

## FACT SHEET

(Pursuant to Nevada Administrative Code (NAC) 445A.401)

Permittee Name: **Robinson Nevada Mining Company**

Project Name: **Robinson Operation**

Permit Number: **NEV0092105**

Review Type/Year/Revision: **Renewal 2022, Fact Sheet Revision 02**

### **A. Location and General Description**

Location: The Robinson Operation facility is located in White Pine County, within Sections 1 and 2, Township 15 North (T15N), Range 61 East (R61E); Sections 5 and 6, T15N R62E; 1, 2, 11-14, 23-27, and 34 - 36, T16N, R61E; Sections 2-24, 29-32, and 34, T16N, R62E; Sections 7, 8, and 17-20, T16N, R63E; and Sections 20, 21, 28, 29, and 32-25, T17N, R62E, Mount Diablo Baseline and Meridian, approximately 9 miles west of the town of Ely, Nevada. The facility is located both on private land controlled by the Permittee (over 7,000 acres) and on public land administered by the U.S. Bureau of Land Management (BLM), Bristlecone Field Office, located in Ely, Nevada (over 1,000 acres).

General Description: Copper ore is mined from historic open pits, processed through the Robinson flotation mill and concentrator circuit to produce copper and molybdenum concentrates, for shipment to off-site (out of state) smelters for refining. Gold is primarily recovered as a by-product in a gravity separation process and minor amounts are recovered in the copper concentrate. Water pumped from the open pits, freshwater wells and other sources, including Mine-Impacted Waters (MIWs), is used for process make-up water. The freshwater wells also provide potable water and fire suppression water. Waste rock is placed primarily on and over historic waste rock dumps (WRDs) and managed to minimize the potential for acid generation. Tailings from the Robinson Mill are conveyed by slurry pipelines for subaerial deposition in the Giroux Wash Tailings Impoundment. Conceptual designs were submitted for construction of a copper heap leach facility with a solvent extraction/electrowinning circuit and designs were approved for expansion of the existing Weary Flats D-Pad gold heap leach facility. Construction of the copper heap leach facility cannot be initiated until detailed design drawings are submitted to and approved by the Nevada Division of Environmental Protection (the Division). Approval to construct remaining phases of the Weary Flats D-Pad gold heap leach facility was rescinded in June 2011.

Facilities are required to be designed, constructed, operated, and closed without any discharge or release in excess of those standards established in regulation, except for meteorological events that exceed the design storm event.

**B. Synopsis**

**Synopsis Table of Contents**

<b>Water Pollution Control Permit and Operations Chronology .....</b>	<b>4</b>
<b>Consent Agreement and Order dated 25 February 1997 .....</b>	<b>5</b>
<b>29 April 2015 Finding of Alleged Violation and Order .....</b>	<b>7</b>
<b>Processing Facilities .....</b>	<b>7</b>
Mill and Flotation Facilities .....	7
Mill Water Ponds .....	11
Carr’s Pond .....	12
Tailings Pipeline Corridor .....	14
<b>Giroux Wash Tailings Storage Facility .....</b>	<b>15</b>
Initial Construction and Operations .....	15
TSF Embankment Construction and Header/Cyclone Deposition System .....	16
TSF Embankment Seepage Collection System and Sediment Control .....	18
TSF Operation and BOC .....	22
<b>TSF Groundwater Contamination .....</b>	<b>27</b>
Initial Detection, Corrective Action, and Pumpback System .....	27
TSF Water Balance and Draindown Estimate Report .....	31
Groundwater Fate and Transport Model .....	34
Minor Modification for Supernatant Management Facilities (2017) .....	36
Major Modification for Giroux Wash Tailings Storage Facilities Expansion (2017) .....	40
Interim Expansion Measures .....	45
<b>Ruth Pit Expansion and Historic Gold Heap Leach Facility Closure .....</b>	<b>47</b>
Resumption of Mining in Ruth Pit .....	47
Heap Leach Pad and Facility Construction .....	48
A-Pad Closure .....	51
South B-Pad Closure .....	51
North B-Pad Closure .....	52
C-Pad Closure .....	53
A-, B-, C-Pad to Mill Draindown Collection and Conveyance System (Closed) .....	54
Weary Flats Heap Leach Pad (aka D-Pad) .....	58

C-Pad Disposal Area for Alta Gold Tailings and South B-Pad Spent Ore.....	60
C-Pad Stability.....	64
<b>Liberty Pit Expansion .....</b>	<b>64</b>
<b>Investigation and Mitigation of Mine-Impacted Waters (MIWs) and MIW Sources .....</b>	<b>65</b>
Intera MIW .....	65
Juniper Seep MIW: .....	71
Green Springs Seep MIW .....	75
Jupiter Seep MIW .....	76
Mollie Gibson Seep MIW.....	78
Historic Acid Leached Material Management.....	83
<b>Lane City WRD Closure.....</b>	<b>84</b>
<b>Plan for Use of Mine-Impacted Waters - The Four-Step Protocol.....</b>	<b>85</b>
<b>Deep Ruth Shaft Cover and Final Closure .....</b>	<b>86</b>
<b>In-Pit Dewatering Systems .....</b>	<b>87</b>
Ruth-Kimbley Pit Dewatering Pipeline System .....	87
Kimbley Pit Dewatering System .....	89
Liberty Pit Dewatering System.....	91
<b>Pit Lake Studies and Ecological Risk Assessments.....</b>	<b>92</b>
Liberty Pit.....	93
Tripp-Veteran Pit.....	95
Ruth West and Ruth East Pits.....	97
Kimbley Pit.....	100
Wedge Pit .....	102
<b>Waste Rock Management.....</b>	<b>103</b>
<b>Petroleum-Contaminated Soil Management .....</b>	<b>107</b>
<b>Profile I-R Monitoring Reduction .....</b>	<b>110</b>

## **Water Pollution Control Permit and Operations Chronology**

On 28 January 1988, Water Pollution Control Permit NEV0060003 was issued to Silver King Mines for the E (East) Robinson Project, which included the construction, operation, and closure of the A-, B-, and C-Pad gold heap leach facilities that were built on historic acid-leached dumps (ALDs) and WRDs surrounding the Ruth Pit.

On 22 October 1991 (per SRK Consulting (U.S.) Inc. records), Water Pollution Control Permit NEV0090030 was issued to Magma Nevada Mining Company (Magma) for the Weary Flats Project, which included construction, operation, and closure of the Weary Flats D-Pad gold heap leach facility. Magma also acquired the Silver King Mines and other mining interests in the district about this time.

On 28 February 1992, Magma submitted an application to dewater the Liberty Pit Lake into the Ruth Pit. On 22 August 1992, Water Pollution Control Permit NEV0092102, for the Liberty Pit, was issued to Magma for this activity.

On 15 July 1993, Water Pollution Control Permit NEV0092105, for the West Robinson Project (renamed the Robinson Operation in late 2007), was issued to Magma for construction, operation, and closure of mining, milling, concentrator circuit, tailings facilities, and new copper heap leach facilities.

In January 1996, Broken Hill Proprietary (BHP) acquired Magma Copper Company, the parent of Magma, its subsidiaries and assets. The Magma assets were placed in the BHP subsidiary BHP Copper Nevada, Inc., which later became BHP Nevada Mining Company (BHP-Nevada).

In January 1996, BHP-Nevada completed construction of the copper process components and Giroux Wash Tailings Impoundment as permitted under NEV0092105, and initiated operations. The copper flotation mill and all related facilities were operated until 30 June 1999, at which time the Robinson Operation was placed into a Temporary Closure as defined under NAC 445A.382; as a result of the Temporary Closure action, Site Characterization Plans (SCPs) were developed and Interim Stabilization Measures were initiated by BHP-Nevada.

At renewal of NEV0092105 on 24 August 1999, the conditions and limitations set forth in Permits NEV0060003, NEV0090030 and NEV0092102 were consolidated and incorporated into NEV0092105. Concurrent with the 1999 renewal of NEV0092105, Permits NEV0060003 (East Robinson Project), NEV0090030 (Weary Flats Project), and NEV0092102 (Liberty Pit) were cancelled by request of the Permittee.

A Final Plan for Permanent Closure (FPPC) was submitted as required by the Division on 23 August 2002, in order to initiate final permanent closure of the facility by 24 August 2004, as required by NAC 445A.446, if the facility were to remain in Temporary Closure.

A review of the submitted FPPC was initiated but final approval was not given due to failure by BHP to provide revisions required by the Division and the resumption of facility operation prior to the final permanent closure deadline.

On 08 April 2004, Quadra Mining Ltd. (Quadra) purchased BHP-Nevada from parent BHP, now the merged BHP-Billiton. NEV0092105 was transferred to Robinson Nevada Mining Company (RNMC), a subsidiary of Quadra, on 26 April 2004. Quadra merged with FNX in 2010 to become Quadra FNX, which was subsequently purchased by KGHM Polska Miedz S.A. (KGHM) in 2012; however, RNMC remained as the Permittee throughout these transactions. RNMC is a wholly-owned subsidiary of KGHM and is the current Permittee for the Robinson Operation.

Temporary Closure ended and RNMC resumed mining in June 2004, followed by resumption of beneficiation and related activities on 01 September 2004. Mining continues from the historic open pits. Copper and molybdenum are recovered in the Robinson Mill flotation circuit and gold is recovered with an added gravity concentration circuit. Mining is conducted on a daily basis and incorporates mixing and placement of waste rock consistent with the Comprehensive Waste Rock Management Plan (WRMP). Overdumping of closed facility components is designed to promote stormwater runoff, minimize infiltration, advance closure of the facility, and ultimately eliminate historic MIWs and MIW sources (see below).

### **Consent Agreement and Order dated 25 February 1997**

A Consent Agreement and Order was executed 25 February 1997, on behalf of BHP-Nevada and the Division and is commonly referred to as the “1997 Consent Agreement”. The 1997 Consent Agreement was developed to resolve a Finding of Alleged Violation and Order issued 20 August 1996, for alleged violations of discharge limits set by the Permit for the Giroux Wash Tailings Storage Facility (TSF), and a second Finding of Alleged Violation and Order issued 02 May 1996, for the accidental release of tailings from the TSF on or about 12 February 1996.

In addition to imposing cash penalties, the final 1997 Consent Agreement addressed design, construction and operational aspects of the TSF, the use of MIW as an alternative to fresh water in the mill and the identification and final management (i.e., final closure) of MIW sources, and the stabilization and final closure of the ‘A’, ‘B’, ‘C’, and ‘D’ heap leach pads. Key requirements and outcomes identified in the 1997 Consent Agreement and further detailed in the associated “Work Plan: Robinson Operation” (Work Plan), attached to the 1997 Consent Agreement as Exhibit ‘F’, include but are not limited to:

- Construction of the bentonite-amended Barge Operating Channel (BOC) to reduce the supernatant pond size, provide interim protection of groundwater, and facilitate beneficial reuse of supernatant pond water;

- Design and construction of modifications to TSF downstream sediment controls and cyclone deposition systems and associated operational modifications to enhance beach development and reduce the potential for infiltration;
- Total dissolved solids (TDS) mobility testing to determine operational chemical characteristics of tailings material, demonstrate the effectiveness of TSF management to protect waters of the State, and determine the solute transport, adsorption, and natural attenuation mechanisms occurring within and beneath the TSF;
- Evapoconcentration analysis to determine the effects of recirculation and evaporation on the chemistry of process water for use in the facility water balance, predictive modeling, and determination of mixing ratios for use of MIW, fresh water, and reclaim water in the mill process and to control supernatant water quality;
- Column testing of the organic-containing A-horizon soil column to determine if surficial soils removed in preparation for TSF expansion could provide lower permeability and greater attenuation of the tailing solution constituents than underlying B-horizon soils;
- Install a new monitor well and monitoring network to characterize groundwater and develop hydrologic block models for the project site to identify and refine the understanding of groundwater flow and controls, determine the hydrologic relationships between dumps and the historic impacts to hydrologic systems, evaluate the capacity for natural attenuation, identify sources of ground and surface waters for use in the Mill, and use collected information to develop flow and transport models;
- Evaluate MIW, a product of historic mining that includes specific pit lakes and seeps from ALDs, for use or re-use as mill make-up water in accordance with the “Four-Step Protocol,” developed through analysis of the Intera Pond;
- Based on completed evaluation and analysis, BHP-Nevada and the Division, must negotiate a “Final Water Source Area Management Plan” (Plan) to culminate in a final approval by the Division to use and manage MIW in accordance with the Plan and consistent with Division regulations;
- Any disturbance or alteration of any MIW, other than the activities described in the Work Plan, must be in accordance with separately prepared plans submitted to and approved by the Division; and
- Final closure of the ‘A’, ‘B’, ‘C’, and ‘D’ pads (originally permitted under Groundwater Pollution Control Permit NEV0060003 and NEV0090030), in accordance with a “Final Closure Plan” to be submitted for approval by 15 April 1997, for pads ‘A’ through ‘C’, and 15 May 1997, for Pad ‘D’.

## **29 April 2015 Finding of Alleged Violation and Order**

The Giroux Wash TSF was not designed or constructed to meet the minimum design criteria for tailings facilities pursuant to NAC 445A.437. The TSF was initially designed to store more than 200 million tons of tailings with an average deposition rate of 48,000 tons per day. Based on periodic exceedances of fluoride concentrations in the BOC chemistry, the Permittee agreed to complete an updated flow and transport model to better assess the potential for groundwater degradation. The updated model (submitted to the Division in 2012) predicted higher sulfate concentrations in compliance well WCC-G1R than was previously predicted in the 1997 model. On 02 June 2014, the Division required the installation of two additional monitoring wells WCC-G6 and WCC-G7. These wells were located 2,000 feet west and 1,000 feet east, respectively, of the existing monitoring well WCC-G5. In November of 2014, sulfate was measured in WCC-G7 at 711 mg/L and resulted in the Permittee's submittal of a Corrective Action Plan (CAP) and the Divisions issuance of the 29 April 2015 FOAV and Order.

The initial CAP focused on delineating the spatial distribution of sulfate in groundwater, the development of a reliable estimate of the hydraulic properties of the Giroux Wash, and identifying geologic features that control the direction and velocity of groundwater flow. A subsequent CAP amendment (CAP Amendment I) focused on the monitoring, mitigation, and sulfate source control. The CAP Amendment I achieved this through geophysics and monitoring well installation, development of a pump back well system, and the development of a tailings water balance. Additional CAP amendments (CAP Amendments II and III) described the ongoing and planned corrective, monitoring, and investigate activities. All pertinent information from the CAP findings were incorporated into the source control engineering design associated with the submitted 2017 Minor and Major Modifications.

On 15 January 2019, a Division Civil Penalty Committee convened to consider the Permittees corrective actions, investigations, and modeling results performed as part of the FOAV and Order. The Committee imposed cash penalties and, upon receipt of the full payment, considered the enforcement action as closed on 30 April 2019. While the enforcement action is considered closed, it is important to note that continued monitoring, modeling updates, and remedial measures continue to be performed.

An EDC was approved in June 2025 to abandon WCC-G6, WCC-G12, PW-01, PW-02, WCC-G7, WCC-G9, WCC-G10, and WCC-G11 due to the expansion of the TSF. The Pumpback wells comprised ~30 gpm, or <10% of the total flow. The data the monitoring wells covered are also covered by other monitoring wells further downstream.

### **Processing Facilities**

Mill and Flotation Facilities: The existing Robinson Mill and Concentrator were constructed by predecessor Magma in 1995-96, to the north of the Liberty Pit in the area

known historically as Riepetown. The Mill is designed to process crushed copper and molybdenum ore, conveyed from an adjacent 211,000 ton ore stockpile pad, at a maximum 62,000 tons per day and a nominal 45,000 tons per day. With the 2016 renewal, the maximum annual processing rate authorized in the Permit was increased from 17,500,000 tons of ore per year to 19,500,000 tons of ore per year, which is equivalent to an average of 53,425 tons of ore per day over the year.

The Mill grinding and gravity flotation concentrator circuit consists of a number of components including, but not limited to, a 32-foot diameter semi-autogenous grinding (SAG) mill, two ball mills, two parallel trains of six rougher flotation cells, two regrind mills, two cleaner column cells, a train of three cleaner scavenger cells, and associated tanks, basins, and sumps located in a metal-clad Mill building. Secondary containment for the components and conveyance systems is provided by sloped concrete floors that drain to area sumps equipped with pumps for return of solution to process. The entire Mill floor is contained by a 2.5 foot-high concrete stemwall constructed around the building perimeter, with raised concrete berms at points of ingress and egress.

The molybdenum flotation plant, which was approved as a minor modification by the Division in August 2005 and constructed later in 2005, is an add-on expansion to the existing copper flotation circuit. The molybdenum circuit is located within the existing Mill containment, except the dry molybdenum concentrate is bagged into supersacks in a new room with a new concrete containment floor constructed contiguous with the existing Mill building. The molybdenum plant is designed to process underflow from the first of two existing copper concentrate thickeners, re-configured to operate in series, through a separate series of molybdenum rougher and cleaner flotation cells. Except for the addition of small amounts of fuel oil to enhance molybdenum recovery, the molybdenum circuit uses the same reagents used in the copper recovery circuit. Because of the fuel oil use, the 2005 minor modification added analysis for total petroleum hydrocarbons (TPH) to the tailings monitoring requirements in the Permit. The molybdenum-depleted copper concentrate is returned from the molybdenum flotation circuit to the second copper thickener for thickening, drying, and shipment for off-site refining.

The molybdenum circuit can process an average of 800 short tons per day (st/d), up to a maximum 1,000 st/d, of copper-molybdenum concentrate to produce a separate molybdenite (molybdenum disulfide;  $\text{MoS}_2$ ) concentrate in a small, dedicated thickener constructed within the Mill building. The thickened molybdenum concentrate is dewatered in a separate small pressure filter prior to packaging in 2-ton super sacks for shipment and off-site refining. Based on average ore feed rates and grades, the molybdenum plant can produce approximately 5.3 dry st/d of molybdenum concentrate.

A minor modification was approved by the Division in June 2009, for installation of XCell™ (XCell) Flotation Machines (FMs) in the copper concentrator circuit. The XCell FMs, which have a unique impeller design, are housed within a new building, with dedicated secondary containment, located adjacent to the southeast corner of the existing Mill building, downstream of the existing concentrator circuit between the existing tailings

splitter sump and the tailings thickeners. The XCell FMs use mechanical means to enhance sulfide recovery from the existing tailings stream without the introduction of additional reagents. The tailings stream is not affected except for a further reduction in sulfide and associated gangue mineral loading.

A second splitter sump (splitter sump extension) was constructed to abut the downgradient edge of the existing splitter sump. Tailings flow is conveyed to the splitter sump extension through a 3-foot by 5.5-foot opening cut into the common concrete wall between the two sumps. The gravity flow of tailings to the splitter sump extension is controlled by two new dart valves. In the event of a pipeline failure, the dart valves will close in less than 60 seconds, limiting the total flow volume to approximately 31,000 gallons.

The single tailings flow of 36,000 gallons per minute (gpm) from the Mill is divided by a second splitter sump extension into two streams of 18,000 gpm each. The individual flows are conveyed with variable-drive pumps through 30-inch diameter rubber-lined pipelines into four XCell FMs, arranged in two parallel trains of two units located downstream of the Pump House in the Flotation Building. Concentrate generated by the XCell FMs is pumped via 3-inch diameter Schedule 40 pipelines to the rougher concentrate circuit in the Mill. Remaining tailings flow from the XCell FMs is conveyed by 42-inch diameter Standard Dimension Ratio (SDR) 32.5 high-density polyethylene (HDPE) pipelines into the existing tailings conveyance pipelines and on to the thickeners.

The splitter sump is constructed on a concrete floor with a subgrade leakage collection and recovery system (LCRS) identified as MTSS-2 in the Permit. The MTSS-2 is backfilled with compacted aggregate. The vee-shaped floor of the MTSS-2 will direct any fugitive solution to a 4-inch diameter perforated HDPE collection pipeline, placed in the vee-trough, that daylights through a one-way flapper valve into the base of the Flotation Building that serves as additional secondary containment. The Pump House, a curbed apron constructed of reinforced concrete, and the Flotation Building are hydraulically linked and constructed with stemwalls to provide in excess of the required 110 percent (%) secondary containment capacity. Building access doors are above any potential spill volume elevation and all concrete joints are constructed with waterstops and appropriate sealants. The MTSS-2 is inspected weekly and flow conditions are reported quarterly. The original splitter sump, which was constructed without leak detection and cannot be practically retrofitted with a leak detection system, is identified as MTSS-1 in the Permit and must be drained, cleaned, visually inspected, and repaired as necessary, on a minimum annual frequency.

An engineering design change (EDC) Permit modification was approved by the Division in March 2013 to construct a SuperCell™ (SuperCell) Flotation Cell and associated tanks, piping, and secondary containment, located in a new building south of the XCell Flotation Building. The SuperCell Flotation Cell, which is several times larger than conventional flotation cells, was designed as a pilot test for the length of one year; however, the Permit does not impose time limits. The intent of the test was to determine if copper recovery can be improved from the tailings stream with an additional flotation cell. The SuperCell is

larger in scale, but otherwise similar in function to the existing XCell FMs. Process flow is delivered to the SuperCell from the existing splitter sump extension via the XCell feed pumps. Concentrate from the SuperCell is pumped to the existing rougher concentrate sumps/launders in the mill building, and tailings gravity feed back to the XCell flotation circuit for further processing.

The SuperCell Building foundation is constructed with native subgrade augmented as necessary with structural fill placed in maximum 6-inch loose lifts and compacted to 95% of the maximum dry density using the American Society for Testing and Materials (ASTM) Modified Proctor Test (Method D1557). The SuperCell Building is hydraulically linked to the XCell Flotation Building via a pipe channel with concrete secondary containment. All concrete seams in secondary containment areas are equipped with flexible waterstops to prevent leakage. The SuperCell Building has secondary containment capacity in excess of the required 110% of the flotation tank, which has a primary containment volume of 181,225 gallons. The SuperCell flotation tank sits atop 6-inch grillage beams to allow visual detection of leaks (monitoring point SCLD-1). Any such leaks will be evaluated during scheduled down time and repaired as warranted based on containment integrity and flow rate. An existing Permit limit for leak detection flow from tanks limits the flow to less than 150 gallons per day (gpd) averaged over the quarter and 50 gpd averaged over the year.

