# APPENDIX A – SURVEYOR'S PROFESSIONAL LICENSE

COLORADO
Department of Regulatory Agencies
Division of Professions and Occupations

Below are your electronic wallet cards to use as proof of your license. You can also print your license at any time by visiting www.colorado.gov/dora/DPO_Print_License and following the instructions listed.

If you would like a more durable wallet card option, you can order one for a fee by visiting www.nasbastore.org and selecting the "Colorado License Cards" link on the left hand side of the page. If you prefer, you can also contact NASBA by phone at 1-888-925-5237 or by email at nasbastore@nasba.org.

Should you have questions about your credential, or need other information please contact our Customer Service Team at 303-894-7800 or dora_dpo_licensing@state.co.us.

**Colorado Department of Regulatory Agencies**
**Division of Professions and Occupations**

State Board of Licensure for Architects, Professional Engineers and Professional Land Surveyors

Lester John Ludeman
Professional Land Surveyor

PLS.0025636 — **Number**
11/01/2023 — **Issue Date**
Active — **Credential Status**
10/31/2025 — **Expire Date**

Verify this credential at: dpo.colorado.gov

Division Director: Sam Delp | Credential Holder Signature

**Colorado Department of Regulatory Agencies**
**Division of Professions and Occupations**

State Board of Licensure for Architects, Professional Engineers and Professional Land Surveyors

Lester John Ludeman
Professional Land Surveyor

PLS.0025636 — **Number**
11/01/2023 — **Issue Date**
Active — **Credential Status**
10/31/2025 — **Expire Date**

Verify this credential at: dpo.colorado.gov

Division Director: Sam Delp | Credential Holder Signature

# APPENDIX B – WEEKLY OBSERVATION REPORTS

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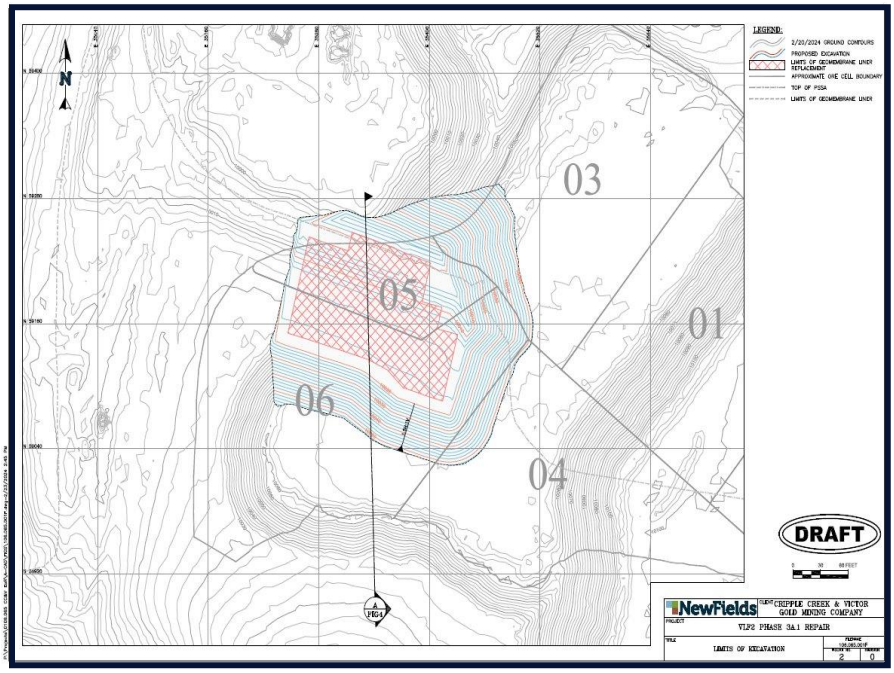


**DIRECTIONS:** Team member(s), assigned as Construction Quality Assurance Monitors, to compile the below information from daily reports. Save all data from Daily Reports to be utilized as necessary.

**1. MINIMUM ONCE PER WEEK:** To be filled out by Project Manager.

| Report Period: Thursday-Friday | Ambient Temperature | | Weather Conditions |
|---|---|---|---|
| | High | Low | Precipitation |
| Date: 2/28/2024 - 2/29/2024 | 61 | 17 | None |
| Observations & Comments | Overburden excavation started on Wednesday, 2/28/24 and the work continued through Thursday 2/29/24. 5' minimum of ROM and DCF material was left covering liner, to be removed by contractor. A total of **323,249ft$^3$** of overburden material has been removed from the project area. | | |

**2. LIMITS OF EXCAVATION:** Excavation limits for the current overburden removal.




**ACTIVE OVERBURDEN EXCAVATION AREA PHOTOGRAPH:** Insert 1 photo of overburden excavation activity – if possible, include equipment or vehicles for scale to accurately convey excavated area size.

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## 3. MATERIAL COVERING LINER DEPTH – NOT TO BE BELOW 5FT FROM TOP OF LINER:

Excavation height >= 5’ ☒ ☐

## 4. APPROVALS: Completed each week by assigned representative or designee.

| Role | Name | Signature |
|---|---|---|
| Tech Services/ CQA Monitor Manager | Kathy Steele | Kathy Steele 3/4/24 |
| S&ER Manager | Katie Blake | DocuSigned by: Katie Blake 5A3D013B629844B... |
| Mine Manager | Tige Brown | Tige Brown |

DocuSign Envelope ID: 37B6F467-151F-406D-8573-48E561BC85CE

# Newmont CC&V

## VLF #2 Phase #3 Liner Remediation Project Weekly Report

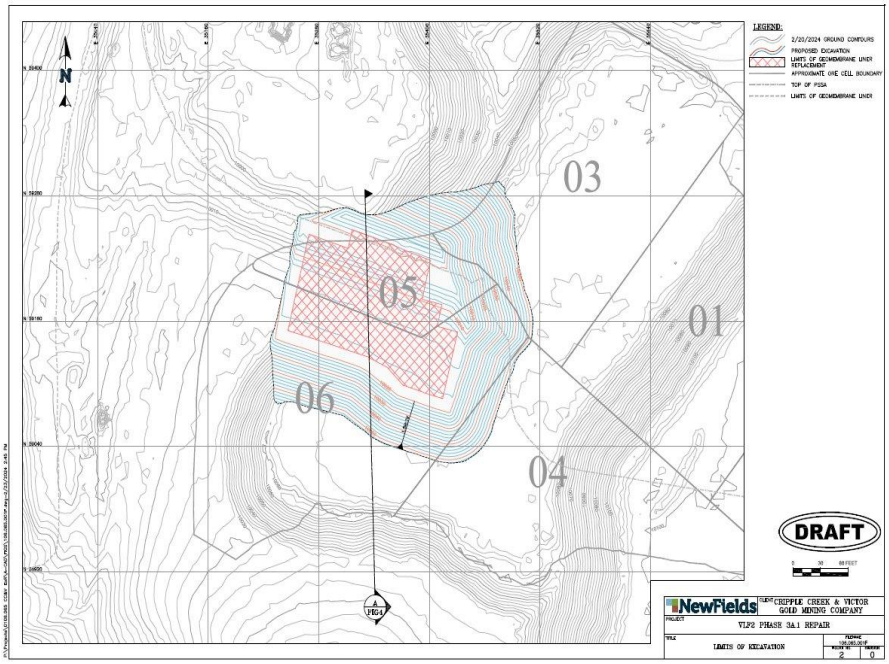


**DIRECTIONS:** Team member(s), assigned as Construction Quality Assurance Monitors, to compile the below information from daily reports. Save all data from Daily Reports to be utilized as necessary.

**1. MINIMUM ONCE PER WEEK:** To be filled out by Project Manager.

| Report Period: Monday-Thursday | Ambient Temperature | | Weather Conditions |
|---|---|---|---|
| | High | Low | Precipitation |
| | | | |
| Date: 3/4/2024 -3/7/2024 | 60 | 31 | None |
| Observations & Comments | Overburden excavation continued Monday, 3/4/24, through Thursday 3/7/24. A combination of 5' of ROM and DCF material was left covering liner, to be removed by contractor. The week of 3/11/24 through 3/15/24 overburden excavation will continue. Contractor will arrive onsite 3/11/24 and will begin excavating the remainder of the ROM material covering the DCF and will also begin removing the DCF to gain visual inspection of the existing 80 mil liner. | | |

**LIMITS OF EXCAVATION:** Excavation limits for the current overburden removal.



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**ACTIVE OVERBURDEN EXCAVATION AREA PHOTOGRAPH:** Insert 1 photo of overburden excavation activity – if possible, include equipment or vehicles for scale to accurately convey excavated area size.



## 2. MATERIAL COVERING LINER DEPTH – NOT TO BE BELOW 5FT FROM TOP OF LINER:

Excavation height >= 5’ ☒ ☐

## 3. APPROVALS: Completed each week by assigned representative or designee.

| Role | Name | Signature |
|---|---|---|
| Tech Services/ CQA Monitor Manager | Kathy Steele | Kathy Steele 3/11/24 |
| S&ER Manager | Katie Blake | DocuSigned by: Katie Blake 12-Mar-24 |
| Mine Manager | Tige Brown | DocuSigned by: Tige Brown 12-Mar-24 |

DocuSign Envelope ID: 9C904A06-3AD4-4875-AEFF-DF0CB8825FBD



# FIELD WEEKLY PROGRESS REPORT

**PROJECT:** **VLF2 PHASE 3 STAGE A.1 LINER REPAIR**

**SITE:** **CRIPPLE CREEK & VICTOR GOLD MINE (COLORADO)**

**CONTRACTOR:** **NEWMONT CC&V MINING OPERATIONS**

**JHL CONSTRUCTORS**

**WEEK ENDING:** **FRIDAY, MARCH 15, 2024**

**REPORTING PERIOD: 03.09.2024 THROUGH 03.15.2024**

| Days | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|---|---|---|
| Work Shifts – JHL/KTI | - | - | D | D | D | W | W |
| D – DAYSHIFT | | N – NIGHTSHIFT | | | W – WEATHER | | |

**AMBIENT TEMPERATURE RANGES AND WEATHER CONDITIONS:**

*HIGHS:* 25°F TO 47°F

*LOWS:* 17°F TO 26°F

*CLOUD COVER:* PARTLY CLOUDY - CLOUDY

*PRECIPITATION:* WEDNESDAY PM-FRIDAY AM HEAVY SNOW (28”-36”)

*WIND:* WIND GUSTS UP TO 30 MPH

**NEWFIELDS PERSONNEL ONSITE:**

| Personnel | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|---|---|---|
| | Mar. 9 | Mar. 10 | Mar. 11 | Mar. 12 | Mar. 13 | Mar. 14 | Mar. 15 |
| Jay Moore | - | - | - | - | - | - | - |
| Tyler Wendlandt | - | - | PR | PR | PR | - | - |
| PR – Project Resident; LS – Lead Soils Technician; LG – Lead Geosynthetics; ST – Soils Technician; GT - Geosynthetics Technician; LT – Laboratory Technician; PCE – Project Certifying Engineer | | | | | | | |

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## 1.0 CC&V AND CONTRACTOR OPERATIONS

### 1.1 Earthworks

#### 1.1.1 Excavation

Newmont Operations continued to excavate Run of Mine (ROM) and Crushed Ore material from the repair project limits. A 6015B shovel/excavator excavated material from Cell 5. A 993 loader assisted the 6015B with stockpile management. The equipment worked on a platform approximately 20' to 25' above the geomembrane surface. The 6015B excavated material to approximately 5' above the geomembrane surface.

JHL Constructors and Newmont Operations began to excavate the remaining 3' of ROM material from the surface of the Drain Cover Fill material in Cell 5 and Cell 6 above the Geomembrane surface. A John Deere 750L and D6 LGP dozer pushed ROM material off the Drain Cover Fill (DCF) surface and stockpiled outside of the project limits. Three Volvo ECR88D mini excavators provided support for the dozers and removed ROM material from the 2:1 slope above the PSSA. The ECR88D excavators worked in sync to excavate material working upwards on the 2:1 slope. The DCF surface was left in-tact with minimal disturbance during the work.

#### 1.1.2 Geomembrane

No work during the week.

#### 1.1.3 Drain Cover Fill

No work during the week.

### 1.2 Laboratory Testing

None.

## 2.0 MEETINGS AND COMMUNICATIONS

- NewFields personnel met with Daniel Egley (CC&V Operations) and Lupe Felix (JHL) daily to discuss progress and project specifications. Also discussed on Wednesday was the winter storm warning. It was agreed that the 2' layer of DCF above geomembrane should be left in place and that no geomembrane be exposed ahead of the weather.

## 3.0 MISCELLANEOUS, ISSUES, AND CONCERNS

- No displacement of DCF material from previous stacking of ROM was noted during the excavation process.

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- Inclement weather (heavy snow) took place from Wednesday night to Friday morning. No construction activity took place 3/14 and 3/15 due to weather.

- It is anticipated that JHL will begin to expose the geomembrane surface during the Week Ending Friday, March 22, 2024 after snow removal.

## 4.0 PHOTOGRAPHS



**March 12, 2024 – DCF Surface after ROM removal.**

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**March 13, 2024 – DCF Surface after ROM removal.**



**March 13, 2024 – Removal of ROM material up 2:1 slope.**

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**March 13, 2024 – DCF Surface on slope after ROM removal.**

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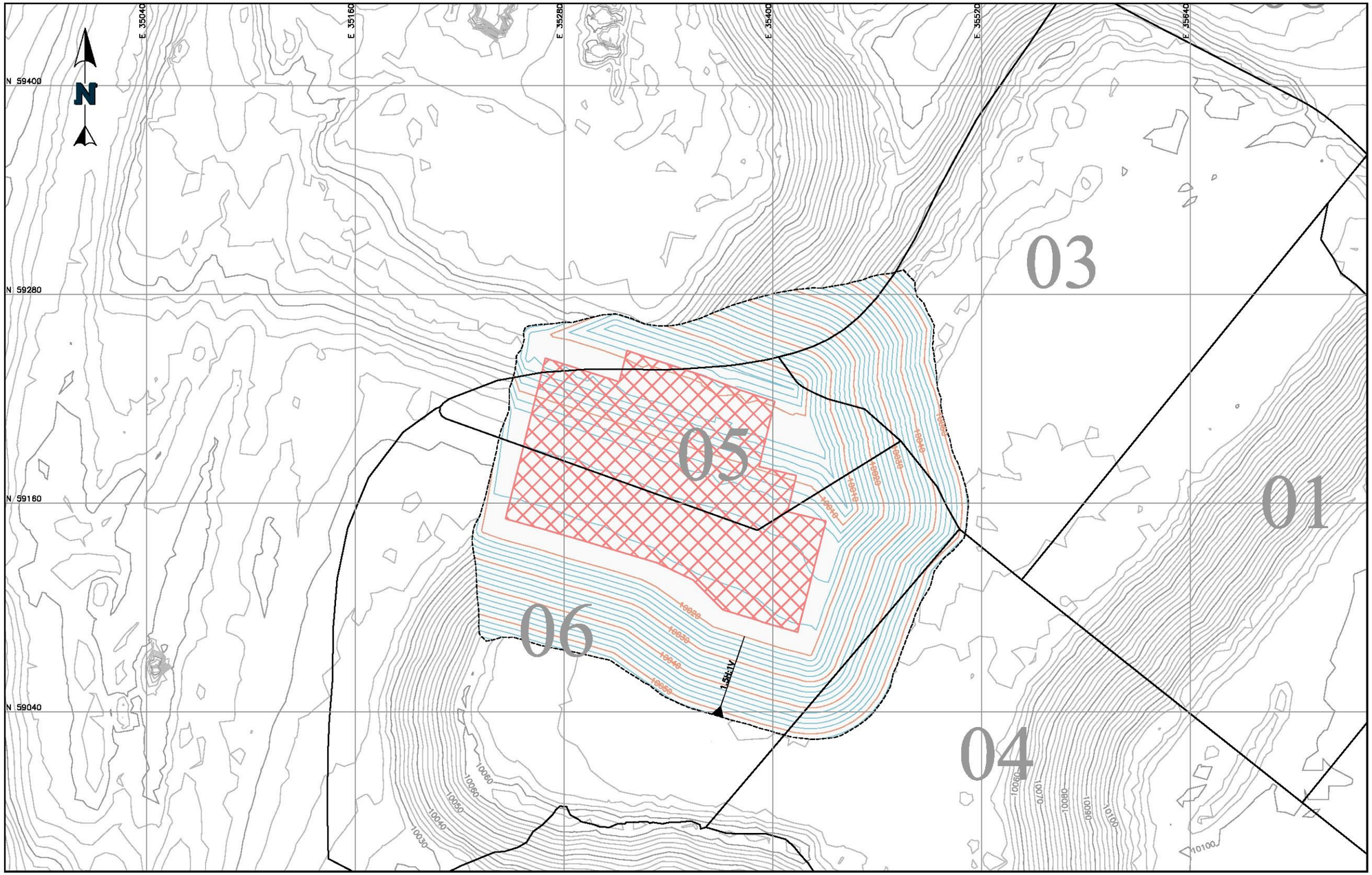
***Report Review and Approval:***

| Role | Name | Signature |
|---|---|---|
| **CQA Monitor/Report Prepared By** | **Tyler Wendlandt** | |
| ***Technical Services Manager or Designee:*** | **Kathy Steele** | Kathy Steele |
| ***S&ER Manager or Designee:*** | **Katie Blake** | DocuSigned by: Katie Blake 5A3D013B629844B... |

**Attachments:**

Figure 1 – VLF2 Phase 3A.1 Repair Limits of Excavation with Cell Boundaries

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**LEGEND:**

- 2/20/2024 GROUND CONTOURS
- PROPOSED EXCAVATION
- LIMITS OF GEOMEMBRANE LINER REPLACEMENT
- APPROXIMATE ORE CELL BOUNDARY

DRAFT

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| | | |
|---|---|---|
| New Fields | CLIENT: CRIPPLE CREEK & VICTOR GOLD MINING COMPANY | |
| PROJECT: VLF2 PHASE 3A.1 REP.AIR | | |
| TITLE: LIMITS OF EXCAVATION | FILENAME: 106.065.001F | |
| | FIGURE NO.: 2 | REVISION: 0 |

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# FIELD WEEKLY PROGRESS REPORT

**PROJECT:** **VLF2 PHASE 3 STAGE A.1 LINER REPAIR**

**SITE:** **CRIPPLE CREEK & VICTOR GOLD MINE (COLORADO)**

**CONTRACTOR:** **NEWMONT CC&V MINING OPERATIONS**

**JHL CONSTRUCTORS**

**WEEK ENDING:** **FRIDAY, MARCH 22, 2024**

**REPORTING PERIOD: 03.16.2024 THROUGH 03.22.2024**

| Days | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|---|---|---|
| Work Shifts – JHL | - | - | D | D | D | D | D |
| D – DAYSHIFT | N – NIGHTSHIFT | | | | W – WEATHER | | |

**AMBIENT TEMPERATURE RANGES AND WEATHER CONDITIONS:**

*HIGHS:* 38°F TO 48°F

*LOWS:* 17°F TO 27°F

*CLOUD COVER:* PARTLY CLOUDY - CLOUDY

*PRECIPITATION:* TRACE SNOW 3/16-3/17 (LESS THAN 1” ACCUMULATION)

*WIND:* WIND GUSTS UP TO 22 MPH

**NEWFIELDS PERSONNEL ONSITE:**

| Personnel | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|---|---|---|
| | Mar. 16 | Mar. 17 | Mar. 18 | Mar. 19 | Mar. 20 | Mar. 21 | Mar. 22 |
| Jay Moore | - | - | - | - | - | - | - |
| Tyler Wendlandt | - | - | PR | PR | PR | PR | PR |
| PR – Project Resident; LS – Lead Soils Technician; LG – Lead Geosynthetics; ST – Soils Technician; GT - Geosynthetics Technician; LT – Laboratory Technician; PCE – Project Certifying Engineer | | | | | | | |

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## 1.0 CC&V AND CONTRACTOR OPERATIONS

### 1.1 Earthworks

#### 1.1.1 Excavation

JHL Constructers removed accumulated snow from the winter storm that occurred on 3/14 to 3/15. A John Deere 750L dozer, three to four ECR88D mini excavators, and two skid steers removed the snow off of the Drain Cover Fill and placed the snow outside of the project limits. A John Deere 524 loader, working on the access road and within the PSSA limits, assisted in the stockpile management.

JHL Constructors continued to excavate the remaining 3' of Run of Mine (ROM)material from the surface of the Drain Cover Fill material in Cell 5 and Cell 6 above the Geomembrane surface. A John Deere 750L dozer pushed ROM material off the Drain Cover Fill (DCF) surface and stockpiled outside of the project limits. Three to four Volvo ECR88D mini excavators provided support for the dozers and removed ROM material from the 2:1 slope above the PSSA. The ECR88D excavators worked in sync to excavate material working upwards on the 2:1 slope. The DCF surface was left in-tact with minimal disturbance during the work. The ROM material excavation was completed 3/19/24.

Once the ROM excavation was completed JHL constructors began to remove DCF and expose the liner surface. Three to four ECR88D mini-excavators excavated approximately 1.5' of DCF. One to two laborers spotted for each excavator and removed the final approximate 0.5' of DCF with flat shovels. Two skid steers hauled and stockpiled the DCF material outside of the project limits. The John Deere 750L dozer managed the stockpiled DCF.

#### 1.1.2 Geomembrane

No work during the week.

#### 1.1.3 Drain Cover Fill

No work during the week.

### 1.2 Laboratory Testing

None.

## 2.0 MEETINGS AND COMMUNICATIONS

- NewFields personnel met with Jason Lohmeier (CC&V Operations) and Lupe Felix (JHL) daily to discuss progress and project specifications.

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## 3.0 MISCELLANEOUS, ISSUES, AND CONCERNS

- No displacement of DCF material from previous stacking of ROM was noted during the excavation process.

- The High-Volume Solution Collection piping system was determined to be in-tact and had not crushed or shifted during ROM placement. Damage occurred during the excavation of the DCF.

- The geomembrane surface showed no significant signs of movement or strain from the ROM placement once exposed.

- Any geomembrane damage created by the excavation of the DCF layer was marked and covered by sand bags to prevent meteoric water from contacting and damaging the Soil Liner Fill (SLF) surface.

- ForeSight West was onsite 3/18/24 and 3/19/24 providing survey support.

- It is anticipated that JHL will complete exposing the geomembrane surface with-in the project limits during the Week Ending Friday, March 29, 2024. Mustang Extreme Environmental has been tentatively scheduled for Wednesday, March 27$^{th}$, 2024 for the geomembrane work.

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## 4.0 PHOTOGRAPHS



**March 18, 2024 – Foresight West Survey Support.**



**March 19, 2024 – Removal of ROM material up 2:1 slope..**

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**March 19, 2024 – Completion of Removal of ROM material on 2:1 slope.**



**March 20, 2024 – HVSC 4 inch CPeP Perforated Pipe After Excavation.**

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**March 21, 2024 – Exposed Geomembrane Surface on 2:1 Slope.**



**March 22, 2024 – Exposed Geomembrane Surface on 2:1 Slope.**

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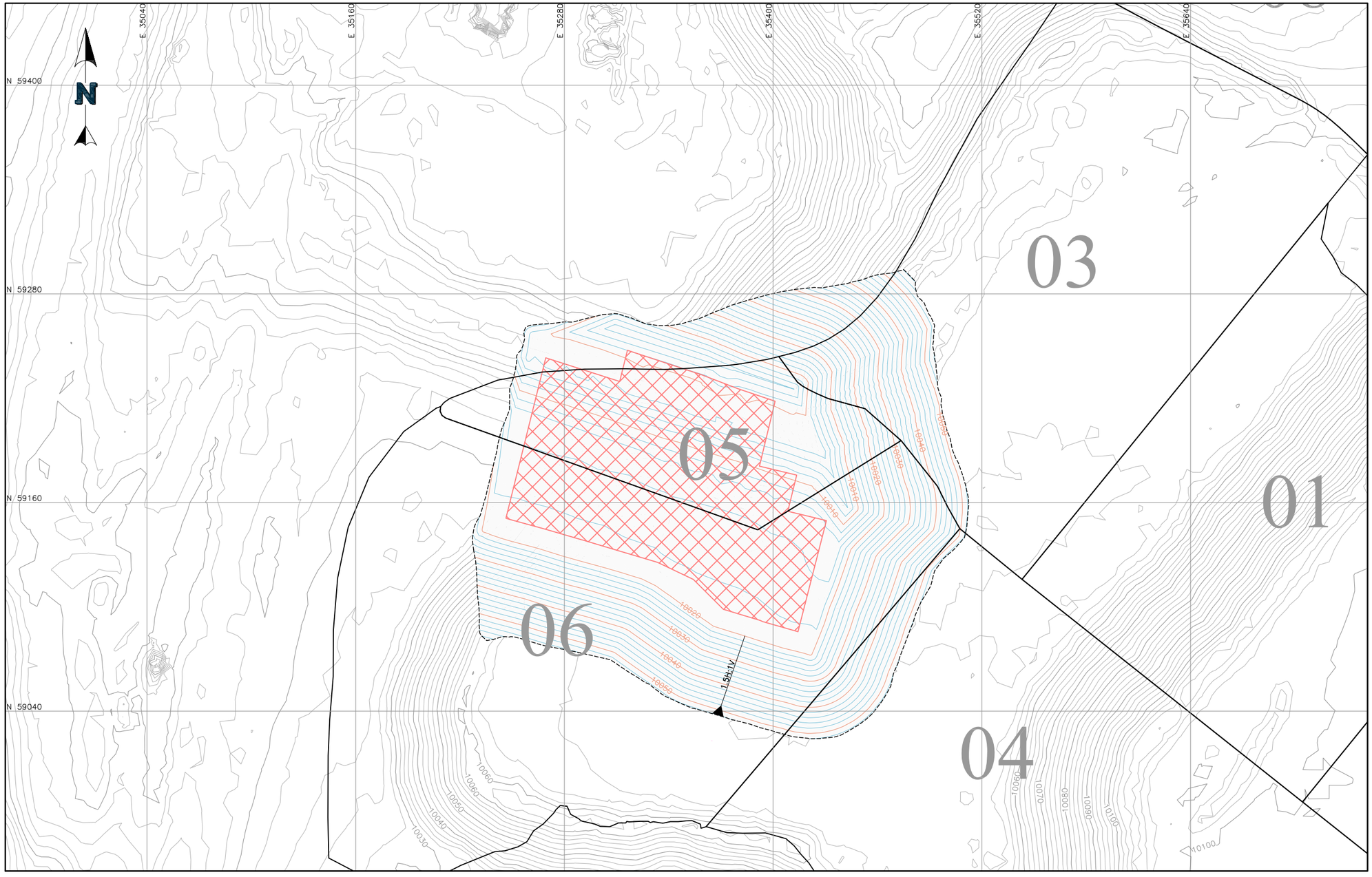
***Report Review and Approval:***

| Role | Name | Signature |
|---|---|---|
| **CQA Monitor/Report Prepared By** | **Tyler Wendlandt** |  |
| ***Technical Services Manager or Designee:*** | **Kathy Steele** | Kathy Steele |
| ***S&ER Manager or Designee:*** | **Katie Blake** | DocuSigned by: Katie Blake 5A3D013B629844B... |
| ***Mine Manager or Designee:*** | **Tige Brown** | Kathy Steele *For Tige Brown this week* |

**Attachments:**

Figure 1 – VLF2 Phase 3A.1 Repair Limits of Excavation with Cell Boundaries

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**LEGEND:**

- 2/20/2024 GROUND CONTOURS
- PROPOSED EXCAVATION
- LIMITS OF GEOMEMBRANE LINER REPLACEMENT
- APPROXIMATE ORE CELL BOUNDARY

0 30 60 FEET

DRAFT

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NewFields

CLIENT CRIPPLE CREEK & VICTOR GOLD MINING COMPANY

PROJECT VLF2 PHASE 3A.1 REPAIR

TITLE LIMITS OF EXCAVATION

FILENAME 106.065.001F

FIGURE NO. 2

REVISION 0

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# FIELD WEEKLY PROGRESS REPORT

**PROJECT:** **VLF2 PHASE 3 STAGE A.1 LINER REPAIR**

**SITE:** **CRIPPLE CREEK & VICTOR GOLD MINE (COLORADO)**

**CONTRACTOR:** **NEWMONT CC&V MINING OPERATIONS**

**JHL CONSTRUCTORS**

**WEEK ENDING:** **FRIDAY, MARCH 29, 2024**

**REPORTING PERIOD: 03.23.2024 THROUGH 03.29.2024**

| Days | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|---|---|---|
| Work Shifts – JHL | - | - | D | D | D | D | D |
| D – DAYSHIFT | N – NIGHTSHIFT | | | | W – WEATHER | | |

**AMBIENT TEMPERATURE RANGES AND WEATHER CONDITIONS:**

*HIGHS:* 23°F TO 47°F

*LOWS:* 9°F TO 28°F

*CLOUD COVER:* PARTLY CLOUDY - CLOUDY

*PRECIPITATION:* SNOW 3/24 (3-5" ACCUMULATION)

*WIND:* WIND GUSTS UP TO 35 MPH

**NEWFIELDS PERSONNEL ONSITE:**

| Personnel | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|---|---|---|
| | Mar. 23 | Mar. 24 | Mar. 25 | Mar. 26 | Mar. 27 | Mar. 28 | Mar. 29 |
| Jay Moore | - | - | - | - | - | PCE | - |
| Tyler Wendlandt | - | - | PR | PR | PR | PR | PR |
| PR – Project Resident; LS – Lead Soils Technician; LG – Lead Geosynthetics; ST – Soils Technician; GT - Geosynthetics Technician; LT – Laboratory Technician; PCE – Project Certifying Engineer | | | | | | | |

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## 1.0 CC&V AND CONTRACTOR OPERATIONS

### 1.1 Earthworks

#### 1.1.1 Excavation

JHL Constructers removed accumulated snow from the winter storm that occurred on 3/24. Two ECR88D mini excavators and two skid steers removed the snow off of the Drain Cover Fill and placed the snow outside of the project limits. Snow on the exposed geomembrane surface was removed by JHL laborers with plastic snow shovels.

JHL constructors continued to remove DCF and expose the liner surface. Two ECR88D mini-excavators excavated approximately 1.5’ of DCF. One to two laborers spotted for each excavator and removed the final approximate 0.5’ of DCF with flat shovels. Two skid steers hauled and stockpiled the DCF material outside of the project limits. The John Deere 750L dozer managed the stockpiled DCF. DCF removal was completed on 3/26/24.

#### 1.1.2 Geomembrane

No work during the week.

#### 1.1.3 Drain Cover Fill

No work during the week.

### 1.2 Laboratory Testing

None.

## 2.0 MEETINGS AND COMMUNICATIONS

- NewFields personnel met with Daniel Egley (CC&V Operations) and Lupe Felix (JHL) daily to discuss progress and project specifications.

## 3.0 MISCELLANEOUS, ISSUES, AND CONCERNS

- No displacement of DCF material from previous stacking of ROM was noted during the excavation process.
- The High-Volume Solution Collection piping system was determined to be in-tact and had not crushed or shifted during ROM placement. Damage occurred during the excavation of the DCF.
- The geomembrane surface showed no significant signs of movement or strain from the ROM placement once exposed.

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- Any geomembrane damage created by the excavation of the DCF layer was marked and covered by sand bags to prevent meteoric water from contacting and damaging the Soil Liner Fill (SLF) surface.
- Mustang Extreme Environmental has delayed the geomembrane work, a new date for the geomembrane work will be provided once the date is available and confirmed with Newmont/Mustang.

## 4.0 PHOTOGRAPHS



**March 25, 2024 – Exposed Geomembrane Surface.**

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**March 25, 2024 – Exposing Geomembrane Surface.**

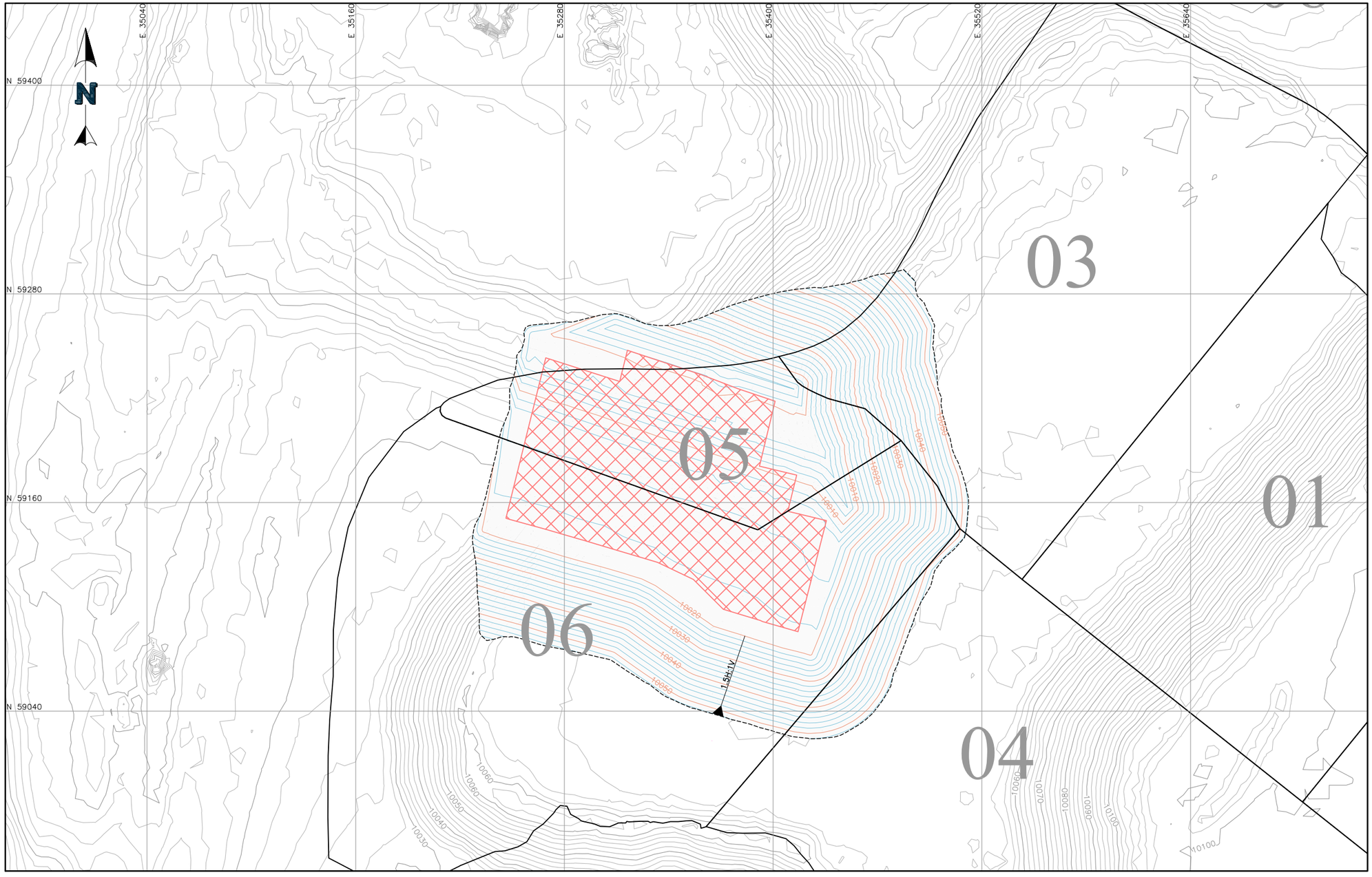
***Report Review and Approval:***

| Role | Name | Signature |
|---|---|---|
| **CQA Monitor/Report Prepared By** | **Tyler Wendlandt** | |
| ***Technical Services Manager or Designee:*** | **Kathy Steele** | DocuSigned by: Kathy Steele 788EEC39641445C... |
| ***S&ER Manager or Designee:*** | **Katie Blake** | DocuSigned by: Katie Blake 5A3D013B629844B... |
| ***Mine Manager or Designee:*** | **Tige Brown** | DocuSigned by: Tige Brown 85A8B156FBC9442... |

**Attachments:**

Figure 1 – VLF2 Phase 3A.1 Repair Limits of Excavation with Cell Boundaries

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**LEGEND:**

- 2/20/2024 GROUND CONTOURS
- PROPOSED EXCAVATION
- LIMITS OF GEOMEMBRANE LINER REPLACEMENT
- APPROXIMATE ORE CELL BOUNDARY

0 30 60 FEET

**DRAFT**

| | |
|---|---|
| NewFields | CLIENT CRIPPLE CREEK & VICTOR GOLD MINING COMPANY |
| PROJECT | VLF2 PHASE 3A.1 REPAIR |
| TITLE: LIMITS OF EXCAVATION | FILENAME 106.065.001F; FIGURE NO. 2; REVISION 0 |

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# FIELD WEEKLY PROGRESS REPORT

**PROJECT:** **VLF2 PHASE 3 STAGE A.1 LINER REPAIR**

**SITE:** **CRIPPLE CREEK & VICTOR GOLD MINE (COLORADO)**

**CONTRACTOR:** **NEWMONT CC&V MINING OPERATIONS**

**JHL CONSTRUCTORS**

**WEEK ENDING:** **FRIDAY, APRIL 05, 2024**

**REPORTING PERIOD: 03.30.2024 THROUGH 04.05.2024**

| Days | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|---|---|---|
| Work Shifts – JHL | - | - | - | - | - | - | - |
| D – DAYSHIFT | N – NIGHTSHIFT | | | | W – WEATHER | | |

**AMBIENT TEMPERATURE RANGES AND WEATHER CONDITIONS:**

*HIGHS:* 34°F TO 55°F

*LOWS:* 19°F TO 31°F

*CLOUD COVER:* PARTLY CLOUDY - CLOUDY

*PRECIPITATION:* SNOW 4/1 (TRACE ACCUMULATION)

*WIND:* WIND GUSTS UP TO 40 MPH

**NEWFIELDS PERSONNEL ONSITE:**

| Personnel | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|---|---|---|
| | Mar. 30 | Mar. 31 | Apr. 1 | Apr. 2 | Apr. 3 | Apr. 4 | Apr. 5 |
| Jay Moore | - | - | - | - | - | - | - |
| Tyler Wendlandt | - | - | PR | PR | PR | PR | PR |
| PR – Project Resident; LS – Lead Soils Technician; LG – Lead Geosynthetics; ST – Soils Technician; GT - Geosynthetics Technician; LT – Laboratory Technician; PCE – Project Certifying Engineer | | | | | | | |

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## 1.0 CC&V AND CONTRACTOR OPERATIONS

### 1.1 Earthworks

#### 1.1.1 Excavation

JHL Constructors were on standby during the week.

#### 1.1.2 Geomembrane

Mustang Extreme Environmental was self-delayed for on-site arrival.

#### 1.1.3 Drain Cover Fill

No work during the week.

### 1.2 Laboratory Testing

None.

## 2.0 MEETINGS AND COMMUNICATIONS

- NewFields personnel met with Daniel Egley (CC&V Operations) daily to discuss the geomembrane (Mustang) schedule.

## 3.0 MISCELLANEOUS, ISSUES, AND CONCERNS

- Mustang Extreme Environmentals delayed site arrival has delayed the geomembrane work, a new date for the geomembrane work will be provided once the date is available and confirmed with Newmont/Mustang.

DocuSign Envelope ID: DD3FCCE8-F5FD-4767-B7A9-14D5D7D44A55



## 4.0 PHOTOGRAPHS



**April 3, 2024 –Overview of Exposed Geomembrane Surface.**

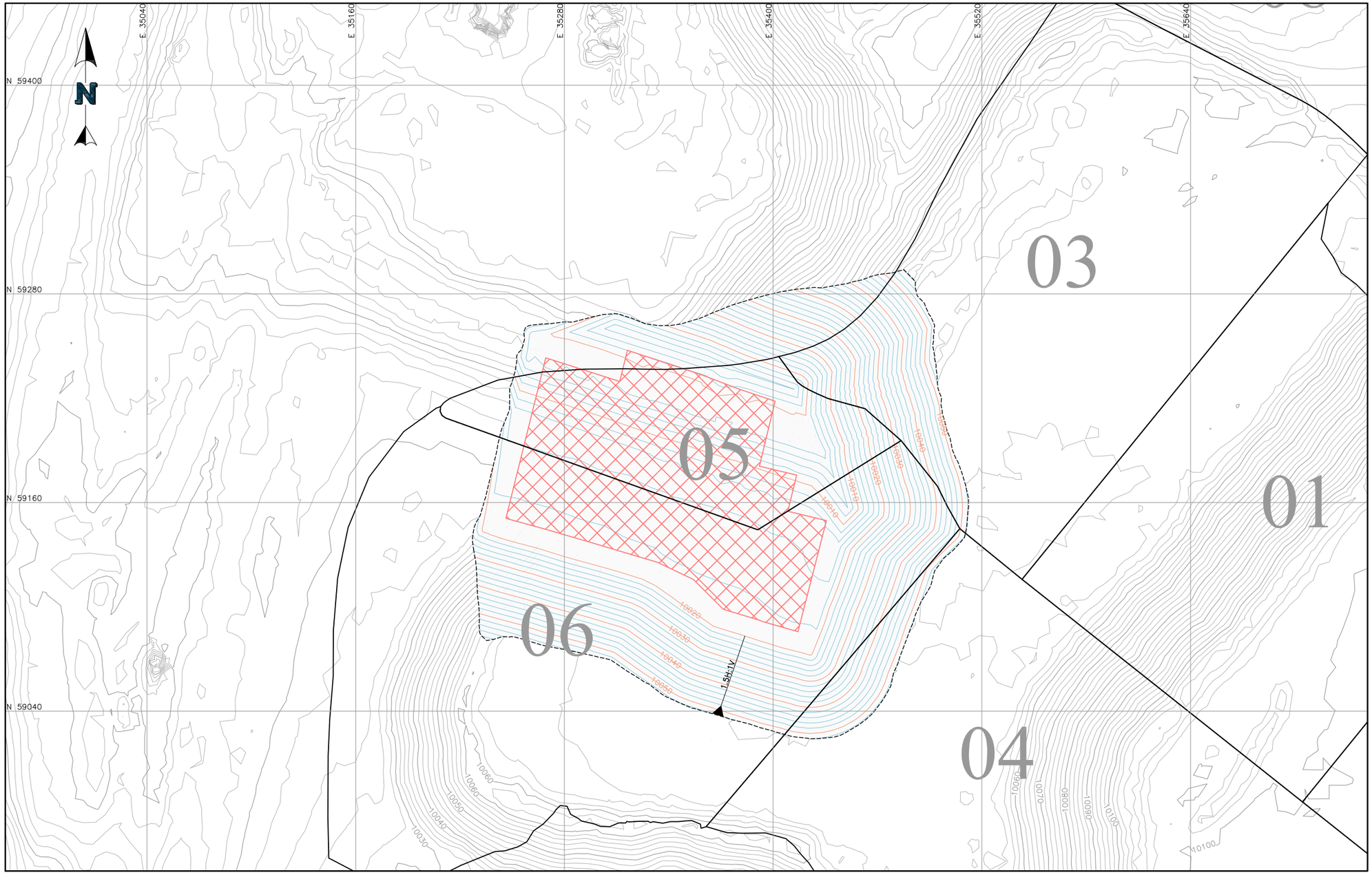
***Report Review and Approval:***

| Role | Name | Signature |
|---|---|---|
| **CQA Monitor/Report Prepared By** | **Tyler Wendlandt** | |
| ***Technical Services Manager or Designee:*** | **Kathy Steele** | DocuSigned by: Kathy Steele 788EEC39641445C... |
| ***S&ER Manager or Designee:*** | **Katie Blake** | DocuSigned by: Katie Blake 5A3D013B629844B... |
| ***Mine Manager or Designee:*** | **Tige Brown** | DocuSigned by: Tige Brown 86A8B156FBC0442... |

**Attachments:**

Figure 1 – VLF2 Phase 3A.1 Repair Limits of Excavation with Cell Boundaries

DocuSign Envelope ID: DD3FCCE8-F5FD-4767-B7A9-14D5D7D44A55




**LEGEND:**

- 2/20/2024 GROUND CONTOURS
- PROPOSED EXCAVATION
- LIMITS OF GEOMEMBRANE LINER REPLACEMENT
- APPROXIMATE ORE CELL BOUNDARY

0 30 60 FEET

**DRAFT**

P:\Projects\0106.065 CC&V EoR\A-CAD\FIGS\106.065.001F.dwg-2/23/2024 11:50 AM

| | |
|---|---|
| NewFields | CLIENT CRIPPLE CREEK & VICTOR GOLD MINING COMPANY |
| PROJECT | VLF2 PHASE 3A.1 REPAIR |
| TITLE: LIMITS OF EXCAVATION | FILENAME 106.065.001F; FIGURE NO. 2; REVISION 0 |

DocuSign Envelope ID: 9A58569C-6F64-48FD-99D5-95D81FD8AED7



# FIELD WEEKLY PROGRESS REPORT

**PROJECT:** **VLF2 PHASE 3 STAGE A.1 LINER REPAIR**

**SITE:** **CRIPPLE CREEK & VICTOR GOLD MINE (COLORADO)**

**CONTRACTOR:** **NEWMONT CC&V MINING OPERATIONS**

**JHL CONSTRUCTORS**

**WEEK ENDING:** **FRIDAY, APRIL 12, 2024**

**REPORTING PERIOD: 04.06.2024 THROUGH 04.12.2024**

| Days | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|---|---|---|
| Work Shifts – JHL | - | - | - | - | - | - | - |
| D – DAYSHIFT | N – NIGHTSHIFT | | | | W – WEATHER | | |

**AMBIENT TEMPERATURE RANGES AND WEATHER CONDITIONS:**

*HIGHS:* 31°F TO 60°F

*LOWS:* 17°F TO 38°F

*CLOUD COVER:* CLEAR - PARTLY CLOUDY

*PRECIPITATION:* NONE

*WIND:* WIND GUSTS UP TO 50 MPH

**NEWFIELDS PERSONNEL ONSITE:**

| Personnel | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|---|---|---|
| | Apr. 6 | Mar. 7 | Apr. 8 | Apr. 9 | Apr. 10 | Apr. 11 | Apr. 12 |
| Jay Moore | - | - | - | - | - | - | - |
| Tyler Wendlandt | - | - | PR | PR | PR | PR | PR |
| PR – Project Resident; LS – Lead Soils Technician; LG – Lead Geosynthetics; ST – Soils Technician; GT - Geosynthetics Technician; LT – Laboratory Technician; PCE – Project Certifying Engineer | | | | | | | |

DocuSign Envelope ID: 9A58569C-6F64-48FD-99D5-95D81FD8AED7



## 1.0 CC&V AND CONTRACTOR OPERATIONS

### 1.1 Earthworks

#### 1.1.1 Excavation

JHL Constructors were on standby during the week.

#### 1.1.2 Geomembrane

Mustang Extreme Environmental was self-delayed for on-site arrival.

#### 1.1.3 Drain Cover Fill

No work during the week.

### 1.2 Laboratory Testing

None.

## 2.0 MEETINGS AND COMMUNICATIONS

- NewFields personnel met with Daniel Egley (CC&V Operations) daily to discuss the geomembrane (Mustang) schedule.

## 3.0 MISCELLANEOUS, ISSUES, AND CONCERNS

Vivid Engineering provided a technician and nuclear density gauge on Monday 4/8/24. The existing Soil Liner Fill material was tested for moisture/density and depth. All tests passed per project specifications. The SLF surface will remain covered with geomembrane until the geomembrane work begins. The areas of geomembrane cut for nuke testing were covered back up by geomembrane and sand-bags to protect the SLF.

Mustang Extreme Environmental's delayed site arrival has delayed the geomembrane work. Work is tentatively scheduled to begin on Saturday 4/13/24.

DocuSign Envelope ID: 9A58569C-6F64-48FD-99D5-95D81FD8AED7



## 4.0 PHOTOGRAPHS



**April 8, 2024 –Nuclear Density Testing of existing SLF.**

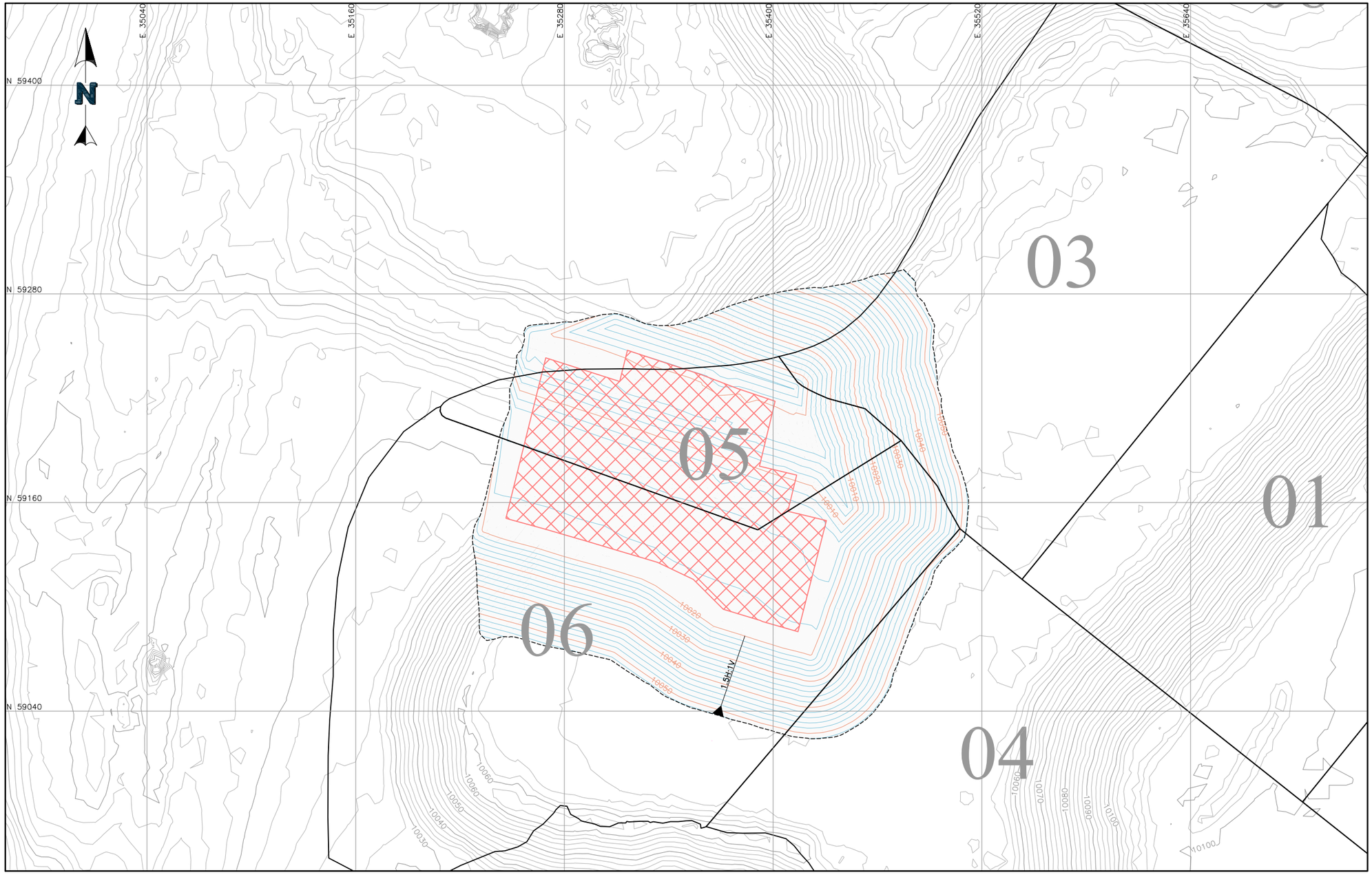
***Report Review and Approval:***

| Role | Name | Signature |
|---|---|---|
| **CQA Monitor/Report Prepared By** | **Tyler Wendlandt** | |
| ***Technical Services Manager or Designee:*** | **Kathy Steele** | DocuSigned by: Kathy Steele 788EEC39641445C... |
| ***S&ER Manager or Designee:*** | **Katie Blake** | DocuSigned by: Katie Blake 5A3D013B629844B... |
| ***Mine Manager or Designee:*** | **Tige Brown** | DocuSigned by: Kathy Steele 788EEC39641445C... |

**Attachments:**

Figure 1 – VLF2 Phase 3A.1 Repair Limits of Excavation with Cell Boundaries

DocuSign Envelope ID: 9A58569C-6F64-48FD-99D5-95D81FD8AED7




**LEGEND:**

- 2/20/2024 GROUND CONTOURS
- PROPOSED EXCAVATION
- LIMITS OF GEOMEMBRANE LINER REPLACEMENT
- APPROXIMATE ORE CELL BOUNDARY

0 30 60 FEET

**DRAFT**

| | |
|---|---|
| NewFields | CLIENT CRIPPLE CREEK & VICTOR GOLD MINING COMPANY |
| PROJECT | VLF2 PHASE 3A.1 REPAIR |
| TITLE: LIMITS OF EXCAVATION | FILENAME 106.065.001F; FIGURE NO. 2; REVISION 0 |

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# FIELD WEEKLY PROGRESS REPORT

**PROJECT:** **VLF2 PHASE 3 STAGE A.1 LINER REPAIR**

**SITE:** **CRIPPLE CREEK & VICTOR GOLD MINE (COLORADO)**

**CONTRACTOR:** **NEWMONT CC&V MINING OPERATIONS**

**JHL CONSTRUCTORS**

**MUSTANG EXTREME ENVIROMENTAL**

**WEEK ENDING:** **FRIDAY, APRIL 19, 2024**

**REPORTING PERIOD: 04.13.2024 THROUGH 04.19.2024**

| Days | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|---|---|---|
| Work Shifts – JHL/Mustang | D | D | D | D | D | N/A | N/A |
| D – DAYSHIFT | N – NIGHTSHIFT | | | | W – WEATHER | | |

**AMBIENT TEMPERATURE RANGES AND WEATHER CONDITIONS THRU 4.17.2024:**

*HIGHS:* 51°F TO 61°F

*LOWS:* 29°F TO 37°F

*CLOUD COVER:* PARTLY CLOUDY-CLOUDY

*PRECIPITATION:* SNOW 4/16 AM (1")

*WIND:* WIND GUSTS UP TO 45 MPH

**NEWFIELDS PERSONNEL ONSITE:**

| Personnel | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|---|---|---|
| | Apr. 13 | Mar. 14 | Apr. 15 | Apr. 16 | Apr. 17 | Apr. 18 | Apr. 19 |
| Jay Moore | - | - | - | - | - | - | - |
| Tyler Wendlandt | PR | PR | PR | PR | PR | - | - |
| Kyle Peltz | GT | GT | GT | ST | ST | - | - |
| PR – Project Resident; LS – Lead Soils Technician; LG – Lead Geosynthetics; ST – Soils Technician; GT - Geosynthetics Technician; LT – Laboratory Technician; PCE – Project Certifying Engineer | | | | | | | |

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# 1.0 CC&V AND CONTRACTOR OPERATIONS

## 1.1 Earthworks

### 1.1.1 Excavation

Excavation for exposing the geomembrane is complete.

### 1.1.2 Geomembrane

Mustang Extreme Environmental (Mustang) arrived onsite to begin work on Saturday 4/13/24.

Mustang cut the existing geomembrane and personnel pulled it out of place. JHL then utilized a John Deere 333 skid steer to remove the geomembrane from the work area. Deployment of new geomembrane would directly follow the removal of the existing geomembrane, minimizing the exposure of the existing SLF surface.

A 2.5-foot-thick ramp was constructed out of DCF material onto the existing exposed geomembrane surface from the existing DCF. The ramp extended past the future new/existing geomembrane tie-in and was tapered down to the geomembrane surface 5 feet past the tie-in, ensuring that any geomembrane left in place as part of the A.1 repair was with-in project specifications. A skid steer was then allowed to cross the area of geomembrane designated for removal for geomembrane deployment. The ramp was removed once the deployment progress reached the last panel to be installed, re-exposing the new/existing tie-in. This method assisted in the preservation of the integrity of the SLF surface/physical properties.

Mustang began and completed deployment of textured 80-mil LLDPE geomembrane. The panel deployment is shown in **Figure 1**.

20,078 square feet of liner was deployed.

1,227 linear feet of liner was fusion welded using two wedge welding machines and two operators.

3 fusion destructive tests were marked and were tested with passing results per project specifications.

1 extrusion sample was marked and was tested with passing results per project specifications.

All Fusion welded seams were pressure tested.

All Extrusion welded seams and repairs were vacuum tested.

*Mustang completed the geomembrane work on Monday 4/15/24.*

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### 1.1.3 High Volume Solution Collection Piping

JHL began and completed the reconstruction of the HVSC piping before DCF placement. ForeSight West survey marked out the original VLF2 P3 A.1 locations of the pipe. The piping was reinstalled per project specifications in the original locations and tied into the existing pipe with-in the DCF.

*JHL completed the HVSC piping reconstruction on 4/14/24.*

### 1.1.4 Drain Cover Fill

JHL and CC&V began and completed the placement of DCF on the approved geomembrane. A John Deere 750L dozer and two John Deere 333 skid steer front end loaders were used to place DCF in a minimum two-foot-thick lift. A CAT IT28 Loader borrowed material from a stockpile consisting of the previously excavated DCF. The DCF was then trammed to the project area to the dozer and skid steers. Laborers spotted equipment, verified lift thickness, and ensured the LVSC piping stayed connected and in place during DCF placement.

Foresight West Survey monitored lift thickness throughout DCF the placement using GPS.

*JHL and CC&V completed the DCF placement on Wednesday 4/17/24.*

## 1.2 Laboratory Testing

NewFields personnel obtained 3 record samples (DCFO-1-R; DCFO-2-R; DCFO-3-R) during the DCF placement. The samples were delivered to Vivid Engineering in Colorado Springs on 4/16/24 at 3pm by NewFields personnel.

## 2.0 MEETINGS AND COMMUNICATIONS

- NewFields personnel met with Daniel Egley and Derrick Tucker (CC&V Operations) daily to discuss project progress and specifications.
- NewFields personnel attended daily contractor safety and line out meetings.

## 3.0 MISCELLANEOUS, ISSUES, AND CONCERNS

SLF material temperatures were taken out of caution during geomembrane removal and replacement. All fill temperatures were above 36 degrees Fahrenheit. Ambient temperatures remained above freezing from Friday 4/12/24 until the AM of Monday 4/15/24.

Inclement weather resulted in a snow accumulation of one inch on the morning of Tuesday 4/16/24. JHL laborers cleared the snow and slush in front of DCF placement.

*All earthworks, piping, and geomembrane work was completed by Wednesday 4/17/24, ending the construction reporting period of the project.*

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## 4.0 PHOTOGRAPHS



**April 13, 2024 –Fusion welding and geomembrane deployment.**



**April 14, 2024-Extrusion welding process overview**

DocuSign Envelope ID: 9A58569C-6F64-48FD-99D5-95D81FD8AED7





**April 16, 2024-DCF placement with GPS grade check**




**April 16, 2024-HVSC piping reconstruction ahead of DCF placement**

DocuSign Envelope ID: 9A58569C-6F64-48FD-99D5-95D81FD8AED7



***Report Review and Approval:***

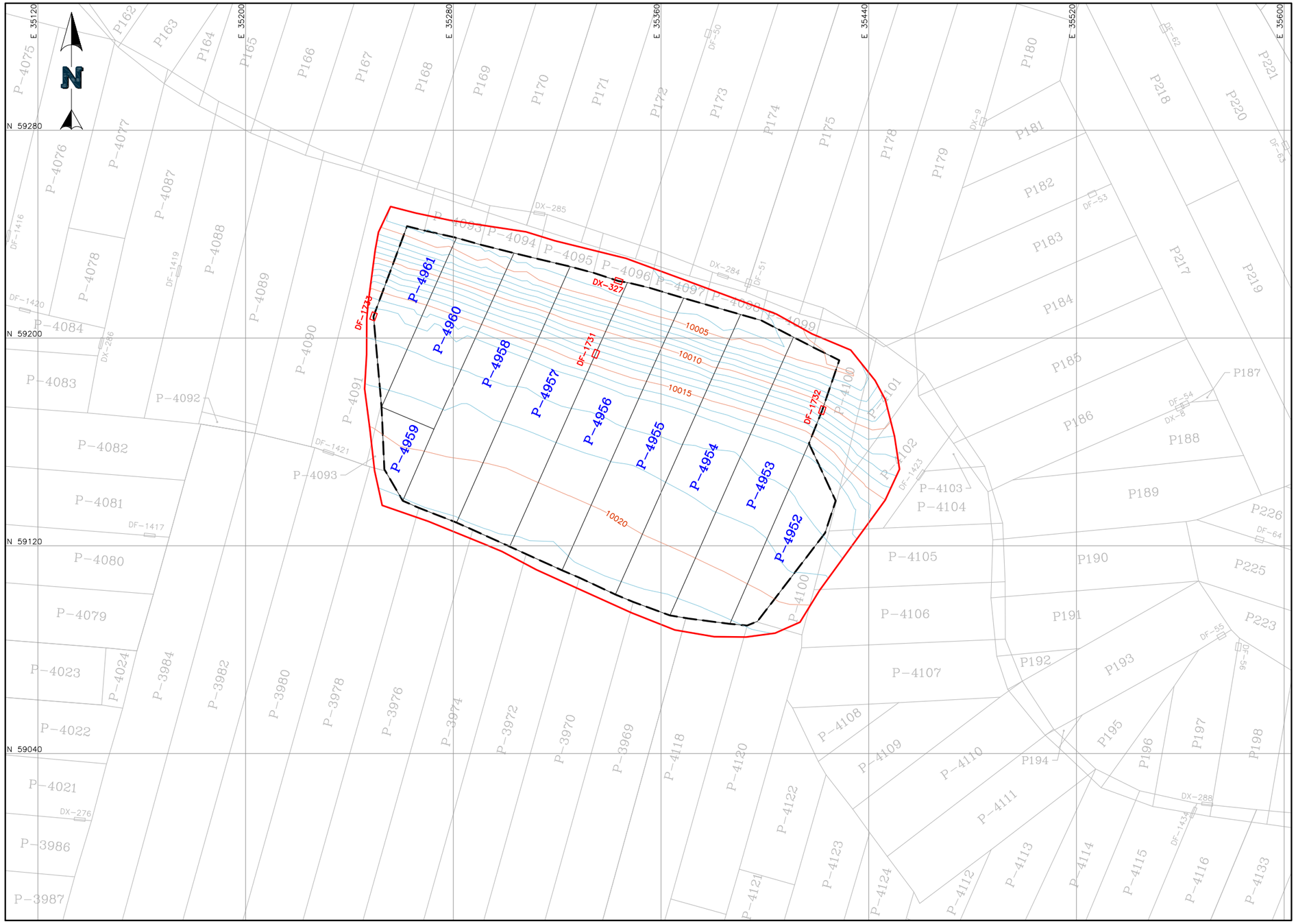
| Role | Name | Signature |
|---|---|---|
| **CQA Monitor/Report Prepared By** | **Tyler Wendlandt** |  |
| ***Technical Services Manager or Designee:*** | **Kathy Steele** | DocuSigned by: Kathy Steele 788EEC39641445C... |
| ***S&ER Manager or Designee:*** | **Katie Blake** | DocuSigned by: Katie Blake 5A3D013B629844B... |
| ***Mine Manager or Designee:*** | **Tige Brown** | DocuSigned by: Kathy Steele 788EEC39641445C... |

**Attachments:**

Figure 1 – 2024.04.17 GEOMEMBRANE DEPLOYMENT

Figure 2 - 2024.04.17 DCF PLACEMENT

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0 20 40 FEET

LEGEND:

- VLF3 PHASE A.1 LINER REPAIR AS-BUILT SLF CONTOURS
- VLF3 PLASE A.1 LINER REPAIR LIMITS
- PREVIOUS GEOMEMBRANE DEPLOYMENT

NewFields

CLIENT CRIPPLE CREEK & VICTOR GOLD MINING COMPANY

PROJECT VLF2 PHASE 3 STAGE A.1 LINER REPAIR

TITLE GEOMEMBRANE DEPLOYMENT WEEK ENDING 04.19.2023

FILENAME 0106.068.005F

FIGURE NO. 1

REVISION

P:\Projects\0106.068 CC&V Liner Repair\A-CAD\FIGS\0106.068.005F.dwg-4/17/2024 3:45 PM

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LEGEND:

- VLF3 PHASE A.1 LINER REPAIR AS-BUILT SLF CONTOURS
- VLF3 PLASE A.1 LINER REPAIR LIMITS
- PREVIOUS GEOMEMBRANE DEPLOYMENT
- DCF PLACEMENT WEEK ENDING 04.17.2024

0 20 40 FEET

NewFields

CLIENT CRIPPLE CREEK & VICTOR GOLD MINING COMPANY

PROJECT VLF2 PHASE 3 STAGE A.1 LINER REPAIR

TITLE DCF PLACEMENT WEEK ENDING 04.19.2023

FILENAME 0106.068.006F

FIGURE NO. 2

REVISION

P:\Projects\0106.068 CC&V Liner Repair\A-CAD\FIGS\0106.068.006F.dwg-4/17/2024 3:41 PM

# APPENDIX C – SOIL LINER FILL

## APPENDIX C.1 – FILL TEMPARATURE MONITORING SUMMARY

## APPENDIX C.2 – MOISTURE DENSITY TEST RESULTS SUMMARY

## APPENDIX C.3 – DEPTH VERIFICATION SUMMARY

## APPENDIX C.4 – SOIL LINER FILL ACCEPTANCE

## APPENDIX C.5 – VLF2 PHASE 3 A.1 SLF LABORATORY RESULTS

# APPENDIX C.1 – FILL TEMPARATURE MONITORING SUMMARY

**Appendix C.1**
**Cripple Creek Victor Gold Mining Company**
**VLF 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Fill Temperature Monitoring Summary**

| Date | Time of Test | Ambient Temp. (°F) | Average Fill Temp. (°F) | Remarks |
|---|---|---|---|---|
| 4/13/2024 | 7:30 | 40 | 38 | Existing SLF under Geomembrane |
| | 7:30 | 40 | 38 | Existing SLF under Geomembrane |
| | 7:30 | 40 | 36 | Existing SLF under Geomembrane |
| | 7:30 | 40 | 39 | Existing SLF under Geomembrane |

# APPENDIX C.2 – MOISTURE DENSITY TEST RESULTS SUMMARY

**Appendix C.2**
**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Nuclear Gauge Moisture-Density Testing Summary - Soil Liner Fill**

| TEST NUMBER | DATE TESTED | LOCATION | | DEPTH (in) | LABORATORY | | | FIELD | | | | PASS/FAIL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NORTHING | EASTING | | SAMPLE NUMBER (1) | MAX. DRY DENSITY (pcf) | OPTIMUM MOISTURE (%) | DRY DENSITY (pcf) | MOISTURE CONTENT (%) | SPECIFIED COMPACTION (%) | COMPACTION (%) | |
| SLF-1-N | 4/8/2024 | 59,180.3 | 59,180.3 | 10 | SLF-25-R | 115.6 | 12.9 | 113.9 | 11.7 | 95 | 98.5 | PASS |
| SLF-2-N | 4/8/2024 | 59,131.5 | 59,131.5 | 10 | SLF-25-R | 115.6 | 12.9 | 114.5 | 13.2 | 95 | 99.0 | PASS |
| SLF-3-N | 4/8/2024 | 59,209.6 | 35,294.5 | 10 | SLF-25-R | 115.6 | 12.9 | 110.7 | 11.7 | 95 | 95.8 | PASS |
| SLF-4-N | 4/8/2024 | 59,215.0 | 35,335.7 | 10 | SLF-25-R | 115.6 | 12.9 | 109.9 | 11.5 | 95 | 95.1 | PASS |

1. Sample SLF-25-R was reported in the 2022 VLF2 Stage 3 A.1 Record of Construction Report. Sample Results for the 2022 VLF2 Stage 3 A.1 sample SLF-25-R are included in the Recertification report as Appendix - C.5.

# APPENDIX C.3 – DEPTH VERIFICATION SUMMARY

**Appendix C.3**
**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Soil Liner Fill Depth Verification Summary**

| DATE | SAMPLE NUMBER | DEPTH (IN) | LOCATION | | ELEVATION (FT) | REQUIRED DEPTH (IN) | PASS/FAIL |
|---|---|---|---|---|---|---|---|
| | | | NORTHING | EASTING | | | |
| 4/12/2024 | SLF-1-D | 16 | 59,180.3 | 59,180.3 | FG | 12 | P |
| 4/12/2024 | SLF-2-D | 16 | 59,131.5 | 59,131.5 | FG | 12 | P |
| 4/12/2024 | SLF-3-D | 16 | 59,209.6 | 35,294.5 | FG | 12 | P |
| 4/12/2024 | SLF-4-D | 16 | 59,215.0 | 35,335.7 | FG | 12 | P |

# APPENDIX C.4 – SOIL LINER FILL ACCEPTANCE

# Soil Liner Fill Acceptance Form

NewFields
Perspective. Vision. Solutions.

**Client:** Cripple Creek & Victor Mining Co.
**Contractor:** JHL/Mustang Extreme Env.
**Project:** VLF2 Phase 3 A.1 Liner Repair
**Weather:** Clear 56°F
**Project No.:** 475.0106.068
**Date:** 4/13/2024

**Area/Location:** P-4952 thru P-4961

**Items Inspected:**
- Depth of SLF verified
- Firm and unyielding Surface
- No visible low/ponding areas
- Free of deleterious materials
- SLF Material Temparature

**Testing Performed:** Nuclear Density/Moisture — Survey Completed

**Deficient Items:**

**Remedial Actions:**

**Subgrade Accepted:** YES X NO

**Comments:** Liner removed from SLF surface with deployment following re-covering the SLF.

**Signatures:**

NewFields: Date: 4/13/24

JHL: Date: 4/13/24

CC&V: Date: 4/13/24

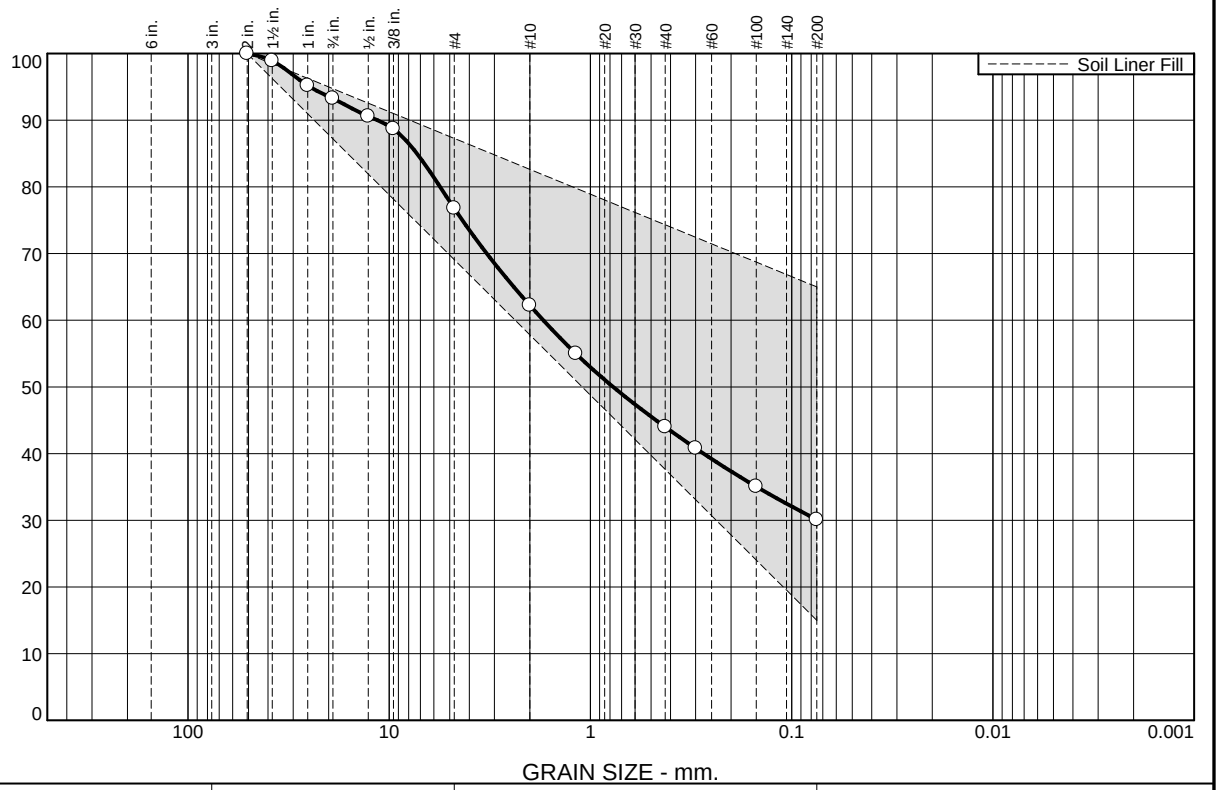
Mustang: Rene Alfaro Date: 4-18-24

Other: Date:

# APPENDIX C.5 – VLF2 PHASE 3 A.1 SLF LABORATORY RESULTS

Test results included in this report relate only to the items inspected or tested. This report shall not be reproduced, in full, without prior written approval of NewFields.

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 6.7 | 16.5 | 14.6 | 18.2 | 13.9 | 30.1 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 2 | 100.0 | 100.0 | |
| 1.5 | 98.9 | | |
| 1 | 95.2 | | |
| .75 | 93.3 | | |
| 0.5 | 90.6 | | |
| .375 | 88.7 | | |
| #4 | 76.8 | | |
| #10 | 62.2 | | |
| #16 | 55.0 | | |
| #40 | 44.0 | | |
| #50 | 40.8 | | |
| #100 | 35.1 | | |
| #200 | 30.1 | 15.0 - 65.0 | |

* Soil Liner Fill

**Material Description**

Brown clayey sand with gravel

**Atterberg Limits**

PL= 18 LL= 41 PI= 23

**Coefficients**

$D_{90}$= 11.4433 $D_{85}$= 7.2771 $D_{60}$= 1.7145
$D_{50}$= 0.7708 $D_{30}$= $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Classification**

USCS= SC AASHTO= A-2-7(2)

**Remarks**

**Location:** N59,397.8 E35,755.8
**Sample Number:** SLF-25-R **Depth:** 9955' **Date:** 7/13/2022

NewFields

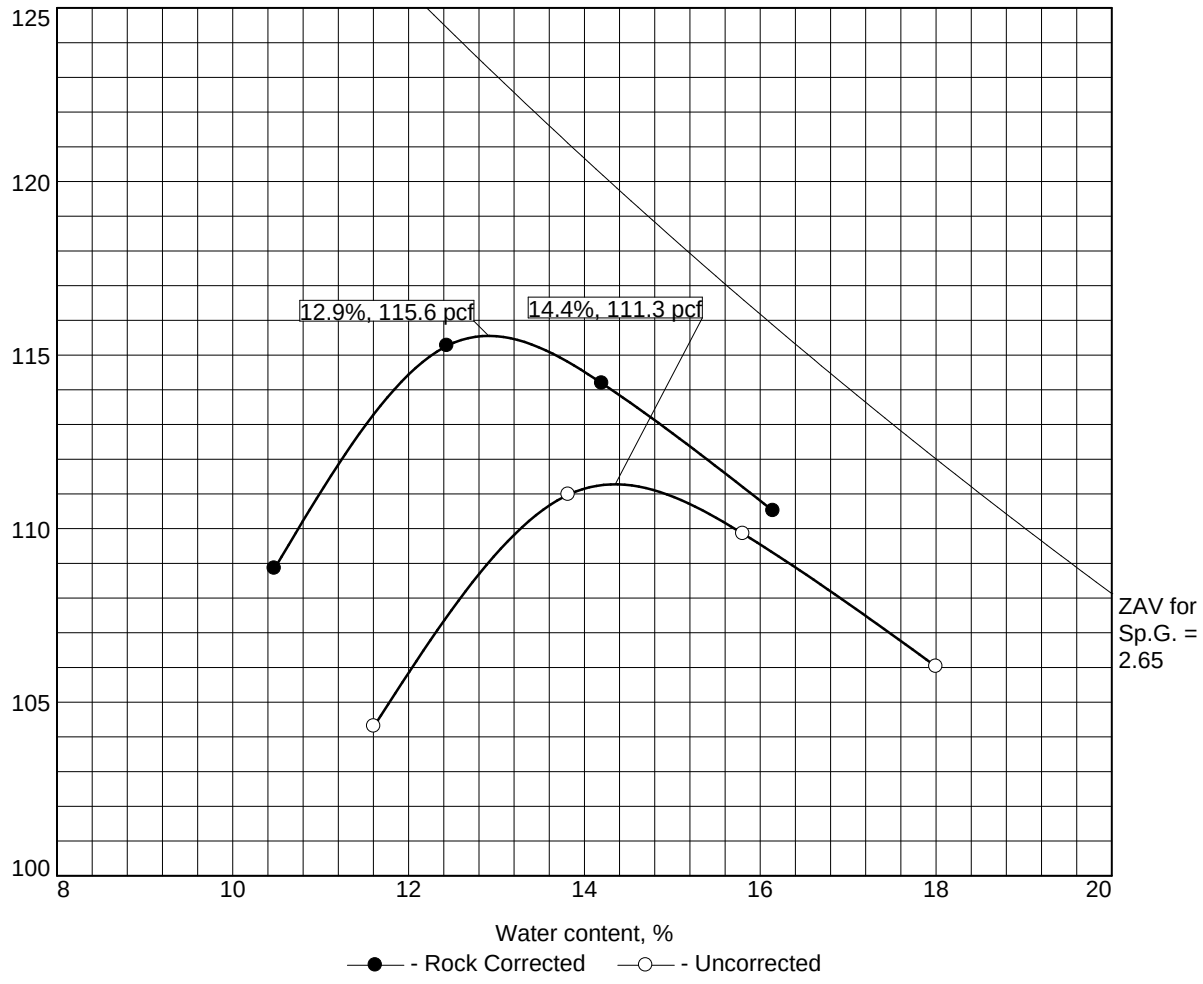
**Client:** Newmont-Cripple Creek & Victor Goldmine
**Project:** VLF2 Phase 3

**Project No:** 475.0106.056 **Figure** SLF-25-R

**Tested By:** AB **Checked By:** GF

Test results included in this report relate only to the items inspected or tested. This report shall not be reproduced, in full, without prior written approval of NewFields.

# COMPACTION TEST REPORT




Test specification: ASTM D 698-12 Method B Standard
ASTM D4718-15 Oversize Corr. Applied to Each Test Point

| Elev/ Depth | Classification | | Nat. Moist. | Sp.G. | LL | PI | % > 3/8 in. | % < No.200 |
|---|---|---|---|---|---|---|---|---|
| | USCS | AASHTO | | | | | | |
| 9955' | SC | A-2-7(2) | | 2.65 | 41 | 23 | 11.3 | 30.1 |

| ROCK CORRECTED TEST RESULTS | UNCORRECTED | MATERIAL DESCRIPTION |
|---|---|---|
| Maximum dry density = 115.6 pcf | 111.3 pcf | Brown clayey sand with gravel |
| Optimum moisture = 12.9 % | 14.4 % | |

**Project No.** 475.0106.056 **Client:** Newmont-Cripple Creek & Victor Goldmine
**Project:** VLF2 Phase 3
**Date:** 7/13/22
**Location:** N59,397.8 E35,755.8 **Sample Number:** SLF-25-R

**Remarks:**

NewFields

**Figure** SLF-25-R

**Tested By:** AB **Checked By:** GF

NewFields

# Flexible Wall Hydraulic Conductivity
## ASTM D5084

| | | | |
|---|---|---|---|
| Client: | Cripple Crrek and Victor Gold Mines | Lab Sample No.: | SLF-25-R |
| Project: | VLF2 PH3 | | |
| Project No.: | 475.0106.056 | Location: | Tezak Processing Plant |
| Phase: | A | Elevation/Depth: | FG |
| Requested By: | TW | Tested By: | TW |
| Test Started: | 11/28/2022 | Checked By: | TW |
| Test Finished: | 12/5/2022 | Sample Description: | Brown clayey gravel with sand |

| Test Boundary Conditions | |
|---|---|
| Type of Permeant | De-aired Bottled |
| Magnitude of Back pressure (psi) | 46 |
| Saturated (Y/N): | Yes |
| Stage 1: Effective Stress (psi) | 5 |
| Sample Type | Remolded |
| Burrete Area ($cm^2$) | 0.877 |

| Test Specimen Data | Initial | During k Testing | Final |
|---|---|---|---|
| Wet Soil + Tare (g) | 595.8 | | 738.50 |
| Dry Soil + Tare (g) | 527.61 | | 642.20 |
| Tare (g) | 0.00 | | 120.40 |
| Wt. of Water (g) | 68.19 | | 96.30 |
| Dry Soil (g) | 527.61 | | 521.80 |
| Moisture Content (%) | 12.9 | | 18.5 |
| Sample Volume ($ft^3$) | 0.01051 | 0.01031 | |
| Dry Density (pcf) | 110.7 | 111.8 | |
| Wet Density (pcf) | 124.9 | 132.6 | |
| Saturation (%) | 69.2 | 100.0 | |
| Percent Compaction | 95.7 | 96.7 | |
| Height (in) | 3.022 | 3.003 | |
| Diameter (in) | 2.767 | 2.749 | |
| Area ($in^2$) | 6.012 | 5.937 | |
| Est. Moisture Content after Consolidation (%) | | 17.6% | |
| Est. Void Ratio after Consolidation | | 0.467 | |
| Specific Gravity* | 2.65 | | |

*Specific gravity is assumed

Maximum Dry Density:
ASTM D 698

| | |
|---|---|
| **Maximum Dry Density (pcf):** | 115.6 |
| **Initial Remolded Dry Density (pcf):** | 110.7 |
| **Initial Percent Compaction:** | 96% |
| **Initial Void Ratio:** | 0.494 |
| **Optimum Moisture Content(%):** | 12.9 |
| **Initial Water Content (%):** | 12.9 |
| **Confining Pressure (psi):** | 5.0 |
| **Hydraulic Conductivity, $k_{20}$ (cm/s):** | **2.7E-07** |
| **Gradient Range (h/L):** | 9.4 10.5 |

# APPENDIX D – GEOMEMBRANE QUALITY CONTROL SUBMITTALS

# APPENDIX D.1 – RÉSUMÉS OF INSTALLATION PERSONNEL

# APPENDIX D.2 – 80-MIL LLDPE INVENTORY

# APPENDIX D.3 – 80-MIL LLDPE DSMS GEOMEMBRANE ROLL QC CERTIFICATES

# APPENDIX D.4 - 80-MIL LLDPE DSMS GEOMEMBRANE RESIN QC CERTIFICATES

# APPENDIX D.5 – WELDING ROD QUALITY CONTROL CERTIFICATES

# APPENDIX D.1 – RÉSUMÉS OF INSTALLATION PERSONNEL

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Fort Worth, Teas 76109

(817) 441-1235

## MASTER SEAMER RESUME

## For

# Hector Ayala

The following project reference list is only a partial list to document recent experience.

