Newmont
CRIPPLE CREEK & VICTOR

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January 19, 2021

ELECTRONIC DELIVERY

Elliott Russell
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

Re: Permit No. M-1980-244; Cripple Creek & Victor Gold Mining Company; Cresson Project; – Technical Revision 125 PAR Response – VLF 2 Phase 2B, Part 2 Record of Construction – Construction Quality Assurance Report

Dear Mr. Russell:

On January 8, 2021 Newmont Corporation's Cripple Creek and Victor Gold Mining Company (CC&V) received the Division of Reclamation, Mining and Safety's (DRMS') adequacy review of Technical Revision 125, requesting approval of the Squaw Gulch Valley Leach Facility Phase 2B, Part 2 Construction Quality Assurance Monitoring and Test Report. Below are DRMS comments in italics followed by CC&V's responses in bold.

1) *Section 1.1 - Project Description: The second paragraph states construction was completed on October 9, 2020. The schedule in Appendix A indicates a "Lead Soils Technician" and a "Lead Geosynthetics Technician" were on site 10/12 & 10/15. If construction was complete on 10/9, what was the purpose of their presence?*

   The Lead Soils Technician and the Lead Geosynthetics Technician were site on 10/12 and 10/15 to pack up the QA/QC equipment in preparation for site de-mobilization.

2) *Section 2.2.1 - Underground Working 6617: The apparent failure of the 2016 remediation for this working is cause for concern with respect to the numerous other remediated underground workings. Has CC&V or the EOR determined why this remediation effort failed? If so, what is being proposed to prevent similar failures in the future?*

   Underground Working 6617 was originally remediated in March 2016. At that time, it was planned that the VLF2 construction would be continuous and the area would have been sealed with Soil Liner Fill and a geomembrane within about a year. Instead, the Phase 2 of VLF2 was delayed and the remediated underground working was exposed to the elements (e.g. direct infiltration by rain and snow melt) for a number of years. This resulted in localized backfill settlement, which contributed to the depression forming at this underground working.

Future mitigation techniques for this issue include placing backfill hydraulically (e.g. sluicing water into the fill, thereby increasing its density and stiffness), which will result in the backfill being less sensitive to stormwater infiltration.

3) *Section 2.5 - Leak Detection Trench: This section states approximately 734 linear feet of trench was constructed. Based on the survey data in 20VLF Phase 2b Part 2 - Leak Detection As-builts (Sheet No 1 of 1), only 716 feet (see Table 1 below) of pipe was installed. The paragraph also states the trench was constructed in accordance with project technical specifications, which include the Issued for Construction (IFC) drawings submitted with TR-125. IFC Drawing A44, Phase 2B Grading Plan, shows the Phase 2B Leak Detection extending to edge of liner. The DRMS acknowledges the alignment differs in that the As-constructed upgradient end of the trench is 25 to 30 feet higher in elevation and farther north than in Drawing A44, but it does not extend to the edge of liner (EOL). The As-built drawing shows the LDS upgradient end to be approximately 300 feet from the EOL. During the review of TR-123, CC&V proposed and the DRMS accepted that future As-built LDS submittals would provide survey data at a minimum of every 100 feet. There are eight survey points describing seven pipe segments on the 20VLF Phase 2b Part 2 - Leak Detection As-builts. The first four segments are all greater than 100 feet long (see Table 1 below). Well over half (495 feet of the 716 feet, sum of columns A and B in Table 1 below) of the LDS pipe was installed at less than one percent. The average pipe slope of the Phase 2, Part 2 LDS pipe is 0.79%. Please address the following:*
    a. *Why was pipe not installed in the additional 18 feet of constructed trench?*
    b. *Why was the trench and piping not extended to the EOL as indicated and approved by the DRMS on IFC drawing A44?*
    c. *Describe why the 100-foot maximum survey segment for the pipe was not adhered to as agreed.*
    d. *Provide a technical explanation for the sub-nominal (0.79%) LDS pipe slope.*

    a) **A clerical error was made. "734'" was an initial approximation from the surveyor and should have been updated with the as-built data received. The correct length is 716' and no trench was constructed without any pipe in it. The updated report is included as Attachment 3.**
    b) **The construction of the leak detection system (LDS) in Phase 2B Part 2 was a continuation of the LDS, which was included in the Phase 2a Part 1 CQA Report, TR-117. This section of LDS, which was constructed in 2016, does extend to the edge of liner (EOL).**
    c) **When agreeing to adhere to 100-foot maximum survey segments, this part of the LDS was already constructed and surveyed, as it is a part of the same LDS approved in Phase 2B Part 1. The 100-foot maximum survey segments will be adhered to in all future LDS constructions.**
    d) **The nominal 1% is for the entire length of that leak detection trench. The entire trench includes sections from Phase 2A Part 1 and Phase 2B Part 1. When looking at the entire length of the trench, the nominal 1% of the entire trench to the manhole is still met.**

4) *Section 3.1.2 - Geomembrane Testing Standards: In Tech Specification No. 01400-2 the geomembrane specifications do not match those in Specification No. 02776-0. Please fix this discrepancy and submit updated specifications.*

When the technical specification was revised in 2016, the geomembrane specifications listed in 01400-2 was not updated to the current industry standards, however the specifications listed in 02776-0 had been updated. The technical specifications to be issued with the VLF2 Phase 3 Construction Documents will be updated to the most current industry standards prior to the commencement of construction.

5) *Section 3.1.3 - GeoTextile Testing Standards: Specifications quoted in text match those given in Specification No. 02777-0. The specification listed, CBR ASTM6241, is clarified later in the text in Section 3.3.5. It should be noted that in the response to the Division's Adequacy Review Item #4 for TR-123, CC&V stated that the specifications would be updated to account for this new test in future phases. The specification was not updated for this phase. Please update the specification to reflect the addition of the new specification and commitment made in TR-123.*

As previously agreed to in TR-123, the Geotextile Testing standards listed in 02777-0 will be updated with the VLF2 Phase 3 documents.

6) *Section 3.3.5 - Geotextile QC Certificates: Describe in more detail where and how the geotextile was stored to meet the specifications.*

The geotextile was stored in the contractor's laydown yard on a prepared surface and was protected and secured with large tarps to protect it from the elements.

7) *Section 3.4.6 Geomembrane Destructive Testing:*
   a. *Is DF-1282N located correctly on panels P-3714/P-3715, when the parent sample DF-1282 is elsewhere on other panels?*
   b. *Please describe the size of the cap for DF-1282, it is difficult to ascertain from the text and appendices.*
   c. *In Appendix J 5.1 DF-1321 is located on P-3797/P-3801 but on Drawing No. 6 it is located on P-3797/P-3799, please resolve and update accordingly.*
   d. *In Appendix J 5.1 DF-1339 is located on P-3840/P-3844 but on Drawing No. 6 it is located on P-3840/P-3845, please resolve and update accordingly.*
   e. *In Appendix J 5.1 DF-1345 is located on P-3850/P-3860 but on Drawing No. 6 it is located on P-3858/P-3860, please resolve and update accordingly.*
   f. *In Appendix J 5.1 DF-1350 located on P-3825/P-3826 is missing from Drawing No. 6, update.*
   g. *In Appendix J 5.1 DF-1387 is located on P-3960/P-3962 but on Drawing No. 6 it is located on P-3960/P-3961, please resolve and update accordingly.*
   h. *In Appendix J 5.1 DF-1388 is located on P-3963/P-3964 but on Drawing No. 6 it is located on P-3962/P-3963, please resolve and update accordingly.*

   a) **Yes, DF-1282N is located on P-3714/P-3715. It was the next seam that the specific welder seamed that day.**
   b) **After tracking the initial destructive test DF-1282 backwards, it was determined that the entire seam P-3441/P-3713 failed, likely due to dirt on the existing exposed edge of P-3441. The entire seam length was repaired, including the five caps detailed in Appendix J.3. The length that was capped was approximately 330 feet.**
   c) **The location of DF-1321 is P-3797/P-3799 and has been updated in Appendix J.5.1. Updated Appendix J.5.1 is attached.**
   d) **The location of DF-1339 is P-3840/P-3845 and has been updated in Appendix J.5.1.**
   e) **The location of DF-1345 is P-3858/P-3860 and has been updated in Appendix J.5.1.**
   f) **Enclosed, DF-1350 has been added to the correct location on Drawing No. 6.**
   g) **The location of DF-1387 is P-3960/P-3961 and has been updated in Appendix J.5.1.**
   h) **The location of DF-1388 is P-3962/P-3963 and has been updated in Appendix J.5.1.**

8) *Section 4 - Project Deviations: Underdrains – the first bullet suggests changes were made to the underdrain alignment related to localized grading. According to IFC Drawing A40, the only underdrain in Phase 2B Part 2 were already existing. How and/or what was modified?*

No underdrain modifications or construction were required in Phase 2B Part 2. The words "underdrain alignment" were included in error; therefore, the project deviation section of the report has been updated to state "*Several localized grading and HVSCS alignment changes were made throughout construction in order to better accommodate the actual site conditions. The grading changes were minor and as such are not highlighted in the Record of Construction Drawings*." The updated report is included as Attachment 3.