A separate EDC was approved by the Division in October 2014 for a pipeline to supply the SuperCell with process water from a header pipe located outside of the west wall of the tailings pump house. The SuperCell™ process water pipeline consists of a 10-inch diameter SDR 11 HDPE primary pipe inside a 14-inch diameter SDR 17 HDPE secondary pipe. The pipeline runs around the north and west sides of the south tailings thickener, crosses under a road (via a 24-inch diameter SDR 11 HDPE tertiary pipe sleeve) and over the SuperCell building secondary containment stemwall, where it connects to the SuperCell process piping. The secondary pipe is monitored for leakage flow where it daylights inside the tailings pump house. Where buried under the roadway, the pipeline bedding material and the random fill over the bedding material are compacted to 95% of the maximum dry density determined by ASTM Method D1557. The rest of the pipeline bed under the exposed pipeline is compacted to 90% of the maximum dry density determined by ASTM Method D1557.

An non-fee review for the addition of sodium hydrosulfide for the suppression of Zinc to the inlet of the SAG mill was approved 24 March 2023.

Copper concentrate thickeners are located external to the Mill building with secondary containment provided by a 6-inch thick, outdoor concrete slab covering a surface area of approximately 18,200 square feet, with a 4.25-foot high concrete stemwall encircling the thickeners. Thickened concentrates are dewatered using pressure filters located in the Mill building, and conveyed to a covered and bermed concrete copper concentrate storage and load-out pad for transport to off-site smelters.

Two tailings thickeners, measuring 230 feet in diameter and designated 'North' and 'South', are also located external to the Mill building and are constructed partially below grade with individual leak detection systems that report to the tailings pump house. Each thickener base construction, from the bottom to the top, consists of bedrock/concrete, approximately 2 inches of bedding sand, and secondary and primary 60-mil HDPE liners separated by geonet. The geonet serves as the LCRS and each LCRS reports to three drain ports per thickener connected by a manifold to a single 2-inch diameter polyvinyl chloride (PVC) pipeline discharge port at the mouth of each thickener tunnel.

Mill Water Ponds: The Mill Water Ponds typically contain fresh water, but are considered process components and are double-lined because they are located on the sulfide-rich Liberty WRD, which is constructed over the Puritan ALD, both of which have the potential to generate acid with the introduction of water should a pond leak to the environment. Freshwater stored in the ponds is pumped to steel storage tanks for use in the Mill circuit and to other tanks dedicated to potable water and fire suppression.

The Mill Water Ponds were constructed from a single excavation divided into two double-lined ponds by a 20-foot wide septum constructed at below-crest elevation. Each pond measures approximately 220 feet on a side, is 14 feet deep, and has a footprint of about 1.1 acre. Each pond has a capacity, below the dividing septum crest, of approximately 3.0 million gallons and each pond is individually leak detected.

As required by the 26 October 2010 Intra Corrective Action Plan (Intra CAP), an EDC was approved by the Division in March 2011 to reconstruct the liner system of the Mill Water Ponds, because leakage from the ponds was believed to be contributing to the Intra MIW flow. As part of the reconstruction, the existing primary liner and LCRS geonet were removed but the original 60-mil smooth HDPE secondary liner was retained to provide a construction base and provide protection of the existing pond earthworks. The existing secondary liner was inspected and all damage repaired. The compacted subgrade was also tested and recompacted to the original specification as warranted.

Excess moisture in the subgrade at the southeast corner of the South Mill Water Pond was noted during the reconstruction activities, suggesting potential leakage through the original liner system may have occurred. The original 60-mil HDPE secondary liner was removed and the area was allowed to dry and recompacted to the original specification prior to construction of the new liner system.

The original LCRS sumps were removed and new sumps were constructed using coarse gravel backfill material encased in 12-ounce per square yard (oz/yd<sup>2</sup>) non-woven geotextile. The sumps are equipped with individual 10-inch diameter HDPE riser pipes located between the new secondary and primary liners for evacuation of collected solution.

All existing intake (24-inch diameter) and overflow (18-inch diameter) pipeline penetrations in the original pond secondary liner were abandoned by plugging and grouting, and were covered with a protective layer of 12-oz/yd<sup>2</sup> non-woven geotextile and

a 60-mil HDPE patch welded to the original liner. As required by the Intera CAP, all buried pipelines external to the ponds were also excavated and reconstructed with secondary containment pipelines or rerouted above ground, except for a few locations where the integrity of the existing pipelines would be compromised by the excavation activities. As applicable, the pipeline secondary containments report to prefabricated concrete vaults equipped with prefabricated HDPE liners that allow the vaults to be used as LCRS sumps.

A new pond liner system was installed using the original 60-mil HDPE secondary liner as a protective layer over the subgrade. The new liner system was constructed, from bottom to top, with a 60-mil textured HDPE Microspike™ secondary liner, a geonet layer, and an 80-mil textured HDPE primary liner. The new liner system was welded to existing concrete embedment strips located at the east side concrete spillway of each pond. The 2-foot minimum freeboard elevation was measured below each spillway invert and marked with reflective tape on at least two sides of the respective pond.

A new intake pipeline for each pond was constructed through the respective pond embankment. The pipeline was constructed of a 24-inch diameter SDR 17 HDPE primary conveyance pipeline placed in a 42-inch diameter SDR 13.5 HDPE secondary containment pipeline. Each intake pipeline connects to the pond through a prefabricated dual-walled penetration box constructed of 1-inch thick HDPE plate. The outer wall of the penetration box is clad with a ½-inch thick HDPE plate, which is tied to the pond liner system to create a continuous leak detection system on the pond side of the construction.

Carr's Pond: Carr's Pond is an emergency containment pond located immediately downgradient of the Mill. The primary purposes of Carr's Pond are to collect any overflow from the tailings pump house, fluids from the Mill during an emergency event, and routine stormwater runoff from the Mill area and surrounding areas. Carr's Pond also receives piped flow from the crushed-ore conveyor reclaim tunnel, located a short distance north of the pond, and piped flow from the Crusher Drive House sump, located uphill to the east of the pond. Carr's Pond previously received solution pumped from the D-Pad heap leach barren solution pond (via the North Stormwater Shed vault), but that pipe is no longer connected.

An October 2013 characterization of sediment from the Crusher Drive House sump indicates that the sediment is acid neutralizing, contains less than 5 milligrams per kilogram TPH, produces a meteoric water mobility procedure (MWMP) extract that does not exceed any groundwater reference values for the Weary Flats Hydrogeologic Block, and exceeds only the manganese groundwater reference value for the Giroux Wash Hydrogeologic Block.

An EDC was approved by the Division in August 2014 to replace the original single-lined Carr's Pond with a double-lined pond, and to construct the double-lined Carr's Pond Sediment Basin adjacent to Carr's Pond, in accordance with a schedule of compliance item that was added to the Permit during the 2010 renewal. With approval of the EDC, the previous 20-day limit for evacuation of any process solution above a minimum 7.5 feet of

freeboard was eliminated from the Permit, and was replaced with a standard 2-foot minimum freeboard requirement. The new Carr's Pond (2014 EDC) has a maximum capacity of approximately 2,776,760 gallons at the 2-foot freeboard level. The new pond was constructed during summer 2015 and commissioned in late 2015.

Per a 1997 as-built report, Carr's Pond was originally constructed, from bottom up, with a soil subgrade, a 3-inch thick layer of compacted structural fill, a 9-inch thick unreinforced concrete slab, geotextile, and a single 80-mil HDPE liner that extends up the pond sidewalls to an anchor trench at the crest. The soil subgrade includes a network of approximately 2-foot wide underdrain trenches excavated to depths between 12 and 18 inches that are backfilled with ¾-inch nominal diameter gravel and covered with a layer of geotextile. The trenches were installed to capture shallow, perched groundwater encountered during construction. The underdrain trenches are graded at approximately 1% toward a drain-rock sump constructed under the north corner of the pond. The underdrain sump is evacuated via a submersible pump mounted inside a 20-inch diameter PVC underdrain collection pipe that daylights at the pond crest near the north corner of the pond (monitoring point CP-UC). Any groundwater pumped from the underdrain collection pipe is discharged into Carr's Pond. During the 2015 new pond construction, the underdrain collection system was evaluated and determined to be functional, but dry. Shallow groundwater also reports to the nearby ore conveyor tunnel and is pumped to Carr's Pond via a buried pipeline that outfalls near the north corner of the pond (monitoring point CP-CT). The original 80-mil HDPE pond liner was removed from the bottom of the pond as part of the 2015 construction, but the concrete slab was left in place, except in the northern corner of the pond where a portion of the concrete slab was removed to make room for the new pond LCRS sump.

On the bottom of the new Carr's Pond, a 12-oz/yd<sup>2</sup> geotextile layer was placed over the concrete slab to protect the new secondary liner. From bottom up, the new pond liner system consists of the geotextile mentioned above, a 60-mil smooth HDPE secondary liner, an HDPE geonet LCRS layer, and a 60-mil textured HDPE primary liner with textured side up. The pond bottom is sloped toward a recessed LCRS sump constructed under the northern corner of the pond adjacent to the original pond underdrain sump. The LCRS sump is constructed between the pond liners with ¾-inch-minus drain rock encased in 12-oz/yd<sup>2</sup> geotextile. An 8-inch diameter HDPE leak detection pipe is used to evacuate the LCRS sump (monitoring point CP-LDP). The pipe, which is perforated within the sump and solid above the sump, runs up the pond slope between the liners and daylights at the pond crest.

Carr's Pond is designed to receive emergency overflow from upset conditions at the tailings pump house via a grated concrete overflow channel that connects the pump house to the pond crest near the south corner of the pond. Carr's Pond is also designed to contain stormwater from the 25-year, 24-hour storm event. The pond receives stormwater from the main mill-site stormwater conveyance channel, which flows along the southeast side of the pond and discharges to the pond via the Carr's Pond Sediment Basin at the east corner of the pond. A 14-inch diameter HDPE pond inlet pipe, which is contained inside

a secondary 30-inch diameter corrugated polyethylene tube (CPT) pipe for most of its run, connects Carr's Pond to the Carr's Pond Sediment Basin. The inlet pipe is approximately 10 feet long and is graded to drain to Carr's Pond. The inlet pipe is booted to the primary liner of the sediment basin near its upstream end. Where the inlet pipe and secondary CPT pipe penetrate the pond liners, the secondary CPT is booted to the pond primary liner. The buried southeast end of the CPT pipe is open, so any flow discharging from the CPT may be either leakage from the primary pipe or drainage from the surrounding soil. Carr's Pond also receives stormwater from a vee ditch on the pond's north perimeter (northwest and northeast sides) that discharges into the Carr's Pond Sediment Basin, and a drain-rock filled drainage trench on the pond's southwest perimeter that discharges into the main mill-site stormwater conveyance channel near the pond's south corner (upstream of the Carr's Pond Sediment Basin). Seepage into the Crusher Drive House sump is pumped to Carr's Pond via a surface pipe near the Carr's Pond Sediment Basin. Another pipe conveys stormwater from the recessed concrete North Stormwater Shed Vault, located just north of Carr's Pond, into the pond near its north corner. The North Stormwater Shed Vault receives flow from buried pipes (north and west inlet pipes to the vault) that convey stormwater from low-lying sumps and a culvert located on the northern side of the mill-site. The North Stormwater Shed outlet pipe is booted through the Carr's Pond primary liner midway down the pond slope near the north corner of the pond.

The main mill-site stormwater conveyance channel collects stormwater, plus any emergency process solution releases, from all but the northwest and north sides of the mill-site, and from further upgradient sources such as the truck shop and Riepetown Spring areas. Except for the Carr's Pond Sediment Basin, the stormwater channel is unlined and not considered containment for released process solution. On the southeast side of Carr's Pond, the main stormwater channel is riprapped to decrease erosion and to protect the transition to the Carr's Pond Sediment Basin liner.

The Carr's Pond Sediment Basin is double-lined with the same liner system as Carr's Pond, except the primary liner is overlain with 12-oz/yd<sup>2</sup> geotextile and a 6-inch thick layer of concrete. The concrete layer allows the use of small motorized equipment in the basin to remove sediment without damaging the liner system. The uppermost 8 inches of the native subgrade under the basin is moisture conditioned and compacted to a minimum 90% of maximum dry density in accordance with ASTM Method D1557. The recessed LCRS sump for the Carr's Pond Sediment Basin (monitoring point CP-SB-LDP) is located under the north corner of the basin and is similar in construction and method of evacuation to the Carr's Pond LCRS sump.

**Tailings Pipeline Corridor:** Tailings slurry is pumped from the two tailings thickeners, North and South, located at the Robinson Mill, to the 25,400-gallon tailings break tank via the tailings pump house and two 20-inch diameter above ground HDPE pipelines measuring approximately 7,000 feet in length. The 24,500 gallon break tank serves to break vacuum pressures within the pipelines and regulate gravitational flow of the slurry where the dual slurry pipeline system transitions to a single, above ground 10,500-foot, 24-inch diameter HDPE pipeline to the Re-Pulp Station. A Choke Station, fitted with wear

resistant ceramic orifice plates, valves, and bypass piping can divert slurry directly to the TSF via the northeastern deposition pipeline or on to the Re-Pulp Station.

The Re-Pulp Station Pump House contains the slurry tank, sump pumps, and associated facilities. Tailings slurry is conveyed from the Re-Pulp Station to the slurry/header distribution system on the tailings impoundment embankment. The distribution system consists of an elevated header pipeline that can feed cyclones or distribution pipelines extending into the impoundment. During the winter or during operational adjustment periods, slurry can also be diverted to bypass the cyclones entirely for direct discharge to the impoundment basin via the western or southeastern deposition pipelines.

An engineering design change approved in April of 2017 permitted the removal of the Repulp Tank, Overflow Tank, and associated piping from the Repulp Building. This engineering design change also approved of a pipeline reconfiguration which allows tailings to be directed to the cyclone headers or, in the event of a cyclone header malfunction, to a bypass pipeline that extends 600-feet to the north of the facility to deposit tailings away from the eastern embankment.

Reclaim water is pumped into an above ground 24-inch diameter HDPE pipeline via the 50,000 gallon reclaim tank and booster station at the Re-Pulp Station to the reclaim break tank located near the highest elevation along the pipeline route. Reclaim solution flows by gravity from the reclaim break tank to the Mill circuit through a 22-inch diameter HDPE pipeline.

Beginning at the Mill, the tailings slurry and reclaim pipeline systems, including the break tanks and the Re-Pulp Station, are located within parallel earthen berms (minimum 2.5 feet high and a nominal 8-foot base width) that form the trapezoidal-shaped, pipeline corridor. In early 2001, and again in mid-2005, to address surface deterioration and erosion issues, the corridor containment berms were reconstructed as necessary with approved fill material and ram-compacted using a loader or excavator bucket. For the work in 2005, and all future work on the corridor containment berms, compaction specifications were established, which call for material to be placed in maximum 12-inch thick lifts and compacted to 90% maximum dry density,  $\pm 2\%$ , in accordance with ASTM Method D1557. The Division does not consider the pipeline corridor a “lined” component as it does not meet the minimum design criteria for liners as outlined in Nevada Administrative Code (NAC) 445A.438. Therefore, any spills must be reported, evaluated, quantified, and remediated in accordance with the approved Emergency Response Plan.

### **Giroux Wash Tailings Storage Facility**

Initial Construction and Operations: Construction of the unlined Giroux Wash TSF was initiated in 1995. A starter embankment, comprised of compacted fill material, was constructed to an elevation of 6,710 feet above mean sea level (AMSL) and deposition of tailings was initiated directly onto a grubbed and contoured native soil subgrade. A 5-foot embankment crest raise was constructed in 1996 using compacted fill. Additional

centerline raises to the embankment, for the life of mine (LOM), will be constructed utilizing coarse fraction cycloned tailings deposition and local compacted fill. The currently permitted maximum crest elevation for the embankment is 6,880 feet AMSL (except on the Eastern Embankment Extension and Western Embankment Extension; see below). Descriptions of specific aspects of the impoundment design follow.

In accordance with the 1997 Consent Agreement, groundwater flow and solute transport modeling was completed for the constructed Giroux Wash TSF. The “Groundwater Flow and Transport Subregional Model: Giroux Wash Tailings Impoundment, 15 October 1997”, was prepared to evaluate tailings water percolation through the unsaturated zone beneath the impoundment, to assess the potential for solute transport, and to assess the potential for degradation of waters of the State. HYDRUS\_2D, MODFLOW, and MT3D96 codes were used for the model and three cases were evaluated: Case 1) 3,000 milligrams per liter (mg/L) TDS and 2,100 mg/L sulfate, the highest concentrations observed to date in solution samples; Case 2) 4,000 mg/L TDS and 2,400 mg/L sulfate; and Case 3) 5,000 mg/L TDS and 3,600 mg/L sulfate as a worst case scenario.

The modeling was used to predict flow and transport for 1,644 years into the future based on continued tailings deposition to the impoundment for the (1997) remaining 16-year mine life at that time. The model concluded that TDS and sulfate concentrations in groundwater will not exceed the respective 1000 mg/L and 500 mg/L water quality reference values at monitoring well WCC-G1 if the BOC is maintained to minimize infiltration of tailings solution to the relatively shallow groundwater (approximately 250 feet below surface in the volcanic rock aquifer) and the BOC solution depth is limited to a maximum 15-foot depth.

In response to repeated exceedances of BOC limits for fluoride and pH, a more detailed update of the Flow and Transport Model was submitted on 13 March 2012. The updated Flow and Transport Model predicted for the first time that the TSF will cause localized areas of low-level groundwater degradation with respect to sulfate, TDS, and high pH under the TSF footprint and a short distance to the south of the TSF. The Division responded in late 2012 and early 2013, requiring additional monitoring wells south of the TSF embankment, and a possible water treatment system to prevent further exceedances of BOC limits and to eliminate the potential for groundwater degradation. Refer to the TSF Groundwater Contamination section below.

TSF Embankment Construction and Header/Cyclone Deposition System: The TSF embankment header deposition system, located along the crest of the Central Embankment, uses a 30-inch diameter rubber-lined steel pipeline mounted on vertical “H-frame” support structures, with 10-inch diameter cyclones, 4-inch diameter HDPE cyclone overflow pipes, 6-inch diameter HDPE spigot pipelines, valves, joints, vertical and horizontal supports and jacking system, and overhead walkway for mechanical system access. The tailings distribution system has been designed to accommodate a phased expansion of the tailings impoundment to an approved maximum embankment elevation of 205 feet above its base (6,820 feet AMSL), with a downstream slope of 2.5H:1V (horizontal to vertical).

Embankment elevations above 6,820 feet AMSL or modifications to the approved TSF design are considered modifications to the Permit and would require Division review and approval prior to construction. Exceptions to the embankment crest elevation limit are the Eastern Embankment Extension, which was constructed in 1997 using a combination of native ground and engineered fill to 6,830-6,865 feet AMSL to provide the necessary elevation for gravity drainage in the tailings pipelines upstream of the header deposition system, and the Western Embankment Extension, on which the Division approved in July 2016 the construction of a tailings pipe support berm. To clarify this discrepancy and to provide an elevation limit that would apply to the Eastern Embankment Extension and Western Embankment Extension, the Division added a limitation to the 2016 Permit renewal requiring that the maximum approved elevation for the tailings beach on the upstream side of any section of the TSF embankment is 6,818 feet AMSL. The 6,818-foot AMSL limit for the crest of tailings deposition was previously established for the Giroux Wash TSF by the Nevada Division of Water Resources (NDWR).

The TSF Central Embankment is continuously raised, except during winter operations when the cyclones are bypassed, by deposition of the coarse tailings fraction separated by the cyclones and by periodically raising the TSF embankment header pipeline using the jacking system. Alternatively, earthen borrow material may be used to raise the embankment height, especially during extended freezing weather conditions when tailings cannot be cycloned. The fine tailings and water fraction from the cyclones is discharged onto the tailings beach on the upstream (north) side of the TSF embankment. The Central Embankment and associated cyclone header deposition system do not extend all the way to the eastern and western ends of the south embankment of the TSF; the Eastern Embankment Extension and Western Embankment Extension of the TSF south embankment are constructed entirely with compacted earthen borrow material over native soil and bedrock. During extended freezing weather conditions, when the cyclones are bypassed, uncycloned whole tailings slurry is discharged through 6-inch diameter spigot pipelines from the header, western, northeastern, and southeastern deposition pipelines, directly into the TSF basin.

An EDC was approved by the Division in April 2008, for the LOM construction of expansions to the Giroux Wash TSF embankment to a maximum permitted crest elevation of 6,820 feet AMSL. The approved design includes lateral and vertical expansions to the western and eastern compacted earth embankments, an up-gradient expansion of the BOC, and associated downstream expansions of the downstream underdrain, stormwater, and sediment control facility (DUSSCF).

The EDC approval requires notification prior to construction of any portion of the expansion and submittal of as-builts and updated operating plans following completion of any construction phase. In addition, the Permittee is required to conduct soil density testing of in-situ and compacted soils in the TSF basin finger zones when they are cleared and grubbed in advance of embankment expansions. Results of in-situ and flexible wall permeability test results are provided to the Division as part of each as-built and QA/QC report, as applicable.