- Wenatchee Landfill (Wenatchee, WA) 469,000 Square Feet of 60 MIL HDPE & GCL. 148,000 Square Feet of 6 oz. Nonwoven Geotextile, 148,000 Square Feet of 16 oz. Nonwoven Geotextile.
- Stillwater Mine (Nye, MT) 180,700 Square Feet of 80 MIL HDPE & Geocomposite.
- El Sobrante Landfill Phase 12 (Corona, CA) – 1,077,420 Square Feet of 60 MIL HDPE, 1,071,800 Square Feet of 40 mil HDPE, 1,060,824 Square Feet of GCL, 603,466 Square Feet of 12 oz. Geotextile, 928,650 Square Feet of 8 oz. Geotextile, 162,650 Square Feet of geocomposite, Wind Defender, & 8 MIL Raven.
- Golden Vertex Phase 2B Leach Pad (Bullhead City, AZ) 619,950 Square Feet of 80 MIL HDPE, 590,550 Square Feet of GCL.
- Stillwater Mine Stage 2 Phase 2 East Dump Project (Nye, MT) 405,590 Square Feet of 80 MIL HDPE & Geocomposite.
- Simi Valley Landfill (Simi Valley, CA) 1,063,271 Square Feet of 60 MIL HDPE, 585,862 Square Feet of 80 MIL HDPE, 1,063,271 Square Feet of GCL, 622,536 Square Feet of 8 oz. Nonwoven Geotextile, 586,660 Square Feet of 16 oz. Nonwoven Geotextile, 1,063,271 Square Feet of Geocomposite, 924,532 Square Feet of 12 MIL Raven, 924,532 Square Feet of Wind Defender.

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## QUALITY CONTROL TECHNICIAN -INSTALLATION FOREMAN RESUME

# Jorge Carbajal Ruiz

The following project reference list is only a partial list to document recent experience.

- McKittrick Landfill (McKittrick, CA) 285,000 Square Feet of 60 MIL HDPE, GCL, & Double Sided Geocomposite.
- Wenatchee Landfill (Wenatchee, WA) 469,000 Square Feet of 60 MIL HDPE & GCL. 148,000 Square Feet of 6 oz. Nonwoven Geotextile, 148,000 Square Feet of 16 oz. Nonwoven Geotextile.
- Stillwater Mine (Nye, MT) 180,700 Square Feet of 80 MIL HDPE & Geocomposite.
- El Sobrante Landfill Phase 12 (Corona, CA) – 1,077,420 Square Feet of 60 MIL HDPE, 1,071,800 Square Feet of 40 mil HDPE, 1,060,824 Square Feet of GCL, 603,466 Square Feet of 12 oz. Geotextile, 928,650 Square Feet of 8 oz. Geotextile, 162,650 Square Feet of geocomposite, Wind Defender, & 8 MIL Raven.
- Golden Vertex Phase 2B Leach Pad (Bullhead City, AZ) 619,950 Square Feet of 80 MIL HDPE, 590,550 Square Feet of GCL.
- Stillwater Mine Stage 2 Phase 2 East Dump Project (Nye, MT) 405,590 Square Feet of 80 MIL HDPE & Geocomposite.
- Simi Valley Landfill (Simi Valley, CA) 1,063,271 Square Feet of 60 MIL HDPE, 585,862 Square Feet of 80 MIL HDPE, 1,063,271 Square Feet of GCL, 622,536 Square Feet of 8 oz. Nonwoven Geotextile, 586,660 Square Feet of 16 oz. Nonwoven Geotextile, 1,063,271 Square Feet of Geocomposite, 924,532 Square Feet of 12 MIL Raven, 924,532 Square Feet of Wind Defender.

- WMI El Sobrante Phase 13A (Corona, CA) – 935,546 Square Feet of 40 mil Textured HDPE, 936,858 Square Feet of GCL, 955,489 Square Feet of 60 mil Textured HDPE, 729,160 Square Feet of 12-ounce nonwoven geotextile, 234,170 Square Feet of Durascrim 8BBR, 238,807 Square Feet
- WMI Altamont Phase 4 (Livermore, CA – 328,608 Square Feet of 8 oz nonwoven geotextile, 397,030 Square feet of Geocomposite, 390,517 Square Feet of GCL, 813,910 Square Feet of 60 mil HDPE, 423,691 Square Feet of 12 oz geotextile.
- WMI Butterfield Cell 15A – (Maricopa, AZ) – 973,118 Square Feet of GCL, 990,896 Square Feet of 60 mil Textured HDPE, 722,031 Square Feet of Geocomposite, 261,233 Square Feet of 16 oz nonwoven geotextile.
- WMI Northwest Regional Landfill (Surprise, AZ) – 613,021 Square Feet of GCL, 614,326 Square Feet of 60 mil HDPE Textured Liner, 489,066 Square Feet of Single Sided Geocomposite, 139,283 Square Feet of 16 oz nonwoven geotextile.

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## MASTER SEAMER RESUME

# JORGE PINEDA

The following project reference list is only a partial list to document recent experience.

- McKittrick Landfill (McKittrick, CA) 285,000 Square Feet of 60 MIL HDPE, GCL, & Double Sided Geocomposite.
- Wenatchee Landfill (Wenatchee, WA) 469,000 Square Feet of 60 MIL HDPE & GCL. 148,000 Square Feet of 6 oz. Nonwoven Geotextile, 148,000 Square Feet of 16 oz. Nonwoven Geotextile.
- Stillwater Mine (Nye, MT) 180,700 Square Feet of 80 MIL HDPE & Geocomposite.
- El Sobrante Landfill Phase 12 (Corona, CA) – 1,077,420 Square Feet of 60 MIL HDPE, 1,071,800 Square Feet of 40 mil HDPE, 1,060,824 Square Feet of GCL, 603,466 Square Feet of 12 oz. Geotextile, 928,650 Square Feet of 8 oz. Geotextile, 162,650 Square Feet of geocomposite, Wind Defender, & 8 MIL Raven.
- Golden Vertex Phase 2B Leach Pad (Bullhead City, AZ) 619,950 Square Feet of 80 MIL HDPE, 590,550 Square Feet of GCL.
- Stillwater Mine Stage 2 Phase 2 East Dump Project (Nye, MT) 405,590 Square Feet of 80 MIL HDPE & Geocomposite.
- Simi Valley Landfill (Simi Valley, CA) 1,063,271 Square Feet of 60 MIL HDPE, 585,862 Square Feet of 80 MIL HDPE, 1,063,271 Square Feet of GCL, 622,536 Square Feet of 8 oz. Nonwoven Geotextile, 586,660 Square Feet of 16 oz. Nonwoven Geotextile, 1,063,271 Square Feet of Geocomposite, 924,532 Square Feet of 12 MIL Raven, 924,532 Square Feet of Wind Defender.

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# RESUME

## For Welding Technician

## Jose Gutierrez

The following project reference list is only a partial list to document recent experience.

- Wenatchee Landfill (Wenatchee, WA) 469,000 Square Feet of 60 MIL HDPE & GCL. 148,000 Square Feet of 6 oz. Nonwoven Geotextile, 148,000 Square Feet of 16 oz. Nonwoven Geotextile.
- Stillwater Mine (Nye, MT) 180,700 Square Feet of 80 MIL HDPE & Geocomposite.
- El Sobrante Landfill Phase 12 (Corona, CA) – 1,077,420 Square Feet of 60 MIL HDPE, 1,071,800 Square Feet of 40 mil HDPE, 1,060,824 Square Feet of GCL, 603,466 Square Feet of 12 oz. Geotextile, 928,650 Square Feet of 8 oz. Geotextile, 162,650 Square Feet of geocomposite, Wind Defender, & 8 MIL Raven.
- Golden Vertex Phase 2B Leach Pad (Bullhead City, AZ) 619,950 Square Feet of 80 MIL HDPE, 590,550 Square Feet of GCL.
- Stillwater Mine Stage 2 Phase 2 East Dump Project (Nye, MT) 405,590 Square Feet of 80 MIL HDPE & Geocomposite.
- Simi Valley Landfill (Simi Valley, CA) 1,063,271 Square Feet of 60 MIL HDPE, 585,862 Square Feet of 80 MIL HDPE, 1,063,271 Square Feet of GCL, 622,536 Square Feet of 8 oz. Nonwoven Geotextile, 586,660 Square Feet of 16 oz. Nonwoven Geotextile, 1,063,271 Square Feet of Geocomposite, 924,532 Square Feet of 12 MIL Raven, 924,532 Square Feet of Wind Defender.

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# INSTALLATION SUPERINTENDENT RESUME

## For

# Rene Alfaro

Installation superintendents must have a minimum of ten million square feet of supervisory experience in geosynthetic liner installations. The following project reference list is only a partial list to document the minimum experience required.

- McKittrick Landfill (McKittrick, CA) 285,000 Square Feet of 60 MIL HDPE, GCL, & Double Sided Geocomposite.
- Wenatchee Landfill (Wenatchee, WA) 469,000 Square Feet of 60 MIL HDPE & GCL. 148,000 Square Feet of 6 oz. Nonwoven Geotextile, 148,000 Square Feet of 16 oz. Nonwoven Geotextile.
- Tangipahoa Parish Landfill Closure (Independence, LA) – 985,320 Square Feet LLDPE & Closure Turf with previous employer.
- Atlantic Waste Disposal (Waverly, VA) – 3,000,000 Square feet of HDPE, GCL & Geocomposite over multiple projects with previous employer.
- Chesser Island Road Landfill (Folkston, GA) – 2,000,000 Square Feet HDPE, GCL, Geocomposite over multiple projects with previous employer.
- Butterfield Landfill (Maricopa, AZ) 990,896 Square Feet of GCL & 60 mil Double Sided Textured HDPE, 722,031 Square Feet of Geocomposite, 261,233 Square Feet of nonwoven geotextile
- Marana Landfill (Marana, AZ) 837,645 Square Feet of GCL, 60 mil Double Sided Textured HDPE, 535,927 Square Feet of Double-sided geocomposite, 836,645 Square Feet of nonwoven geotextile

- Northwest Regional Landfill (Surprise, AZ) 619,032 Square Feet of 60 Mil HDPE, 619,032 Square Feet of GCL, 508,757 Square Feet of Geocomposite, 110,000 Square Feet of 16 oz. Geotextile
- Kirby Canyon Landfill (Morgan Hill, CA) 511,384 Square Feet of 40 mil HDPE, 503,974 Square Feet of 80 Mil HDPE, 503,974 Square Feet of GCL, 514,642 Square Feet of Geocomposite
- El Sobrante Landfill Phase 12 (Corona, CA) – 1,077,420 Square Feet of 60 MIL HDPE, 1,071,800 Square Feet of 40 mil HDPE, 1,060,824 Square Feet of GCL, 603,466 Square Feet of 12 oz. Geotextile, 928,650 Square Feet of 8 oz. Geotextile, 162,650 Square Feet of Geocomposite, Wind Defender, & 8 MIL Raven.

Rene Alfaro has over 36 years of installation experience across a wide variety of industries including solid waste, mining, petrochemical, agriculture, and energy.

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## OPERATOR- FOREMAN RESUME

## For

# Teresa Alfaro

Foremen must have a minimum of five million square feet of hands on synthetic liner welding experience. The following project reference list is only a partial list to document the minimum experience required.

- McKittrick Landfill (McKittrick, CA) 285,000 Square Feet of 60 MIL HDPE, GCL, & Double Sided Geocomposite.
- Wentachee Landfill (Wenatchee, WA) 469,000 Square Feet of 60 MIL HDPE & GCL. 148,000 Square Feet of 6 oz. Nonwoven Geotextile, 148,000 Square Feet of 16 oz. Nonwoven Geotextile.
- Saufley Field Landfill Closure (Pensacola, FL) – 1,001, 880 Square Feet LLDPE & Closure Turf with former employer.
- G.R.O.W.S. Landfill Closure (Morrisville, PA) – 1,306,800 Square Feet LLDPE, Geotextile with former employer.
- El Sobrante Landfill Cells 9B, 10, 11 A (Corona, CA) – 3,000,000 Square Feet HDPE, GCL, Geocomposite with former employer.

Teresa Alfaro has over 12 years of installation experience across a wide variety of industries including solid waste, mining, petrochemical, agriculture, and energy.

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**Fort Worth, Texas 76109**

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## MASTER SEAMER RESUME

# Yoseli Roberto Perez Varona

The following project reference list is only a partial list to document recent experience from 2023.

- Kersey Valley Landfill Phase 6 – Jamestown, NC – 289,500 Square Feet of GCL, HDPE 60 MIL TEXTURED LINER, 6 oz. Nonwoven Geotextile, 12 oz. Nonwoven Geotextile.
- Oceana Gold WPAG – Kershaw, SC – 3,239,293 Square Feet HDPE 80 MIL TEXTURED LINER, 926,250 Square Feet of HDPE GEONET.
- Oceana Gold 465 Pond & Sediment Trap Liner -Kershaw, SC – 469,058 Square Feet of HDPE 60 MIL TEXTURED LINER, 237,680 Square Feet of HDPE Geonet.

# APPENDIX D.2 – 80-MIL LLDPE INVENTORY

**Cripple Creek & Victor Gold Mining Company**
**VLF 2 Phase 3**
**Stage A.1 Record of Construction**
**80-mil LLDPE Geomembrane Site Inventory Control**

NewFields
Perspective. Vision. Solutions.

| Roll Number | Resin Lot Number | Width (ft) | Length (ft) | Area (sf) | Conformance Test | Agru QC Certification | Resin Certification | Site Delivery Date |
|---|---|---|---|---|---|---|---|---|
| FNA0091850001 | DNK810410 | 23 | 410 | 9,430 | x | x | x | 04/21/22 |
| FNA0091850002 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850003 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850004 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850005 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850006 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850007 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850008 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850009 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850010 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850011 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850012 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850013 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/20/22 |
| FNA0091850014 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/20/22 |
| FNA0091850015 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/20/22 |
| FNA0091850016 | DNK810410 | 23 | 410 | 9,430 | x | x | x | 04/20/22 |
| FNA0091850017 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/20/22 |
| FNA0091850018 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/20/22 |
| FNA0091850019 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/20/22 |
| FNA0091850020 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/20/22 |
| FNA0091850021 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/20/22 |
| FNA0091850022 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/20/22 |
| FNA0091850023 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/20/22 |
| FNA0091850024 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/20/22 |
| FNA0091850025 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850026 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850027 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850028 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850029 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850030 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850031 | DNK810410 | 23 | 410 | 9,430 | x | x | x | 04/19/22 |
| FNA0091850032 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850033 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850034 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850035 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850036 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850037 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/26/22 |
| FNA0091850038 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/26/22 |
| FNA0091850039 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/26/22 |
| FNA0091850040 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/26/22 |
| FNA0091850041 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/26/22 |
| FNA0091850042 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/26/22 |
| FNA0091850043 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/26/22 |

**Cripple Creek & Victor Gold Mining Company**
**VLF 2 Phase 3**
**Stage A.1 Record of Construction**
**80-mil LLDPE Geomembrane Site Inventory Control**

| Roll Number | Resin Lot Number | Width (ft) | Length (ft) | Area (sf) | Conformance Test | Agru QC Certification | Resin Certification | Site Delivery Date |
|---|---|---|---|---|---|---|---|---|
| FNA0091850044 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/26/22 |
| FNA0091850045 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/26/22 |
| FNA0091850046 | DNK810410 | 23 | 410 | 9,430 | x | x | x | 04/26/22 |
| FNA0091850047 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/26/22 |
| FNA0091850048 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/26/22 |
| FNA0091850049 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/27/22 |
| FNA0091850050 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/27/22 |
| FNA0091850051 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/27/22 |
| FNA0091850052 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/27/22 |
| FNA0091850053 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/27/22 |
| FNA0091850054 | DNK810410 | 23 | 410 | 9,430 | | x | x | 04/27/22 |
| FNA0091850055 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/27/22 |
| FNA0091850056 | 21KB544 | 23 | 410 | 9,430 | x | x | x | 04/27/22 |
| FNA0091850057 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/27/22 |
| FNA0091850058 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/27/22 |
| FNA0091850059 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/27/22 |
| FNA0091850060 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/27/22 |
| FNA0091850061 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850062 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850063 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850064 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850065 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850066 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850067 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850068 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850069 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850070 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850071 | 21KB544 | 23 | 410 | 9,430 | x | x | x | 04/21/22 |
| FNA0091850072 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850073 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850074 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850075 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850076 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850077 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850078 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850079 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850080 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850081 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850083 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850084 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850085 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850086 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850087 | 21KB544 | 23 | 410 | 9,430 | x | x | x | 04/21/22 |
| FNA0091850088 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |

**Cripple Creek & Victor Gold Mining Company**
**VLF 2 Phase 3**
**Stage A.1 Record of Construction**
**80-mil LLDPE Geomembrane Site Inventory Control**

| Roll Number | Resin Lot Number | Width (ft) | Length (ft) | Area (sf) | Conformance Test | Agru QC Certification | Resin Certification | Site Delivery Date |
|---|---|---|---|---|---|---|---|---|
| FNA0091850089 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850090 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850091 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850092 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850093 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850094 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850095 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850096 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850097 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850098 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850099 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850100 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850101 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850102 | 21KB544 | 23 | 410 | 9,430 | x | x | x | 04/21/22 |
| FNA0091850103 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850104 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850105 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850106 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850107 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850108 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850109 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/21/22 |
| FNA0091850110 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850111 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850112 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850113 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850114 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850115 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850116 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850117 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850118 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FNA0091850119 | 21KB544 | 23 | 410 | 9,430 | | x | x | 04/19/22 |
| FND0103600003 | DPF811480 | 23 | 410 | 9,430 | x | x | x | 10/11/22 |
| FND0103600004 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/11/22 |
| FND0103600005 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/11/22 |
| FND0103600006 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/11/22 |
| FND0103600007 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/11/22 |
| FND0103600008 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/11/22 |
| FND0103600009 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/11/22 |
| FND0103600010 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/11/22 |
| FND0103600011 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/30/22 |
| FND0103600012 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/30/22 |
| FND0103600013 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/30/22 |
| FND0103600014 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/30/22 |
| FND0103600015 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |

**Cripple Creek & Victor Gold Mining Company**
**VLF 2 Phase 3**
**Stage A.1 Record of Construction**
**80-mil LLDPE Geomembrane Site Inventory Control**

| Roll Number | Resin Lot Number | Width (ft) | Length (ft) | Area (sf) | Conformance Test | Agru QC Certification | Resin Certification | Site Delivery Date |
|---|---|---|---|---|---|---|---|---|
| FND0103600016 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600017 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600018 | DPF811480 | 23 | 410 | 9,430 | x | x | x | 10/03/22 |
| FND0103600019 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600020 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600021 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600022 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600023 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600024 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600025 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600026 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600027 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/27/22 |
| FND0103600028 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/27/22 |
| FND0103600029 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/27/22 |
| FND0103600030 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/27/22 |
| FND0103600031 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/27/22 |
| FND0103600032 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/27/22 |
| FND0103600033 | DPF811480 | 23 | 410 | 9,430 | x | x | x | 09/27/22 |
| FND0103600034 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/27/22 |
| FND0103600035 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/27/22 |
| FND0103600036 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/27/22 |
| FND0103600037 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/27/22 |
| FND0103600038 | DPF811480 | 23 | 410 | 9,430 | | x | x | 09/27/22 |
| FND0103600039 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600040 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600041 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600042 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600043 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600044 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600045 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600046 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600047 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600048 | DPF811480 | 23 | 410 | 9,430 | x | x | x | 10/03/22 |
| FND0103600049 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600050 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600051 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600052 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600053 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600054 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600055 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600056 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600057 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600058 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600059 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |

**Cripple Creek & Victor Gold Mining Company**
**VLF 2 Phase 3**
**Stage A.1 Record of Construction**
**80-mil LLDPE Geomembrane Site Inventory Control**

| Roll Number | Resin Lot Number | Width (ft) | Length (ft) | Area (sf) | Conformance Test | Agru QC Certification | Resin Certification | Site Delivery Date |
|---|---|---|---|---|---|---|---|---|
| FND0103600060 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600061 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600062 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/03/22 |
| FND0103600063 | DPF811480 | 23 | 410 | 9,430 | x | x | x | 10/05/22 |
| FND0103600064 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600065 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600066 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600067 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600068 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600069 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600070 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600071 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600072 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600073 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600074 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600075 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/10/22 |
| FND0103600076 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/10/22 |
| FND0103600077 | DPF811480 | 23 | 410 | 9,430 | | x | x | 10/10/22 |
| FND0103600078 | DPF811350 | 23 | 410 | 9,430 | x | x | x | 10/10/22 |
| FND0103600079 | DPF811350 | 23 | 410 | 9,430 | | x | x | 10/10/22 |
| FND0103600080 | DPF811350 | 23 | 410 | 9,430 | | x | x | 10/10/22 |
| FND0103600081 | DPF811350 | 23 | 410 | 9,430 | | x | x | 10/10/22 |
| FND0103600082 | DPF811350 | 23 | 410 | 9,430 | | x | x | 10/10/22 |
| FND0103600083 | DPF811350 | 23 | 410 | 9,430 | | x | x | 10/10/22 |
| FND0103600084 | DPF811350 | 23 | 410 | 9,430 | | x | x | 10/10/22 |
| FND0103600085 | DPF811350 | 23 | 410 | 9,430 | | x | x | 10/10/22 |
| FND0103600087 | DPF811350 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600088 | DPF811350 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600089 | DPF811350 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600090 | DPF811350 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600091 | DPF811350 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600092 | DPF811350 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600093 | DPF811350 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600094 | DPF811350 | 23 | 410 | 9,430 | x | x | x | 10/06/22 |
| FND0103600095 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600096 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600097 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600098 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600099 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600100 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600101 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600102 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600103 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600106 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |

**Cripple Creek & Victor Gold Mining Company**
**VLF 2 Phase 3**
**Stage A.1 Record of Construction**
**80-mil LLDPE Geomembrane Site Inventory Control**

| Roll Number | Resin Lot Number | Width (ft) | Length (ft) | Area (sf) | Conformance Test | Agru QC Certification | Resin Certification | Site Delivery Date |
|---|---|---|---|---|---|---|---|---|
| FND0103600107 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600108 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600109 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600110 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600111 | DPH810510 | 23 | 410 | 9,430 | x | x | x | 10/07/22 |
| FND0103600112 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600114 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600115 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600116 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600117 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600118 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600119 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600120 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600121 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600122 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600123 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600124 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600125 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/05/22 |
| FND0103600126 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/10/22 |
| FND0103600127 | DPH810510 | 23 | 410 | 9,430 | x | x | x | 10/06/22 |
| FND0103600128 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600129 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600130 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600131 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600132 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600133 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600134 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600135 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600136 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600137 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600138 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/06/22 |
| FND0103600139 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600140 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600141 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600142 | DPH810510 | 23 | 410 | 9,430 | x | x | x | 10/07/22 |
| FND0103600143 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600144 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600145 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600146 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600147 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600148 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600149 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600150 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/07/22 |
| FND0103600151 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |

**Cripple Creek & Victor Gold Mining Company**
**VLF 2 Phase 3**
**Stage A.1 Record of Construction**
**80-mil LLDPE Geomembrane Site Inventory Control**

| Roll Number | Resin Lot Number | Width (ft) | Length (ft) | Area (sf) | Conformance Test | Agru QC Certification | Resin Certification | Site Delivery Date |
|---|---|---|---|---|---|---|---|---|
| FND0103600152 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600153 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600154 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600155 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600156 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600157 | DPH810510 | 23 | 410 | 9,430 | x | x | x | 10/12/22 |
| FND0103600158 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600159 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600160 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600161 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600162 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600163 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600164 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600165 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600166 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600167 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600168 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600169 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600170 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600171 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600173 | DPH810510 | 23 | 410 | 9,430 | x | x | x | 10/12/22 |
| FND0103600174 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600175 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600176 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600177 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600178 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600179 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600180 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600181 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600182 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600183 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600184 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600185 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600186 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600187 | DPH810510 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600188 | DPH810490 | 23 | 410 | 9,430 | x | x | x | 10/12/22 |
| FND0103600189 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600190 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600191 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600192 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600193 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600194 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600195 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600196 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |

**Cripple Creek & Victor Gold Mining Company**
**VLF 2 Phase 3**
**Stage A.1 Record of Construction**
**80-mil LLDPE Geomembrane Site Inventory Control**

| Roll Number | Resin Lot Number | Width (ft) | Length (ft) | Area (sf) | Conformance Test | Agru QC Certification | Resin Certification | Site Delivery Date |
|---|---|---|---|---|---|---|---|---|
| FND0103600197 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600198 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600199 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600200 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/13/22 |
| FND0103600201 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/13/22 |
| FND0103600202 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/13/22 |
| FND0103600203 | DPH810490 | 23 | 410 | 9,430 | x | x | x | 10/13/22 |
| FND0103600204 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/13/22 |
| FND0103600205 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/13/22 |
| FND0103600206 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/13/22 |
| FND0103600207 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/13/22 |
| FND0103600208 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/13/22 |
| FND0103600209 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/13/22 |
| FND0103600210 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/13/22 |
| FND0103600211 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/13/22 |
| FND0103600212 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600213 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600214 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600215 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600216 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600217 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600218 | DPH810490 | 23 | 410 | 9,430 | x | x | x | 10/12/22 |
| FND0103600219 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600220 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600222 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600223 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600224 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/12/22 |
| FND0103600225 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/17/22 |
| FND0103600226 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/17/22 |
| FND0103600227 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/14/22 |
| FND0103600228 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/14/22 |
| FND0103600229 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/14/22 |
| FND0103600230 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/14/22 |
| FND0103600231 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/14/22 |
| FND0103600232 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/14/22 |
| FND0103600233 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/14/22 |
| FND0103600234 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/14/22 |
| FND0103600235 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/14/22 |
| FND0103600236 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/14/22 |
| FND0103600237 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/14/22 |
| FND0103600238 | DPH810490 | 23 | 410 | 9,430 | | x | x | 10/14/22 |

# APPENDIX D.3 – 80-MIL LLDPE DSMS GEOMEMBRANE ROLL QC CERTIFICATES

# Geomembrane Quality Certification

**Customer:** Newmont Mining
**Project:**
**Destination:**
**Report Date:** 30-Mar-2022 10:39 AM

**S.O.#** SO00013688
**Item Number:** FG-LDMSDS080BBBEG
**Liner Type:** LLDPE DS MicroSpike 80mil Black GM17
**Roll Count:** 118

| | | | | | | | | ASTM D5994 | | ASTM D7466 | | ASTM D8117 | ASTM D792 | ASTM D1248 | ASTM D4218 | ASTM D5596 | ASTM D6693 | | | | ASTM D1004 | | ASTM D4833 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Roll Number | Prod. Date | Width (ft) | Length (ft) | Area (sqft) | Weight (lb) | Resin Lot# | Thickness-Min | Thickness-Avg | Asperity (top) | Asperity (bottom) | OIT | Density | Melt Flow | Carbon Content | Category 1 Disp. | Tensile Break Str (MD) | Break Elong (MD) | Tensile Break Str (TD) | Break Elong (TD) | Tear Strength (MD) | Tear Strength (TD) | Puncture Resistance |
| | | | | | | | | mil | mil | mil | mil | minut | g/cc | g/10 | % | Categ | ppi | % | ppi | % | lb | lb | lb |
| 1 | FNA0091850001 | 02/24/22 | 23 | 410 | 9430 | 3824 | DNK810410 | 73 | 78 | 29 | 32 | 217 | 0.932 | 0.34 | 2.7 | 10 | 238 | 531 | 257 | 616 | 63 | 64 | 148 |
| 2 | FNA0091850002 | 02/24/22 | 23 | 410 | 9430 | 3820 | DNK810410 | 75 | 78 | 29 | 35 | 217 | 0.932 | 0.34 | 2.7 | 10 | 238 | 531 | 257 | 616 | 63 | 64 | 148 |
| 3 | FNA0091850003 | 02/24/22 | 23 | 410 | 9430 | 3810 | DNK810410 | 75 | 79 | 30 | 32 | 217 | 0.932 | 0.34 | 2.7 | 10 | 238 | 531 | 257 | 616 | 63 | 64 | 148 |
| 4 | FNA0091850004 | 02/24/22 | 23 | 410 | 9430 | 3806 | DNK810410 | 74 | 78 | 31 | 30 | 217 | 0.932 | 0.34 | 2.6 | 10 | 238 | 531 | 257 | 616 | 63 | 64 | 148 |
| 5 | FNA0091850005 | 02/24/22 | 23 | 410 | 9430 | 3816 | DNK810410 | 75 | 78 | 29 | 34 | 217 | 0.932 | 0.34 | 2.7 | 10 | 238 | 531 | 257 | 616 | 63 | 64 | 148 |
| 6 | FNA0091850006 | 02/24/22 | 23 | 410 | 9430 | 3812 | DNK810410 | 72 | 77 | 31 | 30 | 217 | 0.932 | 0.34 | 2.4 | 10 | 230 | 520 | 256 | 618 | 63 | 64 | 148 |
| 7 | FNA0091850007 | 02/24/22 | 23 | 410 | 9430 | 3812 | DNK810410 | 73 | 78 | 30 | 32 | 217 | 0.932 | 0.34 | 2.4 | 10 | 230 | 520 | 256 | 618 | 63 | 64 | 148 |
| 8 | FNA0091850008 | 02/24/22 | 23 | 410 | 9430 | 3812 | DNK810410 | 73 | 77 | 29 | 30 | 217 | 0.932 | 0.34 | 2.4 | 10 | 230 | 520 | 256 | 618 | 63 | 64 | 148 |
| 9 | FNA0091850009 | 02/24/22 | 23 | 410 | 9430 | 3812 | DNK810410 | 74 | 77 | 28 | 30 | 217 | 0.932 | 0.34 | 2.6 | 10 | 230 | 520 | 256 | 618 | 63 | 64 | 148 |
| 10 | FNA0091850010 | 02/24/22 | 23 | 410 | 9430 | 3812 | DNK810410 | 73 | 77 | 34 | 30 | 217 | 0.932 | 0.34 | 2.4 | 10 | 230 | 520 | 256 | 618 | 63 | 64 | 148 |
| 11 | FNA0091850011 | 02/24/22 | 23 | 410 | 9430 | 3816 | DNK810410 | 73 | 77 | 29 | 32 | 217 | 0.936 | 0.34 | 2.6 | 10 | 240 | 523 | 255 | 612 | 62 | 63 | 148 |
| 12 | FNA0091850012 | 02/25/22 | 23 | 410 | 9430 | 3810 | DNK810410 | 71 | 78 | 30 | 29 | 217 | 0.936 | 0.34 | 2.6 | 10 | 240 | 523 | 255 | 612 | 62 | 63 | 148 |
| 13 | FNA0091850013 | 02/25/22 | 23 | 410 | 9430 | 3812 | DNK810410 | 72 | 79 | 29 | 32 | 217 | 0.936 | 0.34 | 2.6 | 10 | 240 | 523 | 255 | 612 | 62 | 63 | 148 |
| 14 | FNA0091850014 | 02/25/22 | 23 | 410 | 9430 | 3818 | DNK810410 | 73 | 78 | 29 | 33 | 217 | 0.936 | 0.34 | 2.4 | 10 | 240 | 523 | 255 | 612 | 62 | 63 | 148 |
| 15 | FNA0091850015 | 02/25/22 | 23 | 410 | 9430 | 3814 | DNK810410 | 71 | 76 | 29 | 30 | 217 | 0.936 | 0.34 | 2.6 | 10 | 240 | 523 | 255 | 612 | 62 | 63 | 148 |
| 16 | FNA0091850016 | 02/25/22 | 23 | 410 | 9430 | 3806 | DNK810410 | 74 | 76 | 29 | 28 | 217 | 0.936 | 0.34 | 2.7 | 10 | 237 | 541 | 252 | 594 | 62 | 63 | 148 |
| 17 | FNA0091850017 | 02/25/22 | 23 | 410 | 9430 | 3820 | DNK810410 | 72 | 76 | 29 | 30 | 217 | 0.936 | 0.34 | 2.7 | 10 | 237 | 541 | 252 | 594 | 62 | 63 | 148 |
| 18 | FNA0091850018 | 02/25/22 | 23 | 410 | 9430 | 3818 | DNK810410 | 72 | 76 | 30 | 32 | 217 | 0.936 | 0.34 | 2.7 | 10 | 237 | 541 | 252 | 594 | 62 | 63 | 148 |
| 19 | FNA0091850019 | 02/25/22 | 23 | 410 | 9430 | 3816 | DNK810410 | 73 | 76 | 30 | 32 | 217 | 0.936 | 0.34 | 2.7 | 10 | 237 | 541 | 252 | 594 | 62 | 63 | 148 |
| 20 | FNA0091850020 | 02/25/22 | 23 | 410 | 9430 | 3814 | DNK810410 | 74 | 77 | 28 | 32 | 217 | 0.936 | 0.34 | 2.7 | 10 | 237 | 541 | 252 | 594 | 62 | 63 | 148 |
| 21 | FNA0091850021 | 02/25/22 | 23 | 410 | 9430 | 3812 | DNK810410 | 73 | 77 | 28 | 30 | 217 | 0.935 | 0.34 | 2.5 | 10 | 246 | 562 | 262 | 628 | 62 | 60 | 147 |
| 22 | FNA0091850022 | 02/25/22 | 23 | 410 | 9430 | 3812 | DNK810410 | 73 | 76 | 28 | 31 | 217 | 0.935 | 0.34 | 2.5 | 10 | 246 | 562 | 262 | 628 | 62 | 60 | 147 |
| 23 | FNA0091850023 | 02/25/22 | 23 | 410 | 9430 | 3814 | DNK810410 | 75 | 77 | 31 | 35 | 217 | 0.935 | 0.34 | 2.5 | 10 | 246 | 562 | 262 | 628 | 62 | 60 | 147 |
| 24 | FNA0091850024 | 02/25/22 | 23 | 410 | 9430 | 3820 | DNK810410 | 73 | 76 | 29 | 33 | 217 | 0.935 | 0.34 | 2.5 | 10 | 246 | 562 | 262 | 628 | 62 | 60 | 147 |
| 25 | FNA0091850025 | 02/25/22 | 23 | 410 | 9430 | 3824 | DNK810410 | 73 | 77 | 27 | 31 | 217 | 0.935 | 0.34 | 2.5 | 10 | 246 | 562 | 262 | 628 | 62 | 60 | 147 |
| 26 | FNA0091850026 | 02/25/22 | 23 | 410 | 9430 | 3814 | DNK810410 | 74 | 78 | 29 | 30 | 217 | 0.935 | 0.34 | 2.3 | 10 | 249 | 541 | 264 | 594 | 62 | 60 | 147 |
| 27 | FNA0091850027 | 02/25/22 | 23 | 410 | 9430 | 3812 | DNK810410 | 73 | 78 | 28 | 29 | 217 | 0.935 | 0.34 | 2.3 | 10 | 249 | 541 | 264 | 594 | 62 | 60 | 147 |
| 28 | FNA0091850028 | 02/25/22 | 23 | 410 | 9430 | 3814 | DNK810410 | 73 | 77 | 29 | 32 | 217 | 0.935 | 0.34 | 2.3 | 10 | 249 | 541 | 264 | 594 | 62 | 60 | 147 |
| 29 | FNA0091850029 | 02/26/22 | 23 | 410 | 9430 | 3814 | DNK810410 | 75 | 77 | 29 | 31 | 217 | 0.935 | 0.34 | 2.6 | 10 | 249 | 541 | 264 | 594 | 62 | 60 | 147 |
| 30 | FNA0091850030 | 02/26/22 | 23 | 410 | 9430 | 3824 | DNK810410 | 74 | 77 | 29 | 29 | 217 | 0.935 | 0.34 | 2.3 | 10 | 249 | 541 | 264 | 594 | 62 | 60 | 147 |
| 31 | FNA0091850031 | 02/26/22 | 23 | 410 | 9430 | 3796 | DNK810410 | 72 | 77 | 29 | 30 | 217 | 0.933 | 0.34 | 2.4 | 10 | 250 | 539 | 264 | 617 | 70 | 72 | 146 |
| 32 | FNA0091850032 | 02/26/22 | 23 | 410 | 9430 | 3820 | DNK810410 | 73 | 77 | 29 | 31 | 217 | 0.933 | 0.34 | 2.4 | 10 | 250 | 539 | 264 | 617 | 70 | 72 | 146 |

| # | Roll Number | Prod. Date | Width (ft) | Length (ft) | Area (sqft) | Weight (lb) | Resin Lot# | ASTM D5994 Thickness-Min (mil) | ASTM D5994 Thickness-Avg (mil) | ASTM D7466 Asperity (top) (mil) | ASTM D7466 Asperity (bottom) (mil) | ASTM D8117 OIT (minut) | ASTM D792 Density (g/cc) | ASTM D1248 Melt Flow (g/10) | ASTM D4218 Carbon Content (%) | ASTM D5596 Category 1 Disp. (Categ) | ASTM D6693 Tensile Break Str (MD) (ppi) | ASTM D6693 Break Elong (MD) (%) | ASTM D6693 Tensile Break Str (TD) (ppi) | ASTM D6693 Break Elong (TD) (%) | ASTM D1004 Tear Strength (MD) (lb) | ASTM D1004 Tear Strength (TD) (lb) | ASTM D4833 Puncture Resistance (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 33 | FNA0091850033 | 02/26/22 | 23 | 410 | 9430 | 3826 | DNK810410 | 73 | 77 | 27 | 34 | 217 | 0.933 | 0.34 | 2.4 | 10 | 250 | 539 | 264 | 617 | 70 | 72 | 146 |
| 34 | FNA0091850034 | 02/26/22 | 23 | 410 | 9430 | 3828 | DNK810410 | 73 | 76 | 32 | 31 | 217 | 0.933 | 0.34 | 2.2 | 10 | 250 | 539 | 264 | 617 | 70 | 72 | 146 |
| 35 | FNA0091850035 | 02/26/22 | 23 | 410 | 9430 | 3816 | DNK810410 | 72 | 76 | 31 | 31 | 217 | 0.933 | 0.34 | 2.4 | 10 | 250 | 539 | 264 | 617 | 70 | 72 | 146 |
| 36 | FNA0091850036 | 02/26/22 | 23 | 410 | 9430 | 3820 | DNK810410 | 72 | 76 | 30 | 31 | 217 | 0.933 | 0.34 | 2.5 | 10 | 243 | 529 | 263 | 604 | 70 | 72 | 146 |
| 37 | FNA0091850037 | 02/26/22 | 23 | 410 | 9430 | 3824 | DNK810410 | 73 | 76 | 31 | 31 | 217 | 0.933 | 0.34 | 2.5 | 10 | 243 | 529 | 263 | 604 | 70 | 72 | 146 |
| 38 | FNA0091850038 | 02/26/22 | 23 | 410 | 9430 | 3820 | DNK810410 | 73 | 76 | 31 | 31 | 217 | 0.933 | 0.34 | 2.5 | 10 | 243 | 529 | 263 | 604 | 70 | 72 | 146 |
| 39 | FNA0091850039 | 02/26/22 | 23 | 410 | 9430 | 3820 | DNK810410 | 74 | 76 | 31 | 32 | 217 | 0.933 | 0.34 | 2.5 | 10 | 243 | 529 | 263 | 604 | 70 | 72 | 146 |
| 40 | FNA0091850040 | 02/26/22 | 23 | 410 | 9430 | 3814 | DNK810410 | 73 | 76 | 31 | 31 | 217 | 0.933 | 0.34 | 2.5 | 10 | 243 | 529 | 263 | 604 | 70 | 72 | 146 |
| 41 | FNA0091850041 | 02/26/22 | 23 | 410 | 9430 | 3816 | DNK810410 | 74 | 77 | 30 | 32 | 217 | 0.933 | 0.34 | 2.5 | 10 | 254 | 540 | 274 | 609 | 69 | 66 | 151 |
| 42 | FNA0091850042 | 02/26/22 | 23 | 410 | 9430 | 3812 | DNK810410 | 74 | 77 | 31 | 32 | 217 | 0.933 | 0.34 | 2.5 | 10 | 254 | 540 | 274 | 609 | 69 | 66 | 151 |
| 43 | FNA0091850043 | 02/26/22 | 23 | 410 | 9430 | 3812 | DNK810410 | 76 | 78 | 30 | 28 | 217 | 0.933 | 0.34 | 2.5 | 10 | 254 | 540 | 274 | 609 | 69 | 66 | 151 |
| 44 | FNA0091850044 | 02/26/22 | 23 | 410 | 9430 | 3816 | DNK810410 | 75 | 77 | 29 | 31 | 217 | 0.933 | 0.34 | 2.4 | 10 | 254 | 540 | 274 | 609 | 69 | 66 | 151 |
| 45 | FNA0091850045 | 02/26/22 | 23 | 410 | 9430 | 3814 | DNK810410 | 78 | 78 | 29 | 30 | 217 | 0.933 | 0.34 | 2.5 | 10 | 254 | 540 | 274 | 609 | 69 | 66 | 151 |
| 46 | FNA0091850046 | 02/27/22 | 23 | 410 | 9430 | 3810 | DNK810410 | 73 | 76 | 29 | 30 | 217 | 0.933 | 0.34 | 2.4 | 10 | 250 | 542 | 261 | 623 | 69 | 66 | 151 |
| 47 | FNA0091850047 | 02/27/22 | 23 | 410 | 9430 | 3814 | DNK810410 | 78 | 79 | 29 | 32 | 217 | 0.933 | 0.34 | 2.4 | 10 | 250 | 542 | 261 | 623 | 69 | 66 | 151 |
| 48 | FNA0091850048 | 02/27/22 | 23 | 410 | 9430 | 3816 | DNK810410 | 78 | 79 | 28 | 32 | 217 | 0.933 | 0.34 | 2.4 | 10 | 250 | 542 | 261 | 623 | 69 | 66 | 151 |
| 49 | FNA0091850049 | 02/27/22 | 23 | 410 | 9430 | 3814 | DNK810410 | 76 | 78 | 27 | 31 | 217 | 0.933 | 0.34 | 2.4 | 10 | 250 | 542 | 261 | 623 | 69 | 66 | 151 |
| 50 | FNA0091850050 | 02/27/22 | 23 | 410 | 9430 | 3810 | DNK810410 | 78 | 79 | 28 | 31 | 217 | 0.933 | 0.34 | 2.4 | 10 | 250 | 542 | 261 | 623 | 69 | 66 | 151 |
| 51 | FNA0091850051 | 02/27/22 | 23 | 410 | 9430 | 3810 | DNK810410 | 73 | 77 | 30 | 31 | 217 | 0.933 | 0.34 | 2.8 | 10 | 240 | 560 | 267 | 608 | 68 | 68 | 149 |
| 52 | FNA0091850052 | 02/27/22 | 23 | 410 | 9430 | 3818 | DNK810410 | 73 | 77 | 27 | 31 | 217 | 0.933 | 0.34 | 2.8 | 10 | 240 | 560 | 267 | 608 | 68 | 68 | 149 |
| 53 | FNA0091850053 | 02/27/22 | 23 | 410 | 9430 | 3812 | DNK810410 | 74 | 77 | 29 | 30 | 217 | 0.933 | 0.34 | 2.8 | 10 | 240 | 560 | 267 | 608 | 68 | 68 | 149 |
| 54 | FNA0091850054 | 02/27/22 | 23 | 410 | 9430 | 3814 | DNK810410 | 73 | 77 | 28 | 29 | 217 | 0.933 | 0.34 | 2.5 | 10 | 240 | 560 | 267 | 608 | 68 | 68 | 149 |
| 55 | FNA0091850055 | 02/27/22 | 23 | 410 | 9430 | 3810 | 21KB544 | 72 | 77 | 27 | 31 | 192 | 0.935 | 0.44 | 2.8 | 10 | 236 | 538 | 261 | 614 | 68 | 68 | 149 |
| 56 | FNA0091850056 | 02/27/22 | 23 | 410 | 9430 | 3804 | 21KB544 | 72 | 77 | 28 | 31 | 192 | 0.935 | 0.44 | 2.7 | 10 | 236 | 538 | 261 | 614 | 68 | 68 | 149 |
| 57 | FNA0091850057 | 02/27/22 | 23 | 410 | 9430 | 3804 | 21KB544 | 73 | 77 | 27 | 32 | 192 | 0.935 | 0.44 | 2.7 | 10 | 236 | 538 | 261 | 614 | 68 | 68 | 149 |
| 58 | FNA0091850058 | 02/27/22 | 23 | 410 | 9430 | 3806 | 21KB544 | 76 | 77 | 28 | 33 | 192 | 0.935 | 0.44 | 2.7 | 10 | 236 | 538 | 261 | 614 | 68 | 68 | 149 |
| 59 | FNA0091850059 | 02/27/22 | 23 | 410 | 9430 | 3802 | 21KB544 | 74 | 76 | 28 | 33 | 192 | 0.935 | 0.44 | 2.5 | 10 | 236 | 538 | 261 | 614 | 68 | 68 | 149 |
| 60 | FNA0091850060 | 02/27/22 | 23 | 410 | 9430 | 3798 | 21KB544 | 72 | 76 | 28 | 29 | 192 | 0.935 | 0.44 | 2.7 | 10 | 236 | 538 | 261 | 614 | 68 | 68 | 149 |
| 61 | FNA0091850061 | 02/27/22 | 23 | 410 | 9430 | 3802 | 21KB544 | 75 | 76 | 26 | 35 | 192 | 0.934 | 0.44 | 2.6 | 10 | 240 | 550 | 246 | 583 | 65 | 67 | 150 |
| 62 | FNA0091850062 | 02/27/22 | 23 | 410 | 9430 | 3804 | 21KB544 | 74 | 76 | 26 | 29 | 192 | 0.934 | 0.44 | 2.6 | 10 | 240 | 550 | 246 | 583 | 65 | 67 | 150 |
| 63 | FNA0091850063 | 02/27/22 | 23 | 410 | 9430 | 3808 | 21KB544 | 74 | 76 | 26 | 32 | 192 | 0.934 | 0.44 | 2.6 | 10 | 240 | 550 | 246 | 583 | 65 | 67 | 150 |
| 64 | FNA0091850064 | 02/28/22 | 23 | 410 | 9430 | 3810 | 21KB544 | 74 | 77 | 30 | 28 | 192 | 0.934 | 0.44 | 2.6 | 10 | 240 | 550 | 246 | 583 | 65 | 67 | 150 |
| 65 | FNA0091850065 | 02/28/22 | 23 | 410 | 9430 | 3810 | 21KB544 | 75 | 77 | 29 | 30 | 192 | 0.934 | 0.44 | 2.6 | 10 | 240 | 550 | 246 | 583 | 65 | 67 | 150 |
| 66 | FNA0091850066 | 02/28/22 | 23 | 410 | 9430 | 3806 | 21KB544 | 77 | 79 | 29 | 29 | 192 | 0.934 | 0.44 | 2.7 | 10 | 242 | 541 | 249 | 578 | 65 | 67 | 150 |
| 67 | FNA0091850067 | 02/28/22 | 23 | 410 | 9430 | 3808 | 21KB544 | 73 | 77 | 29 | 34 | 192 | 0.934 | 0.44 | 2.7 | 10 | 242 | 541 | 249 | 578 | 65 | 67 | 150 |
| 68 | FNA0091850068 | 02/28/22 | 23 | 410 | 9430 | 3810 | 21KB544 | 77 | 78 | 29 | 28 | 192 | 0.934 | 0.44 | 2.7 | 10 | 242 | 541 | 249 | 578 | 65 | 67 | 150 |
| 69 | FNA0091850069 | 02/28/22 | 23 | 410 | 9430 | 3814 | 21KB544 | 72 | 76 | 30 | 29 | 192 | 0.934 | 0.44 | 2.5 | 10 | 242 | 541 | 249 | 578 | 65 | 67 | 150 |
| 70 | FNA0091850070 | 02/28/22 | 23 | 410 | 9430 | 3814 | 21KB544 | 72 | 76 | 31 | 30 | 192 | 0.934 | 0.44 | 2.7 | 10 | 242 | 541 | 249 | 578 | 65 | 67 | 150 |
| 71 | FNA0091850071 | 02/28/22 | 23 | 410 | 9430 | 3800 | 21KB544 | 73 | 76 | 30 | 31 | 192 | 0.934 | 0.44 | 2.4 | 10 | 245 | 530 | 267 | 614 | 70 | 66 | 154 |
| 72 | FNA0091850072 | 02/28/22 | 23 | 410 | 9430 | 3826 | 21KB544 | 73 | 76 | 31 | 32 | 192 | 0.934 | 0.44 | 2.4 | 10 | 245 | 530 | 267 | 614 | 70 | 66 | 154 |
| 73 | FNA0091850073 | 02/28/22 | 23 | 410 | 9430 | 3824 | 21KB544 | 72 | 76 | 32 | 32 | 192 | 0.934 | 0.44 | 2.4 | 10 | 245 | 530 | 267 | 614 | 70 | 66 | 154 |
| 74 | FNA0091850074 | 02/28/22 | 23 | 410 | 9430 | 3828 | 21KB544 | 73 | 77 | 30 | 32 | 192 | 0.934 | 0.44 | 2.4 | 10 | 245 | 530 | 267 | 614 | 70 | 66 | 154 |

| # | Roll Number | Prod. Date | Width (ft) | Length (ft) | Area (sqft) | Weight (lb) | Resin Lot# | ASTM D5994 Thickness-Min (mil) | ASTM D5994 Thickness-Avg (mil) | ASTM D7466 Asperity (top) (mil) | ASTM D7466 Asperity (bottom) (mil) | ASTM D8117 OIT (minut) | ASTM D792 Density (g/cc) | ASTM D1248 Melt Flow (g/10) | ASTM D4218 Carbon Content (%) | ASTM D5596 Category 1 Disp. (Categ) | ASTM D6693 Tensile Break Str (MD) (ppi) | ASTM D6693 Break Elong (MD) (%) | ASTM D6693 Tensile Break Str (TD) (ppi) | ASTM D6693 Break Elong (TD) (%) | ASTM D1004 Tear Strength (MD) (lb) | ASTM D1004 Tear Strength (TD) (lb) | ASTM D4833 Puncture Resistance (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 75 | FNA0091850075 | 02/28/22 | 23 | 410 | 9430 | 3836 | 21KB544 | 73 | 76 | 32 | 30 | 192 | 0.934 | 0.44 | 2.4 | 10 | 245 | 530 | 267 | 614 | 70 | 66 | 154 |
| 76 | FNA0091850076 | 02/28/22 | 23 | 410 | 9430 | 3836 | 21KB544 | 71 | 76 | 31 | 33 | 192 | 0.934 | 0.44 | 2.6 | 10 | 264 | 557 | 252 | 580 | 70 | 66 | 154 |
| 77 | FNA0091850077 | 02/28/22 | 23 | 410 | 9430 | 3836 | 21KB544 | 72 | 76 | 31 | 32 | 192 | 0.934 | 0.44 | 2.6 | 10 | 264 | 557 | 252 | 580 | 70 | 66 | 154 |
| 78 | FNA0091850078 | 02/28/22 | 23 | 410 | 9430 | 3832 | 21KB544 | 77 | 78 | 28 | 31 | 192 | 0.934 | 0.44 | 2.6 | 10 | 264 | 557 | 252 | 580 | 70 | 66 | 154 |
| 79 | FNA0091850079 | 02/28/22 | 23 | 410 | 9430 | 3840 | 21KB544 | 76 | 77 | 30 | 32 | 192 | 0.934 | 0.44 | 2.6 | 10 | 264 | 557 | 252 | 580 | 70 | 66 | 154 |
| 80 | FNA0091850080 | 02/28/22 | 23 | 410 | 9430 | 3850 | 21KB544 | 74 | 78 | 29 | 34 | 192 | 0.934 | 0.44 | 2.6 | 10 | 264 | 557 | 252 | 580 | 70 | 66 | 154 |
| 81 | FNA0091850081 | 03/01/22 | 23 | 410 | 9430 | 3852 | 21KB544 | 75 | 79 | 30 | 33 | 192 | 0.935 | 0.44 | 2.3 | 10 | 243 | 544 | 249 | 603 | 66 | 65 | 154 |
| 82 | FNA0091850083 | 03/01/22 | 23 | 410 | 9430 | 3826 | 21KB544 | 74 | 77 | 30 | 33 | 192 | 0.935 | 0.44 | 2.3 | 10 | 243 | 544 | 249 | 603 | 66 | 65 | 154 |
| 83 | FNA0091850084 | 03/01/22 | 23 | 410 | 9430 | 3828 | 21KB544 | 72 | 76 | 30 | 33 | 192 | 0.935 | 0.44 | 2.3 | 10 | 243 | 544 | 249 | 603 | 66 | 65 | 154 |
| 84 | FNA0091850085 | 03/01/22 | 23 | 410 | 9430 | 3830 | 21KB544 | 75 | 79 | 28 | 32 | 192 | 0.935 | 0.44 | 2.7 | 10 | 243 | 544 | 249 | 603 | 66 | 65 | 154 |
| 85 | FNA0091850086 | 03/01/22 | 23 | 410 | 9430 | 3824 | 21KB544 | 72 | 78 | 29 | 31 | 192 | 0.935 | 0.44 | 2.3 | 10 | 243 | 544 | 249 | 603 | 66 | 65 | 154 |
| 86 | FNA0091850087 | 03/01/22 | 23 | 410 | 9430 | 3834 | 21KB544 | 73 | 79 | 29 | 33 | 192 | 0.935 | 0.44 | 2.4 | 10 | 244 | 533 | 257 | 600 | 66 | 65 | 154 |
| 87 | FNA0091850088 | 03/01/22 | 23 | 410 | 9430 | 3828 | 21KB544 | 75 | 78 | 27 | 34 | 192 | 0.935 | 0.44 | 2.4 | 10 | 244 | 533 | 257 | 600 | 66 | 65 | 154 |
| 88 | FNA0091850089 | 03/01/22 | 23 | 410 | 9430 | 3822 | 21KB544 | 74 | 79 | 29 | 35 | 192 | 0.935 | 0.44 | 2.4 | 10 | 244 | 533 | 257 | 600 | 66 | 65 | 154 |
| 89 | FNA0091850090 | 03/01/22 | 23 | 410 | 9430 | 3824 | 21KB544 | 74 | 79 | 30 | 30 | 192 | 0.935 | 0.44 | 2.4 | 10 | 244 | 533 | 257 | 600 | 66 | 65 | 154 |
| 90 | FNA0091850091 | 03/01/22 | 23 | 410 | 9430 | 3820 | 21KB544 | 71 | 77 | 31 | 29 | 192 | 0.935 | 0.44 | 2.4 | 10 | 244 | 533 | 257 | 600 | 66 | 65 | 154 |
| 91 | FNA0091850092 | 03/01/22 | 23 | 410 | 9430 | 3822 | 21KB544 | 74 | 78 | 28 | 33 | 192 | 0.933 | 0.44 | 2.4 | 10 | 249 | 535 | 250 | 587 | 70 | 68 | 154 |
| 92 | FNA0091850093 | 03/01/22 | 23 | 410 | 9430 | 3818 | 21KB544 | 71 | 79 | 27 | 34 | 192 | 0.933 | 0.44 | 2.4 | 10 | 249 | 535 | 250 | 587 | 70 | 68 | 154 |
| 93 | FNA0091850094 | 03/01/22 | 23 | 410 | 9430 | 3816 | 21KB544 | 73 | 79 | 33 | 27 | 192 | 0.933 | 0.44 | 2.4 | 10 | 249 | 535 | 250 | 587 | 70 | 68 | 154 |
| 94 | FNA0091850095 | 03/01/22 | 23 | 410 | 9430 | 3832 | 21KB544 | 72 | 77 | 30 | 29 | 192 | 0.933 | 0.44 | 2.2 | 10 | 249 | 535 | 250 | 587 | 70 | 68 | 154 |
| 95 | FNA0091850096 | 03/01/22 | 23 | 410 | 9430 | 3834 | 21KB544 | 72 | 77 | 30 | 29 | 192 | 0.933 | 0.44 | 2.4 | 10 | 249 | 535 | 250 | 587 | 70 | 68 | 154 |
| 96 | FNA0091850097 | 03/01/22 | 23 | 410 | 9430 | 3822 | 21KB544 | 72 | 77 | 27 | 30 | 192 | 0.933 | 0.44 | 2.5 | 10 | 253 | 531 | 266 | 609 | 70 | 68 | 154 |
| 97 | FNA0091850098 | 03/02/22 | 23 | 410 | 9430 | 3830 | 21KB544 | 72 | 77 | 29 | 29 | 192 | 0.933 | 0.44 | 2.5 | 10 | 253 | 531 | 266 | 609 | 70 | 68 | 154 |
| 98 | FNA0091850099 | 03/02/22 | 23 | 410 | 9430 | 3828 | 21KB544 | 73 | 77 | 27 | 30 | 192 | 0.933 | 0.44 | 2.5 | 10 | 253 | 531 | 266 | 609 | 70 | 68 | 154 |
| 99 | FNA0091850100 | 03/02/22 | 23 | 410 | 9430 | 3832 | 21KB544 | 73 | 78 | 27 | 29 | 192 | 0.933 | 0.44 | 2.7 | 10 | 253 | 531 | 266 | 609 | 70 | 68 | 154 |
| 100 | FNA0091850101 | 03/02/22 | 23 | 410 | 9430 | 3830 | 21KB544 | 73 | 77 | 29 | 29 | 192 | 0.933 | 0.44 | 2.5 | 10 | 253 | 531 | 266 | 609 | 70 | 68 | 154 |
| 101 | FNA0091850102 | 03/02/22 | 23 | 410 | 9430 | 3814 | 21KB544 | 76 | 79 | 31 | 31 | 192 | 0.934 | 0.44 | 2.5 | 10 | 256 | 546 | 273 | 610 | 72 | 72 | 153 |
| 102 | FNA0091850103 | 03/02/22 | 23 | 410 | 9430 | 3844 | 21KB544 | 73 | 76 | 32 | 33 | 192 | 0.934 | 0.44 | 2.5 | 10 | 256 | 546 | 273 | 610 | 72 | 72 | 153 |
| 103 | FNA0091850104 | 03/02/22 | 23 | 410 | 9430 | 3834 | 21KB544 | 72 | 76 | 32 | 33 | 192 | 0.934 | 0.44 | 2.5 | 10 | 256 | 546 | 273 | 610 | 72 | 72 | 153 |
| 104 | FNA0091850105 | 03/02/22 | 23 | 410 | 9430 | 3836 | 21KB544 | 74 | 79 | 33 | 33 | 192 | 0.934 | 0.44 | 2.6 | 10 | 256 | 546 | 273 | 610 | 72 | 72 | 153 |
| 105 | FNA0091850106 | 03/02/22 | 23 | 410 | 9430 | 3828 | 21KB544 | 76 | 80 | 32 | 31 | 192 | 0.934 | 0.44 | 2.5 | 10 | 256 | 546 | 273 | 610 | 72 | 72 | 153 |
| 106 | FNA0091850107 | 03/02/22 | 23 | 410 | 9430 | 3832 | 21KB544 | 73 | 76 | 31 | 33 | 192 | 0.934 | 0.44 | 2.4 | 10 | 263 | 603 | 250 | 538 | 72 | 72 | 153 |
| 107 | FNA0091850108 | 03/02/22 | 23 | 410 | 9430 | 3832 | 21KB544 | 73 | 77 | 28 | 34 | 192 | 0.934 | 0.44 | 2.4 | 10 | 263 | 603 | 250 | 538 | 72 | 72 | 153 |
| 108 | FNA0091850109 | 03/02/22 | 23 | 410 | 9430 | 3828 | 21KB544 | 73 | 76 | 32 | 32 | 192 | 0.934 | 0.44 | 2.4 | 10 | 263 | 603 | 250 | 538 | 72 | 72 | 153 |
| 109 | FNA0091850110 | 03/02/22 | 23 | 410 | 9430 | 3832 | 21KB544 | 74 | 76 | 31 | 34 | 192 | 0.934 | 0.44 | 2.5 | 10 | 263 | 603 | 250 | 538 | 72 | 72 | 153 |
| 110 | FNA0091850111 | 03/02/22 | 23 | 410 | 9430 | 3832 | 21KB544 | 72 | 77 | 33 | 32 | 192 | 0.934 | 0.44 | 2.4 | 10 | 263 | 603 | 250 | 538 | 72 | 72 | 153 |
| 111 | FNA0091850112 | 03/02/22 | 23 | 410 | 9430 | 3852 | 21KB544 | 72 | 78 | 28 | 32 | 192 | 0.934 | 0.44 | 2.6 | 10 | 250 | 536 | 263 | 606 | 73 | 70 | 154 |
| 112 | FNA0091850113 | 03/02/22 | 23 | 410 | 9430 | 3850 | 21KB544 | 73 | 78 | 26 | 31 | 192 | 0.934 | 0.44 | 2.6 | 10 | 250 | 536 | 263 | 606 | 73 | 70 | 154 |
| 113 | FNA0091850114 | 03/02/22 | 23 | 410 | 9430 | 3850 | 21KB544 | 73 | 77 | 29 | 31 | 192 | 0.934 | 0.44 | 2.6 | 10 | 250 | 536 | 263 | 606 | 73 | 70 | 154 |
| 114 | FNA0091850115 | 03/03/22 | 23 | 410 | 9430 | 3850 | 21KB544 | 73 | 77 | 27 | 32 | 192 | 0.934 | 0.44 | 3.4 | 10 | 250 | 536 | 263 | 606 | 73 | 70 | 154 |
| 115 | FNA0091850116 | 03/03/22 | 23 | 410 | 9430 | 3850 | 21KB544 | 75 | 78 | 26 | 31 | 192 | 0.934 | 0.44 | 2.6 | 10 | 250 | 536 | 263 | 606 | 73 | 70 | 154 |
| 116 | FNA0091850117 | 03/03/22 | 23 | 410 | 9430 | 3837 | 21KB544 | 73 | 77 | 28 | 31 | 192 | 0.934 | 0.44 | 2.5 | 10 | 259 | 547 | 262 | 615 | 73 | 70 | 154 |

| # | Roll Number | Prod. Date | Width (ft) | Length (ft) | Area (sqft) | Weight (lb) | Resin Lot# | ASTM D5994 Thickness-Min mil | ASTM D5994 Thickness-Avg mil | ASTM D7466 Asperity (top) mil | ASTM D7466 Asperity (bottom) mil | ASTM D8117 OIT minut | ASTM D792 Density g/cc | ASTM D1248 Melt Flow g/10 | ASTM D4218 Carbon Content % | ASTM D5596 Category 1 Disp. Categ | ASTM D6693 Tensile Break Str (MD) ppi | ASTM D6693 Break Elong (MD) % | ASTM D6693 Tensile Break Str (TD) ppi | ASTM D1004 Break Elong (TD) % | ASTM D1004 Tear Strength (MD) lb | ASTM D1004 Tear Strength (TD) lb | ASTM D4833 Puncture Resistance lb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 117 | FNA0091850118 | 03/03/22 | 23 | 410 | 9430 | 3862 | 21KB544 | 73 | 79 | 33 | 33 | 217 | 0.936 | 0.34 | 2.7 | 10 | 237 | 541 | 252 | 594 | 62 | 63 | 148 |
| 118 | FNA0091850119 | 03/03/22 | 23 | 410 | 9430 | 3856 | 21KB544 | 72 | 78 | 32 | 27 | 217 | 0.936 | 0.34 | 2.7 | 10 | 237 | 541 | 252 | 594 | 62 | 63 | 148 |

Ryan Steele, Lab Manager

For Questions, Please Contact: Lab Manager, Fernley
Ryan Steele
775-835-8282
Ext 2015

# Geomembrane Quality Certification

**Customer:** Newmont Mining
**Project:** Cripple Creek
**Destination:** Cripple Creek, CO
**Report Date:** 13-Sep-2022 10:12 AM

**S.O.#** SO00016473
**Item Number:** FG-LDMSDS080BBBEG
**Liner Type:** LLDPE DS MicroSpike 80mil Black GM17
**Roll Count:** 56 (From 1 To 56)

| | | | | | | | | ASTM D5994 | | ASTM D7466 | | ASTM D8117 | ASTM D792 | ASTM D1238 | ASTM D4218 | ASTM D5596 | ASTM D6693 | | | | ASTM D1004 | | ASTM D4833 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Roll Number | Prod. Date | Width (ft) | Length (ft) | Area (sqft) | Weight (lb) | Resin Lot# | Thickness-Min | Thickness-Avg | Asperity (top) | Asperity (bottom) | OIT | Density | Melt Flow | Carbon Content | Category 1 Disp. | Tensile Break Str (MD) | Break Elong (MD) | Tensile Break Str (TD) | Break Elong (TD) | Tear Strength (MD) | Tear Strength (TD) | Puncture Resistance |
| | | | | | | | | mil | mil | mil | mil | minut | g/cc | g/10 | % | Categ | ppi | % | ppi | % | lb | lb | lb |
| 1 | FND0103600003 | 09/09/22 | 23 | 410 | 9430 | 3860 | DPF811480 | 77 | 79 | 26 | 31 | 183 | 0.933 | 0.34 | 2.3 | 10 | 270 | 548 | 257 | 617 | 66 | 68 | 154 |
| 2 | FND0103600004 | 09/09/22 | 23 | 410 | 9430 | 3812 | DPF811480 | 77 | 79 | 24 | 32 | 183 | 0.933 | 0.34 | 2.3 | 10 | 270 | 548 | 257 | 617 | 66 | 68 | 154 |
| 3 | FND0103600005 | 09/09/22 | 23 | 410 | 9430 | 3808 | DPF811480 | 77 | 79 | 20 | 30 | 183 | 0.933 | 0.34 | 2.3 | 10 | 270 | 548 | 257 | 617 | 66 | 68 | 154 |
| 4 | FND0103600006 | 09/09/22 | 23 | 410 | 9430 | 3810 | DPF811480 | 75 | 79 | 30 | 29 | 183 | 0.933 | 0.34 | 2.3 | 10 | 270 | 548 | 257 | 617 | 66 | 68 | 154 |
| 5 | FND0103600007 | 09/09/22 | 23 | 410 | 9430 | 3810 | DPF811480 | 75 | 79 | 26 | 31 | 183 | 0.933 | 0.34 | 2.3 | 10 | 270 | 548 | 257 | 617 | 66 | 68 | 154 |
| 6 | FND0103600008 | 09/10/22 | 23 | 410 | 9430 | 3812 | DPF811480 | 74 | 78 | 29 | 28 | 183 | 0.933 | 0.34 | 2.4 | 10 | 273 | 574 | 265 | 613 | 66 | 62 | 154 |
| 7 | FND0103600009 | 09/10/22 | 23 | 410 | 9430 | 3818 | DPF811480 | 74 | 77 | 25 | 36 | 183 | 0.933 | 0.34 | 2.4 | 10 | 273 | 574 | 265 | 613 | 66 | 62 | 154 |
| 8 | FND0103600010 | 09/10/22 | 23 | 410 | 9430 | 3816 | DPF811480 | 77 | 80 | 25 | 26 | 183 | 0.933 | 0.34 | 2.4 | 10 | 273 | 574 | 265 | 613 | 66 | 62 | 154 |
| 9 | FND0103600011 | 09/10/22 | 23 | 410 | 9430 | 3820 | DPF811480 | 75 | 78 | 24 | 28 | 183 | 0.933 | 0.34 | 2.4 | 10 | 273 | 574 | 265 | 613 | 66 | 62 | 154 |
| 10 | FND0103600012 | 09/10/22 | 23 | 410 | 9430 | 3822 | DPF811480 | 75 | 78 | 24 | 27 | 183 | 0.933 | 0.34 | 2.4 | 10 | 273 | 574 | 265 | 613 | 66 | 62 | 154 |
| 11 | FND0103600013 | 09/10/22 | 23 | 410 | 9430 | 3818 | DPF811480 | 77 | 79 | 25 | 33 | 183 | 0.933 | 0.34 | 2.4 | 10 | 261 | 551 | 265 | 609 | 66 | 65 | 160 |
| 12 | FND0103600014 | 09/10/22 | 23 | 410 | 9430 | 3824 | DPF811480 | 76 | 78 | 27 | 31 | 183 | 0.933 | 0.34 | 2.4 | 10 | 261 | 551 | 265 | 609 | 66 | 65 | 160 |
| 13 | FND0103600015 | 09/10/22 | 23 | 410 | 9430 | 3830 | DPF811480 | 76 | 79 | 25 | 27 | 183 | 0.933 | 0.34 | 2.4 | 10 | 261 | 551 | 265 | 609 | 66 | 65 | 160 |
| 14 | FND0103600016 | 09/10/22 | 23 | 410 | 9430 | 3820 | DPF811480 | 77 | 79 | 28 | 28 | 183 | 0.933 | 0.34 | 2.4 | 10 | 261 | 551 | 265 | 609 | 66 | 65 | 160 |
| 15 | FND0103600017 | 09/10/22 | 23 | 410 | 9430 | 3818 | DPF811480 | 76 | 79 | 25 | 29 | 183 | 0.933 | 0.34 | 2.4 | 10 | 261 | 551 | 265 | 609 | 66 | 65 | 160 |
| 16 | FND0103600018 | 09/10/22 | 23 | 410 | 9430 | 3798 | DPF811480 | 77 | 79 | 27 | 27 | 183 | 0.933 | 0.34 | 2.4 | 10 | 262 | 542 | 272 | 631 | 66 | 65 | 160 |
| 17 | FND0103600019 | 09/10/22 | 23 | 410 | 9430 | 3810 | DPF811480 | 74 | 79 | 27 | 27 | 183 | 0.933 | 0.34 | 2.4 | 10 | 262 | 542 | 272 | 631 | 66 | 65 | 160 |
| 18 | FND0103600020 | 09/10/22 | 23 | 410 | 9430 | 3810 | DPF811480 | 77 | 79 | 29 | 27 | 183 | 0.933 | 0.34 | 2.4 | 10 | 262 | 542 | 272 | 631 | 66 | 65 | 160 |
| 19 | FND0103600021 | 09/10/22 | 23 | 410 | 9430 | 3812 | DPF811480 | 76 | 80 | 27 | 34 | 183 | 0.933 | 0.34 | 2.3 | 10 | 262 | 542 | 272 | 631 | 66 | 65 | 160 |
| 20 | FND0103600022 | 09/11/22 | 23 | 410 | 9430 | 3816 | DPF811480 | 77 | 78 | 25 | 32 | 183 | 0.933 | 0.34 | 2.3 | 10 | 262 | 542 | 272 | 631 | 66 | 65 | 160 |
| 21 | FND0103600023 | 09/11/22 | 23 | 410 | 9430 | 3816 | DPF811480 | 76 | 78 | 27 | 30 | 183 | 0.934 | 0.34 | 2.1 | 10 | 269 | 556 | 267 | 613 | 68 | 70 | 158 |
| 22 | FND0103600024 | 09/11/22 | 23 | 410 | 9430 | 3812 | DPF811480 | 76 | 78 | 27 | 30 | 183 | 0.934 | 0.34 | 2.1 | 10 | 269 | 556 | 267 | 613 | 68 | 70 | 158 |
| 23 | FND0103600025 | 09/11/22 | 23 | 410 | 9430 | 3812 | DPF811480 | 76 | 79 | 26 | 27 | 183 | 0.934 | 0.34 | 2.1 | 10 | 269 | 556 | 267 | 613 | 68 | 70 | 158 |
| 24 | FND0103600026 | 09/11/22 | 23 | 410 | 9430 | 3812 | DPF811480 | 76 | 79 | 27 | 29 | 183 | 0.934 | 0.34 | 2.2 | 10 | 269 | 556 | 267 | 613 | 68 | 70 | 158 |
| 25 | FND0103600027 | 09/11/22 | 23 | 410 | 9430 | 3810 | DPF811480 | 76 | 78 | 26 | 30 | 183 | 0.934 | 0.34 | 2.2 | 10 | 269 | 556 | 267 | 613 | 68 | 70 | 158 |
| 26 | FND0103600028 | 09/11/22 | 23 | 410 | 9430 | 3810 | DPF811480 | 77 | 79 | 27 | 29 | 183 | 0.934 | 0.34 | 2.2 | 10 | 262 | 563 | 262 | 605 | 68 | 70 | 158 |
| 27 | FND0103600029 | 09/11/22 | 23 | 410 | 9430 | 3808 | DPF811480 | 76 | 78 | 27 | 28 | 183 | 0.934 | 0.34 | 2.2 | 10 | 262 | 563 | 262 | 605 | 68 | 70 | 158 |
| 28 | FND0103600030 | 09/11/22 | 23 | 410 | 9430 | 3806 | DPF811480 | 75 | 78 | 27 | 29 | 183 | 0.934 | 0.34 | 2.2 | 10 | 262 | 563 | 262 | 605 | 68 | 70 | 158 |
| 29 | FND0103600031 | 09/11/22 | 23 | 410 | 9430 | 3800 | DPF811480 | 78 | 80 | 25 | 30 | 183 | 0.934 | 0.34 | 2.3 | 10 | 262 | 563 | 262 | 605 | 68 | 70 | 158 |
| 30 | FND0103600032 | 09/11/22 | 23 | 410 | 9430 | 3998 | DPF811480 | 74 | 78 | 25 | 28 | 183 | 0.934 | 0.34 | 2.2 | 10 | 262 | 563 | 262 | 605 | 68 | 70 | 158 |
| 31 | FND0103600033 | 09/11/22 | 23 | 410 | 9430 | 3796 | DPF811480 | 75 | 79 | 24 | 24 | 183 | 0.934 | 0.34 | 2.3 | 10 | 263 | 547 | 271 | 620 | 68 | 66 | 159 |
| 32 | FND0103600034 | 09/11/22 | 23 | 410 | 9430 | 3802 | DPF811480 | 75 | 78 | 25 | 26 | 183 | 0.934 | 0.34 | 2.3 | 10 | 263 | 547 | 271 | 620 | 68 | 66 | 159 |

| # | Roll Number | Prod. Date | Width (ft) | Length (ft) | Area (sqft) | Weight (lb) | Resin Lot# | ASTM D5994 Thickness-Min | ASTM D5994 Thickness-Avg | ASTM D7466 Asperity (top) | ASTM D7466 Asperity (bottom) | ASTM D8117 OIT | ASTM D792 Density | ASTM D1238 Melt Flow | ASTM D4218 Carbon Content | ASTM D5596 Category 1 Disp. | ASTM D6693 Tensile Break Str (MD) | ASTM D6693 Break Elong (MD) | ASTM D6693 Tensile Break Str (TD) | ASTM D6693 Break Elong (TD) | ASTM D1004 Tear Strength (MD) | ASTM D1004 Tear Strength (TD) | ASTM D4833 Puncture Resistance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | mil | mil | mil | mil | minut | g/cc | g/10 | % | Categ | ppi | % | ppi | % | lb | lb | lb |
| 33 | FND0103600035 | 09/11/22 | 23 | 410 | 9430 | 3798 | DPF811480 | 74 | 78 | 26 | 28 | 183 | 0.934 | 0.34 | 2.3 | 10 | 263 | 547 | 271 | 620 | 68 | 66 | 159 |
| 34 | FND0103600036 | 09/11/22 | 23 | 410 | 9430 | 3808 | DPF811480 | 74 | 79 | 28 | 27 | 183 | 0.934 | 0.34 | 2.2 | 10 | 263 | 547 | 271 | 620 | 68 | 66 | 159 |
| 35 | FND0103600037 | 09/12/22 | 23 | 410 | 9430 | 3812 | DPF811480 | 75 | 79 | 26 | 27 | 183 | 0.934 | 0.34 | 2.2 | 10 | 263 | 547 | 271 | 620 | 68 | 66 | 159 |
| 36 | FND0103600038 | 09/12/22 | 23 | 410 | 9430 | 3816 | DPF811480 | 74 | 78 | 29 | 28 | 183 | 0.934 | 0.34 | 2.3 | 10 | 260 | 546 | 265 | 607 | 68 | 66 | 159 |
| 37 | FND0103600039 | 09/12/22 | 23 | 410 | 9430 | 3812 | DPF811480 | 75 | 79 | 25 | 32 | 183 | 0.934 | 0.34 | 2.3 | 10 | 260 | 546 | 265 | 607 | 68 | 66 | 159 |
| 38 | FND0103600040 | 09/12/22 | 23 | 410 | 9430 | 3820 | DPF811480 | 77 | 79 | 26 | 27 | 183 | 0.934 | 0.34 | 2.3 | 10 | 260 | 546 | 265 | 607 | 68 | 66 | 159 |
| 39 | FND0103600041 | 09/12/22 | 23 | 410 | 9430 | 3820 | DPF811480 | 75 | 78 | 27 | 31 | 183 | 0.934 | 0.34 | 2.3 | 10 | 260 | 546 | 265 | 607 | 68 | 66 | 159 |
| 40 | FND0103600042 | 09/12/22 | 23 | 410 | 9430 | 3822 | DPF811480 | 74 | 79 | 25 | 33 | 183 | 0.934 | 0.34 | 2.3 | 10 | 260 | 546 | 265 | 607 | 68 | 66 | 159 |
| 41 | FND0103600043 | 09/12/22 | 23 | 410 | 9430 | 3818 | DPF811480 | 71 | 77 | 29 | 30 | 183 | 0.930 | 0.34 | 2.3 | 10 | 267 | 563 | 273 | 645 | 65 | 65 | 157 |
| 42 | FND0103600044 | 09/12/22 | 23 | 410 | 9430 | 3822 | DPF811480 | 76 | 79 | 25 | 29 | 183 | 0.930 | 0.34 | 2.3 | 10 | 267 | 563 | 273 | 645 | 65 | 65 | 157 |
| 43 | FND0103600045 | 09/12/22 | 23 | 410 | 9430 | 3818 | DPF811480 | 75 | 78 | 26 | 28 | 183 | 0.930 | 0.34 | 2.3 | 10 | 267 | 563 | 273 | 645 | 65 | 65 | 157 |
| 44 | FND0103600046 | 09/12/22 | 23 | 410 | 9430 | 3808 | DPF811480 | 74 | 78 | 26 | 26 | 183 | 0.930 | 0.34 | 2.3 | 10 | 267 | 563 | 273 | 645 | 65 | 65 | 157 |
| 45 | FND0103600047 | 09/12/22 | 23 | 410 | 9430 | 3808 | DPF811480 | 76 | 80 | 27 | 28 | 183 | 0.930 | 0.34 | 2.3 | 10 | 267 | 563 | 273 | 645 | 65 | 65 | 157 |
| 46 | FND0103600048 | 09/12/22 | 23 | 410 | 9430 | 3806 | DPF811480 | 76 | 78 | 29 | 29 | 183 | 0.930 | 0.34 | 2.3 | 10 | 271 | 568 | 251 | 596 | 65 | 65 | 157 |
| 47 | FND0103600049 | 09/12/22 | 23 | 410 | 9430 | 3812 | DPF811480 | 75 | 79 | 25 | 30 | 183 | 0.930 | 0.34 | 2.3 | 10 | 271 | 568 | 251 | 596 | 65 | 65 | 157 |
| 48 | FND0103600050 | 09/12/22 | 23 | 410 | 9430 | 3808 | DPF811480 | 76 | 79 | 28 | 29 | 183 | 0.930 | 0.34 | 2.3 | 10 | 271 | 568 | 251 | 596 | 65 | 65 | 157 |
| 49 | FND0103600051 | 09/12/22 | 23 | 410 | 9430 | 3816 | DPF811480 | 73 | 78 | 27 | 29 | 183 | 0.930 | 0.34 | 2.5 | 10 | 271 | 568 | 251 | 596 | 65 | 65 | 157 |
| 50 | FND0103600052 | 09/13/22 | 23 | 410 | 9430 | 3820 | DPF811480 | 75 | 80 | 26 | 29 | 183 | 0.930 | 0.34 | 2.5 | 10 | 271 | 568 | 251 | 596 | 65 | 65 | 157 |
| 51 | FND0103600053 | 09/13/22 | 23 | 410 | 9430 | 3822 | DPF811480 | 76 | 79 | 26 | 28 | 183 | 0.933 | 0.34 | 2.3 | 10 | 265 | 554 | 267 | 610 | 64 | 65 | 157 |
| 52 | FND0103600054 | 09/13/22 | 23 | 410 | 9430 | 3822 | DPF811480 | 71 | 78 | 27 | 30 | 183 | 0.933 | 0.34 | 2.3 | 10 | 265 | 554 | 267 | 610 | 64 | 65 | 157 |
| 53 | FND0103600055 | 09/13/22 | 23 | 410 | 9430 | 3848 | DPF811480 | 76 | 79 | 26 | 32 | 183 | 0.933 | 0.34 | 2.3 | 10 | 265 | 554 | 267 | 610 | 64 | 65 | 157 |
| 54 | FND0103600056 | 09/13/22 | 23 | 410 | 9430 | 3826 | DPF811480 | 75 | 78 | 26 | 28 | 183 | 0.933 | 0.34 | 2.3 | 10 | 265 | 554 | 267 | 610 | 64 | 65 | 157 |
| 55 | FND0103600057 | 09/13/22 | 23 | 410 | 9430 | 3822 | DPF811480 | 75 | 78 | 28 | 29 | 183 | 0.933 | 0.34 | 2.3 | 10 | 265 | 554 | 267 | 610 | 64 | 65 | 157 |
| 56 | FND0103600058 | 09/13/22 | 23 | 410 | 9430 | 3824 | DPF811480 | 75 | 80 | 26 | 28 | 183 | 0.933 | 0.34 | 2.5 | 10 | 260 | 538 | 272 | 622 | 64 | 65 | 157 |

Ryan Steele, Lab Manager

For Questions, Please Contact: Lab Manager, Fernley
Ryan Steele
775-835-8282
Ext 2015

# Geomembrane Quality Certification

**Customer:** Newmont Mining
**Project:** Cripple Creek
**Destination:** Cripple Creek, CO
**Report Date:** 15-Sep-2022 8:31 AM

**S.O.#** SO00016473
**Item Number:** FG-LDMSDS080BBBEG
**Liner Type:** LLDPE DS MicroSpike 80mil Black GM17
**Roll Count:** 27 (From 57 To 83)

| | | | | | | | | ASTM D5994 | | | ASTM D7466 | ASTM D8117 | ASTM D792 | ASTM D1238 | ASTM D4218 | ASTM D5596 | ASTM D6693 | | | | | ASTM D1004 | | ASTM D4833 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Roll Number | Prod. Date | Width (ft) | Length (ft) | Area (sqft) | Weight (lb) | Resin Lot# | Thickness-Min | Thickness-Avg | Asperity (top) | Asperity (bottom) | OIT | Density | Melt Flow | Carbon Content | Category 1 Disp. | Tensile Break Str (MD) | Break Elong (MD) | Tensile Break Str (TD) | Break Elong (TD) | Tear Strength (MD) | Tear Strength (TD) | Puncture Resistance |
| | | | | | | | | mil | mil | mil | mil | minut | g/cc | g/10 | % | Categ | ppi | % | ppi | % | lb | lb | lb |
| 57 | FND0103600059 | 09/13/22 | 23 | 410 | 9430 | 3830 | DPF811480 | 76 | 78 | 25 | 32 | 183 | 0.933 | 0.34 | 2.5 | 10 | 260 | 538 | 272 | 622 | 64 | 65 | 157 |
| 58 | FND0103600060 | 09/13/22 | 23 | 410 | 9430 | 3822 | DPF811480 | 75 | 80 | 25 | 29 | 183 | 0.933 | 0.34 | 2.5 | 10 | 260 | 538 | 272 | 622 | 64 | 65 | 157 |
| 59 | FND0103600061 | 09/13/22 | 23 | 410 | 9430 | 3822 | DPF811480 | 76 | 80 | 27 | 31 | 183 | 0.933 | 0.34 | 2.5 | 10 | 260 | 538 | 272 | 622 | 64 | 65 | 157 |
| 60 | FND0103600062 | 09/13/22 | 23 | 410 | 9430 | 3822 | DPF811480 | 75 | 79 | 26 | 32 | 183 | 0.933 | 0.34 | 2.5 | 10 | 260 | 538 | 272 | 622 | 64 | 65 | 157 |
| 61 | FND0103600063 | 09/13/22 | 23 | 410 | 9430 | 3814 | DPF811480 | 76 | 80 | 26 | 30 | 183 | 0.932 | 0.34 | 2.3 | 10 | 269 | 556 | 266 | 596 | 70 | 69 | 160 |
| 62 | FND0103600064 | 09/13/22 | 23 | 410 | 9430 | 3816 | DPF811480 | 73 | 79 | 24 | 30 | 238 | 0.930 | 0.34 | 2.3 | 10 | 269 | 556 | 266 | 596 | 66 | 70 | 160 |
| 63 | FND0103600065 | 09/13/22 | 23 | 410 | 9430 | 3826 | DPH810510 | 76 | 81 | 27 | 32 | 238 | 0.930 | 0.34 | 2.3 | 10 | 269 | 556 | 266 | 596 | 66 | 70 | 160 |
| 64 | FND0103600066 | 09/14/22 | 23 | 410 | 9430 | 3826 | DPH810510 | 74 | 78 | 33 | 30 | 238 | 0.930 | 0.34 | 2.3 | 10 | 269 | 556 | 266 | 596 | 66 | 70 | 160 |
| 65 | FND0103600067 | 09/14/22 | 23 | 410 | 9430 | 3826 | DPH810510 | 75 | 80 | 28 | 37 | 238 | 0.930 | 0.34 | 2.3 | 10 | 269 | 556 | 266 | 596 | 66 | 70 | 160 |
| 66 | FND0103600068 | 09/14/22 | 23 | 410 | 9430 | 3826 | DPH810510 | 75 | 78 | 27 | 33 | 238 | 0.930 | 0.34 | 2.3 | 10 | 266 | 535 | 266 | 614 | 66 | 70 | 160 |
| 67 | FND0103600069 | 09/14/22 | 23 | 410 | 9430 | 3826 | DPH810510 | 76 | 78 | 31 | 29 | 238 | 0.930 | 0.34 | 2.3 | 10 | 266 | 535 | 266 | 614 | 66 | 70 | 160 |
| 68 | FND0103600070 | 09/14/22 | 23 | 410 | 9430 | 3826 | DPH810510 | 74 | 80 | 31 | 29 | 238 | 0.930 | 0.34 | 2.3 | 10 | 266 | 535 | 266 | 614 | 66 | 70 | 160 |
| 69 | FND0103600071 | 09/14/22 | 23 | 410 | 9430 | 3826 | DPH810510 | 76 | 79 | 34 | 28 | 238 | 0.930 | 0.34 | 2.3 | 10 | 266 | 535 | 266 | 614 | 66 | 70 | 160 |
| 70 | FND0103600072 | 09/14/22 | 23 | 410 | 9430 | 3830 | DPH810510 | 73 | 78 | 26 | 32 | 238 | 0.930 | 0.34 | 2.3 | 10 | 266 | 535 | 266 | 614 | 66 | 70 | 160 |
| 71 | FND0103600073 | 09/14/22 | 23 | 410 | 9430 | 3832 | DPH810510 | 76 | 79 | 25 | 28 | 238 | 0.933 | 0.34 | 2.4 | 10 | 289 | 556 | 277 | 631 | 67 | 62 | 157 |
| 72 | FND0103600074 | 09/14/22 | 23 | 410 | 9430 | 3826 | DPF811480 | 73 | 78 | 28 | 35 | 238 | 0.933 | 0.34 | 2.4 | 10 | 289 | 556 | 277 | 631 | 67 | 62 | 157 |
| 73 | FND0103600075 | 09/14/22 | 23 | 410 | 9430 | 3824 | DPF811480 | 77 | 80 | 25 | 28 | 238 | 0.933 | 0.34 | 2.4 | 10 | 289 | 556 | 277 | 631 | 67 | 62 | 157 |
| 74 | FND0103600076 | 09/14/22 | 23 | 410 | 9430 | 3822 | DPF811480 | 74 | 78 | 26 | 32 | 238 | 0.933 | 0.34 | 2.3 | 10 | 289 | 556 | 277 | 631 | 67 | 62 | 157 |
| 75 | FND0103600077 | 09/14/22 | 23 | 410 | 9430 | 3816 | DPF811480 | 75 | 79 | 25 | 32 | 238 | 0.933 | 0.34 | 2.4 | 10 | 289 | 556 | 277 | 631 | 67 | 62 | 157 |
| 76 | FND0103600078 | 09/14/22 | 23 | 410 | 9430 | 3808 | DPF811350 | 74 | 79 | 28 | 31 | 238 | 0.933 | 0.34 | 2.5 | 10 | 288 | 553 | 281 | 612 | 67 | 62 | 157 |
| 77 | FND0103600079 | 09/14/22 | 23 | 410 | 9430 | 3818 | DPF811350 | 72 | 77 | 30 | 34 | 238 | 0.933 | 0.34 | 2.5 | 10 | 288 | 553 | 281 | 612 | 67 | 62 | 157 |
| 78 | FND0103600080 | 09/14/22 | 23 | 410 | 9430 | 3824 | DPF811350 | 76 | 79 | 27 | 37 | 238 | 0.933 | 0.34 | 2.5 | 10 | 288 | 553 | 281 | 612 | 67 | 62 | 157 |
| 79 | FND0103600081 | 09/15/22 | 23 | 410 | 9430 | 3828 | DPF811350 | 77 | 79 | 28 | 39 | 238 | 0.933 | 0.34 | 2.2 | 10 | 288 | 553 | 281 | 612 | 67 | 62 | 157 |
| 80 | FND0103600082 | 09/15/22 | 23 | 410 | 9430 | 3830 | DPF811350 | 74 | 79 | 34 | 32 | 238 | 0.933 | 0.34 | 2.2 | 10 | 288 | 553 | 281 | 612 | 67 | 62 | 157 |
| 81 | FND0103600083 | 09/15/22 | 23 | 410 | 9430 | 3832 | DPF811350 | 75 | 79 | 28 | 39 | 238 | 0.934 | 0.34 | 2.4 | 10 | 272 | 543 | 279 | 614 | 75 | 71 | 156 |
| 82 | FND0103600084 | 09/15/22 | 23 | 410 | 9430 | 3832 | DPF811350 | 74 | 77 | 29 | 39 | 238 | 0.934 | 0.34 | 2.4 | 10 | 272 | 543 | 279 | 614 | 75 | 71 | 156 |
| 83 | FND0103600085 | 09/15/22 | 23 | 410 | 9430 | 3836 | DPF811350 | 77 | 80 | 33 | 39 | 238 | 0.934 | 0.34 | 2.4 | 10 | 272 | 543 | 279 | 614 | 75 | 71 | 156 |

For Questions, Please Contact: Lab Manager, Fernley

Ryan Steele, Lab Manager

Ryan Steele
775-835-8282
Ext 2015

# Geomembrane Quality Certification

NewFields

ACCEPTANCE IS FOR GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS ONLY. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESS AND TECHNIQUES FOR CONSTRUCTION; COORDINATING ITS WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING ITS WORK IN A SAFE AND SATISFACTORY MANNER.

