LOGAN WASH MINE
ANNUAL REPORT

Mine Permit No. M-1977-424
Anniversary Date: March 28, 2024

Prepared for

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Table of Contents

1.0 Introduction 1
2.0 Disturbed Acreage Status 2
2.1 Mine Areas 2
2.2 Roads 2
2.2.1 Area 18: Logan Wash Access Road 2
2.1.2 Area 13: Miscellaneous Access Roads 3
2.3 Structures 3
2.3.1 Vaults, Pipelines, and Evaporation Pond 3
2.3.2 Monitoring Wells 4
2.4 Status Summary 4
2.4.1 Areas Released of Warranty 4
2.4.2 Areas Under Reclamation 4
2.4.3 Areas Not Under Reclamation 4
2.4.4 Areas to Be Requested for Release 5
3.0 Monitoring Activities in 2023 5
3.1 CDPS (NPDES) Permit Termination 5
3.2 Mine-Water and Retort-Water Discharge 6
3.3 Water Quality Monitoring 6
3.4 Research Mine Manometer Monitoring 7
3.5 Evaporation Pond Leak Detection System 7
3.6 Climatic Data 8
4.0 Reclamation Activities in 2023 8
4.1 Revegetation Maintenance 8
4.2 Well Abandonment 9
5.0 Maintenance Activities in 2023 9
5.1 Mine Maintenance 9
5.2 Evaporation Pond Maintenance 9
5.3 Retort Water Pipeline Maintenance and Repair 9
6.0 Anticipated Reclamation in the Year 2024 11
7.0 Anticipated Disturbance in the Year 2024 11
8.0 Threatened Species Designation 11

Figures

Figure 1. Logan Wash Mine Location Map
Figure 2. Logan Wash Mine Facilities
Figure 3. Logan Wash Mine Monitoring Wells
Figure 4A. Logan Wash Mine Reclamation Status East Area
Figure 4B. Logan Wash Mine Reclamation Status West Area
Figure 5. Logan Wash Mine LW-001 and LW-Retort Discharge
Figure 6. Logan Wash Mine Biannual Mine Water Sampling Locations
Figure 7. Logan Wash Mine 2023 Precipitation
Figure 8. Pond Lining System
Figure 9. Logan Wash Mine Evaporation Pond Site Map As-Built 2018 Pond Reline Project
Figure 10. Locations of *P. debilis*, Proposed Mitigation Measures and Potential Transplant Areas
Figure 11. Logan Wash Mine *P. debilis* Transplanting March 25, 2015
Figure 12: Logan Wash Mine Retort Pipeline Spill Location

Tables

Table 1. Reclamation Status at Logan Wash Mine, March 2024
Table 2. Reclamation Status of Miscellaneous Access Roads, March 2024
Table 3. Well Abandonment Schedule, March 2024
Table 4. Logan Wash Mine Areas Requested for Release in 2023
Table 5. Logan Wash Mine Areas Not Under Reclamation
Table 6. Summary of Reclamation Status at Logan Wash Mine
Table 7. Logan Wash Mine Site Monitoring Events, January 2023 to December 2023
Table 8. Logan Wash Mine LW-001 Mine Water Analytical Data
Table 9. Logan Wash Mine Retort Water Analytical Data
Table 10. Logan Wash Mine Monitoring Well Analytical Data

Annual Report
March 28th, 2023 – March 27th, 2024
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1.0 Introduction

This annual report has been prepared in accordance with regulations of the State of Colorado Division of Reclamation, Mining and Safety (DRMS) and the regulations promulgated by the Colorado Mined Land Reclamation Board. The information presented in this report pertains to the period March 28, 2023 to March 27, 2024 (reporting period). Projected reclamation activities for the following year are also presented.

The Logan Wash Mine, located approximately 12 miles northeast of De Beque, Colorado, is managed by Glenn Springs Holdings, Inc. (GSHI) for Occidental Oil Shale, Inc. (OOSI). The main mine portals are located in Section 25, Township 7 South, Range 97 West. A general site location map for the Logan Wash Mine is presented in Figure 1.

This annual report summarizes the reclamation status of the Logan Wash Mine. The Logan Wash Mine is currently under closure and reclamation status. During the reporting period reclamation and maintenance work was conducted on the OOSI property. GSHI anticipates reclamation maintenance activities to continue in 2024, focusing on maintenance and operation of mine water discharge and the associated Evaporation Pond.

In 2006, at the request of DRMS, OOSI prepared and submitted Amendment No. 1: Retort Water Pipeline and Evaporation Pond. Although these structures were constructed in 1984 after receiving permits from the U.S. Bureau of Land Management (BLM) and Garfield County, for unknown reasons the structures were not incorporated into the existing mine permit.