9) *Section 4 - Project Deviations: Leak Detection Trench – the narrative in the sixth bullet states only "small sections" of the LDS trench were constructed at less than one percent. Based on the survey data provided in TR-123 and TR-125, more than a third (~1,150 out of ~3,250) was constructed at less than one percent. The use of the word "small" is misleading. Please revise this statement to indicate approximately a third of the LDS trench was constructed at a slope less than the minimum one percent and provide a technical explanation related to bedrock proximity requiring construction methods such as blasting that would be more detrimental to the project.*

The deviation has been updated to state "*The overall slope of the trench is greater than 1 percent and was considered to meet the intent of the design, as it will convey solution to the manhole. The section of the trench presented in this report was constructed at the same time as the trench presented in Phase 2B Part 1, which was approved in TR123. Along areas of the slope that the leak detection trench was being constructed, bedrock was located beneath the immediate subgrade. The excavator was not able to rip through the bedrock and would have required a more extensive, less precise technique such as blasting to excavate the trench. These techniques would have required fill to be placed on the slope, increasing the risk of settlement. As a result, approximately a third of the Leak Detection Trench in Phase 2B Part 2 was constructed at less than 1 percent, however, the nominal slope of the trench to the manhole is greater than 1 percent. These sections were evaluated during construction by the Engineer of Record and were allowed as the intent of the design was still achieved.*" The updated report is included as Attachment 3.

10) *Section 4 - Project Deviations: TR-123 included the following deviation regarding the Leak Detection Trench: "The contractor substituted 80mil geomembrane instead of the 40mil geomembrane for this phase of construction. The roll of the 40 mil was depleted in a section of a trench upstream of this phase, to be reported in a future submittal. The EoR approved this change since the replacement material exceeded the specification of the material.". Within TR-125, there is only a brief mention of this change in section 2.5 Leak Detection Trench, however it not stated in Section 4. Please address why this was not included in the deviation section and update the section accordingly.*

The deviation has been added to the list and states "*The contractor substituted 80-mil geomembrane instead of the 40-mil geomembrane for a portion of this phase of construction. The roll of the 40-mil was depleted in this section of the trench. The Engineer of Record approved this change since the replacement material exceeded the specification of the material.*"

11) *Appendix C - Technical Specifications - Technical Specification 02200 - Earthworks: The DRMS noted the same flaws with this specification that were noted in TR-123 related to 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 an invalid range if 3 percent must be retained on the 2-inch screen. Please make the necessary corrections.

An older version of the earthwork technical specifications was inadvertently submitted with the CQA Report, Rev 0. The correct version has been included in Attachment 3.

12) *Appendix F: Newmont signature dates on Week Ending, 9-28-2019, 10-5-2019, and 10-12-2019 post-date TR-125 submittal, please update to be accurate.*

Weekly reports for 9-28-2019 and 10-12-2019 were updated with the correct signature date for the Newmont Representative and are included in Attachment 3. Upon review of the weekly report dated 10-5-2019, the Newmont Representative Signature date is correct.

13) *Appendix L: The Tensiometer Certifications submitted are dated for 5/13/2020. The conformance testing data submitted in Appendix K.1 was all conducted in 2019, before the testing equipment was certified. Please clarify this discrepancy.*

The tensiometer certifications in Appendix L are for the destructive testing done on site. The conformance testing in Appendix K.1 is done in a laboratory prior to the liner rolls being shipped to site.

Should you require further information please do not hesitate to contact Katie Blake at 719-689-4048 or Katie.Blake@Newmont.com.

Regards,

Katie Blake
Sustainability Manager
Cripple Creek and Victor Mining Company

EC: E. Russell – DRM
T. Cazier – DRMS
M. Cunningham – DRMS
P. Lennberg - DRMS
B. Bowles - DRMS
L. Morgan – Teller County

Enc (3)

ATTACHMENT 1:
Appendix J.5.1

Cripple Creek & Victor Gold Mining Company
Squaw Gulch Valley Leach Facility
Phase 2B Part 2 Record of Construction
Geomembrane Fusion Welding Destructive Testing Summary

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Sample Number	Seam Number	Date Seamed	Welding Data		Date Tested	Test Results																QA Monitor
			Operator	Machine Number		Peel Strength (Minimum = 100 ppi)					Peel Strength (Minimum = 100 ppi)					Shear Strength (Minimum = 120 ppi)					Pass/Fail	
DF-1346	P-3863/P-3864	9/5/2020	AG	82	9/15/2020	135	128	138	126	140	133	135	142	133	137	151	150	144	147	141	PASS	RM
DF-1347	P-3864/P-3865	9/5/2020	WL	42	9/15/2020	133	129	130	125	128	140	135	128	126	126	152	140	140	159	143	PASS	RM
DF-1348	P-3868/P-3869	9/5/2020	AG	82	9/15/2020	123	121	133	133	137	142	132	137	137	140	152	149	143	143	141	PASS	RM
DF-1349	P-3873/P-3875	9/5/2020	WL	42	9/15/2020	134	128	138	130	134	131	129	134	128	132	145	148	140	156	149	PASS	RM
DF-1350	P-3825/P-3826	9/3/2020	WL	42	9/14/2020	119	122	129	125	126	118	122	119	123	122	144	148	148	152	148	PASS	RM
DF-1351	P-3878/P-3879	9/18/2020	AG	82	9/21/2020	138	122	142	135	143	136	131	141	136	141	149	163	153	180	149	PASS	TT
DF-1352	P-3882/P-3883	9/18/2020	AG	82	9/21/2020	154	149	151	135	151	148	144	142	139	140	160	162	159	163	157	PASS	TT
DF-1353	P-3883/P-3886	9/18/2020	WL	42	9/21/2020	144	135	155	151	157	149	140	141	137	151	159	163	155	162	154	PASS	TT
DF-1354	P-3886/P-3888	9/18/2020	AG	82	9/21/2020	157	147	143	163	157	148	142	148	151	147	164	170	167	168	163	PASS	TT
DF-1355	P-3888/P-3890	9/18/2020	AG	82	9/22/2020	155	154	163	153	166	155	146	154	147	152	174	184	176	177	182	PASS	RM
DF-1356	P-3890/P-3892	9/18/2020	WL	42	9/22/2020	153	143	157	158	150	133	138	147	137	146	167	171	166	171	172	PASS	RM
DF-1357	P-3896/P-3897	9/18/2020	AG	82	9/23/2020	172	174	180	170	169	180	168	173	173	172	182	186	180	184	179	PASS	BM
DF-1358	P-3899/P-3900	9/19/2020	WL	42	9/22/2020	151	145	149	145	159	141	137	145	138	144	172	181	173	177	170	PASS	RM
DF-1359	P-3896/P-3903	9/19/2020	AG	82	9/23/2020	170	155	155	152	160	174	150	163	151	156	186	190	186	189	188	PASS	BM
DF-1360	P-3906/P-3907	9/19/2020	WL	42	9/23/2020	173	179	179	171	176	182	171	175	177	171	183	187	180	186	182	PASS	BM
DF-1361	P-3906/P-3909	9/19/2020	AG	82	9/23/2020	169	160	163	168	177	171	164	174	166	164	192	197	193	197	194	PASS	BM
DF-1362	P-3909/P-3911	9/19/2020	WL	42	9/23/2020	152	157	155	150	153	158	150	157	144	152	185	181	187	182	197	PASS	BM
DF-1363	P-3912/P-3913	9/19/2020	AG	82	9/24/2020	148	141	157	145	146	145	129	143	143	142	159	166	163	167	164	PASS	TT
DF-1364	P-3913/P-3915	9/21/2020	WL	42	9/24/2020	131	131	132	129	133	141	136	143	138	139	142	150	145	149	147	PASS	TT
DF-1365	P-3918/P-3920	9/21/2020	WL	42	9/24/2020	138	135	142	144	149	140	135	139	137	140	153	162	156	166	148	PASS	TT
DF-1366	P-3919/P-3921	9/21/2020	AG	82	9/24/2020	140	134	146	140	144	142	137	141	135	146	154	159	155	158	153	PASS	TT
DF-1367	P-3921/P-3923	9/21/2020	WL	42	9/24/2020	142	137	144	141	145	134	132	136	136	137	152	152	149	152	149	PASS	TT
DF-1368	P-3923/P-3925	9/21/2020	AG	82	9/25/2020	157	149	157	151	149	169	145	161	163	156	180	182	176	180	175	PASS	TT
DF-1369	P-3927/P-3928	9/21/2020	AG	82	9/25/2020	159	150	154	141	156	159	152	156	151	156	177	178	167	183	176	PASS	TT
DF-1370	P-3928/P-3929	9/21/2020	WL	42	9/25/2020	163	153	161	161	162	170	157	171	157	162	172	183	178	184	179	PASS	TT
DF-1371	P-3929/P-3930	9/22/2020	WL	42	9/25/2020	171	146	159	153	160	154	150	155	160	151	169	171	168	173	168	PASS	TT
DF-1372	P-3932/P-3933	9/22/2020	AG	82	9/25/2020	172	158	163	161	163	161	154	157	153	161	178	180	175	182	175	PASS	TT
DF-1373	P-3933/P-3934	9/22/2020	WL	42	9/25/2020	160	156	159	154	159	158	154	154	155	161	165	181	177	179	173	PASS	TT
DF-1374	P-3934/P-3935	9/22/2020	AG	82	9/25/2020	169	163	168	164	160	165	163	167	156	159	188	177	182	178	182	PASS	TT
DF-1375	P-3935/P-3936	9/22/2020	WL	42	9/25/2020	164	145	151	158	151	155	148	158	153	150	177	178	173	183	187	PASS	TT
DF-1376	P-3936/P-3937	9/22/2020	AG	82	9/25/2020	156	162	158	159	156	158	156	166	152	157	174	185	179	183	180	PASS	TT
DF-1377	P-3937/P-3938	9/23/2020	WL	42	9/25/2020	139	138	141	136	133	154	145	149	146	150	164	167	163	162	158	PASS	TT
DF-1378	P-3940/P-3941	9/23/2020	AG	82	9/25/2020	156	138	151	142	149	141	137	143	140	142	155	163	156	163	157	PASS	TT
DF-1379	P-3941/P-3942	9/23/2020	WL	42	9/25/2020	133	138	155	137	141	147	140	149	143	154	159	157	158	155	160	PASS	TT