■ APPROVED ☐ APPROVED WITH CHANGES NOTED

☐ REVISE AND RESUBMIT ☐ REJECTED

DATE: Sep 23, 2022 BY: Nikoliya L Boyanich

**Customer:** Newmont Mining
**Project:** Cripple Creek
**Destination:** Cripple Creek, CO
**Report Date:** 21-Sep-2022 11:44 AM

**S.O.#** SO00016473
**Item Number:** FG-LDMSDS080BBBEG
**Liner Type:** LLDPE DS MicroSpike 80mil Black GM17
**Roll Count:** 45 (From 84 To 128)

| | | | | | | | | ASTM D5994 | | ASTM D7466 | | ASTM D8117 | ASTM D792 | ASTM D1238 | ASTM D4218 | ASTM D5596 | ASTM D6693 | | | | ASTM D1004 | | ASTM D4833 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Roll Number | Prod. Date | Width (ft) | Length (ft) | Area (sqft) | Weight (lb) | Resin Lot# | Thickness-Min | Thickness-Avg | Asperity (top) | Asperity (bottom) | OIT | Density | Melt Flow | Carbon Content | Category 1 Disp. | Tensile Break Str (MD) | Break Elong (MD) | Tensile Break Str (TD) | Break Elong (TD) | Tear Strength (MD) | Tear Strength (TD) | Puncture Resistance |
| | | | | | | | | mil | mil | mil | mil | minut | g/cc | g/10 | % | Categ | ppi | % | ppi | % | lb | lb | lb |
| 84 | FND0103600087 | 09/15/22 | 23 | 410 | 9430 | 3832 | DPF811350 | 74 | 77 | 27 | 29 | 187 | 0.934 | 0.38 | 2.3 | 10 | 272 | 559 | 266 | 625 | 69 | 67 | 157 |
| 85 | FND0103600088 | 09/15/22 | 23 | 410 | 9430 | 3826 | DPF811350 | 75 | 79 | 27 | 30 | 187 | 0.934 | 0.38 | 2.3 | 10 | 272 | 559 | 266 | 625 | 69 | 67 | 157 |
| 86 | FND0103600089 | 09/15/22 | 23 | 410 | 9430 | 3830 | DPF811350 | 71 | 77 | 27 | 30 | 187 | 0.934 | 0.38 | 2.3 | 10 | 272 | 559 | 266 | 625 | 69 | 67 | 157 |
| 87 | FND0103600090 | 09/15/22 | 23 | 410 | 9430 | 3824 | DPF811350 | 76 | 80 | 26 | 35 | 187 | 0.934 | 0.38 | 2.1 | 10 | 272 | 559 | 266 | 625 | 69 | 67 | 157 |
| 88 | FND0103600091 | 09/16/22 | 23 | 410 | 9430 | 3830 | DPF811350 | 74 | 78 | 27 | 36 | 187 | 0.934 | 0.38 | 2.1 | 10 | 272 | 559 | 266 | 625 | 69 | 67 | 157 |
| 89 | FND0103600092 | 09/16/22 | 23 | 410 | 9430 | 3818 | DPF811350 | 73 | 78 | 26 | 30 | 187 | 0.934 | 0.38 | 2.4 | 10 | 275 | 548 | 273 | 600 | 69 | 67 | 157 |
| 90 | FND0103600093 | 09/16/22 | 23 | 410 | 9430 | 3826 | DPF811350 | 71 | 79 | 29 | 35 | 187 | 0.934 | 0.38 | 2.4 | 10 | 275 | 548 | 273 | 600 | 69 | 67 | 157 |
| 91 | FND0103600094 | 09/16/22 | 23 | 410 | 9430 | 3812 | DPF811350 | 76 | 78 | 27 | 33 | 187 | 0.934 | 0.38 | 2.4 | 10 | 275 | 548 | 273 | 600 | 69 | 67 | 157 |
| 92 | FND0103600095 | 09/16/22 | 23 | 410 | 9430 | 3826 | DPH810510 | 76 | 81 | 23 | 35 | 187 | 0.934 | 0.38 | 2.1 | 10 | 275 | 548 | 273 | 600 | 69 | 67 | 157 |
| 93 | FND0103600096 | 09/16/22 | 23 | 410 | 9430 | 3816 | DPH810510 | 76 | 78 | 28 | 31 | 187 | 0.934 | 0.38 | 2.1 | 10 | 275 | 548 | 273 | 600 | 69 | 67 | 157 |
| 94 | FND0103600097 | 09/16/22 | 23 | 410 | 9430 | 3828 | DPH810510 | 74 | 77 | 27 | 32 | 238 | 0.934 | 0.34 | 2.1 | 10 | 267 | 546 | 282 | 629 | 67 | 64 | 155 |
| 95 | FND0103600098 | 09/16/22 | 23 | 410 | 9430 | 3826 | DPH810510 | 76 | 79 | 24 | 29 | 238 | 0.934 | 0.34 | 2.1 | 10 | 267 | 546 | 282 | 629 | 67 | 64 | 155 |
| 96 | FND0103600099 | 09/16/22 | 23 | 410 | 9430 | 3828 | DPH810510 | 77 | 79 | 27 | 28 | 238 | 0.934 | 0.34 | 2.1 | 10 | 267 | 546 | 282 | 629 | 67 | 64 | 155 |
| 97 | FND0103600100 | 09/16/22 | 23 | 410 | 9430 | 3820 | DPH810510 | 74 | 80 | 29 | 30 | 238 | 0.934 | 0.34 | 2.2 | 10 | 267 | 546 | 282 | 629 | 67 | 64 | 155 |
| 98 | FND0103600101 | 09/16/22 | 23 | 410 | 9430 | 3872 | DPH810510 | 74 | 78 | 27 | 36 | 238 | 0.934 | 0.34 | 2.1 | 10 | 267 | 546 | 282 | 629 | 67 | 64 | 155 |
| 99 | FND0103600102 | 09/16/22 | 23 | 410 | 9430 | 3868 | DPH810510 | 76 | 80 | 28 | 29 | 238 | 0.934 | 0.34 | 2.2 | 10 | 287 | 570 | 282 | 629 | 67 | 64 | 155 |
| 100 | FND0103600103 | 09/16/22 | 23 | 410 | 9430 | 3870 | DPH810510 | 75 | 79 | 27 | 32 | 238 | 0.934 | 0.34 | 2.2 | 10 | 287 | 570 | 282 | 629 | 67 | 64 | 155 |
| 101 | FND0103600106 | 09/17/22 | 23 | 410 | 9430 | 3850 | DPH810510 | 75 | 80 | 27 | 29 | 238 | 0.934 | 0.34 | 2.2 | 10 | 287 | 570 | 282 | 629 | 67 | 64 | 155 |
| 102 | FND0103600107 | 09/17/22 | 23 | 410 | 9430 | 3848 | DPH810510 | 76 | 79 | 25 | 29 | 238 | 0.934 | 0.34 | 2.4 | 10 | 287 | 570 | 282 | 629 | 67 | 64 | 155 |
| 103 | FND0103600108 | 09/17/22 | 23 | 410 | 9430 | 3856 | DPH810510 | 75 | 80 | 26 | 29 | 238 | 0.934 | 0.34 | 2.4 | 10 | 287 | 570 | 282 | 629 | 67 | 64 | 155 |
| 104 | FND0103600109 | 09/17/22 | 23 | 410 | 9430 | 3850 | DPH810510 | 77 | 80 | 26 | 28 | 238 | 0.931 | 0.34 | 2.2 | 10 | 258 | 546 | 264 | 606 | 64 | 63 | 156 |
| 105 | FND0103600110 | 09/17/22 | 23 | 410 | 9430 | 3852 | DPH810510 | 77 | 80 | 26 | 27 | 238 | 0.931 | 0.34 | 2.2 | 10 | 258 | 546 | 264 | 606 | 64 | 63 | 156 |
| 106 | FND0103600111 | 09/17/22 | 23 | 410 | 9430 | 3848 | DPH810510 | 75 | 80 | 29 | 28 | 238 | 0.931 | 0.34 | 2.2 | 10 | 258 | 546 | 264 | 606 | 64 | 63 | 156 |
| 107 | FND0103600112 | 09/17/22 | 23 | 410 | 9430 | 3858 | DPH810510 | 77 | 78 | 28 | 35 | 238 | 0.931 | 0.34 | 2.3 | 10 | 258 | 546 | 264 | 606 | 64 | 63 | 156 |
| 108 | FND0103600114 | 09/17/22 | 23 | 410 | 9430 | 3858 | DPH810510 | 78 | 81 | 27 | 35 | 238 | 0.931 | 0.34 | 2.2 | 10 | 258 | 546 | 264 | 606 | 64 | 63 | 156 |
| 109 | FND0103600115 | 09/17/22 | 23 | 410 | 9430 | 3864 | DPH810510 | 76 | 79 | 26 | 33 | 238 | 0.931 | 0.34 | 2.2 | 10 | 269 | 572 | 253 | 616 | 64 | 63 | 156 |
| 110 | FND0103600116 | 09/17/22 | 23 | 410 | 9430 | 3854 | DPH810510 | 77 | 81 | 26 | 35 | 238 | 0.931 | 0.34 | 2.2 | 10 | 269 | 572 | 253 | 616 | 64 | 63 | 156 |
| 111 | FND0103600117 | 09/17/22 | 23 | 410 | 9430 | 3858 | DPH810510 | 77 | 80 | 28 | 31 | 238 | 0.931 | 0.34 | 2.2 | 10 | 269 | 572 | 253 | 616 | 64 | 63 | 156 |
| 112 | FND0103600118 | 09/17/22 | 23 | 410 | 9430 | 3892 | DPH810510 | 78 | 82 | 27 | 33 | 238 | 0.931 | 0.34 | 2.3 | 10 | 269 | 572 | 253 | 616 | 64 | 63 | 156 |
| 113 | FND0103600119 | 09/17/22 | 23 | 410 | 9430 | 3834 | DPH810510 | 76 | 80 | 27 | 31 | 238 | 0.931 | 0.34 | 2.2 | 10 | 269 | 572 | 253 | 616 | 64 | 63 | 156 |
| 114 | FND0103600120 | 09/17/22 | 23 | 410 | 9430 | 3840 | DPH810510 | 76 | 78 | 26 | 29 | 238 | 0.932 | 0.34 | 2.4 | 10 | 270 | 559 | 265 | 618 | 67 | 61 | 155 |
| 115 | FND0103600121 | 09/18/22 | 23 | 410 | 9430 | 3842 | DPH810510 | 75 | 79 | 26 | 28 | 238 | 0.932 | 0.34 | 2.4 | 10 | 270 | 559 | 265 | 618 | 67 | 61 | 155 |

| # | Roll Number | Prod. Date | Width (ft) | Length (ft) | Area (sqft) | Weight (lb) | Resin Lot# | ASTM D5994 Thickness-Min | ASTM D5994 Thickness-Avg | ASTM D7466 Asperity (top) | ASTM D7466 Asperity (bottom) | ASTM D8117 OIT | ASTM D792 Density | ASTM D1238 Melt Flow | ASTM D4218 Carbon Content | ASTM D5596 Category 1 Disp. | ASTM D6693 Tensile Break Str (MD) | ASTM D6693 Break Elong (MD) | ASTM D6693 Tensile Break Str (TD) | ASTM D6693 Break Elong (TD) | ASTM D1004 Tear Strength (MD) | ASTM D1004 Tear Strength (TD) | ASTM D4833 Puncture Resistance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | mil | mil | mil | mil | minut | g/cc | g/10 | % | Categ | ppi | % | ppi | % | lb | lb | lb |
| 116 | FND0103600122 | 09/18/22 | 23 | 410 | 9430 | 3840 | DPH810510 | 77 | 79 | 28 | 27 | 238 | 0.932 | 0.34 | 2.4 | 10 | 270 | 559 | 265 | 618 | 67 | 61 | 155 |
| 117 | FND0103600123 | 09/18/22 | 23 | 410 | 9430 | 3838 | DPH810510 | 75 | 79 | 27 | 29 | 238 | 0.932 | 0.34 | 2.4 | 10 | 270 | 559 | 265 | 618 | 67 | 61 | 155 |
| 118 | FND0103600124 | 09/18/22 | 23 | 410 | 9430 | 3844 | DPH810510 | 73 | 79 | 26 | 29 | 238 | 0.932 | 0.34 | 2.4 | 10 | 270 | 559 | 265 | 618 | 67 | 61 | 155 |
| 119 | FND0103600125 | 09/18/22 | 23 | 410 | 9430 | 3844 | DPH810510 | 75 | 79 | 27 | 29 | 238 | 0.932 | 0.34 | 2.1 | 10 | 256 | 550 | 249 | 599 | 67 | 61 | 155 |
| 120 | FND0103600126 | 09/18/22 | 23 | 410 | 9430 | 3834 | DPH810510 | 77 | 79 | 27 | 28 | 238 | 0.932 | 0.34 | 2.1 | 10 | 256 | 550 | 249 | 599 | 67 | 61 | 155 |
| 121 | FND0103600127 | 09/18/22 | 23 | 410 | 9430 | 3842 | DPH810510 | 75 | 80 | 27 | 34 | 238 | 0.932 | 0.34 | 2.1 | 10 | 256 | 550 | 249 | 599 | 67 | 61 | 155 |
| 122 | FND0103600128 | 09/18/22 | 23 | 410 | 9430 | 3836 | DPH810510 | 74 | 78 | 27 | 31 | 238 | 0.932 | 0.34 | 2.2 | 10 | 256 | 550 | 249 | 599 | 67 | 61 | 155 |
| 123 | FND0103600129 | 09/18/22 | 23 | 410 | 9430 | 3842 | DPH810510 | 75 | 78 | 27 | 32 | 238 | 0.932 | 0.34 | 2.1 | 10 | 256 | 550 | 249 | 599 | 67 | 61 | 155 |
| 124 | FND0103600130 | 09/18/22 | 23 | 410 | 9430 | 3840 | DPH810510 | 76 | 78 | 25 | 31 | 238 | 0.933 | 0.34 | 2.3 | 10 | 241 | 551 | 257 | 627 | 66 | 64 | 153 |
| 125 | FND0103600131 | 09/18/22 | 23 | 410 | 9430 | 3834 | DPH810510 | 76 | 79 | 25 | 30 | 238 | 0.933 | 0.34 | 2.3 | 10 | 241 | 551 | 257 | 627 | 66 | 64 | 153 |
| 126 | FND0103600132 | 09/18/22 | 23 | 410 | 9430 | 3832 | DPH810510 | 77 | 78 | 30 | 30 | 238 | 0.933 | 0.34 | 2.3 | 10 | 241 | 551 | 257 | 627 | 66 | 64 | 153 |
| 127 | FND0103600133 | 09/18/22 | 23 | 410 | 9430 | 3840 | DPH810510 | 76 | 78 | 26 | 31 | 238 | 0.933 | 0.34 | 2.3 | 10 | 241 | 551 | 257 | 627 | 66 | 64 | 153 |
| 128 | FND0103600134 | 09/18/22 | 23 | 410 | 9430 | 3840 | DPH810510 | 74 | 79 | 29 | 33 | 238 | 0.933 | 0.34 | 2.3 | 10 | 241 | 551 | 257 | 627 | 66 | 64 | 153 |

Ryan Steele, Lab Manager

For Questions, Please Contact: Lab Manager, Fernley
Ryan Steele
775-835-8282
Ext 2015

NewFields

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APPROVED | APPROVED WITH CHANGES NOTED
REVISE AND RESUBMIT | REJECTED

DATE: Sep 23, 2022 BY: Nikoliya L Boyanich

# Geomembrane Quality Certification

**Customer:** Newmont Mining
**Project:** Cripple Creek
**Destination:** Cripple Creek, CO
**Report Date:** 21-Sep-2022 1:02 PM

**S.O.#** SO00016473
**Item Number:** FG-LDMSDS080BBBEG
**Liner Type:** LLDPE DS MicroSpike 80mil Black GM17
**Roll Count:** 36 (From 129 To 164)

NewFields

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APPROVED | APPROVED WITH CHANGES NOTED
REVISE AND RESUBMIT | REJECTED

DATE: *Sep 23, 2022* BY: *Nikoliya L Boyanich*

| | | | | | | | | ASTM D5994 | | | ASTM D7466 | ASTM D8117 | ASTM D792 | ASTM D1238 | ASTM D4218 | ASTM D5596 | ASTM D6693 | | | | | ASTM D1004 | | ASTM D4833 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Roll Number | Prod. Date | Width (ft) | Length (ft) | Area (sqft) | Weight (lb) | Resin Lot# | Thickness-Min | Thickness-Avg | Asperity (top) | Asperity (bottom) | OIT | Density | Melt Flow | Carbon Content | Category 1 Disp. | Tensile Break Str (MD) | Break Elong (MD) | Tensile Break Str (TD) | Break Elong (TD) | Tear Strength (MD) | Tear Strength (TD) | Puncture Resistance |
| | | | | | | | | mil | mil | mil | mil | minut | g/cc | g/10 | % | Categ | ppi | % | ppi | % | lb | lb | lb |
| 129 | FND0103600135 | 09/19/22 | 23 | 410 | 9430 | 3834 | DPH810510 | 75 | 80 | 26 | 34 | 238 | 0.933 | 0.34 | 2.2 | 10 | 278 | 555 | 259 | 631 | 66 | 64 | 153 |
| 130 | FND0103600136 | 09/19/22 | 23 | 410 | 9430 | 3840 | DPH810510 | 76 | 79 | 32 | 30 | 238 | 0.933 | 0.34 | 2.2 | 10 | 278 | 555 | 259 | 631 | 66 | 64 | 153 |
| 131 | FND0103600137 | 09/19/22 | 23 | 410 | 9430 | 3834 | DPH810510 | 75 | 78 | 26 | 33 | 238 | 0.933 | 0.34 | 2.2 | 10 | 278 | 555 | 259 | 631 | 66 | 64 | 153 |
| 132 | FND0103600138 | 09/19/22 | 23 | 410 | 9430 | 3840 | DPH810510 | 77 | 80 | 24 | 32 | 238 | 0.933 | 0.34 | 2.3 | 10 | 278 | 555 | 259 | 631 | 66 | 64 | 153 |
| 133 | FND0103600139 | 09/19/22 | 23 | 410 | 9430 | 3838 | DPH810510 | 76 | 80 | 26 | 34 | 238 | 0.933 | 0.34 | 2.2 | 10 | 278 | 555 | 259 | 631 | 66 | 64 | 153 |
| 134 | FND0103600140 | 09/19/22 | 23 | 410 | 9430 | 3832 | DPH810510 | 74 | 79 | 26 | 34 | 238 | 0.933 | 0.34 | 2.5 | 10 | 275 | 549 | 263 | 615 | 74 | 74 | 154 |
| 135 | FND0103600141 | 09/19/22 | 23 | 410 | 9430 | 3842 | DPH810510 | 77 | 80 | 24 | 33 | 238 | 0.933 | 0.34 | 2.5 | 10 | 275 | 549 | 263 | 615 | 74 | 74 | 154 |
| 136 | FND0103600142 | 09/19/22 | 23 | 410 | 9430 | 3826 | DPH810510 | 76 | 78 | 26 | 28 | 238 | 0.933 | 0.34 | 2.5 | 10 | 275 | 549 | 263 | 615 | 74 | 74 | 154 |
| 137 | FND0103600143 | 09/19/22 | 23 | 410 | 9430 | 3836 | DPH810510 | 76 | 79 | 25 | 35 | 238 | 0.933 | 0.34 | 2.1 | 10 | 275 | 549 | 263 | 615 | 74 | 74 | 154 |
| 138 | FND0103600144 | 09/19/22 | 23 | 410 | 9430 | 3832 | DPH810510 | 77 | 80 | 26 | 31 | 238 | 0.933 | 0.34 | 2.5 | 10 | 275 | 549 | 263 | 615 | 74 | 74 | 154 |
| 139 | FND0103600145 | 09/19/22 | 23 | 410 | 9430 | 3834 | DPH810510 | 75 | 78 | 26 | 33 | 238 | 0.933 | 0.34 | 2.3 | 10 | 274 | 540 | 278 | 635 | 66 | 64 | 153 |
| 140 | FND0103600146 | 09/19/22 | 23 | 410 | 9430 | 3834 | DPH810510 | 76 | 78 | 26 | 33 | 238 | 0.933 | 0.34 | 2.3 | 10 | 274 | 540 | 278 | 635 | 66 | 64 | 153 |
| 141 | FND0103600147 | 09/19/22 | 23 | 410 | 9430 | 3834 | DPH810510 | 75 | 79 | 26 | 33 | 238 | 0.933 | 0.34 | 2.3 | 10 | 274 | 540 | 278 | 635 | 66 | 64 | 153 |
| 142 | FND0103600148 | 09/19/22 | 23 | 410 | 9430 | 3836 | DPH810510 | 76 | 80 | 26 | 33 | 238 | 0.933 | 0.34 | 2.3 | 10 | 274 | 540 | 278 | 635 | 66 | 64 | 153 |
| 143 | FND0103600149 | 09/19/22 | 23 | 410 | 9430 | 3836 | DPH810510 | 75 | 80 | 26 | 33 | 238 | 0.933 | 0.34 | 2.3 | 10 | 274 | 540 | 278 | 635 | 66 | 64 | 153 |
| 144 | FND0103600150 | 09/20/22 | 23 | 410 | 9430 | 3840 | DPH810510 | 75 | 80 | 24 | 34 | 238 | 0.931 | 0.34 | 2.4 | 10 | 258 | 624 | 254 | 550 | 65 | 66 | 155 |
| 145 | FND0103600151 | 09/20/22 | 23 | 410 | 9430 | 3838 | DPH810510 | 76 | 81 | 25 | 32 | 238 | 0.931 | 0.34 | 2.4 | 10 | 258 | 624 | 254 | 550 | 65 | 66 | 155 |
| 146 | FND0103600152 | 09/20/22 | 23 | 410 | 9430 | 3840 | DPH810510 | 77 | 82 | 25 | 33 | 238 | 0.931 | 0.34 | 2.4 | 10 | 258 | 624 | 254 | 550 | 65 | 66 | 155 |
| 147 | FND0103600153 | 09/20/22 | 23 | 410 | 9430 | 3832 | DPH810510 | 75 | 79 | 25 | 33 | 238 | 0.931 | 0.34 | 2.4 | 10 | 258 | 624 | 254 | 550 | 65 | 66 | 155 |
| 148 | FND0103600154 | 09/20/22 | 23 | 410 | 9430 | 3836 | DPH810510 | 75 | 79 | 25 | 31 | 238 | 0.931 | 0.34 | 2.4 | 10 | 258 | 624 | 254 | 550 | 65 | 66 | 155 |
| 149 | FND0103600155 | 09/20/22 | 23 | 410 | 9430 | 3832 | DPH810510 | 73 | 78 | 28 | 30 | 238 | 0.931 | 0.34 | 2.2 | 10 | 243 | 537 | 260 | 624 | 65 | 66 | 155 |
| 150 | FND0103600156 | 09/20/22 | 23 | 410 | 9430 | 3836 | DPH810510 | 76 | 78 | 29 | 29 | 238 | 0.931 | 0.34 | 2.2 | 10 | 243 | 537 | 260 | 624 | 65 | 66 | 155 |
| 151 | FND0103600157 | 09/20/22 | 23 | 410 | 9430 | 3816 | DPH810510 | 76 | 79 | 26 | 31 | 238 | 0.931 | 0.34 | 2.2 | 10 | 243 | 537 | 260 | 624 | 65 | 66 | 155 |
| 152 | FND0103600158 | 09/20/22 | 23 | 410 | 9430 | 3822 | DPH810510 | 74 | 77 | 27 | 29 | 238 | 0.931 | 0.34 | 2.3 | 10 | 243 | 537 | 260 | 624 | 65 | 66 | 155 |
| 153 | FND0103600159 | 09/20/22 | 23 | 410 | 9430 | 3842 | DPH810510 | 72 | 77 | 27 | 30 | 238 | 0.931 | 0.34 | 2.2 | 10 | 243 | 537 | 260 | 624 | 65 | 66 | 155 |
| 154 | FND0103600160 | 09/20/22 | 23 | 410 | 9430 | 3854 | DPH810510 | 75 | 77 | 27 | 27 | 238 | 0.933 | 0.34 | 2.3 | 10 | 241 | 528 | 255 | 615 | 68 | 66 | 155 |
| 155 | FND0103600161 | 09/20/22 | 23 | 410 | 9430 | 3852 | DPH810510 | 75 | 77 | 27 | 29 | 238 | 0.933 | 0.34 | 2.3 | 10 | 241 | 528 | 255 | 615 | 68 | 66 | 155 |
| 156 | FND0103600162 | 09/20/22 | 23 | 410 | 9430 | 3860 | DPH810510 | 74 | 77 | 28 | 30 | 238 | 0.933 | 0.34 | 2.3 | 10 | 241 | 528 | 255 | 615 | 68 | 66 | 155 |
| 157 | FND0103600163 | 09/20/22 | 23 | 410 | 9430 | 3848 | DPH810510 | 75 | 78 | 28 | 28 | 238 | 0.933 | 0.34 | 2.2 | 10 | 241 | 528 | 255 | 615 | 68 | 66 | 155 |
| 158 | FND0103600164 | 09/21/22 | 23 | 410 | 9430 | 3850 | DPH810510 | 75 | 79 | 27 | 27 | 238 | 0.933 | 0.34 | 2.2 | 10 | 241 | 528 | 255 | 615 | 68 | 66 | 155 |
| 159 | FND0103600165 | 09/21/22 | 23 | 410 | 9430 | 3860 | DPH810510 | 76 | 79 | 25 | 29 | 238 | 0.933 | 0.34 | 2.1 | 10 | 243 | 541 | 246 | 588 | 68 | 66 | 155 |
| 160 | FND0103600166 | 09/21/22 | 23 | 410 | 9430 | 3872 | DPH810510 | 77 | 79 | 28 | 27 | 238 | 0.933 | 0.34 | 2.1 | 10 | 243 | 541 | 246 | 588 | 68 | 66 | 155 |

| # | Roll Number | Prod. Date | Width (ft) | Length (ft) | Area (sqft) | Weight (lb) | Resin Lot# | ASTM D5994 Thickness-Min (mil) | ASTM D5994 Thickness-Avg (mil) | ASTM D7466 Asperity (top) (mil) | ASTM D7466 Asperity (bottom) (mil) | ASTM D8117 OIT (minut) | ASTM D792 Density (g/cc) | ASTM D1238 Melt Flow (g/10) | ASTM D4218 Carbon Content (%) | ASTM D5596 Category 1 Disp. (Categ) | ASTM D6693 Tensile Break Str (MD) (ppi) | ASTM D6693 Break Elong (MD) (%) | ASTM D6693 Tensile Break Str (TD) (ppi) | ASTM D6693 Break Elong (TD) (%) | ASTM D1004 Tear Strength (MD) (lb) | ASTM D1004 Tear Strength (TD) (lb) | ASTM D4833 Puncture Resistance (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 161 | FND0103600167 | 09/21/22 | 23 | 410 | 9430 | 3864 | DPH810510 | 75 | 77 | 28 | 27 | 238 | 0.933 | 0.34 | 2.1 | 10 | 243 | 541 | 246 | 588 | 68 | 66 | 155 |
| 162 | FND0103600168 | 09/21/22 | 23 | 410 | 9430 | 3870 | DPH810510 | 76 | 78 | 28 | 26 | 238 | 0.933 | 0.34 | 2.1 | 10 | 243 | 541 | 246 | 588 | 68 | 66 | 155 |
| 163 | FND0103600169 | 09/21/22 | 23 | 410 | 9430 | 3872 | DPH810510 | 76 | 78 | 25 | 26 | 238 | 0.933 | 0.34 | 2.1 | 10 | 243 | 541 | 246 | 588 | 68 | 66 | 155 |
| 164 | FND0103600170 | 09/21/22 | 23 | 410 | 9430 | 3868 | DPH810510 | 78 | 81 | 25 | 28 | 238 | 0.931 | 0.34 | 2.2 | 10 | 244 | 533 | 238 | 571 | 67 | 61 | 156 |

Ryan Steele, Lab Manager

For Questions, Please Contact: Lab Manager, Fernley
Ryan Steele
775-835-8282
Ext 2015

NewFields

ACCEPTANCE IS FOR GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS ONLY. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESS AND TECHNIQUES FOR CONSTRUCTION; COORDINATING ITS WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING ITS WORK IN A SAFE AND SATISFACTORY MANNER.

■ APPROVED
☐ APPROVED WITH CHANGES NOTED
☐ REVISE AND RESUBMIT
☐ REJECTED

DATE: Sep 23, 2022 BY: Nikoliya L Boyanich

# Geomembrane Quality Certification

**Customer:** Newmont Mining
**Project:** Cripple Creek
**Destination:** Cripple Creek, CO
**Report Date:** 26-Sep-2022 10:56 AM

**S.O.#** SO00016473
**Item Number:** FG-LDMSDS080BBBEG
**Liner Type:** LLDPE DS MicroSpike 80mil Black GM17
**Roll Count:** 66 (From 165 To 230)

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APPROVED | APPROVED WITH CHANGES NOTED | REVISE AND RESUBMIT | REJECTED

DATE: Sep 28, 2022 BY: Nikoliya L Boyanich

| | | | | | | | | ASTM D5994 | | ASTM D7466 | | ASTM D8117 | ASTM D792 | ASTM D1238 | ASTM D4218 | ASTM D5596 | ASTM D6693 | | | | ASTM D1004 | | ASTM D4833 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Roll Number | Prod. Date | Width (ft) | Length (ft) | Area (sqft) | Weight (lb) | Resin Lot# | Thickness-Avg | Thickness-Min | Asperity (bottom) | Asperity (top) | OIT | Density | Melt Flow | Carbon Content | Category 1 Disp. | Break Elong (MD) | Break Elong (TD) | Tensile Break Str (MD) | Tensile Break Str (TD) | Tear Strength (TD) | Tear Strength (MD) | Puncture Resistance |
| | | | | | | | | mil | mil | mil | mil | minut | g/cc | g/10 | % | Categ | % | % | ppi | ppi | lb | lb | lb |
| 165 | FND0103600171 | 09/21/22 | 23 | 410 | 9430 | 3868 | DPH810510 | 78 | 73 | 32 | 27 | 238 | 0.931 | 0.34 | 2.2 | 10 | 533 | 571 | 244 | 238 | 61 | 67 | 156 |
| 166 | FND0103600173 | 09/21/22 | 23 | 410 | 9430 | 3872 | DPH810510 | 79 | 75 | 29 | 27 | 238 | 0.931 | 0.34 | 2.2 | 10 | 533 | 571 | 244 | 238 | 61 | 67 | 156 |
| 167 | FND0103600174 | 09/21/22 | 23 | 410 | 9430 | 3874 | DPH810510 | 78 | 75 | 30 | 27 | 238 | 0.931 | 0.34 | 2.3 | 10 | 533 | 571 | 244 | 238 | 61 | 67 | 156 |
| 168 | FND0103600175 | 09/21/22 | 23 | 410 | 9430 | 3866 | DPH810510 | 78 | 76 | 28 | 26 | 238 | 0.931 | 0.34 | 2.2 | 10 | 533 | 571 | 244 | 238 | 61 | 67 | 156 |
| 169 | FND0103600176 | 09/21/22 | 23 | 410 | 9430 | 3872 | DPH810510 | 77 | 74 | 31 | 27 | 238 | 0.931 | 0.34 | 2.4 | 10 | 557 | 632 | 262 | 279 | 61 | 67 | 156 |
| 170 | FND0103600177 | 09/21/22 | 23 | 410 | 9430 | 3870 | DPH810510 | 79 | 75 | 30 | 27 | 238 | 0.931 | 0.34 | 2.4 | 10 | 557 | 632 | 262 | 279 | 61 | 67 | 156 |
| 171 | FND0103600178 | 09/21/22 | 23 | 410 | 9430 | 3848 | DPH810510 | 77 | 75 | 33 | 27 | 238 | 0.931 | 0.34 | 2.4 | 10 | 557 | 632 | 262 | 279 | 61 | 67 | 156 |
| 172 | FND0103600179 | 09/22/22 | 23 | 410 | 9430 | 3868 | DPH810510 | 79 | 75 | 30 | 25 | 238 | 0.931 | 0.34 | 2.3 | 10 | 557 | 632 | 262 | 279 | 61 | 67 | 156 |
| 173 | FND0103600180 | 09/22/22 | 23 | 410 | 9430 | 3868 | DPH810510 | 79 | 76 | 33 | 27 | 238 | 0.931 | 0.34 | 2.2 | 10 | 557 | 632 | 262 | 279 | 61 | 67 | 156 |
| 174 | FND0103600181 | 09/22/22 | 23 | 410 | 9430 | 3850 | DPH810510 | 79 | 74 | 32 | 24 | 238 | 0.931 | 0.34 | 2.4 | 10 | 533 | 604 | 244 | 247 | 69 | 70 | 156 |
| 175 | FND0103600182 | 09/22/22 | 23 | 410 | 9430 | 3866 | DPH810510 | 78 | 75 | 28 | 29 | 238 | 0.931 | 0.34 | 2.4 | 10 | 533 | 604 | 244 | 247 | 69 | 70 | 156 |
| 176 | FND0103600183 | 09/22/22 | 23 | 410 | 9430 | 3864 | DPH810510 | 78 | 74 | 31 | 25 | 238 | 0.931 | 0.34 | 2.4 | 10 | 533 | 604 | 244 | 247 | 69 | 70 | 156 |
| 177 | FND0103600184 | 09/22/22 | 23 | 410 | 9430 | 3874 | DPH810510 | 78 | 75 | 29 | 26 | 238 | 0.931 | 0.34 | 2.2 | 10 | 533 | 604 | 244 | 247 | 69 | 70 | 156 |
| 178 | FND0103600185 | 09/22/22 | 23 | 410 | 9430 | 3878 | DPH810510 | 79 | 76 | 29 | 27 | 238 | 0.931 | 0.34 | 2.4 | 10 | 533 | 604 | 244 | 247 | 69 | 70 | 156 |
| 179 | FND0103600186 | 09/22/22 | 23 | 410 | 9430 | 3878 | DPH810510 | 79 | 76 | 34 | 28 | 238 | 0.931 | 0.34 | 2.2 | 10 | 631 | 597 | 259 | 275 | 61 | 67 | 156 |
| 180 | FND0103600187 | 09/22/22 | 23 | 410 | 9430 | 3878 | DPH810510 | 79 | 75 | 32 | 26 | 238 | 0.931 | 0.34 | 2.2 | 10 | 631 | 597 | 259 | 275 | 61 | 67 | 156 |
| 181 | FND0103600188 | 09/22/22 | 23 | 410 | 9430 | 3894 | DPH810490 | 79 | 77 | 34 | 28 | 208 | 0.935 | 0.31 | 2.2 | 10 | 631 | 597 | 259 | 275 | 61 | 67 | 156 |
| 182 | FND0103600189 | 09/22/22 | 23 | 410 | 9430 | 3862 | DPH810490 | 80 | 77 | 33 | 27 | 208 | 0.935 | 0.31 | 2.2 | 10 | 631 | 597 | 259 | 275 | 61 | 67 | 156 |
| 183 | FND0103600190 | 09/22/22 | 23 | 410 | 9430 | 3828 | DPH810490 | 77 | 74 | 33 | 28 | 208 | 0.935 | 0.31 | 2.2 | 10 | 631 | 597 | 259 | 275 | 61 | 67 | 156 |
| 184 | FND0103600191 | 09/22/22 | 23 | 410 | 9430 | 3830 | DPH810490 | 78 | 75 | 33 | 26 | 208 | 0.933 | 0.31 | 2.2 | 10 | 530 | 579 | 242 | 232 | 63 | 67 | 155 |
| 185 | FND0103600192 | 09/22/22 | 23 | 410 | 9430 | 3826 | DPH810490 | 79 | 74 | 32 | 28 | 208 | 0.933 | 0.31 | 2.2 | 10 | 530 | 579 | 242 | 232 | 63 | 67 | 155 |
| 186 | FND0103600193 | 09/22/22 | 23 | 410 | 9430 | 3836 | DPH810490 | 78 | 72 | 31 | 25 | 208 | 0.933 | 0.31 | 2.2 | 10 | 530 | 579 | 242 | 232 | 63 | 67 | 155 |
| 187 | FND0103600194 | 09/23/22 | 23 | 410 | 9430 | 3840 | DPH810490 | 79 | 75 | 30 | 25 | 208 | 0.933 | 0.31 | 2.3 | 10 | 530 | 579 | 242 | 232 | 63 | 67 | 155 |
| 188 | FND0103600195 | 09/23/22 | 23 | 410 | 9430 | 3842 | DPH810490 | 78 | 71 | 29 | 27 | 208 | 0.933 | 0.31 | 2.3 | 10 | 530 | 579 | 242 | 232 | 63 | 67 | 155 |
| 189 | FND0103600196 | 09/23/22 | 23 | 410 | 9430 | 3836 | DPH810490 | 80 | 75 | 33 | 23 | 208 | 0.933 | 0.31 | 2.6 | 10 | 587 | 548 | 242 | 239 | 63 | 67 | 155 |
| 190 | FND0103600197 | 09/23/22 | 23 | 410 | 9430 | 3838 | DPH810490 | 79 | 73 | 33 | 23 | 208 | 0.933 | 0.31 | 2.6 | 10 | 587 | 548 | 242 | 239 | 63 | 67 | 155 |
| 191 | FND0103600198 | 09/23/22 | 23 | 410 | 9430 | 3840 | DPH810490 | 78 | 74 | 32 | 24 | 208 | 0.933 | 0.31 | 2.6 | 10 | 587 | 548 | 242 | 239 | 63 | 67 | 155 |
| 192 | FND0103600199 | 09/23/22 | 23 | 410 | 9430 | 3838 | DPH810490 | 79 | 75 | 29 | 31 | 208 | 0.933 | 0.31 | 2.3 | 10 | 587 | 548 | 242 | 239 | 63 | 67 | 155 |
| 193 | FND0103600200 | 09/23/22 | 23 | 410 | 9430 | 3850 | DPH810490 | 77 | 75 | 36 | 25 | 208 | 0.933 | 0.31 | 2.6 | 10 | 587 | 548 | 242 | 239 | 63 | 67 | 155 |
| 194 | FND0103600201 | 09/23/22 | 23 | 410 | 9430 | 3824 | DPH810490 | 78 | 76 | 33 | 27 | 208 | 0.934 | 0.31 | 2.3 | 10 | 565 | 581 | 263 | 246 | 69 | 70 | 157 |
| 195 | FND0103600202 | 09/23/22 | 23 | 410 | 9430 | 3824 | DPH810490 | 77 | 76 | 33 | 28 | 208 | 0.934 | 0.31 | 2.3 | 10 | 565 | 581 | 263 | 246 | 69 | 70 | 157 |
| 196 | FND0103600203 | 09/23/22 | 23 | 410 | 9430 | 3822 | DPH810490 | 77 | 75 | 33 | 25 | 208 | 0.934 | 0.31 | 2.3 | 10 | 565 | 581 | 263 | 246 | 69 | 70 | 157 |

| | | | | | | | | ASTM D5994 | | ASTM D7466 | | ASTM D8117 | ASTM D792 | ASTM D1238 | ASTM D4218 | ASTM D5596 | ASTM D6693 | | | | ASTM D1004 | | ASTM D4833 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Roll Number | Prod. Date | Width (ft) | Length (ft) | Area (sqft) | Weight (lb) | Resin Lot# | Thickness-Avg | Thickness-Min | Asperity (bottom) | Asperity (top) | OIT | Density | Melt Flow | Carbon Content | Category 1 Disp. | Break Elong (MD) | Break Elong (TD) | Tensile Break Str (MD) | Tensile Break Str (TD) | Tear Strength (TD) | Tear Strength (MD) | Puncture Resistance |
| | | | | | | | | mil | mil | mil | mil | minut | g/cc | g/10 | % | Categ | % | % | ppi | ppi | lb | lb | lb |
| 197 | FND0103600204 | 09/23/22 | 23 | 410 | 9430 | 3824 | DPH810490 | 78 | 75 | 35 | 26 | 208 | 0.934 | 0.31 | 2.3 | 10 | 565 | 581 | 263 | 246 | 69 | 70 | 157 |
| 198 | FND0103600205 | 09/23/22 | 23 | 410 | 9430 | 3822 | DPH810490 | 77 | 74 | 35 | 26 | 208 | 0.934 | 0.31 | 2.3 | 10 | 565 | 581 | 263 | 246 | 69 | 70 | 157 |
| 199 | FND0103600206 | 09/23/22 | 23 | 410 | 9430 | 3824 | DPH810490 | 77 | 75 | 33 | 27 | 208 | 0.934 | 0.31 | 2.5 | 10 | 532 | 558 | 247 | 236 | 69 | 70 | 157 |
| 200 | FND0103600207 | 09/23/22 | 23 | 410 | 9430 | 3822 | DPH810490 | 78 | 75 | 29 | 25 | 208 | 0.934 | 0.31 | 2.5 | 10 | 532 | 558 | 247 | 236 | 69 | 70 | 157 |
| 201 | FND0103600208 | 09/23/22 | 23 | 410 | 9430 | 3824 | DPH810490 | 78 | 73 | 34 | 28 | 208 | 0.934 | 0.31 | 2.1 | 10 | 532 | 558 | 247 | 236 | 69 | 70 | 157 |
| 202 | FND0103600209 | 09/24/22 | 23 | 410 | 9430 | 3826 | DPH810490 | 78 | 75 | 32 | 27 | 208 | 0.934 | 0.31 | 2.1 | 10 | 532 | 558 | 247 | 236 | 69 | 70 | 157 |
| 203 | FND0103600210 | 09/24/22 | 23 | 410 | 9430 | 3822 | DPH810490 | 78 | 77 | 33 | 27 | 208 | 0.934 | 0.31 | 2.5 | 10 | 532 | 558 | 247 | 236 | 69 | 70 | 157 |
| 204 | FND0103600211 | 09/24/22 | 23 | 410 | 9430 | 3826 | DPH810490 | 79 | 75 | 32 | 26 | 208 | 0.936 | 0.31 | 2.4 | 10 | 531 | 606 | 245 | 255 | 67 | 66 | 157 |
| 205 | FND0103600212 | 09/24/22 | 23 | 410 | 9430 | 3828 | DPH810490 | 78 | 76 | 33 | 32 | 208 | 0.936 | 0.31 | 2.4 | 10 | 531 | 606 | 245 | 255 | 67 | 66 | 157 |
| 206 | FND0103600213 | 09/24/22 | 23 | 410 | 9430 | 3830 | DPH810490 | 79 | 76 | 39 | 26 | 208 | 0.936 | 0.31 | 2.4 | 10 | 531 | 606 | 245 | 255 | 67 | 66 | 157 |
| 207 | FND0103600214 | 09/24/22 | 23 | 410 | 9430 | 3824 | DPH810490 | 78 | 76 | 32 | 28 | 208 | 0.936 | 0.31 | 2.4 | 10 | 531 | 606 | 245 | 255 | 67 | 66 | 157 |
| 208 | FND0103600215 | 09/24/22 | 23 | 410 | 9430 | 3830 | DPH810490 | 77 | 75 | 35 | 26 | 208 | 0.936 | 0.31 | 2.4 | 10 | 531 | 606 | 245 | 255 | 67 | 66 | 157 |
| 209 | FND0103600216 | 09/24/22 | 23 | 410 | 9430 | 3822 | DPH810490 | 78 | 77 | 35 | 27 | 208 | 0.936 | 0.31 | 2.2 | 10 | 550 | 596 | 253 | 249 | 67 | 66 | 157 |
| 210 | FND0103600217 | 09/24/22 | 23 | 410 | 9430 | 3822 | DPH810490 | 77 | 74 | 36 | 25 | 208 | 0.936 | 0.31 | 2.2 | 10 | 550 | 596 | 253 | 249 | 67 | 66 | 157 |
| 211 | FND0103600218 | 09/24/22 | 23 | 410 | 9430 | 3806 | DPH810490 | 78 | 77 | 35 | 26 | 208 | 0.936 | 0.31 | 2.2 | 10 | 550 | 596 | 253 | 249 | 67 | 66 | 157 |
| 212 | FND0103600219 | 09/24/22 | 23 | 410 | 9430 | 3816 | DPH810490 | 77 | 75 | 34 | 26 | 208 | 0.936 | 0.31 | 2.0 | 10 | 550 | 596 | 253 | 249 | 67 | 66 | 157 |
| 213 | FND0103600220 | 09/24/22 | 23 | 410 | 9430 | 3818 | DPH810490 | 78 | 76 | 34 | 26 | 208 | 0.936 | 0.31 | 2.2 | 10 | 550 | 596 | 253 | 249 | 67 | 66 | 157 |
| 214 | FND0103600222 | 09/24/22 | 23 | 410 | 9430 | 3822 | DPH810490 | 79 | 75 | 32 | 26 | 208 | 0.934 | 0.31 | 2.2 | 10 | 557 | 575 | 261 | 243 | 64 | 68 | 157 |
| 215 | FND0103600223 | 09/25/22 | 23 | 410 | 9430 | 3814 | DPH810490 | 77 | 73 | 29 | 30 | 208 | 0.934 | 0.31 | 2.2 | 10 | 557 | 575 | 261 | 243 | 64 | 68 | 157 |
| 216 | FND0103600224 | 09/25/22 | 23 | 410 | 9430 | 3824 | DPH810490 | 79 | 75 | 26 | 30 | 208 | 0.934 | 0.31 | 2.2 | 10 | 557 | 575 | 261 | 243 | 64 | 68 | 157 |
| 217 | FND0103600225 | 09/25/22 | 23 | 410 | 9430 | 3818 | DPH810490 | 77 | 74 | 30 | 30 | 208 | 0.934 | 0.31 | 2.2 | 10 | 557 | 575 | 261 | 243 | 64 | 68 | 157 |
| 218 | FND0103600226 | 09/25/22 | 23 | 410 | 9430 | 3822 | DPH810490 | 78 | 76 | 25 | 28 | 208 | 0.934 | 0.31 | 2.2 | 10 | 557 | 575 | 261 | 243 | 64 | 68 | 157 |
| 219 | FND0103600227 | 09/25/22 | 23 | 410 | 9430 | 3822 | DPH810490 | 78 | 72 | 28 | 28 | 208 | 0.934 | 0.31 | 2.3 | 10 | 525 | 563 | 233 | 239 | 64 | 68 | 157 |
| 220 | FND0103600228 | 09/25/22 | 23 | 410 | 9430 | 3826 | DPH810490 | 77 | 75 | 30 | 27 | 208 | 0.934 | 0.31 | 2.3 | 10 | 525 | 563 | 233 | 239 | 64 | 68 | 157 |
| 221 | FND0103600229 | 09/25/22 | 23 | 410 | 9430 | 3822 | DPH810490 | 78 | 77 | 33 | 27 | 208 | 0.934 | 0.31 | 2.3 | 10 | 525 | 563 | 233 | 239 | 64 | 68 | 157 |
| 222 | FND0103600230 | 09/25/22 | 23 | 410 | 9430 | 3824 | DPH810490 | 77 | 74 | 33 | 26 | 208 | 0.934 | 0.31 | 2.4 | 10 | 525 | 563 | 233 | 239 | 64 | 68 | 157 |
| 223 | FND0103600231 | 09/25/22 | 23 | 410 | 9430 | 3822 | DPH810490 | 78 | 75 | 33 | 26 | 208 | 0.934 | 0.31 | 2.3 | 10 | 525 | 563 | 233 | 239 | 64 | 68 | 157 |
| 224 | FND0103600232 | 09/25/22 | 23 | 410 | 9430 | 3824 | DPH810490 | 78 | 74 | 33 | 26 | 208 | 0.935 | 0.31 | 2.5 | 10 | 561 | 583 | 259 | 240 | 68 | 68 | 154 |
| 225 | FND0103600233 | 09/25/22 | 23 | 410 | 9430 | 3810 | DPH810490 | 77 | 73 | 34 | 27 | 208 | 0.935 | 0.31 | 2.5 | 10 | 561 | 583 | 259 | 240 | 68 | 68 | 154 |
| 226 | FND0103600234 | 09/25/22 | 23 | 410 | 9430 | 3800 | DPH810490 | 78 | 75 | 33 | 26 | 208 | 0.935 | 0.31 | 2.5 | 10 | 561 | 583 | 259 | 240 | 68 | 68 | 154 |
| 227 | FND0103600235 | 09/25/22 | 23 | 410 | 9430 | 3808 | DPH810490 | 78 | 76 | 32 | 28 | 208 | 0.935 | 0.31 | 2.4 | 10 | 561 | 583 | 259 | 240 | 68 | 68 | 154 |
| 228 | FND0103600236 | 09/25/22 | 23 | 410 | 9430 | 3800 | DPH810490 | 77 | 75 | 31 | 25 | 208 | 0.935 | 0.31 | 2.4 | 10 | 561 | 583 | 259 | 240 | 68 | 68 | 154 |
| 229 | FND0103600237 | 09/25/22 | 23 | 410 | 9430 | 3826 | DPH810490 | 79 | 77 | 29 | 29 | 208 | 0.935 | 0.31 | 2.5 | 10 | 560 | 606 | 254 | 258 | 68 | 68 | 154 |
| 230 | FND0103600238 | 09/26/22 | 23 | 410 | 9430 | 3824 | DPH810490 | 78 | 72 | 28 | 28 | 208 | 0.935 | 0.31 | 2.5 | 10 | 560 | 606 | 254 | 258 | 68 | 68 | 154 |

Ryan Steele, Lab Manager

For Questions, Please Contact: Lab Manager, Fernley
Ryan Steele
775-835-8282



NewFields

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APPROVED | APPROVED WITH CHANGES NOTED
REVISE AND RESUBMIT | REJECTED

# APPENDIX D.4 - 80-MIL LLDPE DSMS GEOMEMBRANE RESIN QC CERTIFICATES

CoA Date: 10/25/2021

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 EAST NEWLANDS
FERNLEY NV 89408
USA

Recipient: PALMER
Fax:

Delivery #: 80540994
PO #: 18729
Weight: 179600.000 LB
Ship Date: 10/25/2021
Package: BULK
Mode: Hopper Car
Car #: CPCX816394
Seal No: 263746

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DNK810410

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.34 | g/10min |
| HLMI | ASTM D1238 | 14.20 | g/10min |
| Pellet Count | ST-905 | 32 | pelet/gram |
| Production date | | 20211014 | |
| Density | D1505 | 0.919 | g/cm3 |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem).
**However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Leslie Dziamara at +1-832-813-4806

Formosa Plastics

FORMOSA PLASTICS CORPORATION, TEXAS
201 FORMOSA DRIVE
PO BOX 700
POINT COMFORT TX 77978
PHONE:( 888 )FPCUSA3

# Certificate of Analysis

(CONFIDENTIAL)

CUSTOMER:AGRU/AMERICA, INC.
2000 E NEWLAND DRIVE

FERNLEY NV 89408
PRODUCT :L91904B
RAILCAR ACFX041846
CLEANING/INSPECTION NO: 041846111121

S/O NO : JWCA232
CUSTOMER PO : PO 18939
DATE SHIPPED: 12/29/21
LOT NO : 21KB544
WEIGHT (LB) : 180,000.00
CUSTID:FT03888 SPIDM1

| TEST ITEM | REFERENCE METHOD | TEST VALUE |
|---|---|---|
| Melt Index, g/10min | ASTM D1238 | .44 |
| Density, g/cm3 | ASTM D1505 | .9201 |

Linda Kao

QC SUPERVISOR: LINDA KAO

January 29, 2014

**Mail To:**

**Grant Palmer**
**Agru America**
500 Garrison Road
Georgetown, SC 29440

email: gp@AgruAmerica.com

**Bill To:**

**<= Same**

Dear Mr. Palmer:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

| | |
|---|---|
| TRI Job Reference Number: | E2386-59-09 |
| Material(s) Tested: | One Agru 80 mil Microspike LLDPE Geomembrane(s) |
| Test(s) Requested: | 2% Secant (ASTM D5323 via ASTM D638, GM17)<br>Multi-axial Tensile (ASTM D 5617) |

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com



The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

September 29, 2016
January 11, 2017 Updated UV Resistance (D 7238) & Oven Aging (D 5721)

**Mail To:**

**Nathan Ivy**
**Agru America**
500 Garrison Rd
Georgetown, SC 29440

email: nivy@agruamerica.com

**Bill To:**

**<= Same**

Dear Mr. Ivy:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project: **Trial 16-006**

TRI Job Reference Number: 24280

Material(s) Tested: One, Agru 40 mil Smooth LLDPE Geomembrane

Test(s) Requested: 2% Secant Modulus (ASTM D 5323 )
Multi-axial Tensile (ASTM D 5617)
Data Updated==> UV Resistance (ASTM D 7238)
Data Updated==> Oven Aging (ASTM D5721)

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file



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TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

**GEOMEMBRANE TEST RESULTS**
**TRI Client: Agru America**
**Project: Trial 16-006**

**Material: Agru 40 mil Smooth LLDPE Geomembrane**
**Sample Identification: G16D002549 , , Formasa L91507H**
**TRI Log #: 24280**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2% Secant Modulus (ASTM D 5323, 2 ipm strain rate, modulus at 2% strain)** | | | | | | | | | | | | |
| MD 2% Secant Modulus (psi) | 30710 | 32447 | 32924 | 31549 | 30236 | | | | | | **31573** | 1132 |
| MD 2% Secant Modulus (ppi) | 1367 | 1430.9 | 1481.6 | 1303 | 1285 | | | | | | **1373** | 83 |
| TD 2% Secant Modulus (psi) | 33432 | 30097 | 32079 | 34335 | 32442 | | | | | | **32477** | 1596 |
| TD 2% Secant Modulus (ppi) | 1381 | 1258.1 | 1340.9 | 1407.7 | 1326.9 | | | | | | **1343** | 57 |
| **Multi-axial Tensile (ASTM D 5617)** | | | | | | | | | | | | |
| Thickness (mils) | 40 | 38 | 40 | | | | | | | | **40** | 1 |
| Maximum Stress (psi) | 1540 | 1612 | 1590 | | | | | | | | **1581** | 37 |
| % Elongation @ Rupture (%) | 90.6 | 107.6 | 86.3 | | | | | | | | **94.8** | 11.3 |
| Failure Description | H-CAT N-EF | TDT N-EF | MDT N-EF | | | | | | | | | |

| | |
|---|---|
| MDT | A tear in the machine direction. |
| H | Circular or elliptical hole in the specimen. |
| H-CAT | Circular or elliptical hole in an area where the material has significantly necked down or thinned. The large thinned area resembles a pupil of a cat eye. |
| N-EF | No edge failure |



The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

**GEOMEMBRANE TEST RESULTS**
**TRI Client: Agru America**
**Project: Trial 16-006**

**Material: Agru 40 mil Smooth LLDPE Geomembrane**
**Sample Identification: G16D002549 , , Formasa L91507H**
**TRI Log #: 24280**

| PARAMETER | TEST REPLICATE NUMBER | | | | | | | | | | MEAN | STD. DEV. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | |
| **UV Resistance (ASTM D 7238)** | | | | | | | | | | | | | |
| The resistance to degradation due to exposure to ultraviolet light and moisture was determined in accordance with GRI-GM11, Accelerated Weathering of Geomembranes Using a Fluorescent UVA Device. This standard covers the basic principles for using the QUV apparatus to accelerate the weathering of geomembranes using UVA bulbs and condensation. To comply with Specification GRI GM13, the sample was exposed to 1600 hours of UV exposure composed of 80 cycles of UA at 75 C for 20 hours followed by condensation at 60 C for 4 hours. The High Pressure Oxidative Induction Time (HPOIT) was evaluated before and after the exposure and results were as follows. | | | | | | | | | | | | | |
| | | | | | | | | | | | | | PERCENT RETAINED |
| HPOIT (minutes) - Baseline | 574 | | | | | | | | | | **574** | | |
| HPOIT (minutes) - After QUV Aging | 418 | | | | | | | | | | **418** | | 73 |
| Note: No surface cracking was observed. | | | | | | | | | | | | | |
| **Oven Aging (ASTM D 5721)** | | | | | | | | | | | | | |
| The geomembrane was exposed to 90 days of elevated temperature exposure in an air oven maintained at 85°C ± 0.5°C in accordance with ASTM D 5721-95, Standard Practice for Air-Oven Aging of Polyolefin Geomembranes. High Pressure Oxidative Induction Time (HPOIT) was tested after exposure and compared to values generated for unexposed material. The results are provided below. | | | | | | | | | | | | | |
| | | | | | | | | | | | | | PERCENT RETAINED |
| HPOIT (minutes) - Baseline | 574 | | | | | | | | | | **574** | | |
| HPOIT (minutes) - After Oven Aging | 561 | | | | | | | | | | **561** | | 98 |
| Note: No surface cracking was observed. | | | | | | | | | | | | | |



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TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

## GEOMEMBRANE TEST RESULTS
**TRI Client: Agru America**

**Material: Agru 80 mil Microspike LLDPE Geomembrane**
**Sample Identification: G14D031009 , Chevron 7104 LLDPE Resin, Resin Lot # CDG810350**
**TRI Log #: E2386-59-09**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2% Secant Modulus (ASTM D5323 via ASTM D638, GM17)** | | | | | | | | | | | | |
| MD 2% Secant Modulus (psi) | 30887 | 30305 | 30617 | 32594 | 31327 | | | | | | **31146** | 892 |
| MD 2% Secant Modulus (ppi) | 2662 | 2530 | 2596 | 2533 | 2444 | | | | | | **2553** | 82 |
| TD 2% Secant Modulus (psi) | 35037 | 35745 | 35187 | 37057 | 34833 | | | | | | **35572** | 897 |
| TD 2% Secant Modulus (ppi) | 2950 | 2760 | 3065 | 2827 | 2675 | | | | | | **2855** | 154 |
| **Multi-axial Tensile (ASTM D 5617)** | | | | | | | | | | | | |
| **Test Method A: Centerpoint Deflection Versus Pressure** | | | | | | | | | | | | |
| Thickness (mils) | 81.0 | 78.0 | 79.0 | | | | | | | | **79.3** | 1.5 |
| Maximum Stress (psi) | 1873 | 1781 | 1899 | | | | | | | | **1851** | 62 |
| % Elongation @ Rupture (%) | 77.6 | 77.0 | 85.0 | | | | | | | | **79.9** | 4.5 |
| Failure Description | MDT N-EF | MDT N-EF | MDT N-EF | | | | | | | | | |

| | |
|---|---|
| MDT | A tear in the machine direction. |
| H | Circular or elliptical hole in the specimen. |
| H-CAT | Circular or elliptical hole in an area where the material has significantly necked down or thinned. The large thinned area resembles a pupil of a cat eye. |
| N-EF | No edge failure |

MD Machine Direction TD Transverse Direction



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TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

CoA Date: 07/15/2022

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 Newlands Dr E
FERNLEY NV 89408-8944
USA

Recipient: PALMER
Fax:

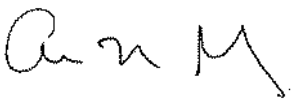
Delivery #: 80715572
PO #: 19485
Weight: 185350.000 LB
Ship Date: 07/15/2022
Package: BULK
Mode: Hopper Car
Car #: CPCX805072
Seal No: 302679

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DPF811480

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.34 | g/10min |
| HLMI | ASTM D1238 | 13.20 | g/10min |
| Pellet Count | ST-905 | 33 | pelet/gram |
| Production date | | 20220621 | |
| Density | D1505 | 0.919 | g/cm3 |

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**However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**



AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Leslie Dziamara at +1-832-813-4806

*Vergil H. Rhodes, PE, CPlasT - Tech Svc & App Dev Engineer, Geomembranes*
*Highways 60 & 123, Bartlesville Research and Technology Center, Room 103 PTC*
*Bartlesville, OK 74003*
*■ 539-529-4279 ■ rhodevh@cpchem.com ■ Fax: 918-977-7599 ■ www.cpchem.com*

November 12, 2021
Filename: Agru Oven and QUV Exposure for HP-OIT Testing_2021_111221.pdf

Nathan Ivy - Corporate Quality Control/Technical Manager
Agru America, Inc.
800 Rockmead #122
Kingwood, TX 77339
281-358-4741

Dear Mr. Ivy:

Please recall your request for testing of oven-exposed and UV-exposed geomembrane samples produced primarily from Marlex® 7104 LLDPE and Marlex® K307 MDPE. Agru blended other components with each of these polyethylenes to produce the geomembrane samples for testing. Geomembrane samples have been received from Agru, and test specimens were taken from the smooth areas of the samples. Test results are reported on the following two pages. The samples were tested for HP-OIT in their as-received condition and were also tested after oven and UV exposures of 90 days and 1600 hours of irradiance, respectively, in accordance with GRI-GM13 and GRI-GM17 requirements.

The following geomembrane sheet samples were received from Agru in July 2021 and were reported to be primarily composed of each of the Chevron Phillips Chemical Company grades in the description below:

- Marlex® K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick.

- Marlex® 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick.

The exposure and testing conditions along with the corresponding test results are tabulated on the next two pages. GM-13 and GM-17 require a minimum % HP-OIT retention after a 90-day oven exposure and after a 1600-hour UV irradiance exposure. These test results indicate the GM-13 and GM-17 minimum % HP-OIT retentions were exceeded by the Agru-supplied K307 and 7104 sheet samples, respectively.

If you have any questions, please feel free to contact me (contact information given above).

Sincerely,

Vergil Rhodes
Polyethylene Technical Service and Applications Development, Geomembrane

NOTICES
Technical Information - By using any Technical Information contained herein, Recipient agrees that said Technical Information is given by CPChem for convenience only, without any warranty or guarantee of any kind, and is accepted and used at your sole risk. Recipients are encouraged to verify independently any such information to their reasonable satisfaction. As used in this paragraph, "Technical Information" includes any technical advice, recommendations, testing, or analysis, including, without limitation, information as it may relate to the selection of a product for a specific use and application.

The following oven aging and UV exposure test methods were conducted in accordance with the GRI-GM13 (HDPE) and GRI-GM17 (LLDPE) requirements:

| **Test Name** | **Exposure Conditions** | **Test Method** |
|---|---|---|
| Oven Aging | 90 days in an oven at 85 °C | ASTM D5721 |
| UV Exposure | 1600 UV irradiance hours. Cycle: 20 hours UVA-340 at 75 °C followed by 4 hours dark with condensation at 60 °C. Irradiance was 0.78 W/m$^2$ at wavelength 340 nm. Note: This implies a total UV chamber residence time of 1920 hours, e.g., 1600 hours of irradiance and 320 hours of dark/condensation. | ASTM D7238 |
| HP-OIT | 150 °C in an oxygen atmosphere at 500 psi | ASTM D5885 |

**Oven Aging Results:**

| Sample | Initial HP-OIT (min) | HP-OIT after 90 days of oven aging. (min) | **% HP-OIT** Retained after 90 days of oven aging. | GRI-GM13 and GRI-GM17 minimum % HP-OIT requirements after 90 days of oven aging. |
|---|---|---|---|---|
| K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick | 1313 | 1174 | **89.4%** | GRI-GM13: % HP-OIT: 80% minimum |
| 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick | 973 | 802 | **82.4%** | GRI-GM17: % HP-OIT: 60% minimum |

Continued on Page 3 - - -

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**UV Aging Results:**

| Sample | Initial HP-OIT (min) | HP-OIT after 1600 hrs of UV exposure. (min) | **% HP-OIT** Retained after 1600 hrs of UV exposure. | GRI-GM13 and GRI-GM17 minimum % HP-OIT requirements after 1600 hours of UV exposure. |
|---|---|---|---|---|
| K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick | 1313 | 1053 | **80.2%** | GRI-GM13: % HP-OIT: 50% minimum |
| 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick | 973 | 768 | **78.9%** | GRI-GM17: % HP-OIT: 35% minimum |

Notes:

- 1600 hours of UV exposure in accordance with ASTM D7238 implies a total UV chamber residence time of 1920 hours, e.g., 1600 hours of irradiance and 320 hours of darkness with condensation.
- Sheet samples were aged with the shiny side of the sheet facing the UV bulbs.

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January 29, 2014

**Mail To:**

**Grant Palmer**
**Agru America**
500 Garrison Road
Georgetown, SC 29440

email: gp@AgruAmerica.com

**Bill To:**

**<= Same**

Dear Mr. Palmer:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

| | |
|---|---|
| TRI Job Reference Number: | E2386-59-09 |
| Material(s) Tested: | One Agru 80 mil Microspike LLDPE Geomembrane(s) |
| Test(s) Requested: | 2% Secant (ASTM D5323 via ASTM D638, GM17)<br>Multi-axial Tensile (ASTM D 5617) |

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com



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## GEOMEMBRANE TEST RESULTS
**TRI Client: Agru America**

**Material: Agru 80 mil Microspike LLDPE Geomembrane**
**Sample Identification: G14D031009 , Chevron 7104 LLDPE Resin, Resin Lot # CDG810350**
**TRI Log #: E2386-59-09**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2% Secant Modulus (ASTM D5323 via ASTM D638, GM17)** | | | | | | | | | | | | |
| MD 2% Secant Modulus (psi) | 30887 | 30305 | 30617 | 32594 | 31327 | | | | | | **31146** | 892 |
| MD 2% Secant Modulus (ppi) | 2662 | 2530 | 2596 | 2533 | 2444 | | | | | | **2553** | 82 |
| TD 2% Secant Modulus (psi) | 35037 | 35745 | 35187 | 37057 | 34833 | | | | | | **35572** | 897 |
| TD 2% Secant Modulus (ppi) | 2950 | 2760 | 3065 | 2827 | 2675 | | | | | | **2855** | 154 |
| **Multi-axial Tensile (ASTM D 5617)** | | | | | | | | | | | | |
| **Test Method A: Centerpoint Deflection Versus Pressure** | | | | | | | | | | | | |
| Thickness (mils) | 81.0 | 78.0 | 79.0 | | | | | | | | **79.3** | 1.5 |
| Maximum Stress (psi) | 1873 | 1781 | 1899 | | | | | | | | **1851** | 62 |
| % Elongation @ Rupture (%) | 77.6 | 77.0 | 85.0 | | | | | | | | **79.9** | 4.5 |
| Failure Description | MDT N-EF | MDT N-EF | MDT N-EF | | | | | | | | | |

| | |
|---|---|
| MDT | A tear in the machine direction. |
| H | Circular or elliptical hole in the specimen. |
| H-CAT | Circular or elliptical hole in an area where the material has significantly necked down or thinned. The large thinned area resembles a pupil of a cat eye. |
| N-EF | No edge failure |

MD Machine Direction TD Transverse Direction



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TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

CoA Date: 07/15/2022

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 Newlands Dr E
FERNLEY NV 89408-8944
USA

Recipient: PALMER
Fax:

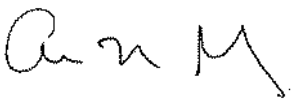
Delivery #: 80715572
PO #: 19485
Weight: 185350.000 LB
Ship Date: 07/15/2022
Package: BULK
Mode: Hopper Car
Car #: CPCX805072
Seal No: 302679

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DPF811480

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.34 | g/10min |
| HLMI | ASTM D1238 | 13.20 | g/10min |
| Pellet Count | ST-905 | 33 | pelet/gram |
| Production date | | 20220621 | |
| Density | D1505 | 0.919 | g/cm3 |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem).
**However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**



AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Leslie Dziamara at +1-832-813-4806

CoA Date: 08/31/2022

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 Newlands Dr E
FERNLEY NV 89408-8944
USA

Recipient: PALMER
Fax:

Delivery #: 80745750
PO #: 19616
Weight: 188450.000 LB
Ship Date: 08/31/2022
Package: BULK
Mode: Hopper Car
Car #: TILX624120
Seal No: 303241

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DPH810510

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.34 | g/10min |
| HLMI | ASTM D1238 | 15.10 | g/10min |
| Pellet Count | ST-905 | 34 | pelet/gram |
| Production date | | 20220818 | |
| Density | D1505 | 0.919 | g/cm3 |

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**However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Leslie Dziamara at +1-832-813-4806

CoA Date: 06/22/2022

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 Newlands Dr E
FERNLEY NV 89408-8944
USA

Recipient: PALMER
Fax:

Delivery #: 80699959
PO #: 19423
Weight: 188350.000 LB
Ship Date: 06/22/2022
Package: BULK
Mode: Hopper Car
Car #: CHVX889338
Seal No: 298633

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DPF811350

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.35 | g/10min |
| HLMI | ASTM D1238 | 14.70 | g/10min |
| Pellet Count | ST-905 | 35 | pelet/gram |
| Production date | | 20220620 | |
| Density | D1505 | 0.919 | g/cm3 |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem).
**However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Leslie Dziamara at +1-832-813-4806

*Vergil H. Rhodes, PE, CPlasT - Tech Svc & App Dev Engineer, Geomembranes*
*Highways 60 & 123, Bartlesville Research and Technology Center, Room 103 PTC*
*Bartlesville, OK 74003*
*■ 539-529-4279 ■ rhodevh@cpchem.com ■ Fax: 918-977-7599 ■ www.cpchem.com*

November 12, 2021
Filename: Agru Oven and QUV Exposure for HP-OIT Testing_2021_111221.pdf

Nathan Ivy - Corporate Quality Control/Technical Manager
Agru America, Inc.
800 Rockmead #122
Kingwood, TX 77339
281-358-4741

Dear Mr. Ivy:

Please recall your request for testing of oven-exposed and UV-exposed geomembrane samples produced primarily from Marlex® 7104 LLDPE and Marlex® K307 MDPE. Agru blended other components with each of these polyethylenes to produce the geomembrane samples for testing. Geomembrane samples have been received from Agru, and test specimens were taken from the smooth areas of the samples. Test results are reported on the following two pages. The samples were tested for HP-OIT in their as-received condition and were also tested after oven and UV exposures of 90 days and 1600 hours of irradiance, respectively, in accordance with GRI-GM13 and GRI-GM17 requirements.

The following geomembrane sheet samples were received from Agru in July 2021 and were reported to be primarily composed of each of the Chevron Phillips Chemical Company grades in the description below:

- Marlex® K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick.

- Marlex® 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick.

The exposure and testing conditions along with the corresponding test results are tabulated on the next two pages. GM-13 and GM-17 require a minimum % HP-OIT retention after a 90-day oven exposure and after a 1600-hour UV irradiance exposure. These test results indicate the GM-13 and GM-17 minimum % HP-OIT retentions were exceeded by the Agru-supplied K307 and 7104 sheet samples, respectively.

If you have any questions, please feel free to contact me (contact information given above).

Sincerely,

Vergil Rhodes
Polyethylene Technical Service and Applications Development, Geomembrane

NOTICES
Technical Information - By using any Technical Information contained herein, Recipient agrees that said Technical Information is given by CPChem for convenience only, without any warranty or guarantee of any kind, and is accepted and used at your sole risk. Recipients are encouraged to verify independently any such information to their reasonable satisfaction. As used in this paragraph, "Technical Information" includes any technical advice, recommendations, testing, or analysis, including, without limitation, information as it may relate to the selection of a product for a specific use and application.

The following oven aging and UV exposure test methods were conducted in accordance with the GRI-GM13 (HDPE) and GRI-GM17 (LLDPE) requirements:

| **Test Name** | **Exposure Conditions** | **Test Method** |
|---|---|---|
| Oven Aging | 90 days in an oven at 85 °C | ASTM D5721 |
| UV Exposure | 1600 UV irradiance hours. Cycle: 20 hours UVA-340 at 75 °C followed by 4 hours dark with condensation at 60 °C. Irradiance was 0.78 W/m$^2$ at wavelength 340 nm. Note: This implies a total UV chamber residence time of 1920 hours, e.g., 1600 hours of irradiance and 320 hours of dark/condensation. | ASTM D7238 |
| HP-OIT | 150 °C in an oxygen atmosphere at 500 psi | ASTM D5885 |

**Oven Aging Results:**

| Sample | Initial HP-OIT (min) | HP-OIT after 90 days of oven aging. (min) | **% HP-OIT** Retained after 90 days of oven aging. | GRI-GM13 and GRI-GM17 minimum % HP-OIT requirements after 90 days of oven aging. |
|---|---|---|---|---|
| K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick | 1313 | 1174 | **89.4%** | GRI-GM13: % HP-OIT: 80% minimum |
| 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick | 973 | 802 | **82.4%** | GRI-GM17: % HP-OIT: 60% minimum |

Continued on Page 3 - - -

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**UV Aging Results:**

| Sample | Initial HP-OIT (min) | HP-OIT after 1600 hrs of UV exposure. (min) | **% HP-OIT** Retained after 1600 hrs of UV exposure. | GRI-GM13 and GRI-GM17 minimum % HP-OIT requirements after 1600 hours of UV exposure. |
|---|---|---|---|---|
| K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick | 1313 | 1053 | **80.2%** | GRI-GM13: % HP-OIT: 50% minimum |
| 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick | 973 | 768 | **78.9%** | GRI-GM17: % HP-OIT: 35% minimum |

Notes:

- 1600 hours of UV exposure in accordance with ASTM D7238 implies a total UV chamber residence time of 1920 hours, e.g., 1600 hours of irradiance and 320 hours of darkness with condensation.
- Sheet samples were aged with the shiny side of the sheet facing the UV bulbs.

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January 29, 2014

**Mail To:**

**Grant Palmer**
**Agru America**
500 Garrison Road
Georgetown, SC 29440

email: gp@AgruAmerica.com

**Bill To:**

**<= Same**

Dear Mr. Palmer:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

| | |
|---|---|
| TRI Job Reference Number: | E2386-59-09 |
| Material(s) Tested: | One Agru 80 mil Microspike LLDPE Geomembrane(s) |
| Test(s) Requested: | 2% Secant (ASTM D5323 via ASTM D638, GM17)<br>Multi-axial Tensile (ASTM D 5617) |

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com



The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

## GEOMEMBRANE TEST RESULTS
**TRI Client: Agru America**

**Material: Agru 80 mil Microspike LLDPE Geomembrane**
**Sample Identification: G14D031009 , Chevron 7104 LLDPE Resin, Resin Lot # CDG810350**
**TRI Log #: E2386-59-09**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2% Secant Modulus (ASTM D5323 via ASTM D638, GM17)** | | | | | | | | | | | | |
| MD 2% Secant Modulus (psi) | 30887 | 30305 | 30617 | 32594 | 31327 | | | | | | **31146** | 892 |
| MD 2% Secant Modulus (ppi) | 2662 | 2530 | 2596 | 2533 | 2444 | | | | | | **2553** | 82 |
| TD 2% Secant Modulus (psi) | 35037 | 35745 | 35187 | 37057 | 34833 | | | | | | **35572** | 897 |
| TD 2% Secant Modulus (ppi) | 2950 | 2760 | 3065 | 2827 | 2675 | | | | | | **2855** | 154 |
| **Multi-axial Tensile (ASTM D 5617)** | | | | | | | | | | | | |
| **Test Method A: Centerpoint Deflection Versus Pressure** | | | | | | | | | | | | |
| Thickness (mils) | 81.0 | 78.0 | 79.0 | | | | | | | | **79.3** | 1.5 |
| Maximum Stress (psi) | 1873 | 1781 | 1899 | | | | | | | | **1851** | 62 |
| % Elongation @ Rupture (%) | 77.6 | 77.0 | 85.0 | | | | | | | | **79.9** | 4.5 |
| Failure Description | MDT N-EF | MDT N-EF | MDT N-EF | | | | | | | | | |

| | |
|---|---|
| MDT | A tear in the machine direction. |
| H | Circular or elliptical hole in the specimen. |
| H-CAT | Circular or elliptical hole in an area where the material has significantly necked down or thinned. The large thinned area resembles a pupil of a cat eye. |
| N-EF | No edge failure |

MD Machine Direction TD Transverse Direction



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TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

CoA Date: 06/22/2022

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 Newlands Dr E
FERNLEY NV 89408-8944
USA

Recipient: PALMER
Fax:

Delivery #: 80699959
PO #: 19423
Weight: 188350.000 LB
Ship Date: 06/22/2022
Package: BULK
Mode: Hopper Car
Car #: CHVX889338
Seal No: 298633

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DPF811350

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.35 | g/10min |
| HLMI | ASTM D1238 | 14.70 | g/10min |
| Pellet Count | ST-905 | 35 | pelet/gram |
| Production date | | 20220620 | |
| Density | D1505 | 0.919 | g/cm3 |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem). **However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

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ACCEPTANCE IS FOR GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS ONLY. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESS AND TECHNIQUES FOR CONSTRUCTION; COORDINATING ITS WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING ITS WORK IN A SAFE AND SATISFACTORY MANNER.

