

February 8, 2016



FEB 09 2016

DVISION OF RECLAMATION MINING AND SAFETY

Mr. Timothy A. Cazier, PE Environmental Protection Specialist Colorado Division of Reclamation Mining and Safety 1313 Sherman Street, Room 215 Denver, Colorado 80203

RE: Cripple Creek & Victor Mining, Co. Cresson Project M-1980-244; Review Comments for Quality Assurance Monitoring & Test Results Final Report for Squaw Gulch VLF Phase 1 (9,550 Bench to Completed Areas Outlined on Figure 2)-Additional Comments

Dear Mr. Cazier,

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) has prepared this letter on behalf of Cripple Creek & Victor Mining Company (CC&V) in response to comments provided by the Colorado Division of Reclamation Mining and Safety (DRMS) regarding review comments of the above referenced project via email to CC&V on February 4, 2016. Only an electronic copy of this letter and attachments will be provided for resubmittal. DRMS comments appear in italics followed by Amec Foster Wheeler's responses. The numbering presented below corresponds to the comment numbering sequence provided by DRMS.

Comments:

2. The Division was unable to locate specifications, record of construction drawings or certification reports for the 14-inch barren solution steel pipe that the Division understands is intended to be used to pump barren solution from the Carlton ADR (aka ADR1) to the Squaw Gulch Facility in the near future. As this pipeline is a pumped system, it has the potential to operate under pressure, and given its proximity to the edge of the liner, the Division has determined that Rules 7.3.1(5) and 7.3.2(2) apply requiring a certification report prepared by a professional engineer or other appropriately qualified professional that will confirm that the facility (pipeline) was constructed in accordance with the approved design plan (i.e. drawings and specifications approved in MLE2/AM-10).. The Division will require submittal of and acceptance by the Division prior to allowing the use of the 14-inch steel pipe to pump designated chemicals. On February 1, 2016 CC&V emailed the Division a letter (dated January 29, 2016) certifying the 14-inch steel pipeline was constructed to specifications. On February 1, 2016, the Division received an electronic copy of specifications whish were certified as being met (dated January 29, 2016). Additional information clarifying the 14-inch steel pipe alignment (Drawing "Barren Solution Pipeline D, As Constructed") over certified geomembrane panels was received February 2, 2016

Amec Foster Wheeler Environment & Infrastructure, Inc. 2000 S. Colorado Blvd., Suite 2-1000 Denver, CO 80222 Tel: (303) 935-6505 Fax: (303) 935-6575 amecfw.com via email. The Division has two items that need to be resolved to adequately demonstrate the 14-inch steel pipe was constructed in accordance with the design plan:

a) TR-76 proposed a sleeve to be installed over the unlined portion of the 14-inch barren solution steel pipe alignment between the Mill Platform Drainline Containment Area and the Squaw Gulch VLF Liner Limit. The Division has verbally requested a ROC drawing demonstrating the required 10+ feet of overlap over the two liner limits. This ROC drawing must be stamped by the engineer of record.

Response:

Foresight West Surveying surveyed both ends of the pipe sleeve and the sleeve is shown on ROC Drawing 8 of 8 attached with this letter. The geomembrane liner locations shown are approximately on the 2-foot bench next to the anchor trench and the survey points recorded at each seam. (See Issued for Construction Drawing A220 Section 1 for a section of the anchor trench). In addition, Amec Foster Wheeler measured and painted 5 foot increments on the pipe and photographed the area to further demonstrate the location relative to the liner. Photographs are attached with this letter.

b) The aforementioned "Barren Solution Pipeline D, As Constructed" received electronically on 2/1/2016 was not stamped by the engineer or record. Please provide a stamped version as a ROC drawing.

Response:

It was Amec Foster Wheeler's understanding that the state requested a figure to provide assistance with the review of the barren solution pipeline layout after it crossed onto the geomembrane liner, not a request for a signed Record of Construction drawing. The barren solution pipe downstream of geomembrane Panel P1386 has three sources of containment. The pipe itself, the geomembrane liner, and the clay liner (soil liner fill with a permeability of 1×10^{-6} cm/s). The submitted ROC report was signed and stamped by the engineer of record verifying that the facility was constructed in accordance with the approved design. However to satisfy the Divisions request, a stamped ROC drawing has been included with this letter. It is numbered ROC Drawing 7 of 8.

Amec Foster Wheeler has provide a stamped drawing and discussion of the panels upstream of geomembrane Panel P1386 to satisfy Rules 7.3.1(5) and 7.3.2(2). Discussion of these panels are further addressed in Item 4 of this letter.