The 2017 Renewal and Major Modification consisted of, along with additional construction and source mitigation measures, the increase in the elevation of the main embankment to a height of 6,880 feet AMSL or 265 feet above the base. During NDWR's review of the *Application for Approval of Plans and Specifications for Alteration of a Dam, Permit No. J-413* (SRK, 2016) a third party review was requested due to the complexity of the TSF. The third party review determined that additional tailings characterization was required for the ultimate embankment height construction. A revised permit application document titled *Revised Application for Approval of Plans and Specifications for Alteration of a Dam, Permit No. J-413* (SRK, 2017) was submitted to NDWR for permission to construct a 10-foot lift on the embankment while additional information was collected and analyzed for the ultimate buildout elevation of 6,880 feet AMSL. The 10-foot raise was approved by NDWR on 19 June 2017. The expansion of the facility under dam Permit J-413 and Water Pollution Control Permit NEV0092105 was approved on 09 April 2018 and 18 November 2017, respectively, which encompasses raising of the Cycloned Main Embankment (CME) to an elevation of 6,880 feet AMSL and the associated grading of the perimeter embankments to the SCAE at an elevation of 6,865 feet AMSL.

As of the 2024 ROC, the CME elevations range from 6,857.5 feet amsl at the west end to 6,864.4 feet amsl in the center. The Western and Eastern Embankment Extensions are constructed to elevations of approximately 6,860 and 6,860 feet amsl, respectively. The BOC and SCAE areas have current crest elevations of approximately 6,835 feet amsl. The Western Perimeter Embankment grades from an approximate elevation of 6,860 feet amsl to an elevation of 6,835 feet amsl (i.e., elevation of the BOC). The Eastern Perimeter Embankment grades from an approximate elevation of 6,866 feet amsl to an elevation of 6,860 feet amsl. The permittee is authorized to impound tailings within 2 feet of the crest of each of the separate embankments, with the exception of the BOC where the impoundment of tailings is limited to 9 feet below the crest to provide storage capacity for the Probable Maximum Precipitation event.

TSF Embankment Seepage Collection System and Sediment Control: A group of 10 vibrating wire piezometers (EP1 through EP10), installed in 1998 at 700-foot intervals along the TSF Central Embankment centerline at an elevation of approximately 6,715 feet AMSL (within or on the initial 5-foot raise above the starter embankment), are used to measure the phreatic water surface within the cycloned tailings to maintain embankment stability and monitor the recovery of these waters. One additional piezometer (EP11) was installed in 2006 within the compacted fill of the Western Embankment Extension. Recovery of water within the Central Embankment is facilitated by a drainage blanket located beneath the embankment and constructed of a geotextile-encased 18-inch thick drain-rock layer that includes embedded perforated and non-perforated HDPE conveyance pipelines. The drainage blanket lies directly on compacted fill and native soil. Solution collected in the underdrainage system and conveyed to the Seepage Collection Pond may include meteoric water, process water draindown from the cycloned tailings, and/or seepage through the impounded tailings and the embankment. The purpose of this system is to accelerate drainage and consolidation of cycloned solids, which will provide dam

stability and enhance containment of fluids. The Eastern Embankment Extension and Western Embankment Extension do not include underdrainage systems.

An EDC was approved by the Division in January 2016 for installation of nine additional TSF embankment piezometers (EP12-EP16, EP17a, b, c, and EP18) clustered into three groups drilled from the embankment crest into the cycloned tailings, and in some cases into the underlying starter embankment and native soil. Each piezometer is a grouted borehole containing one or more 2-foot vertical intervals of bedding sand each enclosing a single Geokon vibrating wire pressure transducer. The three piezometer clusters may each include one vertical piezometer equipped with up to three transducers at three different depths (e.g., EP17a, b, c), one piezometer equipped with one transducer inclined northward toward the TSF basin, and one piezometer equipped with one transducer inclined southward toward the downstream toe of the embankment. The new piezometers were installed to provide a more accurate understanding of the phreatic surface within the embankment, both for stability evaluation and design of possible future embankment raises. The piezometers may also provide supporting information for the ongoing investigation on TSF leakage to groundwater. The piezometers were installed in January and February 2016.

In order to improve monitoring capabilities and replace several inoperable vibrating wire piezometers, the permittee installed an additional 24 piezometers at the Giroux Wash TSF between July and October of 2021. The piezometers were installed at 15 different locations throughout the various embankments of the TSF. The piezometers were installed either by being pushed into their final location utilizing a Cone Penetration rig or by being placed in a borehole that was created by a truck mounted sonic drill rig. The piezometers were grouted in place and checked for proper function, after which a datalogger was installed.

In late May 2016, a 0.8 gpm flow of seepage water was observed emanating from a small area of tuffaceous bedrock in a road-cut exposure immediately downslope of the downstream face of the Eastern Embankment Extension. Tailings spigotting was temporarily curtailed on the adjacent upstream side of the embankment, a temporary 60-mil HDPE-lined collection sump was installed, and the seepage rates immediately decreased.

In early June 2016, the Division approved a non-fee modification for a permanent Eastern Embankment Extension seep collection system, and the installation of five additional vibrating wire piezometers. The piezometers were installed within the Eastern Embankment Extension, the underlying bedrock, and the adjacent tailings beach to investigate the phreatic surface in those materials near the seep. The seep collection system includes a cut-off trench that terminates in a sump, from which the collected seepage is pumped back to the TSF through a pipeline equipped with a totalizing flow meter. The cut-off trench is 2- to 3-feet deep and 2-feet wide, and is lined on its bottom and south wall with a 60-mil HDPE geomembrane. The cut-off trench is backfilled with limestone drain rock that is encapsulated within 8 oz/yd<sup>2</sup> non-woven geotextile. The geotextile and drain rock surround a 4-inch diameter, perforated, corrugated, polyethylene (CPE) collection

pipe that reports to the pump sump. The pump sump is also lined with a 60-mil HDPE geomembrane on its base and 1H:1V-sloped walls.

With the June 2016 Division approval, monitoring and reporting requirements were added to the Permit for the Eastern Embankment Extension seep (e.g., pumped seepage volumes, seepage analyses, piezometric heads, and TSF embankment seep reports). Future tailings deposition must be performed in such a way as to minimize embankment seepage and maintain embankment stability while maintaining a beach sloped away from the upstream side of the embankment in any embankment seep area. Please see section titled *Major Modification for Giroux Wash Tailings Facility Expansion (2017)* for additional details regarding for the permanent seepage management facilities.

RNMC submitted an EDC to the Division on 14 September 2023 for the capture of the EEE Seep and addition of an pipe and vault system. The submittal was approved by the Division in a letter dated 14 March 2024. The EDC was necessary for the construction of the TSF expansion. The EEE seep will be measured and tested at the vault. After the vault the seepage fluid will report to the Seepage Collection Pond.

The “Old” Tailings Seepage Collection Pond (OTSCP), located a short distance south of the TSF embankment, is constructed with a single 60-mil HDPE liner. The solution from the TSF underdrainage system that flows into the pond is pumped back to the TSF via an above-ground pipeline from three vertical sump pumps. Under normal operating conditions, the pond cannot be pumped below an approximate 2-foot depth necessary to facilitate pumping and/or prevent piping from freezing. An emergency generator is in place at the pond to operate pumping systems in the event of an extended power outage.

In accordance with Schedule of Compliance Item #8 of the 2017 Permit modification and renewal, RNMC submitted an engineering design change for double lining and modifying the pumping and piping system of the OTSCP. The OTSCP will be converted to a double-lined pond, utilizing 60-mil high density polyethylene (HDPE) drain liner (textured side up) as a secondary liner and a smooth 80-mil HDPE liner as the primary liner. The textured side of the 60-mil secondary liner will allow for rapid transport of any fluid to the newly constructed leak collection and recovery sump that will be located at the low point of the pond and placed in between the primary and secondary liners. In the area of the sump, the secondary 60-mil HDPE liner will be underlain by a Geosynthetic Clay Liner (GCL) to further protect the secondary liner and limit solution infiltration in the event of a release. The sump will be filled with select drain gravel wrapped in a 10 oz/yd<sup>2</sup> geotextile that is overlain by the 80-mil HDPE primary liner. A perforated leak detection pipe that transitions into a solid walled pipe will be placed within the drainage gravel and will allow for the Permittee to remove solution in the event that there is leakage from the primary liner.

The current pond configuration utilizes four collection sumps, constructed of 48-inch diameter 4-inch precast concrete manholes, booted through the single 60-mil HDPE liner. The 2017 EDC proposed that two of these sumps (the east and west sumps) will be

abandoned while the new double lined pond will utilize the two northern sumps, designated as the eastern and western sumps. The two northern sumps will be booted through both the primary and secondary pond liners and will have two 1/2-inch steel bands placed around the 16-inch diameter HDPE pond feed pipes. The boots will be constructed in a way that any leakage from the primary liner will report to the leak detection sump. The sumps will be retrofitted with new pumps that will provide enough hydraulic head and flow to transport the collected solution from the pond to the Reclaim Water Tank (RWT) located on the eastern side of the Giroux Wash Tailings Storage Facility, a linear pipeline distance of approximately 8,100 feet. A new 3,200 foot long section of 10-inch diameter PE4710 HDPE Standard Dimensional Ratio (SDR) 11 pipeline will progress from the OTSCP to the RWT. The existing 4,800 feet of 14-inch diameter HDPE SDR11 pipeline will be relocated to the eastern end of the newly installed 10-inch diameter pipeline and will travel the remaining distance to the RWT.

On 26 July 2018, the Permittee submitted a revision to the previously approved EDC requesting that an entirely new double-lined and leak detected TSCP (designated "New" TSCP [NTSCP]) be constructed to the south of the existing pond. However, the previously approved seepage collection pond would remain in the Permit to provide for additional capacity if needed and for possible conversion to an E-cell at closure.

The NTSCP is located approximately 75 feet south of the existing OTSCP, and receives solution routed to the pond through the extension of existing seepage conveyance pipelines and lined open channels. The NTSCP is rectangular in shape and has approximate surface dimensions of 250 feet by 150 feet. The pond is approximately 17 feet deep with 2.5 horizontal to 1 vertical side slopes to the floor of the pond. This provides a capacity of approximately 2.14 million gallons at the 2-foot freeboard elevation (6569 feet above mean sea level). The liner system consists of, from the floor up, 12-inches of prepared subgrade, a 60-mil HDPE secondary drain liner (drain side up), and an 80-mil HDPE single-sided textured liner (textured side up). The pond is graded to drain any leakage from the primary liner to a drain rock filled and non-woven geotextile wrapped sump. An 8-inch diameter HDPE perforated collector pipe is laid within the sump and transitions into a solid walled pipeline that penetrates the primary liner at the crest of the pond and allows for the removal of collected fluid.

The new pumping system consists of two 250-horsepower pumps (one operating and one for redundancy) capable of pumping 920 gpm to the RWT, a linear pipeline distance of approximately 8,450 feet. In the event that additional pumping capacity is required, both pumps can be utilized to transfer up to 1,150 gpm to the RWT. As discussed above, the new pipeline system that will transfer solution to the RWT has been deferred until the 2022 construction season and will be accompanied by its own ROC report.

The DUSSCF serves to retain sediments carried by stormwater runoff from the downstream slope of the TSF embankment, conveys tailings solution from the downstream slope of the embankment to the underdrainage system, and provides a collection system for potential upsets from the tailings header components. This unlined sediment control system consists

of settling basins or paddocks underlain by a southward extension of the embankment underdrainage blanket and perforated piping system, and pre-cast concrete (or perforated CPE) vertical inlet structures to decant clarified solution from the settling basin underdrainage system. The clarified solution flows from the vertical decant structures into either solid HDPE pipelines or a 60-mil HDPE-lined collection ditch that conveys the solution to the either the OTSCP or NTSCP for return to the TSF.

The DUSSCF is typically extended southward annually to accommodate the annual southward progradation of the TSF downstream embankment toe and is generally expanded in phases, the last being constructed in 2018. From bottom up, the DUSSCF paddock construction consists of subgrade (and random fill where needed) compacted to 92% maximum dry density (ASTM Method D1557), a bottom layer of 10 oz/yd<sup>2</sup> nonwoven geotextile, an 18-inch thick underdrainage blanket constructed with clean drainage gravel, a top layer of 10 oz/yd<sup>2</sup> nonwoven geotextile, and a 12-inch thick layer of graded cover material compacted to 92% maximum dry density (ASTM Method D1557). The coarse tailings fraction from the cyclones at the TSF header system is deposited on top of the graded cover layer. An earthen dike forms the southern limit of the DUSSCF. The dike is constructed to a minimum height of 7 feet above the base of the underdrainage blanket using borrow material compacted to 92% minimum dry density (ASTM Method D1557). Twelve- to 18-inch diameter perforated CPE underdrain collection pipes, installed within the underdrainage blanket, report to vertical 12-inch diameter CPE decant risers, which are placed periodically within the DUSSCF paddocks. Fifteen-inch diameter non-perforated HDPE pipelines connected to the base of the vertical CPE decant risers convey the underdrainage solution to the lined collection channels and onward to the Seepage Collection Pond.

TSF Operation and BOC: Except during winter months, cyclones on the TSF Central Embankment are used to separate a sufficient quantity of coarse fraction of the tailings solids (underflow) for Central Embankment raise construction. Typically, 18 to 25 adjacent cyclones are operational over a Central Embankment linear crest distance of approximately 8,200 feet. The fine tailings fraction and a majority of the tailings fluid fraction from the cyclones are distributed in thin layers through the cyclone overflow pipelines into the impoundment basin creating a tailings beach with a northerly gradient of approximately 0.25%. This subaerial deposition method can achieve maximum tailings consolidation and lowers the material permeability into the range of  $1 \times 10^{-5}$  centimeters per second (cm/s) to as low as  $1 \times 10^{-7}$  cm/s, depending on material type, grain size, and beach management. Tailings slurry deposition also occurs from the western, northeastern, and southeastern deposition pipelines to maintain an appropriate beach slope in those areas of the impoundment.

An EDC was approved by the Division in August 2009, for construction of an extension to the tailings western deposition pipeline. The original 20-inch diameter deposition pipeline functioned by gravity and could only deposit tailings to a point approximately 3,000 feet beyond the western end of the 30-inch diameter cyclone header pipeline. This depositional limitation resulted in difficulties maintaining the required 2-foot maximum supernatant

fluid depths outside the BOC in natural “finger” drainages along the extreme west and northwest limits of the tailings impoundment. The capability to deposit tailings over a longer western beach enhances the ability to displace supernatant fluid from the collection areas in the natural drainages and direct it to the BOC.

The 2009 western deposition pipeline extension design consisted of a separate, approximately 12,000-foot long conveyance pipeline comprised of 12-inch diameter SDR 13.5 (first 2,000 feet) and SDR 17 (remaining 10,000 feet) HDPE, fed by a dedicated, skid-mounted, slurry booster pump. The booster pump – a variable frequency drive design – was connected by a 14-inch diameter take-off pipeline to the main 20-inch diameter deposition pipeline, just west of the west end of the 30-inch diameter cyclone header pipeline. The pump installation, located on the Western Embankment Extension, included a pressure transducer to shut the pump down to prevent cavitation and pump damage when the inlet flow pressure drops below 3 pounds per square inch. A check valve on the outflow side of the pump prevented backflow along the distribution pipeline. A 2-inch diameter HDPE pipeline that supplied gland seal water to the pump from the OTSCP was placed in a 4-inch diameter HDPE secondary containment pipeline to prevent erosion in the event of a leak where it is routed up the face of the TSF embankment.

The 12-inch diameter western deposition pipeline extension was located along and inside the downgradient 2-foot high berm of the realigned access road that traverses the western and northwestern boundary of the tailings impoundment. Two-foot wide cut-outs in the road berm, placed at 100-foot intervals, allowed any escaping fluid, in the event of a spill, and stormwater reporting directly to the road to flow into the impoundment basin. Several 4-inch diameter spigots were used to distribute tailings into downgradient finger drainages. Strategically placed 12-inch diameter takeoffs from the deposition pipeline allowed distribution of larger tailings volumes through multiple spigots if necessary.

An EDC approved by the Division in July 2016 authorized construction of a new western deposition pipeline tailings booster pump station at the west end of the Western Embankment Extension. The new pump station replaced the 2009 booster pump station and included two pumps and pipelines instead of one to deposit more tailings in the finger drainages and BOC and minimized additional tailings deposition near the Western Embankment Extension where the tailings beach elevation was already near the 6,818-foot AMSL Permit limit. The new western deposition pipeline tailings booster pump station was located within the TSF footprint and situated topographically lower than the adjacent embankment crest so that any upset or overflow from the booster pump station would remain within the TSF. The WEE slurry booster pump station, tank, and 12-inch diameter HDPE pipeline were decommissioned in 2017.

The 2016 western deposition pipeline tailings booster pump station included a concrete pad, an approximate 42,000-gallon, rubber-lined, steel surge tank, and two pumps. The surge tank was fed by a 20-inch diameter HDPE pipe connected to the west end of the cyclone header pipeline. Construction of a 5-foot high earthen berm was authorized along the Western Embankment Extension to support the 20-inch diameter pipeline and facilitate

gravity flow; however, the Permit limited the elevation of the cycloned Central Embankment crest to no greater than 6,820 feet AMSL, and the elevation of the crest of the tailings beach adjacent to the inside face of any portion of the tailings embankment to 6,818 feet AMSL. The surge tank feed a new 500-horsepower variable frequency drive pump, which was connected to a new 20-inch diameter SDR 11 second western deposition pipeline that extended 4,000 feet to the north around the tailings impoundment. As part of the 2016 EDC, the existing tailings booster pump was relocated to the new surge tank to feed the existing 12-inch diameter HDPE western deposition pipeline. The 2016 EDC also extended the 12-inch diameter existing western deposition pipeline farther to the north to deposit tailings in the finger drainages and the BOC itself. The upper 8 inches of native subgrade under the 6-inch thick concrete slab that supports the surge tank and pumps were compacted to 92% maximum dry density as determined by ASTM Method D1557.

An EDC approved by the Division in April of 2018 permitted modifications to the tailings slurry conveyance and deposition pipelines. Tailings from the Repulp Building Tank can report to TSF by direct discharge through the northern deposition pipeline or travel through three 20-inch diameter HDPE SRD15.5 pipelines (approximately 3,230 feet in length) to the header pipeline for deposition from cyclones or spigots. The tailings can also travel through the cyclone header pipeline, consisting of a 30-inch diameter rubber-lined steel pipeline measuring 8,075 feet long, to the Western Slurry Deposition System pipeline that consists of a 24-inch HDPE SDR 11 pipeline that travels approximately 1,900 feet along the WPE, and deposits tailings via nine 6-inch spigots. The 24-inch HDPE western deposition pipeline then transitions into 22-inch, 20-inch, and 12-inch pipelines that travel approximately 3,000, 2,950, and 2,000 feet, respectively, along the WPE, depositing tailings through 6-inch spigots.

The three 20-inch diameter HDPE SDR 15.5 pipelines that feed the cyclones and the 24-inch diameter HDPE SDR 11 pipeline that feeds the western deposition pipeline, were replaced with single 30-inch diameter HDPE SDR 11 pipelines that measure 3,230 and 2,500 feet in length, respectively. The previously utilized pipelines that deposited tailings from the WPE were moved further north along the WPE to allow for tailings deposition in the northern reaches of the TSF. In addition to the pipeline modifications, the Western Extension Embankment Slurry Booster Pump Station (previously approved) was relocated to the WPE and was placed back into service.

Slurry rheology testing was performed to determine the slurry viscosity, shear stress, and coefficient of rigidity for the Bingham mixture (tailings), to determine hydraulic pumping and pipeline requirements. Testing was performed at 45% and 50% solids concentrations by weight. Hydraulic calculations for the modified conveyance and deposition pipelines showed that two 1,600 horsepower tailings booster pumps would provide adequate operating head for cyclone header operation and that the pipeline pressures for the maximum slurry flow rate of 14,000 gallons per minute will remain below the maximum operating pipeline pressures.

The existing 24-inch pressure activated valve was relocated to the bypass side of the tee. This valve will be connected to a pressure sensor located on the tailings pipeline and will open when the pressure exceeds 85 pounds per square inch (psi) to protect the HDPE pipelines delivering tailings to the cyclone header.

The TSF tailings beach ultimately grades toward the supernatant collection facility known as the BOC, which is located at the northwest limit of the impoundment footprint. Supernatant fluid flows into the BOC where it is recycled by pumping through a 24-inch diameter HDPE reclaim pipeline for reuse in the Mill circuit. The BOC is a key design element for maintaining the depth of standing supernatant fluid at all other locations within the impoundment basin below the permitted maximum of 2 feet. As part of the 2016 Permit renewal, supernatant depth monitoring requirements were added to the Permit for selected areas of the TSF basin outside of the BOC.

The original BOC was trapezoidal-shaped and measures approximately 3,600 feet long, which included a 1,250-foot final extension approved by the Division as part of the 2008 TSF embankment LOM expansion EDC approved in April 2008 and completed in late 2008. The BOC ranged from 10 to 15 feet in depth with 3H:1V sidewalls and a bottom width of approximately 150 feet. The base and sidewall soils are amended with powdered bentonite clay material to form a low permeability soil layer compacted to achieve a nominal permeability of  $1 \times 10^{-6}$  cm/s with a nominal thickness of 12 inches. To further minimize the potential for seepage of supernatant solution through the compacted base, solution must be pumped from the BOC via the reclaim water pipeline to the Mill within 20 days if the solution depth exceeds 15 feet at the barge.

During the original BOC construction, three vibrating wire piezometers, P1, P2, and P3, were placed below the natural ground surface under the tailings basin adjacent to the mouth of the BOC at depths of 1-, 15- and 30-feet, respectively. The purpose of these piezometers is to monitor the rate of seepage from the tailings impoundment basin for comparison with results of a vadose zone hydrogeologic model that was used to simulate conditions within the impoundment and potential seepage rates in the vadose zone.

As part of the 2008 extension construction, several additional piezometers were installed along two roughly northeast-southwest trending section lines, located approximately 750 feet apart and perpendicular to the longitudinal trace of the approved BOC extension. On each section, three piezometers (i.e., one set) are located on the centerline of the BOC and placed at depths of 1-, 5-, and 10-feet below the amended and compacted BOC low permeability layer. Two other sets, located at the lateral limit of the section, i.e., the east and west edge of the BOC, each contain two piezometers placed at depths of 25- and 35-feet below surface. These additional piezometers, 14 in total, were placed to monitor hydraulic head and potential fluid migration beneath and lateral to the BOC. The piezometers are designated by set number and depth from northeast to southwest along the section. For example, Set 1 is comprised of BOC1-25 and BOC1-35; Set 2 is comprised of BOC2-1, BOC2-5, and BOC2-10; etc.