■ APPROVED ☐ APPROVED WITH CHANGES NOTED
☐ REVISE AND RESUBMIT ☐ REJECTED

DATE: Sep 23, 2022 BY: Nikoliya L Boyanich

For CoA questions contact Leslie Dziamara at +1-832-813-4806

CoA Date: 08/31/2022

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 Newlands Dr E
FERNLEY NV 89408-8944
USA

Recipient: PALMER
Fax:

Delivery #: 80745750
PO #: 19616
Weight: 188450.000 LB
Ship Date: 08/31/2022
Package: BULK
Mode: Hopper Car
Car #: TILX624120
Seal No: 303241

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DPH810510

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.34 | g/10min |
| HLMI | ASTM D1238 | 15.10 | g/10min |
| Pellet Count | ST-905 | 34 | pelet/gram |
| Production date | | 20220818 | |
| Density | D1505 | 0.919 | g/cm3 |

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AMANDA ROBY
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☐ REVISE AND RESUBMIT ☐ REJECTED

DATE: Sep 23, 2022 BY: Nikoliya L Boyanich

For CoA questions contact Leslie Dziamara at +1-832-813-4806

*Vergil H. Rhodes, PE, CPlasT - Tech Svc & App Dev Engineer, Geomembranes*
*Highways 60 & 123, Bartlesville Research and Technology Center, Room 103 PTC*
*Bartlesville, OK 74003*
*■ 539-529-4279 ■ rhodevh@cpchem.com ■ Fax: 918-977-7599 ■ www.cpchem.com*

November 12, 2021
Filename: Agru Oven and QUV Exposure for HP-OIT Testing_2021_111221.pdf

Nathan Ivy - Corporate Quality Control/Technical Manager
Agru America, Inc.
800 Rockmead #122
Kingwood, TX 77339
281-358-4741

Dear Mr. Ivy:

Please recall your request for testing of oven-exposed and UV-exposed geomembrane samples produced primarily from Marlex® 7104 LLDPE and Marlex® K307 MDPE. Agru blended other components with each of these polyethylenes to produce the geomembrane samples for testing. Geomembrane samples have been received from Agru, and test specimens were taken from the smooth areas of the samples. Test results are reported on the following two pages. The samples were tested for HP-OIT in their as-received condition and were also tested after oven and UV exposures of 90 days and 1600 hours of irradiance, respectively, in accordance with GRI-GM13 and GRI-GM17 requirements.

The following geomembrane sheet samples were received from Agru in July 2021 and were reported to be primarily composed of each of the Chevron Phillips Chemical Company grades in the description below:

- Marlex® K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick.

- Marlex® 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick.

The exposure and testing conditions along with the corresponding test results are tabulated on the next two pages. GM-13 and GM-17 require a minimum % HP-OIT retention after a 90-day oven exposure and after a 1600-hour UV irradiance exposure. These test results indicate the GM-13 and GM-17 minimum % HP-OIT retentions were exceeded by the Agru-supplied K307 and 7104 sheet samples, respectively.

If you have any questions, please feel free to contact me (contact information given above).

Sincerely,

Vergil Rhodes
Polyethylene Technical Service and Applications Development, Geomembrane

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The following oven aging and UV exposure test methods were conducted in accordance with the GRI-GM13 (HDPE) and GRI-GM17 (LLDPE) requirements:

| **Test Name** | **Exposure Conditions** | **Test Method** |
|---|---|---|
| Oven Aging | 90 days in an oven at 85 °C | ASTM D5721 |
| UV Exposure | 1600 UV irradiance hours. Cycle: 20 hours UVA-340 at 75 °C followed by 4 hours dark with condensation at 60 °C. Irradiance was 0.78 W/m$^2$ at wavelength 340 nm. Note: This implies a total UV chamber residence time of 1920 hours, e.g., 1600 hours of irradiance and 320 hours of dark/condensation. | ASTM D7238 |
| HP-OIT | 150 °C in an oxygen atmosphere at 500 psi | ASTM D5885 |

**Oven Aging Results:**

| Sample | Initial HP-OIT (min) | HP-OIT after 90 days of oven aging. (min) | **% HP-OIT** Retained after 90 days of oven aging. | GRI-GM13 and GRI-GM17 minimum % HP-OIT requirements after 90 days of oven aging. |
|---|---|---|---|---|
| K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick | 1313 | 1174 | **89.4%** | GRI-GM13: % HP-OIT: 80% minimum |
| 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick | 973 | 802 | **82.4%** | GRI-GM17: % HP-OIT: 60% minimum |

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■ APPROVED ☐ APPROVED WITH CHANGES NOTED

☐ REVISE AND RESUBMIT ☐ REJECTED

DATE: *Sep 23, 2022* BY: *Nikoliya L Boyanich*

Continued on Page 3 - - -

NOTICES

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**UV Aging Results:**

| Sample | Initial HP-OIT (min) | HP-OIT after 1600 hrs of UV exposure. (min) | **% HP-OIT** Retained after 1600 hrs of UV exposure. | GRI-GM13 and GRI-GM17 minimum % HP-OIT requirements after 1600 hours of UV exposure. |
|---|---|---|---|---|
| K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick | 1313 | 1053 | **80.2%** | GRI-GM13: % HP-OIT: 50% minimum |
| 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick | 973 | 768 | **78.9%** | GRI-GM17: % HP-OIT: 35% minimum |

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■ APPROVED ☐ APPROVED WITH CHANGES NOTED

☐ REVISE AND RESUBMIT ☐ REJECTED

DATE: *Sep 23, 2022* BY: *Nikoliya L Boyanich*

Notes:

- 1600 hours of UV exposure in accordance with ASTM D7238 implies a total UV chamber residence time of 1920 hours, e.g., 1600 hours of irradiance and 320 hours of darkness with condensation.
- Sheet samples were aged with the shiny side of the sheet facing the UV bulbs.

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January 29, 2014

**Mail To:**

**Grant Palmer**
**Agru America**
500 Garrison Road
Georgetown, SC 29440

email: gp@AgruAmerica.com

**Bill To:**

**<= Same**

Dear Mr. Palmer:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

| | |
|---|---|
| TRI Job Reference Number: | E2386-59-09 |
| Material(s) Tested: | One Agru 80 mil Microspike LLDPE Geomembrane(s) |
| Test(s) Requested: | 2% Secant (ASTM D5323 via ASTM D638, GM17)<br>Multi-axial Tensile (ASTM D 5617) |

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com



The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

## GEOMEMBRANE TEST RESULTS
**TRI Client: Agru America**

**Material: Agru 80 mil Microspike LLDPE Geomembrane**
**Sample Identification: G14D031009 , Chevron 7104 LLDPE Resin, Resin Lot # CDG810350**
**TRI Log #: E2386-59-09**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2% Secant Modulus (ASTM D5323 via ASTM D638, GM17)** | | | | | | | | | | | | |
| MD 2% Secant Modulus (psi) | 30887 | 30305 | 30617 | 32594 | 31327 | | | | | | **31146** | 892 |
| MD 2% Secant Modulus (ppi) | 2662 | 2530 | 2596 | 2533 | 2444 | | | | | | **2553** | 82 |
| TD 2% Secant Modulus (psi) | 35037 | 35745 | 35187 | 37057 | 34833 | | | | | | **35572** | 897 |
| TD 2% Secant Modulus (ppi) | 2950 | 2760 | 3065 | 2827 | 2675 | | | | | | **2855** | 154 |
| **Multi-axial Tensile (ASTM D 5617)** | | | | | | | | | | | | |
| **Test Method A: Centerpoint Deflection Versus Pressure** | | | | | | | | | | | | |
| Thickness (mils) | 81.0 | 78.0 | 79.0 | | | | | | | | **79.3** | 1.5 |
| Maximum Stress (psi) | 1873 | 1781 | 1899 | | | | | | | | **1851** | 62 |
| % Elongation @ Rupture (%) | 77.6 | 77.0 | 85.0 | | | | | | | | **79.9** | 4.5 |
| Failure Description | MDT N-EF | MDT N-EF | MDT N-EF | | | | | | | | | |

MDT A tear in the machine direction.
H Circular or elliptical hole in the specimen.
H-CAT Circular or elliptical hole in an area where the material has significantly necked down or thinned. The large thinned area resembles a pupil of a cat eye.
N-EF No edge failure

MD Machine Direction TD Transverse Direction

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☐ APPROVED ☐ APPROVED WITH CHANGES NOTED
☐ REVISE AND RESUBMIT ☐ REJECTED

DATE: Sep 23, 2022 BY: Nikoliya L Boyanich



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TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

CoA Date: 08/31/2022

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 Newlands Dr E
FERNLEY NV 89408-8944
USA

Recipient: PALMER
Fax:

Delivery #: 80745750
PO #: 19616
Weight: 188450.000 LB
Ship Date: 08/31/2022
Package: BULK
Mode: Hopper Car
Car #: TILX624120
Seal No: 303241

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DPH810510

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.34 | g/10min |
| HLMI | ASTM D1238 | 15.10 | g/10min |
| Pellet Count | ST-905 | 34 | pelet/gram |
| Production date | | 20220818 | |
| Density | D1505 | 0.919 | g/cm3 |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem). **However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

NewFields

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■ APPROVED ☐ APPROVED WITH CHANGES NOTED
☐ REVISE AND RESUBMIT ☐ REJECTED

DATE: Sep 23, 2022 BY: Nikoliya L Boyanich

For CoA questions contact Leslie Dziamara at +1-832-813-4806

*Vergil H. Rhodes, PE, CPlasT - Tech Svc & App Dev Engineer, Geomembranes*
*Highways 60 & 123, Bartlesville Research and Technology Center, Room 103 PTC*
*Bartlesville, OK 74003*
*■ 539-529-4279 ■ rhodevh@cpchem.com ■ Fax: 918-977-7599 ■ www.cpchem.com*

November 12, 2021
Filename: Agru Oven and QUV Exposure for HP-OIT Testing_2021_111221.pdf

Nathan Ivy - Corporate Quality Control/Technical Manager
Agru America, Inc.
800 Rockmead #122
Kingwood, TX 77339
281-358-4741

Dear Mr. Ivy:

Please recall your request for testing of oven-exposed and UV-exposed geomembrane samples produced primarily from Marlex® 7104 LLDPE and Marlex® K307 MDPE. Agru blended other components with each of these polyethylenes to produce the geomembrane samples for testing. Geomembrane samples have been received from Agru, and test specimens were taken from the smooth areas of the samples. Test results are reported on the following two pages. The samples were tested for HP-OIT in their as-received condition and were also tested after oven and UV exposures of 90 days and 1600 hours of irradiance, respectively, in accordance with GRI-GM13 and GRI-GM17 requirements.

The following geomembrane sheet samples were received from Agru in July 2021 and were reported to be primarily composed of each of the Chevron Phillips Chemical Company grades in the description below:

- Marlex® K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick.

- Marlex® 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick.

The exposure and testing conditions along with the corresponding test results are tabulated on the next two pages. GM-13 and GM-17 require a minimum % HP-OIT retention after a 90-day oven exposure and after a 1600-hour UV irradiance exposure. These test results indicate the GM-13 and GM-17 minimum % HP-OIT retentions were exceeded by the Agru-supplied K307 and 7104 sheet samples, respectively.

If you have any questions, please feel free to contact me (contact information given above).

Sincerely,

Vergil Rhodes
Polyethylene Technical Service and Applications Development, Geomembrane

NOTICES
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The following oven aging and UV exposure test methods were conducted in accordance with the GRI-GM13 (HDPE) and GRI-GM17 (LLDPE) requirements:

| **Test Name** | **Exposure Conditions** | **Test Method** |
|---|---|---|
| Oven Aging | 90 days in an oven at 85 °C | ASTM D5721 |
| UV Exposure | 1600 UV irradiance hours. Cycle: 20 hours UVA-340 at 75 °C followed by 4 hours dark with condensation at 60 °C. Irradiance was 0.78 W/m$^2$ at wavelength 340 nm. Note: This implies a total UV chamber residence time of 1920 hours, e.g., 1600 hours of irradiance and 320 hours of dark/condensation. | ASTM D7238 |
| HP-OIT | 150 °C in an oxygen atmosphere at 500 psi | ASTM D5885 |

**Oven Aging Results:**

| Sample | Initial HP-OIT (min) | HP-OIT after 90 days of oven aging. (min) | **% HP-OIT** Retained after 90 days of oven aging. | GRI-GM13 and GRI-GM17 minimum % HP-OIT requirements after 90 days of oven aging. |
|---|---|---|---|---|
| K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick | 1313 | 1174 | **89.4%** | GRI-GM13: % HP-OIT: 80% minimum |
| 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick | 973 | 802 | **82.4%** | GRI-GM17: % HP-OIT: 60% minimum |

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ACCEPTANCE IS FOR GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS ONLY. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESS AND TECHNIQUES FOR CONSTRUCTION; COORDINATING ITS WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING ITS WORK IN A SAFE AND SATISFACTORY MANNER.

■ APPROVED ☐ APPROVED WITH CHANGES NOTED
☐ REVISE AND RESUBMIT ☐ REJECTED

DATE: *Sep 23, 2022* BY: *Nikoliya L Boyanich*

Continued on Page 3 - - -

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**UV Aging Results:**

| Sample | Initial HP-OIT (min) | HP-OIT after 1600 hrs of UV exposure. (min) | **% HP-OIT** Retained after 1600 hrs of UV exposure. | GRI-GM13 and GRI-GM17 minimum % HP-OIT requirements after 1600 hours of UV exposure. |
|---|---|---|---|---|
| K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick | 1313 | 1053 | **80.2%** | GRI-GM13: % HP-OIT: 50% minimum |
| 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick | 973 | 768 | **78.9%** | GRI-GM17: % HP-OIT: 35% minimum |

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■ APPROVED ☐ APPROVED WITH CHANGES NOTED

☐ REVISE AND RESUBMIT ☐ REJECTED

DATE: Sep 23, 2022 BY: Nikoliya L Boyanich

Notes:

- 1600 hours of UV exposure in accordance with ASTM D7238 implies a total UV chamber residence time of 1920 hours, e.g., 1600 hours of irradiance and 320 hours of darkness with condensation.
- Sheet samples were aged with the shiny side of the sheet facing the UV bulbs.

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January 29, 2014

**Mail To:**

**Grant Palmer**
**Agru America**
500 Garrison Road
Georgetown, SC 29440

email: gp@AgruAmerica.com

**Bill To:**

**<= Same**

Dear Mr. Palmer:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

| | |
|---|---|
| TRI Job Reference Number: | E2386-59-09 |
| Material(s) Tested: | One Agru 80 mil Microspike LLDPE Geomembrane(s) |
| Test(s) Requested: | 2% Secant (ASTM D5323 via ASTM D638, GM17)<br>Multi-axial Tensile (ASTM D 5617) |

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com



The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

## GEOMEMBRANE TEST RESULTS
**TRI Client: Agru America**

**Material: Agru 80 mil Microspike LLDPE Geomembrane**
**Sample Identification: G14D031009 , Chevron 7104 LLDPE Resin, Resin Lot # CDG810350**
**TRI Log #: E2386-59-09**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2% Secant Modulus (ASTM D5323 via ASTM D638, GM17)** | | | | | | | | | | | | |
| MD 2% Secant Modulus (psi) | 30887 | 30305 | 30617 | 32594 | 31327 | | | | | | **31146** | 892 |
| MD 2% Secant Modulus (ppi) | 2662 | 2530 | 2596 | 2533 | 2444 | | | | | | **2553** | 82 |
| TD 2% Secant Modulus (psi) | 35037 | 35745 | 35187 | 37057 | 34833 | | | | | | **35572** | 897 |
| TD 2% Secant Modulus (ppi) | 2950 | 2760 | 3065 | 2827 | 2675 | | | | | | **2855** | 154 |
| **Multi-axial Tensile (ASTM D 5617)** | | | | | | | | | | | | |
| **Test Method A: Centerpoint Deflection Versus Pressure** | | | | | | | | | | | | |
| Thickness (mils) | 81.0 | 78.0 | 79.0 | | | | | | | | **79.3** | 1.5 |
| Maximum Stress (psi) | 1873 | 1781 | 1899 | | | | | | | | **1851** | 62 |
| % Elongation @ Rupture (%) | 77.6 | 77.0 | 85.0 | | | | | | | | **79.9** | 4.5 |
| Failure Description | MDT N-EF | MDT N-EF | MDT N-EF | | | | | | | | | |

MDT A tear in the machine direction.
H Circular or elliptical hole in the specimen.
H-CAT Circular or elliptical hole in an area where the material has significantly necked down or thinned. The large thinned area resembles a pupil of a cat eye.
N-EF No edge failure

MD Machine Direction TD Transverse Direction

NewFields

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☐ APPROVED ☐ APPROVED WITH CHANGES NOTED
☐ REVISE AND RESUBMIT ☐ REJECTED

DATE: Sep 23, 2022 BY: Nikoliya L Boyanich



The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

CoA Date: 08/31/2022

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 Newlands Dr E
FERNLEY NV 89408-8944
USA

Recipient: PALMER
Fax:

Delivery #: 80745750
PO #: 19616
Weight: 188450.000 LB
Ship Date: 08/31/2022
Package: BULK
Mode: Hopper Car
Car #: TILX624120
Seal No: 303241

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DPH810510

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.34 | g/10min |
| HLMI | ASTM D1238 | 15.10 | g/10min |
| Pellet Count | ST-905 | 34 | pelet/gram |
| Production date | | 20220818 | |
| Density | D1505 | 0.919 | g/cm3 |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem). **However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

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■ APPROVED ☐ APPROVED WITH CHANGES NOTED
☐ REVISE AND RESUBMIT ☐ REJECTED

DATE: Sep 28, 2022 BY: Nikoliya L Boyanich

AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Leslie Dziamara at +1-832-813-4806

CoA Date: 08/31/2022

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 Newlands Dr E
FERNLEY NV 89408-8944
USA

Recipient: PALMER
Fax:

Delivery #: 80745751
PO #: 19616
Weight: 188350.000 LB
Ship Date: 08/31/2022
Package: BULK
Mode: Hopper Car
Car #: SHPX463810
Seal No: 292597

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DPH810490

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.31 | g/10min |
| HLMI | ASTM D1238 | 14.30 | g/10min |
| Pellet Count | ST-905 | 33 | pelet/gram |
| Production date | | 20220818 | |
| Density | D1505 | 0.919 | g/cm3 |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem). **However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

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☐ REVISE AND RESUBMIT ☐ REJECTED

DATE: Sep 28, 2022 BY: Nikoliya L Boyanich

For CoA questions contact Leslie Dziamara at +1-832-813-4806

*Vergil H. Rhodes, PE, CPlasT - Tech Svc & App Dev Engineer, Geomembranes*
*Highways 60 & 123, Bartlesville Research and Technology Center, Room 103 PTC*
*Bartlesville, OK 74003*
*■ 539-529-4279 ■ rhodevh@cpchem.com ■ Fax: 918-977-7599 ■ www.cpchem.com*

November 12, 2021
Filename: Agru Oven and QUV Exposure for HP-OIT Testing_2021_111221.pdf

Nathan Ivy - Corporate Quality Control/Technical Manager
Agru America, Inc.
800 Rockmead #122
Kingwood, TX 77339
281-358-4741

Dear Mr. Ivy:

Please recall your request for testing of oven-exposed and UV-exposed geomembrane samples produced primarily from Marlex® 7104 LLDPE and Marlex® K307 MDPE. Agru blended other components with each of these polyethylenes to produce the geomembrane samples for testing. Geomembrane samples have been received from Agru, and test specimens were taken from the smooth areas of the samples. Test results are reported on the following two pages. The samples were tested for HP-OIT in their as-received condition and were also tested after oven and UV exposures of 90 days and 1600 hours of irradiance, respectively, in accordance with GRI-GM13 and GRI-GM17 requirements.

The following geomembrane sheet samples were received from Agru in July 2021 and were reported to be primarily composed of each of the Chevron Phillips Chemical Company grades in the description below:

- Marlex® K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick.

- Marlex® 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick.

The exposure and testing conditions along with the corresponding test results are tabulated on the next two pages. GM-13 and GM-17 require a minimum % HP-OIT retention after a 90-day oven exposure and after a 1600-hour UV irradiance exposure. These test results indicate the GM-13 and GM-17 minimum % HP-OIT retentions were exceeded by the Agru-supplied K307 and 7104 sheet samples, respectively.

If you have any questions, please feel free to contact me (contact information given above).

Sincerely,

Vergil Rhodes
Polyethylene Technical Service and Applications Development, Geomembrane

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The following oven aging and UV exposure test methods were conducted in accordance with the GRI-GM13 (HDPE) and GRI-GM17 (LLDPE) requirements:

| **Test Name** | **Exposure Conditions** | **Test Method** |
|---|---|---|
| Oven Aging | 90 days in an oven at 85 °C | ASTM D5721 |
| UV Exposure | 1600 UV irradiance hours. Cycle: 20 hours UVA-340 at 75 °C followed by 4 hours dark with condensation at 60 °C. Irradiance was 0.78 W/m$^2$ at wavelength 340 nm. Note: This implies a total UV chamber residence time of 1920 hours, e.g., 1600 hours of irradiance and 320 hours of dark/condensation. | ASTM D7238 |
| HP-OIT | 150 °C in an oxygen atmosphere at 500 psi | ASTM D5885 |

**Oven Aging Results:**

| Sample | Initial HP-OIT (min) | HP-OIT after 90 days of oven aging. (min) | **% HP-OIT** Retained after 90 days of oven aging. | GRI-GM13 and GRI-GM17 minimum % HP-OIT requirements after 90 days of oven aging. |
|---|---|---|---|---|
| K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick | 1313 | 1174 | **89.4%** | GRI-GM13: % HP-OIT: 80% minimum |
| 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick | 973 | 802 | **82.4%** | GRI-GM17: % HP-OIT: 60% minimum |

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■ APPROVED ☐ APPROVED WITH CHANGES NOTED

☐ REVISE AND RESUBMIT ☐ REJECTED

DATE: *Sep 28, 2022* BY: *Nikoliya L Boyanich*

Continued on Page 3 - - -

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■ APPROVED ☐ APPROVED WITH CHANGES NOTED
☐ REVISE AND RESUBMIT ☐ REJECTED
DATE: Sep 28, 2022 BY: Nikoliya L Boyanich

**UV Aging Results:**

| Sample | Initial HP-OIT (min) | HP-OIT after 1600 hrs of UV exposure. (min) | **% HP-OIT** Retained after 1600 hrs of UV exposure. | GRI-GM13 and GRI-GM17 minimum % HP-OIT requirements after 1600 hours of UV exposure. |
|---|---|---|---|---|
| K307 Lot # PND821550, Agru Roll # GTC0078250016, black sheet, smooth, nominal 0.057" thick | 1313 | 1053 | **80.2%** | GRI-GM13: % HP-OIT: 50% minimum |
| 7104 Lot # DNE810980, Agru Roll # GTA0077190117, black sheet, textured, nominal 0.055" thick | 973 | 768 | **78.9%** | GRI-GM17: % HP-OIT: 35% minimum |

Notes:

- 1600 hours of UV exposure in accordance with ASTM D7238 implies a total UV chamber residence time of 1920 hours, e.g., 1600 hours of irradiance and 320 hours of darkness with condensation.
- Sheet samples were aged with the shiny side of the sheet facing the UV bulbs.

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January 29, 2014

**Mail To:**

**Grant Palmer**
**Agru America**
500 Garrison Road
Georgetown, SC 29440

email: gp@AgruAmerica.com

**Bill To:**

**<= Same**

Dear Mr. Palmer:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

| | |
|---|---|
| TRI Job Reference Number: | E2386-59-09 |
| Material(s) Tested: | One Agru 80 mil Microspike LLDPE Geomembrane(s) |
| Test(s) Requested: | 2% Secant (ASTM D5323 via ASTM D638, GM17)<br>Multi-axial Tensile (ASTM D 5617) |

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com



The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

## GEOMEMBRANE TEST RESULTS
**TRI Client: Agru America**

**Material: Agru 80 mil Microspike LLDPE Geomembrane**
**Sample Identification: G14D031009 , Chevron 7104 LLDPE Resin, Resin Lot # CDG810350**
**TRI Log #: E2386-59-09**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2% Secant Modulus (ASTM D5323 via ASTM D638, GM17)** | | | | | | | | | | | | |
| MD 2% Secant Modulus (psi) | 30887 | 30305 | 30617 | 32594 | 31327 | | | | | | **31146** | 892 |
| MD 2% Secant Modulus (ppi) | 2662 | 2530 | 2596 | 2533 | 2444 | | | | | | **2553** | 82 |
| TD 2% Secant Modulus (psi) | 35037 | 35745 | 35187 | 37057 | 34833 | | | | | | **35572** | 897 |
| TD 2% Secant Modulus (ppi) | 2950 | 2760 | 3065 | 2827 | 2675 | | | | | | **2855** | 154 |
| **Multi-axial Tensile (ASTM D 5617)** | | | | | | | | | | | | |
| **Test Method A: Centerpoint Deflection Versus Pressure** | | | | | | | | | | | | |
| Thickness (mils) | 81.0 | 78.0 | 79.0 | | | | | | | | **79.3** | 1.5 |
| Maximum Stress (psi) | 1873 | 1781 | 1899 | | | | | | | | **1851** | 62 |
| % Elongation @ Rupture (%) | 77.6 | 77.0 | 85.0 | | | | | | | | **79.9** | 4.5 |
| Failure Description | MDT N-EF | MDT N-EF | MDT N-EF | | | | | | | | | |

| | |
|---|---|
| MDT | A tear in the machine direction. |
| H | Circular or elliptical hole in the specimen. |
| H-CAT | Circular or elliptical hole in an area where the material has significantly necked down or thinned. The large thinned area resembles a pupil of a cat eye. |
| N-EF | No edge failure |

MD Machine Direction TD Transverse Direction



The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

# APPENDIX D.5 – WELDING ROD QUALITY CONTROL CERTIFICATES

# WELDING ROD CERTIFICATE OF CONFORMITY

**Item:** FW-WR-LLDPE-BK-5MM Weld Rod Black LLDPE 5MM

**Prod Run #** FNWR10089910004

**Lot Number** DNK810490 **Date Printed:** 27-Sep-2022 10:41 AM

**Material** FNWR10089910004 **Page:** 1/1

| Test / Method | U of M | Results Value |
|---|---|---|
| Carbon Content<br>ASTM D4218 | % | 2.1 |
| Density<br>ASTM D792 | g/cc | 0.931 |
| Melt Flow<br>ASTM D1238 | g/10 min | 0.36 |

**Customer:** NEWMIN
Newmont Mining

**Destination:**

**SO #:** SO00013688

Ryan Steele, Lab Manager

**Production Date:** 03/09/22

CoA Date: 10/28/2021

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 EAST NEWLANDS
FERNLEY NV 89408
USA

Recipient: PALMER
Fax:

Delivery #: 80544120
PO #: 18729
Weight: 187350.000 LB
Ship Date: 10/28/2021
Package: BULK
Mode: Hopper Car
Car #: CPCX816492
Seal No: 267520

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DNK810490

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.36 | g/10min |
| HLMI | ASTM D1238 | 17.00 | g/10min |
| Pellet Count | ST-905 | 32 | pelet/gram |
| Production date | | 20211015 | |
| Density | D1505 | 0.920 | g/cm3 |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem).
**However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Leslie Dziamara at +1-832-813-4806

# WELDING ROD CERTIFICATE OF CONFORMITY

**Item:** FW-WR-LLDPE-BK-5MM Weld Rod Black LLDPE 5MM

**Prod Run #** FNWR10089910005

**Lot Number** DNK810490 **Date Printed:** 27-Sep-2022 10:11 AM

**Material** FNWR10089910005 **Page:** 1/1

| Test / Method | U of M | Results Value |
|---|---|---|
| Carbon Content<br>ASTM D4218 | % | 2.2 |
| Density<br>ASTM D792 | g/cc | 0.931 |
| Melt Flow<br>ASTM D1238 | g/10 min | 0.36 |

**Customer:** NEWMIN
Newmont Mining

**Destination:**

**SO #:** SO00013688

Ryan Steele, Lab Manager

**Production Date:** 03/10/22

CoA Date: 10/28/2021

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 EAST NEWLANDS
FERNLEY NV 89408
USA

Recipient: PALMER
Fax:

Delivery #: 80544120
PO #: 18729
Weight: 187350.000 LB
Ship Date: 10/28/2021
Package: BULK
Mode: Hopper Car
Car #: CPCX816492
Seal No: 267520

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DNK810490

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.36 | g/10min |
| HLMI | ASTM D1238 | 17.00 | g/10min |
| Pellet Count | ST-905 | 32 | pelet/gram |
| Production date | | 20211015 | |
| Density | D1505 | 0.920 | g/cm3 |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem).
**However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Leslie Dziamara at +1-832-813-4806

# WELDING ROD CERTIFICATE OF CONFORMITY

**Item:** FW-WR-LLDPE-BK-5MM Weld Rod Black LLDPE 5MM

**Prod Run #** FNWR10089910006

**Lot Number** DNM810240 **Date Printed:** 27-Sep-2022 10:38 AM

**Material** FNWR10089910006 **Page:** 1/1

| Test / Method | U of M | Results Value |
|---|---|---|
| Carbon Content<br>ASTM D4218 | % | 2.2 |
| Density<br>ASTM D792 | g/cc | 0.933 |
| Melt Flow<br>ASTM D1238 | g/10 min | 0.35 |

**Customer:** NEWMIN
Newmont Mining

**Destination:**

**SO #:** SO00013688

Ryan Steele, Lab Manager

**Production Date:** 03/11/22

CoA Date: 02/04/2022

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 EAST NEWLANDS
FERNLEY NV 89408
USA

Recipient: PALMER
Fax:

Delivery #: 80608492
PO #: 19065
Weight: 185250.000 LB
Ship Date: 02/04/2022
Package: BULK
Mode: Hopper Car
Car #: SHQX041928
Seal No: 273863

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DNM810240

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.35 | g/10min |
| HLMI | ASTM D1238 | 14.10 | g/10min |
| Pellet Count | ST-905 | 31 | pelet/gram |
| Production date | | 20211104 | |
| Density | D1505 | 0.920 | g/cm3 |

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AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Leslie Dziamara at +1-832-813-4806

# WELDING ROD CERTIFICATE OF CONFORMITY

**Item:** FW-WR-LLDPE-BK-5MM Weld Rod Black LLDPE 5MM

**Prod Run #** FNWR10093340003

**Lot Number** DNM810400 **Date Printed:** 27-Sep-2022 10:43 AM

**Material** FNWR10093340003 **Page:** 1/1

| Test / Method | U of M | Results Value |
|---|---|---|
| Carbon Content<br>ASTM D4218 | % | 2.3 |
| Density<br>ASTM D792 | g/cc | 0.932 |
| Melt Flow<br>ASTM D1238 | g/10 min | 0.33 |

**Customer:** NEWMIN
Newmont Mining

**Destination:**

**SO #:** SO00013688

Ryan Steele, Lab Manager

**Production Date:** 03/18/22

CoA Date: 02/04/2022

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 EAST NEWLANDS
FERNLEY NV 89408
USA

Recipient: PALMER
Fax:

Delivery #: 80608491
PO #: 19065
Weight: 187900.000 LB
Ship Date: 02/04/2022
Package: BULK
Mode: Hopper Car
Car #: CPCX817372
Seal No: 268336

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DNM810400

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.33 | g/10min |
| HLMI | ASTM D1238 | 14.30 | g/10min |
| Pellet Count | ST-905 | 31 | pelet/gram |
| Production date | | 20211106 | |
| Density | D1505 | 0.920 | g/cm3 |

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AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Leslie Dziamara at +1-832-813-4806

# WELDING ROD CERTIFICATE OF CONFORMITY

**Item:** FW-WR-LLDPE-BK-5MM Weld Rod Black LLDPE 5MM

**Prod Run #** FNWR10100700003

**Lot Number** DPC810470 **Date Printed:** 04-Oct-2022 10:15 AM

**Material** FNWR10100700003 **Page:** 1/1

| Test / Method | U of M | Results Value |
|---|---|---|
| Carbon Content<br>ASTM D4218 | % | 2.5 |
| Density<br>ASTM D792 | g/cc | 0.935 |
| Melt Flow<br>ASTM D1238 | g/10 min | 0.36 |

**Customer:** NEWMIN
Newmont Mining

**Destination:**

**SO #:** SO00016473

Ryan Steele, Lab Manager

**Production Date:** 07/22/22

CoA Date: 04/06/2022

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 EAST NEWLANDS
FERNLEY NV 89408
USA

Recipient: PALMER
Fax:

Delivery #: 80649495
PO #: 19241
Weight: 183950.000 LB
Ship Date: 04/06/2022
Package: BULK
Mode: Hopper Car
Car #: CPCX816600
Seal No: 278667

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DPC810470

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.36 | g/10min |
| HLMI | ASTM D1238 | 14.30 | g/10min |
| Pellet Count | ST-905 | 33 | pelet/gram |
| Production date | | 20220315 | |
| Density | D1505 | 0.919 | g/cm3 |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem).
**However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Leslie Dziamara at +1-832-813-4806

# WELDING ROD CERTIFICATE OF CONFORMITY

**Item:** FW-WR-LLDPE-BK-5MM Weld Rod Black LLDPE 5MM

**Prod Run #** FNWR10100700005

**Lot Number** DPC810470 **Date Printed:** 30-Sep-2022 10:14 AM

**Material** FNWR10100700005 **Page:** 1/1

| Test / Method | U of M | Results Value |
|---|---|---|
| Carbon Content<br>ASTM D4218 | % | 2.5 |
| Density<br>ASTM D792 | g/cc | 0.935 |
| Melt Flow<br>ASTM D1238 | g/10 min | 0.36 |

**Customer:** NEWMIN
Newmont Mining

**Destination:**

**SO #:** SO00016473

Ryan Steele, Lab Manager

**Production Date:** 07/27/22

CoA Date: 04/06/2022

# Certificate of Analysis

Shipped To: AGRU AMERICA INC:FERNLEY
2000 EAST NEWLANDS
FERNLEY NV 89408
USA

Recipient: PALMER
Fax:

Delivery #: 80649495
PO #: 19241
Weight: 183950.000 LB
Ship Date: 04/06/2022
Package: BULK
Mode: Hopper Car
Car #: CPCX816600
Seal No: 278667

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DPC810470

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.36 | g/10min |
| HLMI | ASTM D1238 | 14.30 | g/10min |
| Pellet Count | ST-905 | 33 | pelet/gram |
| Production date | | 20220315 | |
| Density | D1505 | 0.919 | g/cm3 |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem).
**However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

AMANDA ROBY
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Leslie Dziamara at +1-832-813-4806

# APPENDIX E – GEOMEMBRANE INSTALLATION SUMMARIES

# APPENDIX E.1 – GEOMEMBRANE DEPLOYMENT SUMMARY

# APPENDIX E.2- GEOMEMBRANE FUSION TRIAL SEAM SUMMARY

# APPENDIX E.3 – GEOMEMBRANE EXTRUSION TRIAL SEAM SUMMARY

# APPENDIX E.4 – GEOMEMBRANE FUSION WELDING SUMMARY

# APPENDIX E.5 – GEOMEMBRANE EXTRUSION WELDING SUMMARY

# APPENDIX E.6 – GEOMEMBRANE FUSION DESTRUCTIVE TESTING SUMMARY

# APPENDIX E.7 – GEOMEMBRANE EXTRUSION DESTRUCTIVE TESTING SUMMARY

# APPENDIX E.8 – GEOMEMBRANE PRESSURE TESTING SUMMARY

# APPENDIX E.9 – GEOMEMBRANE DEFECT/REPAIR SUMMARY

# APPENDIX E.10 – GEOMEMBRANE ACCEPTANCE FORMS

# APPENDIX E.1 – GEOMEMBRANE DEPLOYMENT SUMMARY

**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Geomembrane Panel Deployment Summary**

| Deployment Date | Panel Number | Roll Number | Ambient Temp. (°F) | Average Thickness (mil) | QA Monitor | Approximate Quantities | | | Surveyed Quantities | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Length (ft) | Width (ft) | Area (ft²) | Area (ft²) | Cumulative Area (ft²) | |
| 6/15/2023 | P-4952 | D0135 | 55 | 80 | TW | 65 | 15 | 975 | 1,026 | 1,026 | |
| 6/15/2023 | P-4953 | D0135 | 55 | 80 | TW | 122 | 22.5 | 2,745 | 2,486 | 3,512 | |
| 6/15/2023 | P-4954 | D0135 | 55 | 80 | TW | 124.5 | 22.5 | 2,801 | 2,640 | 6,152 | |
| 6/15/2023 | P-4955 | D0071 | 55 | 80 | TW | 122 | 22.5 | 2,745 | 2,627 | 8,779 | |
| 6/15/2023 | P-4956 | D0071 | 55 | 80 | TW | 115 | 22.5 | 2,588 | 2,512 | 11,291 | |
| 6/15/2023 | P-4957 | D0207 | 55 | 80 | TW | 111.5 | 22.5 | 2,509 | 2,470 | 13,761 | |
| 6/15/2023 | P-4958 | D0207 | 55 | 80 | TW | 110.5 | 22.5 | 2,486 | 2,368 | 16,129 | |
| 6/15/2023 | P-4959 | D0207 | 55 | 80 | TW | 30 | 15 | 450 | 409 | 16,537 | |
| 6/15/2023 | P-4960 | D0135 | 55 | 80 | TW | 78.5 | 22.5 | 1,766 | 1,621 | 18,158 | |
| 6/15/2023 | P-4961 | D0207 | 55 | 80 | TW | 45 | 22.5 | 1,013 | 962 | 19,120 | |

# APPENDIX E.2 – GEOMEMBRANE FUSION TRIAL SEAM SUMMARY

**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Geomembrane Fusion Trial Seam Summary**

| Date | Sample Number | Time | Machine Number | Operator | Ambient Air Temp. (°F) | Machine Settings | | Test Results | | | | | | | QA Monitor | Remarks[2,3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Temp. (°F) | Speed (ft/min) | Inside Peel (Min. = 100 ppi) | | Outside Peel (Min. = 100 ppi) | | Shear (Minimum = 120 ppi) | | Pass/ Fail | | |
| | | | | | | | | Strength (ppi) | Mode[1] | Strength (ppi) | Mode[1] | Strength (ppi) | Mode[1] | | | |
| 4/13/2024 | TF-1 | 11:10 AM | 85 | JG | 55 | 860 | 4.0 | 128 | BRK | 125 | BRK | 130 | BRK | P | TW | SS |
| | | | | | | | | 124 | BRK | 109 | BRK | | | | | |
| 4/13/2024 | TF-2 | 11:50 AM | 66 | JP | 55 | 860 | 4.0 | 124 | BRK | 122 | BRK | 133 | BRK | P | TW | SS |
| | | | | | | | | 118 | BRK | 118 | BRK | | | | | |
| 4/13/2024 | TF-3 | 11:40 AM | 66 | JP | 55 | 860 | 4.0 | 121 | BRK | 120 | BRK | 130 | BRK | P | TW | TT |
| | | | | | | | | 128 | BRK | 124 | BRK | | | | | |
| 4/13/2024 | TF-4 | 3:00 PM | 85 | JG | 55 | 860 | 4.0 | 130 | BRK | 120 | BRK | 146 | BRK | P | TW | SS |
| | | | | | | | | 130 | BRK | 127 | BRK | | | | | |
| 4/13/2024 | TF-5 | 4:05 PM | 66 | JP | 58 | 860 | 4.0 | 137 | BRK | 127 | BRK | 144 | BRK | P | TW | TT |
| | | | | | | | | 135 | BRK | 129 | BRK | | | | | |
| 4/14/2024 | TF-6 | 8:40 AM | 66 | JP | 50 | 860 | 4.0 | 147 | BRK | 152 | BRK | 179 | BRK | P | TW | TT |
| | | | | | | | | 145 | BRK | 148 | BRK | | | | | |

[1]See Figure 3 for Break Modes
[2]TT - Textured to Textured Weld
[3]SS - Smooth to Smooth Weld

# APPENDIX E.3 – GEOMEMBRANE EXTRUSION TRIAL SEAM SUMMARY

**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Geomembrane Extrusion Trial Seam Summary**

| Date | Sample Number | Time | Machine Number | Operator | Ambient Air Temp. (°F) | Machine Settings | | Test Results | | | | | QA Monitor | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Pre-Heat Temp. (°F) | Extruder Temp. (°F) | Peel (Min. = 88 ppi) | | Shear (Min. = 120 ppi) | | Pass/Fail | | |
| | | | | | | | | Strength (ppi) | Mode[1] | Strength (ppi) | Mode[1] | | | |
| 4/15/2024 | TX-1 | 8:00 AM | 5 | JP | 45 | 550 | 550 | 162 | SE1 | 167 | BRK1 | P | TW | |
| | | | | | | | | 159 | SE1 | | | | | |
| 4/15/2024 | TX-2 | 10:00 AM | 5 | JP | 55 | 550 | 550 | 150 | SE1 | 180 | BRK1 | P | TW | |
| | | | | | | | | 146 | SE1 | | | | | |
| 4/15/2024 | TX-3 | 1:10 PM | 5 | JP | 52 | 550 | 550 | 124 | SE1 | 158 | BRK1 | P | KP | |
| | | | | | | | | 127 | SE1 | | | | | |



[1]See Figure 4 for Modes

# APPENDIX E.4 – GEOMEMBRANE FUSION WELDING SUMMARY

**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Geomembrane Fusion Welding Summary**

NewFields
Perspective. Vision. Solutions.

| Seam Date | Seam Number | Seam Sections[1,2] From / To | Start Time | Ambient Temp (°F) | Operator | Machine Number | Speed Setting (ft/min) | Machine Temperature | | Welded Seam Length (ft) | QA Monitor | Destructive Test Sample Number | Remarks[2] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Setting (°F) | Actual (°F) | | | | |
| 4/13/24 | 4952/4953 | S / N | 11:40 AM | 55 | JG | 85 | 4 | 860 | 860 | 70 | TW | | |
| 4/13/24 | 4953/4954 | N / S | 11:50 AM | 55 | JG | 85 | 4 | 860 | 860 | 125 | TW | | |
| 4/13/24 | 4954/4955 | N / S | 1:45 PM | 55 | JG | 85 | 4 | 860 | 860 | 124 | TW | | |
| 4/13/24 | 4955/4956 | S / N | 2:48 PM | 55 | JG | 85 | 4 | 860 | 860 | 120 | TW | | |
| 4/13/24 | 4956/4957 | N / S | 3:15 PM | 55 | JG | 85 | 4 | 860 | 860 | 110 | TW | DF-1730 | 40' S of NEOS |
| 4/13/24 | 4957/4958 | S / N | 4:30 PM | 55 | JG | 85 | 4 | 860 | 860 | 113 | TW | | |
| 4/13/24 | 4958/4960 | N / S | 4:45 PM | 55 | JG | 85 | 4 | 860 | 860 | 78 | TW | | |
| 4/13/24 | 4958/4959 | S / N | 5:16 PM | 55 | JG | 85 | 4 | 860 | 860 | 30 | TW | | |
| 4/13/24 | 4960/4961 | S / N | 5:26 PM | 55 | JG | 85 | 4 | 860 | 860 | 71 | TW | | |
| 4/13/24 | 3970/4954 | S / N | 2:25 PM | 55 | JP | 66 | 4 | 860 | 860 | 7 | KP | | |
| 4/13/24 | 3969/4954 | W / E | 2:26 PM | 55 | JP | 66 | 4 | 860 | 860 | 15 | KP | | |
| 4/13/24 | 3969/4953 | W / E | 2:36 PM | 55 | JP | 66 | 4 | 860 | 860 | 4 | KP | | |
| 4/13/24 | 4118/4953 | W / E | 2:37 PM | 55 | JP | 66 | 4 | 860 | 860 | 16 | KP | | |
| 4/13/24 | 4118/4952 | W / E | 2:39 PM | 55 | JP | 66 | 4 | 860 | 860 | 6 | KP | | |
| 4/13/24 | 4120/4952 | W / E | 2:40 PM | 55 | JP | 66 | 4 | 860 | 860 | 4 | KP | | |
| 4/13/24 | 4100/4952 | W / E | 2:41 PM | 55 | JP | 66 | 4 | 860 | 860 | 43 | KP | | |
| 4/13/24 | 4102/4952 | S / N | 2:55 PM | 55 | JP | 66 | 4 | 860 | 860 | 12 | KP | | |
| 4/13/24 | 4100/4952 | S / N | 2:58 PM | 55 | JP | 66 | 4 | 860 | 860 | 21 | KP | | |
| 4/13/24 | 4100/4953 | S / N | 3:30 PM | 55 | JP | 66 | 4 | 860 | 860 | 38 | KP | DF-1731 | 20' S OF NEOS |
| 4/13/24 | 3978/4958 | W / E | 4:00 PM | 55 | JP | 66 | 4 | 860 | 860 | 6 | KP | | |
| 4/13/24 | 3976/4958 | W / E | 4:01 PM | 55 | JP | 66 | 4 | 860 | 860 | 15 | KP | | |
| 4/13/24 | 3976/4957 | W / E | 4:04 PM | 55 | JP | 66 | 4 | 860 | 860 | 7 | KP | | |
| 4/13/24 | 3974/4957 | W / E | 4:05 PM | 55 | JP | 66 | 4 | 860 | 860 | 16 | KP | | |
| 4/13/24 | 3974/4956 | W / E | 4:37 PM | 55 | JP | 66 | 4 | 860 | 860 | 6 | KP | | |
| 4/13/24 | 3972/4956 | W / E | 4:38 PM | 55 | JP | 66 | 4 | 860 | 860 | 16 | KP | | |
| 4/13/24 | 3972/4955 | W / E | 4:41 PM | 55 | JP | 66 | 4 | 860 | 860 | 7 | KP | | |
| 4/13/24 | 3970/4955 | W / E | 4:42 PM | 55 | JP | 66 | 4 | 860 | 860 | 16 | KP | | |
| 4/13/24 | 4959/4960 | W / E | 4:55 PM | 55 | JP | 66 | 4 | 860 | 860 | 23 | KP | | |
| 4/13/24 | 4093/4959 | W / E | 5:28 PM | 55 | JP | 66 | 4 | 860 | 860 | 20 | KP | | |
| 4/13/24 | 3978/4959 | W / E | 5:31 PM | 55 | JP | 66 | 4 | 860 | 860 | 17 | KP | | |
| 4/14/24 | 4091/4961 | N / S | 9:22 AM | 43 | JP | 66 | 4 | 860 | 860 | 71 | KP | DF-1732 | 34' N OF SEOS |

Note: Destructive testing locations are determined based on welding length measurements taken independently for each machine. The specified sample frequency is applied on a continuous basis, over the duration of the project, based on these measurements.

[1]D - Indicates Defect Number
[2]EEOS - East End of Seam; NEOS- North End of Seam; SEOS - South End of Seam; WEOS - West End of Seam

# APPENDIX E.5 – GEOMEMBRANE EXTRUSION WELDING SUMMARY

**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Geomembrane Extrusion Welding Summary**

| Seam Date | Seam Number | Seam Sections[1] From / To | Start Time | Ambient Temp (°F) | Operator | Machine Number | Pre-Heat Setting | Machine Temperature | | Welded Seam Length (ft) | QA Monitor | Destructive Test Sample Number | Vacuum Test Results Pass/Fail | Remarks[2] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Setting (°F) | Actual (°F) | | | | | |
| 4/14/24 | 4091/4961 | W / E | 9:50 AM | 60 | JP | 5 | 550 | 550 | 550 | 5 | KP | | PASS | |
| 4/14/24 | 4093/4961 | W / E | 10:00 AM | 60 | JP | 5 | 550 | 550 | 550 | 12 | KP | | PASS | |
| 4/14/24 | 4093/4960 | W / E | 10:05 AM | 60 | JP | 5 | 550 | 550 | 550 | 9 | KP | | PASS | |
| 4/14/24 | 4094/4960 | W / E | 10:07 AM | 60 | JP | 5 | 550 | 550 | 550 | 12 | KP | | PASS | |
| 4/14/24 | 4094/4958 | W / E | 10:09 AM | 60 | JP | 5 | 550 | 550 | 550 | 7 | KP | | PASS | |
| 4/14/24 | 4095/4958 | W / E | 10:17 AM | 60 | JP | 5 | 550 | 550 | 550 | 12 | KP | | PASS | |
| 4/14/24 | 4095/4957 | W / E | 9:39 AM | 60 | JP | 5 | 550 | 550 | 550 | 8 | KP | | PASS | |
| 4/14/24 | 4096/4957 | W / E | 9:45 AM | 60 | JP | 5 | 550 | 550 | 550 | 11 | KP | DX-327 | PASS | 7' E OF WEOS |
| 4/14/24 | 4096/4956 | W / E | 9:56 AM | 60 | JP | 5 | 550 | 550 | 550 | 8 | KP | | PASS | |
| 4/14/24 | 4097/4956 | W / E | 10:04 AM | 60 | JP | 5 | 550 | 550 | 550 | 12 | KP | | PASS | |
| 4/14/24 | 4097/4955 | W / E | 10:32 AM | 60 | JP | 5 | 550 | 550 | 550 | 7 | KP | | PASS | |
| 4/14/24 | 4098/4955 | W / E | 11:05 AM | 60 | JP | 5 | 550 | 550 | 550 | 12 | KP | | PASS | |
| 4/14/24 | 4098/4954 | W / E | 11:15 AM | 62 | JP | 5 | 550 | 550 | 550 | 7 | KP | | PASS | |
| 4/14/24 | 4099/4954 | W / E | 11:25 AM | 62 | JP | 5 | 550 | 550 | 550 | 12 | KP | | PASS | |
| 4/14/24 | 4099/4953 | W / E | 11:26 AM | 62 | JP | 5 | 550 | 550 | 550 | 8 | KP | | PASS | |
| 4/14/24 | 4100/4953 | W / E | 11:35 AM | 62 | JP | 5 | 550 | 550 | 550 | 12 | KP | | PASS | |

**Note:** This log only reflects welds made as part of a seam. See Appendix E.9 Defect Repair Summary for information regarding welds made as part of defect repairs.

[1] D - Indicates Defect Number
[2] Remarks:
EEOS - East End of Seam; NEOS- North End of Seam;
SEOS - South End of Seam; WEOS - West End of Seam

# APPENDIX E.6 – GEOMEMBRANE FUSION DESTRUCTIVE TEST SUMMARY

**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification 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-1730 | 4956/4957 | 4/13/2024 | JG | 85 | 4/15/2024 | 136 | 155 | 129 | 133 | 144 | 149 | 135 | 136 | 154 | 147 | 169 | 153 | 168 | 147 | 163 | P | TW |
| DF-1731 | 4100/4953 | 4/13/2024 | JP | 66 | 4/15/2024 | 171 | 153 | 162 | 146 | 163 | 150 | 149 | 171 | 161 | 161 | 192 | 163 | 180 | 158 | 180 | P | TW |
| DF-1732 | 4091/4961 | 4/14/2024 | JP | 66 | 4/15/2024 | 153 | 142 | 159 | 141 | 160 | 144 | 160 | 157 | 160 | 159 | 174 | 157 | 176 | 159 | 178 | P | TW |

**Note:** For Exact Destruct Locations See ROC Drawing 2, Appendix E.4 Fusion Welding Summary

# APPENDIX E.7 – GEOMEMBRANE EXTRUSION DESTRUCTIVE TEST SUMMARY

**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Geomembrane Extrusion Welding Destructive Testing Summary**

| Sample Number | Seam/Defect Number[4] | Date Seamed | Welding Data | | Date Tested | Test Results[1] | | | | | | | | | | | QA Monitor | Remarks[2,3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Operator | Machine Number | | Peel Strength (Minimum = 88 ppi) | | | | | Shear Strength (Minimum = 120 ppi) | | | | | Pass/Fail | | |
| DX-327 | 4096/4957 | 04/14/24 | JG | 5 | 04/16/24 | 170 | 160 | 156 | 156 | 172 | 178 | 164 | 180 | 165 | 176 | P | TW | TT |

**Note:** For Exact Destruct Locations See Appendix E.5 Extrusion Welding Summary

[1]See Figure 2 for Break Modes
[2]TT - Textured to Textured Weld
[3]SS - Smooth to Smooth Weld
[4]D- Indicates Defect Number

# APPENDIX E.8 – GEOMEMBRANE PRESSURE TESTING SUMMARY

**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Geomembrane Pressure Testing Summary**

| Date Tested | Seam Number | Location[1] | | | QC Tech. | Time | | Pressure | | Pressure Difference (psi) | Pass/Fail | QA Monitor | Seam Complete | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | From | / | To | | Start | Finish | Initial (psi) | Final (psi) | | | | Yes | No | |
| 4/13/2024 | 4952/4953 | SEOS | / | NEOS | JC | 1:26 PM | 1:31 PM | 30 | 30 | 0 | P | TW | X | | |
| 4/13/2024 | 4953/4954 | SEOS | / | NEOS | JC | 1:27 PM | 1:32 PM | 30 | 30 | 0 | P | TW | X | | |
| 4/13/2024 | 4954/4955 | SEOS | / | D13122 | JC | 2:27 PM | 1:32 PM | 31 | 31 | 0 | P | TW | | X | |
| 4/13/2024 | 4954/4955 | D13122 | / | NEOS | JC | 2:30 PM | 2:35 PM | 30 | 30 | 0 | P | TW | X | | |
| 4/13/2024 | 4955/4956 | NEOS | / | SEOS | JC | 3:36 PM | 3:41 PM | 30 | 30 | 0 | P | TW | X | | |
| 4/13/2024 | 4956/4957 | SEOS | / | D13129 | JC | 3:44 PM | 3:49 PM | 30 | 30 | 0 | P | TW | | X | |
| 4/13/2024 | 4956/4957 | D13129 | / | NEOS | JC | 3:54 PM | 3:59 PM | 30 | 30 | 0 | P | TW | X | | |
| 4/13/2024 | 4957/4958 | NEOS | / | SEOS | JC | 5:21 PM | 5:26 PM | 30 | 30 | 0 | P | TW | X | | |
| 4/13/2024 | 4958/4960 | SEOS | / | NEOS | JC | 5:23 PM | 5:28 PM | 30 | 30 | 0 | P | TW | X | | |
| 4/14/2024 | 4958/4959 | SEOS | / | NEOS | JC | 8:24 AM | 8:29 AM | 30 | 30 | 0 | P | KP | X | | |
| 4/14/2024 | 4959/4960 | WEOS | / | EEOS | JC | 9:00 AM | 9:05 AM | 30 | 30 | 0 | P | KP | X | | |
| 4/14/2024 | 4959/4093 | NEOS | / | SEOS | JC | 9:11 AM | 9:16 AM | 30 | 30 | 0 | P | KP | X | | |
| 4/14/2024 | 3978/4959 | SEOS | / | NEOS | JC | 9:34 AM | 9:39 AM | 30 | 30 | 0 | P | KP | X | | |
| 4/14/2024 | 3976/4958 | WEOS | / | EEOS | JC | 9:35 AM | 9:40 AM | 30 | 30 | 0 | P | KP | X | | |
| 4/14/2024 | 4901/4961 | SEOS | / | NEOS | JC | 9:51 AM | 9:56 AM | 30 | 28 | 2 | P | KP | X | | |
| 4/14/2024 | 3976/4957 | EEOS | / | WEOS | JC | 10:00 AM | 10:05 AM | 30 | 30 | 0 | P | KP | X | | |
| 4/14/2024 | 3974/4957 | WEOS | / | EEOS | JC | 10:25 AM | 10:30 AM | 30 | 28 | 2 | P | KP | X | | |
| 4/14/2024 | 3974/4956 | EEOS | / | WEOS | JC | 10:31 AM | 10:36 AM | 30 | 29 | 1 | P | KP | X | | |
| 4/14/2024 | 3972/4956 | EEOS | / | WEOS | JC | 10:35 AM | 10:40 AM | 30 | 29 | 1 | P | KP | X | | |
| 4/14/2024 | 3972/4955 | EEOS | / | WEOS | JC | 10:39 AM | 10:44 AM | 30 | 30 | 0 | P | KP | X | | |
| 4/14/2024 | 3970/4955 | WEOS | / | EEOS | JC | 10:42 AM | 10:47 AM | 30 | 28 | 2 | P | KP | X | | |
| 4/14/2024 | 3970/4954 | EEOS | / | WEOS | JC | 10:44 AM | 10:49 AM | 30 | 28 | 2 | P | KP | X | | |
| 4/14/2024 | 3969/4954 | WEOS | / | EEOS | JC | 10:57 AM | 11:02 AM | 30 | 30 | 0 | P | KP | X | | |
| 4/14/2024 | 3969/4953 | EEOS | / | WEOS | JC | 11:43 AM | 11:48 AM | 30 | 30 | 0 | P | KP | X | | |
| 4/14/2024 | 4118/4953 | WEOS | / | EEOS | JC | 11:43 AM | 11:48 AM | 30 | 30 | 0 | P | KP | X | | |
| 4/14/2024 | 4118/4952 | EEOS | / | WEOS | JC | 11:44 AM | 11:49 AM | 30 | 30 | 0 | P | KP | X | | |
| 4/14/2024 | 4120/4952 | WEOS | / | EEOS | JC | 11:53 AM | 11:58 AM | 30 | 29 | 1 | P | KP | X | | |
| 4/14/2024 | 4100/4952 | NEOS | / | SEOS | JC | 12:59 PM | 1:04 PM | 30 | 30 | 0 | P | KP | X | | |
| 4/14/2024 | 4102/4952 | SEOS | / | D13112 | JC | 1:02 PM | 1:07 PM | 30 | 28 | 2 | P | KP | X | | |
| 4/14/2024 | 4102/4952 | NEOS | / | D13112 | JC | 1:04 PM | 1:09 PM | 30 | 30 | 0 | P | KP | x | | |
| 4/14/2024 | 4100/4952 | SEOS | / | NEOS | JC | 1:13 PM | 1:18 PM | 30 | 28 | 2 | P | KP | X | | |
| 4/14/2024 | 4100/4953 | SEOS | / | NEOS | JC | 1:24 PM | 1:29 PM | 30 | 30 | 0 | P | KP | X | | |

[1]Location Abbreviations:
D - Indicates Defect Number
EEOS - East End of Seam; NEOS- North End of Seam;
SEOS - South End of Seam; WEOS - West End of Seam

**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Geomembrane Pressure Testing Summary**

| Date Tested | Seam Number | Location[1] | | QC Tech. | Time | | Pressure | | Pressure Difference (psi) | Pass/Fail | QA Monitor | Seam Complete | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | From | To | | Start | Finish | Initial (psi) | Final (psi) | | | | Yes | No | |
| 4/15/2024 | 4960/4961 | SEOS | NEOS | JC | 8:09 AM | 8:14 AM | 30 | 30 | 0 | P | KP | X | | |
| 4/15/2024 | 4091/4961 | SEOS | D13135 | JC | 8:15 AM | 8:20 AM | 30 | 30 | 0 | P | KP | | X | |
| 4/15/2024 | 4091/4961 | D13135 | SEOS | JC | 8:20 AM | 8:25 AM | 30 | 30 | 0 | P | KP | X | | |

[1]Location Abbreviations:
D - Indicates Defect Number
EEOS - East End of Seam; NEOS- North End of Seam;
SEOS - South End of Seam; WEOS - West End of Seam

# APPENDIX E.9 – GEOMEMBRANE DEFECT/REPAIR SUMMARY

# Cripple Creek Victor Gold Mining Company
## Valley Leach Facility 2 Phase 3
## Stage A.1 Liner Recertification Record of Construction
## Geomembrane Defect / Repair Summary

**Location:** AT - Anchor Trench; TI - Tie In; NEOS - North End of Seam; EEOS - East End of Seam; SEOS - South End of Seam; WEOS - West End of Seam
**Defect Type:** FM - Fishmouth; BO - Burnout; W - Wrinkle; BS - Boot Skirt; DF - Fusion Destruct; DX - Extrusion Destruct; PU - Puncture; PT - Pressure Test; INT - Panel Intersection
FS - Failed Seam; DO - Damage by Others; WR - Welder Restart; IO - Insufficient Overlap; MD - Manufacturer Defect; FVT - Failed Vacuum Test
See Footnote for Definitions
**Defect Repair:** P - Patch; C - Cap; B - Bead

| Defect Date | Defect Number | Seam/Panel Number | Location | Defect Type | Defect Repair | | | | | | Repair Vacuum Test | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Repair Date | Time | Size | Type | Operator | Machine Number | Test Date | Tech | QA Monitor | P/F | |
| 04/13/24 | 13109 | 4952/4120/4118 | INTERSECTION | T | 04/15/24 | 10:48 AM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13110 | 4952/4120/4100 | INTERSECTION | T | 04/15/24 | 10:25 AM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13111 | 4952/4105/4102/4100 | INTERSECTION | T | 04/15/24 | 11:08 AM | 4X4 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13112 | 4952/4102 | 7' N of S | IO | 04/15/24 | 11:11 AM | 3X4 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13113 | 4952/4102/4100 | INTERSECTION | T | 04/15/24 | 11:23 AM | 4X4 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13114 | 4952/4953/4100 | INTERSECTION | T | 04/15/24 | 11:31 AM | 3X3 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13115 | 4953/4100 | INTERSECTION | T | 04/14/24 | 3:18 PM | 6X6 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13116 | 4952/4953/4118 | INTERSECTION | T | 04/15/24 | 10:43 AM | 2X2 | C | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13117 | 4952 | 1' N of S | DO | 04/15/24 | 10:41 AM | 0.5 | B | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13118 | 4953/4118/3969 | INTERSECTION | T | 04/15/24 | 10:39 AM | 1X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13119 | 4953/4954/3969 | INTERSECTION | T | 04/15/24 | 10:35 AM | 4X4 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13120 | 4954/3969/3970 | INTERSECTION | T | 04/15/24 | 10:18 AM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13121 | 4954/4955/3970 | INTERSECTION | T | 04/15/24 | 10:15 AM | 4X5 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13122 | 4954/4955 | 20' N of S | BO | 04/15/24 | 10:19 AM | 2X5 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13123 | 4955/3970/3972 | INTERSECTION | T | 04/15/24 | 10:05 AM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13124 | 4955/4956/3972 | INTERSECTION | T | 04/15/24 | 9:54 AM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13125 | 4956/3972/3974 | INTERSECTION | T | 04/15/24 | 9:49 AM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13126 | 4956/4957/3974 | INTERSECTION | T | 04/15/24 | 9:40 AM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13127 | 4956/4957 | 10' N of S | BO | 04/15/24 | 9:44 AM | 4X4 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13128 | 4956/4957 | 40' N of S | DF-1730 | 04/15/24 | 2:39 PM | 2X5 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13129 | 4956/4957 | 35' S of N | BO | 04/15/24 | 2:40 PM | 2X4 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13130 | 4957/3974/3976 | INTERSECTION | T | 04/15/24 | 9:22 AM | 1X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13131 | 4957/4958/3976 | INTERSECTION | T | 04/15/24 | 9:17 AM | 1X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13132 | 4958/3976/3978 | INTERSECTION | T | 04/15/24 | 9:10 AM | 1X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13133 | 4958/4959/3978 | INTERSECTION | T | 04/15/24 | 8:55 AM | 3X8 | P | JP | 5 | 04/15/24 | JG | KP | P | CAPS SEAM 3978/4958 |
| 04/13/24 | 13134 | 4958/4959/4960 | INTERSECTION | T | 04/15/24 | 9:03 AM | 4X4 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13135 | 4959/4960/4961/4091/4093 | INTERSECTION | T | 04/15/24 | 8:39 AM | 7X7 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13136 | 4959/4093/3978 | INTERSECTION | T | 04/15/24 | 8:44 AM | 0.5 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13137 | 4961/4091 | 25' N of S | DF-1732 | 04/14/24 | 3:16 PM | 2X5 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13138 | 4091/4961 | INTERSECTION | T | 04/14/24 | 11:45 AM | 2X3 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13139 | 4961/4091/4093 | INTERSECTION | T | 04/14/24 | 11:55 AM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13140 | 4961/4960/4093 | INTERSECTION | T | 04/14/24 | 12:58 PM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13141 | 4960/4093/4094 | INTERSECTION | T | 04/14/24 | 1:05 PM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13142 | 4958/4960/4094 | INTERSECTION | T | 04/14/24 | 1:14 PM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13143 | 4958/4094/4095 | INTERSECTION | T | 04/14/24 | 1:20 PM | 2X3 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13144 | 4957/4958/4095 | INTERSECTION | T | 04/14/24 | 1:35 PM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13145 | 4957/4095/4096 | INTERSECTION | T | 04/14/24 | 1:42 PM | 3X3 | P | JP | 5 | 04/15/24 | JG | KP | P | |

# Cripple Creek Victor Gold Mining Company
## Valley Leach Facility 2 Phase 3
## Stage A.1 Liner Recertification Record of Construction
## Geomembrane Defect / Repair Summary

| Defect Date | Defect Number | Seam/Panel Number | Location | Defect Type | Defect Repair | | | | | | Repair Vacuum Test | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Repair Date | Time | Size | Type | Operator | Machine Number | Test Date | Tech | QA Monitor | P/F | |
| 04/13/24 | 13146 | 4957/4096 | 3' W of E | DX-327 | 04/14/24 | 2:46 PM | 2X5 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13147 | 4957/4956/4096 | INTERSECTION | T | 04/14/24 | 2:30 PM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13148 | 4956/4096/4097 | INTERSECTION | T | 04/14/24 | 2:03 PM | 1X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13149 | 4955/4956/4097 | INTERSECTION | T | 04/14/24 | 2:14 PM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13150 | 4955/4097/4098 | INTERSECTION | T | 04/14/24 | 2:39 PM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13151 | 4098 | 2' N of S | PU | 04/14/24 | 3:00 PM | 1X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13152 | 4954/4955/4098 | INTERSECTION | T | 04/14/24 | 2:46 PM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13153 | 4954/4098/4099 | INTERSECTION | T | 04/14/24 | 2:54 PM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13154 | 4953/4954/4099 | INTERSECTION | T | 04/14/24 | 3:05 PM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13155 | 4953/4099/4100 | INTERSECTION | T | 04/14/24 | 3:11 PM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/13/24 | 13156 | 4953/4100 | 20' N of S | DF-1731 | 04/14/24 | 11:52 AM | 2X5 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/15/24 | 13157 | 4100 | 2' E of W | PU | 04/15/24 | 11:30 AM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/15/24 | 13158 | 4100 | 4' E of W | PU | 04/15/24 | 11:41 AM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/15/24 | 13159 | 4105 | 2' W of E | PU | 04/15/24 | 11:15 AM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/15/24 | 13160 | 4952 | 5' N of S | DO | 04/15/24 | 11:58 AM | 0.5 | B | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/15/24 | 13161 | 4100 | 35' N of S | PU | 04/15/24 | 1:33 PM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/15/24 | 13162 | 4100 | 30' N of S | DO | 04/15/24 | 1:46 PM | 0.5 | B | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/15/24 | 13163 | 4101 | 20' N of S | DO | 04/15/24 | 1:50 PM | 0.5 | B | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/15/24 | 13164 | 4100 | 8' N of S | PU | 04/15/24 | 2:02 PM | 2X2 | P | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/15/24 | 13165 | 4957 | 2' N of Tie-in | DO | 04/15/24 | 2:07 PM | 0.5 | B | JP | 5 | 04/15/24 | JG | KP | P | |
| 04/15/24 | 13166 | 4093 | 2' N of Tie-in | DO | 04/15/24 | 2:16 PM | 0.5 | B | JP | 5 | 04/15/24 | JG | KP | P | |

**Definitions:**

Fish Mouth: A seam between two panels in which one of the panels was wrinkled, preventing it from lying flat.
Burnout: A hole or damage to liner caused by a welding machine getting stuck or moving too slowly over a seam.
Wrinkle: Geomembrane that does not lie flat, and can often be folded over on itself.
Boot Skirt: Geomembrane shaped and welded to fit around pipe protrusions.
Fusion Destruct: A hole where a destructive test was sampled on a fusion welded seam.
Extrusion Destruct: A hole where a destructive test was sampled on an extrusion welded seam.
Puncture: A hole in the geomembrane caused by a sharp object.
Pressure Test: A hole at the end of a fusion welded seam where a needle was inserted for pressure testing.
Panel Intersection: The intersection of three or more panels.
Failed Seam: A fusion welded seam that failed air pressure testing.
Damage by Others: A blanket term for damage to the liner caused by personnel after installation. Can be caused by equipment, dragging things across the liner, etc.
Welder Re-start: A hole or damage to the seam caused by re-starting of the welding machine.
Insufficient Overlap: Usually a fusion welded seam where the panel overlap was not enough to create a sealed air channel for air pressure testing on double fusion welded seams, or an overlap of less than 6 inches for extrusion welded seams.
Manufacturer Defect: A flaw in the liner generated during the manufacturing process.
Failed Vacuum Test: An extrusion welded seam that failed a vacuum test.

# APPENDIX E.10 – GEOMEMBRANE ACCEPTANCE FORM

# Geomembrane Acceptance Form

NewFields
Perspective. Vision. Solutions.

**Client:** Cripple Creek & Victor Mining Co.
**Contractor:** Mustang Extreme Enviromental
**Project:** VLF2 Phase 3 A.1 Liner Repair
**Weather:** P Cloudy 45°F
**Project No.:** 475.0106.068
**Date:** 4/16/2024

**Panels:** P-4952 thru P-4961

**Items Inspected:**
- All seaming and repair work is complete in the accepted area
- All seams and repairs have been pressure tested or vacuum tested
- All destructive samples have been tested and meet project specifications
- As-built panel layout, deployment logs, seaming logs, pressure testing logs, vacuum testing logs, repair logs, and destructive testing logs have been reviewed and approved for DCF placement.

**Testing Performed:**

| | |
|---|---|
| Pressure Testing | Destructive Testing |
| Vacuum Testing | Survey Completed |

**Deficient Items:**

**Remedial Actions:**

**Geomembrane Accepted:** YES X NO

**Comments:**

**Signatures:**

**NewFields:** Date: 4/16/24

**JHL:** Date: 4/16/24

**CC&V:** Date: 4/16/24

**Mustang:** Date: 4-16-24

**Other:** Date:



# APPENDIX F – THIRD PARTY CONFORMANCE TESTING RESULTS

TRI ENVIRONMENTAL

TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

Austin, TX - USA | Anaheim, CA - USA | Anderson, SC - USA | Gold Coast - Australia | Suzhou - China

GAI-LAP

## MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

**Project Name:** Cripple Creek & Victor Mine VLF2 Ph 3A **TYPE OF MQA:** LEVEL (2) **QA by:** Maria Espitia

**Material:** 80mil LLDPE Double Sided Microspike **SAMPLING FREQUENCY:** 1/150,000 sq.ft.

**Manufacturer:** AGRU

**Location:** NV

| No. | Roll # | Lot # | Length (ft.) | Width (ft.) | Area ($ft^2$) | Date Manufactured | Sampled by | Date Sampled | Date Received | Reference Job No/ Control No |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | FNA0091850001 | DNK810410 | 410 | 23 | 9430 | 2/24/2022 | TRI-CA | 2/24/2022 | 2/28/2022 | CA220175 C#161880 |
| 2 | FNA0091850002 | DNK810410 | 410 | 23 | 9430 | 2/24/2022 | | | | |
| 3 | FNA0091850003 | DNK810410 | 410 | 23 | 9430 | 2/24/2022 | | | | |
| 4 | FNA0091850004 | DNK810410 | 410 | 23 | 9430 | 2/24/2022 | | | | |
| 5 | FNA0091850005 | DNK810410 | 410 | 23 | 9430 | 2/24/2022 | | | | |
| 6 | FNA0091850006 | DNK810410 | 410 | 23 | 9430 | 2/24/2022 | | | | |
| 7 | FNA0091850007 | DNK810410 | 410 | 23 | 9430 | 2/24/2022 | | | | |
| 8 | FNA0091850008 | DNK810410 | 410 | 23 | 9430 | 2/24/2022 | | | | |
| 9 | FNA0091850009 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 10 | FNA0091850010 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 11 | FNA0091850011 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 12 | FNA0091850012 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 13 | FNA0091850013 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 14 | FNA0091850014 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 15 | FNA0091850015 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 16 | FNA0091850016 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | TRI-CA | 2/28/2022 | 3/3/2022 | CA220187 C#161917 |
| 17 | FNA0091850017 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 18 | FNA0091850018 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 19 | FNA0091850019 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 20 | FNA0091850020 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 21 | FNA0091850021 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 22 | FNA0091850022 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 23 | FNA0091850023 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 24 | FNA0091850024 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 25 | FNA0091850025 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 26 | FNA0091850026 | DNK810410 | 410 | 23 | 9430 | 2/25/2022 | | | | |
| 27 | FNA0091850027 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 28 | FNA0091850028 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 29 | FNA0091850029 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |

GAI-LAP

## MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

**Project Name:** Cripple Creek & Victor Mine VLF2 Ph 3A **TYPE OF MQA:** LEVEL (2) **QA by:** Maria Espitia

**Material:** 80mil LLDPE Double Sided Microspike **SAMPLING FREQUENCY:** 1/150,000 sq.ft.

**Manufacturer:** AGRU

**Location:** NV

| No. | Roll # | Lot # | Length (ft.) | Width (ft.) | Area ($ft^2$) | Date Manufactured | Sampled by | Date Sampled | Date Received | Reference Job No/ Control No |
|---|---|---|---|---|---|---|---|---|---|---|
| 30 | FNA0091850030 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 31 | FNA0091850031 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | TRI-CA | 2/28/2022 | 3/3/2022 | CA220187 C#161918 |
| 32 | FNA0091850032 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 33 | FNA0091850033 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 34 | FNA0091850034 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 35 | FNA0091850035 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 36 | FNA0091850036 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 37 | FNA0091850037 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 38 | FNA0091850038 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 39 | FNA0091850039 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 40 | FNA0091850040 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 41 | FNA0091850041 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 42 | FNA0091850042 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 43 | FNA0091850043 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 44 | FNA0091850044 | DNK810410 | 410 | 23 | 9430 | 2/26/2022 | | | | |
| 45 | FNA0091850045 | DNK810410 | 410 | 23 | 9430 | 2/27/2022 | | | | |
| 46 | FNA0091850046 | DNK810410 | 410 | 23 | 9430 | 2/27/2022 | TRI-CA | 2/28/2022 | 3/2/2022 | CA220183 C#161907 |
| 47 | FNA0091850047 | DNK810410 | 410 | 23 | 9430 | 2/27/2022 | | | | |
| 48 | FNA0091850048 | DNK810410 | 410 | 23 | 9430 | 2/27/2022 | | | | |
| 49 | FNA0091850049 | DNK810410 | 410 | 23 | 9430 | 2/27/2022 | | | | |
| 50 | FNA0091850050 | DNK810410 | 410 | 23 | 9430 | 2/27/2022 | | | | |
| 51 | FNA0091850051 | DNK810410 | 410 | 23 | 9430 | 2/27/2022 | | | | |
| 52 | FNA0091850052 | DNK810410 | 410 | 23 | 9430 | 2/27/2022 | | | | |
| 53 | FNA0091850053 | DNK810410 | 410 | 23 | 9430 | 2/27/2022 | | | | |
| 54 | FNA0091850054 | DNK810410 | 410 | 23 | 9430 | 2/27/2022 | | | | |
| | | | | **Sub Total $ft^2$ =** | **509220** | | | | | |
| 55 | FNA0091850055 | 21KB544 | 410 | 23 | 9430 | 2/27/2022 | | | | |
| 56 | FNA0091850056 | 21KB544 | 410 | 23 | 9430 | 2/27/2022 | TRI-CA | 2/28/2022 | 3/2/2022 | CA220183 C#161908 |
| 57 | FNA0091850057 | 21KB544 | 410 | 23 | 9430 | 2/27/2022 | | | | |

GAI-LAP

## MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

**Project Name:** Cripple Creek & Victor Mine VLF2 Ph 3A **TYPE OF MQA:** LEVEL (2) **QA by:** Maria Espitia

**Material:** 80mil LLDPE Double Sided Microspike **SAMPLING FREQUENCY:** 1/150,000 sq.ft.

**Manufacturer:** AGRU

**Location:** NV

| No. | Roll # | Lot # | Length (ft.) | Width (ft.) | Area ($ft^2$) | Date Manufactured | Sampled by | Date Sampled | Date Received | Reference Job No/ Control No |
|---|---|---|---|---|---|---|---|---|---|---|
| 58 | FNA0091850058 | 21KB544 | 410 | 23 | 9430 | 2/27/2022 | | | | |
| 59 | FNA0091850059 | 21KB544 | 410 | 23 | 9430 | 2/27/2022 | | | | |
| 60 | FNA0091850060 | 21KB544 | 410 | 23 | 9430 | 2/27/2022 | | | | |
| 61 | FNA0091850061 | 21KB544 | 410 | 23 | 9430 | 2/27/2022 | | | | |
| 62 | FNA0091850062 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 63 | FNA0091850063 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 64 | FNA0091850064 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 65 | FNA0091850065 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 66 | FNA0091850066 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 67 | FNA0091850067 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 68 | FNA0091850068 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 69 | FNA0091850069 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 70 | FNA0091850070 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 71 | FNA0091850071 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | TRI-CA | 3/2/2022 | 3/3/2022 | CA220188 C#161919 |
| 72 | FNA0091850072 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 73 | FNA0091850073 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 74 | FNA0091850074 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 75 | FNA0091850075 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 76 | FNA0091850076 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 77 | FNA0091850077 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 78 | FNA0091850078 | 21KB544 | 410 | 23 | 9430 | 2/28/2022 | | | | |
| 79 | FNA0091850079 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 80 | FNA0091850080 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 81 | FNA0091850081 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 82 | FNA0091850083 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 83 | FNA0091850084 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 84 | FNA0091850085 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 85 | FNA0091850086 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 86 | FNA0091850087 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | TRI-CA | 3/2/2022 | 3/4/2022 | CA220196 C#161949 |

GAI-LAP

## MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

**Project Name:** Cripple Creek & Victor Mine VLF2 Ph 3A **TYPE OF MQA:** LEVEL (2) **QA by:** Maria Espitia

**Material:** 80mil LLDPE Double Sided Microspike **SAMPLING FREQUENCY:** 1/150,000 sq.ft.

**Manufacturer:** AGRU

**Location:** NV

| No. | Roll # | Lot # | Length (ft.) | Width (ft.) | Area ($ft^2$) | Date Manufactured | Sampled by | Date Sampled | Date Received | Reference Job No/ Control No |
|---|---|---|---|---|---|---|---|---|---|---|
| 87 | FNA0091850088 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 88 | FNA0091850089 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 89 | FNA0091850090 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 90 | FNA0091850091 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 91 | FNA0091850092 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 92 | FNA0091850093 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 93 | FNA0091850094 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 94 | FNA0091850095 | 21KB544 | 410 | 23 | 9430 | 3/1/2022 | | | | |
| 95 | FNA0091850096 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 96 | FNA0091850097 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 97 | FNA0091850098 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 98 | FNA0091850099 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 99 | FNA0091850100 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 100 | FNA0091850101 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 101 | FNA0091850102 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | TRI-CA | 3/2/2022 | 3/4/2022 | CA220196 C#161950 |
| 102 | FNA0091850103 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 103 | FNA0091850104 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 104 | FNA0091850105 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 105 | FNA0091850106 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 106 | FNA0091850107 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 107 | FNA0091850108 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 108 | FNA0091850109 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 109 | FNA0091850110 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 110 | FNA0091850111 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 111 | FNA0091850112 | 21KB544 | 410 | 23 | 9430 | 3/2/2022 | | | | |
| 112 | FNA0091850113 | 21KB544 | 410 | 23 | 9430 | 3/3/2022 | | | | |
| 113 | FNA0091850114 | 21KB544 | 410 | 23 | 9430 | 3/3/2022 | | | | |
| 114 | FNA0091850115 | 21KB544 | 410 | 23 | 9430 | 3/3/2022 | | | | |
| 115 | FNA0091850116 | 21KB544 | 410 | 23 | 9430 | 3/3/2022 | | | | |

GAI-LAP

## MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

**Project Name:** Cripple Creek & Victor Mine VLF2 Ph 3A **TYPE OF MQA:** LEVEL (2) **QA by:** Maria Espitia

**Material:** 80mil LLDPE Double Sided Microspike **SAMPLING FREQUENCY:** 1/150,000 sq.ft.

**Manufacturer:** AGRU

**Location:** NV

| No. | Roll # | Lot # | Length (ft.) | Width (ft.) | Area ($ft^2$) | Date Manufactured | Sampled by | Date Sampled | Date Received | Reference Job No/ Control No |
|---|---|---|---|---|---|---|---|---|---|---|
| 116 | FNA0091850117 | 21KB544 | 410 | 23 | 9430 | 3/3/2022 | | | | |
| 117 | FNA0091850118 | 21KB544 | 410 | 23 | 9430 | 3/3/2022 | | | | |
| 118 | FNA0091850119 | 21KB544 | 410 | 23 | 9430 | 5/24/2019 | | | | |
| | | | | Sub Total $ft^2$ = | 603520 | | | | | |
| | | | | TOTAL $ft^2$ = | 1,112,740 | | | | | |

March 8, 2022

Nikoliya Boyanich
***NewFields***
9400 Station Street, Suite 300
Long Tree, CO80124

GAI-LAP
Initial: CVZ #:0.13
DATE: 03/08/2022

**Re:** FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the ***final*** laboratory report for the Conformance testing of one (1) 80mil LLDPE Double Sided Microspike sample.

**PROJECT NAME:** Cripple Creek & Victor Mine VLF2 Ph 3A DATE REPORTED: **March 8, 2022**

**REFERENCE TRI JOB NO.:** CA220175

**DATE RECEIVED:** February 28, 2022

**SAMPLED BY:** TRI-CA, AGRU NV

**SAMPLE IDENTIFICATIONS:**

| *SAMPLE ID* | *TRI CONTROL NUMBER* |
|---|---|
| R#FNA0091850001 L#DNK810410 | 161880 |

**TESTS REQUIRED / PERFORMED:**

| *TEST METHOD* | *DESCRIPTION* |
|---|---|
| 1. ASTM D5994 | Thickness |
| 2. ASTM D6693 | Tensile Properties |
| 3. ASTM D792 | Specific Gravity |
| 4. ASTM D4218 | Carbon Content Muffle |

**TEST RESULTS:** The test results are summarized in the attached Table 1.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,

**TRI Environmental, Inc. - California**

Maria Espitia
Quality Assurance

Chad Blackwell
TRI-CA Director

*Signatures are on file*

It shall be noted that the **sample** tested **is** believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at a longer period, please advise us in writing..

