	**4.53**	0.32	2.19	0.08	2.17	0.08	2.84	1.22	0.87	0.16	OK	OK	OK
										Capacity		*0.040*	**0.15**	*0.21*	*3.66*	*0.21*	*2.43*	*0.09*	*2.40*	*0.09*	*2.17*	*1.36*	*0.85*	*0.10*	*OK*	*OK*	*OK*
									#N/A	Stability																OK	
										Capacity																*OK*	
									#N/A	Stability																OK	
										Capacity																*OK*	
									#N/A	Stability																OK	
										Capacity																*OK*	
Test for n = 0.025	1.55	150	0.040	3.0	10.0	0.5	1.00	E	Earth-lined	Stability	0.018		0.21	0.39	**4.00**	0.25	3.26	0.12	3.21	0.12	2.03	0.30	0.79	0.12	OK	OK	OK
										Capacity		*0.025*	**0.24**	*0.49*	*3.13*	*0.15*	*3.67*	*0.13*	*3.62*	*0.14*	*1.49*	*0.34*	*0.76*	*0.08*	*OK*	*OK*	*OK*

Manning's n Table (Mannings Velocity)

$v = 1.49/n\ Rh^{2/3}S^{1/2}$ Where: v = velocity (fps); n = roughness coeffient; Rh = Hydraulic Radius (ft), S = slope (ft/ft)

Roughness Code	Mannings 'n' for Stability	Mannings 'n' for Capacity	Lining Type/Material	Maximum Velocity	Maximum Shear Stress	Notes	Source
E	0.018	0.025	Earth-lined	4	*0.5*		
G	0.030	0.035	Grass-lined	5	*1.*		
RL	0.040	0.045	Riprap - Large (D50=24")	14	*6*	Use appropriate sizing methodology	
RM	0.035	0.040	Riprap - Medium	12	*5*	Use appropriate sizing methodology	
RS	0.032	0.036	Riprap - Small (D50=6")	10	*4*	Use appropriate sizing methodology	
T	0.025	0.035	Turf Reinf.	10	*1.5*	limits depend on manufacturer	
U1	**0.010**	**0.020**	User Defined (1)	**2.5**	**1**	User to supply rationale	
U2	**0.030**	**0.040**	Custom-Earth/Rock lined	**5**	**1.5**	User to supply rationale	
U3	**0.020**	**0.025**	User Defined (3)	**5**	**2**	User to supply rationale	

Not Finalized.