The remainder of this annual report is organized as follows:

- Section 2: Disturbed Acreage Status
- Section 3: Monitoring Activities in 2023
- Section 4: Reclamation Activities in 2023
- Section 5: Maintenance Activities in 2023
- Section 6: Anticipated Reclamation in the Year 2024
- Section 7: Anticipated Disturbance in the Year 2024
- Section 8: Threatened Species Designation

Please refer to Figure 1, the Logan Wash Mine Location Map, Figure 2, Logan Wash Mine Facilities, and Figure 3, the Logan Wash Mine Monitoring Wells for features discussed in this report. This report also refers to Exhibit E, the original Reclamation Plan, and Exhibit F, the Reclamation Map. Please see Exhibit E in the permit document files; a copy of Exhibit F is attached. In the report text, all acreage amounts have been rounded to the nearest tenth of an acre. The interpreted total disturbed acreage, estimated acres reclaimed, acres released, and acres under reclamation may not sum perfectly, due to different interpretations of actual disturbed areas, measurement methods that have evolved over the years, and numeric rounding.

2.0 Disturbed Acreage Status

During the reporting period no additional acreage was disturbed. According to Exhibit E of the Reclamation Plan (1981) for Logan Wash Mine, 134.7 acres were approved for disturbance within the permit area with an actual disturbance of 113.6 acres. Over the years, this acreage has been revised to account for subsequent new disturbance and incorporation of the Evaporation Pond (Amendment No. 1) into the permit. Table 1.0 shows a summary of the original designated reclamation areas and their reclamation status based on historical reclamation reporting.

However, during preparations to submit a reclamation release in 2022, WWL learned from DRMS that the permitted acreage shown in their records indicated a total of 108.55 acres, and that it was preferable to examine what acreage would remain after the forthcoming reclamation release request of August 2022. The balance in acreage would therefore be acreage previously released and acreage likely to be released in the new request. A subsequent DRMS site inspection on October 12, 2022, resulted in the release of all lands requested, an estimated 21.65 acres and an estimated 26.0 acres remaining as unreclaimed. Areas released in 2022 include Areas 1, 2, 4, 10, 13, and the Soil Barrow Area.

Figures 4A and 4B illustrate the current reclamation status of disturbed areas and roads. The reclamation status of previously disturbed areas is discussed below.

2.1 Mine Areas

Other than roads and the Evaporation Pond and associated retort pipeline, the Lower Bench is the only remaining mine area (Area 1) that is not reclaimed. This area consists of 2.1 acres and is currently being used as mine access to monitor hydrological stations and general revegetation progress at other parts of the mine property, including Parachute beardtongue (Parachute Penstemon or Penstemon debilis) surveys. However, over the last decade or so, the Lower Bench has naturally revegetated and a large portion (except the Lower Bench Vault and weather station) may qualify for reclamation release.

2.2 Roads

2.2.1 Area 18: Logan Wash Access Road

Disturbed acreage associated with the Logan Wash Road or the “tramroad” was originally shown in the mine permit to be 53.4 acres. This road extends from its intersection with Road 45 up Logan Wash to and beyond the mine property. BLM records indicate that the original Logan Wash Road right-of-way (COC-223027) was 58.6 acres and includes all of the Upper Access Road up to the BLM-OOSI property boundary near the intersection of the Upper and Lower Bench Roads. However, the OOSI reclamation plan included the Upper Access Road in Area 13, Miscellaneous Access Roads.

Logan Wash Road is commonly used for access to BLM and private lands and during reclamation release discussions in 2022, Logan Wash Road was formally removed from the Logan Wash Mine Reclamation Plan with DRMS’s approval.

A number of road turn-outs or cut and fill areas were constructed along Logan Wash Road under the mine permit. These areas are shown as “B1 through B-10” in Table 1. All of the “B” reclamation areas were released of reclamation responsibility by DMRS in October 2022.

2.1.2 Area 13: Miscellaneous Access Roads

Documentation that defines the locations of the Miscellaneous Access Roads (Area 13) in detail in the original reclamation plan is limited (see Table 2). Based on field observations, a number of older roads have been reclaimed and are no longer used. These roads are located on the slope above the Upper Bench and on the slope between the Upper Access Road and the Lower Access Road (see Figure 4A). These roads were released from reclamation responsibility as a result of previous requests, some as early as 1986.

The remaining roads that may have been included in Area 13 are: 1) Upper Access Road, 4.8 acres; 2) Lower Access Road, 1.8 acres; 3) Upper Bench Road, 1.4 acres; 4) Lower Bench Road, 1.5 acres; and 5) Evaporation Pond Road, 1.3 acres. The lower portion of the Lower Access Road (approximately 1.36 acres) was associated with the Heater/Treater reclamation area (Table 2). The Upper Bench Road was released from reclamation in October 2022. All other miscellaneous roads mentioned remain in an unreclaimed state as they are used for ongoing monitoring operations. Table 2 lists the various Miscellaneous Access Roads identified in the early Reclamation Plans. Roads currently not reclaimed total approximately 9.4 acres.