Note: CAP information is located on Fusion Welding Summary

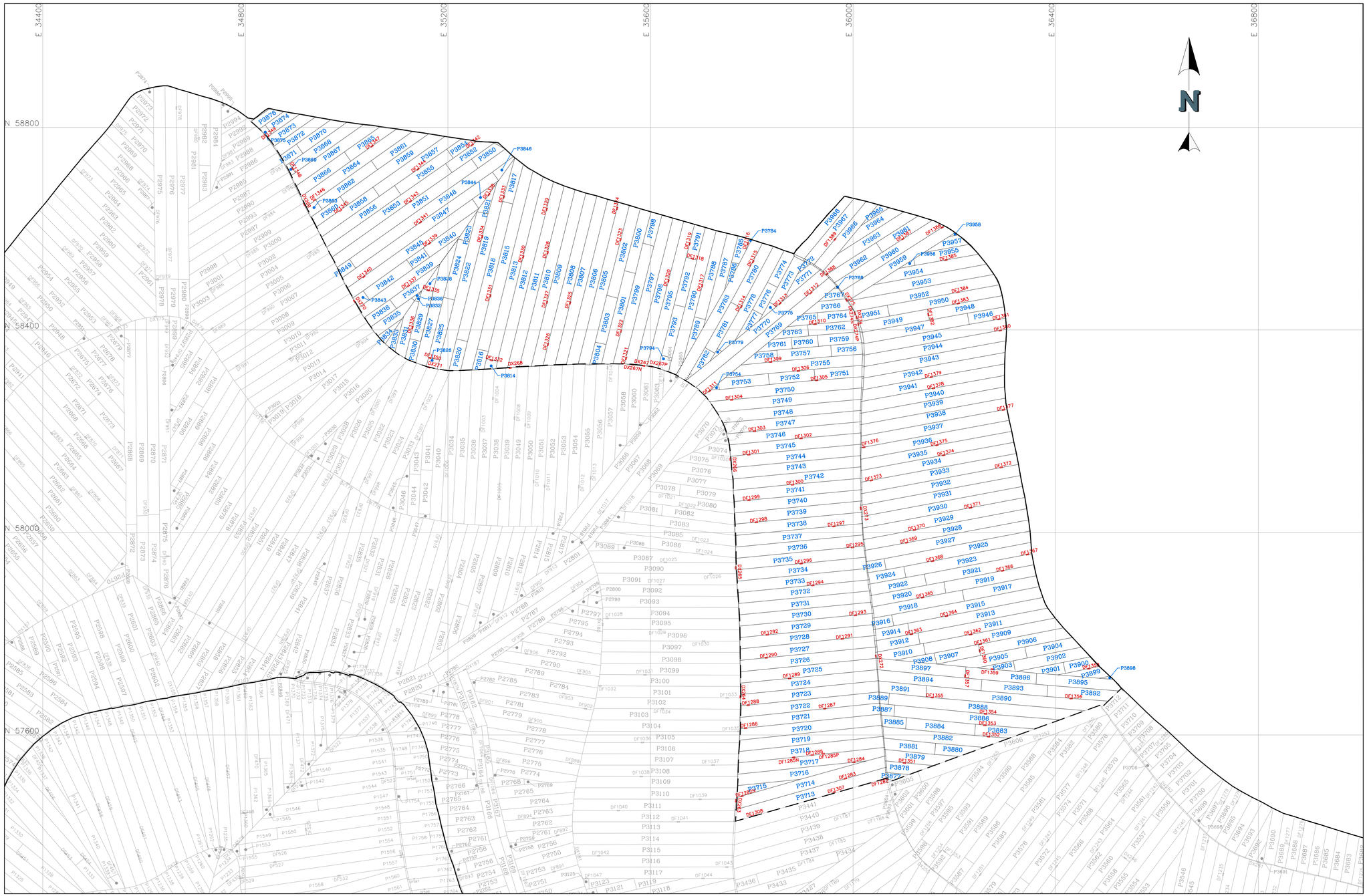
Cripple Creek & Victor Gold Mining Company
Squaw Gulch Valley Leach Facility
Phase 2B Part 2 Record of Construction
Geomembrane Fusion Welding Destructive Testing Summary

Sample Number	Seam Number	Date Seamed	Welding Data		Date Tested	Test Results																QA Monitor
			Operator	Machine Number		Peel Strength (Minimum = 100 ppi)					Peel Strength (Minimum = 100 ppi)					Shear Strength (Minimum = 120 ppi)					Pass/Fail	
DF-1380	P-3944/P-3945	9/23/2020	AG	82	9/26/2020	162	165	169	155	165	168	160	180	157	168	187	189	185	188	185	PASS	TT
DF-1381	P-3945/P-3946	9/23/2020	WL	42	9/27/2020	171	164	181	147	160	158	151	155	161	170	188	190	184	188	184	PASS	TT
DF-1382	P-3948/P-3949	9/23/2020	AG	82	9/28/2020	169	155	167	157	164	166	157	165	162	157	163	166	162	166	163	PASS	TT
DF-1383	P-3948/P-3950	9/23/2020	WL	42	9/29/2020	173	153	164	166	182	179	160	171	156	156	189	193	189	187	185	PASS	TT
DF-1384	P-3950/P-3952	9/24/2020	AG	82	9/30/2020	162	154	155	152	158	163	156	149	146	161	185	178	184	179	182	PASS	TT
DF-1385	P-3954/P-3955	9/24/2020	WL	42	10/1/2020	148	156	152	172	146	164	159	162	159	166	172	178	177	174	181	PASS	TT
DF-1386	P-3959/P-3960	9/24/2020	AG	82	10/2/2020	152	144	146	150	158	168	147	154	146	154	175	184	178	183	179	PASS	TT
DF-1387	P-3960/P-3961	9/24/2020	WL	42	10/3/2020	152	155	158	170	173	150	159	146	137	143	173	179	177	177	177	PASS	TT
DF-1388	P-3962/P-3963	9/24/2020	AG	82	10/4/2020	150	150	171	146	171	147	147	157	163	170	181	182	182	181	180	PASS	TT
DF-1389	P-3966/P-3967	9/24/2020	WL	42	9/26/2020	160	151	168	162	158	150	158	163	145	167	179	179	181	180	180	PASS	TT

N - Next
P - Previous

Note: CAP information is located on Fusion Welding Summary

ATTACHMENT 2:
UPDATED GEOMENBRANE PANEL LAYOUT AS-BUILT (DRAWING 6)



0 100 200 FEET

LEGEND:

