COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

October 16, 2020

Ms. Melissa Harmon
Cripple Creek & Victor Gold Mining Company
P.O. Box 191
Victor, CO 80860

RE: Cresson Project, Permit No. M-1980-244; Review Comments for Squaw Gulch Valley Leach Facility Adequacy Review – Phase 2B Part 1 Record of Construction Report (TR-123)

Dear Ms. Harmon:

The Division of Reclamation, Mining and Safety (DRMS) has reviewed the two-volume Squaw Gulch Valley Leach Facility Phase 2B Part 1 Record of Construction Report dated September 28, 2020.

Pursuant to Rule 7.3.1(5), no chemicals used in the extractive metallurgical process or toxic or acid-forming materials … shall be placed in constructed facilities until the Board or Office accepts the certification of the facility, or phase thereof, that precedes placement. The following comments need to be addressed prior to the DRMS accepting the submitted report:

Report:

1. Section 2.9 Drain cover fill: The narrative indicates both overburden (DCF) and ore (DCF-ore) used for drain cover fill were processed and stockpiled away from the immediate construction area. The inclusions of panel numbers in summary Tables 7 and 8 suggest gradation samples were collected for DCF and DCF-ore after placement. Given there are differing specifications for DCF and DCF-ore, it is important to maintain a distinction between the two materials. Please clarify where gradation samples were obtained (stockpile vs. final placement area), and if samples were taken in the final placement area, how was it determined which gradation specification was applicable.
2. Section 3.1 - Testing Standards: Please explain why there is no QA/QC or other documentation regarding the LLDPE 40 mil geomembrane that was used in the leak detection trench and provide the appropriate documentation.
3. Section 3.1.3 Geotextile Testing Standards: The DRMS acknowledges the inclusion of accepting ASTM 6241 for a geotextile puncture test in Section 4, Project Deviations. However, no explanation for the substitute test or passing standards are provided. Please clarify why geotextile testing standard CBR Puncture (ASTM 6241) is being referenced when it is not a testing standard in Technical Specification No. 02777.

4. Section 3.3.5 Geotextile QC Certificates: Please provide the following:
    a. Expand the discussion to include why the approved puncture test, ASTM D4833, was not met or why there was a change to a substitute test, CBR Puncture (ASTM 6241). Include what the CBR test value is for geotextile used.
    b. Provide a revised Technical Specification No. 02777 to update the change.
    c. Describe in more detail where and how the geotextile was stored to meet the specifications.
5. Section 3.4 Geomembrane Construction Quality Assurance: Please address the following:
    a. Section 3.4.1 Third Party Conformance Testing: Why was Puncture Resistance (ASTM 4833) not tested for by the third party?
    b. Section 3.4.5 Geomembrane Destructive Testing: The DRMS counted 178 tests not 172 fusion tests as stated in this section. Please explain the discrepancy in the number of tests.
6. Section 4 Project Deviations: Based on Comments 9, 10 and 11 below, the leak detection trench, high volume solution collection pipe, and horizontally deployed geomembrane panels need to be included in this section.

Tables:

7. Tables 1 and 8 - Drain Cover Fill (Crushed Ore): See Comment 12 below for a discussion on the discrepancies related to this document's presentation of the gradation specification for the crushed ore drain cover fill. Please provide appropriately revised Tables 1 and/or 8 to be consistent with Appendix C, Technical Specification 02200 and Appendix H.5 to be consistent.
8. Table 6 - CQA Earthworks Testing Summary-Soil Liner Fill: Soil Liner Fill (SLF) Sample Number NFSLF-130-R shows a 99.2 percent passing of 2.0" Grain Size Distribution. The table and Technical Specification 02200, Soil liner Fill requires the specification for 2.0" Grain Size Distribution is 100 percent passing. The narrative within Section 3.2.3 Soil Liner Fill states all forty SLF samples were tested with passing results. Please explain why NFSLF-130-R was not identified as a failed sample when the 2.0" Grain Size Distribution did not meet the specification listed in Table 6.