4. The aforementioned "Barren Solution Pipeline D, As Constructed" drawing shows approximately 45 lineal feet of the pipe crossing geomembrane panels P1387 and P1388 which are not to be certified until some future date (according to both this drawing and ROC drawing 6 of 6). The Division understands from weekly construction reports and conversations with mine personnel that these two panels and the soil liner fill (SLF) below them meet specifications, but are not certified constructed at this time because the edge of these geomembrane panels must be left exposed to accommodate future construction. However pursuant to Rule 7.3.1 (f), this area must be certified as meeting the design plan prior to conveying designated chemicals. CC&V has verbally agreed to address this discrepancy with appropriate documentation to assure the Division and the record that the liner in the area of panels P1387 and P1388 meet the design plan.

Response:

Amec Foster Wheeler did not include panels P1387 through P1392 or Panel P1419 in the record of construction report submitted January 2016. These panels were not included because the entire panel is not considered complete. The panels would have needed to be tied into a permanent anchor trench or be connected to another panel of geomembrane to be included in the ROC report. The above stated panels have edges that are placed in a temporary anchor trench. When construction continues, the temporary anchor trench will be removed and the small section of soil liner fill material below repaired to specifications and provide a continuous clay liner; in other words, geomembrane cannot be cut off and abandoned in-place in a temporary anchor trench. The purpose of a temporary anchor trench is to protect the soil liner fill below the geomembrane against weather, typically wind, rain, or snow as well as protect the geomembrane from any potential wind damage. These panels will be connected to geomembrane deployed in 2016. The geomembrane was accepted for drain cover fill (DCF) placement on October 26, 2015 and was also shown on the geomembrane acceptance map included with the weekly report week ending October 31, 2015. Drain cover material was placed over a majority of these panels, but an approximate 9-foot buffer was left to allow for the tie-in. Record Drawing 8 of 8 provides a detailed drawing of the area in question. Note 2 on the drawing states the shaded area of the panels meet the design plans and project specifications up to 12 feet from the temporary anchor trench, however, the entire panels will be certified in a future ROC report. The finalized data in the tables for the SLF nuclear density testing (in the vicinity of the temporary anchor trench) as well as the geomembrane tables will be reported when destructive and non-destructive testing; repairs; and deployment panel lengths are completed. It has also been noted on ROC drawing the path the barren solution is likely to take in the highly unlikely situation there is a leak in the pipe. As can be seen, the solution would remain on geomembrane liner.

5. The Division's review of Appendices I.5 and M.5 (40-mil and 80-mil Geomembrane-Roll Quality Control Certificates, respectively) demonstrate a failure to meet the specifications (Section 02776.0 Geomembrane) for thickness approved as part of MLE2/AM-10. Specifically:

Appendix I.5-40-mil LLDPE Smooth Geomembrane-Roll Quality Control Certificates:

- Roll #F14D402025, Lot # CEH810040: Thickness Measurement MIN = 37 mil
- Roll # F14D402026, Lot # CEH810040: Thickness Measurement MIN = 37 mil
- Roll # F14D403032, Lot # CEH810040: Thickness Measurement MIN = 37 mil

Appendix M.5-80-mil LLDPE DSMS Geomembrane-Roll Quality Control Certificates:

- Roll #429780-13, Lot # CDE810570: Thickness Measurement AVG = 78 mil
- Roll # 429782-13, Lot # CDE810570: Thickness Measurement AVG = 78 mil
- Roll # 430103-13, Lot # CDE810570: Thickness Measurement AVG = 78 mil

According to Appendix E-Technical Specifications-Section 02776.0 Geomembrane-Typical Properties-Table 2.01-A, Thickness MIN AVG (minimum average roll value) for Smooth or Textured 80-mil LLDPE is 80 mils. The Division understands industry standards may have changed, but this does not relieve CC&V from their obligation to meet the approved design plan. CC&V has verbally agreed to demonstrate the current industry standard is equivalent to the approved thickness specifications. Please provide documentation to demonstrate equivalency. (Note: if this condition or circumstance arises in the future, a Technical Revision must be submitted to revise and/or modify the approved specifications?