- LIMITS OF GEOMEMBRANE ACCEPTANCE
- P2499 PANEL NUMBER
- DF805 DESTRUCT FUSION NUMBER AND REPAIR
- DX148 DESTRUCT EXTRUSION NUMBER AND REPAIR
- P1077 PREVIOUSLY CERTIFIED PANEL NUMBER
- DF384 DESTRUCT FUSION NUMBER AND REPAIR
- DX80 DESTRUCT EXTRUSION NUMBER AND REPAIR

REV	DATE	DESCRIPTION	TECH	ENG
1	1/15/21	RE-ISSUED FOR RECORD OF CONSTRUCTION	JEP	JNM
0	11/19/20	ISSUED FOR RECORD OF CONSTRUCTION	JEP	JNM

APPROVED BY: JNM
CHECKED BY: JNM
DESIGNED BY: JEP
DRAWN BY: JEP

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COLORADO REGISTERED JOHN NEWELL MARKS 37574 PROFESSIONAL ENGINEER 1-15-21

NewFields

CLIENT: CRIPPLE CREEK & VICTOR GOLD MINING COMPANY

PROJECT: SQUAW GULCH VALLEY LEACH FACILITY PHASE 2B PART 2

TITLE: GEOMEMBRANE PANEL LAYOUT AS-BUILT

FILENAME: 0106.032.001P

DRAWING NO.: 6

REVISION: 1

P:\Projects\0106.032 VLF2 Phase 2 CQA\A-CAD\DWGS\ROC Report - 2B Part 2\0106.032.001P.dwg-11/13/2020 9:30 AM

ATTACHMENT 3:

UPDATED SQUAW GULCH VALLEY LEACH FACILITY PHASE 2B PART 2 RECORD OF CONSTRUCTION REPORT (REV 1)

SQUAW GULCH VALLEY LEACH FACILITY
PHASE 2B PART 2
RECORD OF CONSTRUCTION REPORT Rev 1

Prepared for:
Cripple Creek & Victor Gold Mining Company
P.O. Box 191
Victor, CO 80860

Prepared by:
NewFields Mining Design & Technical Services
9400 Station Street, Suite 300
Lone Tree, Colorado 80124

NewFields Job No. 475.0106.032
January 15, 2021

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1. INTRODUCTION

NewFields Companies, LLC (NewFields) was commissioned by the Cripple Creek & Victor Gold Mining Company (CC&V), which is owned and managed by Newmont, to provide Construction Quality Assurance and Quality Control (QA/QC) for the construction of the Squaw Gulch Valley Leach Facility (VLF) Phase 2 project. The project is located in Teller County, Colorado, just east of the city of Cripple Creek. The Squaw Gulch VLF is included in the Cresson Project, which is a gold mining and ore processing facility comprised of surface mines, crushers, lined VLFs, gold recovery plants, and associated infrastructure. The Cresson project was designed and constructed to meet or exceed the requirements established by C.R.S. §34 32 101 et seq. and regulations promulgated there under by the Mined Land Reclamation Board (MLRB). The work associated with the Cresson Project is being performed under specific criteria established in Amendment No. 10 of Permit Number M-1980-244, as approved by the MLRB.

This Record of Construction (ROC) report documents the QA/QC services for Squaw Gulch VLF Project through Phase 2B Part 2. The majority of the earthworks for the Squaw Gulch VLF Phase 2 facility extending to the subgrade below the Soil Liner Fill (SLF) was constructed simultaneously with the Squaw Gulch VLF Phase 1. The following ROC reports should be referenced for Phase 2B Part 2 documentation that was completed during Phase 1 and Phase 2A:

"Squaw Gulch VLF Pregnant Solution Storage Area Project Final Report," submitted by AMEC in November 2014

"Squaw Gulch VLF Phase 1 (9,450' to 9,500' Bench) Final Report," submitted by AMEC in October 2015

"Squaw Gulch VLF Phase 1 (9,550-foot Elevation Bench to Completed Areas Outlined on Figure 2) Final Report," submitted by AMEC in January 2016

"Squaw Gulch Valley Leach Facility Phase 1 Completion Record of Construction Report," submitted by NewFields in October 2016

"Squaw Gulch Valley Leach Facility Phase 2A Part 1 Record of Construction Report," submitted by NewFields in July 2019

"Squaw Gulch Valley Leach Facility Phase 2A Part 2 Record of Construction Report," submitted by NewFields in September 2019

"Squaw Gulch Valley Leach Facility Phase 2A Part 3 Record of Construction Report," submitted by NewFields in July 2020

"Squaw Gulch Valley Leach Facility Phase 2B Part 1 Record of Construction Report," submitted by NewFields in September 2020

The attached Figures 1 and 2 present the general site location, the Squaw Gulch VLF Phases, and the Phase 2B Part 2 certification limits.

1.1. Project Description

The Squaw Gulch VLF is located north of the current Arequa Gulch VLF in an area referred to as Squaw Gulch and is referred to as the Squaw Gulch VLF as part of the Mine Life Extension 2 Project. This area encompasses Squaw, Anaconda, and Swede Gulches. The Squaw Gulch VLF Phase 2B Part 2 area is a continuation of construction. Construction associated with this certification report was completed in October 2020.

The majority of the earthworks construction to the extent of the finished subgrade elevation below the Soil Liner Fill (SLF) was performed concurrently with the Squaw Gulch VLF Phase 1 work prior to 2020. All work performed on Phase 2B Part 2 prior to 2020 is presented in the previously submitted certification reports submitted in July 2019 and September 2019. The Squaw Gulch VLF Phase 2B Part 2 area was constructed by placing SLF, overlain with an 80 mil Linear Low Density Polyethylene (LLDPE) double sided micro-spike (DSMS) geomembrane, and covered with Drain Cover Fill (DCF). Construction within this area was completed on October 9, 2020. The Squaw Gulch VLF Phase 2B grading plan and typical VLF cross sections are shown on Drawings A44 and A60/A62 in the Issued for Construction (IFC) drawing set, respectively.

1.2. Parties Involved

Work performed during the Squaw Gulch VLF Phase 2B Part 2 project was completed by several parties. Responsible parties involved in the project are listed below:

- Project management was provided by CC&V. Messrs. Steve Blaskovich, Jeff Gaul, and John Shiflett represented CC&V as the Construction Manager and Construction Superintendents, respectively.
- Tezak Heavy Equipment Co., Inc. (Tezak) was contracted by CC&V as the general contractor responsible for all construction activities after January 2019 for the Phase 2A and Phase 2B projects.
- Edward-James Surveying, Inc. (EJS) performed surveying for all construction activities performed by Tezak and was subcontracted by Tezak.
- Tetra Tech, formerly known as American Environmental Group, Ltd. (AEG), was subcontracted by Tezak to perform the Phase 2B geomembrane installation.
- NewFields provided field engineering and construction QA/QC testing and inspection for the Phase 2B project. A Staff Schedule of NewFields personnel is presented in Appendix A.

- Foresight West Surveying, Inc. (Foresight) performed third party surveying and was subcontracted by CC&V.
- Agru America Inc. (Agru) manufactured and delivered geomembrane materials.
- Skaps Industries manufactured and delivered all the geotextile materials.
- Tensar International Corporation manufactured and delivered all geogrid materials.
- Texas Research International, Inc. (TRI) was subcontracted by NewFields to perform third party conformance testing during the geosynthetics manufacturing.

1.3. Construction Quality Assurance (CQA) / Construction Quality Control (CQC)

CC&V contracted NewFields to perform all CQA and CQC activities for the Squaw Gulch VLF Phase 2B Part 2 project. All CQA records of testing are presented in the Tables and Appendices attached to this report.

1.4. Design Drawings and Technical Specifications

The Phase 2B Part 2 Squaw Gulch VLF was constructed in general accordance with the Design Drawings and Technical Specifications from the report titled "*Cripple Creek & Victor Gold Mining Company, Squaw Gulch Valley Leach Facility Design,"* issued by AMEC, September 1, 2011. NewFields developed updated Issued for Construction Drawings dated September 2018 and the Technical Specifications were updated in August 2016. In March 2020, NewFields updated the Earthworks Technical Specifications to allow for 3-inch minus crushed ore to be used as Drain Cover Fill. The IFC Drawings and ROC Drawings are attached to this document. Survey for the Squaw Gulch VLF Phase 2B Part 2 ROC drawings was performed by EJS and Foresight. Copies of the Surveyor's Professional Licenses are presented in Appendix B. The Technical Specifications are presented in Appendix C and the earthwork material specifications are summarized in Table 1. Any deviations from the IFC drawings or project Technical Specifications are discussed in Section 4 of this report.

1.5. Use of this Report

This report has been prepared exclusively for Cripple Creek & Victor Gold Mining Company. No third party, other than the design team (NewFields), shall be entitled to rely on any information, conclusions, opinions, or other information contained herein without the express written consent of CC&V. Any third party that does rely on any information, conclusions, opinions, or other information contained herein without the express written consent of CC&V understands and acknowledges that NewFields is not liable for any claim arising out of such use.