Record of Construction Drawings:

9. Squaw Gulch – 20VLF Phase 2B Part 1, Leak Detection Pipe Asbuilts: The DRMS identified several segments of the leak detection pipe with grades not meeting the approved specifications. Segments totaling approximately 351 feet (cumulatively) were found to have a slope less than 1%, but at least 0.5% (see Attached **Table A**). Additional segments totaling approximately 306 feet (cumulatively) were found to have a slope less 0.5% (see Attached **Table A**). Finally, three segments totaling approximately 79 feet (cumulatively) were found to have a slope with a reverse gradient (see Attached **Table A**). According to IFC Drawing A68 – Leak Detection & Typical Erosion Control Details, Detail/Section N – Leak Detection Trench, the slope of the pipe in this trench which is critical to the function of this designated environmental protection facility (EPF) is to be "1% minimum". It should also be noted the construction of the leak detection trench includes a 40-mil geomembrane liner. Where this liner ends and another piece is required to continue, the liner is not welded as a seam, but has a 5-foot overlap with the next piece. Should this overlap occur in the vicinity of very flat, or worse, reverse gradients, the potential for captured process solution to leak out under the overlap is very real. The DRMS is aware of the reference in

Detail/Section N to "Note 4" that seemingly is intended to allow flatter slopes by the inclusion of a reference to Note 4. In fact, Note 4 on the drawing only provides dimensions for the soil liner fill plug. However, Note 3 states "AS REQUIRED BY LOCALIZED GRADING, THE UNDERDRAIN CAN BE INSTALLED WITH A MINIMUM SLOPE OF 0.5% WITH APPROVAL FROM THE ENGINEER". The underlined emphasis on "as required by localized grading" and "underdrain" is intentional. As Note 3 clearly states "underdrain" and not "leak detection" trench or pipe, and the Note 3 is not referenced in Detail/Section N; there is at best some ambiguity as to whether this flatter slope is even intended to be considered for the leak detection pipe. It should also be noted that while Drawing A68 is a Newfields drawing, the original drawing approved by the DRMS for the Squaw Gulch VLF under AM-10 is an AMEC drawing and has a similar design and reference to an identical note which also references the underdrain, rather than the leak detection pipe or trench. Furthermore, the beginning of the note indicates such a reduction in slope should only be allowed by constraints related to the local grading. This segment of the leak detection trench/pipe is nearly all on slopes between 2H:1V and 2.5 H:1V, thereby not providing any demonstrable localized grading constraints.

a. Please explain why this deviation was not addressed in Section 4, Project Deviations.

b. Please address how you will bring this leak detection trench into compliance with the approved drawings and specifications, or otherwise demonstrate how it will function as intended per the design drawings.

c. If the 0.5% grade allowance is to be proposed as acceptable, please demonstrate how localized grading constrained the trench such that the prescribed minimum 1% slope was not attainable.

10. Squaw Gulch – 20VLF Phase 2B Part 1, High Volume Collection Pipe Asbuilts: The DRMS identified several segments (see attached **Table B**) of the 12-inch High Volume Collection Pipe with grades not meeting the approved specifications. Note 1 on IFC drawings A70 and A72 clearly states "SOLUTION COLLECTION PIPING SHALL BE PLACED WITH A MINIMUM SLOPE OF 1 PERCENT". The DRMS is uncertain as to whether or not the flatter than one percent installation of these pipes might compromise the environmental protection function of this EPF. It appears to only affect the efficiency at which process solution is conveyed to the ADR. It is nonetheless a deviation from the approved design.

    a. Please explain why this deviation was not addressed in Section 4, Project Deviations.

    b. Please address how you will bring this High Volume Collection Pipe into compliance with the approved drawings and specifications, or otherwise demonstrate how it will function as intended per the design drawings.