Response:

Amec Foster Wheeler has reviewed the Division's concerns regarding the minimum thickness needed for the 40-mil LLDPE geomembrane in the leak detection trench. The minimum thickness required for this application is far below what is specified. The liner in this trench should never have any hydraulic head acting upon it. Forty-mil LLDPE geomembrane was selected as it is the lowest thickness of LLDPE geomembrane commercially available. Forty-mil LLDPE geomembrane was also recommended as it is more pliable to conform to the shape of the leak detection trench compared with thicker geomembranes. Last but not le'ast, a layer 12 oz/yd² non-woven geotextile material is placed over the 40-mil LLDPE geomembrane to provide further protection against mechanical damage. Amec Foster Wheeler considers the geomembrane as installed in the leak detection trench to be technically acceptable and meet the design intent. Amec Foster Wheeler recognizes the thickness does not fully meet the technical specification as outlined, however we accepted the 40-mil geomembrane as per the current industry standard GRI GM-17 for LLDPE geomembranes and meets the design intent.

The 80-mil LLDPE Quality Control Certifications referenced in Appendix M meet the requirements of the Underdrain Pond Specification submitted with the Under Drain Pond letter submitted to CC&V by Amec Foster Wheeler on March 31, 2015 (Agru attachment LLDPE MicroSpike[®] Liner). The provided specifications data sheet states the minimum average is 76 mils. On Drawing 2 of 2 of the subsequent submittal dated June 19, 2015, the note reads "the installation of the 80-mil LLDPE (either single-sided textured or double-sided textured) will follow the technical specifications for the SGVLF." The installation procedures were followed and observed and documented by Quality Assurance Personnel. In addition, the underdrain ponds will not be enduring the hydraulic pressure or loads as compared to the SGVLF. It is Amec Foster Wheeler's opinion that the geomembrane liner installed in the underdrain ponds is acceptable for its intended use.

6. Appendix D, Weekly Reports: The Report for Week Ending October 10, 2015 is missing a signature for CC&V Projects review. Please provide a CC&V Projects review signed and dated copy of this weekly report.

Response:

The weekly report was signed by Ron DiDonato (CC&V Projects) on October 20, 2015, he accidently signed on the wrong line. He has crossed out his signature and re-signed it on the correct line. Please see the updated Weekly Report dated October 10, 2015.

7. Underground workings remediation: Weekly reports included in this report summarize underground working remediation activity (e.g. Week Ending November 14, 2-15), yet no underground workings remediation certification section was included in this report. Please confirm no underground workings remediation occurred within the area to be certified by this report.

Response:

Section 2.1 of the submitted ROC report states all underground working remediation within the Phase 1 Project boundary were reported in the Squaw Gulch VLF Phase 1 (9,450' to 9,550' Bench) Record of Construction report submitted November 2015. The weekly reports are a "snap shot" of all construction activities that occurred during the week reported. The reports include activities outside of the certification boundary. The underground workings reported in the weekly reports are being remediated in preparation for final grading, SLF and geomembrane placement within the Phase 2 boundary for the upcoming 2016 construction season.

Please do not hesitate to contact me at 303-975-2192 or <u>Andrea.Meduna@amecfw.com</u> with any questions.

Sincerely, Amec Foster Wheeler Environment & Infrastructure, Inc.



Andrea L. Meduna, PE Project Manager/Certifying Engineer

Attachments:

- Attachment 1 ROC Drawing 8 of 8 Barren Solution Pipeline D As Constructed Approved Panel Portions
- Attachment 2 Barren Solution Pipeline Photographs (Reference TR-76)
- Attachment 3 ROC 7 of 8 Barren Solution Pipeline D As Constructed
- Attachment 4 Revised signed copy of the October 10, 2015 Weekly Report
- cc: Mr. Ron Roberts, Project Manager, CC&V
 - Mr. Ron DiDonato, Project Superintendent, CC&V
 - Mr. Jeff Gaul, Project Superintendent, CC&V
 - Mr. Chris Hanks, Chief Environmental Coordinator, CC&V
 - Mr. Marc Tidquist, Sr. Environmental Coordinator, CC&V
 - Ms. Meghan Duck, Document Control, CC&V
 - Ms. Katie Holybee, Document Control, CC&V
 - Mr. Robert Redd, Project Resident, Amec Foster Wheeler



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GULCH VLF PHASE 1 PIPELINE D AS CONS D PANEL PORTIONS	TRUCTED	ISSUED DATE 2/8/2016 project no. 74201125N0 drawing no. rev 8 OF 8 0





Photo 1 1Existing Liner Anchor Trench Stakes





Photo 2 Pipe Sleeve Markings





Photo 3 Posts Denoting Edge of SGVLF Geomembrane Liner





Photo 4 Edge of the Ball Mill Geomembrane Liner



REV	DATE	DESCRIPTION	CADD	CRIPPLE CREEK & VI MINING COMP
				DISCLAIMER AMEC FOSTER WHEELER PRODUCED THE IN THIS DRAWING THROUGH THE USE OF TEC PRACTICAL EXPERIENCE SPECIFIC TO ITS E DRAWING DOES NOT GUARANTEE ANY RIGH INFORMATION AND PRACTICAL EXPERIENCE. ADAPTATION OF THE DATA OR CONTENTS AT USER'S SOLE RISK AND WITHOUT ANY RESPONSIBILITY TO AMEC FOSTER WHEELEF