2. SQUAW GULCH VLF CONSTRUCTION ACTIVITIES

Tezak performed construction activities during the Squaw Gulch VLF project, excluding geomembrane installation.

Equipment used to perform these activities is listed below:

CAT 163 Motor Grader

CAT D6 Low Ground Pressure (LGP) Dozer

CAT D6 LGP Dozers equipped with Global Positioning System (GPS)

CAT D8 Dozer

CAT 259 Skid steer

CAT 279 Skid steer

CAT 966 Loader

CAT 988 Loader

John Deere 744k Loader

Komatsu PC78MR-6

CAT CS56 Smooth Drum Compactor

CAT CP56 Sheepsfoot Drum Compactor

John Deere 4066 Ag Tractor

CAT 320 Excavator w/Roller Attachment

John Deere 470 Excavator

CAT 730 Haul Trucks

CAT 725 Haul Truck

CAT 740 Haul Trucks

CAT 259 Track Skid

Kenworth Fuel Truck

JLG Telescopic Forklift

CAT 740B Water Truck

International Water Truck

2.1. Clearing and Grubbing

The footprint of the Phase 2B Part 2 Squaw Gulch VLF was stripped of all deleterious materials. Any soil containing vegetation was removed and placed in several site topsoil stockpiles designated by CC&V. All cleared areas were inspected by the CQA Monitor to ensure that all deleterious material was removed prior to further construction activities.

2.2. Underground Working Remediation

During the course of construction and continuous inspection, two separate ground depressions were identified within the Phase 2B subgrade. The first one was in an area with no other previously known underground workings (UG), designated as UG6699. The second one was located above previously remediated UG6617 performed in 2016. Underground working remediation is summarized in the table presented in Appendix M.1. The table includes the historic identification number, identification number, location (northing, easting, and surface elevation), type of working, remediation type, remediation quantities and remarks regarding the remediation. Remediation was performed in accordance with IFC Drawing A38 and the project Technical Specifications. IFC Drawings A30 through A36 present all historic underground

workings that were known at the start of construction. Appendix M.2 contains a layout of all underground workings that were remediated within the Phase 2 limits.

2.2.1. Underground Working 6617

UG6617 remediation was performed in 2016 and details of procedures used can be referenced in the "Squaw Gulch Valley Leach Facility Phase 2A Part 1 Record of Construction Report, Revision 2", dated August 26, 2019. Confirmatory drilling was performed to define the subsurface condition and surface depression cause. A void was identified in the working, under the geogrid cap and evidence of cap settlement was present. Based on this information the EOR required the existing underground working remediation removal and reconstruction. The top three steps of the existing geogrid cap were removed, and the entire working was re-excavated to competent rock removing the void identified during confirmatory drilling. Due to the large excavation, UG6617 was backfilled using structural fill as the engineered measure to help minimize differential settlement. A three-layer cap with select structural fill in between the layers was then re-installed extending the geogrid a minimum of fifteen feet outside the working limits. This working was remediated in accordance with IFC Drawing A38 and the project Technical Specifications.

2.2.2. Underground Working 6699

Investigation of UG6699 was performed using a track mounted excavator to remove the existing material from the depression. The working was found to be a shallow surface working and was completely removed during the excavation. UG6699 was backfilled with structural fill in accordance with IFC Drawing A38 and the project Technical Specifications.

2.3. Site Grading

Approximately 12,715 cy of Structural Fill (SF) material was used to grade the site within the limits of Squaw Gulch VLF Phase 2B Part 2 area. Prior to SF placement, the existing subgrade was scarified to a depth of 6 inches, moisture conditioned, and compacted, as required. The SF was then placed in maximum 2-foot thick loose lifts, moisture conditioned as required, and compacted using a 12-ton vibratory sheepsfoot drum compactor. The entire surface of each lift was compacted with a minimum of four passes in accordance with the developed method specifications. The development of the method specifications is described in Appendix D. All subgrade preparation and SF placement associated with site grading was monitored by the CQA Monitor to ensure that it met the project Technical Specifications.

2.4. Subgrade Preparation

The subgrade was prepared and inspected prior to SLF placement. The exposed subgrade surface was moisture conditioned and compacted using a 12-ton sheepsfoot drum vibratory compactor where needed. Compaction of the subgrade was performed in accordance with the applicable developed method specifications, presented in Appendix D, for a 12-ton vibratory sheepsfoot drum compactor. The CQA Monitor inspected and approved the finished subgrade surface prior to SLF placement.

2.5. Leak Detection Trench

Approximately 716 linear feet of leak detection trench was constructed within the Squaw Gulch VLF Phase 2B Part 2 limits in accordance with the project Technical Specifications. The Phase 2B Part 2 leak detection trench is presented in the Leak Detection Trench As-built record of construction drawing. The leak detection trench constructed for this report is a continuation of the leak detection trench previously certified in "Squaw Gulch Valley Leach Facility Phase 2A Part 1 Record of Construction Report," submitted by NewFields in July 2019.

Detail N on IFC Drawing A68 shows the typical leak detection trench section. Per Detail N, a minimum one foot by one-foot trench was excavated and 40 mil LLDPE geomembrane was installed along the base of the trench. In a section of the trench, 80 mil LLDPE geomembrane was used when the stockpiled 40 mil geomembrane was consumed. The geomembrane was installed in long strips with a 5-foot overlap and was overlain by a 12 oz/yd^2 non-woven geotextile. A 4-inch diameter perforated corrugated polyethylene pipe (CPeP) was then placed in the trench. The trench was backfilled with Leak Detection Fill (LDF) and the geotextile was wrapped around the fill with a minimum 1-foot overlap. A 1 percent minimum overall slope was maintained along the length of the trench to the manhole. Sections that were less than 1 percent were visually evaluated and were considered to still meet the intent of the design to convey solution to the manhole to detect a possible leak. The section of the trench presented in this report was constructed at the same time as the trench presented in Phase 2B Part A, which was approved in TR123. The CQA Monitor observed the leak detection trench installation to date.

The Squaw Gulch VLF Phase 2B Part 2 leak detection trench was constructed by installing approximately 3,669 square feet of LLDPE geomembrane, 3,669 square feet of 12 oz/yd^2 non-woven geotextile, 734 linear feet of 4-inch CPeP and 27 cy of LDF.

2.6. Soil Liner Fill

Approximately 37,157 cy of SLF was placed within the Squaw Gulch VLF Phase 2B Part 2 area. The as-built SLF surface is presented in Soil Liner Fill As-Built record of construction drawings.

Materials from the Cameron borrow, WHEX pit and ECOSA borrow were processed through a custom-designed rotary mill and screen in order to remove oversized rock and uniformly condition the material. After processing, the SLF was stockpiled in designated stockpiles around the site.

The contractor used 30- and 40-ton articulated haul trucks to haul SLF from the local stockpiles to the Squaw Gulch VLF Phase 2B Part 2 footprint. The material was spread using LGP dozers equipped with GPS, and moisture conditioned in place by tandem-axel water trucks and laborers. A 12- and 19-ton smooth drum vibratory compactors, track-mounted skid steer with roller attachment, and excavator with smooth drum roller attachment were utilized to compact the SLF to a minimum thickness of 12 inches. The specified minimum density was 95 percent of the maximum dry density at minus 2 percent to plus 3 percent of optimum moisture content as determined by American Society for Testing and Materials (ASTM) D698.

Laboratory testing, moisture content verification, nuclear density testing, depth verification, and visual inspection of the SLF were performed by the CQA Monitor prior to approval for geomembrane deployment. If deficient areas of the SLF were encountered, the area was reworked and retested until the area was compliant with the project Technical Specifications. All SLF was inspected and approved by the CQA Monitor, CC&V, Tezak, and Tetra Tech prior to geomembrane deployment. SLF acceptance is discussed further in Section 3.2.3 and Section 3.4.2. SLF acceptance forms are provided in Appendix E.

2.7. Geomembrane

Tetra Tech installed approximately 1,003,241 square feet of 80 mil LLDPE DSMS geomembrane within the Squaw Gulch VLF Phase 2B Part 2 area as shown on Record Drawing No. 6. The geomembrane used in Phase 2B Part 2 was from the geomembrane stockpile from the 2019 construction season as well as from the December 2019 delivery. The edge of geomembrane along the eastern end of the project limits, which will tie in with future construction phases, was protected by burying it within the SLF.

Forklifts were used to transport and deploy the geomembrane panels parallel to the slopes to minimize stress on seams. Double-wedge fusion welding was the primary method of geomembrane seaming. Extrusion welding methods were used to perform tie-in seaming, defect repairs, and detail activities. Continuity conformance of fusion welded seams was performed using pressure testing methods, while extrusion welded seams and repairs were non-destructively tested using vacuum testing methods. Destructive testing was performed for both seaming types. The CQA Monitor observed and documented all geomembrane installation and repair activities.