11. Geomembrane Panel Layout As-Built, Drawing No. 9: In the southeast corner of this drawing, panels P3350, P3351, P3352, P3353, and P3354 appear to be deployed in a horizontal alignment (i.e., roughly parallel to the contours). According to Technical Specification No. 02776-0 Geomembrane, field seams "shall be oriented parallel to the line of maximum slope, i.e., oriented down, not across the slope" (reference p. 13, section 3.7.A.1). The purpose of this particular specification is to minimize strain on welded seams and rely more on the tensile strength of the intact manufactured product. Please:

    a. Explain how this layout meets the approved specifications, and

b. Explain why the orientation of these five panels was not addressed in Section 4.0 Project Deviations.

Appendices:

12. Appendix C - Technical Specification No. 02200: The date and revision designation for this specification changed between TR-122 and TR-123. The TR-122 version was dated March 13, 2020 and designated as "REV D". The TR-123 version was dated March 17 with no revision designation whatsoever. The DRMS has also noted flaws with the specification for the "substitute crushed ore as Drain Cover Fill specification" (p. 4 of 02200). There is no range for the second largest sieve (2-inch), only 97 percent passing which means exactly three percent of the test sample must be retained on the 2-inch screen. Furthermore, the third largest sieve range (for the ¾-inch screen) allows up to 100 percent of the test sample to pass. This is simply an invalid range if 3 percent must be retained on the 2-inch screen. This discrepancy is also presented in Table 1. However, the DRMS noted the range for the test samples passed through the 2-inch sieve presented in Table 8 and Appendix H.5 was altered to be an actual range from 97 to 100 percent which is inconsistent with the 02200 specification. Please address the following:

    a. Explain why there were two different versions of the 02200 specification in as few as four days and why the later version has no revision designation,

    b. Please summarize all the changes made to 02200 between the March 13 and March 17 versions,

    c. Please explain the discrepancy between the drain cover fill – ore specification in Appendix C and Table 1 when compared to Appendix h.5

    d. Provide corrections to Appendix C, Tables 1 and 8, and/or Appendix H.5 to be consistent.

13. Appendix C - Technical Specification No. 02776-1: There appears to be a significant document control problem. This Geogrid specification was submitted to DRMS in July of this year as revision 2, issued for construction dated 6/15/2016. The revision for this Geogrid specification submitted with TR-123 in September of this year is designated as revision 3, re-issued for construction and dated 8/25/2016, just over two months after the revision 2 version. Yet construction for the project subject to TR-122 did not start until this year, almost 4 years after revision 3 of this specification was re-issued for construction. It is important that construction activity have the latest version of specifications for reference and that for environmental protection facilities (EPFs) such as this, the DRMS reviews and approves any significant change to specifications prior to construction, if they differ from the specifications previously approved by the DRMS. A side-by-side comparison of revisions 2 and 3 indicate no change other than possible minor formatting changes which raises two questions:

    a. What was the purpose of re-issuing this specification in August 2016?

    b. As revision 3 version was released nearly four years ago, why was it not submitted with TR-122?

14. Appendix C – Specification Document Control: As a follow-on to the two previous comments (12 and 13), when the DRMS discovers any unannounced changes to specifications in a CQA report submittal, this prompts us to do a detailed review of the remainder of specifications as an integral part of our CQA report review requires checking test results against the specifications. It is quite time consuming to perform a page-by-page comparison of all 136 pages of the specifications.

Implementing adequate document control and providing notice of any changes prior to the initiation of construction will reduce review time and lessen adequacy review comments. No response is necessary, but incorporating this comment into future submittals will help streamline the review process.

15. Appendix F – Figures: Weekly reports for weeks ending July 4 and September 5 referenced Figures 1, 2, 3, and 4; but those four figures were not included in Appendix F. Please provide Figures 1 through 4 for the Weekly reports ending July 4 and September 5.

16. Appendix H.3 - Soil Liner Fill Laboratory Test Results: The laboratory test results for Soil Liner Fill (SLF) Sample Numbers NFSLF-128-R, NFSLF-129-R, NFSLF-130-R, andNFSLF-132-R were not provided in Appendix H.3. Please provide the four laboratory test results for the four missing samples.