The 2008 construction also included three piezometers (VSP4, VSP5, and VSP6) placed in a vertical arrangement at depths of 1-, 15-, and 30-feet below the native ground surface in a drainage located approximately 2,400 feet southwest of the P1-, P2-, P3-location. These piezometers are intended to measure potential vertical seepage in a finger drain area inundated with tailings and solution.

The 2008 phase of the LOM expansion was completed in November 2008. The as-built report for the 2008 expansion includes details for construction of the base of the BOC expansion with a series of 'step lifts' to minimize the frequency of pumping barge relocations along the channel and to maintain a more consistent solution depth below the barge. This design feature, reviewed and approved during construction, consists of constructing the floor of the BOC expansion in approximately 200-foot long, flat sections divided by a short section with a 3H:1V slope and 6-foot rise.

The Divisions 2017 Major Modification approval required that an EDC be submitted for the synthetic lining of the Supernatant Collection Area Embankment (SCAE) where supernatant would be pooled prior to passing through the decant structure to the Reclaim Water Pond (RWP) where it would be pumped back to the Mill (see section *Minor Modification for Supernatant Management Facilities (2017)* for more detail). The Permittee submitted this EDC on 30 May 2018, and it was approved by the Division on 14 June 2019. The permittee subsequently submitted an EDC to manage supernatant at the BOC and SCAE with shore-based pumps and to defer from the construction of the decant structure and RWP. The justification for this EDC was based on the successful management of the new shore-based pumps and the ability of these pumps to minimize the size and depth of the supernatant pool. This EDC was approved by the Division on 14 June 2018.

In November of 2019, the Permittee proposed to manage supernatant at an expanded and synthetically lined BOC area opposed to the approved plan for management at the synthetically lined SCAE. The management of supernatant at the existing BOC would minimize the amount of time needed to migrate the supernatant pool to the SCAE and subsequently minimize the amount of supernatant that would be stored over areas that have higher hydraulic conductivities and are more prone to seepage. The management and synthetic lining of the BOC also provides for the supernatant pool to be stored over a lower permeability liner opposed to consolidated tailings or bentonite amended soil. In addition to these benefits, the management of supernatant at an expanded BOC would simplify stormwater management at closure and improve the longer term erosional and mass stability of the SCAE.

In contrast to the previous design with a trapezoidal configuration, the proposed expansions will generally use existing topography that is slightly smoothed or regarded to accommodate liner installation. An 80-mil single-side textured (textured side up) HDPE liner will be installed on the side slopes and base of the of the BOC in four liner placement episodes, although the number could change depending on the rate of rise of the TSF and the ability to contain supernatant for design storm events. This construction would extend

the BOC up the White River Wash approximately 1,600 feet and will result in widths ranging from approximately 200 to 600.

Shore based pumps and access roads will be constructed within the synthetic lined containment of the expanded BOC. The roads and pump pads will be constructed by installing a 20 oz/sq yd geotextile on top of the liner to protect it from the 1-foot thick type 2 road base that will make up the road and pad surface. The roads and the pump pads will be moved strategically along with the phased lining episodes.

The slope stability of critical BOC embankment sections was evaluated to ensure that they would remain stable in both static and pseudo-static conditions. The highest section of the proposed embankment, the existing unlined embankment, and the proposed small embankment to be constructed at the northern extent of the expanded BOC. The embankments were modeled as water-retaining structures and the same parameters utilized in the 2017 Dam Safety Applications were carried forward for this analysis. SLIDE 7.0 (RocScience Inc., 2018), a 2-D slope stability program, was utilized to evaluate the static and pseudo static conditions of the three embankment sections and determined that all embankments would exceed Division Factor of Safety requirements for both conditions. A liquefaction analysis was also performed on soils within the existing BOC area and resulted in the development of the current plan to expand the BOC up the White River Wash opposed to raising the of existing embankment.

A 34,000-foot long trapezoidal stormwater diversion channel is located upgradient to the north and west of the TSF and the BOC to divert upgradient surface runoff resulting from the 100-year/24-hour storm event. The stormwater diversion channel is an earthen channel, which is not armored with rip-rap, according to the December 1994 Revised Design Report Addendum to the Robinson Project Tailings Impoundment Facility.

### **TSF Groundwater Contamination**

Initial Detection, Corrective Action, and Pumpback System: In early 2015, groundwater degradation with respect to sulfate was discovered in new groundwater monitoring well WCC-G7, located a short distance south of the TSF embankment. The detected sulfate concentration of 711 mg/L exceeds the 500 mg/L Profile I-R reference value for sulfate and is believed to be the result of leakage from the TSF. On 29 April 2015, the Division issued a Finding of Alleged Violation (FOAV) and Order, requiring the Permittee to complete actions, which had already begun, to investigate and remediate the contamination, including implementation of a Giroux Wash Corrective Action Plan (Giroux Wash CAP). One aspect of the CAP is the installation of groundwater wells to delineate, remediate, and monitor the contaminant plume. Accordingly, in 2015 and early 2016 the Permittee installed 10 new groundwater wells in the vicinity (four pumpback wells and six monitoring wells). Another requirement of the Giroux Wash CAP is to reduce or eliminate the source of the degradation. As part of the 2016 Permit renewal, a schedule of compliance item was added to the Permit requiring submittal of a Permit modification to eliminate the potential for the TSF to degrade waters of the State. The Permit

modification was submitted to the Division as both a Minor Modification (18 March 2016) and a Major Modification (08 December 2016), both are described below in *Minor Modification for Supernatant Management Facilities (2017)* and *Major Modification for Giroux Wash Tailings Storage Facilities Expansion (2017)*.

An EDC was approved by the Division in June 2015 for construction of the Giroux Wash groundwater pumpback system to convey contaminated groundwater collected in pumpback wells to the TSF Re-Pulp Station pump house Reclaim Water Tank. At the Reclaim Water Tank, the contaminated groundwater is combined with tailings reclaim solution and pumped back to the mill for re-use via the existing tailings reclaim pipeline. The Giroux Wash groundwater pumpback system features 2-inch to 4-inch diameter, SDR 11, HDPE pumpback well pipelines that each connect one groundwater pumpback well to the Giroux Wash groundwater pumpback booster pump station located south of the TSF embankment. From the pumpback booster station, the contaminated groundwater is pumped to the Reclaim Water Tank via an approximately 7,591-foot long, 10-inch diameter, SDR 11, HDPE pumpback pipeline (this pipeline design was later revised; see below). Each pumpback well pipeline is outfitted with a check valve to prevent cross-contamination between wells, a flow meter with totalizer, an isolation valve, a pressure gage, and a sample port. The main groundwater pumpback pipeline features five air vacuum valves, each installed at a local high point, five isolation valve and drain valve pairs, each installed at a local low point, and a sixth drain valve installed at the Giroux Wash groundwater pumpback booster pump station. A 35-gallon HDPE stock tank is installed at each air vacuum valve and drain valve to collect any spillage. The pumpback booster pump station includes a booster pump, a 10,000-gallon plastic tank (the tank size and composition was later revised; see below) that receives solution from the pumpback wells, and an 80-mil HDPE liner capable of containing 110% of the tank capacity. Under the liner the upper 8 inches of native subgrade is compacted to 90% maximum dry density (ASTM Method D1557) and a 4-inch thick underliner layer of non-potentially acid generating (non-PAG) general fill is compacted to 95% maximum dry density (ASTM Method D1557). Cut and fill areas under the pumpback pipeline are compacted to 90% maximum dry density (ASTM Method D1557), except at roadway crossings, where the pipeline is contained within a secondary pipe sleeve and buried at least 3 feet below the road surface in non-PAG general fill that is compacted to 95% maximum dry density (ASTM Method D1557). Final slopes associated with the pumpback pipeline construction will not exceed an angle of 2.5H:1V. The groundwater pumpback pipeline was originally designed to convey up to 500 gpm, but was redesigned as described below with a maximum flow of 32 gpm.

Several supplemental EDCs were approved by the Division in 2015 to connect pumpback wells WCC-G7, WCC-G9, WCC-G10, and WCC-G11 to the Giroux Wash groundwater pumpback system, to reduce the size of the HDPE pipeline between the booster pump station and the Re-Pulp Station Reclaim Water Tank from 10-inch diameter, SDR 11, to 2-inch diameter, SDR 7 (reducing the maximum pumping flow rate, as noted above), and to change the booster tank size and composition from 10,000 gallon plastic to an 8,000 gallon

rectangular steel tank. The pumpback system, as modified, was commissioned in December 2015.

A non-fee application was approved by the Division in July 2016 to convert monitoring wells PW-01 and PW-02 to pumpback wells and connect them to the existing Giroux Wash groundwater pumpback system. Sulfate concentrations in those two wells had risen in prior months above the 500 mg/L groundwater reference value for sulfate. Each of the new pumpback wells is outfitted with the same valves, flowmeter with totalizer, pressure gage, etc. as the other pumpback wells. A 2-inch diameter HDPE pipeline conveys the pumped groundwater from each pumpback well to the existing tank at the booster pump station for pumping to the Reclaim Water Tank. The PW-01 pipeline is approximately 550 feet long, and the PW-02 pipeline is approximately 1,700 feet long. The booster pump has a rated operating range of 11 to 32 gpm by use of a variable frequency drive, and the addition of PW-01 and PW-02 is expected to increase the total pumpback flow from 14 gpm to approximately 18 gpm.

An EDC to add an additional pumpback well (WCC-G24) was approved on 18 April 2023. A supplementary EDC approved a pump back well discharge pipeline from the newly drilled well WCC-G24, to the double lined NTSCP of the pump back system. The new well WCC-G24 is anticipated to have an operating range of approximately 150 gpm. The pipe used for the 4-inch well discharge pipeline consists of SDR-11, 4710 HDPE pipe,

Additional monitoring wells WCC-G13, WCC-G14R, WCC-G15, WCC-G16, and WCCG-17 were installed downgradient of the TSF to further delineate the extent of groundwater degradation. When the first saturated water level was reached, a temporary screen was placed and a sample was taken. The well was then drilled approximately 30 feet deeper with another sample taken. This was to determine the best location of the well screen and to ensure that the well would be able to have the largest impact on degraded water if it were turned into a pumpback well.

In an effort to obtain valuable subsurface characterization and water chemistry information within the Giroux Wash basin fill material, located south and east of the Tailings Storage Facility embankment, RNMC proposed to drill two additional monitoring wells, WCC-G18 and WCC-G19, pursuant to the EDC document titled *Engineering Design Change for Installation of Two Monitoring Wells* (submitted to the Division on 03 March 2017). During a meeting at the Division offices, on 7 September 2017, RNMC agreed to perform aquifer testing on both proposed wells and a plan titled *Proposed Plan for Aquifer Testing for Wells WCC-G18 and WCC-G19 in Giroux Wash* was subsequently submitted to the Division outlining the aquifer testing procedures. The results of this testing will be utilized to further define hydraulic boundaries, which are important for the characterization of the paleo-channels and sulfate transport within the Giroux Wash. These documents were approved by the Division on 26 September 2017.

An EDC to add two additional monitoring wells (WCC-G22 & WCC-G23) was approved on 18 April 2023. The two additional wells are to be located in a small wash below the

sand cyclone portion of the TSF dam. The two wells are to be screened at different intervals to increase the data available in the area to help better manage the TSF.

In July of 2021, the Division approved of the record of construction (EDC approved in January 2020) and the use of an approximate 1,150 lineal foot, 3-inch diameter HDPE pipeline within a 6-inch diameter HDPE pipeline to convey TSF pumpback solution from the existing holding tank to the NTSCP. This pipeline allows for gravity flow of pumpback solution while also being buried to allow for freeze protection (an issue that affected the previous pumping system). The flows are pumped to the Reclaim Tank via the NTSCP pumping system. Flows through the pipeline will be calculated by adding totalizer and flow rate readings from each individual pumpback well together and then averaging over the recording period. To ensure the primary 3-inch pipeline is not compromised, the secondary containment is monitored weekly for flow/no flow conditions and if flow is present will measure the flow rate.

In September of 2021, the Division approved of a record of construction (EDC approved in March of 2020) report for the conversion of existing monitoring well INVW-02 to a pumpback well due to sulfate in the well increasing to approximately 500 mg/L. A new 2-inch diameter HDPE pumpback pipeline was installed to transfer solution from INVW-02 to the NTSCP. The pipeline is protected across roadways by being placed in an HDPE pipe sleeve and buried with a minimum of 3 feet of cover material. General fill was compacted to a minimum of 90% of the maximum dry density as determined by ASTM Method D1557 and materials within a foot of the buried pipeline sleeves consisted of material no greater than 1 inch in diameter.

In February of 2022, the Division approved install one large diameter pumping well (WCC-G20) with the intent on gaining further insight into the lithological characterization of the Giroux Wash, additional chemistry data, and to test the hydraulic properties of the Giroux Wash while expediting sulfate remediation. Prior to the drilling of WCC-G20, an Electro-Hydro Dynamic resistivity geophysical survey will be completed, and a short-term constant rate pumping test (approximately 8 hours) will be performed at WCC-G1R, which is analogous to the depth and screen length for the proposed well.

The well will be drilled to a total depth of approximately 950 feet below the ground surface and completed with a 10-inch outside diameter mild steel casing. The well will be screened from 730 feet to 950 feet and will utilize a perforated metal slot screen with slots that measure 0.125 inches. The screened zone will be filter packed with 1/4-inch by 3/8-inch gravel that will extend 2 feet above the top of the casing. The well will be constructed in accordance with Nevada Administrative Code Chapter 534 regulations.

While the Divisions guidelines for monitoring well construction generally limit the screen length to approximately 30 feet, the primary purpose of this well is to be a higher flow pump back well to assist in remediation the plume. Therefore, the Division gave the Permittee to utilize a longer screen interval if determined that it would be beneficial for sulfate remediation.

In June 2025 the Division approved an EDC to abandon monitoring well WCC-G12 and pumpback wells PW-01, PW-02, WCC-G6, WCC-G7, WCC-G9, WCC-G10, WCC-G11 due to the construction of the TSF engulfing the wells which are located immediately south of the TSF embankment

TSF Water Balance and Draindown Estimate Report: Conceptual and numerical water balance and draindown models were developed for the 2017 Major Modification based on observations and findings in the field along with laboratory data and desktop analysis. The main objective of this study was to evaluate and quantify the potential TSF seepage rates for both operating and post closure scenarios. The TSF water balance model consisted of inflow components that represented a source of water to the TSF, primarily tailings deposition and precipitation, and outflows represented losses of water to the TSF, consisting of reclaim, evaporation, entrainment, and seepage. A field characterization program was completed to determine the physical and hydraulic property characteristics of the tailings. In-situ and laboratory testing were performed to measure the saturated and unsaturated hydraulic properties of different tailings types that have been deposited throughout the TSF operation.

The tailings stream flow rates were modeled to be dependent on the tailing slurry deposition rate, solids density of the thickener underflow, solids density of the cyclone underflow, cyclone split, and the overall mill efficiency. Both the north and south thickener underflow were averaged to produce monthly data that could be incorporated into the model. Tailings deposition from 1996 to 1999, when the minesite went into temporary closure, ranged from approximately 8,000 to 44,000 tons per day (tpd) with a percent solids weight of 45% to 50%. From 2004, when operations resumed, to 2015, the average monthly tailings deposition rate ranged from 27,000 to 54,000 tpd while maintaining approximately 34% to 50% solids by weight (approximately 9,220 gpm of water). Projected conditions were modeled for both continued operational methods and with the improved future operational methods that would incorporate an increased solids density underflow rate from 44.7% to 48% solids by weight (approximately 8,200 gpm of water).

Precipitation inflows were modeled as precipitation that fell directly on the impoundment and the embankments of the TSF and run-on from areas surrounding the TSF. The precipitation rate was compiled from daily measurements, at three weather stations (Giroux Wash Station, Robinson Mine Admin, Ruth COOP), from January 1996 to August 2015. The average annual precipitation rate from January of 1996 to August 2015 was calculated to be approximately 9.25 inches. Run-on was modeled based on the compiled precipitation data, the use of the Soil Conservation Service Curve Number method, and the calculation of the contributing catchment areas. A curve number of 76 was averaged and applied to the catchment area. The estimated historic monthly run on to the facility was calculated to be an approximate yearly average of 120 gpm. With the vertical expansion of the facility, the average monthly run-on diminishes to an annual average of approximately 15 gpm.

Pump back occurs from two sources, the groundwater pumping wells and the seepage collection pond at the base of the embankment. Measured data from the groundwater

pumping wells was collected from September 2014 through December 2015 and was modeled with an average pump back rate of 20 gpm. The average annual seepage collection pond pump back rate was calculated to be approximately equal to that of direct precipitation on the embankment.

During the temporary shutdown period from 1999 to 2004, both thickeners were used to manage MIWs. The MIWs were pumped to the thickeners where they were neutralized and pumped to the TSF on a monthly basis. The water holding volume of the thickeners (7.8 million gallons) was estimated from design drawings and was determined to equate to approximately 160 gpm being sent to the TSF.

The amount of reclaim water pumped to the mill was based on data from January 1996 to June 1999 and October 2011 to December 2015. The missing data was populated by multiplying the amount of water sent to the TSF by a reclaim ratio that was determined based on monthly data that accounted for seasonal cyclone operational effects. The average annual reclaim rate between 2005 and 2015 was 1,980 gpm, ranging from 1,710 gpm to 2,270 gpm. With the expanded TSF and associated operational improvements, a 50% increase in reclaim pumping was modeled to assess potential seepage reduction efforts. Incorporating the 50% increased reclaim rate from 2019 to 2026 increase the average annual flow rate to the Reclaim Water Tank to 2,630 gpm.

Evaporation was modeled using a three-temperature model that is based on the physics of the full energy balance and was determined from local weather, reflectance, and thermal band data from Landsat satellite imagery. A total of 137 images, evenly distributed from 1996 to 2015, were selected to be used with the 3T Model. Using the 3T Model, 30 meter by 30 meter resolution images were produced of the actual monthly evaporation from 1996 to 2015. The monthly evaporation rate was multiplied by the area of the TSF at that point in time to yield a 20-year series of monthly evaporation volumes from the TSF. Average annual evaporation rates, between 2006 and 2015, were determined to be 40 gpm from the embankment and 2,340 gpm from the impoundment. A larger evaporation rate ranging from 3,170 gpm to 3,670 gpm was determined for the expanded TSF model due to the higher moisture retaining characteristics of the fine grained impoundment tailings, presence of wet/ponded conditions, and the slightly larger area of the TSF (approximately 1,900 acres).

Entrainment of water within the tailings material was calculated using the moisture retention characteristics and dry bulk density of the tailings deposited within the TSF. The moisture retention and dry bulk density characterization were calculated based on areas of different tailings types and a laboratory testing program. The coarse-grained tailings associated with the embankment and beach areas were assumed to drain while fine-grained tailings were assumed to remain saturated. The estimated annual impoundment entrainment between 2005 and 2015 averaged approximately 1,440 gpm, and the estimated annual embankment entrainment was determined to be approximately 70 gpm. The Projected entrainment for the expanded tailings facility was considered to have the same entrainment rate between 2005 and 2015.

In-Situ Hydraulic testing was performed on tailings material, in the current supernatant collection area (BOC), and the alluvium that the TSF is constructed above. Tests were performed on the tailings material using an array of permeability measuring equipment in which the saturated hydraulic conductivity ( $K_{sat}$ ) measurements range from  $3.7 \times 10^{-3}$  cm/sec to  $3.8 \times 10^{-6}$  cm/sec, and decreased exponentially as a function of increasing fines content. The geometric mean  $K_{sat}$  ranged from  $2.1 \times 10^{-3}$  cm/sec (tailings with less than 30% fines) to  $1.9 \times 10^{-5}$  cm/sec (tailings with greater than 70% fines). Testing was performed on the sidewall and floor of the BOC and resulted in a weighted flux rate of  $1.2 \times 10^{-5}$  cm/sec. Alluvium around the perimeter of the TSF displayed  $K_{sat}$  between  $5.9 \times 10^{-4}$  cm/sec to  $1.8 \times 10^{-5}$  cm/sec, with a geometric mean of  $1.3 \times 10^{-4}$  cm/sec.

Laboratory rigid wall and triaxle flex-wall hydraulic conductivity testing was performed on composited samples and different bulk densities to simulate tailings depths ranging from 75 to 250 feet below the tailings surface. Estimates of alluvium  $K_{sat}$  were taken from GSA (2015) for depths of 100 to 500 feet below the tailings surface. The testing data indicates that  $K_{sat}$  decreases with larger percent fines and an increased tailings depth. Seven composite samples were compacted to low and high bulk densities to correspond to tailings depths of 75 to 250 feet below the tailings surface. The measured van-Genuchten model predicted unsaturated hydraulic conductivity function matched well with the optimized van-Genuchten model. Results show that low bulk density samples tend to have higher saturated water contents and drain at less negative soil water potential than shown in the higher bulk density samples.

The amount of water available for seepage was determined by the difference of the inflows minus the outflows. From 1996 to 1999, it was estimated that the seepage rate increased from 1,480 gpm to 2,010 gpm. During the temporary closure, from 1999 to 2004, the seepage rate decreased from 2,010 to 980 gpm. Between 2005 and 2015 the seepage rate from the impoundment was variable and ranged from 2,500 to 4,500 gpm. The projected potential seepage rate from the tailings facility, without operational improvements, was determined to decrease through time from 2,980 to 2,600 gpm, due to the increased consolidation of tailings and an increased evaporation rate due to a larger surface area. The expanded TSF with increased reclaim ratio and increased tailings solids ratio from the thickener underflow results in further reduction of potential seepage. By the year 2026 the predicted annual average potential seepage rate decreases from 3,010 gpm to 1,330 gpm (averaging between 1,000 and 2,500 gpm). This seepage model, and associated results, did not account for the bentonite amendment of the alluvial soils in the expansion areas prior to inundation by tailings material or the synthetic liner placement on the downstream face of the SCAE. These measures will further decrease the seepage rate and will be captured in the next update of the model.