2.8. Anchor Trench

The geomembrane was anchored at the limits of Phase 2B Part 2 area in a minimum 2-foot wide and 3-foot deep anchor trench. Once non-destructive testing and repairs were completed and approved, the anchor trench was backfilled by Tezak in accordance with the project Technical Specifications. The backfill material was placed in 12-inch thick lifts and compacted by a smooth drum vibratory compactor. In areas where future geomembrane installation would cover the anchor trench, SLF was used to backfill the top 12 inches of the anchor trench.

2.9. High Volume Solution Collection System (HVSCS) Piping

High Volume Collection Pipe As-Built record of construction drawings present the as-built layouts of the HVSCS piping installed within the Squaw Gulch VLF Phase 2B Part 2 area. IFC Drawings A70 and A74 present the HVSCS layout and detail, respectively.

All HVSCS piping was installed on approved geomembrane and kept in place during DCF placement. Approximately 9,549 linear feet of 4-inch diameter perforated corrugated polyethylene pipe (CPeP), 517 linear feet of 8-inch diameter perforated CPeP and 2,502 linear feet of 12-inch diameter perforated CPeP were installed.

The 12-inch diameter CPeP that runs around the perimeter of the VLF is included to provide a flow path if the perimeter barren pipeline were to leak. The 12-inch perimeter pipe is a preventative measure and is not intended to collect high volume solution. This pipe was generally installed parallel to the perimeter anchor trench and does not always have a minimum 1 percent slope.

2.10. Drain Cover Fill

Approximately 74,314 cy of DCF was placed within the Squaw Gulch VLF Phase 2B Part 2 area in accordance with the project Technical Specifications. Crushed overburden was used for drain cover fill placement. Crushed overburden material from the Cresson Project was processed between September 2013 and November 2014. All oversized material was removed from the overburden by screening the material over a vibrating 1 ½ inch screen. After processing, the DCF was stockpiled north of the Squaw Gulch VLF in an area designated by CC&V. No crushed ore was used as DCF within the footprint of this report.

Tezak used 30- and 40-ton articulated haul trucks to haul DCF from the stockpile to the Squaw Gulch VLF Phase 2B Part 2 footprint. The DCF was placed in a minimum 2-foot lift on approved geomembrane by LGP dozers. The DCF as-built boundary is shown on Record Drawing No. 7.

Haul routes consisted of 4-foot lifts that were spread into 2-foot lifts upon finish grading the area. Haul routes consisting of the crushed ore DCF were left in place. All DCF was placed in an uphill direction on slopes steeper than 4H:1V using dozers with GPS capability.

A CQA Monitor was present during all DCF placement activities to verify that the DCF was placed in accordance with the project Technical Specifications and that no damage to the geomembrane occurred. If any damage to the geomembrane was noted, work activities were paused, and the damage was repaired prior to resuming DCF placement. The DCF As-Built Isopach is shown on Record Drawing No. 7. It is important to note that the DCF isopach was developed by generating a volume surface between two surfaces, the top of the SLF and the top of the DCF. The SLF and DCF surfaces were created from survey points. All survey points were not taken in the same location for each surface. The depths showing less than 2 feet have some level of error associated with them due to the surface triangulation between points. Any identified low spot was hand measured and verified in the field by NewFields to ensure a minimum depth of 2 feet. If a low spot was found in the field, the contractor was notified and remediated it to 2 feet thick minimum.

3. QUALITY ASSURANCE/QUALITY CONTROL

QA/QC activities were performed by the CQA Monitor for all shifts during the Squaw Gulch VLF project. A trailer and storage container were mobilized to site and were used for office space and a field laboratory to perform the necessary laboratory testing. QA/QC activities performed included: monitoring all aspects of construction, inspection and approval of all project components, laboratory testing of soils and geomembrane, field testing of soils and geomembrane, documentation of construction and QA/QC activities.

Daily and weekly construction progress reports were generated and submitted to CC&V and the Engineer of Record (EOR). The weekly construction progress reports are presented in Appendix F. The weekly reports beginning in 2019 were included for leak detection, subgrade and underground remediation work. Weekly reports beginning the week of June 13, 2020 were included for SLF activities. Weekly reports from August 29, 2020 through October 3, 2020 were included for liner placement activities. Weekly reports through October 10, 2020 were included for DCF placement activities. Photographs of construction activities were taken by the CQA Monitor throughout the Squaw Gulch VLF Phase 2B construction. Photographs of key construction elements are presented in Appendix G. All testing and inspections were performed in accordance with the Technical Specifications presented in Appendix C.

3.1. Testing Standards

The CQA Monitor completed the earthwork laboratory testing in an on-site soils laboratory to verify that all earthwork construction materials met the project Technical Specifications. Geomembrane and geotextile samples were sent to a third-party laboratory to verify that the material properties met the project Technical Specifications. All testing was performed in accordance with these American Society of Testing and Materials (ASTM) standards.

3.1.1. Earthworks Testing Standards

- Particle size analysis (ASTM C117, C136, D1140, D6913)
- Atterberg limits (ASTM D4318)
- Laboratory moisture/density relationship (ASTM D698)
- Moisture Content (ASTM D2216)
- Flexible Wall Permeability (ASTM D5084, Method D)
- Density of soil in place by nuclear method (ASTM D6938)
- Soil Classification (ASTM D2488)

3.1.2. Geomembrane Testing Standards

- Thickness (ASTM D5199/D5994)
- Density (ASTM D792, Method B)
- Carbon Black Content (ASTM D4218)
- Carbon Black Dispersion (ASTM D5596)
- Tensile Properties (ASTM D6693)
- Ultimate Elongation (ASTM D6693)
- Puncture Strength (ASTM D4833)
- Peel and Shear Strength (ASTM D6392)

3.1.3. Geotextile Testing Standards

- Mass per Unit Area (ASTM D5261)
- Puncture Resistance (ASTM D4833)
- CBR Puncture (ASTM D6241)
- Apparent Opening Size (ASTM D4751)

3.1.4. Geogrid Testing Standards

- Tensile Strength (ASTM D6637)
- Junction Strength (ASTM D7737)

- Mass Unit Area (ASTM D5261)

3.2. Earthworks Construction Quality Assurance

All earthwork activities for the Squaw Gulch VLF Phase 2B Part 2 project were performed in accordance with the Design Drawings and Technical Specifications as discussed in Section 2. The CQA Monitor observed, documented, and performed testing during material placement. This included; ensuring the proper materials were placed, fills were free of deleterious materials, lift placement was performed uniformly and on a firm and unyielding underlying layer, haulage traffic was spread across fill surfaces when practical, moisture conditioning was performed uniformly with acceptable moisture content, the proper method specification was used when applicable, and specified densities were achieved during field testing. Earthworks laboratory and field testing and frequencies are summarized in Table 2.

The CQA Monitor checked ambient temperatures and logged the daily high and low temperatures, maximum wind speeds and amount of precipitation in Table 3. If earthwork activities were performed while the ambient temperature was below 32°F, fill temperatures were monitored by the CQA Monitor to ensure no frozen material was compacted. Ambient and fill temperatures are presented in Table 4.

3.2.1. Structural Fill

Squaw Gulch VLF Phase 2B Part 2 was constructed by placing 12,715 cy of SF. The particle size distribution and Atterberg limits testing frequencies were one sample for every 50,000 cy. A minimum of one SF sample was required to be tested for particle size and Atterberg limits based on the quantity of material placed. A total of two SF samples were tested with passing results. SF laboratory testing is summarized in Table 5 and individual test results are presented in Appendix H.1.

No laboratory compaction testing was performed on the SF placed within the Squaw Gulch VLF Phase 2 area, as all SF material contained more than 30 percent retained on the ¾-inch sieve. Density was achieved by placing the material in accordance with the method compaction specifications presented in Appendix D.

3.2.2. Select Structural Fill

Squaw Gulch VLF Phase 2B Part 2 was constructed by placing 1,904 cy of SSF. The particle size distribution and Atterberg limits testing frequencies were one sample for every 50,000 cy. A minimum of one SSF sample was required to be tested for particle size and Atterberg limits based on the quantity of material placed. A total of one SSF sample was tested with passing results. SSF laboratory testing is summarized in Table 8 and individual test results are presented in Appendix H.5.

3.2.3. Leak Detection Fill

The Squaw Gulch VLF Phase 2B Part 2 area was constructed by placing 27 cy of LDF. The particle size distribution and Atterberg limits testing frequencies were one sample for every 10,000 cy. One LDF sample was required to be tested for particle size and Atterberg limits. One LDF sample was tested with passing results. LDF laboratory testing is summarized in Table 9 and individual test results are presented in Appendix H.2.