17. Appendix J.-5.1: The DRMS has identified the following apparent discrepancies. Please provide the requested clarification:

    a. Sample DF-1127N in the table appears to be mislabeled and should be to DF-1126N to match ROC Drawing 9. Update the Drawing or Table as appropriate.

    b. DF-1115 the first peel strength is 313 ppi. Please confirm this is a true value

18. Appendix J.-5.2: The DRMS has identified the following apparent discrepancies. Please provide the requested clarification:

    a. There are no test results for DX-220P in the table, whereas on ROC Drawing 9, a sample is indicated. Please explain the discrepancy.

    b. Please define what is meant by CAP, P-CAP1 and P-CAP3 in Appendix J.5.2

The decision date for TR-123 is October 28, 2020. Please be advised that if you are unable to satisfactorily address any concerns identified in this review before the decision date, **it will be your responsibility to request an extension of the review period**. As this submittal is being reviewed by multiple DRMS staff, please allow a reasonable amount of time for our review of your responses prior to the decision date. If there are outstanding issues that have not been adequately addressed prior to the end of the review period, and no extension has been requested, the Division may deny this Technical Revision. If you have any questions or need further information, please contact me at (303)328-5229.

Sincerely,

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

Enclosures: Tables A and B

ec: Michael Cunningham, DRMS
Elliott Russell, DRMS
Patrick Lennberg, DRMS
Brock Bowles, DRMS
DRMS file
Justin Raglin, CC&V
Katie Blake, CC&V

TABLE A - 19VLF PHASE 2B-1 -LEAK DETECTION ASBUILTS (SHEET NO 2 OF 2)