**2 Pages Total** *(including this sheet)*

# TABLE 1.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **2/28/2022**
Date Reported: **3/8/2022**
Client Sample ID: **R#FNA0091850001 L#DNK810410**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA220175**
TRI Control No.: **161880**

| METHOD | DESCRIPTION | SPECIMENS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Proj. Specs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | 68 min. |
| | | **83** | **84** | **82** | **83** | **83** | **80** | **81** | **82** | **82** | **81** | **82** | **1** | **80** | **84** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9325** | **0.9325** | | | | | | | | | **0.9325** | **0.0000** | **0.9325** | **0.9325** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **216** | **246** | **215** | **225** | **226** | | | | | | **226** | **13** | **215** | **246** | **120 min.** |
| | *TD* | **233** | **255** | **242** | **260** | **250** | | | | | | **248** | **11** | **233** | **260** | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | **482** | **537** | **498** | **486** | **486** | | | | | | **498** | **22** | **482** | **537** | **250 min.** |
| | *TD* | **532** | **584** | **557** | **595** | **575** | | | | | | **568** | **25** | **532** | **595** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.41** | **2.39** | | | | | | | | | **2.40** | **0.01** | **2.39** | **2.41** | **2 - 3** |

(End of Table 1)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

**1970 S. Santa Cruz Street, Anaheim, CA 92805, www.precisionlabs.net**
TRI Environmental, Inc. dba Precision Geosynthetic Laboratories International

March 9, 2022

Nikoliya Boyanich
***NewFields***
9400 Station Street, Suite 300
Long Tree, CO 80124

GAI-LAP
Initial: CVZ #:0.13
DATE: 03/09/2022

**Re:** FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the ***final*** laboratory report for the Conformance testing of two (2) 80mil LLDPE Double Sided Microspike samples.

**PROJECT NAME:** Cripple Creek & Victor Mine VLF2 Ph 3A DATE REPORTED: **March 9, 2022**

**REFERENCE TRI JOB NO.:** CA220183

**DATE RECEIVED:** March 02, 2022

**SAMPLED BY:** TRI-CA, AGRU NV

**SAMPLE IDENTIFICATIONS:**

| *SAMPLE ID* | *TRI CONTROL NUMBER* |
|---|---|
| R#FNA0091850046 L#DNK810410 | 161907 |
| R#FNA0091850056 L#21KB544 | 161908 |

**TESTS REQUIRED / PERFORMED:**

| *TEST METHOD* | *DESCRIPTION* |
|---|---|
| 1. ASTM D5994 | Thickness |
| 2. ASTM D6693 | Tensile Properties |
| 3. ASTM D792 | Specific Gravity |
| 4. ASTM D4218 | Carbon Content Muffle |

**TEST RESULTS:** The test results are summarized in the attached Tables 1 to 2.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,

**TRI Environmental, Inc. - California**

Maria Espitia
Quality Assurance

Chad Blackwell
TRI-CA Director

*Signatures are on file*

It shall be noted that the **samples** tested **are** believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at a longer period, please advise us in writing.

**3 Pages Total** *(including this sheet)*

# TABLE 1.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **3/2/2022**
Date Reported: **3/9/2022**
Client Sample ID: **R#FNA0091850046 L#DNK810410**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA220183**
TRI Control No.: **161907**

| METHOD | DESCRIPTION | SPECIMENS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Proj. Specs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | 68 min. |
| | | 81 | 81 | 84 | 81 | 80 | 83 | 81 | 81 | 85 | 81 | 82 | 2 | 80 | 85 | 76 min. ave. |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | 0.9383 | 0.9384 | | | | | | | | | 0.9384 | 0.0000 | 0.9383 | 0.9384 | 0.939 max. |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | 206 | 217 | 239 | 246 | 206 | | | | | | 223 | 19 | 206 | 246 | 120 min. |
| | *TD* | 247 | 256 | 240 | 262 | 242 | | | | | | 249 | 9 | 240 | 262 | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | 479 | 506 | 541 | 555 | 464 | | | | | | 509 | 39 | 464 | 555 | 250 min. |
| | *TD* | 585 | 601 | 565 | 620 | 572 | | | | | | 589 | 22 | 565 | 620 | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | 2.49 | 2.38 | | | | | | | | | 2.43 | 0.08 | 2.38 | 2.49 | 2 - 3 |

(End of Table 1)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

# TABLE 2.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **3/2/2022**
Date Reported: **3/9/2022**
Client Sample ID: **R#FNA0091850056 L#21KB544**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA220183**
TRI Control No.: **161908**

| | | SPECIMENS | | | | | | | | | | | | | | Proj. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Specs. |
| **METHOD** | **DESCRIPTION** | | | | | | | | | | | | | | | |
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | 68 min. |
| | | 80 | 81 | 81 | 81 | 81 | 82 | 81 | 80 | 80 | 81 | 81 | 1 | 80 | 82 | 76 min. ave. |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | 0.9365 | 0.9367 | | | | | | | | | 0.9366 | 0.0001 | 0.9365 | 0.9367 | 0.939 max. |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | 249 | 221 | 241 | 231 | 241 | | | | | | 236 | 11 | 221 | 249 | 120 min. |
| | *TD* | 206 | 257 | 254 | 228 | 253 | | | | | | 239 | 22 | 206 | 257 | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | 546 | 510 | 540 | 521 | 539 | | | | | | 531 | 15 | 510 | 546 | 250 min. |
| | *TD* | 495 | 604 | 602 | 549 | 593 | | | | | | 569 | 47 | 495 | 604 | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | 2.43 | 2.45 | | | | | | | | | 2.44 | 0.01 | 2.43 | 2.45 | 2 - 3 |

(End of Table 2)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

March 10, 2022

Nikoliya Boyanich
***NewFields***
9400 Station Street, Suite 300
Long Tree, CO 80124

GAI-LAP
Initial: CVZ #:0.13
DATE: 03/10/2022

**Re:** FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the ***final*** laboratory report for the Conformance testing of two (2) 80mil LLDPE Double Sided Microspike samples.

**PROJECT NAME:** Cripple Creek & Victor Mine VLF2 Ph 3A DATE REPORTED: **March 10, 2022**

**REFERENCE TRI JOB NO.:** CA220187

**DATE RECEIVED:** March 03, 2022

**SAMPLED BY:** TRI-CA, AGRU NV

**SAMPLE IDENTIFICATIONS:**

| *SAMPLE ID* | *TRI CONTROL NUMBER* |
|---|---|
| R#FNA0091850016 L#DNK810410 | 161917 |
| R#FNA0091850031 L#DNK810410 | 161918 |

**TESTS REQUIRED / PERFORMED:**

| *TEST METHOD* | *DESCRIPTION* |
|---|---|
| 1. ASTM D5994 | Thickness |
| 2. ASTM D6693 | Tensile Properties |
| 3. ASTM D792 | Specific Gravity |
| 4. ASTM D4218 | Carbon Content Muffle |

**TEST RESULTS:** The test results are summarized in the attached Tables 1 to 2.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,

**TRI Environmental, Inc. - California**

Maria Espitia
Quality Assurance

Chad Blackwell
TRI-CA Director

*Signatures are on file*

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at a longer period, please advise us in writing.

**3 Pages Total** *(including this sheet)*

# TABLE 1.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **3/2/2022**
Date Reported: **3/10/2022**
Client Sample ID: **R#FNA0091850016 L#DNK810410**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA220187**
TRI Control No.: **161917**

| | | SPECIMENS | | | | | | | | | | | | | | Proj. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Specs. |
| **METHOD** | **DESCRIPTION** | | | | | | | | | | | | | | | |
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | 68 min. |
| | | 81 | 82 | 81 | 82 | 80 | 80 | 83 | 80 | 83 | 81 | 81 | 1 | 80 | 83 | 76 min. ave. |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | 0.9323 | 0.9323 | | | | | | | | | 0.9323 | 0.0000 | 0.9323 | 0.9323 | 0.939 max. |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | 230 | 256 | 248 | 244 | 217 | | | | | | 239 | 16 | 217 | 256 | 120 min. |
| | *TD* | 256 | 282 | 239 | 250 | 264 | | | | | | 258 | 16 | 239 | 282 | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | 518 | 552 | 570 | 535 | 527 | | | | | | 540 | 21 | 518 | 570 | 250 min. |
| | *TD* | 604 | 647 | 572 | 582 | 617 | | | | | | 604 | 30 | 572 | 647 | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | 2.38 | 2.41 | | | | | | | | | 2.39 | 0.02 | 2.38 | 2.41 | 2 - 3 |

(End of Table 1)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

# TABLE 2.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **3/2/2022**
Date Reported: **3/10/2022**
Client Sample ID: **R#FNA0091850031 L#DNK810410**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA220187**
TRI Control No.: **161918**

| METHOD | DESCRIPTION | SPECIMENS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Proj. Specs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | 68 min. |
| | | 84 | 83 | 81 | 80 | 81 | 82 | 81 | 83 | 80 | 83 | 82 | 1 | 80 | 84 | 76 min. ave. |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | 0.9363 | 0.9364 | | | | | | | | | 0.9363 | 0.0000 | 0.9363 | 0.9364 | 0.939 max. |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | 221 | 230 | 234 | 230 | 245 | | | | | | 232 | 9 | 221 | 245 | 120 min. |
| | *TD* | 286 | 223 | 272 | 271 | 246 | | | | | | 260 | 25 | 223 | 286 | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | 513 | 501 | 514 | 428 | 546 | | | | | | 500 | 44 | 428 | 546 | 250 min. |
| | *TD* | 660 | 536 | 633 | 622 | 570 | | | | | | 604 | 50 | 536 | 660 | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | 2.43 | 2.42 | | | | | | | | | 2.42 | 0.01 | 2.42 | 2.43 | 2 - 3 |

(End of Table 2)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

March 10, 2022

GAI-LAP
Initial: CVZ #:0.13
DATE: 03/10/2022

Nikoliya Boyanich
***NewFields***
9400 Station Street, Suite 300
Long Tree, CO 80124

**Re:** FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the ***final*** laboratory report for the Conformance testing of one (1) 80mil LLDPE Double Sided Microspike sample.

**PROJECT NAME:** Cripple Creek & Victor Mine VLF2 Ph 3A DATE REPORTED: **March 10, 2022**

**REFERENCE TRI JOB NO.:** CA220188

**DATE RECEIVED:** March 03, 2022

**SAMPLED BY:** TRI-CA, AGRU NV

**SAMPLE IDENTIFICATIONS:**

| *SAMPLE ID* | *TRI CONTROL NUMBER* |
|---|---|
| R#FNA0091850071 L#21KB544 | 161919 |

**TESTS REQUIRED / PERFORMED:**

| *TEST METHOD* | *DESCRIPTION* |
|---|---|
| 1. ASTM D5994 | Thickness |
| 2. ASTM D6693 | Tensile Properties |
| 3. ASTM D792 | Specific Gravity |
| 4. ASTM D4218 | Carbon Content Muffle |

**TEST RESULTS:** The test results are summarized in the attached Table 1.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,

**TRI Environmental, Inc. - California**

Maria Espitia
Quality Assurance

Chad Blackwell
TRI-CA Director

*Signatures are on file*

It shall be noted that the sample tested is believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at a longer period, please advise us in writing.

**2 Pages Total** *(including this sheet)*

# TABLE 1.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **3/3/2022**
Date Reported: **3/10/2022**
Client Sample ID: **R#FNA0091850071 L#21KB544**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA220188**
TRI Control No.: **161919**

| | | SPECIMENS | | | | | | | | | | | | | | Proj. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Specs. |
| **METHOD** | **DESCRIPTION** | | | | | | | | | | | | | | | |
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | 68 min. |
| | | 82 | 82 | 82 | 82 | 80 | 81 | 81 | 80 | 80 | 80 | 81 | 1 | 80 | 82 | 76 min. ave. |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | 0.9385 | 0.9385 | | | | | | | | | 0.9385 | 0.0000 | 0.9385 | 0.9385 | 0.939 max. |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | 232 | 236 | 249 | 214 | 236 | | | | | | 233 | 12 | 214 | 249 | 120 min. |
| | *TD* | 249 | 261 | 248 | 242 | 235 | | | | | | 247 | 10 | 235 | 261 | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | 541 | 533 | 555 | 481 | 535 | | | | | | 529 | 28 | 481 | 555 | 250 min. |
| | *TD* | 584 | 627 | 575 | 591 | 566 | | | | | | 588 | 24 | 566 | 627 | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | 2.36 | 2.31 | | | | | | | | | 2.33 | 0.04 | 2.31 | 2.36 | 2 - 3 |

(End of Table 1)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

March 11, 2022

Nikoliya Boyanich
***NewFields***
9400 Station Street, Suite 300
Long Tree, CO 80124

GAI-LAP
Initial: CVZ #:0.13
DATE: 03/11/2022

**Re:** FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the ***final*** laboratory report for the Conformance testing of two (2) 80mil LLDPE Double Sided Microspike samples.

**PROJECT NAME:** Cripple Creek & Victor Mine VLF2 Ph 3A DATE REPORTED: **March 11, 2022**

**REFERENCE TRI JOB NO.:** CA220196

**DATE RECEIVED:** March 04, 2022

**SAMPLED BY:** TRI-CA, AGRU NV

**SAMPLE IDENTIFICATIONS:**

| *SAMPLE ID* | *TRI CONTROL NUMBER* |
|---|---|
| R#FNA0091850087 L#21KB544 | 161949 |
| R#FNA0091850102 L#21KB544 | 161950 |

**TESTS REQUIRED / PERFORMED:**

| *TEST METHOD* | *DESCRIPTION* |
|---|---|
| 1. ASTM D5994 | Thickness |
| 2. ASTM D6693 | Tensile Properties |
| 3. ASTM D792 | Specific Gravity |
| 4. ASTM D4218 | Carbon Content Muffle |

**TEST RESULTS:** The test results are summarized in the attached Tables 1 to 2.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,

**TRI Environmental, Inc. - California**

Maria Espitia
Quality Assurance

Chad Blackwell
TRI-CA Director

*Signatures are on file*

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at a longer period, please advise us in writing.

**3 Pages Total** *(including this sheet)*

# TABLE 1.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **3/4/2022**
Date Reported: **3/11/2022**
Client Sample ID: **R#FNA0091850087 L#21KB544**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA220196**
TRI Control No.: **161949**

| | | SPECIMENS | | | | | | | | | | | | | | Proj. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Specs. |
| **METHOD** | **DESCRIPTION** | | | | | | | | | | | | | | | |
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | **68 min.** |
| | | **81** | **80** | **81** | **80** | **82** | **81** | **81** | **83** | **80** | **81** | **81** | **1** | **80** | **83** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9385** | **0.9383** | | | | | | | | | **0.9384** | **0.0001** | **0.9383** | **0.9385** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **242** | **230** | **223** | **245** | **212** | | | | | | **231** | **14** | **212** | **245** | **120 min.** |
| | *TD* | **272** | **261** | **259** | **254** | **251** | | | | | | **260** | **8** | **251** | **272** | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | **523** | **546** | **534** | **521** | **515** | | | | | | **528** | **12** | **515** | **546** | **250 min.** |
| | *TD* | **640** | **618** | **604** | **619** | **594** | | | | | | **615** | **18** | **594** | **640** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.47** | **2.40** | | | | | | | | | **2.43** | **0.05** | **2.40** | **2.47** | **2 - 3** |

(End of Table 1)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

**1970 S. Santa Cruz Street, Anaheim, CA 92805, www.precisionlabs.net**
TRI Environmental, Inc. dba Precision Geosynthetic Laboratories International

# TABLE 2.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **3/4/2022**
Date Reported: **3/11/2022**
Client Sample ID: **R#FNA0091850102 L#21KB544**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA220196**
TRI Control No.: **161950**

| | | SPECIMENS | | | | | | | | | | | | | | Proj. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Specs. |
| **METHOD** | **DESCRIPTION** | | | | | | | | | | | | | | | |
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz) Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | 68 min. |
| | | **81** | **82** | **80** | **81** | **81** | **83** | **81** | **83** | **81** | **81** | **81** | **1** | **80** | **83** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9321** | **0.9320** | | | | | | | | | **0.9320** | **0.0001** | **0.9320** | **0.9321** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **236** | **218** | **253** | **213** | **226** | | | | | | **229** | **16** | **213** | **253** | **120 min.** |
| | *TD* | **249** | **268** | **268** | **253** | **259** | | | | | | **259** | **9** | **249** | **268** | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | **512** | **528** | **550** | **528** | **492** | | | | | | **522** | **22** | **492** | **550** | **250 min.** |
| | *TD* | **591** | **633** | **633** | **599** | **609** | | | | | | **613** | **19** | **591** | **633** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.38** | **2.44** | | | | | | | | | **2.41** | **0.04** | **2.38** | **2.44** | **2 - 3** |

(End of Table 2)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

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GAI-LAP

## MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

**Project Name:** Cripple Creek & Victor Mine VLF2 Ph 3A **TYPE OF MQA:** LEVEL (2) **QA by:** Maria Espitia

**Material:** 80mil LLDPE Microspike **SAMPLING FREQUENCY:** 1/150,000 sq.ft.

**Manufacturer:** AGRU SO#16473

**Location:** NV

| No. | Roll # | Lot # | Length (ft.) | Width (ft.) | Area ($ft^2$) | Date Manufactured | Sampled by | Date Sampled | Date Received | Reference Job No/ Control No |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | FND0103600003 | DPF811480 | 410 | 23 | 9430 | 9/9/2022 | TRI-CA | 9/13/2022 | 9/15/2022 | CA221090 C#166764 |
| 2 | FND0103600004 | DPF811480 | 410 | 23 | 9430 | 9/9/2022 | | | | |
| 3 | FND0103600005 | DPF811480 | 410 | 23 | 9430 | 9/9/2022 | | | | |
| 4 | FND0103600006 | DPF811480 | 410 | 23 | 9430 | 9/9/2022 | | | | |
| 5 | FND0103600007 | DPF811480 | 410 | 23 | 9430 | 9/9/2022 | | | | |
| 6 | FND0103600008 | DPF811480 | 410 | 23 | 9430 | 9/10/2022 | | | | |
| 7 | FND0103600009 | DPF811480 | 410 | 23 | 9430 | 9/10/2022 | | | | |
| 8 | FND0103600010 | DPF811480 | 410 | 23 | 9430 | 9/10/2022 | | | | |
| 9 | FND0103600011 | DPF811480 | 410 | 23 | 9430 | 9/10/2022 | | | | |
| 10 | FND0103600012 | DPF811480 | 410 | 23 | 9430 | 9/10/2022 | | | | |
| 11 | FND0103600013 | DPF811480 | 410 | 23 | 9430 | 9/10/2022 | | | | |
| 12 | FND0103600014 | DPF811480 | 410 | 23 | 9430 | 9/10/2022 | | | | |
| 13 | FND0103600015 | DPF811480 | 410 | 23 | 9430 | 9/10/2022 | | | | |
| 14 | FND0103600016 | DPF811480 | 410 | 23 | 9430 | 9/10/2022 | | | | |
| 15 | FND0103600017 | DPF811480 | 410 | 23 | 9430 | 9/10/2022 | | | | |
| 16 | FND0103600018 | DPF811480 | 410 | 23 | 9430 | 9/10/2022 | TRI-CA | 9/13/2022 | 9/15/2022 | CA221090 C#166765 |
| 17 | FND0103600019 | DPF811480 | 410 | 23 | 9430 | 9/10/2022 | | | | |
| 18 | FND0103600020 | DPF811480 | 410 | 23 | 9430 | 9/10/2022 | | | | |
| 19 | FND0103600021 | DPF811480 | 410 | 23 | 9430 | 9/10/2022 | | | | |
| 20 | FND0103600022 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | | | | |
| 21 | FND0103600023 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | | | | |
| 22 | FND0103600024 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | | | | |
| 23 | FND0103600025 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | | | | |
| 24 | FND0103600026 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | | | | |
| 25 | FND0103600027 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | | | | |
| 26 | FND0103600028 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | | | | |
| 27 | FND0103600029 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | | | | |
| 28 | FND0103600030 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | | | | |

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## MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

**Project Name:** Cripple Creek & Victor Mine VLF2 Ph 3A **TYPE OF MQA:** LEVEL (2) **QA by:** Maria Espitia

**Material:** 80mil LLDPE Microspike **SAMPLING FREQUENCY:** 1/150,000 sq.ft.

**Manufacturer:** AGRU SO#16473

**Location:** NV

| No. | Roll # | Lot # | Length (ft.) | Width (ft.) | Area ($ft^2$) | Date Manufactured | Sampled by | Date Sampled | Date Received | Reference Job No/ Control No |
|---|---|---|---|---|---|---|---|---|---|---|
| 29 | FND0103600031 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | | | | |
| 30 | FND0103600032 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | | | | |
| 31 | FND0103600033 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | TRI-CA | 9/13/2022 | 9/15/2022 | CA221090 C#166766 |
| 32 | FND0103600034 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | | | | |
| 33 | FND0103600035 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | | | | |
| 34 | FND0103600036 | DPF811480 | 410 | 23 | 9430 | 9/11/2022 | | | | |
| 35 | FND0103600037 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | | | | |
| 36 | FND0103600038 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | | | | |
| 37 | FND0103600039 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | | | | |
| 38 | FND0103600040 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | | | | |
| 39 | FND0103600041 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | | | | |
| 40 | FND0103600042 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | | | | |
| 41 | FND0103600043 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | | | | |
| 42 | FND0103600044 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | | | | |
| 43 | FND0103600045 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | | | | |
| 44 | FND0103600046 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | | | | |
| 45 | FND0103600047 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | | | | |
| 46 | FND0103600048 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | TRI-CA | 9/13/2022 | 9/15/2022 | CA221090 C#166767 |
| 47 | FND0103600049 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | | | | |
| 48 | FND0103600050 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | | | | |
| 49 | FND0103600051 | DPF811480 | 410 | 23 | 9430 | 9/12/2022 | | | | |
| 50 | FND0103600052 | DPF811480 | 410 | 23 | 9430 | 9/13/2022 | | | | |
| 51 | FND0103600053 | DPF811480 | 410 | 23 | 9430 | 9/13/2022 | | | | |
| 52 | FND0103600054 | DPF811480 | 410 | 23 | 9430 | 9/13/2022 | | | | |
| 53 | FND0103600055 | DPF811480 | 410 | 23 | 9430 | 9/13/2022 | | | | |
| 54 | FND0103600056 | DPF811480 | 410 | 23 | 9430 | 9/13/2022 | | | | |
| 55 | FND0103600057 | DPF811480 | 410 | 23 | 9430 | 9/13/2022 | | | | |
| 56 | FND0103600058 | DPF811480 | 410 | 23 | 9430 | 9/13/2022 | | | | |

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## MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

**Project Name:** Cripple Creek & Victor Mine VLF2 Ph 3A **TYPE OF MQA:** LEVEL (2) **QA by:** Maria Espitia

**Material:** 80mil LLDPE Microspike **SAMPLING FREQUENCY:** 1/150,000 sq.ft.

**Manufacturer:** AGRU SO#16473

**Location:** NV

| No. | Roll # | Lot # | Length (ft.) | Width (ft.) | Area ($ft^2$) | Date Manufactured | Sampled by | Date Sampled | Date Received | Reference Job No/ Control No |
|---|---|---|---|---|---|---|---|---|---|---|
| 57 | FND0103600059 | DPF811480 | 410 | 23 | 9430 | 9/13/2022 | | | | |
| 58 | FND0103600060 | DPF811480 | 410 | 23 | 9430 | 9/13/2022 | | | | |
| 59 | FND0103600061 | DPF811480 | 410 | 23 | 9430 | 9/13/2022 | | | | |
| 60 | FND0103600062 | DPF811480 | 410 | 23 | 9430 | 9/13/2022 | | | | |
| 61 | FND0103600063 | DPF811480 | 410 | 23 | 9430 | 9/13/2022 | TRI-CA | 9/14/2022 | 9/16/2022 | CA221097 C#166807 |
| 62 | FND0103600064 | DPF811480 | 410 | 23 | 9430 | 9/13/2022 | | | | |
| | | | | **Sub Total $ft^2$ =** | **584660** | | | | | |
| 63 | FND0103600065 | DPH810510 | 410 | 23 | 9430 | 9/13/2022 | | | | |
| 64 | FND0103600066 | DPH810510 | 410 | 23 | 9430 | 9/14/2022 | | | | |
| 65 | FND0103600067 | DPH810510 | 410 | 23 | 9430 | 9/14/2022 | | | | |
| 66 | FND0103600068 | DPH810510 | 410 | 23 | 9430 | 9/14/2022 | | | | |
| 67 | FND0103600069 | DPH810510 | 410 | 23 | 9430 | 9/14/2022 | | | | |
| 68 | FND0103600070 | DPH810510 | 410 | 23 | 9430 | 9/14/2022 | | | | |
| 69 | FND0103600071 | DPH810510 | 410 | 23 | 9430 | 9/14/2022 | | | | |
| 70 | FND0103600072 | DPH810510 | 410 | 23 | 9430 | 9/14/2022 | | | | |
| 71 | FND0103600073 | DPH810510 | 410 | 23 | 9430 | 9/14/2022 | | | | |
| | | | | **Sub Total $ft^2$ =** | **84870** | | | | | |
| 72 | FND0103600074 | DPF811480 | 410 | 23 | 9430 | 9/14/2022 | | | | |
| 73 | FND0103600075 | DPF811480 | 410 | 23 | 9430 | 9/14/2022 | | | | |
| 74 | FND0103600076 | DPF811480 | 410 | 23 | 9430 | 9/14/2022 | | | | |
| 75 | FND0103600077 | DPF811480 | 410 | 23 | 9430 | 9/14/2022 | | | | |
| | | | | **Sub Total $ft^2$ =** | **37720** | | | | | |
| 76 | FND0103600078 | DPF811350 | 410 | 23 | 9430 | 9/14/2022 | TRI-CA | 9/16/2022 | 9/21/2022 | CA221120 C#166946 |
| 77 | FND0103600079 | DPF811350 | 410 | 23 | 9430 | 9/14/2022 | | | | |
| 78 | FND0103600080 | DPF811350 | 410 | 23 | 9430 | 9/14/2022 | | | | |
| 79 | FND0103600081 | DPF811350 | 410 | 23 | 9430 | 9/15/2022 | | | | |
| 80 | FND0103600082 | DPF811350 | 410 | 23 | 9430 | 9/15/2022 | | | | |
| 81 | FND0103600083 | DPF811350 | 410 | 23 | 9430 | 9/15/2022 | | | | |

## MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

**Project Name:** Cripple Creek & Victor Mine VLF2 Ph 3A **TYPE OF MQA:** LEVEL (2) **QA by:** Maria Espitia

**Material:** 80mil LLDPE Microspike **SAMPLING FREQUENCY:** 1/150,000 sq.ft.

**Manufacturer:** AGRU SO#16473

**Location:** NV

| No. | Roll # | Lot # | Length (ft.) | Width (ft.) | Area ($ft^2$) | Date Manufactured | Sampled by | Date Sampled | Date Received | Reference Job No/ Control No |
|---|---|---|---|---|---|---|---|---|---|---|
| 82 | FND0103600084 | DPF811350 | 410 | 23 | 9430 | 9/15/2022 | | | | |
| 83 | FND0103600085 | DPF811350 | 410 | 23 | 9430 | 9/15/2022 | | | | |
| 84 | FND0103600087 | DPF811350 | 410 | 23 | 9430 | 9/15/2022 | | | | |
| 85 | FND0103600088 | DPF811350 | 410 | 23 | 9430 | 9/15/2022 | | | | |
| 86 | FND0103600089 | DPF811350 | 410 | 23 | 9430 | 9/15/2022 | | | | |
| 87 | FND0103600090 | DPF811350 | 410 | 23 | 9430 | 9/15/2022 | | | | |
| 88 | FND0103600091 | DPF811350 | 410 | 23 | 9430 | 9/16/2022 | | | | |
| 89 | FND0103600092 | DPF811350 | 410 | 23 | 9430 | 9/16/2022 | | | | |
| 90 | FND0103600093 | DPF811350 | 410 | 23 | 9430 | 9/16/2022 | | | | |
| 91 | FND0103600094 | DPF811350 | 410 | 23 | 9430 | 9/16/2022 | TRI-CA | 9/20/2022 | 9/22/2022 | CA221122 C#166950 |
| | | | | Sub Total $ft^2$ = | 150880 | | | | | |
| 92 | FND0103600095 | DPH810510 | 410 | 23 | 9430 | 9/16/2022 | | | | |
| 93 | FND0103600096 | DPH810510 | 410 | 23 | 9430 | 9/16/2022 | | | | |
| 94 | FND0103600097 | DPH810510 | 410 | 23 | 9430 | 9/16/2022 | | | | |
| 95 | FND0103600098 | DPH810510 | 410 | 23 | 9430 | 9/16/2022 | | | | |
| 96 | FND0103600099 | DPH810510 | 410 | 23 | 9430 | 9/16/2022 | | | | |
| 97 | FND0103600100 | DPH810510 | 410 | 23 | 9430 | 9/16/2022 | | | | |
| 98 | FND0103600101 | DPH810510 | 410 | 23 | 9430 | 9/16/2022 | | | | |
| 99 | FND0103600102 | DPH810510 | 410 | 23 | 9430 | 9/16/2022 | | | | |
| 100 | FND0103600103 | DPH810510 | 410 | 23 | 9430 | 9/16/2022 | | | | |
| 101 | FND0103600106 | DPH810510 | 410 | 23 | 9430 | 9/17/2022 | | | | |
| 102 | FND0103600107 | DPH810510 | 410 | 23 | 9430 | 9/17/2022 | | | | |
| 103 | FND0103600108 | DPH810510 | 410 | 23 | 9430 | 9/17/2022 | | | | |
| 104 | FND0103600109 | DPH810510 | 410 | 23 | 9430 | 9/17/2022 | | | | |
| 105 | FND0103600110 | DPH810510 | 410 | 23 | 9430 | 9/17/2022 | | | | |
| 106 | FND0103600111 | DPH810510 | 410 | 23 | 9430 | 9/17/2022 | TRI-CA | 9/20/2022 | 9/22/2022 | CA221122 C#166951 |
| 107 | FND0103600112 | DPH810510 | 410 | 23 | 9430 | 9/17/2022 | | | | |
| 108 | FND0103600114 | DPH810510 | 410 | 23 | 9430 | 9/17/2022 | | | | |

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## MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

**Project Name:** Cripple Creek & Victor Mine VLF2 Ph 3A **TYPE OF MQA:** LEVEL (2) **QA by:** Maria Espitia

**Material:** 80mil LLDPE Microspike **SAMPLING FREQUENCY:** 1/150,000 sq.ft.

**Manufacturer:** AGRU SO#16473

**Location:** NV

| No. | Roll # | Lot # | Length (ft.) | Width (ft.) | Area ($ft^2$) | Date Manufactured | Sampled by | Date Sampled | Date Received | Reference Job No/ Control No |
|---|---|---|---|---|---|---|---|---|---|---|
| 109 | FND0103600115 | DPH810510 | 410 | 23 | 9430 | 9/17/2022 | | | | |
| 110 | FND0103600116 | DPH810510 | 410 | 23 | 9430 | 9/17/2022 | | | | |
| 111 | FND0103600117 | DPH810510 | 410 | 23 | 9430 | 9/17/2022 | | | | |
| 112 | FND0103600118 | DPH810510 | 410 | 23 | 9430 | 9/17/2022 | | | | |
| 113 | FND0103600119 | DPH810510 | 410 | 23 | 9430 | 9/17/2022 | | | | |
| 114 | FND0103600120 | DPH810510 | 410 | 23 | 9430 | 9/17/2022 | | | | |
| 115 | FND0103600121 | DPH810510 | 410 | 23 | 9430 | 9/18/2022 | | | | |
| 116 | FND0103600122 | DPH810510 | 410 | 23 | 9430 | 9/18/2022 | | | | |
| 117 | FND0103600123 | DPH810510 | 410 | 23 | 9430 | 9/18/2022 | | | | |
| 118 | FND0103600124 | DPH810510 | 410 | 23 | 9430 | 9/18/2022 | | | | |
| 119 | FND0103600125 | DPH810510 | 410 | 23 | 9430 | 9/18/2022 | | | | |
| 120 | FND0103600126 | DPH810510 | 410 | 23 | 9430 | 9/18/2022 | | | | |
| 121 | FND0103600127 | DPH810510 | 410 | 23 | 9430 | 9/18/2022 | TRI-CA | 9/20/2022 | 9/22/2022 | CA221122 C#166952 |
| 122 | FND0103600128 | DPH810510 | 410 | 23 | 9430 | 9/18/2022 | | | | |
| 123 | FND0103600129 | DPH810510 | 410 | 23 | 9430 | 9/18/2022 | | | | |
| 124 | FND0103600130 | DPH810510 | 410 | 23 | 9430 | 9/18/2022 | | | | |
| 125 | FND0103600131 | DPH810510 | 410 | 23 | 9430 | 9/18/2022 | | | | |
| 126 | FND0103600132 | DPH810510 | 410 | 23 | 9430 | 9/18/2022 | | | | |
| 127 | FND0103600133 | DPH810510 | 410 | 23 | 9430 | 9/18/2022 | | | | |
| 128 | FND0103600134 | DPH810510 | 410 | 23 | 9430 | 9/18/2022 | | | | |
| 129 | FND0103600135 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | | | | |
| 130 | FND0103600136 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | | | | |
| 131 | FND0103600137 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | | | | |
| 132 | FND0103600138 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | | | | |
| 133 | FND0103600139 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | | | | |
| 134 | FND0103600140 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | | | | |
| 135 | FND0103600141 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | | | | |
| 136 | FND0103600142 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | TRI-CA | 9/20/2022 | 9/22/2022 | CA221122 C#166953 |

## MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

**Project Name:** Cripple Creek & Victor Mine VLF2 Ph 3A
**TYPE OF MQA:** LEVEL (2)
**QA by:** Maria Espitia
**Material:** 80mil LLDPE Microspike
**SAMPLING FREQUENCY:** 1/150,000 sq.ft.
**Manufacturer:** AGRU SO#16473
**Location:** NV

| No. | Roll # | Lot # | Length (ft.) | Width (ft.) | Area ($ft^2$) | Date Manufactured | Sampled by | Date Sampled | Date Received | Reference Job No/ Control No |
|---|---|---|---|---|---|---|---|---|---|---|
| 137 | FND0103600143 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | | | | |
| 138 | FND0103600144 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | | | | |
| 139 | FND0103600145 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | | | | |
| 140 | FND0103600146 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | | | | |
| 141 | FND0103600147 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | | | | |
| 142 | FND0103600148 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | | | | |
| 143 | FND0103600149 | DPH810510 | 410 | 23 | 9430 | 9/19/2022 | | | | |
| 144 | FND0103600150 | DPH810510 | 410 | 23 | 9430 | 9/20/2022 | | | | |
| 145 | FND0103600151 | DPH810510 | 410 | 23 | 9430 | 9/20/2022 | | | | |
| 146 | FND0103600152 | DPH810510 | 410 | 23 | 9430 | 9/20/2022 | | | | |
| 147 | FND0103600153 | DPH810510 | 410 | 23 | 9430 | 9/20/2022 | | | | |
| 148 | FND0103600154 | DPH810510 | 410 | 23 | 9430 | 9/20/2022 | | | | |
| 149 | FND0103600155 | DPH810510 | 410 | 23 | 9430 | 9/20/2022 | | | | |
| 150 | FND0103600156 | DPH810510 | 410 | 23 | 9430 | 9/20/2022 | | | | |
| 151 | FND0103600157 | DPH810510 | 410 | 23 | 9430 | 9/20/2022 | TRI-CA | 9/22/2022 | 9/26/2022 | CA221132 C#166984 |
| 152 | FND0103600158 | DPH810510 | 410 | 23 | 9430 | 9/20/2022 | | | | |
| 153 | FND0103600159 | DPH810510 | 410 | 23 | 9430 | 9/20/2022 | | | | |
| 154 | FND0103600160 | DPH810510 | 410 | 23 | 9430 | 9/20/2022 | | | | |
| 155 | FND0103600161 | DPH810510 | 410 | 23 | 9430 | 9/20/2022 | | | | |
| 156 | FND0103600162 | DPH810510 | 410 | 23 | 9430 | 9/20/2022 | | | | |
| 157 | FND0103600163 | DPH810510 | 410 | 23 | 9430 | 9/20/2022 | | | | |
| 158 | FND0103600164 | DPH810510 | 410 | 23 | 9430 | 9/21/2022 | | | | |
| 159 | FND0103600165 | DPH810510 | 410 | 23 | 9430 | 9/21/2022 | | | | |
| 160 | FND0103600166 | DPH810510 | 410 | 23 | 9430 | 9/21/2022 | | | | |
| 161 | FND0103600167 | DPH810510 | 410 | 23 | 9430 | 9/21/2022 | | | | |
| 162 | FND0103600168 | DPH810510 | 410 | 23 | 9430 | 9/21/2022 | | | | |
| 163 | FND0103600169 | DPH810510 | 410 | 23 | 9430 | 9/21/2022 | | | | |
| 164 | FND0103600170 | DPH810510 | 410 | 23 | 9430 | 9/21/2022 | | | | |

TRI ENVIRONMENTAL

TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

Austin, TX - USA | Anaheim, CA - USA | Anderson, SC - USA | Gold Coast - Australia | Suzhou - China

GAI-LAP

## MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

**Project Name:** Cripple Creek & Victor Mine VLF2 Ph 3A **TYPE OF MQA:** LEVEL (2) **QA by:** Maria Espitia

**Material:** 80mil LLDPE Microspike **SAMPLING FREQUENCY:** 1/150,000 sq.ft.

**Manufacturer:** AGRU SO#16473

**Location:** NV

| No. | Roll # | Lot # | Length (ft.) | Width (ft.) | Area ($ft^2$) | Date Manufactured | Sampled by | Date Sampled | Date Received | Reference Job No/ Control No |
|---|---|---|---|---|---|---|---|---|---|---|
| 165 | FND0103600171 | DPH810510 | 410 | 23 | 9430 | 9/21/2022 | | | | |
| 166 | FND0103600173 | DPH810510 | 410 | 23 | 9430 | 9/21/2022 | TRI-CA | 9/22/2022 | 9/26/2022 | CA221132 C#166985 |
| 167 | FND0103600174 | DPH810510 | 410 | 23 | 9430 | 9/21/2022 | | | | |
| 168 | FND0103600175 | DPH810510 | 410 | 23 | 9430 | 9/21/2022 | | | | |
| 169 | FND0103600176 | DPH810510 | 410 | 23 | 9430 | 9/21/2022 | | | | |
| 170 | FND0103600177 | DPH810510 | 410 | 23 | 9430 | 9/21/2022 | | | | |
| 171 | FND0103600178 | DPH810510 | 410 | 23 | 9430 | 9/21/2022 | | | | |
| 172 | FND0103600179 | DPH810510 | 410 | 23 | 9430 | 9/22/2022 | | | | |
| 173 | FND0103600180 | DPH810510 | 410 | 23 | 9430 | 9/22/2022 | | | | |
| 174 | FND0103600181 | DPH810510 | 410 | 23 | 9430 | 9/22/2022 | | | | |
| 175 | FND0103600182 | DPH810510 | 410 | 23 | 9430 | 9/22/2022 | | | | |
| 176 | FND0103600183 | DPH810510 | 410 | 23 | 9430 | 9/22/2022 | | | | |
| 177 | FND0103600184 | DPH810510 | 410 | 23 | 9430 | 9/22/2022 | | | | |
| 178 | FND0103600185 | DPH810510 | 410 | 23 | 9430 | 9/22/2022 | | | | |
| 179 | FND0103600186 | DPH810510 | 410 | 23 | 9430 | 9/22/2022 | | | | |
| 180 | FND0103600187 | DPH810510 | 410 | 23 | 9430 | 9/22/2022 | | | | |
| | | | | Sub Total $ft^2$ = | 839270 | | | | | |
| 181 | FND0103600188 | DPH810490 | 410 | 23 | 9430 | 9/22/2022 | TRI-CA | 9/23/2022 | 9/27/2022 | CA221140 C#167063 |
| 182 | FND0103600189 | DPH810490 | 410 | 23 | 9430 | 9/22/2022 | | | | |
| 183 | FND0103600190 | DPH810490 | 410 | 23 | 9430 | 9/22/2022 | | | | |
| 184 | FND0103600191 | DPH810490 | 410 | 23 | 9430 | 9/22/2022 | | | | |
| 185 | FND0103600192 | DPH810490 | 410 | 23 | 9430 | 9/22/2022 | | | | |
| 186 | FND0103600193 | DPH810490 | 410 | 23 | 9430 | 9/22/2022 | | | | |
| 187 | FND0103600194 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | | | | |
| 188 | FND0103600195 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | | | | |
| 189 | FND0103600196 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | | | | |
| 190 | FND0103600197 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | | | | |
| 191 | FND0103600198 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | | | | |

## MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

**Project Name:** Cripple Creek & Victor Mine VLF2 Ph 3A **TYPE OF MQA:** LEVEL (2) **QA by:** Maria Cipitia

**Material:** 80mil LLDPE Microspike **SAMPLING FREQUENCY:** 1/150,000 sq.ft.

**Manufacturer:** AGRU SO#16473

**Location:** NV

| No. | Roll # | Lot # | Length (ft.) | Width (ft.) | Area ($ft^2$) | Date Manufactured | Sampled by | Date Sampled | Date Received | Reference Job No/ Control No |
|---|---|---|---|---|---|---|---|---|---|---|
| 192 | FND0103600199 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | | | | |
| 193 | FND0103600200 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | | | | |
| 194 | FND0103600201 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | | | | |
| 195 | FND0103600202 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | | | | |
| 196 | FND0103600203 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | TRI-CA | 9/26/2022 | 9/28/2022 | CA221145 C#167080 |
| 197 | FND0103600204 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | | | | |
| 198 | FND0103600205 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | | | | |
| 199 | FND0103600206 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | | | | |
| 200 | FND0103600207 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | | | | |
| 201 | FND0103600208 | DPH810490 | 410 | 23 | 9430 | 9/23/2022 | | | | |
| 202 | FND0103600209 | DPH810490 | 410 | 23 | 9430 | 9/24/2022 | | | | |
| 203 | FND0103600210 | DPH810490 | 410 | 23 | 9430 | 9/24/2022 | | | | |
| 204 | FND0103600211 | DPH810490 | 410 | 23 | 9430 | 9/24/2022 | | | | |
| 205 | FND0103600212 | DPH810490 | 410 | 23 | 9430 | 9/24/2022 | | | | |
| 206 | FND0103600213 | DPH810490 | 410 | 23 | 9430 | 9/24/2022 | | | | |
| 207 | FND0103600214 | DPH810490 | 410 | 23 | 9430 | 9/24/2022 | | | | |
| 208 | FND0103600215 | DPH810490 | 410 | 23 | 9430 | 9/24/2022 | | | | |
| 209 | FND0103600216 | DPH810490 | 410 | 23 | 9430 | 9/24/2022 | | | | |
| 210 | FND0103600217 | DPH810490 | 410 | 23 | 9430 | 9/24/2022 | | | | |
| 211 | FND0103600218 | DPH810490 | 410 | 23 | 9430 | 9/24/2022 | TRI-CA | 9/26/2022 | 9/28/2022 | CA221145 C#167081 |
| 212 | FND0103600219 | DPH810490 | 410 | 23 | 9430 | 9/24/2022 | | | | |
| 213 | FND0103600220 | DPH810490 | 410 | 23 | 9430 | 9/24/2022 | | | | |
| 214 | FND0103600222 | DPH810490 | 410 | 23 | 9430 | 9/24/2022 | | | | |
| 215 | FND0103600223 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |
| 216 | FND0103600224 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |
| 217 | FND0103600225 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |
| 218 | FND0103600226 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |
| 219 | FND0103600227 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |

GAI-LAP

## MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

**Project Name:** Cripple Creek & Victor Mine VLF2 Ph 3A **TYPE OF MQA:** LEVEL (2) **QA by:** Maria Cipitia

**Material:** 80mil LLDPE Microspike **SAMPLING FREQUENCY:** 1/150,000 sq.ft.

**Manufacturer:** AGRU SO#16473

**Location:** NV

| No. | Roll # | Lot # | Length (ft.) | Width (ft.) | Area ($ft^2$) | Date Manufactured | Sampled by | Date Sampled | Date Received | Reference Job No/ Control No |
|---|---|---|---|---|---|---|---|---|---|---|
| 220 | FND0103600228 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |
| 221 | FND0103600229 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |
| 222 | FND0103600230 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |
| 223 | FND0103600231 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |
| 224 | FND0103600232 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |
| 225 | FND0103600233 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |
| 226 | FND0103600234 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |
| 227 | FND0103600235 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |
| 228 | FND0103600236 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |
| 229 | FND0103600237 | DPH810490 | 410 | 23 | 9430 | 9/25/2022 | | | | |
| 230 | FND0103600238 | DPH810490 | 410 | 23 | 9430 | 9/26/2022 | | | | |
| | | | | **Sub Total $ft^2$ =** | **471500** | | | | | |
| | | | | **TOTAL $ft^2$ =** | **2,168,900** | | | | | |

September 21, 2022

Nikoliya Boyanich
***NewFields***
9400 Station Street, Suite 300
Lone Tree, CO 80124

GAI-LAP
Initial: CVZ #:0.13
DATE: 09/21/2022

**Re:** FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the ***final*** laboratory report for the Conformance testing of four (4) 80mil LLDPE Double Sided Microspike samples.

**PROJECT NAME:** Cripple Creek & Victor Mine VLF2 Ph 3A CQA DATE REPORTED: **September 21, 2022**

**REFERENCE TRI JOB NO.:** CA221090

**DATE RECEIVED:** September 15, 2022

**SAMPLED BY:** TRI-CA at AGRU, NV

**SAMPLE IDENTIFICATIONS:**

| *SAMPLE ID* | *TRI CONTROL NUMBER* |
|---|---|
| R#FND0103600003 L#DPF811480 | 166764 |
| R#FND0103600018 L#DPF811480 | 166765 |
| R#FND0103600033 L#DPF811480 | 166766 |
| R#FND0103600048 L#DPF811480 | 166767 |

**TESTS REQUIRED / PERFORMED:**

| *TEST METHOD* | *DESCRIPTION* |
|---|---|
| 1. ASTM D5994 | Thickness |
| 2. ASTM D6693 | Tensile Properties |
| 3. ASTM D792 | Specific Gravity |
| 4. ASTM D4218 | Carbon Content Muffle |

**TEST RESULTS:** The test results are summarized in the attached Tables 1 to 4.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,
**TRI Environmental, Inc. - California**

Maria Espitia
Quality Assurance

Chad Blackwell
TRI-CA Director

*Signatures are on file*

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at a longer period, please advise us in writing.

**5 Pages Total** *(including this sheet)*

# TABLE 1.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **9/15/2022**
Date Reported: **9/21/2022**
Client Sample ID: **R#FND0103600003 L#PDF811480**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221090**
TRI Control No.: **166764**

| METHOD | DESCRIPTION | SPECIMENS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Proj. Specs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | **68 min.** |
| | | **80** | **81** | **84** | **82** | **81** | **85** | **80** | **80** | **82** | **80** | **81** | **2** | **80** | **85** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9366** | **0.9364** | | | | | | | | | **0.9365** | **0.0001** | **0.9364** | **0.9366** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **235** | **226** | **241** | **251** | **244** | | | | | | **240** | **10** | **226** | **251** | **120 min.** |
| | *TD* | **283** | **265** | **249** | **246** | **279** | | | | | | **265** | **17** | **246** | **283** | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | **513** | **480** | **519** | **548** | **533** | | | | | | **519** | **25** | **480** | **548** | **250 min.** |
| | *TD* | **641** | **604** | **582** | **576** | **639** | | | | | | **608** | **31** | **576** | **641** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.46** | **2.43** | | | | | | | | | **2.44** | **0.02** | **2.43** | **2.46** | **2 - 3** |

(End of Table 1)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

# TABLE 2.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **9/15/2022**
Date Reported: **9/21/2022**
Client Sample ID: **R#FND0103600018 L#PDF811480**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221090**
TRI Control No.: **166765**

| METHOD | DESCRIPTION | SPECIMENS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Proj. Specs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | **68 min.** |
| | | **83** | **83** | **84** | **80** | **83** | **81** | **81** | **81** | **82** | **81** | **82** | **1** | **80** | **84** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9377** | **0.9373** | | | | | | | | | **0.9375** | **0.0003** | **0.9373** | **0.9377** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **234** | **251** | **233** | **221** | **239** | | | | | | **236** | **11** | **221** | **251** | **120 min.** |
| | *TD* | **260** | **266** | **256** | **267** | **262** | | | | | | **262** | **4** | **256** | **267** | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | **525** | **564** | **513** | **494** | **526** | | | | | | **524** | **26** | **494** | **564** | **250 min.** |
| | *TD* | **604** | **602** | **580** | **610** | **593** | | | | | | **598** | **11** | **580** | **610** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.47** | **2.49** | | | | | | | | | **2.48** | **0.01** | **2.47** | **2.49** | **2 - 3** |

(End of Table 2)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

# TABLE 3.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **9/15/2022**
Date Reported: **9/21/2022**
Client Sample ID: **R#FND0103600033 L#PDF811480**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221090**
TRI Control No.: **166766**

| METHOD | DESCRIPTION | SPECIMENS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Proj. Specs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | **68 min.** |
| | | **81** | **81** | **84** | **80** | **80** | **80** | **83** | **83** | **81** | **80** | **81** | **1** | **80** | **84** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9368** | **0.9364** | | | | | | | | | **0.9366** | **0.0003** | **0.9364** | **0.9368** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **229** | **252** | **225** | **233** | **220** | | | | | | **232** | **12** | **220** | **252** | **120 min.** |
| | *TD* | **252** | **267** | **263** | **245** | **260** | | | | | | **257** | **9** | **245** | **267** | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | **508** | **544** | **500** | **509** | **498** | | | | | | **512** | **19** | **498** | **544** | **250 min.** |
| | *TD* | **566** | **618** | **594** | **598** | **586** | | | | | | **592** | **19** | **566** | **618** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.49** | **2.48** | | | | | | | | | **2.48** | **0.01** | **2.48** | **2.49** | **2 - 3** |

(End of Table 3)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

# TABLE 4.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **9/15/2022**
Date Reported: **9/21/2022**
Client Sample ID: **R#FND0103600048 L#PDF811480**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221090**
TRI Control No.: **166767**

| METHOD | DESCRIPTION | SPECIMENS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Proj. Specs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | **68 min.** |
| | | **81** | **83** | **83** | **83** | **80** | **80** | **81** | **81** | **83** | **81** | **82** | **1** | **80** | **83** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9379** | **0.9380** | | | | | | | | | **0.9380** | **0.0001** | **0.9379** | **0.9380** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **234** | **234** | **215** | **219** | **238** | | | | | | **228** | **10** | **215** | **238** | **120 min.** |
| | *TD* | **218** | **253** | **243** | **268** | **260** | | | | | | **249** | **19** | **218** | **268** | |
| | Elongation at Break (percent, %) | | | | | *Gauge Length = 2.0 in.* | | | | | | | | | | |
| | *MD* | **530** | **543** | **485** | **472** | **524** | | | | | | **511** | **31** | **472** | **543** | **250 min.** |
| | *TD* | **505** | **561** | **586** | **611** | **597** | | | | | | **572** | **42** | **505** | **611** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.36** | **2.37** | | | | | | | | | **2.36** | **0.01** | **2.36** | **2.37** | **2 - 3** |

(End of Table 4)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

September 23, 2022

Nikoliya Boyanich
***NewFields***
9400 Station Street, Suite 300
Lone Tree, CO 80124

GAI-LAP
Initial: CVZ #:0.13
DATE: 09/23/2022

**Re:** FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the ***final*** laboratory report for the Conformance testing of one (1) 80mil LLDPE Microspike sample.

**PROJECT NAME:** Cripple Creek & Victor Mine VLF2 Ph 3A CQA DATE REPORTED: **September 23, 2022**

**REFERENCE TRI JOB NO.:** CA221097

**DATE RECEIVED:** September 16, 2022

**SAMPLED BY:** TRI-CA at AGRU, NV

**SAMPLE IDENTIFICATIONS:**

| *SAMPLE ID* | *TRI CONTROL NUMBER* |
|---|---|
| R#FND0103600063 L#DPF811480 | 166807 |

**TESTS REQUIRED / PERFORMED:**

| *TEST METHOD* | *DESCRIPTION* |
|---|---|
| 1. ASTM D5994 | Thickness |
| 2. ASTM D6693 | Tensile Properties |
| 3. ASTM D792 | Specific Gravity |
| 4. ASTM D4218 | Carbon Content Muffle |

**TEST RESULTS:** The test results are summarized in the attached Table 1.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,

**TRI Environmental, Inc. - California**

Maria Espitia
Quality Assurance

Chad Blackwell
TRI-CA Director

*Signatures are on file*

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at a longer period, please advise us in writing.

**2 Pages Total** *(including this sheet)*

# TABLE 1.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **9/16/2022**
Date Reported: **9/23/2022**
Client Sample ID: **R#FND0103600063 L#DPF811480**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221097**
TRI Control No.: **166807**

| METHOD | DESCRIPTION | SPECIMENS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Proj. Specs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | 68 min. |
| | | 83 | 80 | 81 | 81 | 81 | 80 | 83 | 81 | 81 | 82 | 81 | 1 | 80 | 83 | 76 min. ave. |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | 0.9369 | 0.9371 | | | | | | | | | 0.9370 | 0.0001 | 0.9369 | 0.9371 | 0.939 max. |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | 244 | 253 | 215 | 232 | 215 | | | | | | 232 | 17 | 215 | 253 | 120 min. |
| | *TD* | 278 | 258 | 260 | 263 | 259 | | | | | | 264 | 8 | 258 | 278 | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | 551 | 531 | 485 | 524 | 501 | | | | | | 518 | 26 | 485 | 551 | 250 min. |
| | *TD* | 640 | 589 | 627 | 609 | 611 | | | | | | 615 | 19 | 589 | 640 | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | 2.42 | 2.44 | | | | | | | | | 2.43 | 0.01 | 2.42 | 2.44 | 2 - 3 |

(End of Table 1)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

September 28, 2022

Nikoliya Boyanich
***NewFields***
9400 Station Street, Suite 300
Lone Tree, CO 80124

GAI-LAP
Initial: CVZ #:0.13
DATE: 09/28/2022

**Re:** FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the ***final*** laboratory report for the Conformance testing of one (1) 80mil LLDPE Microspike sample.

**PROJECT NAME:** Cripple Creek & Victor Mine VLF2 Ph 3A CQA DATE REPORTED: **September 28, 2022**

**REFERENCE TRI JOB NO.:** CA221120

**DATE RECEIVED:** September 21, 2022

**SAMPLED BY:** TRI-CA at AGRU, NV

**SAMPLE IDENTIFICATIONS:**

| *SAMPLE ID* | *TRI CONTROL NUMBER* |
|---|---|
| R#FND0103600078 L#DPF811350 | 166946 |

**TESTS REQUIRED / PERFORMED:**

| *TEST METHOD* | *DESCRIPTION* |
|---|---|
| 1. ASTM D5994 | Thickness |
| 2. ASTM D6693 | Tensile Properties |
| 3. ASTM D792 | Specific Gravity |
| 4. ASTM D4218 | Carbon Content Muffle |

**TEST RESULTS:** The test results are summarized in the attached Table 1.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,

**TRI Environmental, Inc. - California**

Maria Espitia
Quality Assurance

Chad Blackwell
TRI-CA Director

*Signatures are on file*

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at a longer period, please advise us in writing.

**2 Pages Total** *(including this sheet)*

# TABLE 1.

## MATERIAL PROPERTIES

**CLIENT:** NewFields

**PROJECT:** Cripple Creek & Victor Mine VLF2 Phase 3A

Date Received: **9/21/2022**
Date Reported: **9/28/2022**
Client Sample ID: **R#FND0103600078 L#DPF811350**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221120**
TRI Control No.: **166946**

| | | SPECIMENS | | | | | | | | | | | | | | Proj. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Specs. |
| **METHOD** | **DESCRIPTION** | | | | | | | | | | | | | | | |
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz) Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | 68 min. |
| | | **84** | **82** | **82** | **81** | **80** | **83** | **82** | **80** | **82** | **80** | **82** | **1** | **80** | **84** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9343** | **0.9344** | | | | | | | | | **0.9343** | **0.0001** | **0.9343** | **0.9344** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **221** | **219** | **214** | **220** | **238** | | | | | | **222** | **9** | **214** | **238** | **120 min.** |
| | *TD* | **215** | **249** | **241** | **249** | **246** | | | | | | **240** | **14** | **215** | **249** | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | **485** | **477** | **462** | **495** | **522** | | | | | | **488** | **22** | **462** | **522** | **250 min.** |
| | *TD* | **524** | **581** | **563** | **574** | **566** | | | | | | **562** | **22** | **524** | **581** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.47** | **2.50** | | | | | | | | | **2.48** | **0.02** | **2.47** | **2.50** | **2 - 3** |

(End of Table 1)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

September 28, 2022

Nikoliya Boyanich
***NewFields***
9400 Station Street, Suite 300
Lone Tree, CO 80124

GAI-LAP
Initial: CVZ #:0.13
DATE: 09/28/2022

**Re:** FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the ***final*** laboratory report for the Conformance testing of four (4) 80mil LLDPE Microspike samples.

**PROJECT NAME:** Cripple Creek & Victor Mine VLF2 Ph 3A CQA DATE REPORTED: **September 28, 2022**

**REFERENCE TRI JOB NO.:** CA221122

**DATE RECEIVED:** September 22, 2022

**SAMPLED BY:** TRI-CA at AGRU, NV

**SAMPLE IDENTIFICATIONS:**

| *SAMPLE ID* | *TRI CONTROL NUMBER* |
|---|---|
| R#FND0103600094 L#DPF811350 | 166950 |
| R#FND0103600111 L#DPH810510 | 166951 |
| R#FND0103600127 L#DPH810510 | 166952 |
| R#FND0103600142 L#DPH810510 | 166953 |

**TESTS REQUIRED / PERFORMED:**

| *TEST METHOD* | *DESCRIPTION* |
|---|---|
| 1. ASTM D5994 | Thickness |
| 2. ASTM D6693 | Tensile Properties |
| 3. ASTM D792 | Specific Gravity |
| 4. ASTM D4218 | Carbon Content Muffle |

**TEST RESULTS:** The test results are summarized in the attached Table 1 to 4.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,
**TRI Environmental, Inc. - California**

Maria Espitia
Quality Assurance

Chad Blackwell
TRI-CA Director

*Signatures are on file*

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at a longer period, please advise us in writing.

**5 Pages Total** *(including this sheet)*

# TABLE 1.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **9/22/2022**
Date Reported: **9/28/2022**
Client Sample ID: **R#FND0103600094 L#DPF811350**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221122**
TRI Control No.: **166950**

| | | SPECIMENS | | | | | | | | | | | | | | Proj. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Specs. |
| **METHOD** | **DESCRIPTION** | | | | | | | | | | | | | | | |
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | **68 min.** |
| | | **81** | **82** | **81** | **81** | **84** | **82** | **82** | **83** | **80** | **81** | **82** | **1** | **80** | **84** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9335** | **0.9336** | | | | | | | | | **0.9336** | **0.0001** | **0.9335** | **0.9336** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **259** | **226** | **219** | **224** | **233** | | | | | | **232** | **16** | **219** | **259** | **120 min.** |
| | *TD* | **240** | **231** | **268** | **260** | **262** | | | | | | **252** | **16** | **231** | **268** | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | **543** | **494** | **466** | **502** | **525** | | | | | | **506** | **29** | **466** | **543** | **250 min.** |
| | *TD* | **562** | **527** | **625** | **602** | **609** | | | | | | **585** | **40** | **527** | **625** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.48** | **2.46** | | | | | | | | | **2.47** | **0.02** | **2.46** | **2.48** | **2 - 3** |

(End of Table 1)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

# TABLE 2.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **9/22/2022**
Date Reported: **9/28/2022**
Client Sample ID: **R#FND0103600111 L#DPH810510**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221122**
TRI Control No.: **166951**

| METHOD | DESCRIPTION | SPECIMENS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Proj. Specs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | **68 min.** |
| | | **81** | **85** | **82** | **81** | **81** | **83** | **80** | **81** | **81** | **82** | **82** | **1** | **80** | **85** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9352** | **0.9352** | | | | | | | | | **0.9352** | **0.0000** | **0.9352** | **0.9352** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **254** | **225** | **254** | **226** | **249** | | | | | | **242** | **15** | **225** | **254** | **120 min.** |
| | *TD* | **241** | **281** | **266** | **241** | **268** | | | | | | **260** | **18** | **241** | **281** | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | **552** | **499** | **558** | **504** | **546** | | | | | | **532** | **28** | **499** | **558** | **250 min.** |
| | *TD* | **566** | **636** | **609** | **553** | **610** | | | | | | **595** | **34** | **553** | **636** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.45** | **2.42** | | | | | | | | | **2.43** | **0.02** | **2.42** | **2.45** | **2 - 3** |

(End of Table 2)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

# TABLE 3.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **9/22/2022**
Date Reported: **9/28/2022**
Client Sample ID: **R#FND0103600127 L#DPH810510**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221122**
TRI Control No.: **166952**

| METHOD | DESCRIPTION | SPECIMENS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Proj. Specs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | **68 min.** |
| | | **84** | **81** | **84** | **81** | **82** | **81** | **80** | **81** | **83** | **83** | **82** | **1** | **80** | **84** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9340** | **0.9342** | | | | | | | | | **0.9341** | **0.0001** | **0.9340** | **0.9342** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **248** | **227** | **234** | **249** | **225** | | | | | | **237** | **11** | **225** | **249** | **120 min.** |
| | *TD* | **273** | **248** | **267** | **275** | **244** | | | | | | **261** | **14** | **244** | **275** | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | **540** | **501** | **526** | **545** | **491** | | | | | | **520** | **24** | **491** | **545** | **250 min.** |
| | *TD* | **601** | **561** | **588** | **613** | **548** | | | | | | **582** | **27** | **548** | **613** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.45** | **2.43** | | | | | | | | | **2.44** | **0.02** | **2.43** | **2.45** | **2 - 3** |

(End of Table 3)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

# TABLE 4.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **9/22/2022**
Date Reported: **9/28/2022**
Client Sample ID: **R#FND0103600142 L#DPH810510**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221122**
TRI Control No.: **166953**

| METHOD | DESCRIPTION | SPECIMENS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Proj. Specs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | **68 min.** |
| | | **83** | **81** | **82** | **81** | **80** | **81** | **83** | **83** | **81** | **81** | **81** | **1** | **80** | **83** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9377** | **0.9380** | | | | | | | | | **0.9378** | **0.0002** | **0.9377** | **0.9380** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **246** | **227** | **260** | **253** | **258** | | | | | | **249** | **13** | **227** | **260** | **120 min.** |
| | *TD* | **227** | **246** | **261** | **271** | **271** | | | | | | **255** | **19** | **227** | **271** | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | **533** | **522** | **561** | **553** | **555** | | | | | | **545** | **17** | **522** | **561** | **250 min.** |
| | *TD* | **528** | **551** | **596** | **611** | **614** | | | | | | **580** | **38** | **528** | **614** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.42** | **2.45** | | | | | | | | | **2.43** | **0.02** | **2.42** | **2.45** | **2 - 3** |

(End of Table 4)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

October 3, 2022

GAI-LAP
Initial: CVZ #:0.13
DATE: 10/03/2022

Nikoliya Boyanich
***NewFields***
9400 Station Street, Suite 300
Lone Tree, CO 80124

**Re:** FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the ***final*** laboratory report for the Conformance testing of two (2) 80mil LLDPE Microspike samples.

**PROJECT NAME:** Cripple Creek & Victor Mine VLF2 Ph 3A CQA DATE REPORTED: **October 3, 2022**

**REFERENCE TRI JOB NO.:** CA221132

**DATE RECEIVED:** September 26, 2022

**SAMPLED BY:** TRI-CA at AGRU, NV

**SAMPLE IDENTIFICATIONS:**

| *SAMPLE ID* | *TRI CONTROL NUMBER* |
|---|---|
| R#FND0103600157 L#DPH810510 | 166984 |
| R#FND0103600173 L#DPH810510 | 166985 |

**TESTS REQUIRED / PERFORMED:**

| *TEST METHOD* | *DESCRIPTION* |
|---|---|
| 1. ASTM D5994 | Thickness |
| 2. ASTM D6693 | Tensile Properties |
| 3. ASTM D792 | Specific Gravity |
| 4. ASTM D4218 | Carbon Content Muffle |

**TEST RESULTS:** The test results are summarized in the attached Table 1 to 2.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,
**TRI Environmental, Inc. - California**

Maria Espitia — Quality Assurance
Chad Blackwell — TRI-CA Director

*Signatures are on file*

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at a longer period, please advise us in writing.

**3 Pages Total** *(including this sheet)*

# TABLE 1.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **9/26/2022**
Date Reported: **10/3/2022**
Client Sample ID: **R#FND0103600157 L#DPH810510**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221132**
TRI Control No.: **166984**

| | | SPECIMENS | | | | | | | | | | | | | | Proj. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Specs. |
| **METHOD** | **DESCRIPTION** | | | | | | | | | | | | | | | |
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | **68 min.** |
| | | **82** | **80** | **82** | **81** | **80** | **82** | **82** | **81** | **83** | **84** | **82** | **1** | **80** | **84** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9351** | **0.9351** | | | | | | | | | **0.9351** | **0.0000** | **0.9351** | **0.9351** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **293** | **259** | **249** | **267** | **222** | | | | | | **258** | **26** | **222** | **293** | **120 min.** |
| | *TD* | **240** | **254** | **267** | **270** | **253** | | | | | | **257** | **12** | **240** | **270** | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | **589** | **562** | **548** | **564** | **496** | | | | | | **552** | **35** | **496** | **589** | **250 min.** |
| | *TD* | **577** | **605** | **630** | **645** | **598** | | | | | | **611** | **27** | **577** | **645** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.48** | **2.43** | | | | | | | | | **2.46** | **0.04** | **2.43** | **2.48** | **2 - 3** |

(End of Table 1)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

# TABLE 2.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **9/26/2022**
Date Reported: **10/3/2022**
Client Sample ID: **R#FND0103600173 L#DPH810510**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221132**
TRI Control No.: **166985**

| | | SPECIMENS | | | | | | | | | | | | | | Proj. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Specs. |
| **METHOD** | **DESCRIPTION** | | | | | | | | | | | | | | | |
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | 68 min. |
| | | 81 | 81 | 81 | 80 | 81 | 80 | 82 | 82 | 80 | 81 | 81 | 1 | 80 | 82 | 76 min. ave. |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | 0.9382 | 0.9382 | | | | | | | | | 0.9382 | 0.0000 | 0.9382 | 0.9382 | 0.939 max. |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | 247 | 285 | 239 | 295 | 295 | | | | | | 272 | 27 | 239 | 295 | 120 min. |
| | *TD* | 264 | 262 | 261 | 267 | 259 | | | | | | 263 | 3 | 259 | 267 | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | 528 | 569 | 516 | 594 | 611 | | | | | | 563 | 41 | 516 | 611 | 250 min. |
| | *TD* | 609 | 622 | 614 | 633 | 616 | | | | | | 619 | 9 | 609 | 633 | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | 2.43 | 2.45 | | | | | | | | | 2.44 | 0.02 | 2.43 | 2.45 | 2 - 3 |

(End of Table 2)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

October 3, 2022

Nikoliya Boyanich
***NewFields***
9400 Station Street, Suite 300
Lone Tree, CO 80124

GAI-LAP
Initial: CVZ #:0.13
DATE: 10/03/2022

**Re:** FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the ***final*** laboratory report for the Conformance testing of one (1) 80mil LLDPE Microspike sample.

**PROJECT NAME:** Cripple Creek & Victor Mine VLF2 Ph 3A CQA DATE REPORTED: **October 3, 2022**

**REFERENCE TRI JOB NO.:** CA221140

**DATE RECEIVED:** September 27, 2022

**SAMPLED BY:** TRI-CA at AGRU, NV

**SAMPLE IDENTIFICATIONS:**

| *SAMPLE ID* | *TRI CONTROL NUMBER* |
|---|---|
| R#FND0103600188 L#DPH810490 | 167063 |

**TESTS REQUIRED / PERFORMED:**

| *TEST METHOD* | *DESCRIPTION* |
|---|---|
| 1. ASTM D5994 | Thickness |
| 2. ASTM D6693 | Tensile Properties |
| 3. ASTM D792 | Specific Gravity |
| 4. ASTM D4218 | Carbon Content Muffle |

**TEST RESULTS:** The test results are summarized in the attached Table 1.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,
**TRI Environmental, Inc. - California**

Maria Espitia
Quality Assurance

Chad Blackwell
TRI-CA Director

*Signatures are on file*

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at a longer period, please advise us in writing.

**2 Pages Total** *(including this sheet)*

# TABLE 1.

## MATERIAL PROPERTIES

**CLIENT: NewFields**

**PROJECT: Cripple Creek & Victor Mine VLF2 Phase 3A**

Date Received: **9/27/2022**
Date Reported: **10/3/2022**
Client Sample ID: **R#FND0103600188 L#DPH810490**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221140**
TRI Control No.: **167063**

| METHOD | DESCRIPTION | SPECIMENS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Proj. Specs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | **68 min.** |
| | | **81** | **82** | **84** | **80** | **82** | **81** | **82** | **80** | **82** | **83** | **82** | **1** | **80** | **84** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9379** | **0.9379** | | | | | | | | | **0.9379** | **0.0000** | **0.9379** | **0.9379** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **265** | **267** | **246** | **238** | **245** | | | | | | **252** | **13** | **238** | **267** | **120 min.** |
| | *TD* | **289** | **262** | **237** | **270** | **297** | | | | | | **271** | **23** | **237** | **297** | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | **610** | **622** | **575** | **569** | **588** | | | | | | **593** | **23** | **569** | **622** | **250 min.** |
| | *TD* | **602** | **572** | **540** | **560** | **613** | | | | | | **577** | **30** | **540** | **613** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.36** | **2.36** | | | | | | | | | **2.36** | **0.00** | **2.36** | **2.36** | **2 - 3** |

(End of Table 1)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

October 3, 2022

GAI-LAP
Initial: CVZ #:0.13
DATE: 10/03/2022

Nikoliya Boyanich
***NewFields***
9400 Station Street, Suite 300
Lone Tree, CO 80124

**Re:** FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the ***final*** laboratory report for the Conformance testing of two (2) 80mil LLDPE Microspike samples.

**PROJECT NAME:** Cripple Creek & Victor Mine VLF2 Ph 3A CQA DATE REPORTED: **October 3, 2022**

**REFERENCE TRI JOB NO.:** CA221145

**DATE RECEIVED:** September 28, 2022

**SAMPLED BY:** TRI-CA at AGRU, NV

**SAMPLE IDENTIFICATIONS:**

| *SAMPLE ID* | *TRI CONTROL NUMBER* |
|---|---|
| R#FND0103600203 L#DPH810490 | 167080 |
| R#FND0103600218 L#DPH810490 | 167081 |

**TESTS REQUIRED / PERFORMED:**

| *TEST METHOD* | *DESCRIPTION* |
|---|---|
| 1. ASTM D5994 | Thickness |
| 2. ASTM D6693 | Tensile Properties |
| 3. ASTM D792 | Specific Gravity |
| 4. ASTM D4218 | Carbon Content Muffle |

**TEST RESULTS:** The test results are summarized in the attached Table 1 to 2.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,
**TRI Environmental, Inc. - California**

Maria Espitia — Quality Assurance
Chad Blackwell — TRI-CA Director

*Signatures are on file*

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at a longer period, please advise us in writing.

**3 Pages Total** *(including this sheet)*

# TABLE 1.

## MATERIAL PROPERTIES

**CLIENT:** NewFields

**PROJECT:** Cripple Creek & Victor Mine VLF2 Phase 3A

Date Received: **9/28/2022**
Date Reported: **10/3/2022**
Client Sample ID: **R#FND0103600203 L#DPH810490**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221145**
TRI Control No.: **167080**

| METHOD | DESCRIPTION | SPECIMENS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Proj. Specs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz) Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | 68 min. |
| | | 82 | 81 | 81 | 81 | 82 | 80 | 81 | 80 | 81 | 82 | 81 | 1 | 80 | 82 | 76 min. ave. |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | 0.9369 | 0.9370 | | | | | | | | | 0.9370 | 0.0000 | 0.9369 | 0.9370 | 0.939 max. |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | 263 | 270 | 293 | 277 | 260 | | | | | | 273 | 13 | 260 | 293 | 120 min. |
| | *TD* | 267 | 273 | 272 | 274 | 258 | | | | | | 269 | 7 | 258 | 274 | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | 552 | 547 | 584 | 576 | 555 | | | | | | 563 | 16 | 547 | 584 | 250 min. |
| | *TD* | 622 | 629 | 625 | 627 | 589 | | | | | | 618 | 17 | 589 | 629 | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | 2.53 | 2.48 | | | | | | | | | 2.50 | 0.03 | 2.48 | 2.53 | 2 - 3 |

(End of Table 1)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

**1970 S. Santa Cruz Street, Anaheim, CA 92805, www.precisionlabs.net**
TRI Environmental, Inc. dba Precision Geosynthetic Laboratories International

# TABLE 2.

## MATERIAL PROPERTIES

**CLIENT:** NewFields

**PROJECT:** Cripple Creek & Victor Mine VLF2 Phase 3A

Date Received: **9/28/2022**
Date Reported: **10/3/2022**
Client Sample ID: **R#FND0103600218 L#DPH810490**
Material Description: **80mil LLDPE Double Sided Microspike**

QC'd By: Maria Espitia
TRI Job No.: **CA221145**
TRI Control No.: **167081**

| | | SPECIMENS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | Std. Dev. | Min | Max | Proj. Specs. |
| **METHOD** | **DESCRIPTION** | | | | | | | | | | | | | | | |
| ASTM D5994 | Thickness (mils) | | | | | | | | | | | | | | | |
| | *Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)* | | | | | | | | | | | | | | | |
| | *Loading Time: 5 sec Specimen Size: 4" x 4"* | | | | | | | | | | | | | | | 68 min. |
| | | **83** | **81** | **81** | **80** | **83** | **81** | **82** | **80** | **81** | **82** | **81** | **1** | **80** | **83** | **76 min. ave.** |
| ASTM D792 | Specific Gravity (23/ 23°C) | | | | | | | | | | | | | | | |
| Method A | | **0.9359** | **0.9360** | | | | | | | | | **0.9359** | **0.0001** | **0.9359** | **0.9360** | **0.939 max.** |
| ASTM D6693 | Tensile Properties: | | | | | | | | | | | | | | | |
| Type IV | *Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Rate of Separation: 2"/min* | | | | | | | | | | | | | | | |
| | Tensile Strength at Break (lbs/ in.- width) | | | | | | | | | | | | | | | |
| | *MD* | **278** | **266** | **280** | **253** | **256** | | | | | | **267** | **12** | **253** | **280** | **120 min.** |
| | *TD* | **267** | **264** | **264** | **268** | **277** | | | | | | **268** | **5** | **264** | **277** | |
| | Elongation at Break (percent, %) *Gauge Length = 2.0 in.* | | | | | | | | | | | | | | | |
| | *MD* | **567** | **533** | **567** | **551** | **549** | | | | | | **553** | **14** | **533** | **567** | **250 min.** |
| | *TD* | **600** | **614** | **606** | **608** | **635** | | | | | | **613** | **13** | **600** | **635** | |
| ASTM D4218 | Carbon Content | | | | | | | | | | | | | | | |
| | *Apparatus: Muffle Furnace* | | | | | | | | | | | | | | | |
| | | **2.45** | **2.53** | | | | | | | | | **2.49** | **0.06** | **2.45** | **2.53** | **2 - 3** |

(End of Table 2)



By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

LEGENDS:
MD - MACHINE DIRECTION
TD- TRANSVERSE DIRECTION

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# APPENDIX G – TENSIOMETER CALIBRATION CERTIFICATE

# Demtech Services, Inc.

Placerville, California, USA

## CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester T-0100

Device Calibrated: S-Type load cell
Range: 0 - 750 lbs. Tension
Model No: M2405-750#
Serial No: **66039**

Calibration Apparatus:

Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029
A/D Module Serial No: **2618066039**
Channel No: N/A

Dead Weight:

| | |
|---|---|
| W1 | 2 |
| W2 | 152 |
| W3 | 302 |

Reference Cell:

| | |
|---|---|
| R1 | 2 |
| R2 | 152 |
| R3 | 302 |

Indicator reading with no load: 0

Offset: **5.005100** Scale: **3.328255**

| Applied Force lbs. | Cell Response: | Deviation Error: |
|---|---|---|
| 2 | 2 | 0.00 |
| 52 | 52 | 0.00 |
| 102 | 102 | 0.00 |
| 152 | 152 | 0.00 |
| 202 | 202 | 0.00 |
| 252 | 252 | 0.00 |
| 302 | 302 | 0.00 |

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F
Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: D. Harmon

Signature: D. Harmon

Date: 03/15/24

# APPENDIX H – DRAIN COVER FILL

# APPENDIX H.1 – SUMMARY OF EARTHWORKS MATERIAL SPECIFICATION

# APPENDIX H.2- CQA EARTHWORKS TESTING SUMMARY AND FREQUENCY

# APPENDIX H.3 DRAIN COVER FILL ORE LABORATORY SUMMARY AND RESULTS

# APPENDIX H.1 – SUMMARY OF EARTHWORKS MATERIAL SPECIFICATIONS

**Appendix H.2**
**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Summary of Earthworks Material Specifications**

| Material | Plasticity Index | Permeability (cm/s) | Grain Size Distribution | |
|---|---|---|---|---|
| | | | Sieve Size | Percent Passing |
| Drain Cover Fill- Crushed Ore | NP | N/A | 3 inch | 100 |
| | | | 2 inch | 97-100 |
| | | | 3/4 inch | 40-100 |
| | | | No. 4 | 5-35 |
| | | | No. 200 | 0-8 |

Note:
1. NP - Non Plastic
2. N/A - Not Applicable

# APPENDIX H.2 – CQA EARTHWORKS TESTING SUMMARY AND FREQUENCY

**Table 2**
**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Earthworks Testing Summary and Frequency**

| Material Quantity<br>Number of Tests<br>Test Frequency | Material<br>Drain Cover Fill (DCF & DCFO) |
|---|---|
| Quantity of Material Placed (cy) | 1,701 |
| Particle Size Tests Performed | 3 |
| Specified Particle Size Test Frequency | 20,000 |
| Actual Particle Size Test Frequency | 567 |
| Atterberg Limit Tests Performed | 3 |
| Specified Atterberg Limit Test Frequency | 20,000 |
| Actual Atterberg Limit Test Frequency | 567 |
| Laboratory Compaction Tests Performed | N/A |
| Specified Compaction Test Frequency | N/A |
| Actual Compaction Test Frequency | |
| Permeability Tests Performed | N/A |
| Specified Permeability Test Frequency | N/A |
| Actual Permeability Test Frequency | |
| Moisture Content Tests Performed | N/A |
| Specified Moisture Content Test Frequency | N/A |
| Actual Moisture Content Test Frequency | |
| Field Nuclear Density Tests Performed | N/A |
| Specified Nuclear Density Test Frequency | N/A |
| Actual Nuclear Density Test Frequency | |
| Field Depth Verification Tests Performed | N/A |
| Specified Depth Verification Test Frequency | N/A |
| Actual Depth Verification Test Frequency | |

Notes:

1. All frequencies are based on quantities in cubic yards unless stated otherwise.

2. N/A = Not Applicable

# APPENDIX H.3 – DRAIN COVER FILL ORE LABORATORY SUMMARY AND RESULTS

**Cripple Creek & Victor Gold Mining Company**

**Valley Leach Facility 2**

**Phase 3 Stage A.1 Liner Recertification Record of Construction**

**CQA Earthworks Testing Summary - Drain Cover Fill (Crushed Ore)**

| SAMPLE NUMBER | DATE SAMPLED | LOCATION | | ELEVATION (FT) | NATURAL MOISTURE (%) | GRAIN SIZE DISTRIBUTION - PERCENT PASSING | | | | | | | | | | | | | | USCS | ATTERBERG LIMITS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 3.0" | 2.0" | 1.5" | 1.0" | 0.75" | 0.5" | 0.375" | #4 | #10 | #16 | #30 | #50 | #100 | #200 | | PLASTIC LIMIT | LIQUID LIMIT | PLASTIC INDEX |
| | | | | | | SPECIFICATION - PERCENT PASSING | | | | | | | | | | | | | | | SPECIFICATION | | |
| | | PHASE | Liner Panel Number | | | 100 | 97 | - | - | 40 | - | - | 5-35 | - | - | - | - | - | 0-8 | | - | - | NP |
| DCFO-1-R | 04/16/24 | A.1 | 4100 | FG | - | 100 | 97 | 95 | 77 | 67 | 55 | 47 | 34 | 25 | 19 | 15 | 11 | 8 | 5.7 | GP-GM | NP | NV | NP |
| DCFO-2-R | 04/16/24 | A.1 | 4954 | FG | - | 100 | 100 | 99 | 80 | 67 | 53 | 46 | 33 | 24 | 19 | 15 | 12 | 10 | 7.7 | GP-GM | NP | NV | NP |
| DCFO-3-R | 04/16/24 | A.1 | 4957 | FG | - | 100 | 100 | 100 | 85 | 65 | 50 | 42 | 30 | 23 | 19 | 16 | 13 | 11 | 9.4 | GP-GC | 20 | 26 | 6 |

Notes:

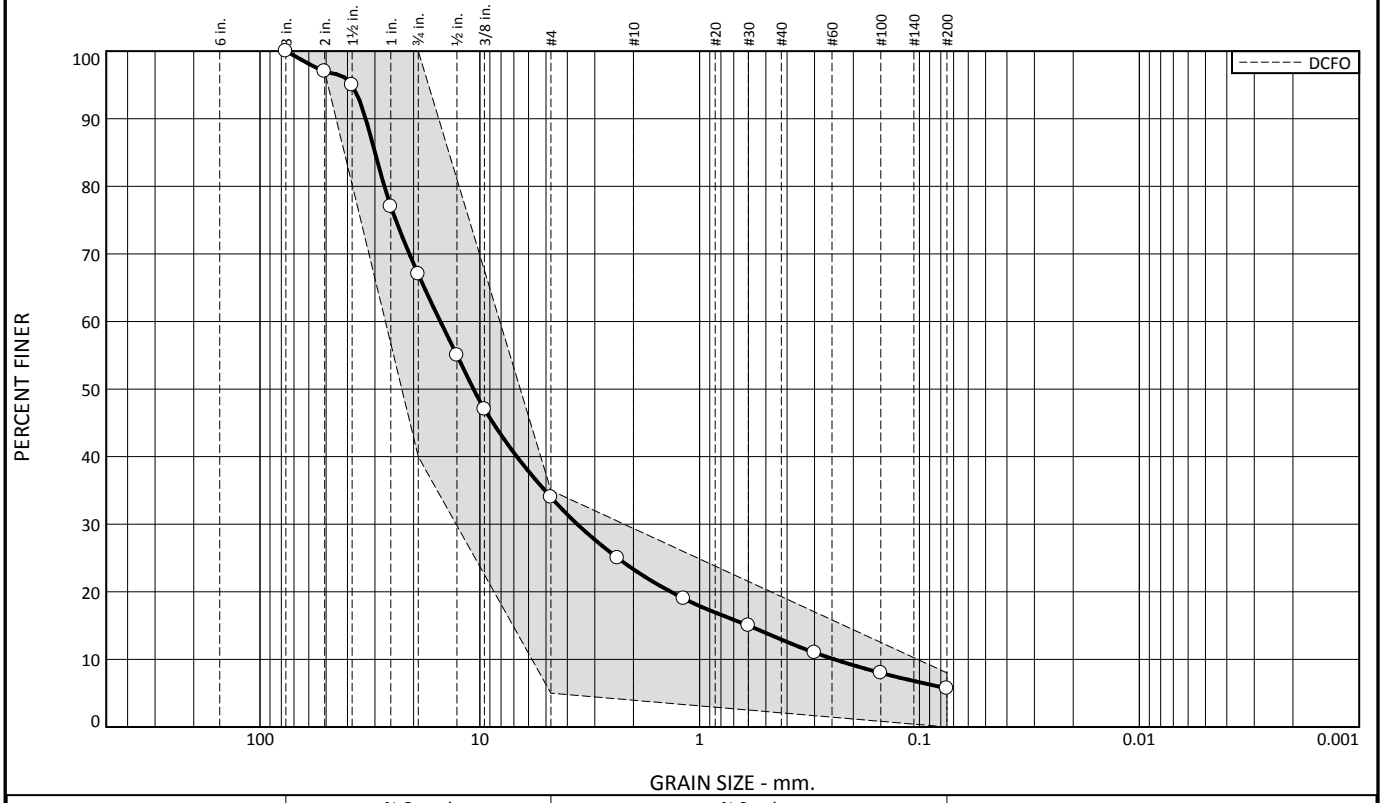
1. Samples with a Plasticity Index 5 or less are reported as Non Plastic

R - Record Sample; FG - Finished Grade

NP - Non Plastic; NV - No Value

# Particle Size Distribution Report

ASTM D6913




| % +3" | % Gravel | | % Sand | | | % Fines |
|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | |
| 0.0 | 33.0 | 33.0 | 10.7 | 10.4 | 7.2 | 5.7 |

Test Results (ASTM D6913)

| Sieve Size or Diam. (mm.) | Finer (%) | Spec.* (%) | Out of Spec. (%) | Pct. of Fines |
|---|---|---|---|---|
| 3" | 100.0 | 100 | | |
| 2" | 97.0 | 97-100 | | |
| 1.5" | 95.0 | | | |
| 1" | 77.0 | | | |
| .75" | 67.0 | 40-100 | | |
| .5" | 55.0 | | | |
| .375" | 47.0 | | | |
| #4 | 34.0 | 5-35 | | |
| #8 | 25.0 | | | |
| #16 | 19.0 | | | |
| #30 | 15.0 | | | |
| #50 | 11.0 | | | |
| #100 | 8.0 | | | |
| #200 | 5.7 | 0-8 | | |

* DCFO

**Material Description**

Gray poorly graded gravel with silt and sand

**Atterberg Limits**

PL= NP LL= NV PI= NP

**Coefficients**

$D_{90}$= 33.0579 $D_{85}$= 29.9490 $D_{60}$= 15.1195
$D_{50}$= 10.6918 $D_{30}$= 3.6001 $D_{15}$= 0.6000
$D_{10}$= 0.2434 $C_u$= 62.11 $C_c$= 3.52

**Classification**

USCS= GP-GM AASHTO= A-1-a

**Test Remarks**

Location: Panel 4100 Slope
Sample Number: DCFO-1-R Depth: FG Sample Date: 04/16/2024

NewFields

Client: Newmont Mining Corporation Cripple Creek and Victor Gold Company
Project: VLF2 P3 A.1 Liner Recertification

Project No: 475.0106.068 Figure DCFO-1-R

Checked By: TW

# SOIL DATA COLLECTION SHEET

Report Number: D19-2-215-240418-SDC-V2-EXEM-4396

Specific Gravity ☐ Moisture Content Only ☐
Sieve Analysis ☐ -200 Wash Only ☐ Atterberg ☐ Moisture/Unit Weight ☐

| | | | |
|---|---|---|---|
| Project Name: | New Fields | Project No.: | D19-2-215 |
| Boring I.D.: | DCFO-1-R, P4100 | Depth (ft.): | NOT PROVIDED |
| Sample I.D.: | V2-EXEM-4396 | ASTM or AASHTO Method: | |
| Sample Description: | SAND, GRAVEL, WET, BROWN | Soil Classification: | |

| Moisture Content - D2216 or T265 | | Unit Weight | | By: | |
|---|---|---|---|---|---|
| Tare No. | PLUMP | Ring Diameter (in.) | | Date: | |
| Wet Wt. + Tare (g) | 6814.2 | Area ($in^2$) | | | |
| Dry Wt. + Tare (g) | 6595.1 | Ring Height (in.) | | **Specific Gravity - C127 or T85** | |
| Water Wt. (g) | 219.1 | Ring Volume ($in^3$) | | Oven Dry: | |
| Tare Wt. (g) | 646.0 | Ring Volume ($ft^3$) | | SSD: | |
| Dry Sample Wt. (g) | 5949.10 | Dry Wt. Sample (lbs.) | 13.116 | Wt in Water: | |
| % Water | 3.7% | Wet Wt. Sample (lbs.) | 13.599 | Spec. Gravity: | #DIV/0! |
| **Run by:** | | Unit Weight Dry (pcf) | | **Run by:** | |
| **Date:** | | Unit Weight Wet (pcf) | | **Date:** | |

**Sieve Analysis - C136 or T27**

| Screen | Ind. Wt. (g) | Cum. Wt (g) | % Ret | % Passing |
|---|---|---|---|---|
| | 0.0 | | 0.0% | 100% |
| 3 | 0.0 | 0.0 | 0.0% | 100% |
| 2 | 177.1 | 177.1 | 3.0% | 97% |
| 1.5 | 121.3 | 298.4 | 2.0% | 95% |
| 1 | 1045.9 | 1344.3 | 17.6% | 77% |
| 3/4 | 607.2 | 1951.5 | 10.2% | 67% |
| 1/2 | 755.2 | 2706.7 | 12.7% | 55% |
| 3/8 | 435.1 | 3141.8 | 7.3% | 47% |
| 4 | 800.2 | 3942.0 | 13.5% | 34% |
| 8 | 540.9 | 4482.9 | 9.1% | 25% |
| 16 | 347.1 | 4830.0 | 5.8% | 19% |
| 30 | 244.7 | 5074.7 | 4.1% | 15% |
| 50 | 201.5 | 5276.2 | 3.4% | 11% |
| 100 | 180.0 | 5456.2 | 3.0% | 8% |
| 200 | 156.6 | 5612.8 | 2.6% | 5.7% |
| Pan | 336.3 | 5650.0 | 5.7% | |
| Total Wt. | 5949.1 | | | |

**Sieved by:** TK
**Date:** 4/22/2024

**-200 Wash - C117 or T11**

| | |
|---|---|
| Tare No: | PLUMP |
| Pre-Wash Wt. + Tare (g): | 6595.10 |
| After Wash Wt. + Tare (g): | 6296.00 |
| Tare Wt. (g): | 646.00 |
| Total Soil Graded (g): | 5650.00 |
| Soil Passing #200 (g): | 299.10 |
| Pre Wash - Tare Wt. (g) | 5949.10 |
| After Wash - Tare Wt. (g) | 5650.00 |
| % Loss During Wash | **5.0%** |
| Wt. Retained on Pan (g) | 5650.00 |

**Washed by:** TK
**Date:** 4/19/2024

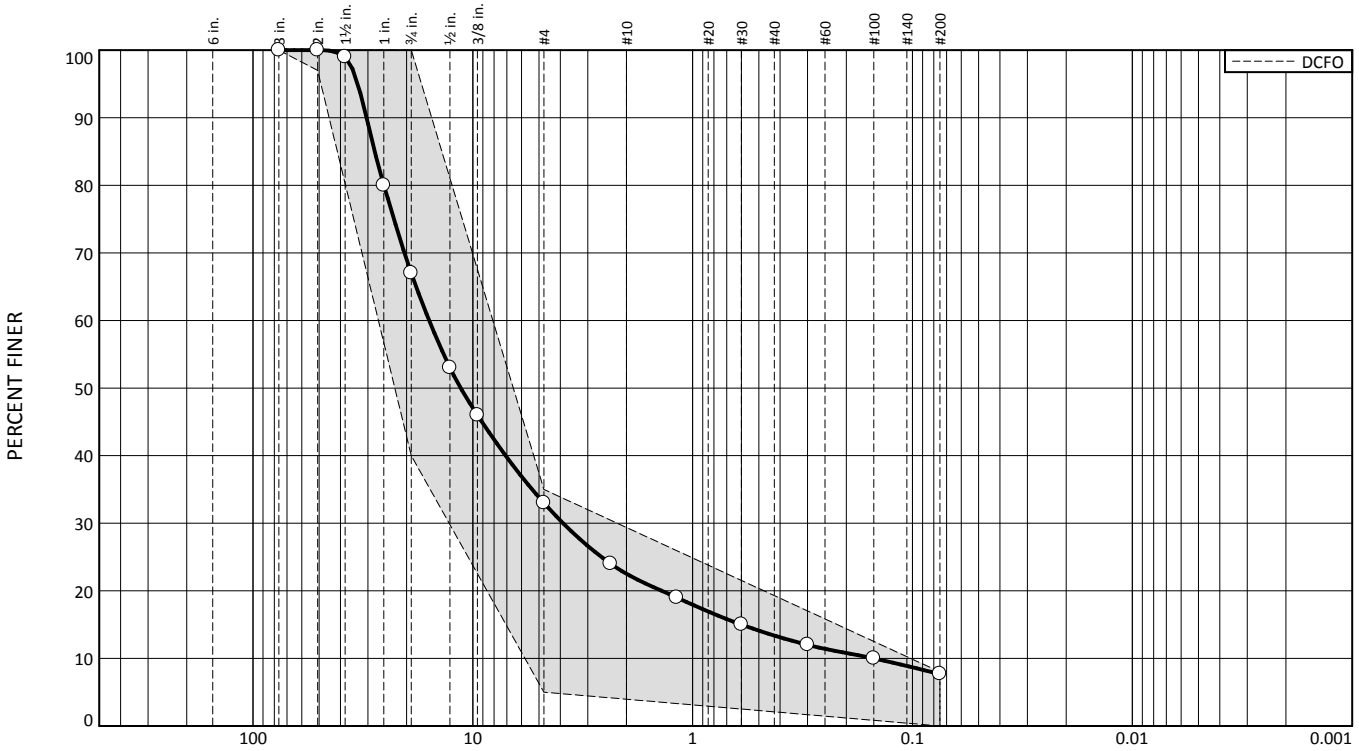
| Non-Plastic ☑ | Liquid Limit - D4318 or T89 | | | Plastic Limit - D4318 or T90 | | **Run by:** TK |
|---|---|---|---|---|---|---|
| # of Blows | | | | | | **Date:** 4/22/2024 |
| Tare No. | NON PLASTIC | | | | | |
| Wet Wt. + Tare (g) | | | | | | |
| Dry Wt. + Tare (g) | | | | | | |
| Weight of Water (g) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Weight of Tare (g) | | | | | | |
| Wt. of Dry Soil (g) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| % Moisture | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | |
| **LL=** | **#DIV/0!** | **PL=** | **#DIV/0!** | **PI=** | **#DIV/0!** | |

**Reviewed by:** Jon Jennings
**Date:** 4/23/2024

Results relate only to the items observed or tested. This test report shall not be reproduced, except in full, with the written approval of VIVID Engineering Group, Inc. and report shall be signed or otherwise approved by authorized staff members only.