3.2.4. Soil Liner Fill

The Squaw Gulch VLF Phase 2B Part 2 area was constructed by placing 37,157 cy of SLF. The particle size distribution, Atterberg limits, laboratory compaction, and permeability testing frequencies were one sample for every 4,000 cy. A minimum of ten SLF samples were required to be tested for particle size distribution, Atterberg limits, laboratory compaction, and permeability testing. A total of thirty five SLF record samples were tested with passing results. SLF laboratory testing is summarized in Table 6 and individual test results are presented in Appendix H.3.

The nuclear density/moisture testing frequency for SLF is one test for every 500 cy. A minimum of seventy five SLF nuclear density/moisture tests were required. A total of seventy eight SLF nuclear density/moisture tests were performed with passing results. The depth check frequency for SLF is two checks for every acre. A minimum of forty seven SLF depth checks were required. A total of seventy eight SLF depth checks were performed with passing results. SLF nuclear density/moisture testing and SLF depth checks are presented in Tables 10 and 11, respectively.

3.2.5. Drain Cover Fill

The Squaw Gulch VLF Phase 2B Part 2 area was constructed by placing 74,314 cy of DCF. The particle size distribution and Atterberg limits testing frequencies were one sample for every 20,000 cy. A minimum of four DCF samples were required to be tested for particle size and Atterberg limits. A total of seven DCF samples were tested with passing results. DCF laboratory testing is summarized in Table 7 and individual test results are presented in Appendix H.4.

3.3. Geosynthetics Quality Control Submittals

The CQA Monitor reviewed and approved all geosynthetic QC submittals, including geomembrane installation personnel resumes, geomembrane roll QC certificates, geomembrane resin QC certificates, welding rod QC certificates, and geotextile QC certificates. The CQA Monitor tracked all geomembrane delivered to site in the site inventory. The site inventory, for all 80 mil geomembrane used within the Phase 2B Part 2 area, is presented in Appendix I.1.

3.3.1. Geomembrane Installation Personnel Resumes

Tetra Tech submitted the resumes of all installation personnel prior to construction or repair activities within the Squaw Gulch VLF Phase 2B Part 2 area. The CQA Monitor verified that the Installation Superintendent, Master Seamer and QC Inspector possessed the installation experience required by the project Technical Specifications. Geomembrane installation personnel resumes for all crews that performed work on the Squaw Gulch VLF Phase 2B Part 2 area are presented in Appendix I.2.

3.3.2. Geomembrane Roll QC Certificates

The Squaw Gulch VLF Phase 2B Part 2 geomembrane was manufactured by AGRU America. Manufacturing Roll QC certificates were submitted for every roll of geomembrane (approximately one every 9,000 square feet), exceeding the required minimum frequency of one per 50,000 square feet of geomembrane. The roll QC certificates were reviewed by the CQA Monitor, ensuring all geomembrane materials met or exceeded the project Technical Specifications. It should be noted that a separate Asperity test measuring the height of the microspikes on the liner, was also recorded in the QC certificates. The Asperity height is separate from the thickness of the liner. The roll QC certificates for all geomembrane used within the Phase 2B Part 2 area are presented in Appendix I.3 and Appendix I.3 of “Squaw Gulch Valley Leach Facility Phase 2A Part 2 Record of Construction Report”. Geomembrane roll QC Certificates were provided for all 80 mil rolls installed within Phase 2B Part 2. Geomembrane roll QC Certificates were provided for 40 mil rolls in Appendix J.3.1 of “Squaw Gulch Valley Leach Facility Phase 2A Part 1 Record of Construction Report”.

3.3.3. Geomembrane Resin QC Certificates

AGRU America manufactured the geomembrane for the Squaw Gulch Phase 2B Part 2 VLF by using LLDPE polymer raw material (resin). Chevron Phillips Chemical Company provided resin QC certificates at a rate of one per rail car shipment. The resin QC certificates were reviewed by the CQA Monitor, ensuring all materials met or exceeded the project Technical Specifications. It is important to note that the Oven-Aging, UV-Aging, 2% Secant and Multi-Axial Tensile testing is considered formulation testing and is only completed when a resin formula has changed to ensure that the resin/additive formula is adequate. The resin formula has not changed since the letters included in Appendix I.4. The most recent resin QC certificates for all geomembrane used within the Phase 2B Part 2 area are presented in Appendix I.4 and Appendix I.4 of “Squaw Gulch Valley Leach Facility Phase 2A Part 2 Record of Construction Report”.

3.3.4. Geomembrane Welding Rod QC Certificates

AGRU America manufactured the extrusion welding rod for the Squaw Gulch Phase 2B Part 2 VLF from various resin lots. The CQA Monitor reviewed and verified that all welding rod QC certificates provided by Chevron Phillips Chemical Company met the project Technical Specifications and was manufactured using the same type of resin. The welding rod QC certificates are presented in Appendix I.5 and Appendix I.5 of "Squaw Gulch Valley Leach Facility Phase 2A Part 2 Record of Construction Report".

3.3.5. Geotextile QC Certificates

Skaps Industries manufactured the 12 oz/yd^2 non-woven geotextile that was used to construct the underdrain systems and leak detection trenches. The geotextile used in this Phase was delivered in July 2019 and stored per the Technical Specifications. The CQA Monitor verified that the geotextile QC certificates, presented in Appendix I.6, met the project Technical Specifications.

ASTM D6241 was substituted for ASTM D4833 because within the ASTM standard D4833 itself, it states geotextile shall be tested using the CBR puncture strength test, D6241. The minimum CBR puncture value required is 685.1lbs based on the comparison equation between D4833 and D6241 in "Comparison of CBR and Pin Puncture Strength Testing Used in the Evaluation of Geotextiles," written by the University of Wisconsin, Milwaukee in May 2014.

3.3.6. Geogrid QC Certificates

Tensar manufactured the UX1800 uniaxial geogrid that was used in underground working remediation. The CQA Monitor verified that the geogrid QC certificates, presented in Appendix I.7, met the project Technical Specifications.

3.4. Geomembrane Construction Quality Assurance

CQA performed on installed LLDPE geomembrane consisted of visual observations of panel deployment, double-wedge fusion seaming, extrusion seaming, extrusion welded repairs, non-destructive testing, and destructive testing. Fusion welded seams were non-destructively tested for continuity using pressure testing methods. Extrusion welds were non-destructively tested using vacuum testing methods. Fusion and extrusion welding methods were also tested destructively. All field sampling and testing was performed by Tetra Tech and observed by the CQA Monitor. Visual observations of field seams and panels were routinely made to inspect the seam for squeeze-out, melt, over-grind, and overlap. Defects and/or failed seams were marked and repaired in accordance with the specified repair procedures.

Welding machines were continually inspected for proper operation, settings and condition by performing trial welds prior to actual geomembrane installation. Logs of the trial welds, panels, seams, continuity testing, repairs, and destructive testing were maintained by both the contractor and the CQA Monitor on a daily basis. The CQA Monitor's geomembrane installation logs are presented in Appendix J.

All geomembrane installation for the Squaw Gulch VLF project was performed in accordance with Design Drawings and Technical Specifications. Record Drawing No. 6 shows panel locations, seams, and destructive test locations.

3.4.1. Geomembrane Third Party Conformance Testing

CC&V took delivery of geomembrane to be used in the 2020 construction season in December 2019. The third party conformance test samples for this shipment of geomembrane were obtained at a rate of one test for every 150,000 square feet, and at least one test for each resin lot, resulting in a total of 20 tests. Samples were tested by TRI in Anaheim, CA. All conformance test results were reviewed by a NewFields representative and met the Technical Specifications. Third party conformance test results are presented for 80mil geomembrane in Appendix K. Third party conformance test results for the 80 mil geomembrane rolls delivered prior to December 2019 can be found in the previous Phase 2A reports.

3.4.2. Geogrid Third Party Conformance Testing

Third party conformance testing on every geogrid resin lot was performed by TRI in Austin, TX. All conformance test results were reviewed by the CQA Monitor, and lots that met the project Technical Specifications were approved for use. Third party conformance test results are presented in Appendix K.2.

3.4.3. Geomembrane Panel Deployment

The SLF surface was inspected by the CQA monitor prior to geomembrane deployment, ensuring the surface was free of any protruding rock greater that 0.75" or irregularities (rutting, ridges, indentations, etc.) greater than 0.5". The SLF surface was approved by Tetra Tech, Tezak, CC&V, and the CQA Monitor prior to and during deployment each day. SLF acceptance forms are presented in Appendix E. During geomembrane panel deployment, the CQA Monitor logged the dimensions of each panel, the roll number used for each panel, and measured the thickness of the panel edges. Roll numbers were checked against the site inventory to ensure only approved geomembrane was deployed. The Geomembrane Panel Deployment Summary is presented in Appendix J.1.