2.3 Structures

2.3.1 Vaults, Pipelines, and Evaporation Pond

Structures that remain at the mine site include two vault structures, one on the Lower Bench and one on the Research Mine Bench, one sealed ventilation shaft, and one capped and vented ventilation shaft. Pipelines include 1) the retort water pipeline which conveys retort mine water from the sealed L-1 portal at the mine site to the Evaporation Pond; 2) the Logan Wash Mine mine water drainage pipeline (LW-001) which extends from the sealed L1 portal to the Lower Bench Vault and then to an infiltration gallery on the Lower Bench; and 3) the Research Mine mine water drainage pipeline (LW-002) which extends from the sealed Research Mine portal through the Research Mine Vault to the Lower Bench Vault and on to Lower Bench discharge point. See Figure 2 for the locations of these structures. The retort water (LW-Retort) and mine water (LW-001) are sampled for water quality at the Lower Bench Vault on a semi-annual basis.

Two other vaults are located at the Evaporation Pond. One vault forms a concrete spillway from the Settling Pond to the Evaporation Pond, and the other vault was used as a leak detection monitoring structure for the Evaporation Pond, and is located on the west side of the Evaporation Pond.

All vaults are administered as confined space concrete structures with surface access-ways constructed just above grade. Depending on the final mine closure method, these structures may remain as permanent structures on the mine site to manage and monitor mine water drainage.

The retort water pipeline was constructed with manhole clean-outs approximately every 2,500 to 3,000 feet. Two manholes, the Upper Manhole and Lower Manhole (also confined spaces), are accessed periodically to measure retort water discharge rates. The Upper Manhole is located in the vicinity of the former Heater Treater (Area 15), in the upper part of Logan Wash near the confluence with Dry Gulch. The Lower Manhole is located immediately north of the Evaporation Pond, approximately 40 feet from the pond gate. The other 10 manholes exist on the retort water pipeline that are buried by shallow road fill, colluvium, and vegetative litter, and have not been accessed in recent years (some near the Evaporation Pond were welded shut many years ago).

2.3.2 Monitoring Wells

Monitoring wells associated with the Logan Wash Mine were constructed within and outside of the immediate mine area. Past reconnaissance has been conducted to locate and confirm the existence of these well sites. Eight wells were located and identified within the mine area and within Logan Wash. Several other wells were located at some distance from the mine (see Figure 3 and Table 3). Of the 8 identified wells in the mine area, two wells, Well LWCW-1A and Well LW-22A, have been sampled for water quality on a semi-annual basis. Well LW-22A, located on private land some distance downgradient of the mine, was dropped from the sampling program in 2020. The landowner has been contacted to inquire as to whether they may be interested in taking over ownership of the well; they have yet to respond to this inquiry. Well LWCW-1A will remain in place as a monitoring well until final permit closure.

Wells LW-108, LW-112, and LW-242 were abandoned in 2005 in accordance with Colorado Division of Water Resources rules. The other 3 wells, LW-32, LW-45, and LW-116, remain in place but will be scheduled for abandonment in the future. Casing access and downhole conditions are unknown for these wells. Reconnaissance to date has not revealed any other monitoring wells within the permit area and the Logan Wash drainage.

Reconnaissance for wells located outside the permitted area in distant drainages was conducted in past reporting periods. Wells LW-102 and LW-243 were located in Smith Gulch, Well LW-103 was located in Kelly Gulch, and Well LW-104 was located in Riley Gulch. Wells LW-121, LW-46, LW-47, LW-47A, and LW-106 were not located after a thorough search and are assumed to be abandoned. Wells LW-102, LW-104 and LW-243 were abandoned in 2007. Table 3 shows the status of well abandonment as of this reporting period.

2.4 Status Summary

2.4.1 Areas Released of Warranty

Reclamation areas released from warranty by DRMS prior to 2022 include: Areas 5, 7, 21, and 22, and areas A5, A7, A21, A22, B1, B4, B6, B9, B10, and B11. In October 2022, Areas 1, 2, 4, 10, 13, all remaining B Road Areas, and the Soil Barrow Area were released from reclamation responsibility by DRMS. Table 4 shows the areas requested for release of reclamation warranty in 2022. According to the DRMS acreage release letter of October 31, 2022, a total of approximately 82.55 acres have been released of warranty for the mine permit.

2.4.2 Areas Under Reclamation

Areas that began 2022 under reclamation (revegetation in progress) included Areas 1, 2, 3, 4, 10, the 0.7-acre Soil Barrow Area, parts of Area 13, and road Areas B2, B3, B7 and B8. Areas 1 through 4 include the Upper and Lower Mine Dumps (face areas), Upper Mine Bench, Lower Mine Bench, and the Research Mine Bench and Dump, respectively. Area 10 is the former Helo Pad. Area 13 is Miscellaneous Access Roads.