# Particle Size Distribution Report

ASTM D6913




| % +3" | % Gravel | | % Sand | | | % Fines |
|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | |
| 0.0 | 33.0 | 34.0 | 10.5 | 9.1 | 5.7 | 7.7 |

Test Results (ASTM D6913)

| Sieve Size or Diam. (mm.) | Finer (%) | Spec.* (%) | Out of Spec. (%) | Pct. of Fines |
|---|---|---|---|---|
| 3" | 100.0 | 100 | | |
| 2" | 100.0 | 97-100 | | |
| 1.5" | 99.0 | | | |
| 1" | 80.0 | | | |
| .75" | 67.0 | 40-100 | | |
| .5" | 53.0 | | | |
| .375" | 46.0 | | | |
| #4 | 33.0 | 5-35 | | |
| #8 | 24.0 | | | |
| #16 | 19.0 | | | |
| #30 | 15.0 | | | |
| #50 | 12.0 | | | |
| #100 | 10.0 | | | |
| #200 | 7.7 | 0-8 | | |

* DCFO

**Material Description**

Brown poorly graded gravel with silt and sand

**Atterberg Limits**

PL= NP LL= NV PI= NP

**Coefficients**

$D_{90}$= 30.4050 $D_{85}$= 27.9185 $D_{60}$= 15.7932
$D_{50}$= 11.3605 $D_{30}$= 3.8849 $D_{15}$= 0.6000
$D_{10}$= 0.1500 $C_u$= 105.29 $C_c$= 6.37

**Classification**

USCS= GP-GM AASHTO= A-1-a

**Test Remarks**

Location: Panel 4954 Flat
Sample Number: DCFO-2-R Depth: FG Sample Date: 04/16/2024

NewFields

Client: Newmont Mining Corporation Cripple Creek and Victor Gold Company
Project: VLF2 P3 A.1 Liner Recertification

Project No: 475.0106.068 Figure DCFO-2-R

Checked By: TW

# SOIL DATA COLLECTION SHEET

Report Number: D19-2-215-240418-SDC-V2-EXEM-4395

Specific Gravity ☐ Moisture Content Only ☐
Sieve Analysis ☐ -200 Wash Only ☐ Atterberg ☐ Moisture/Unit Weight ☐

| | | | |
|---|---|---|---|
| Project Name: | New Fields | Project No.: | D19-2-215 |
| Boring I.D.: | DCFO-2-R, P4954 | Depth (ft.): | NOT PROVIDED |
| Sample I.D.: | V2-EXEM-4395 | ASTM or AASHTO Method: | |
| Sample Description: | SAND, GRAVEL, WET, BROWN | Soil Classification: | |

| Moisture Content - D2216 or T265 | | Unit Weight | | By: | |
|---|---|---|---|---|---|
| Tare No. | SKUNK | Ring Diameter (in.) | | Date: | |
| Wet Wt. + Tare (g) | 7024.5 | Area (in$^2$) | | | |
| Dry Wt. + Tare (g) | 6629.2 | Ring Height (in.) | | **Specific Gravity - C127 or T85** | |
| Water Wt. (g) | 395.3 | Ring Volume (in$^3$) | | Oven Dry: | |
| Tare Wt. (g) | 642.3 | Ring Volume (ft$^3$) | | SSD: | |
| Dry Sample Wt. (g) | 5986.90 | Dry Wt. Sample (lbs.) | 13.199 | Wt in Water: | |
| % Water | 6.6% | Wet Wt. Sample (lbs.) | 14.070 | Spec. Gravity: | #DIV/0! |
| **Run by:** | | Unit Weight Dry (pcf) | | **Run by:** | |
| **Date:** | | Unit Weight Wet (pcf) | | **Date:** | |

**Sieve Analysis - C136 or T27**

| Screen | Ind. Wt. (g) | Cum. Wt. (g) | % Ret | % Passing |
|---|---|---|---|---|
| | 0.0 | | 0.0% | 100% |
| 3 | 0.0 | 0.0 | 0.0% | 100% |
| 2 | 0.0 | 0.0 | 0.0% | 100% |
| 1.5 | 64.7 | 64.7 | 1.1% | 99% |
| 1 | 1106.6 | 1171.3 | 18.5% | 80% |
| 3/4 | 776.1 | 1947.4 | 13.0% | 67% |
| 1/2 | 889.1 | 2836.5 | 14.9% | 53% |
| 3/8 | 391.4 | 3227.9 | 6.5% | 46% |
| 4 | 807.9 | 4035.8 | 13.5% | 33% |
| 8 | 492.5 | 4528.3 | 8.2% | 24% |
| 16 | 331.6 | 4859.9 | 5.5% | 19% |
| 30 | 230.5 | 5090.4 | 3.9% | 15% |
| 50 | 166.5 | 5256.9 | 2.8% | 12% |
| 100 | 139.5 | 5396.4 | 2.3% | 10% |
| 200 | 126.9 | 5523.3 | 2.1% | 7.7% |
| Pan | 461.9 | 5537.1 | 7.7% | |
| Total Wt. | 5985.2 | | | |

**Sieved by:** TK
**Date:** 4/22/2024

**-200 Wash - C117 or T11**

| | |
|---|---|
| Tare No: | SKUNK |
| Pre-Wash Wt. + Tare (g): | 6629.20 |
| After Wash Wt. + Tare (g): | 6181.10 |
| Tare Wt. (g): | 642.30 |
| Total Soil Graded (g): | 5538.80 |
| Soil Passing #200 (g): | 448.10 |
| Pre Wash - Tare Wt. (g) | 5986.90 |
| After Wash - Tare Wt. (g) | 5538.80 |
| % Loss During Wash | **7.5%** |
| Wt. Retained on Pan (g) | 5537.10 |

**Washed by:** TK
**Date:** 4/19/2024

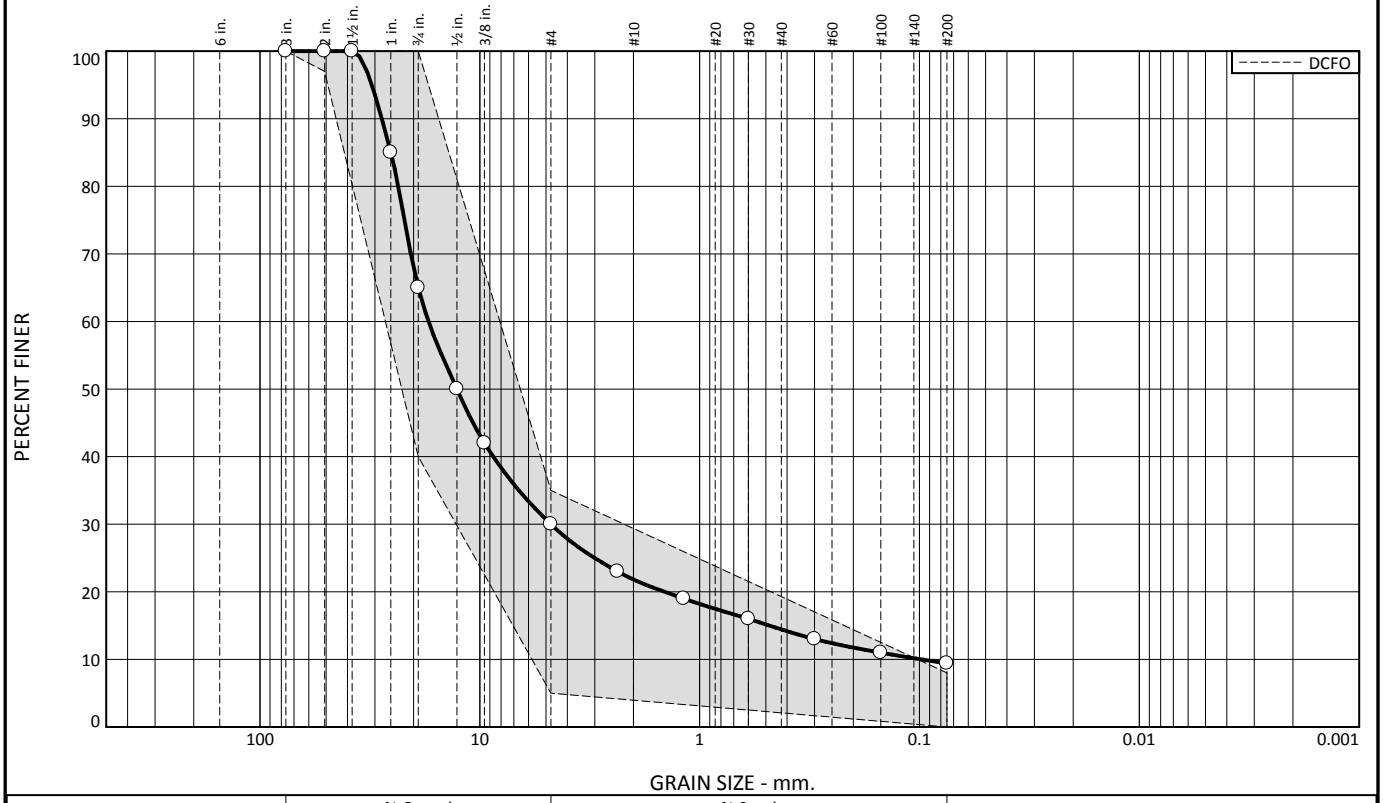
| Non-Plastic ☐ | Liquid Limit - D4318 or T89 | | | Plastic Limit - D4318 or T90 | | **Run by:** TK |
|---|---|---|---|---|---|---|
| # of Blows | 29 | 24 | 16 | | | **Date:** 4/22/2024 |
| Tare No. | B5 | 800 | T | B10 | 400 | |
| Wet Wt. + Tare (g) | 40.59 | 41.81 | 40.86 | 29.27 | 28.37 | |
| Dry Wt. + Tare (g) | 36.90 | 37.86 | 36.93 | 28.00 | 27.22 | |
| Weight of Water (g) | 3.69 | 3.95 | 3.93 | 1.27 | 1.15 | |
| Weight of Tare (g) | 20.87 | 20.92 | 20.93 | 20.94 | 20.83 | |
| Wt. of Dry Soil (g) | 16.03 | 16.94 | 16.00 | 7.06 | 6.39 | |
| % Moisture | 23.0 | 23.3 | 24.6 | 18.0 | 18.0 | |
| **LL=** | **23** | **PL=** | **18** | **PI=** | **5** | |

**Reviewed by:** Jon Jennings
**Date:** 4/23/2024

Results relate only to the items observed or tested. This test report shall not be reproduced, except in full, with the written approval of VIVID Engineering Group, Inc. and report shall be signed or otherwise approved by authorized staff members only.

# Particle Size Distribution Report

ASTM D6913




| % +3" | % Gravel | | % Sand | | | % Fines |
|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | |
| 0.0 | 35.0 | 35.0 | 8.2 | 7.4 | 5.0 | 9.4 |

Test Results (ASTM D6913)

| Sieve Size or Diam. (mm.) | Finer (%) | Spec.* (%) | Out of Spec. (%) | Pct. of Fines |
|---|---|---|---|---|
| 3" | 100.0 | 100 | | |
| 2" | 100.0 | 97-100 | | |
| 1.5" | 100.0 | | | |
| 1" | 85.0 | | | |
| .75" | 65.0 | 40-100 | | |
| .5" | 50.0 | | | |
| .375" | 42.0 | | | |
| #4 | 30.0 | 5-35 | | |
| #8 | 23.0 | | | |
| #16 | 19.0 | | | |
| #30 | 16.0 | | | |
| #50 | 13.0 | | | |
| #100 | 11.0 | | | |
| #200 | 9.4 | 0-8 | +1.4 | |

* DCFO

**Material Description**

Red poorly graded gravel with siltyclay and sand

**Atterberg Limits**

PL= 20 LL= 26 PI= 6

**Coefficients**

$D_{90}$= 27.9040 $D_{85}$= 25.4000 $D_{60}$= 17.1156
$D_{50}$= 12.7000 $D_{30}$= 4.7500 $D_{15}$= 0.4807
$D_{10}$= 0.0980 $C_u$= 174.58 $C_c$= 13.45

**Classification**

USCS= GP-GC AASHTO= A-1-a

**Test Remarks**

Location: Panel 4957 Slope
Sample Number: DCFO-3-R Depth: FG Sample Date: 04/16/2024

NewFields

Client: Newmont Mining Corporation Cripple Creek and Victor Gold Company
Project: VLF2 P3 A.1 Liner Recertification

Project No: 475.0106.068 Figure DCFO-3-R

Checked By: TW

# SOIL DATA COLLECTION SHEET

Report Number: D19-2-215-240418-SDC-V2-EXEM-4394

Specific Gravity ☐ Moisture Content Only ☐
Sieve Analysis ☐ -200 Wash Only ☐ Atterberg ☐ Moisture/Unit Weight ☐

| | | | |
|---|---|---|---|
| Project Name: | New Fields | Project No.: | D19-2-215 |
| Boring I.D.: | DCFO-3-R, P4957 | Depth (ft.): | NOT PROVIDED |
| Sample I.D.: | V2-EXEM-4394 | ASTM or AASHTO Method: | |
| Sample Description: | SAND, GRAVEL, SL CLAYEY, MOIST, RED | Soil Classification: | |

| Moisture Content - D2216 or T265 | | Unit Weight | | By: |
|---|---|---|---|---|
| Tare No. | GLOBE | Ring Diameter (in.) | | Date: |
| Wet Wt. + Tare (g) | 5171.6 | Area (in$^2$) | | |
| Dry Wt. + Tare (g) | 4869.3 | Ring Height (in.) | | **Specific Gravity - C127 or T85** |
| Water Wt. (g) | 302.3 | Ring Volume (in$^3$) | | Oven Dry: |
| Tare Wt. (g) | 642.3 | Ring Volume (ft$^3$) | | SSD: |
| Dry Sample Wt. (g) | 4227.00 | Dry Wt. Sample (lbs.) | 9.319 | Wt in Water: |
| % Water | 7.2% | Wet Wt. Sample (lbs.) | 9.985 | Spec. Gravity: #DIV/0! |
| **Run by:** | | Unit Weight Dry (pcf) | | **Run by:** |
| **Date:** | | Unit Weight Wet (pcf) | | **Date:** |

**Sieve Analysis - C136 or T27**

| Screen | Ind. Wt. (g) | Cum. Wt (g) | % Ret | % Passing |
|---|---|---|---|---|
| | 0.0 | | 0.0% | 100% |
| 3 | 0.0 | 0.0 | 0.0% | 100% |
| 2 | 0.0 | 0.0 | 0.0% | 100% |
| 1.5 | 0.0 | 0.0 | 0.0% | 100% |
| 1 | 653.6 | 653.6 | 15.5% | 85% |
| 3/4 | 830.4 | 1484.0 | 19.6% | 65% |
| 1/2 | 640.1 | 2124.1 | 15.1% | 50% |
| 3/8 | 326.4 | 2450.5 | 7.7% | 42% |
| 4 | 509.5 | 2960.0 | 12.1% | 30% |
| 8 | 290.5 | 3250.5 | 6.9% | 23% |
| 16 | 178.1 | 3428.6 | 4.2% | 19% |
| 30 | 131.2 | 3559.8 | 3.1% | 16% |
| 50 | 99.9 | 3659.7 | 2.4% | 13% |
| 100 | 84.4 | 3744.1 | 2.0% | 11% |
| 200 | 83.8 | 3827.9 | 2.0% | 9.4% |
| Pan | 398.9 | 3841.0 | 9.4% | |
| Total Wt. | 4226.8 | | | |

**Sieved by:** TK
**Date:** 4/22/2024

**-200 Wash - C117 or T11**

| | |
|---|---|
| Tare No: | GLOBE |
| Pre-Wash Wt. + Tare (g): | 4869.30 |
| After Wash Wt. + Tare (g): | 4483.50 |
| Tare Wt. (g): | 642.30 |
| Total Soil Graded (g): | 3841.20 |
| Soil Passing #200 (g): | 385.80 |
| Pre Wash - Tare Wt. (g) | 4227.00 |
| After Wash - Tare Wt. (g) | 3841.20 |
| % Loss During Wash | **9.1%** |
| Wt. Retained on Pan (g) | 3841.00 |

**Washed by:** TK
**Date:** 4/19/2024

| Non-Plastic ☐ | Liquid Limit - D4318 or T89 | | | Plastic Limit - D4318 or T90 | | **Run by:** TK |
|---|---|---|---|---|---|---|
| # of Blows | 34 | 27 | 18 | | | **Date:** 4/22/2024 |
| Tare No. | P | B4 | 600 | Q5 | Q3 | |
| Wet Wt. + Tare (g) | 36.11 | 40.88 | 42.47 | 27.86 | 28.36 | |
| Dry Wt. + Tare (g) | 33.11 | 36.71 | 37.87 | 26.71 | 27.10 | |
| Weight of Water (g) | 3.00 | 4.17 | 4.60 | 1.15 | 1.26 | |
| Weight of Tare (g) | 20.97 | 20.86 | 20.85 | 20.76 | 20.85 | |
| Wt. of Dry Soil (g) | 12.14 | 15.85 | 17.02 | 5.95 | 6.25 | |
| % Moisture | 24.7 | 26.3 | 27.0 | 19.3 | 20.2 | |
| **LL=** | **26** | **PL=** | **20** | **PI=** | **6** | |

**Reviewed by:** Jon Jennings
**Date:** 4/23/2024

Results relate only to the items observed or tested. This test report shall not be reproduced, except in full, with the written approval of VIVID Engineering Group, Inc. and report shall be signed or otherwise approved by authorized staff members only.

# APPENDIX I – SUMMARY OF WEATHER DATA

**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Summary of Weather Data**

| Date | Low Ambient Temperature (°F) | High Ambient Temperature (°F) | Precipitation (inches) | Maximum Wind Speed (mph) | Remarks |
|---|---|---|---|---|---|
| Monday, March 4, 2024 | 27 | 34 | | 19 | |
| Tuesday, March 5, 2024 | 25 | 36 | | 19 | |
| Wednesday, March 6, 2024 | 27 | 37 | | 20 | |
| Thursday, March 7, 2024 | 25 | 36 | | 41 | |
| Friday, March 8, 2024 | 19 | 27 | Snow (4") | 34 | |
| Saturday, March 9, 2024 | | | | | |
| Sunday, March 10, 2024 | | | | | |
| Monday, March 11, 2024 | 30 | 45 | | 15 | |
| Tuesday, March 12, 2024 | 28 | 45 | | 28 | |
| Wednesday, March 13, 2024 | 25 | 36 | Snow (Trace) | 32 | |
| Thursday, March 14, 2024 | 21 | 27 | Snow (30") | 30 | |
| Friday, March 15, 2024 | 21 | 28 | Snow (6") | 24 | |
| Saturday, March 16, 2024 | | | | | |
| Sunday, March 17, 2024 | | | | | |
| Monday, March 18, 2024 | 21 | 39 | | 20 | |
| Tuesday, March 19, 2024 | 30 | 43 | | 24 | |
| Wednesday, March 20, 2024 | 30 | 45 | | 25 | |
| Thursday, March 21, 2024 | 30 | 48 | | 25 | |
| Friday, March 22, 2024 | 32 | 48 | | 21 | |
| Saturday, March 23, 2024 | | | | | |
| Sunday, March 24, 2024 | | | | | |
| Monday, March 25, 2024 | 9 | 23 | Snow (5") | 29 | |
| Tuesday, March 26, 2024 | 13 | 30 | | 34 | |
| Wednesday, March 27, 2024 | 20 | 33 | | 34 | |
| Thursday, March 28, 2024 | 28 | 47 | | 29 | |
| Friday, March 29, 2024 | 25 | 45 | | 23 | |
| Saturday, March 30, 2024 | | | | | |
| Sunday, March 31, 2024 | | | | | |
| Monday, April 1, 2024 | 19 | 34 | | 15 | |
| Tuesday, April 2, 2024 | 23 | 42 | | 19 | |
| Wednesday, April 3, 2024 | 26 | 52 | | 22 | |
| Thursday, April 4, 2024 | 31 | 57 | | 14 | |
| Friday, April 5, 2024 | 25 | 55 | | 45 | |
| Saturday, April 6, 2024 | | | | | |
| Sunday, April 7, 2024 | | | | | |
| Monday, April 8, 2024 | 19 | 38 | | 18 | |
| Tuesday, April 9, 2024 | 22 | 43 | | 29 | |
| Wednesday, April 10, 2024 | 21 | 42 | | 23 | |
| Thursday, April 11, 2024 | 28 | 50 | | 25 | |
| Friday, April 12, 2024 | 38 | 60 | | 22 | |
| Saturday, April 13, 2024 | 35 | 59 | | 15 | |
| Sunday, April 14, 2024 | 37 | 61 | | 20 | |
| Monday, April 15, 2024 | 29 | 50 | Snow (2") | 35 | |
| Tuesday, April 16, 2024 | 33 | 51 | | 21 | |

**Cripple Creek & Victor Gold Mining Company**
**Valley Leach Facility 2 Phase 3**
**Stage A.1 Liner Recertification Record of Construction**
**Summary of Weather Data**

| Date | Low Ambient Temperature (°F) | High Ambient Temperature (°F) | Precipitation (inches) | Maximum Wind Speed (mph) | Remarks |
|---|---|---|---|---|---|
| Wednesday, April 17, 2024 | 29 | 58 | | 35 | |

# APPENDIX J - TECHNICAL SPECIFICATIONS

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| Specification Name | Specification Number | Revision Date |
|---|---|---|
| Construction Staking | 1050 | 8/27/2021 |
| Earthworks Construction Quality Assurance (CQA) Plan | 1400 | 8/27/2021 |
| Earthworks Construction Quality Assurance (CQA) Plan – Owner Performed Work | 01400-1 | 9/13/2023 |
| Geosynthetics Construction Quality Assurance (CQA) Plan | 01400-2 | 8/27/2021 |
| Earthworks | 2200 | 8/27/2021 |
| Earthworks – Owner Performed Work | 02200-1 | 9/13/2023 |
| Underground Working Remediation | 2210 | 8/27/2021 |
| RipRap | 2271 | 8/27/2021 |
| Pipe Bollards | 2608 | 8/27/2021 |
| Piping | 2710 | 8/27/2021 |
| Geomembrane | 02776-0 | 1/11/2022 |
| Geogrid | 02776-1 | 8/27/2021 |
| Geotextile | 2777 | 8/27/2021 |
| Cast-in-Place Concrete | 3300 | 8/27/2021 |
| Cemented Rockfill | 3310 | 8/27/2021 |
| Concrete Plug | 3320 | 8/27/2021 |
| Flowable Fill | 3330 | 8/27/2021 |

| NewFields | CLIENT<br>Newmont<br>Cripple Creek & Victor Gold Mine | PROJECT NO<br>475.0106.049 |
|---|---|---|
| **PROJECT: VLF2 Phase 3** | | |
| **TITLE: TECHNICAL SPECIFICATIONS – Construction Staking** | | **SPECIFICATION NO.**<br>**01050 CONSTRUCTION STAKING** |

| REV | DATE | PAGES | APPROVALS | | | REMARKS |
|---|---|---|---|---|---|---|
| | | | AUTHOR | REVIEW | CLIENT | |
| 0 | 12/5/2019 | 3 | JNM | KCW | | Issued for Permitting |
| 1 | 8/27/2021 | 3 | JNM | KCW | | Issued for Construction |
| | | | | | | |
| | | | | | | |

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   1.3. Flagging Code ..... 1
   1.4. Staking ..... 1
   1.5. Construction Certification Documentation ..... 1

# SECTION 01050 CONSTRUCTION STAKING AND CONSTRUCTION DOCUMENTATION

## 1. PART 1: GENERAL

### 1.1. Summary

This Section defines the control staking services required by the **CONTRACTOR**. All staking and surveying will be the responsibility of the **CONTRACTOR** unless otherwise specifically defined in this section. All grade checking and transferring of lines and grades from **CC&V**'s stakes will be the **CONTRACTOR**'S responsibility.

### 1.2. Control Stakes

Control stakes which are reference points for all construction work will be conspicuously marked. It shall be the responsibility of the **CONTRACTOR** to inform his employees and his subcontractors of their importance and the necessity for their preservation. At least forty-eight (48) hours written advance request for removal of control stakes shall be given to **CC&V**. A total of ten (10) control stakes will be provided to the **CONTRACTOR** by **CC&V** for this work.

Control stakes shall be set one time only.

### 1.3. Flagging Code

A color code will be established by the **CONTRACTOR** during the course of the project indicating specific colors for the various kinds of stakes to be set.

### 1.4. Staking

A. **CC&V** will provide vertical and horizontal reference control stakes in the proximity of the work as discussed in Section 1.2 of this SPECIFICATION.

B. The **CONTRACTOR** shall be responsible for setting construction and grade stakes and for proper preservation of control points.

C. The **CONTRACTOR** will provide as-built coordinates and elevations for the Leak Detection system, Low Volume Solution Collection piping and High Volume Solution Collection piping or as requested by the **MANAGER**.

### 1.5. Construction Certification Documentation

A. The **CONTRACTOR** shall be responsible for accurately surveying the locations and elevations, and where applicable, the type, thickness, and geometry of any and all pipes and fittings, ditches, geosynthetic materials, breaks in fill or cut slopes, general grading,

change in fill or synthetic material type, and any other aspect of the work to facilitate construction and as required by the **MANAGER**.

B. Submittals By **CONTRACTOR** Upon Completion of Work:

Within seven (7) calendar days after completion of the WORK, **CONTRACTOR** shall furnish **MANAGER** with "Record Drawings" (also referred to as "As-Built Drawings") of the Work. The Record Drawing will be drawn at a scale of 1-inch equals 100 feet with 10 foot topographic contour interval, and on a 24-inch by 36-inch sheet. All surveying Record Drawings shall be signed and sealed by the Colorado licensed surveyor who directed the work. The required surveying shall be carried out on a 100-foot by 100-foot grid with additional survey points required to define valley leach facility topographic features (i.e., toe of slope, crest of slope, breaks in grade), unless otherwise directed by **MANAGER**. The Record Drawings shall include elevations and locations for the following:

- Leak detection trench plan view showing the limits of the valley leach facility, leak detection trench alignment, and leak detection sumps, with elevations every approximately 100-feet
- Soil Liner Fill plan view showing the limits of the valley leach facility, with contours of the Soil Liner Fill and Bedding Fill surface on a 10-foot contour interval, including the regraded ore slopes and end berms
- Low Volume Solution Collection piping plan showing the limits of the composite liner, double liner and single liner, and piping alignment with elevations every approximately 100 feet
- Perimeter access roads
- Top of Upper geosynthetics in the Pregnant Solution Storage Area, including the Vertical Riser Sump and base plates
- High Volume Solution Collection piping plan showing the limits of the VLF, and piping alignment with elevation every approximately 100-feet

In addition, the Colorado licensed surveyor will provide a surveyor's certificate to be submitted in the Construction Certification Report.

C. Submittal

**CONTRACTOR** will submit completed as-built documentation within seven (7) calendar days upon completion of the work in the following manner:

1. Submit two (2) hard copies to the **MANAGER**.
2. Submit two (2) non-reproducible copies to the **MANAGER** in electronic form on compact disks (CD) or DVD's and in an AutoCAD compatible format.

D. The **CONTRACTOR** will be responsible for performing the following survey activities associated with the Construction Certification Report:

**1.** Provide northing, easting, and elevation for all Soil Liner Fill depth verifications.

**2.** Provide northing, easting, and elevation for geomembrane panel intersections and destructive samples.

**3.** Provide continuous northing, easting, and elevation reference for field testing and sampling location identification.

**4.** Provide depth verification for the Low Volume Solution Collection Fill on a 50-foot by 50-foot grid with additional points at all grade breaks.

**5.** Provide depth verification for Drain Cover Fill on a 50-foot by 50-foot grid with additional survey points at all breaks in grade.

**6.** Provide northing, easting and elevation reference for any underground working confirmatory drillhole and blasthole locations.

Northings, eastings, and elevations for Items 1, 2, 3 and 6 will be performed on a daily basis and results will be provided to the **MANAGER** in both electronic and hardcopy format within 24 hours of performing the survey.

| NewFields | CLIENT<br>Newmont<br>Cripple Creek & Victor Gold Mine | PROJECT NO<br>475.0106.049 |
|---|---|---|
| **PROJECT: VLF2 Phase 3** | | |
| **TITLE: TECHNICAL SPECIFICATIONS – Earthworks Construction Quality Assurance (CQA) Plan** | | **SPECIFICATION NO.**<br>**01400 EARTHWORK CQA** |

| REV | DATE | PAGES | APPROVALS | | | REMARKS |
|---|---|---|---|---|---|---|
| | | | AUTHOR | REVIEW | CLIENT | |
| 0 | 12/5/2019 | 10 | JNM | KCW | | Issued for Permitting |
| 1 | 12/17/2020 | 10 | JNM | KCW | | Re-Issued for Permitting |
| 2 | 8/27/2021 | 10 | JNM | KCW | | Issued for Construction |
| | | | | | | |

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TABLE 2: SOIL CONSTRUCTION TESTING FREQUENCY[1] VOLUME PER TEST ..... 10

# SECTION 01400 EARTHWORKS CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN

## 1. PART 1: INTRODUCTION

This plan addresses the construction quality assurance (CQA) procedures for the installation of the earthworks (soils) components of the valley leach facility at the Cresson Project, Teller County, Colorado. This program has been developed to assure that the construction of the soil components are in compliance with the project SPECIFICATIONS and to demonstrate that the regulatory requirements for the construction are achieved.

The objective of this plan is to assure that proper materials, construction techniques, and procedures are followed by the **CONTRACTOR** and that the intent of the design is met. This plan also provides the means for resolution of problems that may occur during construction.

This plan addresses quality assurance, not quality control. This CQA Plan is independent of the quality control (QC) programs conducted by **CONTRACTOR**. The intent of the CQA Plan is to provide independent third party verification and testing, to demonstrate that the **CONTRACTOR** has met its obligations in the supply and installation of earthwork (soils) materials according to the design, project SPECIFICATIONS, contractual, and regulatory requirements. Quality control is provided by **CONTRACTOR** and refers to those actions taken by the **CONTRACTOR** to ensure that materials and workmanship meet the requirements of the DRAWINGS and SPECIFICATIONS.

## 2. PART 2: DESCRIPTION OF PARTIES TO CONSTRUCTION QUALITY ASSURANCE

The following section provides descriptions of the parties to this CQA Plan including their responsibilities and qualifications.

### 2.1. CC&V

In this CQA Plan, **CC&V** refers specifically to Cripple Creek & Victor Gold Mining Company. **CC&V** owns and operates the valley leach facility.

### 2.2. Manager

In this CQA Plan, **MANAGER** refers to the individual appointed by the Cripple Creek & Victor Gold Mining Company. **MANAGER** is the official representative of **CC&V** and is responsible for all construction activities including oversight and direction during construction. **MANAGER** is also responsible for coordinating construction and CQA activities for the project.

**MANAGER** shall serve as communications coordinator for the project, initiating preconstruction and resolution meetings. As communications coordinator, **MANAGER** will serve as a liaison between all parties involved in the project to ensure that ongoing communications are



maintained. **MANAGER** and **CERTIFYING ENGINEER** shall be responsible for the resolution of all CQA issues.

Duties for this position include the following:

- review and approval of DRAWINGS and SPECIFICATIONS for all soil components of the valley leach facility;
- preconstruction coordination with the **CQA MONITOR** to ensure that the **CQA MONITOR** has performed similar reviews of the DRAWINGS and SPECIFICATIONS to ensure that the CQA Plan can be implemented;
- coordination of all construction activities associated with **CONTRACTOR**;
- scheduling and coordinating construction activities with required CQA testing and activities;
- overseeing the construction quality control operations performed by **CONTRACTOR**;
- approve specific corrective measures to be implemented during construction when deviations from the SPECIFICATIONS occur;
- ensure that required quality assurance testing has been performed in accordance with the CQA Plan and to the satisfaction of the **CQA MONITOR**; and
- ensure that the CQA personnel are provided with all documentation required in the CQA Plan and project SPECIFICATIONS.

### 2.3. Design Engineer

In this CQA Plan the **DESIGN ENGINEER and Engineer of Record (EOR)** refers specifically to NewFields who has assumed the role of **DESIGN ENGINEER** after a thorough review of design documents to include, but not limited to, the DRAWINGS and SPECIFICATIONS. The **DESIGN ENGINEER** or the **CERTIFYING ENGINEER** identified in Section 2.4 below, is responsible for approving all DRAWING and SPECIFICATION changes, modifications, or clarifications encountered during construction.

### 2.4. Certifying Engineer

In this plan, **CERTIFYING ENGINEER** refers specifically to NewFields. **CERTIFYING ENGINEER** is the individual or firm responsible for certifying the construction was performed in compliance with the DRAWINGS and SPECIFICATIONS. **MANAGER** and **CERTIFYING ENGINEER** shall be responsible for the resolution of all quality assurance issues.

### 2.5. Construction Quality Assurance Monitor

The **CQA MONITOR** is the firm or individual responsible for performing the CQA tasks outlined in this CQA Plan. The **CQA MONITOR** is the official CQA representative of **CC&V** and has the

responsibility of overseeing the CQA aspects of the Work. In this CQA Plan the **CQA MONITOR** is associated with the **CERTIFYING ENGINEER,** and refers specifically to (To Be Determined). The **CQA MONITOR** has the authority to stop any aspect of the Work that is not in compliance with the CQA Plan. Work would then be resumed once corrective action has been approved by **MANAGER**. The specific responsibilities of the **CQA MONITOR** include:

- review the DRAWINGS, SPECIFICATIONS, and related guidance documents;
- review all **CONTRACTOR** QC submittals and make appropriate recommendations;
- obtain preconstruction and construction samples and perform material evaluation testing as required;
- monitor foundation preparation activities as discussed in Section 6.3.1 and material placement as discussed in Section 6.3.2;
- assure that testing equipment used and tests performed are conducted according to SPECIFICATIONS and industry standards;
- document and report test results to **MANAGER**;
- report any deficiencies to **MANAGER** that are not corrected to the satisfaction of the **CQA MONITOR**, including design or SPECIFICATION changes;
- prepare a Construction Certification Report describing the construction, any deviations from SPECIFICATIONS or DRAWINGS and details, details of all field and laboratory test data, tests results (both laboratory and field), professional certification that construction was completed in accordance with the DRAWINGS and SPECIFICATIONS. The Construction Certification Report will be signed and sealed by the **CERTIFYING ENGINEER** registered in the State of Colorado;
- monitor the ambient air temperature and fill temperature, as outlined in Section 2200 of the SPECIFICATIONS; and
- maintain an on-site soils laboratory and perform regular calibration of equipment.

### 2.6. Earthworks Contractor

The Earthworks Contractor, also referred to as "**CONTRACTOR**", is responsible for proper processing, delivery and placement of all components as outlined in the SPECIFICATIONS.

## 3. PART 3: LINES OF COMMUNICATION

The **CQA MONITOR** shall be capable of direct communication with **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER** at all times. Deficiencies that can be easily remedied, such as unsatisfactory test results, will be dealt with directly between the **CQA MONITOR**, and **CONTRACTOR**. The **CQA MONITOR** will also discuss any deficiencies with the **CERTIFYING ENGINEER**.



If there is a disagreement among the **DESIGN ENGINEER, CERTIFYING ENGINEER,** and/or **MANAGER** that cannot be resolved among themselves, **MANAGER** shall present the matter to **CC&V** with **MANAGER** related recommendations and **CC&V** shall decide the matter with such decision being final.

## 4. PART 4: DEFICIENCIES

When deficiencies (items that do not meet SPECIFICATIONS or DRAWINGS) are discovered, the **CQA MONITOR** will immediately determine the nature and extent of the problem and notify the **CONTRACTOR**. If unsatisfactory test results identify a deficiency, additional tests will be performed to define the extent of the deficient area.

**CONTRACTOR** shall correct the deficiency to the satisfaction of the **CQA MONITOR**. If **CONTRACTOR** is unable to correct the problem, the **CQA MONITOR** will notify **MANAGER** and **CERTIFYING ENGINEER** which will assist in problem resolution. If the solution involves a design revision, the **DESIGN ENGINEER** shall also be contacted.

The **CQA MONITOR** shall retest and the **MANAGER** and **CERTIFYING ENGINEER** shall approve the corrected deficiencies before any additional related work is performed by **CONTRACTOR**. All retests and related documentation shall be recorded by the **CQA MONITOR** and included in the Construction Certification Report.

## 5. PART 5: MEETINGS

This section identifies and describes the meetings to be held during the course of the construction. Meetings shall be held in order to clearly define construction activities and goals in order to facilitate construction.

### 5.1. Preconstruction Meeting

**MANAGER** will hold a preconstruction meeting at the site prior to the start of construction. **MANAGER**, **DESIGN ENGINEER, CERTIFYING ENGINEER**, **CQA MONITOR**, **CONTRACTOR**, and others designated by **MANAGER** shall attend this meeting. The purpose of this meeting will be to:

- review the construction DRAWINGS, CQA Plan, and SPECIFICATIONS;
- define the responsibilities of each party;
- define lines of communication and authority;
- review method of documentation, testing procedures, and reporting inspection data;
- establish testing protocols and procedures for correcting and documenting construction deficiencies;



- discuss any changes that may be needed to ensure that construction will be completed in compliance with the design; and
- This meeting will be documented by **MANAGER** and copies will be distributed to all parties.

### 5.2. Progress Meetings

**MANAGER** will hold a daily progress meeting, either before the start of work or at the completion of work. At a minimum, this meeting will be attended by the **CQA MONITOR** and **CONTRACTOR**. The purpose of this meeting will be to:

- review all the previous day's accomplishments and activities;
- review scheduled work location and activities for the day;
- discuss any problems or potential construction problems; and,
- review test data.

### 5.3. Deficiency Meetings

Special meetings will be held, as needed, to discuss potential problems or deficiencies. At a minimum, these meetings will be attended by the **CQA MONITOR** and **CONTRACTOR**. If the problem relates to a design issue, **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER** should also be present. The meeting will be documented by the **CQA MONITOR**.

## 6. PART 6: EARTHWORKS CONSTRUCTION QUALITY ASSURANCE

Construction of the valley leach facility or specified earthworks shall be in accordance with the DRAWINGS and SPECIFICATIONS. A CQA monitoring and testing program shall be implemented by **CC&V** to ensure construction compliance by the **CONTRACTOR**. The CQA testing program shall consist of construction testing of materials used in the valley leach facility construction. The types of materials are defined in the SPECIFICATIONS. During construction, the **CQA MONITOR** shall sample and test these soil types to determine if they meet SPECIFICATIONS. The **CQA MONITOR** shall obtain and test soil samples in accordance with American Society for Testing and Material standards ASTM D75 and ASTM D420. All tests shall be performed by the **CQA MONITOR** on-site or in a geotechnical laboratory approved by the **CERTIFYING ENGINEER.**

### 6.1. Construction Testing

During construction, the **CQA MONITOR** shall test all earthwork components to verify that the construction is in accordance with the SPECIFICATIONS. Testing shall be performed on all soil used in the construction to confirm the materials meet SPECIFICATIONS. The **CQA MONITOR** shall



conduct testing after final placement of the materials. The tests to be performed, and the testing frequency, for each material type are listed in Tables 1 and 2. The testing frequencies specified in Tables 1 and 2 shall be increased when the **CQA MONITOR** determines that construction conditions (such as adverse weather, equipment breakdown, improperly ballasted compactor, excessive lift thickness, improper soil type, improper moisture conditioning and compaction) warrant additional tests. Additional tests will be approved by **MANAGER** and directed by the **CQA MONITOR**.

### 6.2. Construction Monitoring

The **CQA MONITOR** will monitor and test all earthwork quality assurance components of the construction to verify that the construction is in accordance with the SPECIFICATIONS. The **CQA MONITOR** shall identify inadequate construction methodologies or materials that may adversely impact the performance of the facility being constructed and existing structures. The **CQA MONITOR** will record visual observations throughout the construction process to ensure that the materials are placed to the minimum dimensions as shown on the DRAWINGS. Quality control testing will be performed by the **CONTRACTOR**.

#### 6.2.1. Foundation Preparation

The **CQA MONITOR** shall observe and document the foundation preparation including:

- stripping and excavation activities to ensure that **CONTRACTOR** places the material in the appropriate stockpile (Structural Fill, Select Structural Fill, Leak Detection Fill, Low Volume Solution Collection Fill, Bedding Fill, Soil Liner Fill, Drain Cover Fill, Fine Shaft Backfill, Pipe Bedding Material and Granular Filter Material), if stockpiling is necessary;
- stockpiling activities to verify location of stockpile, material type, and dressing;
- excavations for moisture seeps, unsuitable foundation soil, elevation, and proper drainage;
- subgrade preparation to confirm that the surface of the subgrade is free of soft, organic, and otherwise deleterious materials (such as debris, branches, vegetation, mud, ice, or frozen materials); and that soil and rock surfaces that contain joints or fractures are adequately filled in accordance with the SPECIFICATIONS; and
- construction of access roads, drainage control features and erosion control features to verify compliance with the DRAWINGS and SPECIFICATIONS.

#### 6.2.2. Placement Of Materials

During placement of Structural Fill, Select Structural Fill, Coarse Shaft Backfill, Cemented Rockfill, Low Volume Solution Collection Fill, Bedding Fill, Leak Detection Fill, Soil Liner Fill, Drain Cover



Fill, Fine Shaft Backfill, Pipe Bedding Material and Granular Filter Material, the **CQA MONITOR** shall:

- verify the use of appropriate fills;
- monitor and document material placement, including soil type, particle size, loose lift thickness, moisture conditioning process, compaction equipment and methods used to attain compaction, including number of passes, uniformity of compaction coverage, compacted lift thickness, bonding of lifts and in-place moisture content and dry density is in compliance with the SPECIFICATIONS;
- monitor Soil Liner Fill surface preparation to verify that the surface has been proof-rolled, compacted, or hand worked so as to be in a condition suitable for geomembrane installation as discussed in Section 02200 of the SPECIFICATIONS;
- monitor Bedding Fill placement and surface preparation to verify that the surface is suitable for geomembrane installation as discussed in Section 02200 of the SPECIFICATIONS;
- monitor the placement of fill to ensure that **CONTRACTOR** exercises care in the vicinity of pipes and that the underlying geosynthetics are not damaged;
- monitor and document **CONTRACTOR** verification of in-place Soil Liner Fill, Bedding Fill, Low Volume Solution Collection Fill and Drain Cover Fill thickness;
- monitor equipment being used to place Low Volume Solution Collection Fill and Drain Cover Fill to verify that the **CONTRACTOR** places the material in accordance with the SPECIFICATIONS;
- monitor that Low Volume Solution Collection Fill and Drain Cover Fill is pushed uphill for areas in which the slope exceeds 4H:1V and that the dozer does not perform unacceptable pivot turns; and
- monitor the fill temperature as identified in Section 02200 of the SPECIFICATIONS.

## 7. PART 7: DOCUMENTATION

Documentation kept by the **CQA MONITOR** shall consist of daily record-keeping, construction problem resolutions, design and SPECIFICATION changes, photographic records of construction, weekly progress reports, chain of custody forms for test sample tracking, and a Construction Certification Report.

### 7.1. Daily Record Keeping

Daily records kept by the **CQA MONITOR** shall consist of field notes, observation and testing data sheets, summary of the daily meeting with **CONTRACTOR**, and reporting of construction problems and resolutions. The **CQA MONITOR** shall submit this information on a regular basis to **MANAGER** for review.



### 7.2. Soils Observation and Testing Forms

The **CQA MONITOR** will document soils observations on forms that generally include the following information:

- date, project name, location, and weather data, including high and low daily temperatures;
- a site plan showing work areas and test locations;
- descriptions of ongoing construction detailing work areas and equipment utilized by **CONTRACTOR;**
- summary of test results and samples obtained, with locations and elevations;
- resolutions of deficient test results;
- test equipment calibrations, if necessary;
- summary of meetings held; and
- signature or initials of the **CQA MONITOR**.

### 7.3. Photo Documentation

The **CQA MONITOR** shall photograph all phases of construction. Photographs shall be identified by location, time, date, and name of the **CQA MONITOR** taking the photograph.

### 7.4. Design and Specification Changes

During construction, the need to address DESIGN and SPECIFICATION changes, modifications, or clarifications may arise. In such cases the **CQA MONITOR** shall notify **MANAGER**, which shall notify the **DESIGN ENGINEER** and the **CERTIFYING ENGINEER**. DESIGN and SPECIFICATION changes shall only be made with written agreement from **MANAGER** and **DESIGN ENGINEER**.

### 7.5. Weekly Progress Reports

The **CQA MONITOR** shall prepare weekly progress reports summarizing all construction and quality assurance activities. This report shall be submitted to **MANAGER** and shall include the following information:

- date, project name, and location;
- summary of construction related activities;
- summary of samples taken and test results;
- summary of deficiencies and/or defects and resolutions; and,
- signature of the **CQA MONITOR**.



### 7.6. Construction Certification Report

At the completion of the project, the **CQA MONITOR** shall submit to **MANAGER** a Construction Certification Report. This report shall certify that the work has been performed in compliance with the DRAWINGS and SPECIFICATIONS and will contain the following information:

- summary of all construction activities;
- photographic documentation;
- test data sheets;
- copies of weekly reports;
- CQA test results, including date, test locations and resolutions of deficient test results;
- copies of surveyors certificate;
- fill temperature monitoring results;
- staff schedule summary;
- a description of significant construction problems and the resolution of these problems;
- changes to the DRAWINGS or SPECIFICATIONS and the justification for these changes;
- record drawings, and
- a statement certifying that construction was completed in compliance with the DRAWINGS and SPECIFICATIONS, signed, and sealed by the **CERTIFYING ENGINEER** registered in the State of Colorado.



## TABLE 1: SOIL CONSTRUCTION TESTING FREQUENCY[1] VOLUME PER TEST

| Test and ASTM Designation | Subgrade (cy) | Select Structural Fill (cy) |
|---|---|---|
| Compaction (ASTM D698) | 50,000 | 50,000 |
| Particle Size[2] (ASTM C117, C136, D1140, D6913) | 50,000 | 50,000 |
| Atterberg Limit (ASTM D4318) | -- | -- |
| Moisture Content[3] (ASTM D2216) | 2,000 | 2,000 |
| Nuclear Density/Moisture (ASTM D6938) | 2,000 | 2,000 |

## TABLE 2: SOIL CONSTRUCTION TESTING FREQUENCY[1] VOLUME PER TEST

| Test and ASTM Designation | Low Volume Solution Collection Fill, Bedding Fill, Leak Detection Fill, and Pipe Bedding Fill (cy) | Soil Liner Fill (cy) | Drain Cover Fill (cy) |
|---|---|---|---|
| Compaction (ASTM D698) | -- | 4,000 | -- |
| Particle Size[2] (ASTM C117, C136, D1140) D6913 | 10,000 | 4,000 | 20,000 |
| Atterberg Limit (ASTM D4318) | 10,000 | 4,000 | 20,000 |
| Moisture Content[3] (ASTM D2216) | 10,000 | 500 | 20,000 |
| Permeability[4] (ASTM D5084) | -- | 4,000 | -- |
| Nuclear Density/Moisture (ASTM D6938) | -- | 500 | -- |

**[1] Tests shall be performed at the specified frequency or one per material type, whichever is greater.**

**[2] Use the USCS for description and identification (ASTM D2488).**

**[3] In-place Moisture Content.**

**[4] Permeability testing will be performed during the processing of the Soil Liner Fill material, certifying the processed stockpile.**

| NewFields | CLIENT<br>Newmont<br>Cripple Creek & Victor Gold Mine | PROJECT NO<br>475.0106.049 |
|---|---|---|
| **PROJECT: VLF2 Phase 3** | | |
| **TITLE: TECHNICAL SPECIFICATIONS – Earthworks Construction Quality Assurance (CQA) Plan – Owner Performed Work** | | **SPECIFICATION NO.**<br>**01400-1 EARTHWORK CQA** |

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# SECTION 01400-1 EARTHWORKS CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN – OWNER PERFORMED WORK

## 1. PART 1: INTRODUCTION

This plan addresses the construction quality assurance (CQA) procedures for the installation of the earthworks (soils) component of the backfilling the Pit for VLF3 Phase 3 project at the Cresson Project, Teller County, Colorado. This program has been developed to assure that the construction of the soil components is in compliance with the project SPECIFICATIONS and to demonstrate that the regulatory requirements for the construction are achieved.

The objective of this plan is to assure that proper materials, construction techniques, and procedures are followed by the **CONTRACTOR** and that the intent of the design is met. This plan also provides the means for resolution of problems that may occur during construction.

This plan addresses quality assurance, not quality control. This CQA Plan is independent of the quality control (QC) programs conducted by **CONTRACTOR**. The intent of the CQA Plan is to provide independent third party verification and testing, to demonstrate that the **CONTRACTOR** has met its obligations in the supply and installation of earthwork (soils) materials according to the design, project SPECIFICATIONS, contractual, and regulatory requirements. Quality control is provided by **CONTRACTOR** and refers to those actions taken by the **CONTRACTOR** to ensure that materials and workmanship meet the requirements of the DRAWINGS and SPECIFICATIONS.

## 2. PART 2: DESCRIPTION OF PARTIES TO CONSTRUCTION QUALITY ASSURANCE

The following section provides descriptions of the parties to this CQA Plan including their responsibilities and qualifications.

### 2.1. CC&V

In this CQA Plan, **CC&V** refers specifically to Cripple Creek & Victor Gold Mining Company. **CC&V** owns and operates the valley leach facility.

### 2.2. Manager

In this CQA Plan, **MANAGER** refers to the individual appointed by the Cripple Creek & Victor Gold Mining Company. **MANAGER** is the official representative of **CC&V** and is responsible for all construction activities including oversight and direction during construction. **MANAGER** is also responsible for coordinating construction and CQA activities for the project.

**MANAGER** shall serve as communications coordinator for the project, initiating preconstruction and resolution meetings. As communications coordinator, **MANAGER** will serve as a liaison



between all parties involved in the project to ensure that ongoing communications are maintained. **MANAGER** and **CERTIFYING ENGINEER** shall be responsible for the resolution of all CQA issues.

Duties for this position include the following:

- review and approval of DRAWINGS and SPECIFICATIONS for all soil components of the valley leach facility;
- preconstruction coordination with the **CQA MONITOR** to ensure that the **CQA MONITOR** has performed similar reviews of the DRAWINGS and SPECIFICATIONS to ensure that the CQA Plan can be implemented;
- coordination of all construction activities associated with **CONTRACTOR**;
- scheduling and coordinating construction activities with required CQA testing and activities;
- overseeing the construction quality control operations performed by **CONTRACTOR**;
- approve specific corrective measures to be implemented during construction when deviations from the SPECIFICATIONS occur;
- ensure that required quality assurance testing has been performed in accordance with the CQA Plan and to the satisfaction of the **CQA MONITOR**; and
- ensure that the CQA personnel are provided with all documentation required in the CQA Plan and project SPECIFICATIONS.

### 2.3. Design Engineer

In this CQA Plan, the **DESIGN ENGINEER and Engineer of Record (EOR)** refers specifically to NewFields who has assumed the role of **DESIGN ENGINEER** after a thorough review of design documents to include, but not limited to, the DRAWINGS and SPECIFICATIONS. The **DESIGN ENGINEER** or the **CERTIFYING ENGINEER** identified in Section 2.4 below, is responsible for approving all DRAWING and SPECIFICATION changes, modifications, or clarifications encountered during construction.

### 2.4. Certifying Engineer

In this plan, **CERTIFYING ENGINEER** refers specifically to NewFields. **CERTIFYING ENGINEER** is the individual or firm responsible for certifying the construction was performed in compliance with the DRAWINGS and SPECIFICATIONS. **MANAGER** and **CERTIFYING ENGINEER** shall be responsible for the resolution of all quality assurance issues.



### 2.5. Construction Quality Assurance Monitor

The **CQA MONITOR** is the firm or individual responsible for performing the CQA tasks outlined in this CQA Plan. The **CQA MONITOR** is the official CQA representative of **CC&V** and has the responsibility of overseeing the CQA aspects of the Work. In this CQA Plan the **CQA MONITOR** is associated with the **CERTIFYING ENGINEER and** refers specifically to (To Be Determined). The **CQA MONITOR** has the authority to stop any aspect of the Work that is not in compliance with the CQA Plan. Work would then be resumed once corrective action has been approved by **MANAGER**. The specific responsibilities of the **CQA MONITOR** include:

- review the DRAWINGS, SPECIFICATIONS, and related guidance documents;
- review all **CONTRACTOR** QC submittals and make appropriate recommendations;
- obtain preconstruction and construction samples and perform material evaluation testing as required;
- monitor foundation preparation activities as discussed in Section 6.3.1 and material placement as discussed in Section 6.3.2;
- assure that testing equipment used and tests performed are conducted according to SPECIFICATIONS and industry standards;
- document and report test results to **MANAGER**;
- report any deficiencies to **MANAGER** that are not corrected to the satisfaction of the **CQA MONITOR**, including design or SPECIFICATION changes;
- prepare a Construction Certification Report describing the construction, any deviations from SPECIFICATIONS or DRAWINGS and details, details of all field and laboratory test data, tests results (both laboratory and field), professional certification that construction was completed in accordance with the DRAWINGS and SPECIFICATIONS. The Construction Certification Report will be signed and sealed by the **CERTIFYING ENGINEER** registered in the State of Colorado;
- monitor the ambient air temperature and fill temperature, as outlined in Section 2200 of the SPECIFICATIONS; and
- maintain an on-site soils laboratory and perform regular calibration of equipment.

### 2.6. Earthworks Contractor

The Earthworks Contractor, also referred to as "**CONTRACTOR**", is responsible for proper processing, delivery and placement of all components as outlined in the SPECIFICATIONS.

## 3. PART 3: LINES OF COMMUNICATION

The **CQA MONITOR** shall be capable of direct communication with **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER** at all times. Deficiencies that can be easily remedied, such

as unsatisfactory test results, will be dealt with directly between the **CQA MONITOR**, and **CONTRACTOR**. The **CQA MONITOR** will also discuss any deficiencies with the **CERTIFYING ENGINEER**.

If there is a disagreement among the **DESIGN ENGINEER, CERTIFYING ENGINEER,** and/or **MANAGER** that cannot be resolved among themselves, **MANAGER** shall present the matter to **CC&V** with **MANAGER** related recommendations and **CC&V** shall decide the matter with such decision being final.

## 4. PART 4: DEFICIENCIES

When deficiencies (items that do not meet SPECIFICATIONS or DRAWINGS) are discovered, the **CQA MONITOR** will immediately determine the nature and extent of the problem and notify the **CONTRACTOR**. If unsatisfactory test results identify a deficiency, additional tests will be performed to define the extent of the deficient area.

**CONTRACTOR** shall correct the deficiency to the satisfaction of the **CQA MONITOR**. If **CONTRACTOR** is unable to correct the problem, the **CQA MONITOR** will notify **MANAGER** and **CERTIFYING ENGINEER** which will assist in problem resolution. If the solution involves a design revision, the **DESIGN ENGINEER** shall also be contacted.

The **CQA MONITOR** shall retest and the **MANAGER** and **CERTIFYING ENGINEER** shall approve the corrected deficiencies before any additional related work is performed by **CONTRACTOR**. All retests and related documentation shall be recorded by the **CQA MONITOR** and included in the Construction Certification Report.

## 5. PART 5: MEETINGS

This section identifies and describes the meetings to be held during the course of the construction. Meetings shall be held in order to clearly define construction activities and goals in order to facilitate construction.

### 5.1. Preconstruction Meeting

**MANAGER** will hold a preconstruction meeting at the site prior to the start of construction. **MANAGER**, **DESIGN ENGINEER, CERTIFYING ENGINEER**, **CQA MONITOR**, **CONTRACTOR**, and others designated by **MANAGER** shall attend this meeting. The purpose of this meeting will be to:

- review the construction DRAWINGS, CQA Plan, and SPECIFICATIONS;
- define the responsibilities of each party;
- define lines of communication and authority;



- review method of documentation, testing procedures, and reporting inspection data;
- establish testing protocols and procedures for correcting and documenting construction deficiencies;
- discuss any changes that may be needed to ensure that construction will be completed in compliance with the design; and
- This meeting will be documented by **MANAGER** and copies will be distributed to all parties.

### 5.2. Progress Meetings

**MANAGER** will hold a daily progress meeting, either before the start of work or at the completion of work. At a minimum, this meeting will be attended by the **CQA MONITOR** and **CONTRACTOR**. The purpose of this meeting will be to:

- review all the previous day's accomplishments and activities;
- review scheduled work location and activities for the day;
- discuss any problems or potential construction problems; and,
- review test data.

### 5.3. Deficiency Meetings

Special meetings will be held, as needed, to discuss potential problems or deficiencies. At a minimum, these meetings will be attended by the **CQA MONITOR** and **CONTRACTOR**. If the problem relates to a design issue, **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER** should also be present. The meeting will be documented by the **CQA MONITOR**.

## 6. PART 6: EARTHWORKS CONSTRUCTION QUALITY ASSURANCE

Construction of the valley leach facility or specified earthworks shall be in accordance with the DRAWINGS and SPECIFICATIONS. A CQA monitoring and testing program shall be implemented by **CC&V** to ensure construction compliance by the **CONTRACTOR**. The CQA testing program shall consist of construction testing of materials used in the valley leach facility construction. The types of materials are defined in the SPECIFICATIONS. During construction, the **CQA MONITOR** shall sample and test these soil types to determine if they meet SPECIFICATIONS. The **CQA MONITOR** shall obtain and test soil samples in accordance with American Society for Testing and Material standards ASTM D75 and ASTM D420. All tests shall be performed by the **CQA MONITOR** on-site or in a geotechnical laboratory approved by the **CERTIFYING ENGINEER.**



### 6.1. Overburden Fill Placement

Construction of the Overburden Fill will be completed by the **CONTRACTOR** prior to the arrival of the **CQA MONITOR**. During this period, the **MANAGER** will provide the **CERTIFYING ENGINEER** and Division of Reclamation, Mining and Safety with weekly progress reports. These reports will include photographic evidence the material being placed meets the specification requirements, progress being made, and placement methods utilizing a template developed by the **CERTIFYING ENGINEER**. In addition, "Photographic Analysis" of the gradation of the material will be completed by the **MANAGER** on a monthly basis. Additionally, on a quarterly basis the **CERTIFYING ENGINEER** will perform on-site visual inspections and meet with the **MANAGER** to review the progress of the Overburden Fill placement.

### 6.2. Construction Testing

During construction, the **CQA MONITOR** shall test all earthwork components to verify that the construction is in accordance with the SPECIFICATIONS. Testing shall be performed on all soil used in the construction to confirm the materials meet SPECIFICATIONS. The **CQA MONITOR** shall conduct testing after final placement of the materials. The tests to be performed, and the testing frequency, for each material type are listed in Tables 1. The testing frequencies specified in Tables 1 and 2 shall be increased when the **CQA MONITOR** determines that construction conditions (such as adverse weather, equipment breakdown, improperly ballasted compactor, excessive lift thickness, improper soil type, improper moisture conditioning and compaction) warrant additional tests. Additional tests will be approved by **MANAGER** and directed by the **CQA MONITOR**.

### 6.3. Construction Monitoring

The **CQA MONITOR** will monitor and test all earthwork quality assurance components of the construction to verify that the construction is in accordance with the SPECIFICATIONS. The **CQA MONITOR** shall identify inadequate construction methodologies or materials that may adversely impact the performance of the facility being constructed and existing structures. The **CQA MONITOR** will record visual observations throughout the construction process to ensure that the materials are placed to the minimum dimensions as shown on the DRAWINGS. Quality control testing will be performed by the **CONTRACTOR**.

#### 6.3.1. Foundation Preparation

The **CQA MONITOR** shall observe and document the foundation preparation including:

- stripping and excavation activities to ensure that **CONTRACTOR** places the material in the appropriate stockpile (Structural Fill, Select Structural Fill, Leak Detection Fill, Low Volume Solution Collection Fill, Bedding Fill, Soil Liner Fill, Drain Cover Fill, Fine Shaft Backfill, Pipe



Bedding Material and Granular Filter Material), if stockpiling is necessary;

- stockpiling activities to verify location of stockpile, material type, and dressing;
- excavations for moisture seeps, unsuitable foundation soil, elevation, and proper drainage;
- subgrade preparation to confirm that the surface of the subgrade is free of soft, organic, and otherwise deleterious materials (such as debris, branches, vegetation, mud, ice, or frozen materials); and that soil and rock surfaces that contain joints or fractures are adequately filled in accordance with the SPECIFICATIONS; and
- construction of access roads, drainage control features and erosion control features to verify compliance with the DRAWINGS and SPECIFICATIONS.

### 6.3.2. Placement Of Materials

#### 6.3.2.1. Overburden Material

During placement of Overburden fill, the **CONTRACTOR** shall:

- verify the use of appropriate fills;
- monitor and document material placement, including soil type, particle size, loose lift thickness, is in compliance with the SPECIFICATIONS;

#### 6.3.2.2. Structural Fill

During placement of Structural Fill, the **CQA MONITOR** shall:

- verify the use of appropriate fills;
- monitor and document material placement, including soil type, particle size, loose lift thickness, moisture conditioning process, compaction equipment and methods used to attain compaction, including number of passes, uniformity of compaction coverage, compacted lift thickness, bonding of lifts and in-place moisture content and dry density is in compliance with the SPECIFICATIONS;
- monitor the fill temperature as identified in Section 02200 of the SPECIFICATIONS.

## 7. PART 7: DOCUMENTATION

Documentation kept by the **CONTRACTOR/CQA MONITOR** shall consist of daily record-keeping, construction problem resolutions, design and SPECIFICATION changes, photographic records of construction, weekly progress reports, chain of custody forms for test sample tracking, and a Construction Certification Report.



### 7.1. Daily Record Keeping

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### 7.2. Soils Observation and Testing Forms

The **CONTRACTOR/CQA MONITOR** will document soils observations on forms that generally include the following information:

- date, project name, location, and weather data, including high and low daily temperatures;
- a site plan showing work areas and test locations;
- descriptions of ongoing construction detailing work areas and equipment utilized by **CONTRACTOR;**
- summary of test results and samples obtained, with locations and elevations (Structural Fill only);
- resolutions of deficient test results;
- test equipment calibrations, if necessary;
- summary of meetings held; and
- signature or initials of the **CONTRACTOR/CQA MONITOR**.

### 7.3. Photo Documentation

The **CONTRACTOR/CQA MONITOR** shall photograph all phases of construction. Photographs shall be identified by location, time, date, and name of the **CQA MONITOR** taking the photograph.

### 7.4. Design and Specification Changes

During construction, the need to address DESIGN and SPECIFICATION changes, modifications, or clarifications may arise. In such cases the **CONTRACTOR/CQA MONITOR** shall notify **MANAGER**, which shall notify the **DESIGN ENGINEER** and the **CERTIFYING ENGINEER**. DESIGN and SPECIFICATION changes shall only be made with written agreement from **MANAGER** and **DESIGN ENGINEER**.



### 7.5. Weekly Progress Reports

The **CONTRACTOR/CQA MONITOR** shall prepare weekly progress reports summarizing all construction and quality assurance activities. This report shall be submitted to **MANAGER** and shall include the following information:

- date, project name, and location;
- summary of construction related activities;
- summary of samples taken and test results;
- summary of deficiencies and/or defects and resolutions; and,
- signature of the **CONTRACTOR/CQA MONITOR**.

### 7.6. Construction Certification Report

At the completion of the Structural Fill placement, the **CQA MONITOR** shall submit to **MANAGER** documentation to be included in a future Construction Certification Report. This report shall certify that the work has been performed in compliance with the DRAWINGS and SPECIFICATIONS and will contain the following information:

- summary of all construction activities;
- photographic documentation;
- test data sheets;
- copies of weekly reports during placement of the Structural Fill;
- CQA test results, including date, test locations and resolutions of deficient test results;
- fill temperature monitoring results;
- staff schedule summary;
- a description of significant construction problems and the resolution of these problems;
- changes to the DRAWINGS or SPECIFICATIONS and the justification for these changes.



## TABLE 1: SOIL CONSTRUCTION TESTING FREQUENCY[1] VOLUME PER TEST

| Test and ASTM Designation | Overburden Fill | Structural Fill (cy) |
|---|---|---|
| Compaction (ASTM D698) | - | 50,000 |
| Particle Size[2] (ASTM C117, C136, D1140, D6913) | 1 per month[3] | 50,000 |
| Atterberg Limit (ASTM D4318) | -- | 50,000 |
| Nuclear Density/Moisture (ASTM D6938) | - | 2,000[4] |

**[1] Tests shall be performed at the specified frequency or one per material type, whichever is greater.**
**[2] Use the USCS for description and identification (ASTM D2488).**
**[3] Particle Size analysis will be completed using Photo Analysis Software**
**[4] Nuclear Density/Moisture testing only when appropriate based upon the in-place materials**

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# SECTION 01400-2 GEOSYNTHETIC CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN

## 1. PART 1: INTRODUCTION

This plan addresses the construction quality assurance (CQA) procedures for the installation of the geosynthetic components used for the construction of the valley leach facility at the Cresson Project, Teller County, Colorado. This program has been developed to assure that the construction of the geosynthetic components are in compliance with the project SPECIFICATIONS and to demonstrate that the regulatory requirements for the construction are achieved.

The objective of this plan is to assure that proper materials, construction techniques, and procedures are followed by the **CONTRACTOR** and that the intent of the design is met. This program also intends to identify problems that may occur during construction and provide the means for resolution of these problems.

This program addresses quality assurance, not quality control. This CQA Plan is independent of the quality control (QC) programs conducted by the **MANUFACTURERS**, **INSTALLERS**, and **CONTRACTORS**. The intent of the CQA Plan is to provide independent third party verification and testing, to demonstrate that the **INSTALLER** and **CONTRACTORS** have met their obligations in the supply and installation of geosynthetic materials according to the design, project SPECIFICATIONS, contractual and regulatory requirements. Quality control is provided by the **MANUFACTURERS**, **INSTALLERS**, and **CONTRACTORS** and refers to those actions taken by them to ensure that their materials and workmanship meet the requirements of the plans and project SPECIFICATIONS.

## 2. PART 2: DESCRIPTION OF PARTIES TO CONSTRUCTION QUALITY ASSURANCE

The following section provides descriptions of the parties to this CQA plan including their responsibilities and qualifications.

### 2.1. CC&V

In this CQA Plan **CC&V** refers specifically to Cripple Creek & Victor Gold Mining Company. **CC&V** owns and operates the valley leach facility.

### 2.2. Manager

In this CQA Plan the **MANAGER** refers specifically to the individual appointed by the Cripple Creek & Victor Gold Mining Company. The **MANAGER** is the official representative of **CC&V** responsible for all construction activities including oversight and direction during construction.

The **MANAGER** is also responsible for coordinating construction and CQA activities for the project.

The **MANAGER** shall serve as communications coordinator for the project initiating preconstruction and resolution meetings. As communications coordinator, the **MANAGER** shall serve as a liaison between all parties involved in the project to ensure that ongoing communications are maintained. The **MANAGER** and **CERTIFYING ENGINEER** shall also be responsible for the resolution of all CQA issues that arise during the installation of the geosynthetics.

Duties for this position include the following:

- review and approval of design DRAWINGS and project SPECIFICATIONS for all geosynthetic components of the valley leach facility;
- preconstruction coordination with the **CQA MONITOR** to ensure that the **CQA MONITOR** has performed similar reviews of the design DRAWINGS and project SPECIFICATIONS to ensure that the CQA Plan can be implemented;
- coordination of all construction activities associated with the various **CONTRACTOR(S)**;
- scheduling and coordinating construction activities with required CQA testing and activities;
- overseeing the construction quality control operations performed by the **CONTRACTOR(S)**;
- approve specific corrective measures to be implemented during construction when deviations from the SPECIFICATIONS occur;
- ensure that required quality control testing has been performed in accordance with the CQA Plan and to the satisfaction of the **CQA MONITOR**; and
- ensure that the CQA personnel are provided with all documentation required in the CQA Plan and project SPECIFICATIONS.

### 2.3. Design Engineer

In this CQA Plan the **DESIGN ENGINEER and Engineer of Record (EOR)** refers specifically to NewFields who has assumed the role of **DESIGN ENGINEER** after a thorough review of design documents to include, but not limited to, the DRAWINGS and SPECIFICATIONS. The **DESIGN ENGINEER** or the **CERTIFYING ENGINEER** identified in section 2.4 below, is responsible for approving all DRAWING and SPECIFICATION changes, modifications, or clarifications encountered during construction.

### 2.4. Certifying Engineer

In this plan, **CERTIFYING ENGINEER** refers specifically to NewFields. **CERTIFYING ENGINEER** is the individual or firm responsible for certifying the construction was performed in compliance

with the DRAWINGS and SPECIFICATIONS. **MANAGER** and **CERTIFYING ENGINEER** will be responsible for the resolution of all quality assurance issues.

### 2.5. Construction Quality Assurance Monitor

The Construction Quality Assurance Monitor, also referred to as the "**CQA MONITOR** ", is the firm or individual responsible for performing the CQA tasks outlined in this plan. The **CQA MONITOR** is the official CQA representative of **CC&V** and has the responsibility of overseeing the CQA aspects of the project. In this CQA Plan the **CQA MONITOR** is associated with the **CERTIFYING ENGINEER** and refers specifically to (To Be Determined). The **CQA MONITOR** has the authority to stop any aspect of the work that is not in compliance with the CQA Plan. Work would then be resumed once corrective action has been approved by the **MANAGER** and **CERTIFYING ENGINEER**. The specific responsibilities of the **CQA MONITOR** include:

- review the design DRAWINGS, project SPECIFICATIONS, and related guidance documents;
- review all **CONTRACTOR** QC submittals and make appropriate recommendations;
- observe geosynthetic material delivery, unloading, and storage;
- obtain and test geosynthetic conformance samples during geosynthetics manufacture;
- observe prepared subgrade prior to geosynthetic deployment;
- monitor and document geosynthetic material placement, trial seam testing, non-destructive testing, seaming and repair operations, and destructive testing;
- identify seam samples for CQA destructive testing;
- assure that testing equipment used, and tests performed are conducted according to project SPECIFICATIONS and industry standards;
- perform or observe, document, and report test results to **MANAGER** as required;
- report any deficiencies to **MANAGER** that are not corrected to the satisfaction of the **CQA MONITOR**, including design or project SPECIFICATION changes; and
- prepare a Construction Certification Report describing the construction, any deviations from SPECIFICATIONS or, DRAWINGS and details, details of all field and laboratory details, subgrade acceptance forms, test data, tests results (both laboratory and field), QC submittals, geomembrane panel layout as-built prepared by the **CQA MONITOR**, professional certification that construction was completed in compliance with the DRAWINGS and SPECIFICATIONS. The report will be signed and sealed by the **CERTIFYING ENGINEER** registered in the State of Colorado.

### 2.6. Geosynthetics Manufacturer

The Geosynthetics Manufacturer, also referred to as the "**MANUFACTURER**", is responsible for production of the geosynthetic components outlined in this plan. Each **MANUFACTURER**

must verify prior to construction that the MANUFACTURER can produce material that meets the requirements outlined in project SPECIFICATIONS.

### 2.7. Geosynthetics Installation Contractor

The Geosynthetics Installation Contractor, also referred to as the "**CONTRACTOR**" or "**INSTALLER**", is responsible for installation of the geosynthetic components, as outlined in the project SPECIFICATIONS.

The **INSTALLER** must meet the requirements outlined in the project SPECIFICATIONS.

The **INSTALLER** will be responsible for storage, handling, deploying, temporary geomembrane anchoring, seaming, repairs and non-destructive testing, in accordance with the project plans, SPECIFICATIONS and the Installer's internal quality control program. It is the **INSTALLER**'s responsibility to see that all submittals are received as outlined in the project SPECIFICATIONS.

### 2.8. Earthworks Contractor

The Earthworks Contractor, also referred to as "**CONTRACTOR**" is responsible for proper delivery and placement of earthwork components as outlined in the project SPECIFICATIONS.

## 3. PART 3: LINES OF COMMUNICATION

The **CQA MONITOR** shall be capable of direct communication with the **MANAGER**, **DESIGN ENGINEER**, **CERTIFYING ENGINEER** and **CONTRACTOR** at all times. Deficiencies that can be easily remedied, such as unsatisfactory test results, will be dealt with directly between the **CQA MONITOR**, **INSTALLER**, and/or **CONTRACTORS**.