3.4.4. Geomembrane Fusion Seaming

Double-wedge fusion welding was the primary method of geomembrane seaming for the Squaw Gulch VLF Phase 2B Part 2 project. Prior to fusion welding activities, trial welds were performed for each welding machine and welding technician combination for each type of geomembrane. The fusion welding trial seam logs are presented in Appendix J.2.1. The weld was inspected constantly for insufficient overlap, burnouts, or any other damage caused during the welding process. The CQA Monitor logged the welding machine and welding technician combination, the length of the seam, the direction the seam was welded, time of seaming, the welding machine temperature, and the welding machine speed. Destructive test samples were marked during fusion seaming and are discussed further in Section 3.4.6. Continuity conformance of the seam was also performed using pressure testing methods and is discussed further in Section 3.4.7. The Geomembrane Fusion Welding Summary is presented in Appendix J.3.

3.4.5. Geomembrane Extrusion Seaming

At each construction bench, the deployed geomembrane was tied-into the previously placed geomembrane, overlapping a minimum of two feet. The tie-in was welded using extrusion welding methods. Any damage caused to the existing geomembrane, at the tie-in as it was exposed, was repaired by extending the overlap of new liner or by completely covering the damaged area with a patch. Prior to extrusion seaming activities, trial welds were performed for each welding machine and welding technician combination for each type of geomembrane. The trial seam logs are presented in Appendix J.2.2. As extrusion seaming was performed, proper techniques were verified including welding angle, grinding, and weld/welding rod cleanliness. The CQA Monitor logged the welding machine and welding technician combination, the length of the seam, the direction the seam was welded, time of seaming, the pre-heat temperature, and the welding temperature. Destructive test samples were marked during extrusion seaming and testing is discussed further in Section 3.4.6. All extrusion welded seams were vacuum tested and is discussed further in Section 3.4.8. The Geomembrane Extrusion Welding Summary is presented in Appendix J.4.

3.4.6. Geomembrane Destructive Testing

During welding activities destructive test samples were marked at a minimum every 500 linear feet of seam for each welding type and each welding machine/welding technician combination. A 24-inch long by 12-inch wide sample was cut from the seam centered on the seam lengthwise. The sample was then cut in two halves. One half was archived by the CQA Monitor to be tested later, if necessary. Ten 1-inch coupons were then cut from the remaining sample half. Five coupons were tested for shear strength and five coupons

were tested for peel strength using a tensiometer. The different failure types and test codes for fusion and extrusion destructive testing are presented on Figures 3 and 4, respectively. All destructive testing was performed by Tetra Tech in the presence of the CQA Monitor. A total of one hundred and eight fusion and thirteen extrusion welds were tested. Two fusion and two extrusion destructive tests failed within the Squaw Gulch Phase 2B Part 2 area and the extent of the failures were delineated by obtaining additional samples before and after the failed sample. Once the failing areas were identified, that portion of the seam was capped. Fusion and Extrusion Destructive Testing Summaries are presented in Appendix J.5.1 and Appendix J.5.2, respectively, and the tensiometer certifications are presented in Appendix L.

3.4.7. Geomembrane Pressure Testing

Pressure testing was performed to ensure all fusion welded seams had continuity throughout their entire length. The ends of the seam were sealed and the air channel in the seam was pressurized using a small air compressor to a minimum of 30 pounds per square inch (psi), for a minimum of five minutes. A pressure gauge and needle were used to monitor the air pressure in the seam. If the pressure dropped less than 3 psi, the opposite end of the seam from the pressure gauge was cut. If the needle dropped, continuity was confirmed throughout entire seam length and the test was considered "passing." If a pressure drop of more than 3 psi occurred or the continuity was not proven, smaller sections of the seam were tested to delineate the failing section of the seam. All failing seams or portions of seams were repaired, and vacuum tested. The Geomembrane Seam Pressure Testing Summary is presented in Appendix J.6.

3.4.8. Geomembrane Defects and Repairs

The CQA Monitor constantly inspected the geomembrane for defects from the time it was deployed until it was covered with DCF. A defect is defined as any item in which a repair is necessary to create a continuously sealed geomembrane layer. All defects were marked with a defect number by the CQA Monitor. Repairs were performed using the extrusion welding method and patches extended at least 6 inches beyond the defect in all directions. All repairs were assigned a repair number and cross checked with defect numbers to ensure that all defects were repaired.

All repairs and extrusion welded seams were non-destructively tested using a vacuum box. The area being tested was covered in soapy water and the vacuum box was sealed to the geomembrane. A vacuum was pulled over the area for at least 10 seconds and if no bubbles were present, the test passed. If bubbles were present, the area failed and was marked as a defect. The repair process would then be repeated for the failing vacuum

test. Vacuum tests overlapped each other by a minimum of 3 inches. The Geomembrane Defect/Repair Summary, including vacuum testing logs, is presented in Appendix J.7.

3.4.9. Geomembrane Acceptance

Prior to DCF placement, the geomembrane was accepted by Tetra Tech, Tezak, CC&V, and the CQA Monitor. All CQA logs and survey data were thoroughly reviewed ensuring that all aspects of the geomembrane installation were performed in accordance with project Technical Specifications. Geomembrane Acceptance Forms are presented in Appendix J.8.

4. PROJECT DEVIATIONS

Throughout construction, the following deviations from the Design and IFC Drawings were approved by the Engineer of Record:

- Several localized grading and HVSCS alignment changes were made throughout construction in order to better accommodate the actual site conditions. The grading changes were minor and as such are not highlighted in the Record of Construction Drawings.
- The Soil Liner Fill stockpile was exhausted so the completed Phase 2B Part 2 area is slightly smaller than the design and was terminated as shown in Figures 1 and 2. HVSC Piping and the 12” perimeter pipe were adjusted accordingly. Newmont and the Engineer of Record approved the change.
- Due to the blast zone associated with the Schist Island Pit, the limits of Phase 2B Part 2, as shown with Note 3 on Figures 1 and 2, were adjusted to be outside the zone and approved by the Engineer of Record. HVSC Piping and the 12” perimeter pipe were adjusted accordingly.
- Two DCF samples were presented in this report with PI’s of 6 and 7. These samples were accepted as a non-plastic material and will function as the DCF is intended. Refer to the response to Comment 4 from “Cresson Project; Technical Revision 118 – VLF2 Phase 2, Adequacy Review No. 1 and 2 Response” dated October 25, 2019.
- The Engineer of Record accepted the substitution of the CBR Puncture Value test (ASTM D6241) for the Puncture Value test (ASTM D4833) as reported/tested on the geotextile manufacturing certification sheets.
- The overall slope of the trench is greater than 1 percent and was considered to meet the intent of the design, as it will convey solution to the manhole. The section of the trench presented in this report was constructed at the same time as the trench presented in Phase 2B Part 1, which was approved in TR123. Along areas of the slope that the leak detection trench was being constructed, bedrock was located beneath the immediate subgrade. The excavator was not able to rip through the bedrock and would have required a more extensive, less precise technique such as blasting to excavate the trench.

These techniques would have required fill to be placed on the slope, increasing the risk of settlement. As a result, approximately a third of the Leak Detection Trench in Phase 2B Part 2 was constructed at less than 1 percent, however, the nominal slope of the trench to the manhole is greater than 1 percent. These sections were evaluated during construction by the Engineer of Record and were allowed as the intent of the design was still achieved.

- The contractor substituted 80mil geomembrane instead of the 40mil geomembrane for a portion of this phase of construction. The roll of the 40mil was depleted in this section of the trench. The Engineer of Record approved this change since the replacement material exceeded the specification of the material.

5. ENGINEER'S OPINION

Based on the construction activities observed, testing performed, and inspections completed, NewFields certifies that the project was constructed in general accordance with the approved IFC Drawings and Technical Specifications.

FINAL CERTIFICATION

SQUAW GULCH VALLEY LEACH FACILITY PROJECT
QUALITY ASSURANCE
PHASE 2B PART 2 VLF COMPLETION AREA
TELLER COUNTY, COLORADO

I, Jay N. Janney-Moore, a registered professional engineer in the State of Colorado, hereby certify that the construction of the Squaw Gulch Valley Leach Facility Phase 2B Part 2 VLF Completion Area, as outlined in Figure 2, was completed in compliance with the drawings and project Technical Specifications approved as part of Permit Number M-1980-244, Amendment No. 10 as well as subsequent changes approved by the Office of Mined Land Reclamation.

NewFields Mining Design & Technical Services,

Jay N. Janney-Moore, PE

CO PE No. 37571