As a result of the recent reclamation release on October 31, 2022, all of the above-mentioned areas were released of reclamation warranty.

2.4.3 Areas Not Under Reclamation

Areas not under reclamation include all areas shown in Table 5. These areas are currently being used for mine monitoring purposes and are not under reclamation at this time. These areas consist of the Lower Bench, the Lower Bench Road, the Upper Access Road, the Lower Access Road, the Evaporation Pond Access Road, and the Evaporation Pond and Pipeline (Area 23, 14.9 acres). Area 11, the Guard Gate, and Area 18, Logan Wash Road will not be reclaimed as they are no longer included in Reclamation Plan. The total estimated acreage not under reclamation and remaining to be reclaimed is 26.0 acres.

2.4.4 Areas to Be Requested for Release

No areas are expected to be requested for reclamation release of warranty in 2024.

Table 6 summarizes reclamation status at Logan Wash Mine.

3.0 Monitoring Activities in 2023

Monitoring activities at the Logan Wash Mine during the reporting period consisted of periodic monitoring of mine water discharge and related sampling activities. These activities included:

1) Monthly monitoring (when safe access is possible)
    a. Discharge measurement of the mine water at LW-001 (former Colorado Discharge Permit System [CDPS] Outfall 001) at the Lower Bench
    b. Discharge measurement of the mine retort water at the Upper and Lower Manhole locations
    c. Measurement of the manometer installed in the Research Mine Vault (LW-002)
    d. Salinity of the Evaporation Pond and Settling Pond
    e. Water level measurements of leak detection sumps at the Evaporation Pond and Settling Pond
    f. Precipitation and other meteorological parameters at the Lower Bench and precipitation at the Evaporation Pond

2) Semi-annual water quality sampling
    a. Mine-water discharge at the Lower Bench Vault (LW-001)
    b. Retort-water discharge at the Lower Bench Vault (LW-Retort), the Lower Manhole (LW-LM), the Upper Manhole (LW-UM), and at the Evaporation Pond (LW-POND)
    c. Groundwater at well LWCW-1A

Monitoring of mine discharge waters, the Research Mine manometer, and the Evaporation Pond salinity and leak detection system is done on a monthly frequency except during access restrictions due to road conditions, mostly during the winter months. As mentioned, water quality sampling is done on a semi-annual basis in May and October. A summary of monitoring events for the reporting period is shown in Table 7.

3.1 CDPS (NPDES) Permit Termination

The former CDPS permit for Logan Wash Mine (permit no. CO0048816) that permitted two outfalls, Outfall 001 (Logan Wash Mine, main lower portal [L1 Portal] discharge) and Outfall 002 (Research Mine discharge), was terminated on July 1, 2014. Any mine discharge from the former Outfalls 001 and 002 is being infiltrated into the Lower Mine Bench. For more information regarding the Research Mine portal closure and management of the Research Mine drainage see TR No. 4 and TR No. 6, which present revisions to Exhibit E, the Reclamation Plan for Logan Wash Mine.

3.2 Mine-Water and Retort-Water Discharge

Long-term monitoring of retort water and mine water discharge is necessary to assess mine drainage behavior from the mine. The trend in discharge rates combined with water quality have implications for the future fate of the mine drainage water. Discharge measurements of mine water (LW-001) and retort water (LW-Retort) are conducted on a monthly basis as access allows. Continuous flow (meter) monitoring of LW-001 water came online in August 2011 as part of a requirement of the former CDPS permit. These data were collected by OOSI to assess and evaluate mine closure effectiveness, to support operation and maintenance of the Evaporation Pond and future water management options, and to meet state requirements.

During the summer of 2020, the LW-001 flow meter flow measurements recorded on the data logger experienced periods of false readings not representative of readings indicated on the flow meter display. The data logger was removed and tests were run on the flow meter and converter. These tests were not conclusive and further testing must be conducted. The flow meter will be restored to normal operating conditions as soon as practicable. In the meantime, flow measurements will be manually recorded monthly from the flow meter display.

Retort water discharge is measured manually at the Upper Manhole and Lower Manhole locations. Table 7 is a summary of monitoring events conducted at the mine in 2023, and Figure 5 shows the results for the LW-001 flow meter and the measured discharge for retort water at the Upper Manhole. The figure shows that the LW-001 discharge has decreased since 2011 but appears to have stabilized at a flow rate of approximately 0.7 gallons per minute (gpm). Note that during the Spring runoff period (March through June), mine water (LW-001 water) also enters the Lower Bench Vault by underground seepage along the buried pipeline from the mine. This flow appears to be greater than the flow indicted by the LW-001 flow meter. This water flows through and out the vault by infiltration into the Lower Bench waste rock.