Owner:	Cripple Creek & Victor Gold Mining Co.	Project Number:	74201125N0
Project:	Squaw Gulch Valley Leach Fill (VLF)	Week Ending:	October 10, 2015
Location:	Cripple Creek & Victor Gold Mine, CO		
Contractor:	Ames Construction, Inc.		

Reporting Period: 10.4.2015 through 10.10.2015

Days	S	М	Т	W	Т	F	S
Work Shifts		D	D	D	D	D	D
WORK SHIITS							
D=Day Shift N	N=Night Shift			W=	Wea	ather	

Ambient Temperature Ranges During Week		Weather Conditions During Week:		
Highs:	53°F to 67°F	Cloud Cover:	Partly Cloudy to Mostly Cloudy	
Lows:	35°F to 45°F	Precipitation:	Rain	
		Wind:	Calm to moderate	

Ames: Continuing construction tasks for the Valley Leach Facility (VLF).

Planning: Continuing construction activities and scheduling for the VLF.

CONSTRUCTION ACTIVITIES AND PROGRESS:

I) Earthworks

A) VLF (PSSA, Phase 1, and 2)

Structural Fill:

The following Structural Fill haul to fill and grading activities occurred:

A Cat dozer placed the Structural Fill between stations N20+00 and N22+00. A Cat smooth drum roller compacted the fill area.

A Cat loader placed Structural Fill near station F15+00. A Cat smooth drum roller compacted the fill area.

Cat dozers graded subgrade above stations J10+00 to J12+00 in the vicinity of L Bench.

A Cat excavator loaded Cat 740 haul trucks with spoils from station H29+00. The material was transported to fill locations between stations H23+00 and H24+00. A Cat dozer placed the Structural Fill and a Cat smooth drum roller compacted the fill area.

All of the above Structural Fill material was placed, compacted, and graded per the project plans and specifications.

Subgrade:

Phase 1 areas dozed to finished grade were compacted per project plans and specifications.



See attached figure for approved subgrade.

Soil Liner Fill:

A Cat smooth drum roller, a Cat excavator and a water truck conditioned and compacted SLF prior to geomembrane deployment.

Two Cat smooth drum rollers (connected by cable to thrust block) and a Cat excavator with a smooth drum roller attachment compacted SLF below stations HM15+00 to HM20+00.

Two Cat smooth drum rollers (connected by cable to thrust block) and a Cat excavator with a smooth drum roller attachment compacted SLF below stations HM8+00 to HM18+00. Cat 740 haul trucks transported SLF to stations FM6+00 to FM8+00. A Cat dozer continued building an SLF road above the FM Bench. Cat dozers placed SLF above stations FM6+00 to FM12+00.

John Deere 740 haul trucks delivered SLF to station F8+00. Cat dozers continued building an SLF road across the F Bench between stations F8+00 to F10+00.

Cameron SLF processing continued.

All of the above Soil Liner Fill material was placed, graded, and compacted per the project plans and specifications. Moisture content, density testing and depth verification were performed per project specification prior to surface acceptance and geomembrane installation.

See attached figure for approved SLF.

Drain Cover Fill:

Cat 740 haul trucks transported DCF from the stockpile to Phase 1. Low ground pressure Cat dozers placed DCF on approved geomembrane in Phase 1.

See attached figure for approved DCF.

Spent Ore Fill:

A Cat D9 dozer continued placement of Spent Ore to engulf the open water in the PSSA prior to scheduled loading of Crushed Ore in the Fourth Quarter 2015.

Underdrain System:

Primary Underdrain: Complete.

Secondary Underdrain: None.

Tertiary Underdrain: None.

Leak Detection:

A Cat excavator prepared Leak Detection trench between stations F10+00 to F11+50. A Cat skidsteer assisted with construction of approximately 150 LF of Leak Detection. Construction and backfill was performed per project plans and specifications.

Miscellaneous:

Amec personnel continued LVSCS pump monitoring and observation.