If there is a disagreement among the **DESIGN ENGINEER**, **CERTIFYING ENGINEER** and/or **MANAGER** that cannot be resolved among themselves, **MANAGER** shall present the matter to **CC&V** with **MANAGER** related recommendations and **CC&V** shall decide the matter with such decision being final.

## 4. PART 4: DEFICIENCIES

When deficiencies (items that do not meet project requirements) are discovered, the **CQA MONITOR** shall immediately determine the nature and extent of the problem and notify the **INSTALLER** or **CONTRACTOR**. If unsatisfactory test results identify a deficiency, additional tests will be performed to define the extent of the deficient area.

The **INSTALLER** or **CONTRACTOR** shall correct the deficiency to the satisfaction of the **CQA MONITOR**. If the **CONTRACTOR** is unable to correct the problem, the **CQA MONITOR** will

notify the **MANAGER** and **CERTIFYING ENGINEER** who will assist in problem resolution. If the solution involves a design revision, the **DESIGN ENGINEER** shall also be contacted.

The corrected deficiency shall be retested and/or approved by the **MANAGER** and **CERTIFYING ENGINEER** before any additional related work is performed by the **INSTALLER** or **CONTRACTOR**. All retests and related documentation shall be recorded by the **CQA MONITOR** and included in the final Construction Certification Report.

## 5. PART 5: MEETINGS

This section identifies and describes the meetings to be held during the course of the construction. Meetings shall be held in order to clearly define construction activities and goals in order to facilitate construction.

### 5.1. Preconstruction Meeting

The **MANAGER** will hold a preconstruction meeting at the site prior to the start of construction. The **DESIGN ENGINEER**, **MANAGER**, **CERTIFYING ENGINEER**, **CQA MONITOR**, **INSTALLER**, **CONTRACTOR**, and others designated by the **MANAGER** shall attend this meeting. The purpose of this meeting will be to:

- review the construction DRAWINGS, CQA Plan, and project SPECIFICATIONS;
- define the responsibilities of each party;
- define lines of communication and authority;
- review method of documentation, testing procedures, and reporting inspection data;
- establish testing protocols and procedures for correcting and documenting construction deficiencies;
- discuss any changes that may be needed to ensure that construction will be completed in compliance with the design; and
- This meeting will be documented by the **MANAGER** or his designee and copies distributed to all parties.

### 5.2. Progress Meetings

The **MANAGER** will hold a daily progress meeting, either before the start of work or at the completion of work. At a minimum, this meeting will be attended by the **CQA MONITOR**, **INSTALLER** and **CONTRACTOR**. The purpose of this meeting will be to:

- review all the previous day's accomplishments and activities;
- review scheduled work location and activities for the day; and,



- discuss any problems or potential construction problems.
- This meeting will be documented by the **CQA MONITOR**.

### 5.3. Deficiency Meetings

Special meetings will be held, as needed, to discuss potential problems or deficiencies. At a minimum, these meetings will be attended by the **CQA MONITOR** and **INSTALLER** or **CONTRACTOR**. If the problem relates to a design issue, the **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER** should also be present. The meeting will be documented by the **CQA MONITOR**.

## 6. PART 6: GEOSYNTHETICS CONSTRUCTION QUALITY ASSURANCE

Construction of the valley leach facility or specified geosynthetics must be in compliance with the design plans and SPECIFICATIONS. **CC&V** shall implement a CQA monitoring and testing program to ensure construction compliance by the **CONTRACTOR**. The quality assurance program shall consist of reviewing **CONTRACTOR** quality control submittals, material conformance testing, and construction monitoring and testing.

The types of geosynthetics used in the valley leach facility construction include polyethylene pipe, geomembrane and geotextile. These geosynthetics are defined in the project SPECIFICATIONS. Prior to and during construction, these geosynthetics shall be sampled and tested to determine if they meet project SPECIFICATIONS. All tests shall be performed in a geosynthetics laboratory approved by the **MANAGER** and **CERTIFYING ENGINEER**.

### 6.1. Review Quality Control Submittals

Prior to geosynthetic installation, the **CQA MONITOR** shall review the **INSTALLER'S** quality control submittals to evaluate or confirm that these materials meet project requirements. The **CQA MONITOR** shall review the QC submittals that are outlined in Section 02776 (Geomembrane) and Section 02777 (Geotextile) of the SPECIFICATIONS.

### 6.2. Geomembrane Conformance Testing

Prior to geosynthetic installation, the **CQA MONITOR** shall obtain samples of the geomembrane for conformance testing to confirm that these materials meet project requirements. The conformance testing frequency shall be at a rate of 1 test per 150,000 square feet. Samples shall be taken across the entire width of the roll and shall not include the first 3 feet. The samples shall be 3 feet wide by the roll width. The **CQA MONITOR** shall mark the machine direction, roll number on the sample, and date the sample was obtained and



forward the sample to a third party geosynthetic laboratory. As a minimum, the following conformance tests shall be conducted; with project requirements outlined in Section 02776, Section 2.1:

- Geomembrane: density (ASTM D1505/ASTM D792)
  carbon black content (ASTM D4218)
  thickness (ASTM D5199/ASTM D5994)
  tensile strength (ASTM D6693)

All conformance tests shall be performed in compliance with the project SPECIFICATIONS. The **CQA MONITOR** shall review the test results and shall report any nonconformance to the **MANAGER**, **CERTIFYING ENGINEER** and the Geosynthetics Installation **CONTRACTOR**.

### 6.3. Construction Monitoring and Testing

The **CQA MONITOR** shall monitor and test all geosynthetic components of the construction to verify that the construction is in compliance with the project SPECIFICATIONS. The **CQA MONITOR** shall identify inadequate construction methodologies or materials which may adversely impact the performance of the facility being constructed and existing structures. Visual observations throughout the construction process shall be made to ensure that the materials are placed to the lines and grades as shown on the DRAWINGS.

The **CQA MONITOR** shall review the following submittals by **INSTALLER** during the project:

- verification that a qualified land surveyor has verified all lines and grades; and
- subgrade surface acceptance certificates for each area to be covered by the lining system, signed by the **INSTALLER**.

The **CQA MONITOR** shall:

- Inspect all geosynthetic materials delivered to site. The **CQA MONITOR** shall document any damage and notify **MANAGER**;
- obtain geosynthetic packaging identification slips for verification and generation of an on-site materials inventory;
- observe subgrade conditions prior to geosynthetics installation and verify that any deficiencies, as defined in Section 02200 of the SPECIFICATIONS, are corrected;
- observe permanent anchoring of geosynthetics to verify that design and project SPECIFICATIONS are met; observe that required overlap distances are met;
- monitor and record ambient air temperatures;
- verify that no continuous horizontal seams are placed on slopes unless approved by
- **CERTIFYING ENGINEER**; and



- observe and document that all soil materials placed on top of the geosynthetics are done in such a manner as to ensure that the geosynthetics are not damaged.

### 6.3.1. Geomembrane

During geomembrane installation, the **CQA MONITOR** shall observe and document deployment, trial seams, field seaming, non-destructive and destructive seam testing, and repairs to assure that the installation is in compliance with the SPECIFICATIONS.

Deployment - The **CQA MONITOR** shall verify that only approved materials are used, each panel is given a unique panel number, no geomembrane is placed during unsuitable weather conditions as outlined in SPECIFICATION Section 02776, Section 1.5, the geomembrane is not damaged during installation, and anchoring is performed in compliance with the SPECIFICATIONS and design DRAWINGS. The **CQA MONITOR** shall record the deployment on the deployment log form.

Trial Seams - The **CQA MONITOR** shall verify that seaming conditions are performed in compliance with SPECIFICATIONS, tests are performed at required intervals, specified test procedures are followed, and retests are performed in compliance with the SPECIFICATIONS. If the ambient air temperature measured by the **CQA MONITOR** is above 35°F for the entire day, the **INSTALLER** shall perform trial seams at the beginning of each crew shift, and immediately following any work stoppage (i.e., for lunch, weather conditions, etc.) of for more than 30 minutes or at the discretion of the **CERTIFYING ENGINEER**, for each seaming apparatus used that day. If the ambient air temperature measured by the **CQA MONITOR** is below 35°F for the entire day, the **INSTALLER** shall perform four (4) trial seams, at approximately the same time interval throughout the scheduled work day. Each Seamer shall make at least one trial seam each day. Seaming operation shall not commence until the **CQA MONITOR** has determined that the seaming process is meeting the SPECIFICATION requirement and is acceptable. The **CQA MONITOR** shall record the trial weld results on the trial seam log form.

Field Seaming - The **CQA MONITOR** shall verify that only approved equipment and personnel perform welding, all welding is performed under suitable conditions as specified in the project SPECIFICATIONS, specified overlaps are achieved, seams are oriented in compliance to project requirements, and that grinding techniques and extrudate meet project requirements for extrusion welding. The **CQA MONITOR** shall record all field seaming on field seaming log forms.

Non-Destructive Seam Continuity Testing - The **CQA MONITOR** shall verify that all seams and repair are non-destructively tested in compliance with the project SPECIFICATIONS. If a seam cannot be tested, the seam shall be capped. The **CQA MONITOR** shall observe capping operations. The **CQA MONITOR** shall verify that test equipment and gauges are functioning

properly and that test procedures are in compliance with the project SPECIFICATIONS. The **CQA MONITOR** shall verify that all seams and repairs with failing test results are repaired and/or re-tested until passing results are achieved. The **CQA MONITOR** shall record all non-destructive test locations on the vacuum test and pressure test log forms.

Destructive Seam Testing - The **INSTALLER** shall obtain samples, at locations selected by the **CQA MONITOR**, of the field seamed geomembrane approximately 24 inches along and 12 inches across the seam and centered over the seam as follows:

- a minimum of one sample per day;
- a minimum of one sample for each geomembrane seamer;
- a minimum of one sample every 500 feet of seaming; and
- seams that appear suspect to the **CQA MONITOR**.

The **CQA MONITOR** shall witness the testing of destructive seam samples by the **INSTALLER**. The **INSTALLER** shall mark all samples with their roll and seam number, date, machine number, welding technician identification, extruder and nozzle/wedge temperature, and ambient air temperature.

The **INSTALLER** shall test all destructive samples in compliance with the project SPECIFICATIONS.

The **INSTALLER** shall be responsible for patching all areas cut for test samples in accordance with the SPECIFICATIONS and **MANUFACTURER's** requirements and performing non-destructive testing (i.e., vacuum box) of the seams. The **CQA MONITOR** shall record test locations on the geomembrane defect log forms. Additional testing information will be recorded on the geomembrane seam destructive sample log form. The **CQA MONITOR** shall track failing tests as described in the SPECIFICATIONS.

Repairs - The **CQA MONITOR** shall observe and document that all repair materials, techniques, and procedures used for repairs are approved in advance and meet the requirements of the project SPECIFICATIONS. The **CQA MONITOR** shall verify that all defects and repairs are marked, recorded, repaired, tested, and wrinkles are addressed, prior to being covered by other materials; and that repairs are performed as specified, including proper patch size or dimension. The **CQA MONITOR** shall record defects and repairs on the defect and repair log forms.

### 6.3.2. Geotextile

During geotextile installation, the **CQA MONITOR** shall observe and document deployment, field seaming, and repairs to assure that the installation is in compliance with the SPECIFICATIONS.

Deployment - The **CQA MONITOR** shall verify that the subgrade is free of deleterious materials prior to deployment, anchoring is achieved as specified, specified methods are used to minimize wrinkles and protect underlying layers during cutting of materials, and deployment procedures are performed in compliance with the project SPECIFICATIONS.

Seams - The **CQA MONITOR** shall verify sufficient overlap and that the specified seam procedures were followed in compliance with the project SPECIFICATIONS.

Repairs - The **CQA MONITOR** shall verify that all repairs are performed in compliance with SPECIFICATIONS.

Protection – The **CQA MONITOR** shall observe and document that all soil materials placed on top of the geosynthetics are done in such a manner as to ensure that the geosynthetics and underlying materials are not damaged.

## 6.4. Polyethylene Pipe and Fittings

During polyethylene pipe installation, the **CQA MONITOR** shall observe and document that the installation is in compliance with the project SPECIFICATIONS. CQA monitoring of the polyethylene pipe and fittings will include the following:

Placement - Observation that the handling procedures used do not damage the pipe, backfill is placed in compliance with the requirements of the project SPECIFICATIONS so as not to damage the pipe, any foreign material is removed from the interior of the pipe and indentations on the pipe are within the MANUFACTURER's allowable limits.

Joints and Connections - Monitoring of the jointing and connection operations to verify that the **CONTRACTOR** follows the SPECIFICATIONS and the pipe **MANUFACTURER's** recommendations, verification that the pipes are clean when installed, that perforated sections of pipe are aligned properly prior to connection, pipe boot connections are made in the field using the specified rings and clamps, and plastic ties are used to connect the secondary perforated pipes to primary perforated pipes.

Nondestructive Testing - Observe any required testing of the pipe to verify compliance with the project SPECIFICATIONS.



## 7. PART 7: DOCUMENTATION

Documentation kept by the **CQA MONITOR** shall consist of daily record-keeping, documentation of construction problem resolutions, documentation of design and SPECIFICATION changes, photographic records, weekly progress reports, chain of custody forms for test sample tracking, and a Construction Certification Report.

### 7.1. Daily Record Keeping

The **CQA MONITOR** shall keep daily records consisting of field notes, observation and testing data sheets, summary of the daily meeting with the **INSTALLER** or **CONTRACTOR**, and reporting of construction problems and resolutions. This information shall be submitted on a regular basis to the **MANAGER** for review.

### 7.2. Geosynthetic Observation and Testing Forms

The **CQA MONITOR** shall document geosynthetic observations and test results on forms which include the following information:

- date, project name, location, and weather data;
- identification of panel or seam numbers;
- description of ongoing construction, detailing deployment areas;
- numbering system identifying test or sample number;
- location and identification of repairs and date of repair;
- length and/or thickness measurements for geomembrane panels or seams;
- welding machine temperatures and settings;
- welding machine and technician identifications;
- location of tests and test results;
- identification of testing technicians and time of tests; and
- signature or initials of the **CQA MONITOR**.

### 7.3. Photo Documentation

The **CQA MONITOR** shall photograph all phases of construction.

### 7.4. Design and Specification Changes

During construction, the need to address design and SPECIFICATION changes, modifications, or clarifications may arise. In such cases the **CQA MONITOR** shall notify the **MANAGER**, which will notify the **DESIGN ENGINEER** and **CERTIFYING ENGINEER**. Design and SPECIFICATION

changes shall only be made with written agreement from the **MANAGER** and **DESIGN ENGINEER**.

### 7.5. Weekly Progress Reports

The **CQA MONITOR** shall prepare weekly progress reports summarizing all construction and CQA activities. This report shall be submitted to the **MANAGER** and shall include the following information:

- date, project name, and location;
- summary of construction related activities;
- summary of geomembrane deployed (per day);
- summary of samples taken and test results;
- summary of geomembrane areas completed, and approved for Drain Cover Fill placement;
- summary of deficiencies and/or defects and resolutions; and
- signature of the **CQA MONITOR**.

### 7.6. Construction Certification Report

At the completion of the project, the **CQA MONITOR** shall submit to the **MANAGER** a Construction Certification Report. This report shall certify that the work has been performed in compliance with the design DRAWINGS and project SPECIFICATIONS and will contain the following information:

- summary of all construction activities;
- observation and test data sheets;
- photographic documentation;
- CQA staff scheduling;
- copies of weekly reports;
- **CONTRACTOR'S** subgrade acceptance forms;
- temperature monitoring results;
- geosynthetic quality control documents;
- geosynthetic quality assurance documents;
- geomembrane installation observations, such as for deployment, trial seams, defect repair, destruct testing and non-destructive testing;
- sampling, testing locations, and test results;
- changes to the design DRAWINGS or project SPECIFICATIONS and the justification for these changes;

- record DRAWINGS; and
- a certification statement that construction was completed in compliance with the DRAWINGS and SPECIFICATIONS, signed, and sealed by the **CERTIFYING ENGINEER** registered in the State of Colorado.

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# SECTION 02200 EARTHWORKS

## 1. PART 1: GENERAL

### 1.1. Summary

This specification describes site preparation, excavation, stockpiling of soils for earthwork if necessary, and placement of Structural Fill, Select Structural Fill, Coarse Shaft Backfill, Low Volume Solution Collection Fill, Bedding Fill, Leak Detection Fill, Soil Liner Fill, Select Drain Cover Fill, Fine Shaft Backfill, Pipe Bedding Material, and Granular Filter Material for the valley leach facility.

### 1.2. Related Sections

Refer to the following Sections for related work:

- Section 01050 - Staking and Construction Certification Documentation
- Section 02776-0 - Geomembrane
- Section 02777 - Geotextile

### 1.3. Tolerances

A. Limits of excavation, Structural Fill, Select Structural Fill, Coarse Shaft Backfill, Low Volume Solution Collection Fill, Bedding Fill, Leak Detection Fill, Soil Liner Fill, Drain Cover Fill, Select Drain Cover Fill, Fine Shaft Backfill, Pipe Bedding Material, and Granular Filter Material for the valley leach facility are defined by the lines and elevations shown on the DRAWINGS. All fills shall be placed to the minimum thicknesses shown on the DRAWINGS.

B. Finished grades shown on the DRAWINGS are given in feet and shall slope uniformly between given spot and contour elevations, without sag or humps. All grades shall provide for natural runoff.

C. The Soil Liner Fill and Bedding Fill shall have a minimum thickness of 1.0 foot.

D. The Low Volume Solution Collection Fill will have a minimum thickness of 3.0 feet at all times while the Drain Cover fill and Select Drain Cover Fill will have a minimum thickness of 2.0 feet at all times.

E. Clearance of pipes with respect to regulated boundaries will be checked by **MANAGER**. If clearances are inadequate, **CONTRACTOR** shall backfill trenches to compaction SPECIFICATIONS and relocate trenches at **CONTRACTOR**'s expense.

F. Correction of over-excavation and backfilling shall be to **CONTRACTOR**'s account.

### 1.4. Quality Assurance

A. All work shall be monitored and tested in compliance with the requirements of the CQA Plan.

B. **CONTRACTOR** shall be aware of all testing activities outlined in the CQA Plan, and shall account for these activities in the construction schedule.

C. All CQA soils testing (both field and laboratory testing) will be the responsibility of **CERTIFYING ENGINEER**, as identified in the Earthworks CQA plan. **CONTRACTOR** shall be responsible for cooperating with **CQA MONITOR** during all testing activities. **CONTRACTOR** shall provide equipment and labor to assist **CQA MONITOR** in sampling, if requested, and shall also provide access to all areas requiring testing activities. Quality Control testing shall be the responsibility of the **CONTRACTOR**.

D. All excavation, backfill, and grading operations shall be carried out under the observation of **MANAGER** and **CERTIFYING ENGINEER**.

E. Any work found unsatisfactory, or any work disturbed by subsequent operations before acceptance is granted shall be corrected by **CONTRACTOR**, at its sole cost.

## 2. PART 2: PRODUCTS

### 2.1. Materials

A. Fill materials will be soils, gravels, or rock fill approved by **MANAGER** and **CERTIFYING ENGINEER**. The materials shall be free of organic matter, debris, frozen material, and other deleterious materials, and shall be excavated, as required, as follows:

1. Overburden Fill – material as approved by the **MANAGER** and **CERTIFYING ENGINEER** conforming to the following specifications:

| U.S. Standard Sieve Size | Percent Passing by Dry Weight |
|---|---|
| 60-inch | 100 |
| 36-inch | 80 – 100 |
| 3-inch | 40 – 100 |
| Plasticity Index: 30 maximum | |

2. Structural Fill - material as approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following specification:

| U.S. Standard Sieve Size | Percent Passing by Dry Weight |
|---|---|
| 24-inch | 100 |
| 8-inch | 40 – 100 |
| No. 200 | 0 – 25 |
| Plasticity Index: 30 maximum | |

3. Select Structural Fill - well graded granular soil or sound, hard, durable, rockfill excavated on-site or supplied from off-site mine waste rock with a maximum particle size of 3 inches as approved by **MANAGER** and **CERTIFYING ENGINEER**.

4. Leak Detection Fill - material approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following specification:

| U.S. Standard Sieve Size | Percent Passing by Dry Weight |
|---|---|
| 1-inch | 100 |
| ⅜-inch | 40 – 70 |
| No. 4 | 5 – 50 |
| No. 40 | 0 – 20 |
| No. 200 | 0 – 10 |
| Plasticity Index: NP | |

5. Low Volume Solution Collection Fill - material approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following specification:

| U.S. Standard Sieve Size | Percent Passing by Dry Weight |
|---|---|
| 1-inch | 100 |
| ⅜-inch | 40 – 70 |
| No. 4 | 5 – 55 |
| No. 200 | 0 – 10 |
| Plasticity Index: NP | |

6. Soil Liner Fill - processed materials as approved by **MANAGER** and **CERTIFYING ENGINEER**, conforming to the following specification:

| U.S. Standard Sieve Size | Percent Passing by Dry Weight |
|---|---|
| 2-inch | 100 |
| No. 200 | 15 – 65 |
| Point load tensile strength: | > 300 psi |
| Plasticity Index: 10<br>Minimum Hydraulic Conductivity 1×10-6 cm/s maximum | |

7. Drain Cover Fill - material approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following specification:

| U.S. Standard Sieve Size | Percent Passing by Dry Weight |
|---|---|
| 1½-inch | 100 |
| ¾-inch | 70 – 100 |
| No. 4 | 5 – 55 |
| No. 200 | 0 – 10 |
| Plasticity Index: NP | |

Upon approval by the **CERTYIFYING ENGINEER**, spent ore (within the above SPECIFICATIONS) from Phase IV of VLF1 may be used as Drain Cover Fill.

or

The **MANAGER** substitute crushed ore as Drain Cover Fill. The crushed ore material shall conform to the following SPECIFICATIONS:

| U.S. Standard Sieve Size | Percent Passing by Dry Weight |
|---|---|
| 3-inch | 100 |
| 2-inch | 97 - 100 |
| ¾-inch | 40 – 100 |
| No. 4 | 5 – 35 |
| No. 200 | 0 – 8 |
| Plasticity Index: Non Plastic | |

8. Select Drain Cover Fill - material approved by MANAGER and CERTIFYING ENGINEER conforming to the following specification:

| U.S. Standard Sieve Size | Percent Passing by Dry Weight |
|---|---|
| 1½-inch | 100 |
| ¾-inch | 70 – 100 |
| No. 4 | 5 – 55 |
| No. 200 | 0 – 10 |
| Plasticity Index: NP | |

**Acceptance of non-conforming materials:** In cases where non-conformance to these material specifications occur the Design Engineer in tandem with the Manager can approve the material for use, if in their opinion, the specification deviation does not diminish functionality of a given design element and/or compromise the design intent. If non-conforming materials are accepted by the Design Engineer and Manager for use during construction, the DRMS will be contacted, within a week of discovery, to alert them to the acceptance and rationale behind acceptance of non-conforming materials.

## 3. PART 3: EXECUTION

### 3.1. Clearing and Grubbing

A. Clearing and grubbing shall be done within the footprint of the limits of the construction area, as delineated on the DRAWINGS. Clearing shall extend a maximum of 15 feet and a minimum of 10 feet outside of the construction limits or as directed by **MANAGER**. Areas for clearing shall be released to **CONTRACTOR** by **MANAGER**. No pioneering of roads across undisturbed areas shall be allowed without prior approval of **MANAGER**

B. No clearing shall be performed until written permission is given by **MANAGER** and until the **CONTRACTOR** has provided construction staking for the proposed work. Clearing shall consist of cutting brush to the ground level, removing such material, along with wood, rubbish, tree stumps, and any other vegetation with roots in excess of 1-inch diameter, and other deleterious materials, and disposing of all such material in the accepted manner described below.

C. In areas designated to be stripped of unsuitable or objectionable material, said materials shall be stripped to the full depth of organic or other unsuitable material as determined by **MANAGER** and **CERTIFYING ENGINEER**, whichever is greater.

D. Stripped and grubbed vegetation shall be removed and disposed in stockpiles or other approved methods in an area designated by **MANAGER**.

### 3.2. Topsoil Removal

Topsoil is defined as an acceptable growth medium as approved by **MANAGER** and **CERTIFYING ENGINEER** that has no chemical or physical characteristics, which will exclude its use as such.

A. Stripping of the topsoil shall be done within the entire area of the stripping limits.

B. **CONTRACTOR** shall excavate and remove topsoil in a manner that will minimize contamination with other soil horizons and will take such measures as are necessary to ensure that the removal of topsoil does not result in erosion or excessive sedimentation.

C. **CONTRACTOR** shall stockpile topsoil at locations designated by **MANAGER**. Stored topsoil shall not be disturbed by mining, leaching operations, or construction activities, and shall be protected from wind and water erosion, compaction, and contamination.

D. **CONTRACTOR** shall grade topsoil stockpiles to prevent erosion and ponding of precipitation in the stockpile areas. The maximum topsoil stockpile height will be approved by **MANAGER**. The **CONTRACTOR** shall protect stockpiled topsoil by an effective cover of non-noxious, quick- growing, annual, and perennial plants, approved by **MANAGER**, which shall be seeded or planted during the first appropriate growing season after removal.

### 3.3. Waste Removal

Waste material is defined as material too wet, too dry, frozen or containing ice or snow, containing organic or other deleterious matter, having poor characteristics of grading or compaction, having other characteristics that may result in undesirable settlement or other movement of the fill, or within the fill, or otherwise not meeting the requirements of the SPECIFICATIONS, provided that this definition permits drying, water, and any other processing or reprocessing to make the material stable and suitable prior to incorporating it into the fill as permitted in the SPECIFICATIONS or by the **MANAGER** and **CERTIFYING ENGINEER**.

A. **CONTRACTOR** shall excavate and remove waste in a manner that will minimize contamination with other soil horizons.

B. **CONTRACTOR** shall stockpile removed waste at locations designated by **MANAGER**

### 3.4. Excavation

A. **CONTRACTOR** shall perform excavation to the lines and grades shown on the DRAWINGS or as directed by **MANAGER**. No excavation shall begin until the **CONTRACTOR** has provided construction staking for the proposed work.

B. **CONTRACTOR** shall prevent the disturbance of surrounding areas during excavation. Where selective excavations are required to obtain materials for Structural Fill and Select Structural Fill, the material removed from the excavations shall be taken directly to the

fill areas or, if required, stockpiled by material types. The stockpiles shall be approved by **MANAGER**.

C. **CONTRACTOR** shall grade all excavations to ensure grades are maintained to provide adequate drainage at all times. Work shall be suspended by **CONTRACTOR** when, in the opinion of **MANAGER** and **CERTIFYING ENGINEER**, the site is overly wet, muddy, or otherwise unsuitable for proper maintenance, until directed otherwise by **MANAGER**, at no cost to **CC&V**.

D. In excavations where Structural Fill or Select Structural Fill is to be placed on slopes steeper than 3H:1V, horizontal benches shall be excavated into the slope to allow fill to be placed in horizontal lifts. The **CONTRACTOR** shall continuously bench and key embankment material into the existing material a minimum of 2 feet.

E. The **CONTRACTOR** will be responsible for the safety of temporary construction slopes. **CONTRACTOR** shall inspect all temporary and permanent open-cut excavations on a regular basis for signs of instability. Should signs of instability be noted, **CONTRACTOR** shall immediately undertake remedial measures and shall notify **MANAGER** immediately. Permanent cut slopes shall be left in smooth, safe, and stable condition at the end of the workday.

F. **CONTRACTOR** shall final grade excavations within the valley leach facility to establish positive drainage to the Pregnant Solution Storage Area. In no case will depressions or bowls be permitted in the valley leach facility area.

G. **CONTRACTOR** shall conduct all excavation and shoring operations in compliance with applicable MSHA, Colorado State and Federal government laws and regulations.

## 3.5. Subgrade

A. The **MANAGER** and **CERTIFYING ENGINEER** will inspect and approve the exposed subgrade prior to any fill or Soil Liner being placed. **CQA MONITOR** will confirm that the surface of the subgrade is smooth and free of debris, grade stakes, angular rocks, roots, branches, vegetation, mud, ice, or frozen material. If the subgrade is determined to be frozen, using the criteria identified in Section 3.6 below, the **CONTRACTOR** may either remove and replace the frozen subgrade or wait until subsequent temperature monitoring indicates the fill is unfrozen, at no cost to **CC&V**. The subgrade shall have no sudden sharp or abrupt changes in grade.

B. **CONTRACTOR** is responsible for maintaining subgrades in a condition satisfactory to **CERTIFYING ENGINEER**. **CONTRACTOR** shall protect prepared subgrades, including previously approved subgrade, from weather, construction equipment, or other factors as outlined in Section 3.6.A.10 below. Subgrade surfaces, including previously approved subgrade, that become softened or otherwise unsuitable for placement of fill, shall be repaired to **CERTIFYING ENGINEER's** and **MANAGER's** satisfaction, at no cost to **CC&V**.

C. Prior to placement of fill materials, **CONTRACTOR** shall scarify all in-situ materials to a depth of 6-inches, moisture condition, and recompact the subgrade. Compactive effort shall be adequate to obtain a minimum of 95 percent of maximum dry density as determined by the standard Proctor test (ASTM D698) for the particular fill material. Moisture conditioning shall be adequate to achieve a uniform moisture and density. In rock areas, the **CONTRACTOR** shall prepare the subgrade by removing loose rock fragments until competent foundation material is encountered as approved by **CERTIFYING ENGINEER**.

D. If the underlying material is unsuitable to permit proper compaction of the subgrade, **CONTRACTOR** shall loosen, aerate (or excavate and remove), and recompact the subgrade until the top layer can be compacted as required. The recompacted surface shall then be scarified, as needed, to provide a good bond between the foundation and fill materials.

## 3.6. Fill Placement

A. The following general guidelines shall be followed except as noted elsewhere in this Section.

**1.** No fill materials shall be placed until the foundation and subgrade preparations have been completed as specified herein, in Section 3.5 of this SPECIFICATION. The procedures for fill placement shall be approved by **MANAGER** and **CERTIFYING ENGINEER** prior to start of fill placement.

**2.** No brush, roots, sod, frozen material, or other deleterious or unsuitable materials shall be incorporated in the fills. The suitability of all materials intended for use in the fill shall be subject to approval by **MANAGER** and **CERTIFYING ENGINEER**. Fill placement shall be temporarily stopped by **CONTRACTOR** due to weather conditions, if materials and installation do not meet the SPECIFICATIONS, at no cost to **CC&V**. Fill shall not be placed upon frozen material, such as snow or ice.

**3.** If the surface of the prepared foundation or the surface of any layer of the fill is too dry or too smooth to bond properly with the layer of material to be placed thereon, it shall be moisture-conditioned and/or worked with harrow, scarifier teeth, disc, or other suitable equipment to provide a satisfactory bonding surface before fill material is placed thereon. If the surface of the prepared foundation or the rolled surface of any layer is excessively wet for fill materials to be placed thereon, it shall be removed and allowed to dry or worked with a harrow, scarifier teeth, disc, or other suitable equipment to reduce the moisture content to an acceptable level or meet project SPECIFICATIONS as determined by **MANAGER** and **CERTIFYING ENGINEER**. It shall then be compacted before the next layer of fill material is placed. Determination of such dry or wet conditions shall be made by **CERTIFYING ENGINEER**.

4. The distribution of materials shall be such that the fill is free from voids, lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material. The material of a fill shall be as described in Section 2.1 of this specification.
5. Unless otherwise approved by **MANAGER** and **CERTIFYING ENGINEER**, the entire fill surface shall be at or near the same elevation at all times during construction. At all times during construction, the surface of the fill shall be graded and maintained by the **CONTRACTOR** to prevent ponding of water and to allow for storm water drainage.
6. Except as otherwise specified or approved by **MANAGER** and **CERTIFYING ENGINEER**, the **CONTRACTOR** shall dump and spread fill in such a manner so that no excessive gaps are left between successively dumped loads of materials. The fill shall be leveled prior to compaction by means of a dozer or grader, or other suitable approved equipment, to obtain a surface free from depressions.
7. Except in areas approved by **MANAGER** and **CERTIFYING ENGINEER** where space is limited or otherwise specified, **CONTRACTOR** shall place fill by routing the hauling and spreading units approximately parallel to the axis of the fill. As far as practical, hauling units shall be so routed that they do not follow in the same paths, but split their tracks evenly across the surface of the fill to enhance compaction.
8. **CONTRACTOR** shall apply water required for moisture conditioning on the fill or in the borrow areas.

   **CONTRACTOR** shall maintain fill materials within the moisture content range required to permit proper compaction to the specified density with the equipment being used. The moisture content of the fill materials, prior to and during compaction, shall be uniform throughout each layer of the material.

   Prior to mixing of wet and dry material on the fill to obtain the proper moisture content, approval shall be obtained from **CERTIFYING ENGINEER**. Mixed material shall have a uniform distribution of the moisture content prior to placement on the subsequent lift.

   When materials spread on the fill are too dry for proper compaction, **CONTRACTOR** shall spray water on each layer of the fill and shall work the moisture into the fill by harrowing or other approved means, until a uniform distribution of moisture is obtained. Material that is too wet for proper compaction, as determined by **CERTIFYING ENGINEER**, shall be removed from the fill and/or spread out and permitted to dry, assisted by disking, and harrowing or mixing in dry material when permitted by **CERTIFYING ENGINEER**, if necessary, until the moisture content is reduced to an amount suitable for obtaining the specified degree of compaction, at no cost to **CC&V.**



9. After each layer of fill material has been placed, spread, and moisture-conditioned, the layer shall be compacted by passing compaction equipment over the entire surface of the layer a sufficient number of times to obtain the required density, as specified herein. Compaction shall be accomplished with equipment and by methods approved by **CERTIFYING ENGINEER**. If such equipment or methods are found unsatisfactory for the intended use, **CONTRACTOR** shall replace the unsatisfactory equipment with other types or adjust methods until proper compaction is achieved. Prior to placement of a subsequent lift, the previous lift shall be thoroughly scarified to a nominal depth of 2-inches to provide good bonding between lifts. Scarification shall be accomplished by disking, raking with a grader, or an alternative method approved by **CERTIFYING ENGINEER**.
10. The **CQA MONITOR** will measure the ambient air temperature on an hourly basis. If the ambient air temperature is less than thirty-two degrees Fahrenheit for more than one hour over the preceding twenty-four (24) hours, the **CQA MONITOR** will measure the temperature of the fill to determine if the fill is frozen. "Frozen" is defined as a mean temperature of thirty-two degrees Fahrenheit (32°F) or less. The **CQA MONITOR** will measure the temperature at a depth of three (3) inches and six (6) inches, recording the lower of the two. Six (6) measurements will be taken per acre, and if the average is below thirty-two degrees Fahrenheit (32°F), the fill will be considered frozen. If the fill is determined to be frozen the **CONTRACTOR** may either remove and replace the frozen fill or wait until subsequent temperature monitoring indicates the fill is unfrozen at no cost to **CC&V**.
11. Overburden slopes shall be compacted using a method specification and graded to meet the grades and dimensions shown on the DRAWINGS. The Bedding Fill subgrade surface will be prepared as identified in Section 2200 of the SPECIFICATIONS.

B. Overburden Fill

1. Areas to receive Overburden Fill will include, but are not limited to, backfilling existing pits to within 35 feet of the proposed geomembrane surface.
2. Overburden Fill material shall be overburden waste placed with in maximum 25-foot thick lifts, and compacted utilizing loaded haulage equipment.
3. Maximum rock size for overburden fill shall be 5 feet.
4. Prior to commencement of Overburden Fill, the **CONTRACTOR** shall complete task training to ensure that material meeting the specification is borrowed and placed. This training will include visually identifying oversized material and visually verifying that the material being loaded and placed is reasonably graded to avoid placement of gap graded material with excessive voids.

C. Structural Fill

1. Areas to receive Structural Fill will include, but are not limited to, slope reductions, and miscellaneous site grading.
2. **CONTRACTOR** shall condition Structural Fill to a moisture content that allows compaction to the required density and that results in a firm, unyielding surface capable of allowing the movement of vehicles and equipment over the surface without causing rutting or other deleterious effects.
3. **CONTRACTOR** shall place Structural Fill materials with less than 30 percent rock materials above 3/4-inch size in maximum 12-inch loose lifts, and compact to 95 percent of maximum dry density (ASTM D698). The moisture content shall be within +3% to -3% of the optimum moisture content.
4. **CONTRACTOR** shall condition, place and compact Structural Fill containing more than 30 percent rock materials above 3/4-inch size(rock fill) by a method compaction technique. The compaction equipment shall consist of a minimum 10-ton (static drum weight) vibratory smooth-drum compactor. The number of passes and loose lift thickness shall be subject to **CERTIFYING ENGINEER's** approval, at no additional cost to **CC&V**. The method specifications may be changed at any time, at the discretion of **CERTIFYING ENGINEER**, based upon changes in material characteristics, field conditions, and/or compaction equipment.
5. Maximum rock size for rock fill shall be two-thirds of the compacted lift thickness, unless otherwise approved by **MANAGER**, **DESIGN ENGINEER,** and **CERTIFYING ENGINEER**. **CONTRACTOR** shall remove oversize materials from fills at no additional cost to **CC&V**.

D. Select Structural Fill

1. Select Structural Fill shall be placed for miscellaneous site grading as required by the **MANAGER** and **CERTIFYING ENGINEER**.
2. **CONTRACTOR** shall condition Select Structural Fill to a moisture content that allows compaction to the required density and that results in a firm, unyielding surface capable of allowing the movement of vehicles and equipment over the surface without causing rutting or other deleterious effects.
3. **CONTRACTOR** shall place Select Structural Fill materials with less than 30 percent rock materials above 3/4-inch size in maximum 12-inch loose lifts, and compacted to 95 percent of maximum dry density (ASTM D698). The moisture content shall be within +3% to -3% of the optimum moisture content.
4. **CONTRACTOR** shall condition and place Select Structural Fill containing more than 30 percent rock materials above 3/4-inch size (rock fill) in maximum 12-inch loose lifts and compact by a method compaction technique. The compaction equipment shall consist of a minimum ten 10-ton (static drum weight) vibratory smooth-drum

compactor. The number of passes shall be subject to **CERTIFYING ENGINEER's** approval, at no additional cost to **CC&V**. The method SPECIFICATIONS may be changed at any time, at the discretion of **CERTIFYING ENGINEER**, based upon changes in material characteristics, field conditions, and/or compaction equipment.

E. Leak Detection Fill

1. Leak Detection Fill shall be placed in the Leak Detection Trenches as shown on the DRAWINGS.
2. **CONTRACTOR** shall condition Leak Detection Fill to allow a surface that does not cause rutting or other deleterious effects.

F. Low Volume Solution Collection Fill

1. Low Volume Solution Collection Fill shall be placed over the geomembrane in the locations shown on the DRAWINGS.
2. **CONTRACTOR** shall condition Low Volume Solution Collection Fill to allow a surface that does not cause rutting or other deleterious effects.
3. **CONTRACTOR** shall place Low Volume Solution Collection Fill around the Low Volume Solution Collection Vertical Riser Pipes in maximum 12-inch loose lifts and compact using a hand operated vibratory plate compactor to the satisfaction of the **MANAGER** and **CERTIFYING ENGINEER**. Low Volume Solution Collection Fill shall be worked under the Low Volume Solution Collection Rise pipe haunches by hand to provide uniform support of the pipe.
4. Prior to placing the Low Volume Solution Collection Fill, **CONTRACTOR** shall verify by visual inspection that the underlying geosynthetics are free of holes, tears, wrinkles, or foreign objects. **MANAGER** and **CERTIFYING ENGINEER** will inspect the geosynthetic for wrinkles prior to placement of Low Volume Solution Collection Fill. As instructed by **MANAGER**, **CONTRACTOR** shall "work out" wrinkles to the satisfaction of **MANAGER** and **CERTIFYING ENGINEER** prior to placement of the Low Volume Solution Collection Fill. In all cases, wrinkles shall not be of a size that they could fold back on themselves. Wrinkles greater than one foot shall be removed and repaired by the **INSTALLER**.
5. **CONTRACTOR** shall place Low Volume Solution Collection Fill in a single 36-inch loose lift. The tracked equipment shall operate only over previously placed Low Volume Solution Collection Fill. **CONTRACTOR** shall not operate equipment directly on geosynthetics. Only a dozer with a ground pressure not exceeding 14.7 psi can be used to place Low Volume Solution Collection Fill. Equipment used for placement will not be allowed to pivot on one track (i.e., no abrupt or sharp turns). There shall be no downhill placement on slopes steeper than 4H:1V. Material can be placed along contours if buttressed from below.



6. Rubber tired construction equipment shall not be allowed to travel over the geomembrane or on top of Solution Collection piping unless a thickness of at least 45 inches of Low Volume Solution Collection Fill has been placed over the geomembrane and on top of Solution Collection piping. The **CONTRACTOR** will be required to demonstrate to the **MANAGER, DESIGN ENGINEER** and **CERTIFYING ENGINEER** that the equipment and procedures used are not detrimental to the geomembrane and piping, at no cost to **CC&V**. Off road haul truck traffic shall require a minimum of 60 inches for Cat 773 (or equivalent) of Low Volume Solution Collection Fill placed over the geomembrane and solution collection piping, and a minimum of 120 inches for CAT 777 (or equivalent) of Low Volume Solution Collection Fill placed over the geomembrane and solution collection piping.
7. When placing Low Volume Solution Collection Fill the maximum acceptable drop height is 3 feet.
8. **CONTRACTOR** shall operate equipment in a manner that is protective of underlying geosynthetics. If **MANAGER** or **CERTIFYING ENGINEER** suspects the occurrence of any damage to the underlying geosynthetics, **MANAGER** will instruct **CONTRACTOR** to remove Low Volume Solution Collection Fill to expose the geosynthetics. **CONTRACTOR** shall uncover, repair any observed damage of the underlying geosynthetics, in accordance with the repair requirements of Sections 02776 and 02777 of the SPECIFICATIONS, and recover, at no cost to **CC&V**.
9. **CONTRACTOR** shall place Low Volume Solution Collection Fill at a rate such that no single area of 350,000 square feet of geomembrane liner is exposed to ultraviolet light for more than 180 days.
10. **CONTRACTOR** shall provide close continuous monitoring at the point of placement during the placement of the Low Volume Solution Collection Fill over geosynthetics.
11. **CONTRACTOR** shall verify the final thickness of Low Volume Solution Collection Fill to determine compliance with this SPECIFICATION. **CONTRACTOR** shall record verification location, elevation, and thickness. **CQA MONITOR** shall witness all verification measurements. **CONTRACTOR** will submit a method of verifying Low Volume Solution Collection Fill depth to **MANAGER** for approval. Grade markers shall be placed on a 50- by-50-foot grid with additional points required for breaks in grade. **CONTRACTOR** shall remove all grade markers under supervision of **CQA MONITOR** after verification measurements have been approved by **MANAGER** and **CERTIFYING ENGINEER** and will backfill holes with Low Volume Solution Collection Fill. Areas with deficient thickness shall be reworked by **CONTRACTOR**, until acceptable measurements are obtained. If **MANAGER** or **CERTIFYING ENGINEER** suspects the occurrence of any damage to the underlying geosynthetics, **MANAGER** will instruct **CONTRACTOR** to remove Low Volume Solution Collection Fill to expose the geosynthetics. **CONTRACTOR** shall uncover, repair any observed damage of the

underlying geosynthetics, in accordance with the repair requirements of Sections 02776 and 02777 of the SPECIFICATIONS and recover, at no cost to **CC&V**.

12. **CONTRACTOR** will provide adequate illumination as approved by **MANAGER**, if Low Volume Solution Collection Fill placement is carried out at night. A minimum of 2-foot candles measured at the synthetic liner, shall be used when Low Volume Solution Collection Fill placement is carried out at night.

G. Soil Liner Fill

1. Soil Liner Fill shall be placed within the limits of the valley leach facility as shown on the DRAWINGS and shall begin only after completion of all, or **MANAGER** and **CERTIFYING ENGINEER** approved portion of, excavation and Structural Fill placement in the valley leach facility.
2. **CONTRACTOR** shall process, place and compact the Soil Liner Fill to achieve a coefficient of permeability of less than $1x10^{-6}$ cm/sec, measured according to ASTM Method D5084, Method D. Any Soil Liner Fill not meeting the permeability specification shall be removed and replaced with material meeting the permeability specification, at no additional cost to **CC&V**.
3. **CONTRACTOR** shall place and compact the Soil Liner Fill in loose lifts such that the compacted lift thickness is a minimum of 12 inches.
4. **CONTRACTOR** shall compact the Soil Liner Fill to at least 95 percent of the maximum dry density as determined by the Standard Proctor density test (ASTM D698). The moisture content shall be within +3% to -2% of the optimum moisture content. Both moisture and density shall be uniform throughout the lift. If the Soil Liner Fill cannot be conditioned to meet the placement SPECIFICATIONS, the material shall be removed and replaced with new Soil Liner Fill at the **CONTRACTOR's** expense. The **CONTRACTOR** shall reduce the clod size of the soil liner fill to a size that is acceptable to the **CERTIFYING ENGINEER**, the method by which will be approved by **CERTIFYING ENGINEER** and **MANAGER** prior to implementation.
5. The moisture content of the Soil Liner Fill shall be uniform throughout prior to and during compaction of the material. **CONTRACTOR** shall be responsible for meeting moisture content and compaction SPECIFICATIONS. If the Soil Liner Fill cannot be conditioned to meet the placement SPECIFICATIONS, the material shall be removed and replaced with new Soil Liner Fill at no additional cost to **CC&V**. **MANAGER** may require **CONTRACTOR** to moisture condition Soil Liner Fill at stockpile at least 24 hours prior to the Soil Liner Fill being placed.
6. **CONTRACTOR** shall place Soil Liner Fill to form a continuous monolithic material. If a lift of compacted Soil Liner Fill dries out during placement operations, **CONTRACTOR** shall scarify, moisture condition the dry soil and recompact the lift. If a lift of compacted Soil Liner Fill becomes overly wet due to precipitation or over watering,

**CONTRACTOR** shall allow the wet soil to dry to the specified moisture content range before re-compaction of fill and placement of geosynthetic materials.

7. **CONTRACTOR** shall assist **CQA MONITOR** in obtaining soil samples for CQA testing. Soil Liner Fill sampling shall be scheduled by **CQA MONITOR** with **CONTRACTOR** to facilitate CQA field testing.
8. **CONTRACTOR** shall maintain Soil Liner Fill stockpile areas in a free-draining condition. The **CONTRACTOR** will maintain Soil Liner Fill stockpiles and Soil Liner Fill placed within the limits of the valley leach facility to prevent the drying out of the surface.
9. **CONTRACTOR** shall compact corners and other areas inaccessible to driven compaction equipment using hand-operated 500-pound vibratory plate or vibratory smooth-drum compaction equipment approved by **MANAGER** and **CERTIFYING ENGINEER**.
10. **CONTRACTOR** shall trim the surface of the Soil Liner Fill to the design grades shown on the DRAWINGS.
11. **CONTRACTOR** shall roll the surface of the Soil Liner Fill with a smooth drum roller to remove ridges and surface irregularities greater than 0.5 inches in height. **CERTIFYING ENGINEER** shall determine if surface preparation is sufficient to place geomembrane. On areas with slopes steeper than 3H:1V, **CONTRACTOR** shall adopt methods as necessary to obtain the same final surface preparations that would be obtained by the passage of a smooth-drum roller on flat or level ground. Pushing of compaction equipment by tracked equipment shall not be performed. Wheel ruts on the surface of the Soil Liner Fill from grading equipment shall be repaired by **CONTRACTOR** prior to placement of the geomembrane by rolling the surface as approved by **CQA MONITOR**.
12. **CONTRACTOR** will remove angular protruding rocks greater than 3/4 inches in diameter from the compacted Soil Liner Fill surface. Indentations left in the Soil Liner Fill Surface after removal of the rocks shall be filled with Soil Liner Fill or other suitable fill approved by **CQA MONITOR**, and compacted to achieve final grade. Areas of the Soil Liner Fill surface with concentrated gravelly areas will have suitable fill approved by **CQA MONITOR** placed on top and compacted to achieve final grade. A maximum thickness of 0.5 inches of suitable fill will be placed on the Soil Liner Fill.
13. **MANAGER** and **CERTIFYING ENGINEER** will identify any areas of significant desiccation, crusting, or erosion of a lift surface. Soil Liner Fill surfaces found to have desiccation cracks greater than 0.25-inches in width or depth, or which exhibit swelling, heaving or other similar conditions shall be replaced or reworked by **CONTRACTOR** to remove such defects. Desiccation cracks on the Soil Liner Fill surface less than 0.25-inches in width or depth shall be compacted with a smooth drum roller. **CONTRACTOR** shall take whatever steps necessary to prepare Soil Liner Fill

surface to the satisfaction of **MANAGER** and **CERTIFYING ENGINEER**, at no additional cost to **CC&V**.

14. **CONTRACTOR** shall maintain the Soil Liner Fill surface in a condition suitable for geomembrane installation as specified in these SPECIFICATIONS and in the CQA Plan until the surface is covered. **CONTRACTOR** shall repair all weather related damage to Soil Liner Fill surfaces or other portions of the Work that have or have not been covered by geomembrane, at no additional cost to **CC&V.** If any moisture is allowed to collect under the geomembrane prior to or after final seaming and softens the Soil Liner Fill, the geomembrane shall be removed and **CONTRACTOR** shall recondition and recompact the Soil Liner Fill to meet all placement and trimming SPECIFICATIONS, at no additional cost to **CC&V**.
15. **CONTRACTOR** shall remove all hubs and survey stakes in the Soil Liner Fill and backfill all holes with **MANAGER** and **CERTIFYING ENGINEER** approved moisture-conditioned Soil Liner Fill or bentonite. Compact with a Proctor hammer or other suitable device that will achieve a kneading type of compaction and will achieve the required density.
16. **CONTRACTOR** shall verify the final thickness of Soil Liner Fill to determine compliance with this SPECIFICATION. Thickness verification shall be performed at a minimum frequency of two measurements per acre using a soil-coring device, unless directed otherwise by **MANAGER**. **CONTRACTOR** shall record as part of the as-built documentation the location, elevation, and thickness of each Soil Liner Fill verification test. **CQA MONITOR** will witness all verification measurements. **CONTRACTOR** shall backfill all holes with **MANAGER** and **CERTIFYING ENGINEER** approved moisture- conditioned Soil Liner Fill compacted with a Proctor hammer or other suitable device that will achieve a kneading type of compaction and will achieve the required density, or bentonite. Areas with deficiencies shall be reworked by **CONTRACTOR**, until acceptable measurements are obtained at no additional cost to **CC&V**.
17. If tests indicate the Work does not meet the requirements of the SPECIFICATIONS, **MANAGER** and **CERTIFYING ENGINEER** will establish the extent of the nonconforming area. The nonconforming area shall be re-worked by CONTRACTOR until acceptable test results are obtained at no additional cost to **CC&V**
18. Prior to any geosynthetics being placed on Soil Liner Fill, the area will be tested by **CQA MONITOR**. No geosynthetics will be allowed to be placed on frozen material, as defined in Section 3.6.A.10, without the area in question being retested by the **CQA MONITOR**.

H. Drain Cover Fill

1. Drain Cover Fill shall be placed over the geomembrane in the locations shown on the DRAWINGS.

2. Prior to placing the Drain Cover Fill, **CONTRACTOR** shall verify by visual inspection that the underlying geosynthetics are free of holes, tears, wrinkles, or foreign objects. **MANAGER** and **CERTIFYING ENGINEER** will inspect the geosynthetic for wrinkles prior to placement of Drain Cover Fill. As instructed by **MANAGER**, **CONTRACTOR** shall "work out" wrinkles to the satisfaction of **MANAGER** and **CERTIFYING ENGINEER** prior to placement of the Drain Cover Fill. In all cases, wrinkles shall not be of a size that they could fold back on themselves. Wrinkles greater than one foot shall be removed and repaired by the **INSTALLER**.
3. **CONTRACTOR** shall place Drain Cover Fill in a single 24-inch loose lift. The tracked equipment shall operate only over previously placed Drain Cover Fill. **CONTRACTOR** shall not operate equipment directly on geosynthetics. Only a dozer with a ground pressure not exceeding 8.7 psi can be used to place Drain Cover Fill. A CAT 12G motor grader, or equivalent approved by **CERTIFYING ENGINEER,** can be used for Drain Cover Fill final grading. Equipment used for placement will not be allowed to pivot on one track (i.e. no abrupt or sharp turns). There shall be no downhill placement on slopes steeper than 4H:1V. Material can be placed along contours if buttressed from below. Motor graders shall not be allowed to make abrupt turns, brake suddenly, or dig blade in which results in the tires spinning on the Drain Cover Fill surface.
4. Highway compatible Rubber tired construction equipment shall not be allowed to travel over the geomembrane or on top of Solution Collection piping unless a thickness of at least 45 inches of Drain Cover Fill has been placed over the geomembrane and on top of Solution Collection piping. The **CONTRACTOR** will be required to demonstrate to the **MANAGER, DESIGN ENGINEER** and **CERTIFYING ENGINEER** that the equipment and procedures used are not detrimental to the geomembrane and piping, at no cost to **CC&V**. Off road haul truck traffic shall require a minimum of 42 inches for Cat 740 (or equivalent), a minimum of 60 inches for Cat 773 (or equivalent), and a minimum of 120 inches for CAT 777 (or equivalent) of Drain Cover Fill placed over the geomembrane and solution collection piping.
5. When placing Drain Cover Fill the maximum acceptable drop height is 3 feet.
6. **CONTRACTOR** shall operate equipment in a manner that is protective of underlying geosynthetics. If **MANAGER** or **CERTIFYING ENGINEER** suspects the occurrence of any damage to the underlying geosynthetics, **MANAGER** will instruct **CONTRACTOR** to remove Drain Cover Fill to expose the geosynthetics. **CONTRACTOR** shall uncover, repair any observed damage of the underlying geosynthetics, in accordance with the repair requirements of Sections 02776 and 02777 of the SPECIFICATIONS, and recover, at no cost to **CC&V**.
7. **CONTRACTOR** shall place Drain Cover Fill at a rate such that the geomembrane liner is not exposed to ultraviolet light for more than 180 days.
8. **CONTRACTOR** shall provide close continuous monitoring at the point of placement during the placement of the Drain Cover Fill over geosynthetics.



9. **CONTRACTOR** shall verify the final thickness of Drain Cover Fill to determine compliance with this SPECIFICATION. **CONTRACTOR** shall record verification location, elevation, and thickness. **CQA MONITOR** shall witness all verification measurements. **CONTRACTOR** will submit a method of verifying Drain Cover Fill depth to **MANAGER** for approval. Areas with deficient thickness shall be reworked by **CONTRACTOR**, until acceptable measurements are obtained. If **MANAGER** or **CERTIFYING ENGINEER** suspects the occurrence of any damage to the underlying geosynthetics, **MANAGER** will instruct **CONTRACTOR** to remove Drain Cover Fill to expose the geosynthetics. **CONTRACTOR** shall uncover, repair any observed damage of the underlying geosynthetics, in accordance with the repair requirements of Sections 02776 and 02777 of the SPECIFICATIONS and recover, at no cost to **CC&V**.
10. **CONTRACTOR** will provide adequate illumination as approved by **MANAGER**, if Drain Cover Fill placement is carried out at night. A minimum of 2-foot candles measured at the synthetic liner shall be used when Drain Cover Fill placement is carried out at night.

I. Select Drain Cover Fill

1. Select Drain Cover Fill shall be placed around the PSSA Riser Pipes as shown on the drawings.
2. **CONTRACTOR** shall place Select Drain Cover Fill in maximum 24-inch loose lifts around the PSSA Riser Pipes. The fill elevation shall always rise evenly around the pipe.
3. **CONTRACTOR** will not allow mobile heavy equipment to contact the PSSA Riser Pipe during fill placement.
4. **CONTRACTOR** shall place Crushed Ore, or an equivalent material approved by the **CERTIFYING ENGINEER** and **MANAGER** around the limits of the Select Drain Cover Fill placement as the elevation of the Select Drain Cover Fill rises.
5. Select Drain Cover Fill is to remain loose and free draining around the PSSA Riser Pipe Louvered Screen. Any material that is not loose around the screen will be scarified and made loose before the placement of the next lift of material.
6. **CONTRACTOR** shall constantly monitor the plumb of the PSSA Riser Pipes during Select Drain Cover Fill placement. Any corrections required to maintain the plumb of the PSSA Riser Pipes will be done so at no cost to CC&V.

J. Pipe Bedding Material

1. Pipe bedding material shall be placed around the CSP as shown on the drawings.
2. For piping external to the valley leach facility, **CONTRACTOR** shall compact the Pipe Bedding Material requiring compaction to at least 95 percent of the maximum dry



density as determined by the Standard Proctor density test (ASTM D698), and a moisture content 3 percent below and 3 percent over the optimum moisture content.

3. **CONTRACTOR** shall place Pipe Bedding Material in maximum 12-inch loose lifts. Pipe Bedding Material will be worked under pipe haunches by hand to provide uniform support of the CSP.
4. Native material used for backfilling CSP excavation shall be placed in 12-inch to 18-inch loose lifts, and compacted by wheel rolling with light, rubber tired or other light compaction equipment, as approved by **CERTIFYING ENGINEER.**

K. Granular Filter Material

1. Granular Filter Material shall be placed beneath the Riprap as shown on the drawings.

L. Bedding Fill

1. Bedding Fill shall be placed within the limits of the valley leach facility as shown on the DRAWINGS.
2. **CONTRACTOR** shall place and compact the Bedding Fill in loose lifts such that the compacted lift thickness is a minimum of 12 inches. **CONTRACTOR** shall condition the Bedding Fill to allow a surface that does not cause rutting or other deleterious effects. The moisture content and density shall be uniform throughout the lift. If a lift of compacted Bedding Fill dries out during placement operations, **CONTRACTOR** shall scarify, moisture condition the dry soil and recompact the lift. If a lift of compacted Bedding Fill becomes overly wet due to precipitation or over watering, **CONTRACTOR** shall allow the wet soil to dry to the specified moisture content range before re-compaction of fill and placement of geosynthetic materials.
3. **CONTRACTOR** shall assist **CQA MONITOR** in obtaining soil samples for CQA testing. Bedding Fill sampling shall be scheduled by **CQA MONITOR** with **CONTRACTOR** to facilitate CQA field testing.
4. **CONTRACTOR** shall trim the surface of the Bedding Fill to the design grades shown on the DRAWINGS.
5. **CONTRACTOR** shall roll the surface of the Bedding Fill with a smooth drum roller to remove ridges and surface irregularities greater than 0.5 inches in height. **CERTIFYING ENGINEER** shall determine if surface preparation is sufficient to place geomembrane. On areas with slopes steeper than 3H:1V, **CONTRACTOR** shall adopt methods as necessary to obtain the same final surface preparations that would be obtained by the passage of a smooth-drum roller on flat or level ground. Pushing of compaction equipment by tracked equipment shall not be performed. Wheel ruts on the surface of the Bedding Fill from grading equipment shall be repaired by **CONTRACTOR** prior to placement of the geomembrane by rolling the surface as



approved by **CQA MONITOR**. **CONTRACTOR** shall take whatever steps necessary to prepare Soil Liner Fill surface to the satisfaction of **MANAGER** and **CERTIFYING ENGINEER**, at no additional cost to **CC&V**.

6. **CONTRACTOR** shall maintain the Bedding Fill surface in a condition suitable for geomembrane installation as specified in these SPECIFICATIONS and in the CQA Plan until the surface is covered. **CONTRACTOR** shall repair all weather-related damage to Bedding Fill surfaces or other portions of the Work that have or have not been covered by geomembrane, at no additional cost to **CC&V**.

   If any moisture is allowed to collect under the geomembrane prior to or after final seaming and softens the Bedding Fill, the geomembrane shall be removed and **CONTRACTOR** shall recondition and recompact the Soil Liner Fill to meet all placement and trimming SPECIFICATIONS, at no additional cost to **CC&V**.

7. **CONTRACTOR** shall remove all hubs and survey stakes in the Bedding Fill and backfill all holes with **MANAGER** and **CERTIFYING ENGINEER** approved material.

8. **CONTRACTOR** shall verify the final thickness of Bedding Fill to determine compliance with this SPECIFICATION. **CONTRACTOR** shall record as part of the as-built documentation the location, elevation, and thickness of each Bedding Fill verification test. **CQA MONITOR** will witness all verification measurements. Areas with deficiencies shall be reworked by **CONTRACTOR**, until acceptable measurements are obtained at no additional cost to **CC&V**. If tests indicate the Work does not meet the requirements of the SPECIFICATIONS, **MANAGER** and **CERTIFYING ENGINEER** will establish the extent of the nonconforming area. The nonconforming area shall be reworked by **CONTRACTOR** until acceptable test results are obtained at no additional cost to **CC&V**

9. Prior to any geosynthetics being placed on Bedding Fill, the area will be tested by **CQA MONITOR**. No geosynthetics will be allowed to be placed on frozen material, as defined in Section 3.6.A.10, without the area in question being retested by the **CQA MONITOR**

## 3.7. Equipment

**CONTRACTOR** may use any type of earthmoving or excavating equipment unless otherwise noted in the SPECIFICATIONS, provided the equipment is in a satisfactory condition, complies with applicable rules and regulations, is of such capacity that the construction schedule can be maintained as planned by **CONTRACTOR**, and is approved by **MANAGER.**

| NewFields | CLIENT<br>Newmont<br>Cripple Creek & Victor Gold Mine | PROJECT NO<br>475.0106.049 |
|---|---|---|
| **PROJECT: VLF2 Phase 3** | | |
| **TITLE: TECHNICAL SPECIFICATIONS –EARTHWORKS-Owner Performed Work** | | **SPECIFICATION NO.**<br>**02200-1 EARTHWORKS** |

| REV | DATE | PAGES | APPROVALS | | | REMARKS |
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| | | | AUTHOR | REVIEW | CLIENT | |
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# SECTION 02200.0 EARTHWORKS

## 1. PART 1: GENERAL

### 1.1. Summary

This specification describes the placement of Overburden Fill and Structural Fill for the pit backfilling project.

### 1.2. Related Sections

Refer to the following Sections for related work:

- Section 01400 – Earthworks CAQ

### 1.3. Tolerances

A. Limits of excavation, Overburden Fill and Structural Fill for the pit backfill project are defined by the lines and elevations shown on the DRAWINGS. All fill shall be placed to the minimum thicknesses shown on the DRAWINGS.

B. Finished grades shown on the DRAWINGS are given in feet and shall slope uniformly between given spot and contour elevations, without sag or humps. All grades shall provide for natural runoff.

C. Correction of over-excavation and backfilling shall be to **CONTRACTOR**'s account.

### 1.4. Quality Assurance

A. All work shall be monitored and tested in compliance with the requirements of the CQA Plan.

B. **CONTRACTOR** shall be aware of all testing activities outlined in the CQA Plan and shall account for these activities in the construction schedule.

C. All the CQA soils testing for the Overburden Fill (both field and laboratory testing) will be the responsibility of the CONTRACTOR, as identified in the Earthworks CQA plan.

D. All CQA soils testing for the Structural Fill (both field and laboratory testing) will be the responsibility of **CERTIFYING ENGINEER**, as identified in the Earthworks CQA plan. **CONTRACTOR** shall be responsible for cooperating with **CQA MONITOR** during all testing activities. **CONTRACTOR** shall provide equipment and labor to assist **CQA MONITOR** in sampling, if requested, and shall also provide access to all areas requiring testing activities. Quality Control testing shall be the responsibility of the **CONTRACTOR**.

E. All excavation, backfill, and grading operations shall be carried out under the observation of **MANAGER** and **CERTIFYING ENGINEER**.

F. Any work found unsatisfactory or any work disturbed by subsequent operations before acceptance is granted shall be corrected by **CONTRACTOR**, at its sole cost.

## 2. PART 2: PRODUCTS

### 2.1. Materials

A. Fill materials will be soils, gravels, or rock fill approved by **MANAGER** and **CERTIFYING ENGINEER**. The materials shall be free of organic matter, debris, frozen material, and other deleterious materials, and shall be excavated, as required, as follows:

1. Overburden Fill – material as approved by the Manager and Certifying Engineer conforming to the following specifications:

| U.S. Standard Sieve Size | Percent Passing by Dry Weight |
|---|---|
| 60– inch | 100 |
| 36-inch | 80-100 |
| 3-inch | 40 -100 |

2. Structural Fill - material as approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following specification:

| U.S. Standard Sieve Size | Percent Passing by Dry Weight |
|---|---|
| 24 – inch | 100 |
| 8-inch | 40-100 |
| No. 200 | 0 – 25 |
| Plasticity Index: 30 maximum | |

**Acceptance of non-conforming materials:** In cases where non-conformance to these material specifications occur the Design Engineer in tandem with the Manager can approve the material for use, if in their opinion, the specification deviation does not diminish functionality of a given design element and/or compromise the design intent. If non-conforming materials are accepted by the Design Engineer and Manager for use during construction, the DRMS will be contacted, within a week of discovery, to alert them to the acceptance and rationale behind acceptance of non-conforming materials.

## 3. PART 3: EXECUTION

### 3.1. Waste Removal

Waste material is defined as material too wet, too dry, frozen or containing ice or snow, containing organic or other deleterious matter, having poor characteristics of grading or compaction, having other characteristics that may result in undesirable settlement or other movement of the fill, or within the fill, or otherwise not meeting the requirements of the SPECIFICATIONS, provided that this definition permits drying, water, and any other processing or reprocessing to make the material stable and suitable prior to incorporating it into the fill as permitted in the SPECIFICATIONS or by the **MANAGER** and **CERTIFYING ENGINEER**.

A. **CONTRACTOR** shall excavate and remove waste in a manner that will minimize contamination with other soil horizons.

B. **CONTRACTOR** shall stockpile removed waste at locations designated by **MANAGER**

### 3.2. Excavation

A. **CONTRACTOR** shall perform excavation to the lines and grades shown on the DRAWINGS or as directed by **MANAGER**. No excavation shall begin until the **CONTRACTOR** has provided construction staking for the proposed work.

B. **CONTRACTOR** shall prevent the disturbance of surrounding areas during excavation. Where selective excavations are required to obtain materials for Structural Fill, the material removed from the excavations shall be taken directly to the fill areas or, if required, stockpiled by material types. The stockpiles shall be approved by **MANAGER**.

C. **CONTRACTOR** shall grade all excavations to ensure grades are maintained to provide adequate drainage at all times. Work shall be suspended by **CONTRACTOR** when, in the opinion of **MANAGER** and **CERTIFYING ENGINEER**, the site is overly wet, muddy, or otherwise unsuitable for proper maintenance, until directed otherwise by **MANAGER**, at no cost to **CC&V**.

D. In excavations where Structural Fill is to be placed on slopes steeper than 3H:1V, horizontal benches shall be excavated into the slope to allow fill to be placed in

horizontal lifts. The **CONTRACTOR** shall continuously bench and key embankment material into the existing material a minimum of 2 feet.

E. The **CONTRACTOR** will be responsible for the safety of temporary construction slopes. **CONTRACTOR** shall inspect all temporary and permanent open-cut excavations on a regular basis for signs of instability. Should signs of instability be noted, **CONTRACTOR** shall immediately undertake remedial measures and shall notify **MANAGER** immediately. Permanent cut slopes shall be left in smooth, safe, and stable condition at the end of the workday.

F. **CONTRACTOR** shall final grade excavations within the project to establish positive drainage to the Pregnant Solution Storage Area. In no case will depressions or bowls be permitted in the valley leach facility area.

G. **CONTRACTOR** shall conduct all excavation and shoring operations in compliance with applicable MSHA, Colorado State and Federal government laws and regulations.

### 3.3. Fill Placement

A. The following general guidelines shall be followed except as noted elsewhere in this Section.

**1.** No fill materials shall be placed until the foundation and subgrade preparations have been completed as specified herein, in section 3.5 of this SPECIFICATION. The procedures for fill placement shall be approved by **MANAGER** and **CERTIFYING ENGINEER** prior to start of fill placement.

**2.** No brush, roots, sod, frozen material, or other deleterious or unsuitable materials shall be incorporated in the fills. The suitability of all materials intended for use in the fill shall be subject to approval by **MANAGER** and **CERTIFYING ENGINEER**. Fill placement shall be temporarily stopped by **CONTRACTOR** due to weather conditions, if materials and installation do not meet the SPECIFICATIONS, at no cost to **CC&V**. Fill shall not be placed upon frozen material, such as snow or ice.

**3.** If the surface of the prepared foundation or the surface of any layer of the fill is too dry or too smooth to bond properly with the layer of material to be placed thereon, it shall be moisture-conditioned and/or worked with harrow, scarifier teeth, disc, or other suitable equipment to provide a satisfactory bonding surface before fill material is placed thereon. If the surface of the prepared foundation or the rolled surface of any layer is excessively wet for fill materials to be placed thereon, it shall be removed and allowed to dry or worked with a harrow, scarifier teeth, disc, or other suitable equipment to reduce the moisture content to an acceptable level or meet project SPECIFICATIONS as determined by **MANAGER** and **CERTIFYING ENGINEER**. It shall then be compacted before the next layer of fill material is placed. Determination of such dry or wet conditions shall be made by **CERTIFYING ENGINEER**.

4. The distribution of materials shall be such that the fill is free from voids, lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material. The material of a fill shall be as described in Section 2.1 of this specification.
5. Unless otherwise approved by **MANAGER** and **CERTIFYING ENGINEER**, the entire fill surface shall be at or near the same elevation at all times during construction. At all times during construction, the surface of the fill shall be graded and maintained by the **CONTRACTOR** to prevent ponding of water and to allow for storm water drainage.
6. Except as otherwise specified or approved by **MANAGER** and **CERTIFYING ENGINEER**, the **CONTRACTOR** shall dump and spread fill in such a manner so that no excessive gaps are left between successively dumped loads of materials. The fill shall be leveled prior to compaction by means of a dozer or grader, or other suitable approved equipment, to obtain a surface free from depressions.
7. Except in areas approved by **MANAGER** and **CERTIFYING ENGINEER** where space is limited or otherwise specified, **CONTRACTOR** shall place fill by routing the hauling and spreading units approximately parallel to the axis of the fill. As far as practical, hauling units shall be so routed that they do not follow in the same paths, but split their tracks evenly across the surface of the fill to enhance compaction.
8. **CONTRACTOR** shall apply water required for moisture conditioning on the fill or in the borrow areas.

   **CONTRACTOR** shall maintain fill materials within the moisture content range required to permit proper compaction to the specified density with the equipment being used. The moisture content of the fill materials, prior to and during compaction, shall be uniform throughout each layer of the material.

   Prior to mixing of wet and dry material on the fill to obtain the proper moisture content, approval shall be obtained from **CERTIFYING ENGINEER**. Mixed material shall have a uniform distribution of the moisture content prior to placement on the subsequent lift.

   When materials spread on the fill are too dry for proper compaction, **CONTRACTOR** shall spray water on each layer of the fill and shall work the moisture into the fill by harrowing or other approved means, until a uniform distribution of moisture is obtained. Material that is too wet for proper compaction, as determined by **CERTIFYING ENGINEER**, shall be removed from the fill and/or spread out and permitted to dry, assisted by disking and harrowing or mixing in dry material when permitted by **CERTIFYING ENGINEER**, if necessary, until the moisture content is reduced to an amount suitable for obtaining the specified degree of compaction, at no cost to **CC&V.**



9. After each layer of fill material has been placed, spread, and moisture-conditioned, the layer shall be compacted by passing compaction equipment over the entire surface of the layer a sufficient number of times to obtain the required density, as specified herein. Compaction shall be accomplished with equipment and by methods approved by **CERTIFYING ENGINEER**. If such equipment or methods are found unsatisfactory for the intended use, **CONTRACTOR** shall replace the unsatisfactory equipment with other types or adjust methods until proper compaction is achieved.
10. For Structural Fill with less than 30 percent rock materials above 3/4-inch size, the **CQA MONITOR** will measure the ambient air temperature on an hourly basis. If the ambient air temperature is less than thirty-two degrees Fahrenheit for more than one hour over the preceding twenty-four (24) hours, the **CQA MONITOR** will measure the temperature of the fill to determine if the fill is frozen. "Frozen" is defined as a mean temperature of thirty-two degrees Fahrenheit (32°F) or less. The **CQA MONITOR** will measure the temperature at a depth of three (3) inches and six (6) inches, recording the lower of the two. Six (6) measurements will be taken per acre, and if the average is below thirty-two degrees Fahrenheit (32°F), the fill will be considered frozen. If the fill is determined to be frozen the **CONTRACTOR** may either remove and replace the frozen fill or wait until subsequent temperature monitoring indicates the fill is unfrozen at no cost to **CC&V**.
11. Overburden slopes shall be compacted using a method specification and graded to meet the grades and dimensions shown on the DRAWINGS. The Bedding Fill subgrade surface will be prepared as identified in Section 2200 of the SPECIFICATIONS.

B. Overburden Fill

1. Areas to receive Overburden Fill will include, but are not limited to, backfilling existing pits to within 35 feet of the proposed geomembrane surface.
2. Overburden Fill material shall be overburden waste placed with in maximum 25-foot thick lifts, and compacted utilizing loaded haulage equipment.
3. Maximum rock size for overburden fill shall be 5 feet.
4. Prior to commencement of Overburden Fill, the **CONTRACTOR** shall complete task training to ensure that material meeting the specification is borrowed and placed. This training will include visually identifying oversized material and visually verifying that the material being loaded and placed is reasonably graded to avoid placement of gap graded material with excessive voids.

C. Structural Fill

1. Areas to receive Structural Fill will include, but are not limited to, slope reductions, and miscellaneous site grading.
2. **CONTRACTOR** shall condition Structural Fill to a moisture content that allows compaction to the required density and that results in a firm, unyielding surface

capable of allowing the movement of vehicles and equipment over the surface without causing rutting or other deleterious effects.

3. **CONTRACTOR** shall place Structural Fill materials with less than 30 percent rock materials above 3/4-inch size in maximum 12-inch loose lifts, and compact to 95 percent of maximum dry density (ASTM D698). The moisture content shall be within +3% to -3% of the optimum moisture content.
4. **CONTRACTOR** shall condition, place and compact Structural Fill containing more than 30 percent rock materials above 3/4-inch size (rock fill) by a method compaction technique. The compaction equipment shall consist of a minimum 10-ton (static drum weight) vibratory smooth-drum compactor. The number of passes and loose lift thickness shall be subject to **CERTIFYING ENGINEER's** approval, at no additional cost to **CC&V**. The method specifications may be changed at any time, at the discretion of **CERTIFYING ENGINEER**, based upon changes in material characteristics, field conditions, and/or compaction equipment.
5. Maximum rock size for rock fill shall be two-thirds of the compacted lift thickness, unless otherwise approved by **MANAGER**, **DESIGN ENGINEER,** and **CERTIFYING ENGINEER**. **CONTRACTOR** shall remove oversize materials from fills at no additional cost to **CC&V**.

### 3.4. Equipment

**CONTRACTOR** may use any type of earthmoving or excavating equipment unless otherwise noted in the SPECIFICATIONS, provided the equipment is in a satisfactory condition, complies with applicable rules and regulations, is of such capacity that the construction schedule can be maintained as planned by **CONTRACTOR**, and is approved by **MANAGER.**

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| **PROJECT: VL2 Phase 3** | | |
| **TITLE: TECHNICAL SPECIFICATIONS –UNDERGROUND WORKING REMEDIATION** | | **SPECIFICATION NO.**<br>**02210 UNDERGROUND WORKINGS** |

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# SECTION 02210 UNDERGROUND WORKING REMEDIATION

## 1. PART 1: GENERAL

### 1.1. Summary

This SPECIFICATION describes the activities associated with the remediation of the underground workings located within the limits of the valley leach facility.

### 1.2. Related Sections

Refer to the following Sections for related work:

- Section 02200 - Earthworks
- Section 03300 - Cast In Place Concrete
- Section 03310 - Cemented Rockfill
- Section 03320 - Concrete Plug
- Section 03330 - Flowable Fill

### 1.3. Quality Assurance

A. All work shall be monitored and tested in compliance with the requirements of the SPECIFICATIONS.

B. All CQA soils testing (both field and laboratory testing) will be the responsibility of CQA Monitor, as identified in the Earthworks CQA plan. **CONTRACTOR** shall be responsible for cooperating with CQA Monitor during all testing activities. **CONTRACTOR** shall provide equipment and labor to assist CQA Monitor in sampling, if requested, and shall also provide access to all areas requiring testing activities. Quality Control testing shall be the responsibility of the **CONTRACTOR**.

C. All excavation, backfill, and grading operations shall be carried out under the observation of MANAGER and CERTIFYING ENGINEER.

D. Any work found unsatisfactory or any work disturbed by subsequent operations before acceptance isgranted shall be corrected by **CONTRACTOR**, at its sole cost.

### 1.4. Submittals

A. **CONTRACTOR** shall provide method of Coarse Shaft Backfill and Select Structural Fill placement.

B. **CONTRACTOR** shall provide method of compacting Native material, Coarse Shaft Backfill, and Select Structural Fill, to meet the compaction requirements identified in Sections 3.2 and 3.3.

C. **CONTRACTOR** shall provide blasting design for approval by **MANAGER**.



## 2. PART 2: PRODUCTS

### 2.1. Materials

A. Fill materials will consist of Structural Fill, Select Structural Fill, and Coarse Shaft Backfill identifiedin Section 02200, Cast-In-Place Concrete identified in Section 03300, Cemented Rockfill identified in Section 03310, Concrete Plug identified in Section 03320, and Flowable Fill identified in Section 03330.

## 3. PART 3: EXECUTION

### 3.1. Excavation

A. The **CONTRACTOR** will be responsible for the safety of temporary construction slopes. **CONTRACTOR** shall inspect all temporary and permanent open-cut excavations on a regular basis for signs of instability. Should signs of instability be noted, **CONTRACTOR** shall immediately undertake remedial measures and shall notify **MANAGER** immediately. Permanent cut slopes shall be left in smooth, safe, and stable condition at the end of the workday.

B. **CONTRACTOR** shall conduct all excavation and shoring operations in compliance with applicableColorado State and Federal government laws and regulations.

### 3.2. Fill Placement

A. Structural Fill

**1.** **CONTRACTOR** shall condition, place and compact Structural Fill by a method compaction technique, as discussed in Section 2200.0.

Maximum rock size for rock fill shall be two-thirds of the compacted lift thickness, unless otherwise approved by **MANAGER**, **DESIGN ENGINEER,** and **CERTIFYING ENGINEER**. **CONTRACTOR** shall remove oversize materials from fills at no additional cost to **CC&V**.

B. Select Structural Fill

**1.** **CONTRACTOR** shall condition and compact the Select Structural Fill using a method specification on 3-foot thick lifts that result in a firm surface that will be approved by the **CERTIFYING ENGINEER**.

C. Coarse Shaft Backfill

**1.** Coarse Shaft Backfill shall be placed in the underground workings as part of remediation, as shown in the DRAWINGS.



2. **CONTRACTOR** shall compact and condition the final surface of the Coarse Shaft Backfill using a method specification that results in a firm surface that will be approved by **CERTIFYING ENGINEER.**

D. Cast-in-Place Concrete

1. Cast-in-Place Concrete shall be placed in the underground working as part of remediation, as show in the DRAWINGS.

E. Cemented Rockfill

1. Cemented Rockfill shall be placed in the underground working as part of remediation, as show in the DRAWINGS.

F. Concrete Plug

1. Concrete Plug shall be placed in the underground working as part of remediation, as show in the DRAWINGS.

G. Flowable Fill

1. Flowable Fill shall be placed in the underground working as part of remediation, as show in the DRAWINGS.

### 3.3. Native Material

For the remediation of shafts greater than 25 feet, which are currently backfilled with native material, **CONTRACTOR** shall excavate the current native backfill to a depth of 25 feet below Soil Liner Fill subgrade elevation. The surface of the native material at this elevation will then be compacted using a methodspecification that results in a firm surface that will be approved by **CERTIFYING ENGINEER. CONTRACTOR** shall then remediate the underground working using Coarse Shaft Backfill, Cement Plug,and Cemented Rockfill as shown on the DRAWINGS.

### 3.4. Blasting

The **CONTRACTOR** shall compact the surface of the area that has been blasted. If the blasted surface is below the Soil Liner subgrade elevation, the **CONTRACTOR** shall compact the blasted surface using a method specification approved by the **CERTIFYING ENGINEER**, and then remediate according to the DRAWINGS to achieve the design grades and elevations. If the blasted surface is above the Soil Liner subgrade elevation, the **CERTIFYING ENGINEER** assess the foundation conditions and recommend whether the **CONTRACTOR** shall over excavate and backfill with Cemented Rockfill and Structural Fill, or if the **CONTRACTOR** shall remove excess material and compact the final grade surface using a method specification approved by the **CERTIFYING ENGINEER**.

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| **TITLE: TECHNICAL SPECIFICATIONS –RIPRAP** | | **SPECIFICATION NO.**<br>**02271 RIPRAP** |

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# SECTION 02271 RIPRAP

## 1. PART 1: GENERAL

### 1.1. Description

All work shall be carried out in compliance with these SPECIFICATIONS and in conformance with the lines, grades, and dimensions as shown on the DRAWINGS.

### 1.2. Related Sections

Refer to the following Sections for related work:

- Section 02200 Earthworks
- Section 03300 Cast-in-place Concrete

## 2. PART 2: SPECIFICATIONS AND INSTALLATION

### 2.1. Material Specifications

A. Rip rap shall consist of hard, dense, and durable stone, angular in shape, and resistant to weathering. Rounded stone or boulders will not be accepted as riprap material. The stone shall have a specific gravity of at least 2.5. Each piece shall have its greatest dimension not greater than three times its least dimension. If approved by **CERTIFYING ENGINEER**, removed concrete may be used for riprap provided it meets the other requirements of this section.

B. Material used for riprap will be approved by **CERTIFYING ENGINEER** if, by visual inspection, the rock is determined to be sound and durable. **MANAGER** and **CERTIFYING ENGINEER** may require **CONTRACTOR** to furnish laboratory results to verify that the material meets SPECIFICATIONS. At the request of **MANAGER, CONTRACTOR** shall furnish laboratory testresults indicating that the material meets the requirements for strength as indicated in the following table.

| Test Description | Test Method | Specification Requirement |
|---|---|---|
| Point Load Tensile Strength | ISRM RTH 325-89/ASTM D5731 | 300 psi (min) |

C. Rip rap shall conform to the gradation requirements given in the following table:

| Stone Size $d_{50}$ (in)[1] | Percent of Material Smaller than Typical Stone[2,4] | Typical Stone Dimensions[3] (in) |
|---|---|---|
| 6 | 70 – 100 | 12 |
| | 50 – 70 | 9 |
| | 35 – 50 | 6 |
| | 2 – 10 | 2 |
| 15 | 70 – 100 | 26 |
| | 50 – 70 | 21 |
| | 35 – 50 | 15 |
| | 2 – 10 | 5 |

[1] $d_{50}$ = average stone size
[2] Based on typical rock weight
[3] Equivalent spherical diameter
[4] Based on a specific gravity of 2.5

D. Nominal stone size and total thickness of the riprap shall be as shown on the DRAWINGS.

## 2.2. Installation

Stones with typical stone dimensions that are equal to $d_{50}$ and larger shall be placed at the top surface with faces and shapes matched to minimize voids and form as smooth a surface as practical. Dumping and backhoe placement alone is not sufficient to ensure a properly interlocked system. The material may be machine- placed to form a substantial bond as approved by **MANAGER** and **CERTIFYING ENGINEER**.