3.3 Water Quality Monitoring

Water quality monitoring continued at the mine site on a semi-annual schedule. Sampling usually occurs in May and October. As mentioned in the above section, knowledge of the water quality of mine drainage waters and its potential change over time is needed to assess the long-term fate of this water and final mine closure options.

OOSI considers evaporation as the preferred method of treatment for the retort water for the long-term. A new liner was installed in the Evaporation Pond in 2018. Hydrologic biannual sampling at the mine currently includes sites: 1) mine water (LW-001), 2) retort mine water (LW-Retort), 3) groundwater at the point of compliance well (LWCW-1A), 4) retort water at the Lower Manhole (LW-LM), and 5) LW-Pond (Evaporation Pond (retort) water). In 2023, a sample of the retort mine water was collected at the Upper Manhole (LW-UM) because of maintenance activities being conducted on the pipeline in the summer of 2023. See section 5.3 below for more information. Sampling of LW-001 and LW-Retort is conducted at the Lower Bench Vault. Well

LWCA-1A, is a compliance well located in Dry Gulch below the toe of the Lower Mine Dump. The LW-LM location is located just upstream of the Settling Pond. Under stipulations for the Evaporation Pond BLM right-of-way, water quality sampling of the Evaporation Pond (sample ID LW-Pond) was added to the semi-annual sampling schedule in 2019. In addition, water quality field parameters are measured at the Evaporation Pond during most monthly mine monitoring visits.

In 2020, monitoring locations Big Seep, an upgradient location, and well LW-22, a downgradient location, were dropped from the sampling program. These sites have provided adequate baseline data and are not critically needed at this time.

In 2023, biannual water quality sampling was conducted at all five locations mentioned above, plus one duplicate sample.

Locations sampled during the 2023 semi-annual sampling events are shown in Figure 6. Analytical data for these samples are shown in Tables 8 through 10.

3.4 Research Mine Manometer Monitoring

The manometer installed in the Research Mine Vault is monitored and recorded on a monthly basis as access conditions allow. During snowmelt periods, monitoring of the manometer may occur on a more frequent basis, or until the peak runoff season begins to subside. The manometer measures the pressure head inside the pipe installed into the mine on the upstream side of a concrete sack dam just inside the portal. This dam serves to retain seasonal groundwater infiltration in the mine. If manometer measurements were to indicate a high level ($\geq$ 36 inches) for more than a week's time, the water in the mine can be released and allowed to infiltrate at the Lower Bench. Due to a larger than average snowpack year, the manometer showed a significant amount of water for a period longer than a week's time and the mine water was released onto the Lower Bench and allowed to infiltrate. See Table 7 for monometer readings in 2023. This release lasted until ???, when the mine water subsided below the toe of the retention dam.

3.5 Evaporation Pond Leak Detection System

Monitoring of the Evaporation Pond Leak Detection Systems is conducted as part of monthly monitoring events as access conditions allow. The historic Evaporation Pond Leak Detection Vault was constructed as part of the original Evaporation Pond system in 1984. A new liner system was installed in 2018 on top of the old liner. Two Evaporation Pond Leak Detection Sumps were constructed for the new overlying pond liner, one on the west side and the other on the east side of the pond. One leak detection sump was also constructed during relining of the Settling Pond, also in 2018. Each detection sump was constructed by installing a PVC monitoring pipe from the top edge of pond liner down the pond slope and in between the new secondary and primary liners. The PVC pipe allows for monitoring of the presence of collected pond water that may have leaked through the primary liner. However, note that the Evaporation Pond is not sloped, so water that may leak through the primary liner may not always flow immediately to the detection sumps.

Monitoring of the Evaporation Pond Leak Detection Vault is conducted by visual observations. The continuous measurement of water pressure (depth) in the vault sump using an installed pressure transducer was discontinued after the new pond liner was installed in 2018. Field observations showed that the vault was dry throughout 2023. A metal cap was placed over the

concrete collar of the vault in 2020; this likely contributed to the vault showing dry conditions throughout the year, as the cap prevents leakage into the vault from precipitation events.

In 2023, the West Sump Detection Pipe was mostly dry, and the East Sump Detection Pipe showed depth to water ranging from 26.2 to 26.70 below top of pipe (TD is zzzz).No water was detected in the Evaporation Pond sumps during 2023. However, water was first detected in the Settling Pond Sump in September, 2021. In November, the Settling Pond sump water was pumped (17.5 gallons) and discharged back into the Settling Pond. An additional 4.5 gallons was pumped in December of 2021. In January and March 2022, the sump was dry. Approximately 5-inches of water was detected in August 2022. In August 2023, the detection probe pipe had de-coupled and was not working properly. However, measurements from June 2023 to March 2024 ranged from 24.15 to 26.3 ft below top of pipe. The March 2024 measurement indicated a total depth of 24.71 ft with a depth to water of 24.23 ft below top of pipe (the August 2023 measured depth to water of 26.3 ft appears to be an error).