Ground Order of Points	Drawing Data					Calcuated Results					Length Summary	
	POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION	NORTHING Δ (ft)	EASTING Δ (ft)	Distance (ft)	Elev. Δ (ft)	Slope[(1)] (ft/ft)	Length ≤ 0.5%	0.5% ≤ Length ≤ 1.0%
1	20028	57582.5	36292.5	10098.88	TOP PIPE							
2	20029	57555.5	36305.2	10098.67	TOP PIPE	-27.0	12.7	29.8	-0.21	***-0.70%***	0.0	29.8
3	20030	57529.7	36318.0	10098.26	TOP PIPE	-25.8	12.8	28.8	-0.41	-1.42%	0.0	0.0
4	20031	57513.9	36326.0	10098.14	TOP PIPE	-15.8	8	17.7	-0.12	***-0.68%***	0.0	17.7
5	20032	57486.0	36341.2	10097.53	TOP PIPE	-27.9	15.2	31.8	-0.61	-1.92%	0.0	0.0
6	30256	57423.2	36412.1	10096.78	TOP PIPE	-62.8	70.9	94.7	-0.75	***-0.79%***	0.0	94.7
7	30255	57389.9	36467.8	10095.81	TOP PIPE	-33.3	55.7	64.9	-0.97	-1.49%	0.0	0.0
8	30254	57376.8	36497.0	10095.61	TOP PIPE	-13.1	29.2	32.0	-0.20	***-0.62%***	0.0	32.0
9	*30253*	57341.2	36545.7	10095.53	TOP PIPE	-35.6	48.7	60.3	-0.08	***-0.13%***	60.3	0.0
10	*30252*	57323.2	36568.2	10095.63	TOP PIPE	-18.0	22.5	*28.8*	0.10	***0.35%***	28.8	0.0
11	*30251*	57296.8	36592.7	10095.17	TOP PIPE	-26.4	24.5	36.0	-0.46	-1.28%	0.0	0.0
12	*30250*	57292.6	36601.0	10095.34	TOP PIPE	-4.2	8.3	*9.3*	0.17	***1.83%***	9.3	0.0
13	30248	57280.7	36631.3	10094.53	TOP PIPE	-11.9	30.3	32.6	-0.81	-2.49%	0.0	0.0
14	30247	57272.6	36663.1	10094.13	TOP PIPE	-8.1	31.8	32.8	-0.40	-1.22%	0.0	0.0
15	30246	57263.5	36698.5	10093.91	TOP PIPE	-9.1	35.4	36.6	-0.22	***-0.60%***	0.0	36.6
16	*30245*	57252.3	36734.8	10093.50	TOP PIPE	-11.2	36.3	38.0	-0.41	-1.08%	0.0	0.0
17	*30244*	57242.6	36774.2	10093.62	TOP PIPE	-9.7	39.4	*40.6*	0.12	***0.30%***	40.6	0.0
18	30272	57228.7	36833.5	10093.35	TOP PIPE	-13.9	59.3	60.9	-0.27	***-0.44%***	60.9	0.0
19	30271	57218.9	36872.8	10093.28	TOP PIPE	-9.8	39.3	40.5	-0.07	***-0.17%***	40.5	0.0
20	30270	57204.5	36929.7	10092.85	TOP PIPE	-14.4	56.9	58.7	-0.43	***-0.73%***	0.0	58.7
21	30269	57188.4	37004.6	10091.94	TOP PIPE	-16.1	74.9	76.6	-0.91	-1.19%	0.0	0.0
22	30268	57178.0	37061.2	10091.34	TOP PIPE	-10.4	56.6	57.5	-0.60	-1.04%	0.0	0.0
23	30243	57170.6	37092.5	10091.20	TOP PIPE	-7.4	31.3	32.2	-0.14	***-0.44%***	32.2	0.0
24	30242	57164.0	37114.9	10091.04	TOP PIPE	-6.6	22.4	23.4	-0.16	***-0.69%***	0.0	23.4
25	30267	57157.0	37148.1	10090.97	TOP PIPE	-7.0	33.2	33.9	-0.07	***-0.21%***	33.9	0.0
26	30241	57142.5	37195.6	10090.40	TOP PIPE	-14.5	47.5	49.7	-0.57	-1.15%	0.0	0.0
27	30266	57127.5	37259.3	10089.55	TOP PIPE	-15.0	63.7	65.4	-0.85	-1.30%	0.0	0.0
28	30263	57109.5	37326.6	10088.72	TOP PIPE	-18.0	67.3	69.7	-0.83	-1.19%	0.0	0.0
29	30262	57082.9	37403.6	10086.98	TOP PIPE	-26.6	77	81.5	-1.74	-2.14%	0.0	0.0
30	30261	57041.6	37488.1	10085.25	TOP PIPE	-41.3	84.5	94.1	-1.73	-1.84%	0.0	0.0
31	30260	57001.1	37548.3	10084.14	TOP PIPE	-40.5	60.2	72.6	-1.11	-1.53%	0.0	0.0
32	30239	56962.5	37597.5	10083.31	TOP PIPE	-38.6	49.2	62.5	-0.83	-1.33%	0.0	0.0
33	30259	56929.7	37637.1	10082.50	TOP PIPE	-32.8	39.6	51.4	-0.81	-1.58%	0.0	0.0
34	30258	56864.7	37717.4	10079.57	TOP PIPE	-65.0	80.3	103.3	-2.93	-2.84%	0.0	0.0
35	30257	56812.3	37781.6	10078.64	TOP PIPE	-52.4	64.2	82.9	-0.93	-1.12%	0.0	0.0
36	30238	56773.8	37831.0	10077.97	TOP PIPE	-38.5	49.4	62.6	-0.67	-1.07%	0.0	0.0
37	30237	56734.7	37877.5	10075.87	TOP PIPE	-39.1	46.5	60.8	-2.10	-3.46%	0.0	0.0
38	30236	56692.3	37917.5	10075.38	TOP PIPE	-42.4	40	58.3	-0.49	***-0.84%***	0.0	58.3
39	30235	56627.1	37957.9	10073.32	TOP PIPE	-65.2	40.4	76.7	-2.06	-2.69%	0.0	0.0
40	30234	56560.7	37990.6	10071.97	TOP PIPE	-66.4	32.7	74.0	-1.35	-1.82%	0.0	0.0
41	30233	56492.5	38020.5	10070.08	TOP PIPE	-68.2	29.9	74.5	-1.89	-2.54%	0.0	0.0
42	30232	56469.8	38026.6	10068.88	TOP PIPE	-22.7	6.1	23.5	-1.20	-5.11%	0.0	0.0
43	30231	56398.9	38039.7	10067.75	TOP PIPE	-70.9	13.1	72.1	-1.13	-1.57%	0.0	0.0
44	30230	56326.6	38024.7	10063.10	TOP PIPE	-72.3	-15	73.8	-4.65	-6.30%	0.0	0.0
45	30229	56265.8	37983.6	10056.08	TOP PIPE	-60.8	-41.1	73.4	-7.02	-9.57%	0.0	0.0
46	30228	56200.9	37932.8	10051.33	TOP PIPE	-64.9	-50.8	82.4	-4.75	-5.76%	0.0	0.0
47	30264	56169.2	37895.0	10046.92	TOP PIPE	-31.7	-37.8	49.3	-4.41	-8.94%	0.0	0.0
							Totals:	2512.8			306.5	351.2