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| **TITLE: TECHNICAL SPECIFICATIONS –PIPE BOLLARDS** | | **SPECIFICATION NO.**<br>**02608 PIPE BOLLARDS** |

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# SECTION 02608 PIPE BOLLARDS

## 1. PART 1: GENERAL

### 1.1. Summary

Pipe guards shall consist of steel pipe backfilled with concrete.

### 1.2. Related Sections

Refer to the following Sections for related work:

- Section 03300 - Cast-in-Place Concrete

### 1.3. Tolerances

Pipe bollards shall be constructed and placed as shown on the DRAWINGS.

### 1.4. Quality Assurance

Any work found unsatisfactory or any work disturbed by subsequent operations before acceptance is granted shall be corrected by **CONTRACTOR** as directed by **MANAGER**.

## 2. PART 2: PRODUCTS

### 2.1. Materials

A. Cast-in-place concrete used to fill pipe bollards shall be concrete as specified in Section 03300.

B. Pipe shall be 36 kips per square inch (ksi) standard steel pipe, with a nominal diameter of 6-inches, and a minimum wall thickness of 0.28-inches.

## 3. PART 3 SUMMARY

### 3.1. Execution

A. Install pipe bollards to depths and in locations as shown on DRAWINGS.

B. Backfill pipe bollards with lean concrete to the lines and grades shown on DRAWINGS.

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| **TITLE: TECHNICAL SPECIFICATIONS –PIPING** | | **SPECIFICATION NO.**<br>**02710 PIPING** |

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# SECTION 02710 PIPING

## 1. PART 1: GENERAL

### 1.1. Related Sections

Refer to the following Sections for related work:

- Section 02200 - Earthworks
- Section 02776 - Geomembrane
- Section 02777 - Geotextile

### 1.2. Submittals

A. **CONTRACTOR** shall abide by all qualification and submittal requirements.

B. **CONTRACTOR** shall provide product data including **MANUFACTURER's** technical data (resin), test data (strength), and SPECIFICATIONS sufficient to allow evaluation by **MANAGER** and **CERTIFYING ENGINEER**.

### 1.3. Quality Assurance

A. All work shall be constructed, monitored, and tested in accordance with the requirements of the CQA Plan.

B. Any work found unsatisfactory or any work disturbed by subsequent operations before acceptance is granted shall be corrected by **CONTRACTOR** as directed by **MANAGER** at no additional cost to **CC&V**.

## 2. PART 2: PRODUCTS

### 2.1. Materials

A. High Volume Solution Collection Pipe:

**1.** 4-inch "Highway Grade" perforated corrugated polyethylene (CPe) pipe, as manufactured by Advanced Drainage Systems, Inc., or an equivalent approved by **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER**.

**2.** 8-inch diameter "N-12" perforated CPe pipe, as manufactured by Advanced Drainage Systems, Inc., or an equivalent approved by **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER**.

**3.** 12-inch diameter "N-12" perforated CPe pipe, as manufactured by Advanced Drainage Systems, Inc., or an equivalent approved by **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER**.

4. 15-inch diameter "N-12" perforated CPe pipe, as manufactured by Advanced Drainage Systems, Inc., or an equivalent approved by **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER**.
5. 18-inch diameter "N-12" perforated CPe pipe, as manufactured by Advanced Drainage Systems, Inc., or an equivalent approved by **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER**.
6. 24-inch diameter "N-12" perforated CPe pipe, as manufactured by Advanced Drainage Systems, Inc., or an equivalent approved by **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER**.
7. 28-inch diameter solid SDR 11 HDPE pipe, as manufactured by DRISCOPIPE or an equivalent approved by **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER**.

B. Leak Detection Pipe:

1. 4-inch diameter, "Highway-Grade" perforated CPe pipe, as manufactured by Advanced Drainage Systems, Inc., or an equivalent approved by **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER**.
2. 4-inch diameter, solid SDR 13.5 HDPE pipe or an equivalent approved by **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER**.

C. Low Volume Solution Collection Pipe:

1. 18-inch diameter solid SDR 11 HDPE pipe or an equivalent approved by **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER**.
2. 4-inch "Highway Grade" perforated corrugated polyethylene (CPe) pipe, as manufactured by Advanced Drainage Systems, Inc., or an equivalent approved by **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER.**

## 3. PART 3: EXECUTION

### 3.1. Installation

A. **CONTRACTOR** shall install pipe according to **MANUFACTURER's** recommendations.

B. **CONTRACTOR** shall take all precautions necessary to not damage the pipe during material placement. **CONTRACTOR** may periodically be requested by **MANAGER** to verify that covered pipe has not been crushed. Costs associated with proving pipes have not been crushed shall be borne by **CONTRACTOR**.

C. Piping shall be placed to the lines and elevations shown on the DRAWINGS, with no sags or humps, as approved by **MANAGER** and **CERTIFYING ENGINEER**.

### 3.2. Pipe Connections

A. All connections for non-perforated pipe shall be watertight under maximum anticipated pressure head.

B. The ends of all pipe shall be capped with a manufactured pipe cap.

C. HDPE pipe will be butt-heat-fusion welded in accordance with the **MANUFACTURER's** guidelines.

D. CPe pipe joints shall conform to **MANUFACTURER's** recommendations.

### 3.3. Bedding and Backfill

A. **CONTRACTOR** shall place and compact Leak Detection Fill in accordance with Item 3.6.E of Section 02200.

B. **CONTRACTOR** shall bed and backfill Leak Detection piping with Leak Detection Fill.

C. Low Volume and High Volume Solution Collection pipe shall be placed on top of the geosynthetics, as shown on the DRAWINGS.

D. Placement of Low Volume and High Volume Solution Collection and High Volume Solution Collection pipes shall be coordinated with other operations such as Low Volume Solution Collection Fill, Bedding Fill, Soil Liner, and Drain Cover fill placement. Equipment access directly on geosynthetics is expressly prohibited. Any damage to the geosynthetics caused by **CONTRACTOR** during pipe placement shall be repaired at the expense of **CONTRACTOR**.

E. A minimum of 5 feet of Low Volume Solution Collection Fill and Drain Cover Fill shall be placed over the top of the pipe before crossing with rubber-tired construction equipment. If pipe becomes crushed during or after installation by **CONTRACTOR**'s equipment or methods of construction, the pipe shall be replaced by **CONTRACTOR**, at no additional cost to **CC&V**. The **CONTRACTOR** will be required to demonstrate to **MANAGER** that the equipment and procedures used are not detrimental to the piping, at no additional cost to **CC&V**.

F. **CONTRACTOR** shall hold pipes in place with sand bags, or other methods approved by **MANAGER**, until the Low Volume Solution Collection Fill and Drain Cover Fill has been placed. Directly before placement of the Low Volume Solution Collection Fill and Drain Cover Fill, the sand bags will be removed.

G. Secondary or tertiary High Volume Solution Collection pipes will be attached to the primary pipes with plastic ties or other method approved by **MANAGER** and **CERTIFYING ENGINEER**.

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| **TITLE: TECHNICAL SPECIFICATIONS –GEOMEMBRANE** | | **SPECIFICATION NO.**<br>**02776-0 GEOMEMBRANE** |

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# SECTION 02776-0 GEOMEMBRANE

## 1. PART 1: GENERAL

### 1.1. Summary

This specification describes requirements for the manufacture, fabrication (if needed), supply, and installation of polyethylene geomembrane for lining of the valley leach facility, as shown on the DRAWINGS; and construction quality control monitoring and testing. All procedures, operations, and methods shall be in strict compliance with the SPECIFICATIONS, Construction Quality Assurance Plan, and the DRAWINGS.

### 1.2. Submittals

A. **CONTRACTOR** shall provide the following information relating to the geomembrane **MANUFACTURER** and **INSTALLER** with its proposal.

1. Information from the **MANUFACTURER** including company name, address, telephone number, the names of the company president and quality control manager, and narrative of the company history.
2. Information from the **MANUFACTURER** on factory size, equipment, personnel, number of shifts per day, and capacity per shift.
3. Quality Control Manuals from the **MANUFACTURER** and **INSTALLER** for the installation and testing of the geomembrane, including trial seams, seaming, nondestructive testing, destructive testing procedures, repair procedures and in-field quality control forms. Upon review of the Quality Control Manuals, **MANAGER** may request additional testing during the manufacturing process at no additional cost to **CC&V**.
4. A list of at least five completed facilities from the **MANUFACTURER** totaling a minimum of five million (5,000,000) square feet between all five facilities of the type of geomembrane that is being installed at the VLF2 Phase 3 Project. Each entry in this list should specify the name and purpose of the facility, its location and date of installation, the name of the owner, the project manager, designer, fabricator (if any), and the geosynthetics installation contractor and the name and telephone number of the contact at the facility who can discuss the project. In addition, the geomembrane thickness and total square footage of the installation surface should be included.
5. Installation capabilities of the **INSTALLER**.
6. Information on equipment and personnel from the **INSTALLER**.
7. A list of at least five completed facilities, totaling five million (5,000,000) square feet for which **INSTALLER** has installed the type of geomembrane that is being installed at the VLF2 Phase 3 Project. For each installation, the following information shall be provided:
    a. Name and purpose of facility, its location, and date of installation.



b. Name of owner, Design Engineer, **MANUFACTURER**, Fabricator, if applicable, and name and telephone number of contact at the facility who can discuss the project. Thickness of geomembrane and surface area of the installed geomembrane.

c. Type of seaming, patching, and tacking equipment.

d. A copy of the MANUFACTURER's and/or Fabricator's approval letter(s) and/or license(s), if applicable.

B. **CONTRACTOR** shall provide the following information after contract award but within ten (10) days prior to geomembrane arrival on-site and prior to commencement of the Work:

1. A copy of each of the Quality Control Certificates on each lot of resin issued by the resin Supplier for the specific material for this project including certification of the resin for extrusion welding.
2. The results of Quality Control testing conducted by the **MANUFACTURER** on the resin used in manufacturing the specific material for this project.
3. A listing that correlates the resin to the individual geomembrane rolls and welding rods.
4. A copy of the geomembrane roll Quality Control Certificates. These certificates shall be supplied at a minimum frequency of one (1) per every fifty thousand (50,000) square feet of geomembrane material produced. These certificates shall be issued only for the individual geomembrane rolls sampled and tested by the **MANUFACTURER** or its representative. The certificates will contain test results of properties outlined in Section 2.1 of this SPECIFICATION. **MANAGER** reserves the right to refuse use of any geomembrane supplied without the proper quality control documentation at no cost to **CC&V**.
5. A detailed list of performance criteria for the geomembrane material being produced for this project. (Note: Performance criteria are sometimes referred to as "minimum property values." Refer to Sections 2.1 and 2.2 of this SPECIFICATION Section for geomembrane properties and Test Methods.)
6. Resume from the **INSTALLER** of the Installation Superintendent, Master Seamer, and Quality Control Inspector to be assigned to the work, including dates and duration of employment.
7. Certification from the **INSTALLER** that both the Installation Supervisor, Quality Control Inspector, and Master Seamer have reviewed the SPECIFICATIONS, Construction Quality Assurance Plan, and the DRAWINGS.
8. A panel layout drawing showing the proposed installation layout identifying field seams and including areas such as sumps, trenches and pipe penetrations as well as any variance or additional details that deviate from the DRAWINGS. The layout shall be adequate for use as a construction plan and shall include dimensions, details, etc. Any proposed variance or deviation from these documents shall be submitted to **MANAGER** in writing a minimum of seven (7) Working days prior to the scheduled

start of geomembrane installation and will be accepted/rejected by **CERTIFYING ENGINEER** prior to start of installation.

9. A list of personnel performing field-seaming operations along with pertinent experience information.
10. All geosynthetic Quality Control Certificates required by these SPECIFICATIONS. Certification that extrudate to be used is composed of the same resin as the geomembrane to be used.

C. Submittals by **CONTRACTOR** to **MANAGER** during the course of the work.

1. Daily reports detailing arrival and departure times, the personnel present on-site, the progress of the Work, the arrival of materials, daily square footage deployed and seamed, daily square footage of geomembrane approved by the **CQA MONITOR** and any problems encountered.
2. Subgrade surface acceptance certificates for each area to be covered by the lining system, signed by **CONTRACTOR**.

D. Without limiting the provisions of the Contract, the **CONTRACTOR** shall warrant the work to **MANAGER** in accordance with the following:

1. The geomembrane supplied is suitable for the environmental conditions at the site and the service conditions as described in this SPECIFICATION.
2. The geomembrane supplied meets or exceeds all published SPECIFICATIONS as referenced by the SPECIFICATION.
3. The geomembrane are free of defects in materials and workmanship.
4. The **CONTRACTOR** shall repair or replace all defects in the material detected on-site, including uncovering and recovering the work, in compliance with the **SPECIFICATIONS** at no additional cost to **CC&V**.
5. The **CONTRACTOR** shall repair any detected leaks in any seams (Manufactured or field joined), including uncovering and recovering the work, in compliance with the SPECIFICATIONS at no additional cost to **CC&V**.

## 1.3. Quality Assurance

A. Manufacturing Qualifications

1. The **MANUFACTURER**(s) shall have experience in the manufacture of the type of geomembrane that is being installed at the VLF2 Phase 3 Project totaling at least five completed facilities totaling a minimum of 5,000,000 square feet between all five facilities.
2. The **MANUFACTURER** shall provide sufficient production and qualified personnel to meet the demands of the work and shall have an internal quality control program for its product.

3. The **MANUFACTURER** shall permit **MANAGER**, **DESIGN ENGINEER**, and/or **CERTIFYING ENGINEER** or their authorized representative to visit the manufacturing plant.

B. Geomembrane Installation Qualifications (**INSTALLER**)

1. **INSTALLER** shall be the **MANUFACTURER** or an approved **CONTRACTOR** trained and licensed to install the **MANUFACTURER**'s geomembrane. Installation shall be performed under the constant direction of single Installation Superintendent who shall remain on-site and be responsible, throughout the geomembrane installation, for geomembrane layout, seaming, patching, testing, repairs, and all other activities by **INSTALLER**.
2. The Installation Superintendent shall have installed or supervised, at a minimum three installation projects that entailed the installation of at least a total of 1,000,000 square feet of the type of geomembrane that is being installed at the VLF2 Phase 3 Project.
3. Actual seaming shall be performed under the direction of a Master Seamer (who may also be the Installation Superintendent) who has seamed a minimum of 1,000,000 square feet of the type of geomembrane that is being installed at the VLF2 Phase 3 Project, using the same type of seaming apparatus specified for the Work.
4. The Installation Superintendent and/or Master Seamer shall be present whenever seaming is performed.

C. Quality Assurance Program

1. All WORK shall be constructed, monitored, and tested in compliance with the requirements of the Construction Quality Assurance Plan (Section 01400-2). **CONTRACTOR** and **MANUFACTURER** shall participate in and comply with all items in these SPECIFICATIONS and requirements of the CQA plan.
2. **CONTRACTOR** shall ensure that each geomembrane **MANUFACTURER** that supplies materials to this project has an internal product quality control program that meets SPECIFICATIONS.
3. During manufacturing of the geomembrane, samples of geomembrane shall be removed for laboratory testing to ensure compliance with this SPECIFICATION. Conformance sampling and testing will be performed in accordance with the Construction Quality Assurance Plan.
4. **CONTRACTOR** shall assure that the geomembrane is delivered to the site at least 10 calendar days prior to installation. **CONTRACTOR** will provide required Quality Control information 10 calendar days prior to geosynthetics being delivered to the VLF2 Phase 3 project and on delivery of geosynthetics to the VLF2 Phase 3 project.
5. Geomembrane rolls that do not meet the requirements of this SPECIFICATION will be rejected. **CONTRACTOR** shall replace the rejected material with new material that conforms to the specification requirements, at no additional cost to **CC&V**.
6. **CONTRACTOR** shall ensure that all personnel performing geomembrane-seaming operations are qualified by experience or by successfully passing seaming tests (see

Section 3.8 of this SPECIFICATION section). **MANAGER** reserves the right to reject any welding technician whose performance is unsatisfactory.

D. **INSTALLER'S** Superintendent and QC Inspector shall attend the pre-construction meeting.

E. Field Samples

1. Geomembrane sampling and testing shall be conducted in accordance with the project SPECIFICATIONS for the following:
   a. trial seam testing (Section 3.7 of this SPECIFICATION)
   b. destructive seam testing (Section 3.9 of this SPECIFICATION)
2. **CONTRACTOR** shall maintain on-site a minimum of one spare operable tensiometer and provide documentation indicating that all tensiometers used at the project were calibrated within 60 days prior to the tensiometer arriving on-site for testing field samples.

F. In order to prevent wind-damaged geomembranes from being placed, the following Quality Assurance procedures shall be followed:

1. **CONTRACTOR** shall perform its Work and utilize sufficient ballast as necessary to prevent wind uplift of the geomembrane panels.
2. If wind damage should occur, **CERTIFYING ENGINEER** shall determine if the geomembrane shall be repaired or replaced. Wind damage to the geomembrane will include wrinkles, creases, and tears, as determined by **CERTIFYING ENGINEER**.
3. Repair or replacement of the wind-damaged geomembrane shall be completed by **CONTRACTOR** at no additional cost to **CC&V**.
4. As determined by **MANAGER** and **CERTIFYING ENGINEER**, the geomembrane panel may be rejected at no cost to **CC&V**.

## 1.4. Delivery, Storage, and Handling

A. Packing and Shipping

1. Labels on each roll delivered to Site shall identify the following.
   a. **MANUFACTURER**'s name
   b. Product Identification
   c. Thickness
   d. Roll number
   e. Batch or lot number
   f. Panel number (when applicable)
   g. Roll dimensions
2. **CONTRACTOR** shall ensure that geomembrane rolls are properly loaded and secured to prevent damage during transit.

3. **CONTRACTOR** shall protect geomembrane from excessive heat, cold, puncture, cutting, or other damaging or deleterious conditions.
4. **CONTRACTOR** shall ensure personnel responsible for loading, transport and unloading of geomembrane are fully aware of the consequences of damage to geomembrane, and are familiar with handling and transport constraints imposed by **MANUFACTURER.**

B. Acceptance at Site

1. **CQA MONITOR** shall perform inventory and surface inspection for defects and damage of all geomembrane rolls upon delivery.
2. **CONTRACTOR** shall unroll and inspect any geomembrane roll that may be damaged below surface.
3. **CONTRACTOR** shall repair damage resulting from handling and transport of geomembranes at no additional cost to **CC&V**. If irreparable, in the opinion of **CERTIFYING ENGINEER**, damaged materials shall be replaced at no additional cost to **CC&V**.

C. Storage and Protection

1. **MANAGER** will provide area for on-site storage of the geomembrane rolls from time of delivery until installation.
2. The storage and handling of the materials is the responsibility of **CONTRACTOR** from the time the materials are manufactured until the time the completed installation is accepted. **CONTRACTOR** is responsible for preparing the storage location and for the protection of the materials from the elements (e.g. ultraviolet light, moisture, temperature, etc.).
3. After **CONTRACTOR** has removed material from storage, **CONTRACTOR** shall protect geomembrane from puncture, dirt, grease, water, moisture, mud, mechanical abrasion, excessive heat, and other sources of damage.
4. **CONTRACTOR** shall preserve integrity and readability of the geomembrane roll labels, and store the rolls such that **MANAGER** and **CERTIFYING ENGINEER** have access to the package slips or roll labels for each roll to verify roll acceptance.
5. The rolls shall be stored on a prepared surface (not wooden pallets) and should not be stacked more than three rolls high. If the rolls are stacked higher than two rolls high, safety measures shall be put into place to prevent the rolls from shifting and personnel from climbing on the rolls to access the lifting straps.

## 1.5. Site Conditions

A. Geomembrane Deployment

1. Do not proceed with deployment at an ambient temperature below 14° F or above 100° F unless otherwise authorized, in writing, by **MANAGER**, **DESIGN ENGINEER,** and **CERTIFYING ENGINEER**. Temperature monitoring shall be performed by the **CQA MONITOR**.

2. Do not deploy during precipitation, in the presence of excessive moisture (e.g. fog, dew), in an area of ponded water, or in the presence of excessive winds. Do not undertake deployment if weather conditions will preclude material seaming on same day as deployment, unless approved by **MANAGER**, **DESIGN ENGINEER,** and **CERTIFYING ENGINEER**.

B. Seaming

1. Normal Weather Conditions

Normal seaming procedures may take place if the following weather conditions exist:

a. Ambient temperature between 35° F and 100° F.

b. Dry conditions, i.e., no precipitation or other excessive moisture, such as fog or dew.

c. No excessive winds.

2. Adverse Weather Conditions

a. Do not seam if ambient temperature is below 14° F or above 100° F.

b. Do not seam during precipitation, in the presence of excessive moisture (e.g. fog, dew), in an area of ponded water, in the presence of excessive winds.

c. If the ambient air temperature is between 35° F and 14° F for the entire shift, Cold Weather Seaming provisions will govern.

1. The **INSTALLER** will be required to perform a minimum of four trial seams during the planned work shift, at approximately the same time interval throughout the scheduled workday.

2. If the Soil Liner Fill is considered frozen as outlined in Section 3.6 of SPECIFICATION Section 2200, the **INSTALLER** must place seaming boards or slip sheets when seaming. Seaming boards or slip-sheets shall be removed by **INSTALLER**.

## 2. PART 2: PRODUCTS

### 2.1. Materials

A. The geomembrane shall be a polyethylene. The geomembrane shall be manufactured of new, first- quality resin produced in the United States or Canada and shall be manufactured specifically for this type of application.

B. The geomembrane sheet shall be comprised of a minimum ninety-six (96) percent pure polyethylene. The remaining portion shall be made up of materials necessary for the performance of the liner (such as carbon black, anti-oxidants, etc.) The geomembrane rolls shall meet the following specifications:

1. The surface of the geomembrane shall not have striations, roughness (except texture as specified), pinholes, or bubbles and shall be free of holes, blisters, undispersed raw materials, or any contamination by foreign matter. **MANAGER** and **CERTIFYING**

**ENGINEER** may request additional testing in order to support such acceptance. All such testing shall be done at the sole expense of the **CONTRACTOR**.

2. The geomembrane rolls shall have the following properties:

## TYPICAL PROPERTIES-TABLE 2.01

| Property | Test Method Smooth/Textured | Smooth 40 mil LLDPE | Textured 80 mil LLDPE | Smooth 100 mil LLDPE | Textured 100 mil LLDPE |
|---|---|---|---|---|---|
| Thickness (mils)[2]<br>Compound Density (g/cc)<br>Carbon Black Dispersion<br>Carbon Black Content (%) | ASTM D5199/ASTM D5994<br>ASTM D1505/ASTM D792<br>ASTM D5596<br>ASTM D4218 | 36/40/40<br>0.939 (max)<br>See Note [7]<br>2-3 | 68/76/80<br>0.939 (max)<br>See Note [7]<br>2-3 | 90/100/100 (min)<br>0.939 (max)<br>See Note [7]<br>2-3 | 85/95/100 (min)<br>0.939 (max)<br>See Note [7]<br>2-3 |
| **Tensile Properties**<br>1. Ultimate Tensile Strength (ppi)<br>2. Ultimate Elongation (%)(2" gauge) | <br>ASTM D6693<br>ASTM D6693 | <br>152 (min)<br>800 (min) | <br>120 (min)<br>250 (min) | <br>380 (min)<br>800 (min) | <br>150 (min)<br>250 (min) |
| Puncture Resistance (lbs.) | ASTM D4833 | 56 (min-avg) | 88 (min-avg) | 140 (min-avg) | 110 (min-avg) |
| **Field Seam Strength Properties**[3,9]<br>**Hot Wedge Seams**<br>1. Shear Strength (ppi)<br>2. Peel Strength[5] (ppi) (Inside and outside tracks)<br>**Extrusion Fillet Seams**<br>1. Shear Strength (ppi)<br>2. Peel Strength (ppi) | <br><br>ASTM D6392<br>ASTM D6392<br><br>ASTM D6392<br>ASTM D6392 | <br><br>60 (min)<br>50 (min), FTB[4,5,6]<br><br>60 (min)<br>44 (min), FTB[4,5,6] | <br><br>120 (min)<br>100 (min), FTB[4,5,6]<br><br>120 (min)<br>88 (min), FTB[4,5,6] | <br><br>150 (min)<br>125 (min), FTB[4,5,6]<br><br>150 (min)<br>114 (min), FTB[4,5,6] | <br><br>150 (min)<br>125 (min), FTB[4,5,6]<br><br>150 (min)<br>114 (min), FTB[4,5,6] |

[1] LLDPE refers to Linear Low Density Polyethylene.
[2] First value represents lowest individual value out of 10 measured. Second value represents minimum average roll value. Third value represents nominal roll value.
[3] Seam strength properties refer to LLDPE to LLDPE welds.
[4] If peel strength exceeds ultimate tensile strength of the sheet but the sample fails FTB, the test will be considered a pass.
[5] Federal Test Method Standards.
[6] Film Tear Bond (FTB) is defined as failure of one of the sheets by tearing, instead of separating from the other sheet at the weld interface area (sheet fails before weld).
[7] 9 in Categories 1 or 2, and 1 in Category 3
[8] Test methods and tolerances specified above for conformance testing are defined in GRI Test Method GM17, Revision 14, dated March 17, 2021.
[9] Test methods and tolerances specified above for field seam strength properties are defined in GRI Test Method GM19a, Revision 10, updated March 18,2021.

## 2.2. Seaming and Testing Equipment

A. Seaming

1. Approved field seaming processes are hot shoe double fusion welding and extrusion welding, when approved by **CERTIFYING ENGINEER**. Use double fusion welding as primary method of seaming adjacent field panels.
2. **CONTRACTOR** shall maintain on-site a minimum of two spare operable seaming apparatuses.
3. Seaming equipment shall not damage the geomembrane.
4. **CONTRACTOR** may use a hot air device ("Leister") to temporarily bond geomembrane panels that are to be extrusion welded.
5. **CONTRACTOR** shall use extrusion welding apparatus equipped with gauges giving temperature of preheat and extrudate at nozzle of apparatus.
6. Welding rods or beads used for extrusion welding shall have the same physical properties as that used for the resin used in the manufacture of the type of geomembrane that is being installed at the VLF2 Phase 3 Project.
7. **CONTRACTOR** shall use fusion welding apparatus which are self-propelled devices equipped with a gauge indicating temperature of heating element, and a gauge indicating the speed of the welding apparatus.

B. Vacuum Testing (for extrusion seam only) The equipment shall consist of the following:

1. Vacuum box assembly consisting of: rigid housing, transparent viewing window, soft neoprene gasket attached to bottom of housing or porthole and valve assembly, and vacuum gauge.
2. Pump assembly equipped with pressure controller and pipe connections.
3. Rubber pressure/vacuum hose with fittings and connections.
4. Bucket of soapy solution.
5. Wide paint brush, or other means of applying soapy solution.

C. Air Pressure Testing (for double fusion seam only) The equipment shall consist of the following:

1. Air pump (manual or motor driven), equipped with a pressure gauge, capable of generating, sustaining, and measuring pressure between 25 and 30 psi and mounted on a cushion to protect geomembrane.
2. Rubber hose with fittings and connections. Sharp hollow needle, or other approved pressure feed device.
3. An air pressure-monitoring device.



## 3. PART 3: EXECUTION

### 3.1. Subgrade

**CONTRACTOR**, on a daily basis, shall certify in writing that the surface on which the geomembrane will be installed is acceptable. It will be the **CONTRACTOR**'s responsibility to maintain, protect, and if required return, the subgrade in the condition that was originally accepted, prior to geosynthetic deployment until accepted by **CC&V**, under criteria identified in Section 02200 as per the Bedding Fill and Soil Liner Fill SPECIFICATIONS.

### 3.2. Acceptance

**CONTRACTOR** shall retain all ownership and responsibility for the geomembrane until final acceptance. The geomembrane shall be accepted by **CC&V** when all of the following conditions are met:

1. Installation is finished.
2. Verification of the adequacy of all seams and repairs, including associated testing, is complete.
3. Certification, including QC documentation is provided by CONTRACTOR to MANAGER.
4. Recommended acceptance by **MANAGER** and **CERTIFYING ENGINEER**.
5. The entire PROJECT, including Drain Cover Fill placement and Diversion Channel construction is completed.

### 3.3. Anchor Trench

A. The anchor trenches shall be excavated to the lines, grade, and width shown on the DRAWINGS, prior to geosynthetic placement. **CERTIFYING ENGINEER** shall verify that the anchor trench has been constructed according to the DRAWINGS.

Slightly rounded corners shall be provided in the trench where the geomembrane adjoins the trench so as to avoid sharp bends in the geomembrane.

B. The anchor trench shall be backfilled and compacted as approved by **MANAGER**, **DESIGN ENGINEER,** and **CERTIFYING ENGINEER**. Trench backfill material shall be placed in eight

(8) to twelve (12) inch thick loose lifts and compacted by wheel rolling with light, rubber-tired, or other light compaction equipment, as approved by **CERTIFYING ENGINEER**.

Care shall be taken when backfilling the trenches to prevent any damage to the geomembrane. At no time shall construction equipment come into direct contact with the geomembrane. If damage occurs, it shall be repaired by **CONTRACTOR** prior to the completion of backfilling, at no cost to **CC&V**. Extend geomembrane into the anchor



trench as shown in the DRAWINGS. The geomembrane shall be seamed along the entire distance of the anchor trench to the termination of the geomembrane sheet.

### 3.4. Protection

**CONTRACTOR** shall be responsible for the following:

A. Do not use equipment or tools, which damage the geomembrane by handling, trafficking, excessive heat, leakage of hydrocarbons, or other means.

B. Ensure prepared surface underlying geomembrane has not deteriorated since previous acceptance, and remains acceptable until acceptance by **CC&V**, as detailed in Section 3.2.

C. Keep geotextile elements immediately underlying the geomembrane clean and free of debris.

D. Do not permit personnel to smoke or wear damaging shoes while working on geomembrane.

E. Unroll panels in a manner, which prevents scratches or crimps in geomembrane and does not damage supporting Soil Liner Fill.

F. Place panels in a manner that prevents wrinkles (especially differential wrinkles between adjacent panels).

G. Prevent wind uplift and damage to geomembrane subgrade by providing temporary and permanent loading and/or anchoring that will not damage geomembrane.

H. Minimize direct contact of equipment and personnel with geomembrane.

I. Protect geomembrane in areas where excessive traffic is expected with geotextiles, extra geomembrane, or other materials acceptable to **MANAGER**, **DESIGN ENGINEER,** and **CERTIFYING ENGINEER**.

### 3.5. Field Panel Deployment

A. **CONTRACTOR** shall install field panels at locations indicated on **CONTRACTOR**'s layout plan, as approved by **MANAGER**, **DESIGN ENGINEER,** and **CERTIFYING ENGINEER**.

B. **CONTRACTOR** shall replace damaged (i.e., torn, twisted, or crimped) field panels, or portions thereof, at no cost to **CC&V**. **CONTRACTOR** shall repair less serious damage according to Section 3.10 of this SPECIFICATION Section, at no cost to **CC&V**. **CERTIFYING ENGINEER** shall determine if material is to be repaired or replaced.

C. **CONTRACTOR** shall remove damaged panels, portions of damaged panels, and other geomembrane scrap.

D. **CONTRACTOR** shall not deploy more geomembrane field panels in one day than can be seamed during the day of deployment.



E. Geomembrane deployment shall proceed between ambient temperatures of fourteen degrees (14° F) Fahrenheit to one-hundred degrees (100o) Fahrenheit. Geomembrane placement shall not be done during any precipitation, in the presence of excessive moisture (e.g., fog, rain, dew) or in the presence of excessive winds, as determined by the **CQA MONITOR**.

F. Following the installation of the geomembrane, an examination of the entire surface shall be conducted to detect potentially harmful rocks or other objects. Any such objects will be removed and the geomembrane repaired by the **CONTRACTOR**, at no cost to **CC&V**.

### 3.6. Factory Seams

**MANAGER** and **CERTIFYING ENGINEER** may require **CONTRACTOR** to test up to as much as twenty percent (20%) of factory fusion welds (non-destructive air pressure test) in the field to verify factory test results. Additional testing at **CONTRACTOR**'s expense will be required if failed tests are obtained in the field.

### 3.7. Field Seams

A. Seam Layout

1. Seams shall be oriented parallel to the line of maximum slope, i.e., oriented down, not across the slope. In corners and odd-shaped geometric locations, the number of field seams shall be minimized.
2. No horizontal or base T-seam or tie-in seams shall be closer than five (5) feet from the toe of the slope. Seams shall be aligned to prevent wrinkles and "fish mouths." If a fish mouth or wrinkle is found, it shall be relieved and capped.
3. Panels of geomembrane will have sufficient overlap provided to allow peel tests to be performed on the seam.

B. Seaming Method

1. The procedure used to temporarily bond adjacent panels together shall not damage the geomembrane; in particular, the temperature of hot air at the nozzle of any spot welding apparatus shall be controlled such that the geomembrane is not damaged.
2. **CONTRACTOR** shall use double fusion welding as primary method of seaming adjacent field panels.
    a. For cross seam tees associated with fusion welding, **CONTRACTOR** shall patch panel intersections consisting of three or more panels and extrusion weld to a minimum distance of 4



inches on each side of patch. The edge of the sheet shall be ground to a 45° angle prior to welding.

b. Place a protective layer, e.g., insulting plate or fabric, beneath hot welding apparatus after usage.

c. When subgrade conditions dictate, use a moveable protective layer directly below each overlap of geomembrane that is to be seamed to prevent buildup of moisture between sheets and prevent debris from collecting around pressure rollers.

3. Remove seaming sheets and excess geomembrane trimmed to provide required overlap. Use conventional extrusion welding as a secondary method for seaming between adjacent panels and as a primary method of welding for detail and repair work.

a. Purge heat-degraded extrudate from barrel of extruder under the following conditions:

1. Prior to beginning a seam.

2. Whenever extruder has been inactive.

b. Place a smooth insulating plate or fabric beneath hot welding apparatus after usage.

c. Use clean and dry welding rods or extrudate pellets.

d. Complete grinding process without damaging geomembrane according to MANUFACTURER's instructions no more than one (1) hour prior to seaming operations.

e. Prevent exposed grinding marks adjacent to an extrusion weld. Do not extend exposed grinding marks more than one-quarter (1/4) inch from seam area. **CERTIFYING ENGINEER** may request that any and all abraded areas be covered with extrudate.

f. Extrusion weld all cross seam tees to a minimum distance of four (4) inches on each side of the tee.

g. For extrusion welds, the edge of the top sheet shall be beveled by grinding the edge of the sheet to approximately a 45-degree angle. Extrusion welds cannot be placed on previous extrusion welds.

C. Seaming Procedures

1. General Seaming Procedures

a. Areas to be seamed shall be cleaned and free of moisture, debris, or any marking on the geomembrane.



b. Use a flat board, a conveyor belt, or similar hard surface directly under the seam overlap to achieve proper support if required.

c. Cut fish mouths or wrinkles at the seam overlap along the ridge of the wrinkle in order to achieve a flat overlap. The cut fish mouths or wrinkles shall be seamed and any portion where the overlap is inadequate shall then be patched with an oval or round patch of the same geomembrane extending a minimum of six (6) inches beyond the cut in all directions.

d. Extend seaming to the outside edge of panels placed in the anchor trench.

D. Do not field seam without the Seaming Supervisor present.

E. Field Trial Seams

1. Trial seams shall be conducted at the beginning of each seaming period and within 30 minutes of commencement of seaming, at the **CERTIFYING ENGINEER**'s discretion, and immediately following any work stoppage (i.e., lunch, weather conditions, etc.) of 30 minutes or more for each seaming apparatus used that day. Each Seamer shall make at least one trial seam each day.

2. Testing shall include visual observation of a trial seam on the geomembrane material. The **INSTALLER** will mark the trial seam with date, ambient air temperature, welding machine number, welding technician identification, and machine temperature and speed. For extrusion welding, the **INSTALLER** will include the nozzle and extrusion settings and welding technician identification.

3. All trial seams shall be made at a location selected by the **CERTIFYING ENGINEER** in the area of the seaming and in contact with the subgrade. The trial seam samples shall be ten (10) feet long for fusion seaming and five (5) feet long for extrusion seaming, with the seam centered lengthwise. Specimens one (1) inch wide shall be cut from opposite ends of the test seam by **CONTRACTOR**. **CONTRACTOR** shall use a tensiometer to test these specimens for shear and peel. Both inside and outside tracks of fusion welds will be tested for peel. For both fusion and extrusion welds, two (2) coupons will be tested for peel and one (1) coupon for shear. The tensiometer shall have a grip separation of four (4) inches plus the width of the seam. The seam is to be centered between the clamps. The grip separation rates for LLDPE are twenty (20) inches per minute for shear and twenty (20) inches per minute for peel. These tests shall not fail according to the criteria in Section 2.1. A break through the weld or at the weld/sheet interface shall be considered a



failure in both shear and peel strength tests unless the weld strength exceeds the sheet strength, as discussed in Section 2.1. If a trial seam fails to meet field seam SPECIFICATIONS, the seaming apparatus and/or seamer shall not be accepted and shall not be used for seaming until the deficiencies are corrected and two consecutive successful full trial seams are achieved.

4. **CONTRACTOR** shall mark the test weld with date, ambient temperature, welding machine number, welding technician identification, machine temperature, and speed. For extrusion welding, **CONTRACTOR** shall record the nozzle and extrusion settings.

### 3.8. Nondestructive Testing

A. **CONTRACTOR** shall non-destructively test all field seams over their full length. All test equipment shall be furnished by **CONTRACTOR**.

B. The following vacuum box procedures are applicable to extrusion seaming and shall be followed by **CONTRACTOR**:

1. Excess sheet overlap shall be trimmed away.
2. Clean the vacuum box window, gasket surfaces and check for leaks.
3. Energize the vacuum pump and reduce the tank pressure to approximately 5 psi.
4. Wet a strip of geomembrane the approximate dimensions of the vacuum box with the soapy solution.
5. Place the box over the wetted area and compress.
6. Close the bleed valve and open the vacuum valve.
7. Ensure that a leak-tight seal is created.
8. For a period of not less than ten (10) seconds, examine the geomembrane through the viewing window for the presence of soap bubbles.
9. If no bubbles appear after ten (10) seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum three (3) inches overlap and repeat the process.
10. All areas where soap bubbles appear shall be marked and repaired and then retested.
11. Test locations, documentation number, date and tester will be indicated with an indelible marker on the geomembrane for each repair or seam section. The color code for indelible markers is to be determined at the pre-construction meetings, and strictly adhered to.

C. The following nondestructive test procedures are applicable to fusion seaming and shall be followed by **CONTRACTOR**.

1. Seal one end of the seam to be tested.
2. Insert needle or other approved pressure feed device through the sealed end of the channel created by the double wedge fusion weld.
3. Energize the air pump to verify the unobstructed passage of air through the channel.
4. Seal the other end of the channel.
5. Energize the air pump to the pressure of approximately 30 psi, close valve, and sustain pressure for approximately 5 minutes.
6. If loss of pressure exceeds 3 psi, or pressure does not stabilize, locate faulty area, repair, and retest.
7. Remove needle or other approved pressure feed device.
8. Repair pressure test locations as described in Section 3.11.
9. Beginning and ending pressures and times, test locations, documentation number, date, and tester will be indicated with an indelible marker on the liner at each test interval location.

D. The following procedures shall apply to locations where seams cannot be non-destructively tested, as determined by **CERTIFYING ENGINEER**:

1. If the seam is accessible to testing equipment prior to final installation, the seam shall be non-destructively tested prior to final installation. If the seam cannot be tested prior to final installation, the seaming operations shall be observed by **CQA MONITOR** for uniformity and completeness.

E. In the event that seam continuity cannot be demonstrated for a non-destructive test of a fusion seam as outlined above, the **CONTRACTOR** shall perform the non-destructive testing over smaller areas as a means of defining the questionable area. The identified questionable area shall be capped.

## 3.9. Destructive Testing

A. **CONTRACTOR** shall test a minimum of one destructive test sample per five hundred (500) feet of seam length from a location specified by **CERTIFYING ENGINEER**. **CONTRACTOR** shall not be informed in advance of the sample location. The samples shall be taken centered over the seam and prioritized as follows:

1. A minimum of one sample per day;



2. All areas identified as suspect during seaming, non-destructive testing/monitoring, and in unusual working conditions.
3. A minimum of one sample for each geomembrane seamer.
4. A minimum of one sample every five hundred (500) feet of seaming.

B. Samples shall be cut by **CONTRACTOR** as the seaming progresses. Sampling locations shall be determined by **CERTIFYING ENGINEER**. **CQA MONITOR** must witness the obtainment of all destructive test samples by **CONTRACTOR**. **CONTRACTOR** shall mark all samples with their seam number, date, welding machine number, welding technician identification, extruder and nozzle/wedge temperature, and ambient air temperature. **CONTRACTOR** shall document the date, time, roll and seam number, ambient temperature, and pass or fail description. All holes in the geomembrane resulting from obtaining the seam samples shall be immediately repaired. All patches shall be vacuum tested.

C. The samples shall be a minimum twelve (12) inches wide by twenty-four (24) inches long with the seam centered lengthwise. The sample shall be cut into two equal length pieces, half to be given to **CC&V** and the other half kept by **CONTRACTOR**.

D. **CONTRACTOR** shall cut and test ten (10) one (1) inch wide specimens from his sample. All testing shall be conducted at room temperature (60° F - 80° F) **CONTRACTOR** shall test five

(5) specimens for seam shear strength and five (5) for peel strength. Both inside and outside tracks of fusion seams will be tested for peel strength. To be acceptable, four (4) out of the five

(5) specimens must pass according to criteria established in Section 2.1. Any specimen that fails through the weld or at the weld/sheet interface shall be considered a failure, unless the weld strength exceeds the sheet strength, as discussed in Section 2.1. The tensiometer shall have a grip separation of four (4) inches plus the width of the seam. The seam is to be centered between the clamps. The grip separation rates for LLDPE are twenty (20) inches per minute for shear and twenty (20) inches per minute for peel. These tests shall not fail according to the criteria in Section 2.1.

E. **CQA MONITOR** must witness the testing of all destructive samples. Destructive tests will be performed within two (2) days of the samples being obtained. Failing tests shall be subjected to additional testing until a passing area is found. A passing area is defined as a seam(s) bounded at each end by a passing destructive test. Seams will be tracked in each direction until a passing destructive test is found or until a previous passing destructive test is reached. Seams will be tracked according to the welding apparatus and the machine

operator. The following procedures shall apply whenever a sample fails the field destructive test:

1. **CONTRACTOR** can retrace the welding path to an intermediate location (at a minimum of ten (10) feet from the location of the failed test in both directions), at **CERTIFYING ENGINEER** discretion, and take a small sample for an additional field test. If this test passes, then the seam shall be capped between the two passing locations. If the test fails, in either direction, the tracking process shall continue until a passing area is found.
2. Over the length of seam failure, **CONTRACTOR** shall either cut out the old seam, reposition the panel and reseam, or cap the failing area, as required by **CERTIFYING ENGINEER**.
3. If the area is reseamed, additional destructive field test(s) shall be taken within the reseamed area. The reseamed sample shall be found acceptable if test results are approved by **CERTIFYING ENGINEER**. If test results are not acceptable, this process shall be repeated until the reseamed length is judged satisfactory by **MANAGER** and **CERTIFYING ENGINEER**.
4. Samples taken as the result of failed tests do not count toward the total number of destructive tests required.

F. **CONTRACTOR** shall document all actions taken in conjunction with destructive test failures, with **CERTIFYING ENGINEER** providing Quality Assurance documentation.

G. Failing seam lengths which were capped shall be non-destructively tested as described in Section 3.8.

## 3.10. Defects and Repairs

A. All seams and non-seam areas of the geomembrane shall be observed by **CQA MONITOR** for defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. The surface of the geomembrane shall be clean at the time of observation. The geomembrane surface shall be brushed, blown, or washed by **CONTRACTOR** if the amount of dust or mud inhibits inspection. **MANAGER** and **CERTIFYING ENGINEER** shall determine if cleaning of the geomembrane is needed to facilitate observation at no additional cost to **CC&V**.

B. Each suspect location in seam and non-seam areas shall be non-destructively tested as determined appropriate by **CQA MONITOR**, in the presence of **CQA MONITOR**. Each location that fails the non- destructive testing shall be marked by **CONTRACTOR**, and repaired accordingly.

C. Repair Procedures

1. Defective seams shall be reconstructed as described in these SPECIFICATIONS.
2. Small holes shall be repaired by abrading the sheet surface and welding an extrusion bead. If the hole is larger than one-quarter (1/4) inch in diameter it shall be patched. Tears shall be repaired by patching. Where the tear is on a slope or an area of stress and has a sharp end it must be rounded prior to patching.
3. Blisters, large holes, undispersed raw materials, and contamination by foreign matter shall be repaired by patches.
4. Surface of geomembrane that are to be patched shall be abraded and cleaned no more than fifteen (15) minutes prior to the repair. No more than 10% of the thickness shall be removed.

D. Patches shall be round or oval in shape, and extend a minimum of six (6) inches beyond the edge of defects. All patches shall be of the same compound and thickness as the geomembrane specified. All patches shall have their top edge beveled to an approximately 45-degree angle with an angle grinder prior to placement of the patch. Patches shall be applied using approved methods only.

E. The extrusion welding process shall restart by grinding the existing seam and rewelding a new seam. Welding shall commence where the grinding started and must overlap the previous seam by at least two (2) inches. Reseaming over an existing seam without regrinding shall not be permitted.

F. Each repair shall be non-destructively tested, except when **CERTIFYING ENGINEER** requires a destructive seam sample obtained from a repaired seam. Repairs that pass the destructive test shall be taken as an indication of an adequate repair. Failed tests indicate that the repair shall be repeated and retested until passing test results are achieved.

Recording the Results: Daily documentation of all non-destructive and destructive testing shall be provided to **MANAGER** by **CQA MONITOR**. This documentation shall identify all seams that initially failed the test and include evidence that these seams were repaired and successfully retested.

## 3.11. Conformance Testing

A. During manufacturing of the geomembrane, **CQA MONITOR** will be present to obtain and forward samples to the Quality Assurance Testing Laboratory for testing to ensure conformance with the SPECIFICATIONS.

B. Samples will be taken across the entire width of the roll and shall not include the first three (3) feet. Unless otherwise stated, samples will be three (3) feet long by the width of the roll. **CQA MONITOR** will mark the machine direction on the

samples with an arrow. Unless otherwise stated, samples shall be taken at a frequency of no less than one per one hundred fifty thousand (150,000) square feet. As a minimum, the following tests will be performed to verify conformance to the design SPECIFICATIONS with minimum values specified in Section 2.1.:

| PROPERTY | TEST METHOD |
|---|---|
| Thickness (mils) Smooth/Textured | ASTM D5199/D5994 |
| Compound Density (g/cc) | ASTM D1505/D792 |
| Tensile Strength<br>(both yield and ultimate strength and elongation, as specified) | ASTM D6693 |
| Carbon Black Content (%) | ASTM D4218 |

## 3.12. Placement of Soil or Granular Materials

All soil materials located on top of a geomembrane shall be placed in such a manner as to ensure:

A. The geomembrane and any underlying geotextile are not damaged.

B. Minimal slippage of the geomembrane on underlying layer occurs.

C. Minimal movement and wrinkling or folding of the underlying geosynthetics layer(s) occurs.

D. No excess tensile stresses shall occur in the geomembrane, such as by earth moving equipment making sudden starts, stops, turns. The allowable ground pressure for equipment shall be prescribed by **DESIGN ENGINEER** for the material type and layer thickness as identified in Section 3.6 of SPECIFICATION Section 2200.

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# SECTION 02776-1 GEOGRID

## 1. PART 1: GENERAL

### 1.1. Summary

This SPECIFICATION describes requirements for the manufacture, fabrication (if needed), supply, and installation of geogrid over potential mine workings, as shown on the DRAWINGS; and construction quality control monitoring and testing. All procedures, operations, and methods shall be in strict compliance with the SPECIFICATIONS, Construction Quality Assurance Plan, and the DRAWINGS.

### 1.2. References

A. ASTM D1248 - Specification for Polyethylene Plastics Molding and Extrusion Materials.

B. ASTM D4218 - Test Method for Carbon Black Content in Polyethylene Compounds by the Muffle- Furnace Technique.

C. ASTM D4355 - Test Method for Deterioration of Geotextile by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus.

D. ASTM D5262 - Test Method for Evaluating Creep and Creep Rupture Behavior of Geosynthetics.

E. ASTM D5732 - Test Method for Stiffness of Non-Woven Fabrics Using the Cantilever Test.

F. ASTM D6637- Test Method for Determining Tensile Properties of Geogrids by the Single or Multi- Rib Tensile Method.

G. ASTM D7737- Standard Test Method of Individual Geogrid Junction Strength

H. ASTM D7748- Standard Test Method for Flexural Rigidity of Geogrids, Geotextiles, and Related Products

I. GRI - Test Method GG2 - Geogrid Junction Strength.

J. GRI - Test Method GG4- Determination of the Long-Term Design Strengths of Geogrids.

K. EPA 9090 - Test Method for Determining the Chemical Waste Compatibility of Synthetic Liners.

### 1.3. Submittals

**CONTRACTOR** shall provide the following information relating to the geogrid **MANUFACTURER** and **INSTALLER** prior to commencement of the **WORK**:

A. Information from the **MANUFACTURER** including company name, address, telephone number, and the names of the company president and quality control manager.

B. Quality Control Manuals from the **MANUFACTURER** for the installation and testing of the geogrid.

C. Quality Control Certificates from the **MANUFACTURER**.

## 1.4. Quality Assurance

A. All work shall be constructed, monitored, and tested in compliance with the requirements of the Construction Quality Assurance Plan (Section 01400-2). **CONTRACTOR** and **MANUFACTURER** shall participate in and comply with all items in these SPECIFICATIONS and requirements of the CQA plan.

B. **CONTRACTOR** shall ensure that each geogrid **MANUFACTURER** that supplies materials to this project has an internal product quality control program that meets SPECIFICATIONS.

C. Geogrid rolls that do not meet the requirements of this SPECIFICATION will be rejected. **CONTRACTOR** shall replace the rejected material with new material that conforms to the SPECIFICATION requirements, at no additional cost to **CC&V**.

## 1.5. Delivery, Storage, and Handling

A. Packing and Shipping

1. Labels on each roll delivered to Site shall identify the following.
    a. **MANUFACTURER**'s name
    b. Product Identification
    c. Thickness
    d. Roll number
    e. Batch or lot number
    f. Roll dimensions
2. **CONTRACTOR** shall ensure that geogrid rolls are properly loaded and secured to prevent damage during transit.
3. **CONTRACTOR** shall protect geogrid from excessive heat, cold, puncture, cutting, or other damaging or deleterious conditions.
4. **CONTRACTOR** shall ensure personnel responsible for loading, transport, and unloading of geogrid are fully aware of the consequences of damage to geogrid, and are familiar with handling and transport constraints imposed by **MANUFACTURER**.
5. Geogrid delivered to the project shall be protected by a relatively impermeable and opaque protective cover, with individual straps for unloading.

B. Acceptance at Site

1. **CQA MONITOR** shall perform inventory and surface inspection for defects and damage of all geogrid rolls upon delivery.

2. **CONTRACTOR** shall unroll and inspect any geogrid roll that may be damaged below surface.
3. **CONTRACTOR** shall repair damage resulting from handling and transport of geogrid at no additional cost to **CC&V**. If irreparable, in the opinion of **CERTIFYING ENGINEER**, damaged materials shall be replaced at no additional cost to **CC&V**.

C. Storage and Protection

1. **MANAGER** will provide area for on-site storage of the geogrid rolls from time of delivery until installation.
2. The storage and handling of the materials is the responsibility of **CONTRACTOR** from the time the materials are manufactured until the time the completed installation is accepted. **CONTRACTOR** is responsible for preparing the storage location and for the protection of the materials from the elements (e.g. ultraviolet light, moisture, temperature, etc.).
3. After **CONTRACTOR** has removed material from storage, **CONTRACTOR** shall protect geogrid from puncture, dirt, grease, water, moisture, mud, mechanical abrasion, excessive heat, and other sources of damage.
4. **CONTRACTOR** shall preserve integrity and readability of the geogrid roll labels, and store the rolls such that **MANAGER** and **CERTIFYING ENGINEER** have access to the package slips or roll labels for each roll to verify roll acceptance.
5. The rolls shall be stored on a prepared surface (not wooden pallets) and should not be stacked more than two rolls high.

## 2. PART 2: PRODUCTS

### 2.1. Materials

A. Geogrid shall be Tensar UX1800 HS or equivalent and shall have the following properties:

**TABLE 2.01 - TYPICAL GEOGRID PROPERTIES**

| PROPERTY | TEST METHOD | UNITS | VALUE |
|---|---|---|---|
| Reinforcement | | | |
| - tensile strength | ASTM D6637 | lb/ft | |
| at 5% strain | | | 6,500 (min) |
| at ultimate | | | 14,300 (min) |
| - junctions strength | ASTM D7737/GRI GG2 | lb/ft | 12,340 (min) |
| Material | | | |
| Mass Unit Area | ASTM D5261 | Oz/sq yd | 28 |

**Notes:**

1. **True resistance to elongation when initially subjected to a load via ASTM D6637 without deforming test materials under load before measuring such resistance or employing "secant" or "offset" tangent methods of measurement so as to overstate tensile properties.**
2. **Geogrid junction strength and junction efficiency measured by ASTM D7737.**

B. Geogrid shall be capable of retaining its structure during handling, placement, and long-term service.

## 2.2. Manufacturer Quality Control

**CONTRACTOR** shall ensure that geogrid **MANUFACTURER** meets the conditions in this section.

A. Geogrid Tests and Inspection

1. Geogrid **MANUFACTURER** shall perform quality control testing of the geogrid. Samples not satisfying specifications shall result in the rejection of applicable rolls. At a minimum, the following tests shall be performed for quality control in accordance with test methods specified in Table 2.01.
   a. Density
   b. Mass per unit area
   c. Carbon black content
2. At geogrid **MANUFACTURER'S** discretion and expense, additional testing of individual rolls may be performed to more closely identify noncomplying rolls and to qualify individual rolls.
3. Geogrid manufacturer shall perform quality control tests at a frequency of at least every 50,000 $ft^2$ of geogrid produced.

# 3. PART 3: EXECUTION

## 3.1. Examinations

A. Conformance Testing

1. Geogrid manufacturer shall supply samples of geogrid to **CQA ENGINEER** for conformance testing. Unless otherwise specified, samples shall be taken at a rate of one per lot, not to exceed one conformance test per 100,000 square feet of geogrid.
2. For geogrid, the following tests shall be performed using the procedures listed in Table 2.01:
   a. Mass per unit area
   b. Aperture size
   c. Wide strip tensile strength
   d. Junction strength
3. Geogrid shall be rejected if conformance test results do not meet or exceed the values presented in Table 2.01.

## 3.2. Installation

A. Geogrid Deployment
   1. No equipment or tools shall damage the geogrid by handling, trafficking, or other means.
   2. No personnel working on the geogrid shall smoke, wear damaging shoes, or engage in other activities that could damage the geogrid.
   3. On slopes, the geogrid shall be securely anchored and then rolled down the slope in such a manner as to continually keep the sheet in tension.
   4. Geogrid panels shall be deployed in such a manner as to preclude wrinkles and folds.
   5. Geogrid within the lined area shall be cut with a cutter approved by **CC&V**, such as scissors. Unshielded razor knives are not acceptable.
   6. Two layers of geogrid shall be installed as indicated on the Drawings. The layers will be placed at right angles to each other as directed by the **CERTIFYING ENGINEER.**
   7. The subgrade shall be prepared for geogrid placement by uniform grading. No steep grade changes or edges shall be allowed. The **CERTIFYING ENGINEER** shall approve the subgrade prior to geogrid installation. The subgrade ***must not*** be smooth rolled.

B. Joining
   1. The geogrid shall be placed in continuous pieces downslope.
   2. If the geogrid is to be joined end to end, a pinned connection splice shall be used. The pinned connection must be manufactured from HDPE materials and shall be manufacturer approved.

C. Defects and Repairs

1. All damaged geogrid rolls shall be rejected. No repairs shall be made.

## 3.3. Placement of Soil or Granular Materials

All soil materials located on top of a geogrid shall be placed in such a manner as to ensure:

1. The geogrid is not damaged.
2. Minimal movement and wrinkling or folding of the underlying geogrid layer(s) occurs.
3. No excess tensile stresses shall occur in the geogrid such as when earth-moving equipment makes sudden starts, stops, or turns.
4. Soil placement over the geogrid shall be performed with construction equipment approved by the **CERTIFYING ENGINEER**. Such construction equipment includes low to moderate ground pressure dozers (e.g., D-6 or D-8 CAT dozer). Dozers will push soil materials over the geogrid from the bottom of the slope in an uphill direction.
5. A minimum of 6” of soil cover shall be placed over the geogrid layers. No construction equipment shall operate directly on the geogrid layer or on less than 6” of soil cover.
6. Soil cover over the geogrid shall consist of Select Structural Fill and shall be compacted and placed according to Select Structural Fill SPECIFICATIONS in Section 2200.
7. Extent of geogrid-reinforced areas shall be surveyed and staked in the field by the **CONTRACTOR**. Subsequent construction activities over the reinforced areas shall not damage geogrid or reduce soil cover thickness to less than 6 inches.

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# SECTION 02711 GEOTEXTILE

## 1. PART 1: GENERAL

### 1.1. Summary

This SPECIFICATION describes requirements for the manufacture, supply, and installation of the geotextile in the Leak Detection System as shown on the DRAWINGS; and construction quality control monitoring. All procedures, operations, and methods shall be in strict compliance with the SPECIFICATIONS, the Construction Quality Assurance Plan, and the DRAWINGS.

### 1.2. Submittals

A. Submittals with Bid Documents

**CONTRACTOR** shall provide the following information relating to the geotextile **MANUFACTURER** with its proposal.

1. Information from **MANUFACTURER** including company name, address, telephone number, the names of the company president and quality control manager, and narrative of the company history.
2. Description of **MANUFACTURER's** manufacturing capabilities:
   a. Information on plant size, equipment, personnel, number of shifts per day, and capacity per shift.
   b. A list of standard material properties and test methods employed to arrive at the values for each. As a minimum, the list shall include properties given in Part 2 of this SPECIFICATION.
3. The Quality Control Manual followed during the manufacturing process including those for the polymer material and for detecting foreign objects in the finished goods, and a description of the quality control laboratory facilities, including the name and telephone number of the quality control manager. Upon review of the Quality Control Manual, the **MANAGER** and **CERTIFYING ENGINEER** may request additional testing during the manufacturing process at no additional cost to **CC&V**.

B. **CONTRACTOR** shall provide the following information after contract award but within ten (10) days prior to material arrival on-site and prior to commencement of the work:

1. The geotextile **MANUFACTURER** shall provide written certification that the geotextile to be used meets the requirements of the VLF2 Phase 3 Project and has been continuously inspected for the presence of needles and geotextile was found to be needle free.



2. A copy of the **MANUFACTURER's** geotextile QC test results of properties outlined in Part 2 of this SPECIFICATION. The **MANAGER** reserves the right to refuse use of any geotextile supplied without the proper QC documentation.
3. A detailed list of performance criteria for the geosynthetic material being produced for this project. (Note: Performance criteria are sometimes referred to as "minimum property values." Refer to Part 2 of this SPECIFICATION for geotextile properties and test methods.)

### 1.3. Quality Assurance

A. All Work shall be constructed, monitored, and tested in compliance with requirements in the Construction Quality Assurance Plan (Section 01400-2). **CONTRACTOR** and **MANUFACTURER** shall participate and comply with all items in these SPECIFICATIONS and requirements of the CQA plan.

B. **CONTRACTOR** shall ensure that geotextile **MANUFACTURER** has an internal product quality control program that meets Contract requirements.

C. **CONTRACTOR** shall be aware of all activities outlined in the Construction Quality Assurance Plan, and the **CONTRACTOR** shall account for these activities in the construction schedule.

D. **CONTRACTOR** shall assure that the geotextile is delivered to the site at least 14 calendar days prior to installation to allow sufficient time for conformance testing, if necessary.

E. Geotextile rolls that do not meet the requirements of this SPECIFICATION will be rejected. **CONTRACTOR** will be required to replace the rejected material with new material that complies with the SPECIFICATIONS, at no additional cost to **CC&V**.

F. In order to prevent weather-damaged geotextile from being placed, the following Quality Assurance procedures shall be followed:

1. **CONTRACTOR** shall perform its Work and utilize sufficient ballast as necessary to prevent wind uplift of the geotextile panels.
2. If weather damage should occur, **CERTIFYING ENGINEER** shall determine if the geotextile shall be repaired or replaced. Weather damage to the geotextile will include tears and dirty fabric, as determined by the **CERTIFYING ENGINEER**.
3. Repair or replacement of the weather-damaged geotextile shall be completed by **CONTRACTOR** at no additional cost to **CC&V**.
4. As determined by **MANAGER** and **CERTIFYING ENGINEER**, the geotextile panel may be rejected at no cost to **CC&V**.

### 1.4. Delivery, Storage, and Handling

A. Packing and Shipping

1. Geotextile shall be supplied in rolls wrapped in relatively impermeable and opaque protective covers, with straps for unloading.
2. Geotextile rolls shall be marked or tagged with the following information.
    a. **MANUFACTURER's** name
    b. Product information
    c. Roll number
    d. Batch of lot number
    e. Roll dimensions
3. **CONTRACTOR** shall ensure that geotextile rolls are properly loaded and secured to prevent damage during transit.
4. **CONTRACTOR** shall protect geotextile from excessive heat, cold, puncture, cutting, or other damaging or deleterious conditions.
5. **CONTRACTOR** shall ensure personnel responsible for loading, transport, and unloading of are familiar with handling and transport constraints imposed by MANUFACTURER.

B. Acceptance at Site

1. **CQA MONITOR** shall perform inventory and surface inspection for defects and damage of all geotextile rolls upon delivery.
2. **CONTRACTOR** shall unroll and inspect any geotextile roll that may be damaged below surface.
3. **CONTRACTOR** shall repair damage resulting from handling and transport of geotextile at no cost to **CC&V**. If irreparable, in the opinion of **CERTIFYING ENGINEER**, damaged materials shall be replaced at no cost to **CC&V**.

C. Storage and Protection

1. **MANAGER** will provide on-site storage area for geotextile rolls from time of delivery until installation.
2. The storage of the materials is the responsibility of **CONTRACTOR** from the time the materials are manufactured until the time the completed installation is accepted. **CONTRACTOR** is responsible for preparing the storage location and for the protection of the material from the elements (e.g. ultraviolet light, moisture, temperature, etc.).
3. After **CONTRACTOR** has removed material from storage area, protect geotextile from puncture, dirt, groundwater, moisture, mud, mechanical abrasion, excessive heat, ultraviolet light exposure, and other sources of damage.
4. Geotextile shall be supplied in rolls wrapped in relatively impermeable and opaque protective covers, with straps for unloading.

5. **CONTRACTOR** shall preserve integrity and readability of the geotextile roll labels, and store such that **MANAGER** and **CERTIFYING ENGINEER** have access to the package slips or roll labels for each roll to verify roll acceptance.

## 2. PART 2: PRODUCTS

### 2.1. Materials

A. Twelve-ounce Non-Woven Needle Punched Geotextile:

1. Geotextile shall be comprised of polyester or polypropylene fibers. Rolls shall be free of holes, contamination, and foreign matter.
2. The geotextile supplied for the project shall meet or exceed the minimum (unless noted otherwise) roll values shown in the table below:

| MINIMUM AVERAGE ROLL VALUES FOR GEOTEXTILE MATERIAL | | |
|---|---|---|
| **Property** | **ASTM Test Method** | **Value** |
| Weight (oz./sq. yd.) | D5261 | 11.9 |
| Puncture (lbs.) | D6241 | 800 |
| Apparent Opening Size | D4751 | No. 80 to 140 Sieve |

## 3. PART 3: EXECUTION

### 3.1. Installation

A. Geotextile Deployment

**CONTRACTOR** shall handle geotextile in a manner to ensure that geotextile is not damaged, and shall comply with the following:

1. No equipment or tools shall damage the geotextile by handling, trafficking, or other means.
2. No personnel working on the geotextile shall smoke, wear damaging shoes, or engage in other activities that could damage the geotextile.
3. Cross seams between two (2) panels of geotextile shall be staggered by a minimum distance of five (5) feet on slopes greater than ten percent (10%).
4. In the presence of wind, all geotextiles shall be weighted with sandbags or the equivalent. Such sandbags shall be installed during deployment and shall remain until replaced with cover material.

5. Geotextile panels shall be deployed in such a manner as to preclude wrinkles and folds. Any wrinkle or fold that may manifest itself into other geosynthetic layers shall be removed.
6. Geotextile within the lined area shall be cut with a cutter approved by **CERTIFYING ENGINEER**, such as scissors.
7. Take necessary precautions to prevent damage to the underlying subgrade during placement of the geotextile.
8. During placement of geotextiles, care shall be taken not to entrap, in or beneath the geotextile, stones, excessive dust, or moisture that could damage the underlying or overlying geomembrane, cause clogging of drains or filters, or hamper subsequent seaming.
9. Following the installation of all geotextile, an examination of the entire surface shall be conducted to detect potentially harmful foreign objects. Any such foreign objects found shall be removed or the panel shall be replaced by the **CONTRACTOR**, at no cost to **CC&V.**
10. Geotextile panels shall not be deployed over frozen ground, unless approved by **CERTIFYING ENGINEER**.

B. Seaming Procedures

1. On slopes steeper than ten (10) percent, and in all cases in which soil or granular materials are to be placed over the geotextile, all seams shall be continuously sewn. In all other applications, sewing is the preferred seaming method.
2. Seams to be sewn shall be overlapped a minimum of six (6) inches and shall be sewn with a locking stitch. Seams to be thermally bonded shall be overlapped a minimum of twelve (12) inches.
3. The thread used in sewing shall be of polymeric material having chemical resistance, and if the geotextile is to be exposed for more than thirty (30) days, ultraviolet resistance equal to or exceeding that of the geotextile.
4. **CONTRACTOR** shall take measures to prevent soil, granular materials, or foreign materials from entering or becoming trapped beneath the geotextile both during and following installation.

C. Defects and Repairs

Repair holes or tears in geotextile as follows:

1. Remove any soil or other material that may have penetrated the torn geotextile.
2. Should any tear exceed 10 percent of the width of the roll, that section of the roll shall be removed from the slope and replaced.

3. On slopes steeper than 10:1 (horizontal:vertical), sew into place, in accordance with Section 3.1(B) of this SPECIFICATION, a patch made from same geotextile. Use continuous sewing.
4. On slopes shallower than 10:1 (horizontal:vertical), sew geotextile patch into place using continuous (preferred) or spot seam in place a patch made from same geotextile, with a minimum 24-inch overlap in all directions.

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# SECTION 03300 CAST-IN-PLACE CONCRETE

## 1. PART 1: GENERAL

### 1.1. Related Sections

Refer to the following Sections for related work:

- Section 02200 - Earthworks

### 1.2. Submittals

A. **CONTRACTOR** shall provide product data to allow evaluation by **MANAGER** and **CERTIFYING ENGINEER**.

B. **CONTRACTOR**'s mix design for each tentative mix for concrete shall contain the following information:

1. Slump on which design is based.
2. Total gallons of water per cubic yard.
3. Brand, type, composition, and quantity of cement.
4. Specific gravity and gradation of each aggregate.
5. Ratio of fine to total aggregates.
6. Weight (surface dry) of each aggregate per cubic yard.
7. Brand, type, ASTM designation, active chemical ingredients, and quantity of each admixture.
8. Time of initial set.

### 1.3. Tolerances

Concrete shall be placed to the lines and dimensions shown on the DRAWINGS.

### 1.4. Quality Assurance

A. All concrete testing (both field and laboratory testing) will be the responsibility of **CONTRACTOR**. **CONTRACTOR** shall be responsible for cooperating with **CQA MONITOR** during all testing activities. **CONTRACTOR** shall provide equipment and labor to assist **CQA MONITOR** in sampling, if requested, and shall also provide access to all areas requiring testing activities.

B. Any Work found unsatisfactory or any Work disturbed by subsequent operations before acceptance is granted shall be corrected by **CONTRACTOR**.

C. Flowable fill shall be manufactured by a ready-mix concrete producer with a minimum of 1 year experience in the production of similar products.

## 2. PART 2: PRODUCTS

### 2.1. Materials

A. Portland Cement, ASTM C 150, Type II.

B. Coarse Aggregate, ASTM C 33, except that clay and shale particles shall not exceed 1 percent of total aggregate.

C. Fine Aggregate, ASTM C 33, washed natural sand.

D. Flowable Fill containing, at a minimum, cementitious materials and water. The mixture may also contain fine aggregate or filler, and/or chemical admixtures in any proportions such that the final product meets the strength, flow consistency and shrinkage requirements included in this specification, as approved by the **CERTIFYING ENGINEER**.

1. Portland Cement: ASTM C150, Type II.
2. Mixing Water
3. Air-Entraining Admixture: ASTM C260.
4. Chemical Admixtures: ASTM C494.
5. Aggregate: ASTM C33.

### 2.2. Mixes

A. Mix Designs:

Concrete mix design shall be designed by an independent testing laboratory.

B. Cast-In-Place Concrete:

1. Cast-in-place concrete with reinforcing steel shall have a minimum 28-day compressivestrength of 4,000 psi.
2. Maximum Aggregate size of 1-inch.
3. Placement slump between 2-inches and 5-inches.
4. Air entrainment of 5% to 8%.

C. Flowable Fill:

1. Minimum compressive strength of 300 psi, ASTM C 39, at 28 days after placement.
2. Minimal subsidence and bleed water shrinkage. Evaporation of bleed water shall not result in shrinkage of more than 1/8 inch per ft. of flowable fill depth (for mixes containing high fly ash content).
3. Unit weight of (115 – 145 lb/feet$^3$) measured at the point of placement. In the absence of strength data the cementitious content shall be a maximum 150 lbs/cy.

### 2.3. Curing Compounds

Concrete curing compound shall be a clear compound complying with ASTM C 309, Type 1-D, Class A andB, such as "RES-X" by Burke, or an equivalent approved by **CERTIFYING ENGINEER**.

## 3. PART 3: EXECUTION

### 3.1. Structural Concrete

Place structural concrete as shown on DRAWINGS.

### 3.2. Installation

A. Ready-Mix Concrete shall be batched, transported, and placed in accordance with ASTM C94. Each batch delivered to the Site shall be accompanied by a certified weight master's delivery ticket.

B. All mixed concrete delivered to the Site shall be placed within 90 minutes from the time of introduction of cement and water into the mix.

C. No water shall be added after leaving the batch plant without the approval of **CERTIFYING ENGINEER**.

D. Placement of concrete, once started, shall be performed as a continuous operation until the scheduled placement is completed.

E. Cold joints shall be approved by **CERTIFYING ENGINEER**.

F. Concrete shall be thoroughly compacted by vibrating with suitable tools during placement, aroundembedded fixtures, and into the corners of forms.

G. Vibrators shall be operated at each point of placement and a standby vibrator in good working condition shall be kept at the placement site until all concrete is placed. Vibrators shall be used that will maintain at least 9,000 cycles per minute when immersed in the concrete.

H. Vibrations shall be used only to minimize honeycomb and accomplish compaction of the concrete, and shall not be used to move concrete from one location to another. Concrete shall not be moved in the forms more than 5 feet.

I. The surface of hardened concrete on which fresh concrete is to be placed shall be rough, clean, sound, and damp. The hardened surface shall be cleaned of all laitance, foreign substances, curing compound, washed with clean water, and wetted thoroughly preceding placement of fresh concrete.

J. Secure tanks, pipes and other members to be encased in flowable fill. Insure that there are no exposed metallic pipes, conduits, or other items that will be in contact with the flowable fill after placement. If so, replace with non-metallic materials or apply manufacturers recommended coating to protect metallic objects before placing the

flowable fill. Replacement or protection of metallic objects is subject to the approval of the **CERTIFYING ENGINEER.**

### 3.3. Cleaning

All form materials and debris resulting from construction shall be disposed of as directed by **MANAGER**.

### 3.4. Curing

A. General:
   1. Concrete shall be protected from loss of moisture for at least seven (7) days after placement.
   2. Curing may be accomplished with water or a curing compound.
   3. Water or curing compound shall be applied to formed surfaces within one (1) hour of form stripping.

B. Water Curing:
   1. Water saturation of unformed surfaces shall begin as quickly as possible after initial set of the concrete.
   2. The rate of water application shall be regulated to provide complete surface coverage with a minimum of runoff.
   3. Concrete surfaces shall not be permitted to become dry during the curing period.

C. Curing Compound:
   1. Curing compound shall be spray-applied at the **MANUFACTURER's** recommended coverage rate.
   2. Unformed surfaces shall be covered within 30 minutes after final finishing.
   3. Curing compound shall be protected against abrasion during the curing period.

### 3.5. Schedules

**CONTRACTOR** shall notify **MANAGER** at least forty-eight (48) hours before each concrete placement.

### 3.6. Field Quality Control

A. Concrete testing will be performed by **CONTRACTOR**.

B. Four standard 4-inch diameter by 8-inch long test cylinders shall be prepared for every 50 yards of concrete placed or for each placement, whichever is greater, at the discretion of the **MANAGER, DESIGN ENGINEER** and **CERTIFYING ENGINEER**.

C. Standard compression tests shall be performed to determine the compressive strength: one at seven (7) days, one at fourteen (14) days, and one at twenty-eight (28) days. The fourth cylinder shall be kept in reserve for additional testing, if necessary.

D. Slump testing shall be performed at the time the cylinders are prepared.

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| **PROJECT: VLF2 Phase 3** | | |
| **TITLE: TECHNICAL SPECIFICATIONS –CEMENTED ROCKFILL** | | **SPECIFICATION NO.**<br>**03310 CEMENTED ROCKFILL** |

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# SECTION 03310 CEMENTED ROCKFILL

## 1. PART 1: GENERAL

### 1.1. Related Sections

Refer to the following Sections for related work:

- Section 02200 - Earthworks

### 1.2. Submittals

A. CONTRACTOR shall provide product data to allow evaluation by MANAGER and CERTIFYING ENGINEER.

B. **CONTRACTOR**'s mix design for each tentative mix for cemented rockfill shall contain the following information:

1. Total gallons of water per cubic yard.
2. Brand, type, composition, and quantity of cement.
3. Time of initial set.
4. Placement and compaction technique, including chute arrangement to transfer material from truck to bottom of underground working without contaminating the Cemented Rockfill with loose surficial soils.
5. Method of mixing the aggregate and cement, and transporting the Cemented Rockfill.

### 1.3. Tolerances

Cemented rockfill shall be placed to the lines and dimensions shown on the DRAWINGS.

### 1.4. Quality Assurance

A. Any Work found unsatisfactory or any Work disturbed by subsequent operations before acceptance is granted shall be corrected by **CONTRACTOR**, at no additional cost to **CC&V**.

## 2. PART 2: PRODUCTS

### 2.1. Materials

A. Portland Cement, ASTM C 150, Type V

B. Fine Shaft Backfill

### 2.2. Mixes

A. Cemented Rockfill:

1. Maximum Aggregate size of 2-inch.
2. 6 percent (by dry weight) cement.
3. The Cemented Rockfill will be placed at a water content to be approved by **CERTIFYING ENGINEER**, corresponding to approximately at optimum water content to wet of optimum water content, as determined by ASTM D698.

## 3. PART 3: EXECUTION

### 3.1. Installation

A. CONTRACTOR shall prepare the underground working to minimize the amount of sloughing in of material from the sides.

B. No water shall be added after leaving the mixing area/batch plant without the approval of MANAGER and CERTIFYING ENGINEER.

C. The surface of hardened concrete on which fresh Cemented Rockfill is to be placed shall be rough, and cleaned of all laitance and foreign substances.

D. The rock surface within the competent bedrock of the underground working shall be scaled to remove any loose material prior to Cemented Rockfill placement.

E. Each 3 foot thick lift of the Cemented Rockfill shall be compacted according to a method specification, approved by the **MANAGER** and **CERTIFYING ENGINEER**.

### 3.2. Field Quality Control

A. All concrete testing (both field and laboratory testing) will be the responsibility of **CONTRACTOR**. **CONTRACTOR** shall be responsible for cooperating with CQA Monitor during all testing activities. **CONTRACTOR** shall provide equipment and labor to assist CQA Monitor in sampling, if requested, and shall also provide access to all areas requiring testing activities.

B. Any Work found unsatisfactory or any Work disturbed by subsequent operations before acceptance is granted shall be corrected by **CONTRACTOR**.

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# SECTION 03320 CONCRETE PLUG

## 1. PART 1: GENERAL

### 1.1. Related Sections

Refer to the following Sections for related work:

- Section 02200 - Earthworks

### 1.2. Submittals

A. **CONTRACTOR** shall provide product data to allow evaluation by **MANAGER** and **CERTIFYING ENGINEER**.

B. **CONTRACTOR**'s mix design for each tentative mix for concrete shall contain the following information:

1. Slump on which design is based.
2. Total gallons of water per cubic yard.
3. Brand, type, composition, and quantity of cement.
4. Specific gravity and gradation of each aggregate.
5. Ratio of fine to total aggregates.
6. Weight (surface dry) of each aggregate per cubic yard.
7. Time of initial set.

### 1.3. Tolerances

Concrete shall be placed to the lines and dimensions shown on the DRAWINGS.

### 1.4. Quality Assurance

A. All concrete testing (both field and laboratory testing) will be the responsibility of **CONTRACTOR**. **CONTRACTOR** shall be responsible for cooperating with **CQA MONITOR** during all testing activities. **CONTRACTOR** shall provide equipment and labor to assist **CQA MONITOR** in sampling, if requested, and shall also provide access to all areas requiring testing activities.

B. Any Work found unsatisfactory or any Work disturbed by subsequent operations before acceptance is granted shall be corrected by **CONTRACTOR**.

## 2. PART 2: PRODUCTS

### 2.1. Materials

A. Portland Cement, ASTM C 150, Type V.

B. Coarse Aggregate, ASTM C 33, except that clay and shale particles shall not exceed 1 percent of total aggregate.

C. Fine Aggregate, ASTM C 33, washed natural sand.

### 2.2. Mixes

A. Mix Designs:

Concrete mix design shall be designed by an independent testing laboratory.

B. Cast-In-Place Concrete:

1. Cast-in-place concrete shall have a minimum 28-day compressive strength of 4,000 psi.
2. Maximum Aggregate size of 1-inch.
3. Placement slump of between 2-inches and 5-inches.

## 3. PART 3: EXECUTION

### 3.1. Installation

A. Ready-Mix Concrete shall be batched, transported, and placed in accordance with ASTM C94. Each batch delivered to the Site shall be accompanied by a certified weight master's delivery ticket.

B. All mixed concrete delivered to the Site shall be placed within 90 minutes from the time of introduction of cement and water into the mix.

C. No water shall be added after leaving the batch plant without the approval of **CERTIFYING ENGINEER**.

D. Placement of concrete, once started, shall be performed as a continuous operation until the scheduled placement is completed.

E. Cold joints shall be approved by **CERTIFYING ENGINEER**.

F. Vibrators shall be used only to minimize honeycomb, and shall not be used to move concrete from one location to another. Concrete shall not be moved in the forms more than 5 feet.

G. The rock surface within the competent bedrock of the underground working shall be scaled to remove any loose material prior to Cement Plug placement.

### 3.2. Cleaning

All form materials and debris resulting from construction shall be disposed of as directed by **MANAGER**.

### 3.3. Schedules

**CONTRACTOR** shall notify **MANAGER** at least forty-eight (48) hours before each concrete placement.

### 3.4. Field Quality Control

A. Concrete testing will be performed by **CONTRACTOR**.

B. Four standard 4-inch diameter by 8-inch long test cylinders shall be prepared for every 50 yards of concrete placed or one per day, whichever is greater, at the discretion of the **MANAGER, DESIGN ENGINEER,** and **CERTIFYING ENGINEER**.

C. Standard compression tests shall be performed to determine the compressive strength: one at seven

(7) days, one at fourteen (14) days, and one at twenty-eight (28) days. The fourth cylinder shall be kept in reserve for additional testing, if necessary.

D. Slump testing shall be performed at the time the cylinders are prepared.

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# SECTION 03330 FLOWABLE FILL

## 1. PART 1: GENERAL

### 1.1. Related Sections

Refer to the following Sections for related work:

- Section 02200 - Earthworks

### 1.2. Submittals

A. **CONTRACTOR** shall provide product data to allow evaluation by **MANAGER** and **CERTIFYING ENGINEER**.

B. **CONTRACTOR**'s mix design for each tentative mix for flowable fill shall contain the following information:

1. Total gallons of water per cubic yard.
2. Brand, type, composition, and quantity of cement.
3. Specific gravity and gradation of each aggregate.
4. Ratio of fine to total aggregates.
5. Weight (surface dry) of each aggregate per cubic yard.
6. Brand, type, ASTM designation, active chemical ingredients, and quantity of each admixture.
7. Time of initial set.
8. Method of mixing the aggregate and cement, and transporting the Flowable Fill.

### 1.3. Tolerances

Flowable fill shall be placed to the lines and dimensions shown on the DRAWINGS.

### 1.4. Quality Assurance

A. Any Work found unsatisfactory or any Work disturbed by subsequent operations before acceptance is granted shall be corrected by **CONTRACTOR**, at no additional cost to **CC&V**.

## 2. PART 2: PRODUCTS

### 2.1. Materials

A. Portland Cement: ASTM C150, Type II.

B. Mixing Water

C. Air-Entraining Admixture: ASTM C260.

D. Chemical Admixtures: ASTM C494.

E. Aggregate: ASTM C33.

### 2.2. Mixes

A. Flowable Fill:

1. Minimum strength of 300 psi, ASTM C 39, at 28 days after placement.
2. Placement slump of between 3-inches and 7-inches.

## 3. PART 3: EXECUTION

### 3.1. Installation

A. All flowable fill delivered to the Site shall be placed within ninety (90) minutes from the time of introduction of cement and water into the mix.

B. No water shall be added after leaving the batch plant without the approval of **CERTIFYING ENGINEER.**

C. Placement of flowable fill, once started, shall be performed as a continuous operation until the scheduled placement is completed.

### 3.2. Protection and Curing

A. Protect exposed surfaces of flowable fill from premature drying, was by rain or running water, wind, mechanical injury, and excessively hot or cold temperature. Curing method shall be subject to approval by **CERTIFYING ENGINEER**.

### 3.3. Field Quality Control

A. All testing (both field and laboratory testing) will be the responsibility of **CONTRACTOR**. **CONTRACTOR** shall be responsible for cooperating with **CQA MONITOR** during all testing activities. **CONTRACTOR** shall provide equipment and labor to assist **CQA MONITOR** in sampling, if requested, and shall also provide access to all areas requiring testing activities.

B. Any Work found unsatisfactory or any Work disturbed by subsequent operations before acceptance is granted shall be corrected by **CONTRACTOR**.