3.6 Climatic Data

Climatic data are monitored on the Lower Bench through the use of an Onset U30-NRC weather (MET) station. Precipitation is also monitored at the Lower Bench and Evaporation Pond using Novalynx Corporation Model 260-2101SK-P rain gauges. When deployed, these instruments operate continuously but must be accessed for data downloads. The rain gauges are not equipped with wind screens. Each gauge measures precipitation with an automated logger that is downloaded several times a year. During winter months, the rain gauges may be temporarily removed from service.

Precipitation data collected in the calendar year 2023 showed a total precipitation of 14.11 and 4.43 inches, for the Lower Bench and Evaporation Pond, respectively (see Figure 7). Between January 1st and March 21st of 2024 the total precipitation data showed 2.54 and 0.91 inches for the Lower Bench and Evaporation Pond, respectively. The NWS Cooperative Network Altenburn, CO station (Coop # 050214, elevation 5,690 feet AMSL), located 13.3 miles northwest of the mine, recorded total precipitation of 18.06 inches for the calendar year of 2023 and 4.25 inches between January 1st and March 21st 2024. The annual average precipitation for this station is 16.26 inches (WRCC, 2022).

4.0 Reclamation Activities in 2023

Monitoring activities described in Section 3 are considered activities that contribute to successful overall mine reclamation. Other reclamation activities conducted at the Logan Wash Mine in 2023 are discussed in the following sections.

4.1 Revegetation Maintenance

Areas seeded during past revegetation work are self-sustaining. Unfortunately, despite installed fencing, cattle accessed the mine area a number of times in 2019 and seriously damaged reclamation grasses on the Upper Mine Bench and Road and the Lower Mine Bench and Road. This vegetation recovered sufficiently to meet reclamation release requirements in areas released from warranty in October, 2022. Some hand seeding may be implemented to maintain the desired vegetation cover and diversity.

Areas within the designated Evaporation Pond area were disturbed during pond relining construction in 2018 (see Section 5.2). These areas were seeded with a native seed mix and biodegradable erosion blankets were placed on the steeper, more vulnerable slopes. Good germination and growth of grasses was evident in the spring of 2020 and has continued to improve in these areas. The steeper slopes have remained stable.

4.2 Well Abandonment

No monitoring wells were abandoned during the reporting period.

5.0 Maintenance Activities in 2023

Maintenance activities included periodic inspections of mine roads, benches, portals, high walls, mine water drainage systems associated with the retorts and general mine workings, as well as the inspection of Evaporation Pond facilities including the pond's liner, security fencing, operation, and leak detection systems. Maintenance activities conducted at the mine, mine Retort Pipeline, and Evaporation Pond are summarized in the following sections.

5.1 Mine Maintenance

During the reporting period, inspections of the Logan Wash Mine site occurred primarily on a monthly basis depending on site access conditions. Inspections focused on mine roads, headwalls, portal closures, bench surfaces, dump faces, road conditions, and constructed stormwater drainage and rip-rap channels. Maintenance of mine roads including the Evaporation Pond Road, Lower Access Road, Upper Access Road, Lower Bench Road, and Logan Wash Road are done on an as-needed basis to mitigate stormwater impacts to the road surface. No other mine maintenance was required during the reporting period.

5.2 Evaporation Pond Maintenance

Maintenance of the Settling Pond and Evaporation Pond include inspection of: 1) discharge rates to the ponds from the mine retort water plumbing system; 2) pond liner, 3) egress ladder integrity, 4) leak detection systems; 5) wildlife security fence; and 6) stormwater drainage ditches and access road conditions. The stormwater drainage ditch system was regraded in November 2023.

Figures 8 and 9 show the liner design and layout and as-built features of the Evaporation Pond, respectively.

5.3 Retort Water Pipeline Maintenance and Repair

During a routine monthly monitoring visit on April 13th, 2023, WWL personnel discovered that there was no mine retort water flowing through the Lower Manhole. A hydro-vacuum service was immediately contacted to locate, check for flow, and clean out the manholes located along Logan Wash Road. No flow was found in manholes 7 and 8 on April 14th. After further investigation, a break in the retort pipeline was found in between manholes 8 and 9 where a large, deep erosional head cut (wash out) into Logan Wash Road was discovered. This erosion was the result of rapid snow melt into Logan Wash. Flow in Logan Wash plugged the culverts underlying Logan Wash Road and flood waters jumped on to the road causing the observed erosion, which subsequently exposed the Mine Retort pipeline, approximately 7 feet below the ground surface. The 6-inch

PVC pipeline was broken due to sloughing from the side of the erosional cut and was releasing the total flow of the retort pipe into the erosional cut and subsequently into Logan Wash, mixing with the snowmelt runoff present in the Wash. See Figure 12 for the precise location of the release.