At closure, drain down seepage was simulated to decline exponentially with time, with a predicted seepage rate at closure of approximately 3,000 gpm (seepage rate of 2,600 gpm from tailings plus 410 gpm from the embankment). Within 10 years the majority of the tailings become unsaturated and simulated seepage rates ranged from 500 gpm to 700 gpm

for the 2019 and 2027 closure scenarios, respectively. The predicted drain down rate at 100 years will steadily approach long-term net infiltration rates ranging between 40 and 45 gpm.

The 2018 and 2020 model updates predicted increases in seepage rates from the facility primarily due to the decreases in the predicted percent solids being discharged to the facility (i.e., more water and less solids). The percent solids by weight projections after 2018 and 2020 were based on the averaging of the rates reported from 2004 on and were determined to be 44.2% and 42.4% solids, respectively. This results in an anticipated increase in flow rates being discharged to the facility from 8,200 gpm (48% solids by weight) and 9,220 gpm (45% solids by weight) for the 2016 model to a flow rate of 10,314 gpm (42.4%) for the 2022 model. This seepage rate from the tailings and embankment is predicted to be approximately 2,280 gpm from 2021 through 2024 and will decrease to approximately 2,000 gpm at the cessation of tailings discharge due to a decreased volume of tailings being sent to the TSF.

With the 2020 model, the drain down seepage was simulated to decline exponentially with time, with a predicted seepage rate at closure (December of 2028) of approximately 2,811 gpm. Within 10 years, most of the tailings become unsaturated and simulated seepage rates decrease to approximately 488 gpm for the 2028 closure scenario. The predicted drain down rate at 100 years will steadily approach long-term net infiltration rates of approximately 52 gpm.

Groundwater Fate and Transport Model: The water balance analysis (completed by Geosystems Analysis (GSA)) provided the initial upper boundary condition for the groundwater fate and transport model. WSP/Parsons Brinkerhoff (WSP-PB, 2016) prepared a detailed groundwater fate and transport model to determine the potential impacts to groundwater that may result from the expanded TSF.

Data collection in the Giroux Wash was performed to refine the conceptual hydrology of the Giroux Wash and consisted of: water level and chemistry, hydraulic conductivity testing, geotechnical testing, attenuation testing, and gravity and electrical resistivity geophysical data collection. Review and interpretation of the collected data identified important new aspects of the hydrogeologic conceptual model including: the presence of heterogeneous paleo-channels in the Giroux Wash subsurface that play an important role in preferentially conducting seepage from the TSF down gradient; basin fill alluvium in the Giroux Wash generally possess low-hydraulic conductivity that is displayed by the result of the observed mounding of seepage underneath of the TSF; extensional faulting resulted in buried grabens and horsts in the subsurface and gives rise to preferential surface flow on the eastern margin, further verifying the deposition of paleo channels; and that TSF seepage is the largest component of the Giroux Wash groundwater balance.

The elements derived from the data collection within the Giroux Wash were applied to a local scale numerical model encompassing the TSF and a four-mile area to the south of the TSF. Unsaturated flow was simulated using the Richards equation and transport was

simulated for six potential constituents that were identified to exceed Profile I-R concentrations in TSF supernatant water that collects in the BOC area.

Two scenarios were modeled, one to evaluate the current TSF closure in 2018 and simulation of the drain down 100 years after closure (2118), and one evaluating conditions of the expanded TSF and improved operations until 2026 with a simulation of the drain down after closure (2126). Model results indicate that there will be no incremental groundwater quantity impacts as a result of the expansion opposed to current TSF operations. Both models displayed groundwater degradation in nine wells within the current monitoring well network, with exceedances of Profile I-R values for sulfate and TDS. The maximum extent of the 500 mg/L sulfate exceedance is not predicted to reach farther down gradient than monitoring well WCC-G8. However, the expanded TSF does generally increase the sulfate and TDS concentrations and lengthen the time of the Profile I-R exceedance. This model does not account for the bentonite-amendment of native soils within the expanded TSF perimeter embankments or the lining of the SCAE. Both of these measures will further decrease seepage and will be captured in the next update of the Groundwater Fate and Transport model.

As part of the 2017 Permit renewal, the Division added a Continuing Investigation Item that required the fate and transport model of the supernatant from the Giroux Wash TSF to be updated on a bi-annually frequency starting in 2018.

Similar to the 2018 model, the 2020 TSF fate and transport model (most recent update) predicted sulfate and nitrogen concentrations 100-years post closure (2028). To validate the model, a transient calibration was performed and ran from 1996 through June of 2020 and utilized the updated water balance as the input for the amount of seepage leaving the facility. The groundwater elevations and sulfate concentrations modeled were compared to collected quarterly data from monitoring and pump back wells. The 2018 model proved to be consistent with observed data, but some changes were made to the 2020 model to better match data collected for two years after 2018. While there were variations in predictions (both high and low) the model produced a good overall match between observed and simulated groundwater elevations and constituent concentrations.

In addition to the base case model, three other cases were evaluated for the improvement of seepage capture downgradient of the facility including the installation of a high flow pumpback well, a longer screened pumpback well, and an extensive network of wells with screens 50 feet below the water table. In all cases, little to modest improvement of capture was predicted with the case evaluating the high flow pumpback well showing the biggest reduction in sulfate and nitrogen 100-years post closure.

The base model predicts that sulfate will exceed the Divisions Profile I-R reference value in nine wells and will extend a maximum of approximately 3,900 feet downgradient of the TSF in year 2077. After which, sulfate concentrations will begin to decline as the source of seepage begins to decrease and recharge dilutes the sulfate concentrations. The base case

does predict the 500 mg/L sulfate to extend beyond monitoring well WCC-G-19, which will require the addition of another downgradient well for monitoring.

Sensitivity analyses were completed on the base case by modifying the parameter values for hydraulic conductivity, specific yield, and porosity by 25% to result in a minimum and maximum extent of the plume. Sensitivity analysis indicate that for a 25% increase in the hydraulic values resulted in a predicted sulfate concentration at key downgradient wells to remain with 120 mg/L of the base case predictions with a confidence interval of 95%.

The base case model predicts that nitrogen will exceed the Divisions Profile I-R reference value in nine wells and will extend a maximum of approximately 16,200 feet downgradient of the TSF in 2128. A sensitivity analysis of the base case model was also performed, and simulations were similar to sulfate with increased hydraulic values producing a further extending plume. It is important to note that while nitrogen exceedances are not a product of TSF seepage, it is being mobilized by mounding created by the seepage.

As part of the Giroux Wash TSF CAP, the Division requested that an evaluation of possible downgradient receptors be provided. Based on these modeling results, there will be no adverse impacts to any downgradient stakeholders, even under the high sensitivity analysis. However, as part of the Divisions review of the updated model, the Division requested that a robust evaluation for the possibility of nitrate+nitrite to be removed through a treatment system be provided to the Division with the next update of the model.

As part of the December 29, 2023 Major Modification for the expansion of the Giroux Wash Tailings Storage Facility, an amended F&T model was submitted to the Division. On June 18, 2025, the Division issued correspondence to provide a summary of the Division's review of the F&T model. On December 02, 2025, the Division received an addendum to the F&T (the Addendum), dated November 25, 2025.

The addendum concludes that Base Case and Case 3 highlight the benefit of pumping WCC-G20 and WCC-G24 in the near term to control sulfate migration. The addendum also states that a combination of additional pumping wells and longer pumping durations will have the greatest effect on long term mitigation. As part of the approval for the December 29, 2023 Major Modification for the expansion of the Giroux Wash Tailings Storage Facility, the Division approved Case 3 for the long term mitigation of the TSF plume.

*Case 3: Mitigation pumping is from the current PBS, plus the addition of INVW-02, WCC-G20, and WCC-G24 with pumping for 50 years post-mining. WCC-G20 is then pumped at 100 gpm for an additional 250 years after the other pumps shut down.*

Minor Modification for Supernatant Management Facilities (2017): In a document titled *Giroux Wash Tailings Facility Corrective Action Plan, Amendment 1 (CAP)*, the Permittee noted that water entrained in deposited tailings and ponding water around the tailings perimeter could create a driving hydraulic head and potentially exacerbate seepage from

the TSF. In an effort to eliminate the driving hydraulic head and reduce potential seepage, the Permittee proposed the constructing of a Supernatant Collection Area (SCA) and associated decant structure that would gravity flow supernatant to a double lined and leak detected reclaim water pond (RWP). From the RWP, supernatant will be pumped back to the Reclaim Water Tank (RWT) and ultimately to the Mill facility. The SCA area will minimize the driving head of the supernatant by reducing the typical operating depth of the supernatant pool from 15 feet in the current BOC area to between 2 and 6 feet in the proposed SCA.

A request for the deferral of construction of the RWP and associated decant structure for one-year was approved by the Division on 14 June 2018. The approval of this request allowed for a one-year pumping test period to evaluate if shore-based suction pumps could replace the RWP and decant structure and function within the operating limitations of both the BOC and SCA. On 24 September 2019, the Division approved and EDC for the removal of the RWP and decant structure from the Permit due to the pumps displaying the ability to further limit seepage from the TSF due to the increased pumping rates and the ability of the pumps to operate closer to the deposited tailing surface and within the operating limitations for both the BOC and SCA.

An EDC for the syntenic lining of the SCAE was approved by the Division in June of 2019. A 60-mil single-sided textured (textured side up) linear low-density polyethylene synthetic liner was installed on approximately linear 3,100 feet of the upstream face of the SCA embankment. The synthetic liner was primarily wedge welded with extrusion welding of repairs and patches performed as required. The liner was anchored by backfilled trenches at the crest and toe of the Phase 1 SCA embankment and covered with piles of general fill as needed to provide ballast. Once construction of future Phases of the SCA embankment are complete, they will be synthetically lined in a similar fashion as discussed above. The approved design also removed the blanket drain and spillway that was permitted with the 2017 Minor Modification.

The BOC consists of an excavated channel approximately 15 to 20 feet deep, 150 feet wide and 800 feet long located in the northwestern portion on the TSF in the west fork of the White River Wash. The base and sides of the BOC were constructed using a 1-foot thick bentonite amended soil layer to inhibit potential seepage from ponded supernatant in the area. In the document titled *Robinson Tailings Storage Facility Water Balance and Draindown Estimates* (GSA 2016), submitted in the Major Modification (discussed in further detail below), it is determined that over 40% of the seepage could come from the current supernatant water above the BOC and finger areas and cyclone underflow deposition. In this study, hydraulic testing (utilizing a cylinder infiltrometer seepage meter) was completed on the side slopes and the floor of the BOC and a calculated hydraulic conductivity of  $1.2 \times 10^{-5}$  cm/sec was determined for the BOC area.

The SCA is constructed in the northern most reach of the TSF in the White River Wash. The SCA is located in an area where low permeability tailings have been encroaching on the proposed site of the SCA since 2010 and has resulted in, according to the latest survey

data, a tailings depth of approximately 25 feet. Tailings in the SCA were determined to have a low permeability due to the results of samples collected in a transect sampling procedure across the TSF. Tailings representative of the SCA floor exhibited greater than 70% fines, and thus constitute low permeability tailings. Based on the representative samples and permeability testing performed in the *Robinson Tailings Storage Facility Water Balance and Draindown Estimates*, the SCA is expected to exhibit a permeability of approximately  $2.4 \times 10^{-6}$  cm/sec. When the depth of deposited tailing in the SCA increases to a depth greater than 50 feet, the SCA will reach permeability's on the order of  $4.7 \times 10^{-7}$  cm/sec.

A slope stability analysis was performed on the SCAE to evaluate the factors of safety (FOS) associated with circular failures and to identify critical embankment sections within the Giroux Wash TSF Expansion. The stability analysis was evaluated using the SLIDE computer program. SLIDE was used to analyze the stability of slip surfaces using vertical slice limit equilibrium methods. The 2014 United States Geological Survey (USGS) National Seismic Hazard Map was used to determine the design moment magnitude and maximum credible earthquake (MCE) peak horizontal ground acceleration (PGA). The MCE PGA was determined to be 0.21 times the acceleration of gravity.

SCAE seepage and stability parameters were based on the materials characterization of the foundation soils, borrow materials, and tailings. Because of the variation in alluvial materials encountered in the geotechnical field investigation, representative composite samples were utilized in the stability analysis. The SCAE critical section was determined to be at the highest embankment elevation and the greatest depth of supernatant directly in contact with the embankment. The SCAE critical section was modeled based on the first phase of construction (discussed in the submitted Major Modification) with an embankment elevation modeled at 6,831 ft AMSL, which is a conservative estimation for the proposed Minor Modification construction elevation of 6,816 ft AMSL.

The steady state seepage model was performed assuming the supernatant pool level was up to the spillway elevation of 6,829 ft AMSL and that the tailings were at their lowest anticipated elevation of 6,810 ft AMSL. A no-flow boundary was assumed at the bottom of the model to drive the phreatic surface up to the surface, at the toe of the embankment. A toe drain, 5 feet deep with a 3-foot wide base and 1.5H:1V side slopes, was modeled at the toe of the Phase 1 construction for both operational and surcharge elevations. The steady state seepage model was analyzed for both the operational and maximum surcharge pool elevation for each of the four borrow material types. Results determined that a maximum flow rate of 19.3 cubic feet per day is expected to enter the toe drain.

The conclusion of the stability and steady state seepage analysis is that all borrow materials are suitable for construction, except for soils with low cohesion that produce the lowest factors of safety. Construction of the SCAE will include the installation of a toe drain; general fill, for embankment construction along areas where supernatant will come into contact with the embankment, will consist of a minimum 20% passing the #200 mesh sieve; borrow materials with a low fines content will be blended or amended with another soil

type and tested before use as general fill; a maximum 6-foot deep operating supernatant depth will be maintained; and piezometers will be installed and regularly monitored on all embankments that could be in contact with the supernatant pool.

A settlement analysis was performed for both the RWP and the SCAE. During the geotechnical site investigation, refusal was achieved in test pits to the east of the RWP. This indicated that bedrock is relatively close to the surface. To make a conservative model, it was assumed that there was 100 feet of silty sand, which exhibits a lower elastic modulus than bedrock, resting on top of the bedrock. Because of the unloading of soils in the vicinity of the RWP it was calculated that the RWP area would heave, when empty, approximately -1.65 feet. The maximum predicted settlement at the SCAE (using the same input parameters as the RWP) is estimated to be 1.64 feet under the center of the embankment.

Stormwater retention basin volumes and peak flow rates for the 100-year, 24-hour storm event were modeled using the SCS curve number method and HEC-HMS software. The 100-year, 24-hour storm rainfall event was determined from National Oceanic and Atmosphere Administration (NOAA) Atlas 14, and was determined to be a rainfall depth of 3.02-inches. The peak flow calculations were performed using the SCS Type II storm distribution, representing high-intensity, short duration storm events, which are representative of storm events in northern Nevada. Precipitation losses were determined through assessments of Natural Resources Conservation Service (NRCS) hydrologic soil-cover complexes at the project site.

It was determined that a North Retention Berm (NRB), a South Retention Basin (SRB), RWP diversion ditches, and a RWP culvert would be utilized to retain and divert stormwater away from the RWP. The North Retention Berm will be constructed to the north of the RWP and have the ability to retain approximately 14 acre-feet of water that would result from a 100-year, 24 hour storm event on the upgradient watershed. The NRB will be constructed to a height of 6,818 ft AMSL and have an emergency spillway elevation of approximately 6,816 ft AMSL that will safely pass the predicted peak flow of 81 cubic feet per second at a depth of 1.2 feet over the crest. The spillway will be 20 feet wide at the base, 2 feet deep, and lined with 12-inches of riprap with 50% having a diameter greater than 8 inches. The SRB will be constructed from excavating alluvium and will have the ability to retain 8 acre-feet of stormwater which is greater than the required 6.4 acre-feet from the 100-year, 24-hour storm event. Triangular vee-ditches are designed around the outside edge of the RWP's access road and have the capacity to sufficiently pass runoff from drainage subareas, and direct the runoff towards the SRB.

The stormwater volume reporting to the SCA was determined by a hydraulic analysis of the watershed subareas affecting the TSF, SCS curve number estimations, and calculation of design storm runoff reporting to the TSF from external and internal watersheds. The total estimated volume of runoff potentially reporting to the TSF from all subareas from the 25-year, 24-hour storm event totals 367 acre-feet. The SCA area south of the SCAE is able to contain a volume of 1,645 acre-feet between the operational SCA depth of 6 feet and the invert elevation of the emergency spillway.

In September of 2019, the Division gave approval for the deferral of utilizing the SCA for supernatant storage and the RWP and the Decant Structure. The existing pumps utilized at the BOC were replaced with pumps that could continue the pumping of supernatant within feet of the low-permeability soil layer/tailings surface and had a higher pumping rate. This resulted in effectively reducing the amount of supernatant available for seepage and thus, continued management of solutions in the BOC was possible while providing the highest level of protection to waters of the State when compared to available alternatives.

With the 2022 Major Modification and renewal of the Permit, the Division approved for the continued management of supernatant at the BOC while it is expanded up the White River Wash. Prior to expanding up the wash, the Permittee will synthetically line the expanded BOC with 80-mil HDPE liner to further limit the amount of seepage from pooled supernatant. Shore based pumps will be placed on synthetically lined pedestals within the containment of the BOC and will transport supernatant back to the Mill for reuse. See section titled *TSF Operation and BOC* for more information on the BOC.

Major Modification for Giroux Wash Tailings Storage Facilities Expansion (2017): In December of 2016, the Permittee submitted a Major Modification (prepared by SRK Consulting), to the Division, for the expansion of the Giroux Wash TSF. The expansion encompasses the vertical centerline expansion of the existing embankments using the same methods previously employed, as well as the construction of new perimeter embankments to limit the lateral spread of tailings. The primary objectives of the TSF expansion are to provide engineered source control to minimize seepage losses from the TSF impoundment (discussed in above section titled “*Groundwater Fate and Transport Model*”) and to provide storage for the deposition of tailings material through the projected end of mine life in 2026. The expansion of the TSF will allow for the additional storage of approximately 205 million tons of tailings material, bringing the ultimate storage capacity of the Giroux Wash TSF to greater than 405 million tons.

The original version of the Major Modification for Giroux Wash Tailings Facilities Expansion was sent to both the Division and NDWR. The NDWR application was for the approval of plans and specifications for alteration of Dam Permit No. J-413 that was associated with the Giroux Wash Facility Expansion. Due to the complexity of the proposed modifications, a third party reviewer was requested to review the submitted analysis. Golder Associates (Golder) comments (titled *KGHM Robinson Giroux Wash Tailings Storage Facility, Independent Third Party Review*) on the Slope Stability, Liquefaction, and Stability Analysis were adopted in their entirety by NDWR and a second version of the report was submitted to the Division and NDWR in response to the third party comments. Additional detail was added to the report to respond to third party review comments. Most of the analysis demonstrated that the proposed embankments would remain stable under the conservative assumptions of the original report; however, additional site characterization was required. The expansion of the facility under dam Permit J-413 and Water Pollution Control Permit NEV0092105 was approved on 09 April 2018 and 18 November 2017, respectively, which encompasses raising of the Cycloned

Main Embankment (CME) to an elevation of 6,880 feet AMSL and the associated grading of the perimeter embankments to the SCAE at an elevation of 6,865 feet AMSL.

The Giroux Wash TSF, as previously stated, was not designed or constructed to meet the minimum design criteria for tailings facilities pursuant to NAC 445A.437. The TSF was initially designed to store more than 200 million tons of tailings with an average deposition rate of 48,000 tons per day. In November of 2014, sulfate was measured in WCC-G7 at 711 mg/L and resulted in the Permittee's submittal of a CAP and the Divisions issuance of the 29 April 2015 FOAV and Order. All pertinent information from the CAP findings were incorporated into the source control engineering design associated with the submitted Major Modification. Please see the above section titled *29 April 2015 Finding of Alleged Violation and Order* for more information about the CAPs and the FOAV and Order.

The Major Modification addressed construction and operation of the expanded TSF by incorporating: phased vertical expansion of the existing embankments; perimeter starter embankment construction, followed by phased vertical expansion; installation of 8.6 acres of 60-mil LLDEP over accessible native soil within the expanded TSF footprint (EDC approved by the Division on 20 June 2018); phased construction of the CME DUSSCF; replacement of the existing pumps at the seepage collection pond and extension of the existing seepage collection pond pipeline to the Reclaim Water Tank; conversion of the SCP to a double-geomembrane lined pond with a leakage collection and recovery system; tailings deposition management via controlled deposition to achieve the maximum generation of supernatant water; deposition from the main embankments to achieve a beach gradient of around 0.25% towards the SCA; thin-layer, "sub-aerial" deposition of tailing material resulting in an upward "bleeding" of water entrained in tailings; and cyclical deposition of tailings to maintain the beachhead gradient from east and west abutments to the center of the CME and ultimately to the SCA.

Raising of the CME will consist of, as previously raised, the deposition of cycloned coarse-fraction tailings underflow onto the impoundment crest, with the cyclone overflow being spigoted onto the beachhead approximately 60 feet out from the cyclones. The coarse fraction underflow will be regularly regraded by a small dozer to ensure a crest width of 40-feet. Both the Western Embankment Extension (WEE) and Eastern Embankment Extension (EEE) will be raised from the existing permitted elevation of 6,820 feet AMSL, to an elevation of 6,880 feet AMSL. This will be accomplished by phased centerline expansions utilizing compacted alluvium material. The alluvium will consist of material with 100% passing the 6-inch sieve, be placed in 12-inch loose lifts, and will be moisture condition, to within  $\pm 2\%$  of the optimum moisture content, and compacted to 92% of the maximum dry density as determined by ASTM D1557. Construction elevation targets for the CME, WEE, and EEE expansions are a Phase I elevation of 6,848 feet AMSL, a Phase 2 elevation of 6,860 feet AMSL, and a Phase 3 elevation of 6,880 feet AMSL. Phase 1 is further broken down into three sub-phases, Phase 1a, Phase 1b, and Phase 1c, constructed to elevations of 6,830, 6,840, and 6,848 feet AMSL, respectively.