Notes: (1) A negative value indicates a slope towards sump

30244 = segments with reverse gradients, 78.7 ft

-0.69% = slope with a magnitude between 0.5% and 1%

-0.21% = slope with a magnitude less than 0.5%

TABLE B - SQUAW GULCH -20VLF PHASE 2B PART 1 HIGH VOLUME COLLECTION PIPE ASBUILTS (SHEET NO 3 OF 3)

Ground Order of Points	Drawing Data					Calcuated Results					Length Summary
	POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION	NORTHING Δ (ft)	EASTING Δ (ft)	Distance (ft)	Elev. Δ (ft)	Slope[(1)] (ft/ft)	Length < 1%
1	6492	56714.6	38152.6	10175.06	12 INCH BOP						
2	6493	56739.1	38136.1	10175.29	12 INCH BOP	24.5	-16.5	29.5	0.23	***0.78%***	29.5
3	6494	56761.1	38119.2	10174.41	12 INCH BOP	22.0	-16.9	27.7	-0.88	-3.17%	0.0
4	6495	56783.4	38103.8	10174.40	12 INCH BOP	22.3	-15.4	27.1	-0.01	***-0.04%***	27.1
6	6067	56212.9	37848.4	10032.23	4 INCH BOP						
7	6070	56239.4	37829.4	10029.53	4 INCH BOP	26.5	-19	32.6	-2.70	-8.28%	0.0
8	6071	56268.5	37808.4	10026.24	4 INCH BOP	29.1	-21	35.9	-3.29	-9.17%	0.0
9	6072	56306.8	37780.6	10021.15	4 INCH BOP	38.3	-27.8	47.3	-5.09	-10.76%	0.0
11	6508	56986.7	37876.8	10171.10	12 INCH BOP						
12	6511	57014.1	37841.0	10172.21	12 INCH BOP	27.4	-35.8	45.1	1.11	***2.46%***	45.1
13	6513	57047.3	37793.8	10171.65	12 INCH BOP	33.2	-47.2	57.7	-0.56	***-0.97%***	57.7
14	6515	57078.1	37750.4	10171.35	12 INCH BOP	30.8	-43.4	53.2	-0.30	***-0.56%***	53.2
15	6517	57105.0	37708.2	10169.55	12 INCH BOP	26.9	-42.2	50.0	-1.80	-3.60%	0.0
16	6519	57132.1	37664.8	10167.86	12 INCH BOP	27.1	-43.4	51.2	-1.69	-3.30%	0.0
18	6601	57323.2	37134.9	10171.22	12 INCH BOP						
19	6603	57332.2	37075.3	10169.94	12 INCH BOP	9.0	-59.6	60.3	-1.28	-2.12%	0.0
20	6605	57342.2	37015.4	10169.13	12 INCH BOP	10.0	-59.9	60.7	-0.81	-1.33%	0.0
21	6606	57345.2	36994.0	10168.43	12 INCH BOP	3.0	-21.4	21.6	-0.70	-3.24%	0.0
										Totals:	212.6

Notes: (1) A negative value indicates a slope towards assumed intercept

-0.04% = slope with a magnitude less than 1% or potential reverse gradient