On April 14th, 2023, two ten-foot sections of pipe were replaced, and a PVC expansion coupling was installed to re-assemble the broken upstream and downstream ends of the pipeline. An earth work contractor temporarily covered the pipeline with native fill to ensure the pipeline would not be immediately exposed if a significant rain event were to occur. WWL collected one water sample from the erosional feature, downstream of the pipeline break, and two soil samples from sediments in the Logan Wash channel. On April 14th, retort water flow was restored, flowing continuously from the Mine, through the repaired section of pipeline, and into the Evaporation Pond. A letter dated May 2, 2023 was submitted to Amy Yeldell of the DRMS and Mr. Scott Hall of the U.S. BLM describing the spill event and results of the sampling and analysis. The results for total petroleum hydrocarbons (TPH) were well below the typical threshold level of 500 mg/Kg proposed by the Colorado Division of Oil and Public Safety (DOPS).

On May 8th, 2023, WWL conducted routine monthly monitoring and found that again, there was no retort water flowing through the Lower Manhole. After an extensive investigation of the pipeline between the Upper Manhole and Lower Manhole, it was determined that another leak or clog had occurred between manholes 8 and 9. A significant amount of sediment had entered the pipeline while it was broken and exposed on the surface during the April pipeline break. It was suspected that this sediment resulted in a clog in the line. The retort pipeline was then shut in at the Lower Bench Vault to prevent additional flow into the pipeline and a potential spill elsewhere along the pipeline.

On May 12th, 2023, an emergency retort pipeline diversion was installed with a bypass valve system immediately upstream of the Upper Manhole. This was done to provide for continual flow from the mine retorts during periods of pipeline damage and repairs by diverting retort flow to a temporarily installed frac tank at the Upper Manhole. Retort water flowed by gravity into the frac tank by way of a 2-inch polyethylene pipe. Retort water was transferred from the frac tank and trucked to the Settling Pond on a three to four day schedule.

Between May 12th, and June 22nd, 2023, the downstream pipeline underwent maintenance while the frac tank was in place at the Upper Manhole bypass. Maintenace consisted of flushing the pipeline with freshwater, cleaning and vacuuming the line with a hydrojet/vac contractor. A secondary expansion coupling was installed on the pipeline at the location of the suspected clog after sediments were removed.

While the pipeline was being repaired and water was being diverted into the frac tank, WWL personnel resealed the weir plate in the concrete manhole interior at the Lower Manhole to ensure that no water could leak around the weir plate, resulting in erroneous Mine Retort water flow rate measurements.

On June 22nd, 2023, the bypass valve was closed, allowing retort water to flow into the Upper Manhole, through the pipeline and into the Evaporation Pond. On June 23rd, 2023, water was observed to be flowing through the Lower Manhole and into the Evaporation Pond. The frac tank was removed on September 11th, 2023, after completing the maintenance activities and allowing adequate time for system equilibration and performance. Mine Retort water has continuously flowed from the mine and into the Evaporation Pond since June 23rd.

The excavation location of the bypass valve was left opened but winterized during the 2023/2024 winter. This was done to provide for monitoring performance of the installed valve. Monthly monitoring did not show any leakage from the valve. In the spring of 2024, the bypass valve will be covered with a pre-cast concrete vault fitted with a metal access cap. The exterior portion of the vault will be backfilled with the excavated soil; the soils will be hand-seeded.

6.0 Anticipated Reclamation in the Year 2024

Because the fate of retort water discharge is currently being assessed under Amendment No. 1, OOSI does not anticipate revegetation or reclamation of any unreclaimed roads or disturbed surface areas at the mine site in 2024.

Saplings that were planted on the mine dump faces will be assessed for overall health and mortality. No mechanical irrigation of these saplings is anticipated. Roads not reclaimed will be maintained. Transplanting of *P. debilis* will be conducted if deemed necessary for plants located on the Lower Bench Road; plants will be moved to the fill slope area adjacent to the road (see Section 8.0).

Evaporation Pond maintenance will include access road and stormwater control maintenance, weed and brush control, leak detection sump pump maintenance, liner repair, and other maintenance as needed.