The Western Perimeter Embankment (WPE), Eastern Perimeter Embankment (EPE), and the SCAE, will be raised from the existing original ground centerline and include a starter embankment constructed of alluvium. The alluvium will consist of material with 100% passing rate through a 6-inch sieve, placed in 12-inch loose lifts, and moisture conditioned to within  $\pm 2\%$  of the optimum moisture content and compacted to a minimum of 92% of the maximum dry density as determined by ASTM D1557. The Phase 1a construction elevations for the WPE and EPE will vary from 6,830 feet AMSL to an elevation of 6,816 feet AMSL in the area of the SCAE. Ultimately the Phase 3 build out elevation of the SCAE will be 6,865 feet AMSL.

Benching and the removal of unsuitable foundation materials will be utilized in the construction of the embankments. Benching will be utilized to ensure proper subgrade preparation prior to lift placement during centerline raising of the earthen embankment sections. Areas within the expanded TSF footprint were determined to have unsuitable material for foundation construction. Where the unsuitable material is discovered, consultation between the engineer on site, the construction quality assurance personnel, and the contractor will determine the depth to which the material will be over-excavated. This is currently estimated at approximately 5 to 10 feet, depending on the location.

A geotechnical site characterization was performed during the initial stages of the TSF expansion design project. The geotechnical site characterization consisted of the development of a conceptual facility footprint that was used to develop the drilling and near-surface soil sampling programs. Twenty-three drill holes were completed in the proposed footprint of the CME, WEE, EEE, and the existing perimeter access road embankment. Based on the results of the embankment subgrade geotechnical investigation four representative samples were selected and used in the stability analysis.

A test pit program consisting of 27 excavated test pits spatially distributed outside of the footprint of the proposed EPE and WPE was completed to characterize the potential borrow materials for the expansion. Nineteen-samples were index tested utilizing the Unified Soil Classification System (ASTM Method D422/C136) and Atterberg Limits (ASTM D4318). Four representative samples were chosen to represent alluvial soils across the site. Additional testing consisted of modified proctor compaction testing (ASTM D1557), remolded large-scale direct shear testing based on the modified proctor result (ASTM D3090-M), and flexible wall permeability testing (ASTM D5084-02 Method 3). Based on alluvial material encountered in the field and composite samples, each of the four composite samples were utilized in the stability analysis.

Tailings within the Giroux Wash TSF were characterized by utilizing a California split spoon sampler during the installation of seven boreholes. An onsite engineer logged the variations in moisture content and tailings gradation. A total of 86 samples were collected and subject to dry density and moisture testing (ASTM D2937 or D1557). Five representative samples were selected for copper tube tri-axial shear testing and three for flexible wall permeability testing. Based on the results of the field and laboratory testing, tailings materials closest to the CME (highest chance of liquefaction during a seismic

event) were identified as cycloned tailings from the cyclone underflow and a transition zone comprised of interbedded layers of cyclone overflow and spigoted whole tailings. The cyclone tailings shear strength was based on the results of the lowest shear strength for cyclone tailings tested and transition zone tailings were assumed to have an undrained shear strength based on the lower bound for fine grained materials and tailings. Tailings in contact with the Eastern and Western Perimeter Embankments and SCAE were modeled with a shear strength of zero.

SRK completed a seismic hazard analysis using the Probabilistic Seismic Hazard Analysis (PSHA) method. This method uses the Poisson Probability Model to estimate ground accelerations expressed as a percent chance of exceedence for a given time period. The probabilistic seismic hazard was obtained from U.S. Geologic Survey Earthquake Hazard Program with seismic motions expressed as a function of acceleration due to gravity. The MCE and PGA were modeled with an equivalent recurrence interval of 2,475 years, equating to a MCE PGA determined to be 0.210 times the acceleration of gravity. Most of the new analysis (submitted in response to third party comments) demonstrated the proposed expanded facility exceeded minimum required factors of safety.

To further increase site characterization, an EDC was submitted to the Division on 08 May 2017 for the addition of 62 piezometers along the CME, the beach up-gradient of the WEE, at the intersection of the WEE and CME, at the intersection of the EEE and the CME, and along the access road at the White River Wash. Geokon 4500S vibrating wire piezometers were selected and installed using a cone penetration rig. During installation, it was determined that only 60 of the proposed 62 piezometers needed to be installed. Monitoring results from the installed piezometers are submitted to the Division quarterly.

As stated in the Minor Modification (described above), the total estimated volume of runoff potentially reporting to the TSF from all subareas from the 25-year, 24-hour storm event totals 367 acre-feet. The SCA area south of the SCAE is able to contain a volume of 1,645 acre-feet between the operational SCA depth of 6 feet and the invert elevation of the emergency spillway. As the TSF expands vertically, run-on will continue to decrease as the areas allowing run-off to enter the TSF are minimized. The same configuration, outlined in the Minor Modification above, will be maintained throughout the expansion of the facility, ensuring that the TSF will be able to handle the designed storm events.

In response to concerns expressed by the Division during an 18 October 2016 meeting, the Permittee committed to phased construction of a bentonite-amended soil liner over accessible portions of exposed native soil within the proposed perimeter embankment footprint. The area lined will be phased (consisting of three phases totaling approximately 119 acres) such that areas that will remain exposed over the winter months will be minimized to ensure that re-compaction is not required. The bentonite-amended soil liner construction will consist of: clearing and grubbing of vegetation from the defined construction area; removal of borrow soil to the specified cut grade; scarify to a minimum of 12-inches, with the removal of rocks and deleterious material; amendment of soils with 3 pounds of bentonite per square foot of subgrade; and the mixing and compaction to a

minimum of 95% of the maximum dry density, as determined by ASTM D1557, and moisture conditioned to between optimum and + 2% of the optimum moisture content. Prior to inundation with tailings material, the bentonite amended soil layer will be tested and determined to have a nominal permeability of less than or equal to  $1 \times 10^{-6}$  cm/sec.

This bentonite-amended soil liner plan, was incorporated into the Permit as an SOC item and was submitted for Division review and approval on 22 December 2017. Due to difficulties encountered in the field with the amendment of the alluvium, it was proposed to synthetically line the approximately 12.8 acres of the exposed alluvium within the footprint of the Giroux Wash TSF. The ability to place liner within the exposed areas was based on: the ability to access the area with heavy equipment; safe working conditions for equipment and foot traffic; presence of workable soils to form a suitable foundation; and the potential of inundation prior to liner construction.

In response to a seep that appeared in native bedrock beneath the EEE in May 2016, a seepage collection and containment system was installed. To account for the potential recurrence of the seep due to future deposition in the area of the EEE, the Permittee converted the existing seepage collection system into a buried drain by installing a dual-walled conveyance pipeline from the existing lined sump to a 1,550 gallon tank south of the ultimate embankment footprint. The existing sump was backfilled with 2-inch minus limestone drain rock, wrapped in geotextile, and place a 3-foot thick layer of drain rock, wrapped in geotextile, along the length of the seepage collection trench that will also extend from the trench to 5 feet above the seep expression. In March of 2024 an EDC was approved to remove the seepage collection sump and extend the existing piping to a underground sump for the leak detection and a flow meter for the seep flows. The sump is to be checked for seepage weekly. After the sump and flow meter the seepage will report to the DUSSCF.

The DUSSCF is comprised of a system of 13 paddocks that are drained by a 40 to 80-foot wide, one-foot thick gravel drain that extends the entire length of the CME. The paddocks are designed to handle the 25-year, 24-hour precipitation event plus the estimated eroded sediments yield from mean annual precipitation on the CME. The Universal Soil Loss Equation was used to compute the sediment yields and the run-off depth was calculated by the NRCS Curve Number method. The results of these calculations are used to size the outer containment berm and internal paddock walls to provide the required DUSSCF containment capacity. Stormwater will cascade from higher paddocks to lower paddocks, through small spillways, in the event that the upper paddocks are overwhelmed. The required containment capacity of the east paddocks are 246,507 cubic feet and the west paddock required capacity is 336,455 cubic feet. The paddocks are designed to have an east paddock capacity of 636,336 cubic feet and a west paddock capacity of 609,425 cubic feet. Please refer to Fact Sheet section *TSF Embankment Seepage Collection System and Sediment Control* for greater detail on DUSSCF design.

Short-term and long-term deposition objectives were developed as one of the critical components of the Giroux Wash TSF expansion. The short-term objectives consist of the

deposition of tailings with a solid to water ratio of 48:52 during non-cycloning periods, the maintenance of a 0.25% beachhead gradient toward the SCA, and construction of the first phase of the embankment construction (6,830 ft AMSL). The long-term tailings depositional goals consist of maintaining a 0.25% beach gradient towards the SCA utilizing cyclical deposition from the Cyclone Headers and various spigots throughout the TSF. Based on a deposition rate of approximately 50,000 tons per day and an average slurry density of 85 to 90 pounds per cubic foot (pcf), the average rates of rise will vary from 5 to 6 feet per year.

The Major Modification incorporated the addition of a tailings booster pump, in the Repulp Station, to increase head in the tailings pipeline leading to the cyclone headers. Slurry rheology testing was performed to determine the slurry viscosity, shear stress, and coefficient of rigidity for the Bingham mixture (tailings), to determine hydraulic pumping and pipeline requirements. Testing was performed at 35% to 45% and 50% solids weight concentration. The 50% solids weight ratio testing proved inconclusive and the parameters for the 50% ratio were calculated using the Fluid Flow 3.33 calculator for Bingham plastic using shear rate and shear stress data provided in the rheology report.

Hydraulic calculations for the existing pipelines conveying slurry flows for the TSF expansion were performed using FluidFlow3 Version 3.33 (FF3). The hydraulic grade line (HGL) for the conveyance of slurry at a rate of 10,800 gpm (45,000 tpd) and 12,810 gpm (53,425 tpd), indicated that a booster pump would be required to provide a minimum of 25 feet of head to increase the flow rate to the Permitted maximum tailings deposition rate of 12,810 gpm. The slurry booster pump will consist of a 400 horsepower pump capable of supplying 14,400 gpm of slurry with 50 feet of pressure head. The in-line slurry booster pump will be installed at the Repulp Station and will include replacement of the existing 3-pipe system with a single pipeline from the Repulp Station to the cyclone header pipeline. The pump will be installed with a variable frequency drive to modify the pump speed as required due to the variations in tailings production rates and densities.

Interim Expansion Measures: Due to the urgency for construction of the expansion to begin during the 2017 construction season, the Division gave approval, on 01 June 2017, for the construction of improvements to the facility, in support of the Major Modification. The improvement construction consisted of raising the pipeline support berm and access road at the western end of the EEE, and the raising of several sections of the reclaim access roads, approximately 5-10 feet, in anticipation for future deposited tailings levels. All construction would be performed in accordance with the 2008 *Engineering Design Change Construction Approval Giroux Wash Tailings Life of Mine Project*.

In June of 2017, the Division also gave approval of an EDC that allowed a portion Main Embankment to be constructed to allow for additional tailings deposition. Cyclone raising of the CME to an elevation of 6,830 feet above mean sea level (AMSL) was accompanied by the construction of the proposed vertical expansion of the WEE and EEE to an elevation of 6,830 feet AMSL. The CME was constructed with cycloned tailings while the WEE and EEE utilized alluvium and were constructed in accordance with the specification approved

2008 Life of Mine EDC and are the same specifications that have been carried forward into the 2017 expansion design.

Two additional EDC's were submitted and approved for raising the WPE and the EPE to ensure that there would be sufficient capacity to store tailings during the 2017/2018 winter season when construction becomes difficult due to the extreme weather.

### Major Modification for Giroux Wash Tailings Storage Facilities Expansion (2026)

On December 29, 2023, the State of Nevada Division of Environmental Protection (the Division) Bureau of Mining Regulation and Reclamation (NDEP-BMRR) received a Major Modification (the Major Mod) to permit an expansion of the Giroux Wash Tailings Storage Facility (the TSF) for the Robinson Operation, WPCP NEV0092105. RNMC submitted the Major Mod to expand the TSF 62 feet (ft) higher than the currently approved Main Embankment elevation of 6,880 feet above mean sea level (ft amsl) to 6,942 ft amsl, to accommodate extended mining through 2043. The proposed 6942 TSF expansion includes continuation of the same design elements originally proposed in the 2016/17 expansion design. The TSF expansion will consist of phased vertical expansion (using centerline construction methods) of the existing Main Embankment (the main east-west embankment comprised of the WEE, CME and EEE). The expansion will be constructed with continued centerline raising of the CME using the header system with associated raising of the header pipeline and cyclones; continued centerline raising of the WEE and EEE using compacted alluvial soils; perimeter embankment expansion construction, including annual construction of downstream (uphill) raises of the WPE, BOCE, SCAE, and EPE; phased uphill expansion of the BOC, including construction every two to three years of the next phase of the geomembrane-lined BOC – the first phase of which was completed during the 2023 construction season; and phased expansion of the CME's Downstream and Underdrain Stormwater and Sediment Control Facilities (DUSSCF) to provide for containment and control of meteoric water contacting and potentially transporting tailings on the downstream face of the CME.

Tailings management will be achieved via controlled deposition, to minimize the availability of supernatant water to infiltration and contribute to seepage. This will be achieved through deposition from the main embankments to achieve a beach gradient of around 0.25 percent toward the northern boundary of the TSF, while facilitating operational recovery of supernatant water from the geomembrane-lined Barge Operating Channel (BOC); and thin-layer subaerial deposition which, by virtue of the consolidated state of the previously deposited layer, results in a preferential upward "bleeding" of water entrained in the tailings due to the specific gravity of the solids fraction. This in turn enables maximum recovery of supernatant water and minimizes entrainment, seepage and draindown from the base of the impoundment. Existing and future rates-of-rise of the tailings surface are sufficiently low to enable efficient and effective sub-aerial deposition to be achieved. Rates-of-rise of less than 10 feet per year are generally preferred for efficient operation. The predicted rate-of-rise for the remainder of the existing permitted expansion (to 6880 ft amsl) and the proposed 6942 TSF expansion are between 5 and 6 feet

per year; and cyclical deposition to maintain the beachhead gradient (fall) from the east and west abutments to the center of the CME to maintain a flow line north to the BOC. This will be achieved using primarily the EEE spigots, the CME total tailings spigots, the cyclone header cyclone overflow spigots, and the WEE spigots. The Bypass Pipeline, the Northeast Deposition Pipeline and the Western Slurry Deposition Pipeline will be used periodically to balance out deposition along the sides of the TSF and maintain a consistent flow line to the BOC. Note that deposition practices since the approval of the current expansion to 6,880 ft (2017) amsl have generated a current tailings surface that is in balance from east to west and north to south, closely approximates the idealized surface, and directs surface flows toward the BOC. There are no longer any “fingers” of freestanding water, and supernatant fluid is efficiently managed within the confines of the BOC. It is currently anticipated that the supernatant pool will migrate into the geomembrane-lined portion of the BOC and be almost completely on geomembrane liner within a few years – well in advance of the proposed expansion above the 6,880 ft amsl elevation. The proposed 6942 TSF expansion will continue current practices to minimize the footprint of standing water and the associated potential for infiltration and seepage generation.

### **Ruth Pit Expansion and Historic Gold Heap Leach Facility Closure**

Resumption of Mining in Ruth Pit: A minor modification was approved by the Division in April 2008, in preparation for resumption of mining and expansion of the Ruth Pit and construction of the new Ruth and Jupiter waste rock facilities. The approved activities also include the construction of certain new water management facilities prior to overdumping with Ruth Pit waste rock placed in accordance with the WRMP. New waste rock cover thicknesses will vary from 20 feet to 135 feet over the existing and newly constructed facilities.

New mining from Ruth Pit requires engineered final closure of certain historic mining components and water management facilities in accordance with the 1997 Agreement and an FPPC to be submitted to the Division for review and approval prior to overdumping. The design and status of many of the affected facilities is described in the sections of the Fact Sheet that follow.

The A-Pad, B-Pad, and C-Pad gold heap leach facilities, located in the eastern portion of the Project area, and the D-Pad (aka, Weary Flats Pad) located north of the Mill, were operated until 1994, when the addition of cyanide to process water ceased. Subsequently, fluids comprised of draindown solution, make-up water, and meteoric water, were collected in the individual process pond systems and recirculated onto the pads as part of a test rinsing scenario in preparation for removal of the spent leach material for placement in closure facilities. The test rinsing activities ended in 1998, except for B-Pad, which continued intermittently until about 2001.

The rinsing and removal closure scenario, developed and described in several earlier closure plans prepared in accordance with the 1997 Consent Agreement, was superseded with Division approval of the April 2008 minor modification to expand the Ruth Pit. The

Tentative Plan for Permanent Closure (TPPC) included in the minor modification application indicates that the pads will be closed in-situ, as generally discussed later in this section. However, an FPPC of any affected component or facility must be submitted and approved by the Division prior to initiation of any closure or overdumping activities.

Final permanent closure was achieved at the end of 2010 for certain A-Pad, B-Pad, and C-Pad surface facilities, including all buildings and associated process components, and the C-Pregnant and C-Barren ponds, but excluding all leach pads, and the A-Barren and B-Storm ponds that were retained as emergency overflow ponds for the A-, B-, C-Pad-to-Mill Draindown Collection and Conveyance System. Final permanent closure of the A-Pregnant Pond, B-Pregnant Pond, and B-Barren Pond was initiated in 2011 and completed in 2013. Closure activities completed and proposed for the A-Pad, North B-Pad, South B-Pad, C-Pad, and D-Pad are discussed in their respective sections below.

Heap Leach Pad and Facility Construction: The A-Pad was constructed over the Mollie Gibson ALD, which dates to circa 1958-1979, ranges from 155 to 270 feet thick, and is composed of high clay content, sulfide-rich, low pH waste rock and low-grade ore that was placed on limestone bedrock and leached with sulfuric acid. A-Pad was commissioned in 1988, with approximately 2.8 million tons of run-of-mine ore loaded onto the 26-acre pad in 12- to 20-foot lifts to a maximum height of 90 feet by the fall of 1991.

The B-Pad facility was constructed as two pads; the North B-Pad (also identified as B-I Pad), which measured approximately 650 feet wide by 1,300 feet long, and the South B-Pad (also identified as B-II Pad), which measured approximately 300 feet wide by 1,800 feet long, to create an approximately 30.5-acre combined footprint. The pads were constructed over the Hayes WRD, a mixed oxide and sulfide WRD, and the associated B-Pad process ponds were constructed over the Sax ALD. Both dumps are 1970's construction, vary in thickness from 100 to 200 feet with an average of 140 feet thick, were constructed on limestone bedrock with no liner, and are composed of high clay content, low pH material from historic copper operations. The Sax ALD material is spent ore that was leached with sulfuric acid. The two B-Pads were also placed into operation in 1988. Approximately 5 million tons of combined crushed and run-of-mine ore were stacked on the two pads in 12- to 20-foot lifts.

The C-Pad was constructed over the Jupiter ALD (also known as the Ada/East Kranovich Dump, circa 1970's), which averages 120 feet thick, with a range of 100 to 150 feet thick, comprised of high clay content, low pH, spent ore from historic copper operations that was placed directly on the underlying limestone bedrock with no liner and leached with sulfuric acid. C-Pad is triangular in shape, measuring approximately 1,200 feet on a side to create a footprint of approximately 26.4 acres. The C-Pad was placed into operation in 1989, with approximately 4.1 million tons of run-of-mine ore loaded onto the pad in 12- to 20-foot high lifts.

Separate carbon recovery plants were built at the B- and C-Pad facilities, while the A-Pad utilized a carbon recovery plant located in the historic Lone Tree Mill, which was located

southwest of A-Pad and has been decommissioned and dismantled. Secondary containment for each of the carbon recovery plants consists of a curbed concrete secondary containment pad with sumps and pumps.

The A-, B-, and C-Pads were constructed with a 12-inch thick subbase using weathered, oxidized, clayey soil borrowed from the mine WRDs and mixed with imported clay. Records from 1994 report a measured permeability of  $3.6 \times 10^{-6}$  cm/sec for the A-Pad subbase but no information is available for B-Pad or C-Pad. The subbase is overlain by 8-oz/yd<sup>2</sup> geotextile (12 oz/yd<sup>2</sup> for C-Pad), which is overlain by a 60-mil smooth HDPE liner. The synthetic liners are overlain with another 8-oz/yd<sup>2</sup> geotextile layer (12 oz/yd<sup>2</sup> for C-Pad) that is covered with 18 to 24 inches (48 inches for C-Pad) of crushed ore to protect the liner and promote solution drainage.

The LCRS design for all three pads incorporated the geotextile layer underlying the synthetic HDPE liner, which was described as a “continuous wick” that reported to a system of collection pipes to convey fugitive solutions. These collection pipes drained to the pregnant solution pond (A-Pad), a series of sumps (B- and C-Pads), and in the case of the B-Pad, separate LCRS return pipes. Based on the poor operational history of similar LCRS designs utilizing geotextile as a fugitive solution conveyance layer, the Division no longer approves such designs and the functionality of these LCRSs cannot be accepted without field confirmation.