Geomembrane:

Geomembrane installation within Phase 1 continued this week performing deployment, seaming, repair, and QA/QC activities. Approximately 167,102 square feet of 80mil LLDPE geomembrane was deployed. Soil Liner Fill was inspected and approved by AMEC, Ames and ECA representatives prior to geomembrane deployment. Approximately 9,556 linear feet of seam was fusion welded during deployment using one or two fusion welding machines for each day of deployment. Approximately 263 linear feet of seam was extrusion welded during deployment. Destructive and non-destructive testing was completed in compliance with project technical specifications.

Ames continuously excavated anchor trench ahead of geomembrane installation. After geomembrane testing was completed, the anchor trench above finished panels was backfilled and compacted per project specifications.

See attached figure for approved geomembrane.

Underdrain Pond Rehabilitation:

ECA installed four new rolls of Geosynthetic Clay Liner (GCL) and four partial rolls of 80-mil LLDPE textured geomembrane at the underdrain ponds. GCL Panels, P1 – P30 were deployed (10,380 sq.ft.). LLDPE Panels, P1 – P9 were deployed (7,753 sq.ft.). Approximately 377 linear feet of seam was fusion welded during deployment. No extrusion welds were performed. Destructive and non-destructive testing was completed in compliance with project technical specifications.Ames completed excavation and backfill of anchor trench.

II) Storm Water Management

Best Management Practices (BMPs) continued to be performed.



CQA ACTIVITIES:

Field Activities: I)

The following activities were observed: Placement and compaction of the Phase 1 Structural Fill materials; subgrade acceptance; placement, compaction, density testing, depth verification and acceptance of Soil Liner Fill materials; geomembrane installation and acceptance; Drain Cover Fill placement; Spent Ore grading in PSSA; and pump monitoring at the LVSCS riser pipes.

II) Laboratory Activities:

Concrete testing (ADR2), atterberg limits, moisture, compaction, permeability and sieve analysis testing continued.

The following samples were collected: Phase 1 - Soil Liner Fill; 1-SLF-46-R

General Project Items

Meetings and Discussions:

The Weekly Contractor Meeting was held October 6, 2015 (Amec Foster Wheeler, CC&V, Ames). Amec Foster Wheeler and CC&V discussed the barren pipeline corridor immediately following the Weekly Contractor Meeting.

- Ames daily safety meetings
- A Amec Foster Wheeler daily safety meetings

Summary of Concerns: None.

CC&V: Daily updates, reporting, and scheduling occurred between CC&V Projects, Amec Foster Wheeler, and Ames.

Deliveries: None.

CQA Monitor

Date: October 14, 2015

Submitted by: Bobby Redd, El **Project Resident**

Reviewed by:

Date: $\frac{10/20/15}{10/20/15}$

CC&V Projects **Reviewed By:**

Date:

Reviewed By:



ATTACHMENT A

Amec Foster Wheeler - 2015 CQA Field Staff Schedule MLE2

Name	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
Name	Oct 4	Oct 5	Oct 6	Oct 7	Oct 8	Oct 9	Oct 10
Bobby Redd		PR	PR	PR	PR	PR	PR
Eric Lorenson		LT	LT	LT	LT	LT	LT
Ben Melly		GL	GL	GL	GL	GL	GL
Rex Harrison		WI	WI	WI	WI	WI	WI
Steve Rice		ST	ST	ST	ST	ST	
Tyler Browning			GT	GT	GT	GT	
Rick Buxton		ST	ST	ST	ST	ST	ST
Shawn Wisely		ST	ST	GT	ST	ST	ST
Alfonso Frias		GT	GT	GT	GT	GT	GT
Madeline Tarasar		ST	ST	ST	ST	ST	ST
Josue Rodriguez		ST	GT	GT			
David Woolley		ST	ST	ST	ST	ST	ST
Chad Schreiner		GT				GT	
Bob Flesher					ST	ST	ST
Andrea Meduna			PE				

LEGEND:

- UM = Unit Manager
- PM = Project Manager
- PCE = Project Certifying Engineer
- PE = Project Engineer
- PR = Project Resident
- LG = Lead Geosynthetics Engineer
- LS = Lead Soils Technician
- ST = Soil Technician
- LT = Laboratory Technician
- GL = Geosynthetics Lead
- GT = Geosynthetics Technician
- FLM= Field/Laboratory Manager
- UG = Underground Working Remediation
- SE = Senior Engineer
- GS = Geophysics Survey Geologist
- HY = Highway Design Engineer
- WI = Welding Inspector



Photographs of Activities



Phase 1 – SLF placement and geomembrane deployment.



Phase 1 – Crushed Ore delivery.





Phase 1 – DCF placement, geomembrane deployment and SLF compaction.



Underdrain Ponds – Geomembrane deployment.