7.0 Anticipated Disturbance in the Year 2024

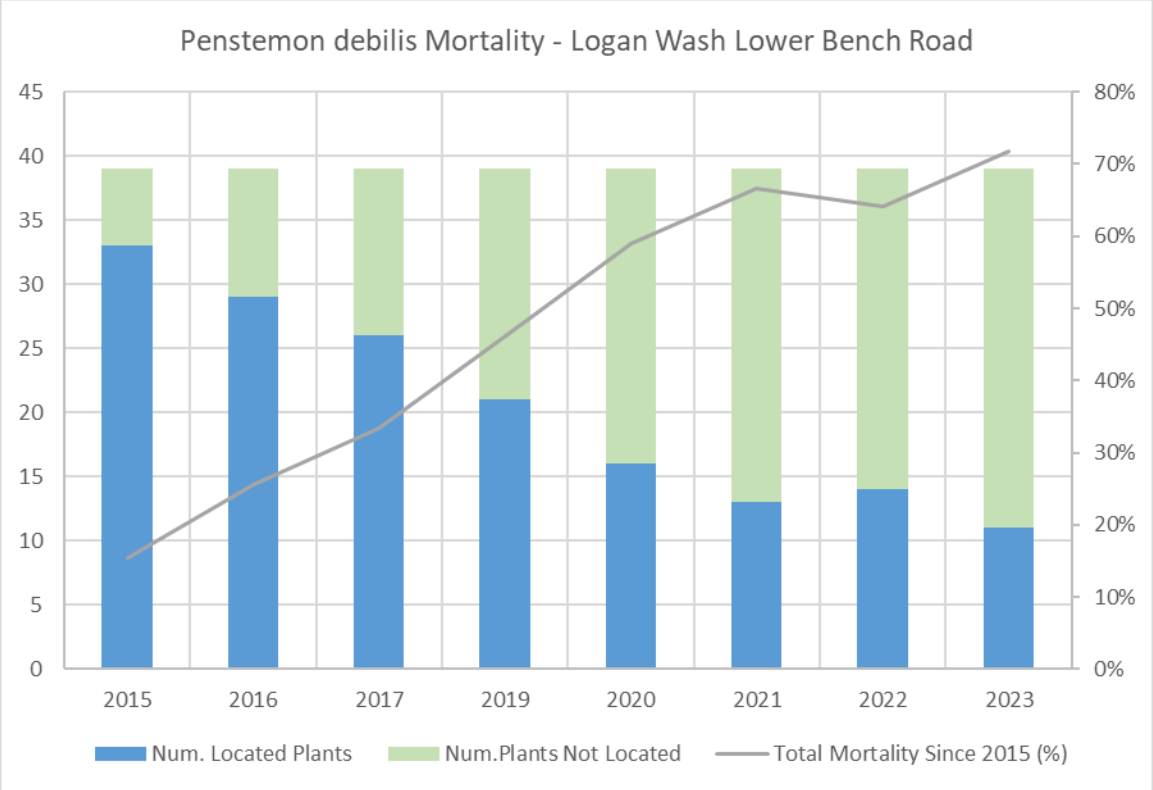
No new disturbance is anticipated to occur in 2024 and 2025 within the mine permit area associated with OOSI mine permit activities. Minor ground disturbance may occur on the Lower Bench Road during transplanting of *P. debilis* species, if needed (see Section 8.0). Maintenance of mine roads and stormwater control features will be conducted as necessary.

8.0 Threatened Species Designation

On July 27, 2011, the U.S. Department of Interior, Fish and Wildlife Service (USFW), listed the plant *Penstemon debilis* (Parachute beardtongue or *P. debilis*) as “threatened” status under the Endangered Species Act of 1973 (Act). The critical habitat for the plant is in Garfield County and the Logan Wash Mine site falls within this critical habitat. Numerous *P. debilis* plants have been observed growing within and along the flanks of the Upper Access Road from the Research Mine portal area to the north on the Upper Mine Bench Road and Lower Mine Bench Road. An Article of Designation (AOD) was signed by Colorado Parks and Wildlife (CPW), OOSI, and Oxy WTP in early 2015 and finalized on February 3, 2015. The AOD allows for OOSI to mitigate impact to *P. debilis* habitat while conducting reclamation obligations under the DRMS mine permit.

A site plant survey conducted by BLM, USFWS, CPW (Colorado Natural Areas Program [CNAP]), and WWL in September, 2014 resulted in a number of *P. debilis* locations being mapped on both OOSI and BLM lands from the Research Mine to the Lower Bench (Figure 10). On March 25, 2015, 39 *P. debilis* plants were transplanted from the Lower Bench Road to the nearby road cut slope that is undisturbed by vehicle/equipment traffic (Figure 11). The transplanted *P. debilis* have been monitored for production and mortality on an annual basis, providing safe access was achievable and snow cover negligible. Results from monitoring of the

transplanted *P. debilis* indicate a current mortality rate of approximately 72 percent. The chart below shows the mortality rate for each year since transplanting in 2015. No mortality rate was measured in 2018, but casual observations indicate that overall plant numbers have decreased, both in the transplanted plants and new volunteer plants in the area on and immediately adjacent to the Lower Bench Access Road.



On June 27, 2023, four state personnel along with WWL Environmental Technician, Taralee Mautz and Principal Hydrogeologist, Bruce Smith, visited Logan Wash Mine to conduct quantitative monitoring on a population of *P. debilis* near the Lower Bench Road. Attendees included the following: Jessica Smith, Delia Malone, Trista Crook, and John Emerick with the Colorado Natural Heritage Program (CNHP).

REFERENCES

WRCC, 2022. Western Region Climate Center website: <https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?co0214>