The A-Pad was constructed with one pregnant and one barren pond, although the barren pond was later disconnected from the fluid management system and sat idle for many years until it was repurposed as the A-Pad Emergency Overflow Pond associated with the 2008 Ruth Pit expansion minor modification. The two ponds were constructed similarly with a 12-inch thick low permeability soil layer comprised of weathered, highly oxidized, clayey soil borrowed from local mine WRDs, mixed with imported clay, compacted in two 6-inch lifts to a reported (1994) permeability of  $3.6 \times 10^{-6}$  cm/sec. The clay was covered with 8-oz/yd<sup>2</sup> woven geotextile overlain by a 40-mil HDPE primary liner. Pond leak detection consisted of a series of 3-inch diameter perforated Advanced Drainage Systems (ADS) pipes wrapped in 8-oz/yd<sup>2</sup> geotextile and placed into channels constructed in the low permeability soil layer. These pipes originally connected to a solid 6-inch PVC pipe that drained into a collection sump located below the synthetic liner on the downgradient side of each pond. The perforated pipes were surrounded by minus 2-inch diameter crushed rock. Based on the poor operational history of similar LCRS designs utilizing geotextile as a fugitive solution conveyance layer, the Division no longer approves such designs and the functionality of these LCRSs cannot be accepted without field confirmation. In the case of the A-Barren Pond, the LCRS leakage detection port (EPLDS-A) was not located during a 2010 compliance inspection and the pond was subsequently monitored and managed as a single-lined pond. The A-Pregnant Pond was removed in 2011-2012, as noted below.

The B-Pad was constructed with three ponds; a pregnant, a barren, and a storm containment pond. All three ponds were constructed with an LCRS to the same specification as the A-

Pad ponds except for the use of a 60-mil HDPE primary liner instead of the 40-mil HDPE liner used for the A-Pad. Leak detection between the primary liner and the low permeability soil layer was provided by a series of 3-inch diameter perforated ADS pipes laid in 6-inch deep gravel-filled channels. The perforated pipes connected to a manifold, which directed the combined flows into a 6-inch diameter PVC pipe. The PVC pipe reported to an external collection sump for solution inventory and evacuation. As with the A-Pad pond LCRS design, the Division would no longer approve such a design and the functionality of this system cannot be accepted without field confirmation. The B-Pad storm containment pond 60-mil HDPE liner was replaced with 80-mil HDPE in 2008, and was repurposed as the B-Pad Emergency Overflow Pond associated with the 2008 Ruth Pit expansion minor modification. Closure of the B-Pad Emergency Overflow Pond was completed in July of 2018 and was replaced by the B-Pad E-Cell, which was constructed within the footprint of the overflow pond.

The A-Pregnant Pond, B-Pregnant Pond, and B-Barren Pond were permanently closed (removed) in 2011-2012 in accordance with an approved FPPC, and contaminated soil underneath them, and underneath the previously closed B-Pad carbon recovery plant building, was excavated and placed on the A-Pad and B-Pad North, respectively. Because residual contamination remained in the bottom of the excavations, an EDC was approved by the Division in April 2013 to backfill all excavations with compacted non-PAG waste rock, covered with a compacted, minimum 3-foot thick, low permeability cover layer (maximum permeability  $1 \times 10^{-5}$  cm/sec), which is graded to shed stormwater laterally into ripped drainage ditches. The low permeability cover layer is overlain with a minimum 1-foot thick erosion protection layer of non-PAG waste rock. As part of the FPPC, the A-Pad and B-Pad draindown flow was collected in lined sumps and piped to the new A-Pad and B-Pad Draindown Transfer Tanks, respectively.

The C-Pad was constructed with one pregnant and one barren solution pond. Both ponds were constructed with an LCRS similar to that of the B-Pad ponds. The leak detection system, located between the primary liner and the low permeability soil layer, consists of a 4-inch diameter perforated pipe placed in a gravel-filled trench constructed around the perimeter of each pond bottom. The perforated pipe connected to a standpipe for leachate collection and evacuation. As with the A- and B-Pad pond LCRS design, the Division would no longer approve such a design and the functionality of this system cannot be accepted without field confirmation. A 14-inch diameter pipe was installed between the two ponds to transfer solutions while maintaining adequate freeboard. The C-Pregnant and C-Barren ponds, and the associated C-Pad carbon recovery plant building, were permanently closed (removed) in accordance with an FPPC in 2010. Contaminated soil underneath each component was excavated and placed on the C-Pad. As part of the FPPC, the C-Pad draindown flow was collected in a lined sump and piped to the new C-Pad Transfer Tank.

Activities related to the Ruth Pit expansion minor modification, approved by the Division in April 2008, included construction of the A-, B-, and C-Pad-to-Mill Draindown Collection and Conveyance System (i.e., A-, B-, and C-Pad solution collection sumps and

pipings, Draindown Transfer Tanks, Emergency Overflow Ponds, conveyance pipelines between tanks and to the Mill, etc.) to facilitate continued fluid management during and following closure and overdumping of the gold heap leach facilities; downstream extension of the Mollie Gibson and Jupiter Seep collection points to facilitate continued monitoring during and following overdumping; closure, salvage, or removal, as appropriate, of existing process and non-process components within the footprint of the expanded Ruth Pit and the Ruth and Jupiter WRDs; and construction of a steel-reinforced concrete cap over the Deep Ruth Shaft in preparation for overdumping. The Division approved activities began in late 2008 and are now completed.

A-Pad Closure: On 17 January 2017, the Division approved an EDC for A-pad spent ore and approximately 25 feet of Mollie Gibson Dump material underlying the A-Pad footprint to be relocated and placed into a designated 37-acre ALM area within the Ruth Dump. The surface of the spent ore was compacted to 92% of the maximum dry density, determined by ASTM D1557, to provide a suitable subgrade for liner installation and placement. The liner subgrade is overlain with a 60-mil double-sided textured, linear low-density polyethylene (LLDPE) synthetic liner that covers the entire ALM area. The finished liner system was covered with a minimum 3-foot layer of 2-inch-minus screened waste rock. This layer of waste rock will protect the liner from future waste rock dumping.

The final closure report (FCR) for the Ruth Dump ALM placement area was received by the Division on 17 November 2017. It was determined between the Permittee and the Division that the FCR would be reconfigured to an as-built report. This change was made in consideration that that over-dumping of the ALM area with a minimum of 50 feet of non-PAG waste rock is a component of the final closure of the Ruth Dump ALM area, and as such, when completed, a new FCR will be submitted to the Division for review and approval.

After review of the Ruth Dump ALM record of construction, it appeared that a small section, approximately 1.3 acres, of the Ruth Dump ALM placement area was not covered. The area was unable to be lined due to safety concerns in the northern and southern section of the placement area. The Permittee proposed the placement of an initial lift of 15-feet of non-PAG material over the exposed areas, prior to being over-dumped with a minimum of 50-feet of non-PAG waste rock. In addition, the Permittee will inspect the northern and southern unlined areas for physical stability or the presence of water or seepage. In the event that seepage is present, it will be, photographed, and sampled and analyzed for specific conductance and NDEP Profile I-R constituent release. The record of construction report was approved by the Division on 21 December 2017. The Final Closure Report was submitted to the Division on 12 January 2018 was approved by the Division on 27 February 2018.

South B-Pad Closure: The February 2014 Division EDC approval, and the associated January 2014 Division approval of an FPPC for South B-Pad, authorized the complete removal of the South B-Pad and stacking of the spent ore from South B-Pad in the C-Pad

Disposal Area (Phase 4). The removal of South B-Pad was necessitated by encroaching earth cracks and the potential for additional failure of the adjacent north wall of the Ruth Pit. The Permittee also intended to expand the Ruth Pit north into the South B-Pad footprint. The EDC also conditionally approved the stacking of spent ore from A-Pad in the C-Pad Disposal Area (Phase 5), subject to the prior submittal and approval of an FPPC for A-Pad and the underlying Mollie Gibson Acid-Leached Dump.

South B-Pad spent ore, the pad base liner, and potentially impacted underlying waste rock were removed during 2014 and 2015 and was placed in the C-Pad Disposal Area over the C-Pad heap leach pad. The FCR for South B-Pad was submitted to the Division on 27 May 2015 and was approved on 14 July 2015.

North B-Pad Closure: Closure plans for the North B-Pad and remaining facilities were described in an FPPC for the North B-Pad and C-Pad Heap Leach Pads that was approved by the Division on 31 August 2015. A significant reduction in the B-Pad draindown flow rate was observed following the South B-Pad removal and the overdumping of the North B-Pad with a minimum of 5 feet of non-PAG waste rock (completed in late 2015). Subsequent expansions of the Ruth Pit required frequent re-routing of the ABC system and by 2017 the system was no longer operational. Solutions reporting to the B-Pad transfer tank were managed via vacuum truck until 2017, when an interim transfer tank was installed.

An EDC, approved by the Division in August of 2017, allowed for the decommissioning of the B-Pad Transfer Tank and the B-Pad Emergency Overflow Pond and the temporary installation of a 500-gallon double walled polyethylene storage tank. This tank was sized to be able to contain the maximum flows observed to date, although there had been no observed flow since March of 2016. This tank remained in place for approximately 12 to 15 months while the B-Pad evaporation cell (described below) was constructed during the 2018 construction season.

A FPPC and EDC was approved by the Division in September of 2017 to modify the existing single-lined B-Pad Emergency Overflow Pond into a double-lined and leak detected evaporation cell (E-Cell). The new B-Pad E-Cell was constructed immediately south-east of the North B-Pad and construction consist of using cut-to-fill excavations, grading, compaction, and liner subgrade preparation. The E-Cell utilizes 3H:1V side slopes, has a depth of 6-feet, and has approximate crest dimensions of 170 feet by 116 feet. The E-Cell utilizes a smooth 80-mil HDPE secondary liner, a layer of geonet for leakage conveyance, and a textured 60-mil HDPE primary liner that is overlain by a 20oz/yd<sup>2</sup> non-woven geotextile. The E-Cell has a 2% grade that drains to the lowest point of the cell where a geotextile-wrapped drainage gravel filled sump is used to collect any fugitive solution. The 4,300-gallon sump has the ability to be pumped by a 6-inch diameter riser pipe. The E-Cell was backfilled with a minimum of 3-feet of select alluvial gravel, with a 1-foot thick alluvial soil cover over exposed liner around the perimeter of the E-Cell. A

layer of drain rock or gravel was placed over the backfilled material to minimize dust generation and access by avian wildlife.

A seepage distribution system was installed within the E-Cell backfill by excavating parallel trenches, approximately 10 feet on-center, lining them with an 8 oz/yd<sup>2</sup> geotextile and the placement of a 4-inch diameter perforated CPE pipe in the base of the lined trench. The trench was then be backfilled with drain gravel and the geotextile will be wrapped around the drainage gravel. The distribution will then be buried approximately 18-inches below the final soil surface.

The E-Cell is designed to handle the 500-year, 24-hour storm event and the maximum expected draindown flow rate of 0.25 gpm. The E-Cell is designed to have a total storage capacity of 100,000 gallons within the soil backfill and drain down distribution system. An additional 385,000 gallons of storage capacity is provided above the backfilled alluvial gravel, giving the B-Pad E-Cell a total capacity of 485,000 gallons.

Closure of the B-Pad Transfer Tank and the B-Pad Emergency Overflow Pond was completed in 2018. The draindown conveyance piping was utilized to route North B-Pad flows to the newly constructed E-Cell with other sections being capped and buried in place. The original transfer tank was removed and stored for potential future use and the pre-cast concrete secondary containment vault was broken and buried in place. The Pond closure consisted of the removal, placement, and the burying of pond sediments and synthetic liner on top of the North B-Pad.

Confirmatory sampling of the B-Pad Emergency Overflow Pond footprint soils was completed and confirmed that the samples met background with the exception of one quadrant. The Permittee removed approximately 5-feet of material from the quadrant and placed the materials on top of the overdumped North B-Pad. The pond area was subsequently overdumped with approximately 10-feet of non-PAG and was graded tp minimize the potential to pond meteoric water.

As a result of slope movement of the Ruth East highwall in the vicinity of the B-Pad E-Cell, the Division approved (on 28 September 2020) the temporary installation and utilization of the previously approved draindown management tank. Ground cracking was observed to go directly through the B-Pad E-Cell and containment could not be ensured. Once slope movement has slowed or stopped and safe access is restored through backfilling of the Ruth East Pit, the condition of the E-Cell will be evaluated, and a path forward proposed for draindown management.

C-Pad Closure: In accordance with the FPPC titled *Final Plan for Permanent Closure (FPPC) for North B-Pad and C-Pad Heap Leach Pads (SRK 2015)*, the C-Pad Disposal Area was covered with approximately the 690,000 tons of non-PAG waste rock that was obtained from the Ruth Pit during mining. The final cover was paced between April and September of 2017 and is a minimum of 5-feet thick. The final cover was graded to promote runoff from the top surface and has side slopes configured at approximately 2.5 H:V. The

remaining disturbance associated with the C-Pad will be reclaimed as part of the Jupiter Dump reclamation, in accordance with the approved Reclamation Plan.

Construction of the interim C-Pad HLP draindown management system was required as a result of recent sloughing (May 2018) of a portion of the Ruth East Pit high wall which impacted the main haul road resulting in its closure. As a result of the road closure, only one pit access road remained operational, which has necessitated the construction of a secondary/emergency access road before mining operations could resume. The safest route identified by the Permittee ran across the location of the C-Pad Draindown Transfer Tank and the C-Pad Emergency Overflow Pond.

Construction of the C-Pad interim draindown management system consisted of the installation of approximately 2,600 feet of 2-inch diameter HDPE SDR 11 pipe inside a 6-inch diameter HDEP SDR 17 pipe. This pipeline was connected to the existing 4-inch diameter HDPE conveyance pipeline that is placed inside of an 8-inch diameter HDPE secondary containment pipe, through a series of reducers. Flows were observed from the secondary 8-inch diameter containment pipeline in February of 2016. Both the 4-inch and 8-inch pipelines feed the primary 2-inch HDPE SDR 11 conveyance pipeline to preclude confusion between leaks coming from the existing pipeline and the newly constructed pipeline segment.

The newly constructed pipeline conveys flows to a new dual walled 17,600-gallon horizontal steel tank that will collect solution until it can be removed by a vacuum truck and introduced into the mill circuit. In the event solution escapes the containment, the secondary containment can be emptied and inspected through six ¾-inch ball valves. An existing 7,000-gallon steel tank was relocated and hydraulically connected to the 17,600 gallon tank by a 4-inch HDEP SDR 17 pipeline to provide for additional fluid capacity in the event of an overflow.

The C-Pad Draindown Management Tank and Emergency Overflow Pond permanent closure was approved by the Division on 12 July 2019 and 27 September 2018, respectively. Final closure of these components consisted of the removal and triple rinsing of all components, with the exception of the sealed buried pipelines, and the confirmatory sampling of soils to ensure that adjacent soils were not contaminated.

A-, B-, C-Pad to Mill Draindown Collection and Conveyance System (Closed): Preparing the A-, B-, C- gold heap leach pads for closure and overdumping required construction of the A-, B-, C-Pad-to-Mill Draindown Collection and Conveyance System, which was approved by the Division as part of a Ruth Pit expansion minor modification in April 2008 and completed in December 2010.

To construct the system, gravel-filled drains were constructed within the existing solution collection channels of each pad. The drain construction involved clearing the existing channels of debris; inspecting and repairing the geomembrane channel liner as necessary; placing a layer of 12-oz/yd<sup>2</sup> geotextile on the channel base and sidewalls; placing a 4-inch

diameter perforated CPE pipe in the base of the channel; covering the perforated CPE pipe with a minimum 6-inch thick layer of drainage gravel; folding the geotextile over the drainage gravel with a minimum 5-foot overlap; and regrading ore over the channel to serve as a protective layer during overdumping. Each perforated CPE pipe terminates in a 60-mil HDPE-lined, gravel-filled collection sump.

Draindown solution exits the collection sump via a solid 4-inch diameter, SDR-17 solid HDPE conveyance pipeline sealed within an 8-inch diameter, SDR-17 solid HDPE pipeline for secondary containment. The pipe-in-pipe conveyance pipeline is booted through the sump liner and conveys solution by gravity to a dedicated draindown transfer tank for each heap leach pad. Between the collection sump and the draindown transfer tank, each conveyance pipeline is placed within a 2-foot wide earthen trench at a depth of at least 3 feet below surface. Each trench is constructed with a 1-foot thick subbase compacted to at least 90% maximum dry density (ASTM Method D1557).

The overall trench construction varies, depending upon whether or not the particular portion of the trench will be overdumped. Where the trench will be overdumped, which is the case for the pad-to-tank pipelines, the trench is constructed with the subbase described above, a layer of 12-oz/yd<sup>2</sup> geotextile, and a 4-inch diameter perforated CPE pipe placed in the bottom of the trench adjacent to the conveyance pipeline. Then the trench is backfilled to the original ground surface with inert drainage gravel, the geotextile is folded over, and the trench is covered with a layer of nominally compacted soil mounded to a height of 1 foot above ground surface. In the case of the overdumped design, the perforated CPE pipe and trench serve as a French drain system to convey solution toward the transfer tank in the event of severe differential settlement or if the secondary containment pipeline is compromised. Approximately 20 feet upgradient of the transfer tank, each trench is filled with bentonite-amended soil to force any fugitive solution into the perforated CPE pipe, which transitions to a solid HDPE or ADS pipeline plumbed into the transfer tank.

Where the draindown pipeline trench will not be overdumped (non-overdumped design), which is the case for the tank-to-tank and tank-to-Mill pipelines, no geotextile or perforated CPE pipe are placed and the trench is backfilled with general fill material compacted to 90% maximum dry density (ASTM Method D1557). Where the double-walled pipeline runs under a roadway, it is buried deeper (5 feet minimum), sleeved inside a tertiary containment pipe, and the trench subbase and backfill are compacted to 95% maximum dry density (ASTM Method D1557). Leakage from the primary containment pipeline is conveyed by the secondary containment pipeline to a nearby LCRS port (see below), the downgradient transfer tank, or the South Tailings Thickener containment at the Mill.

A buried double-walled draindown transfer tank (see below for design details), located near each heap leach pad, is employed to temporarily store draindown solution prior to batch pumping of the solution into the adjacent conveyance pipeline to the next tank and ultimately to the Mill. Solution is conveyed from the C-Pad Draindown Transfer Tank to the B-Pad Draindown Transfer Tank, a distance of approximately 4,200 feet (increased to approximately 4,850 feet as a result of a pipeline relocation approved by the Division in

January 2013); then from the B-Pad Draindown Transfer Tank to the A-Pad Draindown Transfer Tank, a distance of approximately 5,400 feet; and lastly, from the A-Pad Draindown Transfer Tank to the Mill, a distance of approximately 12,400 feet. The tank-to-tank and final tank-to-Mill conveyance pipelines will not be overdumped but will convey both pressurized flow and gravity flow due to local elevation differences along the pipeline alignment.

Based on detailed pipeline design analysis, the conveyance pipelines are constructed with a 2-inch diameter SDR 9 HDPE primary conveyance pipeline placed within a 4-inch diameter SDR 17 HDPE secondary containment pipeline to manage the calculated operating pressures and flow rates. Also, because these pipelines will not be overdumped, the pipeline trench is constructed to the non-overdumped design described above. The pipelines are equipped with LCRS ports at low points along the pipeline run and air vent ports at high points. Each port consists of a 48-inch diameter, pre-cast concrete, insulated manhole riser, approximately 36-54 inches deep, which represents tertiary containment. A blind-flanged, 4-inch diameter tee in the secondary containment pipeline is equipped with a pressure gauge, ball valve, and quick-release fitting to allow safe depressurization of the containment pipeline and removal of any fugitive solution for transport via vacuum truck to the South Tailings Thickener at the Mill. Pipeline pass-through holes in the lower wall of the manhole riser are sealed to the secondary pipe with grout or hydraulic cement. Protocols for monitoring, sampling, and transferring leakage to approved containment are provided in the Permit Fluid Management and Monitoring Plan.

Each draindown transfer tank is a unit comprised of a polyethylene tank, for primary containment, placed inside a precast concrete secondary containment vault, sized to exceed the regulatory minimum 110% secondary containment volume requirement. The transfer tanks are buried to ensure the inlet and outlet pipelines are at least 3 feet below ground surface to minimize the potential for freezing.

The transfer tanks are placed in an excavation with a 12-inch thick compacted native subbase, covered with a minimum 12-inch thick compacted layer of Type II structural fill, and backfilled with general fill material to a depth of at least 3 feet below original ground surface. The secondary containment vaults are equipped with a 4-inch diameter PVC riser pipe, slotted at the base and extending above ground surface, which serves as an inspection and evacuation port for the secondary containment.

The draindown transfer tank volumes are sized to accommodate the draindown flow from the adjacent heap leach pad plus the cumulative upgradient pad flows that could potentially report to it. The C-Pad, B-Pad, and A-Pad transfer tank volumes are 1,550, 3,135, and 5,025 gallons, respectively. Each transfer tank is equipped with a float valve that activates a pump to convey solution to the next transfer tank, or on to the Mill, as applicable, when the transfer tank is half full.

The C-Pad collection system only and the entire C-B-A Pad leak-detected conveyance pipeline were commissioned in late March 2010. The balance of the system construction

was completed in accordance with Division-approved designs, with minor field adjustments, in September 2010, and authorization to commission was provided in October 2010, following as-built and QA/QC acceptance.

The transfer tanks, pump systems, and emergency overflow ponds were to be inspected weekly, except twice weekly for the C-Pad system. In the event of an overflow, or a need to discharge to effect repairs, each tank is equipped with a 4-inch diameter HDPE emergency overflow pipe. The A-Pad Draindown Transfer Tank will overflow to the existing A-Pad Barren Pond (construction and design description above); the B-Pad Draindown Transfer Tank will overflow to the existing B-Pad Stormwater Pond (construction and design description above); and the C-Pad Draindown Transfer Tank will overflow to the new, purpose-built C-Pad Emergency Overflow Pond.

The C-Pad Emergency Overflow Pond measures approximately 50 feet on a side by 5 feet deep. The liner system consists of a single layer of 60-mil HDPE geomembrane placed on a 12-inch thick layer of underliner material compacted to 95% maximum dry density (ASTM Method D1557) constructed over 8 inches of scarified native subbase compacted to 90% maximum dry density (ASTM Method D1557).

Based on the design of both the existing and new ponds, the A- and B-Pad Emergency Overflow Ponds are monitored and managed as single-lined ponds with a 20-day evacuation limit for containment of process solution, including heap leach pad draindown solution and MIW. Due to inadequate freeboard capacity at 2011 draindown flow rates, the C-Pad Emergency Overflow Pond is monitored more frequently (twice weekly) and evacuated within five days after any fluid reports to the pond. All pond designs will accommodate a minimum of one week of maximum cumulative draindown flow (although for the C-Pad Emergency Overflow Pond the 2011 estimated one week maximum draindown flow of 52,214 gallons would leave only 6 inches of freeboard if the pond was previously empty) and the Permit requires the design capacity be available at all times. The C-Pad draindown flow rate declined to below 1.8 gpm in 2015, but the twice weekly monitoring requirement for the C-Pad Emergency Overflow Pond was retained in the 2016 Permit renewal because of the possibility that the decline was due to temporary drought conditions.

An EDC was approved by the Division in January 2013 for the relocation of a section of the C-Pad draindown conveyance pipeline between the C-Pad and B-Pad Draindown Transfer Tanks to make room for a proposed expansion of the Kimbley Pit. The EDC authorizes the removal and decontamination of 3,088 feet of the pipeline, including pipeline LCRS ports DCPLDP-1 and DCPLDP-2, and construction of a new replacement section of pipeline up to 600 feet north of the existing alignment. The new pipeline section is approximately 3,735 feet long and includes replacement LCRS ports DCPLDP-1R and DCPLDP-2R located at low points in the pipeline. The design of the new pipeline section is identical to the existing pipeline, except the pipeline pass-through holes in the concrete manhole risers are sealed using welded HDPE rather than grout or cement. Existing transfer tanks and emergency overflow ponds are unaffected by the EDC.

An EDC was approved by the Division in September 2013 for the similar relocation of two conveyance pipeline sections to make room for further expansion of the Ruth Pit. One of the replaced sections is a 3,756-foot section between the B-Pad and A-Pad transfer tanks, which is replaced with a 3,822-foot new pipeline section located 200-600 feet further north. The replaced section featured two air vent ports, one check valve, and the two LCRS ports DCPLDP-3 and DCPLDP-4. The new pipeline section features one air vent port, two check valves, and the three new LCRS ports DCPLDP-3R, DCPLDP-4AR, and DCPLDP-4BR. The second replaced pipeline section is a 1,412-foot section immediately downstream of the A-Pad transfer tank and on the east and south sides of the A-Pad Emergency Overflow Pond, which is replaced with a 940-foot new pipeline section aligned on the north side of the A-Pad Emergency Overflow Pond. This new section features one air vent port but no LCRS ports or check valves; the section it replaced had no ports or check valves. All pipeline and port construction is the same as previous. The pipeline pass-through holes in the tertiary containment walls of the concrete manhole risers are sealed using a hydraulic cement and elastomeric sealant. The EDC required removal and triple rinsing (into approved containment) of the replaced pipeline sections.

A Final Closure Report was approved by the Division on 20 March 2018, which summarized the steps utilized to close the A-B-C pipeline conveyance system. Final closure consisted of removal, triple-rinsing, and disposal of approximately 5,200 feet of pipeline; the dismantling and removal of all valves, fittings, and risers associated with the leak detection ports, air valves ports, and check valve ports; the in-place closure of approximately 19,030 feet of pipeline by welding HDPE end caps on all pipeline segments that would remain in place; and the burial of the exposed ends with compacted soil.

Weary Flats Heap Leach Pad (aka D-Pad): The D-Pad Phase 1 was commissioned in 1991. The original facility design included two leach pad phases, but only the first phase was constructed. With the 2010 Permit renewal, the Minor Modification authorization to reconstruct certain existing components and construct additional new components as part of the D-Pad heap leach expansion, approved by the Division 30 August 2006, was rescinded. A separate revised Minor Modification to expand D-Pad was submitted in December 2012, but was withdrawn in March 2015 prior to completion of the review process.

The D-Pad facility is located north of the Mill and currently consists of the Phase 1 leach pad, one pregnant pond, one barren pond, and a process plant. The existing heap is 90 feet high and contains 695,000 cubic yards (approximately 500,000 tons) of spent leach ore. As described above for the other gold heap leach pads, addition of cyanide to the heap ended in 1994 and the heap was test rinsed until 1998, with fluid comprised of draindown solution, make-up water, and meteoric water. The practice of rinsing heap leach pads is no longer encouraged by the Division. The 2011 estimated seasonal draindown from D-Pad was approximately 5 gpm (1-2 gpm in 2015). Solution from the D-Pad barren pond could previously be pumped via a 4-inch diameter HDPE surface pipeline to Carr's Pond (via the North Stormwater Shed vault), but that pipe is no longer connected.

The D-Pad Phase 1 footprint measures approximately 12.6 acres and was constructed to a height of approximately 100 feet above the liner in 12- to 25-foot angle-of-repose lifts that have been recontoured to approximately 2.5H:1V side slopes. The liner system of the Phase 1 leach pad consists of a 12-inch thick subbase compacted in two 6-inch lifts with a maximum permeability of  $1 \times 10^{-5}$  cm/sec. The subbase is covered with a single liner of 80-mil HDPE geomembrane, which is overlain by a 24-inch thick drainage layer of crushed spent ore, off-loaded from the B-Pad. Perforated HDPE hydraulic relief pipes, located above the synthetic liner and within the drainage layer, convey pregnant solution to a collection box and ultimately to the D-Pad pregnant pond. A layer of geonet, encased with geotextile, is located between the geomembrane liner and the 12-inch thick soil subbase for routing fugitive process solution from the solution collection box into a vertical HDPE standpipe where it is monitored and evacuated. Secondary containment and leak detection for the HDPE process solution pipelines that convey solution from the collection box to the D-Pad Pregnant Pond is provided by an 18-inch diameter ADS pipe, which surrounds the process pipelines.

Leak detection is provided under each of the three main leach pad solution collection headers and solution collection channels. The LCRS consists of a 3-foot wide piece of geonet encased in geotextile, placed between the geomembrane liner and the soil subbase along the entire corridor of the solution collection pipes and channels. The three leak detection pipes join in a common sump, which collects fugitive solution and routes it via a 2-inch diameter HDPE pipe into a 6-inch diameter HDPE standpipe for monitoring and evacuation. The common sump is approximately 5 feet square by 1 foot deep, filled with clean gravel and located between the synthetic liner and soil subbase.

Documentation for the design and construction of the D-Pad process ponds is very limited. Based on available descriptions, the pregnant pond measures approximately 400 feet by 225 feet in plan-view with a capacity of approximately 6 million gallons; the barren pond measures approximately 250 feet by 125 feet in plan-view, with a capacity of approximately 1.8 million gallons. For each pond, the 18-inch thick subbase was constructed of native and clayey borrow material in three 6-inch thick compacted lifts. The upper 12 inches of subbase material was amended with bentonite, compacted, and reported to have achieved a hydraulic conductivity of  $4.3 \times 10^{-7}$  cm/sec. The compacted subbase was covered with a layer of 12-oz/yd<sup>2</sup> geotextile and a single layer of 80-mil HDPE. The LCRS system for the ponds is believed to be similar to that constructed for the B-Pad and C-Pad ponds. If so, the Division no longer approves such LCRS designs and their functionality cannot be accepted without field confirmation.

The FPPC for the D-Pad was approved on 15 September 2020 and described the ways in which the pad will be closed. The D-Pad effluent chemistry meets WAD cyanide and pH requirements stipulated under NAC 445A.430.1(a) and (b). However, the effluent chemistry contains elevated constituent concentrations that do have the potential to degrade underlying groundwater and therefore does not meet the requirements stipulated under NAC 445A.430.1(c).

Closure actions will consist of collection and conveyance system upgrades, regrading of the heap surface to 2.5H:1V, placement of a 1-foot thick evapotranspirative closure cover, cleaning and removal of the barren pond, and conversion of the pregnant pond to an E-cell. The re-grading and closure cover placement are currently scheduled to be completed by the 4<sup>th</sup> quarter of 2022 with E-Cell construction planned for a later date. The process building is currently being used for storage and will be removed at the end of mine life.

The D-Pad E-Cell will be constructed within the footprint of the pregnant pond. Sediments will be removed and placed within a cleared portion of the covered heap and the pond liners will be triple rinsed, removed, perforated or cut into small pieces and placed within the Class II waived landfill. A composite sample of the pond subsurface soils will be collected and tested by Meteoric Water Mobility Procedure with leachate analyzed for Profile I constituent release. Remedial actions will be based on the Profile I results with an emphasis on WAD cyanide and nitrate concentration and consultation with the Division

Once the liners are removed and remedial actions complete (if necessary) the E-Cell will be constructed through the partial backfilling of the pregnant pond with select non-PAG material to establish the E-Cell base. Once the backfill is placed, it will be compacted, graded, and prepared for the installation of a new geomembrane liner system that will provide containment for the new E-Cell. The geomembrane lining system will consist of a 60-mil HDPE secondary liner, a geonet layer to provide a preferential flow path to the a sump, and a textured 80-mil HDPE primary liner (textured side up). A riser pipe from the sump will be installed between the primary and secondary liners to provide for leak detection and solution removal. A 16 oz/SY geotextile will be placed on top of the 80-mil HDPE primary liner to provide for liner protection when placing a minimum 2.5 foot thick alluvial material that will be able to store and eliminate heap leach draindown and precipitation inventories. A 0.5 foot thick gravel layer will be placed on top of the alluvial material to minimize dust and prevent the formation of accessible open water.

The E-Cell is sized to store and eliminate the combined precipitation and draindown inventory generated on an annual basis. The E-Cell size is also be adequate for management of precipitation from a 500-year, 24-hour storm event falling within the cell perimeter while maintaining at least two feet of freeboard. The draindown distribution system will consist of 4-inch diameter perforated CPE pipe in series of 10-foot on-center parallel trenches with pipes wrapped in geotextile and the trenches backfilled with drain gravel. An in-line sampling port will be installed for draindown sampling and solution flow rate measurements. A piezometer will also be installed in the E-Cell to monitor solution depths.

C-Pad Disposal Area for Alta Gold Tailings and South B-Pad Spent Ore: Historic records indicate that Silver King Mines, and subsequently Alta Gold Corporation, deposited an estimated 1.7 million tons of gold tailings (also known as the Alta Gold Tailings or AGT) produced by the Lone Tree Mill cyanide recovery circuit into the Ruth Pit Lake during the period 1988 through 1990. The Lone Tree Mill, which has been decommissioned and dismantled, and the gold milling and tailings disposal activities were authorized by WPCP

NEV0060003. The conditions and limitations of WPCP NEV0060003 were subsequently consolidated into WPCP NEV0092105 in 1999. The Division would no longer approve such a discharge.

In preparation for resumption of mining and expansion of the Ruth Pit, an EDC modification was submitted and approved by the Division in March 2010, for construction of the C-Pad Disposal Area for placement of AGT within the C-Pad footprint prior to overdumping of the C-Pad with waste rock as part of permanent closure. The approved design allowed relocation of a large portion of the AGT material from the Ruth Pit, where it will be dewatered in-situ, prior to placement in the Division-approved containment of the C-Pad Disposal Area. All AGT material was relocated to the C-Pad Disposal Area by May 2011, and related AGT monitoring requirements were removed from the Permit with the 2016 renewal.

A 30 September 2008 Interim Findings Report (2008 Report), appended to the EDC design report as a reference, estimates that between 1 million and 1.5 million tons of AGT were deposited into the Ruth Pit. The 2008 Report also estimates the AGT may overlie up to 100 feet or approximately 4 million tons of waste rock placed in the pit between the end of copper mining in 1978, and the commencement of gold milling operations and discharge of tailings into the Ruth Pit.

The 2008 Report contains characterization data of drill-hole samples of both AGT solids (14 samples) and entrained water (11 samples). The AGT solids data include MWMP-Profile II, whole rock, and acid-base-accounting (ABA) analytical results. The entrained water was analyzed for the Profile II suite of dissolved constituents.

Based on the characterization, the AGT solids do not exhibit potential to generate acid. Reported constituent concentrations exceeded the groundwater quality reference values for the Ruth Mineralized Hydrogeologic Block (the Block that the Ruth Pit is in) for TDS, sulfate (SO<sub>4</sub>), manganese (Mn), and thallium (Tl) for the *mean* [emphasis added] of all samples. Review of the data identified single exceedances for cadmium (Cd 0.0131 mg/L) and nickel (Ni 0.112 mg/L) in two separate samples, and only one value above the 0.01 mg/L lower limit of detection used at the time for WAD cyanide (0.077 mg/L), but the overall *mean* concentrations for all samples did not exceed Ruth Mineralized Block reference values for these constituents. The *mean* TDS, SO<sub>4</sub>, Mn, and Tl values also exceeded the groundwater reference values established for the adjacent Saxton North Hydrogeologic Block (the Block that the C-Pad is in), and the Mn and Tl *mean* values also exceed the reference values for the adjacent Saxton Mineralized Hydrogeologic Block (the Block that the C-Pad Draindown Transfer Tank is in).

Reported *mean* constituent concentrations for water entrained in the AGT exceeded Profile I reference values for TDS, Ni, SO<sub>4</sub>, Cd, iron (Fe), Mn, Tl, and, as calculated during review of the data, zinc (Zn). These entrained water *mean* constituent values also exceed the background groundwater reference values established for both the adjacent Saxton North and Saxton Mineralized Hydrogeologic Blocks.

The Division-approved March 2010 Phase 1 and Phase 2 C-Pad Disposal Area EDC design (18.8 million cubic feet) will accommodate relocation of approximately 850,000 tons of dried AGT solids based on a dry density of 90 pounds per cubic foot (pcf). The in-situ density of the tailings solids in characterization drill holes ranged from 90 pcf near surface to 115 pcf at depth. If in-situ density of the dewatered tailings solids can be increased during placement on the C-Pad containment, the potential storage can be increased to approximately 950,000 tons at 100 pcf and about 1 million tons at 110 pcf. An EDC for construction of a Phase 3 expansion to the C-Pad Disposal Area was approved by the Division in December 2010. The Phase 3 lift increased the total capacity to a maximum 1.53 to 1.87 million tons, depending upon the dry density of the material. The Phase 3 design also required construction of the Wedge Pit Buttress to stabilize the lift. An EDC for construction of Phases 4 and 5 of the C-Pad Disposal Area was approved by the Division in February 2014. Phases 4 and 5 involved filling remaining space in the C-Pad Disposal Area with spent ore from the South B-Pad and A-Pad, respectively, as described below, rather than with AGT.

The C-Pad Disposal Area was constructed to create a bermed retaining basin structure on the top of the C-Pad, inboard of the pad containment synthetic liner and solution collection system limits. The basin was constructed with approximately 1.5H:1V angle-of-repose side slopes in accordance with the design, which required posted dump slope toe/C-Pad intersection line setting-out and dimensional field surveys to preclude deposition of AGT outside the disposal area base and crest boundaries and the underlying liner limits. The initial, Phase 1, disposal area retaining berm crest elevation was constructed to 7,174 feet AMSL; Phase 2 was constructed to a berm crest elevation of 7,202 feet AMSL; and Phase 3 was constructed to a final maximum berm crest elevation of 7,227 feet AMSL. No AGT material is to be placed outside the C-Pad Disposal Area basin, and a minimum 2-foot freeboard was required between the maximum tailings elevation and the maximum basin perimeter crest elevation.

Prior to any tailings placement, the Division required that synthetic liner, crushed tanks, and any other materials previously placed within the footprint of the retaining basin during approved C-Pad pond and component final closure activities must be thoroughly punctured to ensure downward migration of meteoric and entrained solution to the C-Pad collection and conveyance system. Additionally, approximately 1,695 cubic yards (approximately 2,000 tons) of pond sediment removed during closure of the C-Pad pregnant and barren solution ponds must be placed in maximum 8-inch thick lifts and thoroughly mixed into the spent leach material by ripping with a bulldozer prior to placement of AGT.

Stability analysis indicates the design exceeds all minimum static and pseudostatic factor-of-safety (FOS). However, to improve stability for the Phase 3 lift, the Wedge Pit Buttress was constructed by backfilling the adjacent southern portion of the Wedge Pit with characterized non-PAG waste rock. The buttress design specifies side slopes no steeper than 1.5H:1V and a minimum 80-foot crest width that will ultimately be expanded to 135 feet wide.

Tailings material was removed by a contractor from the Ruth Pit for direct transport and placement in the C-Pad Disposal Area using mine haul trucks. Compaction of the tailings material, which may have increased the ultimate capacity of the design, was accomplished, as practicable, by the haul truck traffic during placement. Phase 1 construction was completed in May 2010 and Phase 2 construction was completed in July 2010. Phase 3 construction was completed during spring 2011, and the final AGT placement in the C-Pad Disposal Area was completed during summer 2011, leaving approximately 17 to 32 feet of freeboard above the top of the AGT and below the Phase 3 crest.

Based on the characterization data and recognizing the minimum design criteria for tailings impoundments established in NAC 445A.437, the EDC concludes that placement of the tailings within the C-Pad Disposal Area eliminates the potential for the AGT to degrade waters of the State because the disposal area is located within the catchment area of the lined footprint of the C-Pad, which is hydraulically linked to the approved A-, B-, C-Pad-to-Mill Draindown Collection and Conveyance System, which conveys collected solution to the Robinson Mill for use as process make-up water.

The February 2014 Division EDC approval, and the associated January 2014 Division approval of an FPPC for South B-Pad, authorize the complete removal of the South B-Pad and stacking of the spent ore from South B-Pad in the C-Pad Disposal Area (Phase 4). The removal of South B-Pad was necessitated by encroaching earth cracks and the potential for additional failure of the adjacent north wall of the Ruth Pit. The Permittee also intends to expand the Ruth Pit to the north into the South B-Pad footprint, and possibly to the west into the A-Pad footprint as well. The EDC also conditionally approves the stacking of spent ore from A-Pad in the C-Pad Disposal Area (Phase 5), subject to the prior submittal and approval of an FPPC for A-Pad and the underlying Mollie Gibson Acid-Leached Dump.

Phases 4 and 5 of the C-Pad Disposal Area leave the height of the perimeter retaining berm crest at the previously approved Phase 3 elevation (7,227 feet AMSL). For Phase 4, the spent ore was to be stacked within the disposal area to approximately 200 feet above the liner, which equates to about 53 feet above the retaining berm crest with an approximate maximum elevation of 7,280 feet AMSL. For Phase 5, the Permit specifies that spent ore and waste rock may not be stacked more than 295 feet above the liner (approximately 7,375 feet AMSL). In both phases, the spent ore was placed to achieve a maximum slope angle of 2.5H:1V from its highest point down to the retaining berm. During placement of spent ore, a temporary perimeter stormwater catchment ditch at least 10-feet wide and 5-feet deep, which is sized to contain runoff from the 100-year, 24-hour storm event, was maintained at the outer toe of the spent ore against the inner embankment of the retaining berm. The retaining berm crest was to be graded to drain inward. The tentative plan for permanent closure of the C-Pad Disposal Area includes regrading the outer slope of the spent ore (maximum slope 2.5H:1V) to eliminate the perimeter stormwater catchment ditch, followed by overdumping the spent ore with at least 5 feet of waste rock.

A revised stability analysis included with the EDC for Phases 4 and 5 of the C-Pad Disposal Area indicates that Phases 4 and 5 will be stable as designed. A deformation analysis was also performed, indicating that the displacement within the C-Pad Disposal Area from a magnitude 7.5 earthquake would be less than 1 centimeter.

As discussed above, the C-Pad Disposal Area was covered with a minimum 5-foot thick layer of non-PAG waste rock. Please see the above section titled *C-Pad Closure* for more information about the closure of the disposal area.

C-Pad Stability: Due to sloughing in the high-wall of the Ruth East Pit in the vicinity of the C-Pad (May 2018), the Division requested that a stability analysis be provided to ensure that the area of the C-Pad would remain stable during a seismic event. A stability analysis was provided on 21 August 2019 which evaluated this situation but did not evaluate the stability of the area after the groundwater elevations rebound at the cessation of dewatering. The Division provided these comments in March of 2020 and a revised stability analysis was received on 26 May 2020. This revised analysis determined that the Ruth East Pit Wall and C-Pad would remain stable during infilling and meet minimum FOS requirements. However, as pore water pressures increased within the Ruth East Pit Wall, the overall Ruth East Pit Wall and C-Pad configuration would have static and pseudo-static FOS of 0.42 and 0.27, respectively.

The Permittee was evaluating the possibility of backfilling the Ruth East Pit during the preparation of this analysis, so it was incorporated into the analysis. The analysis assumed that backfilling would be completed to a maximum elevation of 6,840 feet amsl, and resulted in a marked increase in both static (FOS of 1.81) and pseudo-static (FOS 1.37) conditions. In addition, an interim backfill analysis was performed where backfilling was completed to an elevation of 6470 ft amsl at year 5 after the cessation of dewatering. This interim backfill analysis also displayed a marked increase in static (FOS of 1.51) and pseudo-static (FOS of 1.19) conditions.

Due to the observed sloughing and eventual cracking that has been observed in the Ruth East Pit in the area of the C-Pad, the Division gave interim approval of the backfill while the Major Modification was being prepared for submittal. This approval was given by the Division on 07 October 2020 in a corresponded titled "*C-Pad Stability Analysis – Response to Divisions 11 March 2020 Comments*".

As of the 2022 Major Modification and Renewal, backfill has been placed to an approximate elevation of 6,550 feet amsl and has minimized slope movement (evaluated by radar slope monitoring) to a point where failure is no longer a concern.

### **Liberty Pit Expansion**

As part of the 2021 Major Modification and renewal, the Division approved the resumption of mining in the Liberty Pit. The Liberty East layback expansion consisted of characterization of the anticipated mined materials, the re-evaluation of the Keystone WRF

with alternative North Vet-Trip (part of the BLM Environmental Impact Statement) and King WRFs, and a re-evaluation of the pit lake model. Coupled with this layback was the backfilling of the Ruth East Pit with non-PAG materials to stabilize the highwall in the vicinity of the North B-Pad and C-Pad. Information regarding pit lakes, ecological risk assessments, and waste rock management plans can be found in their respective sections in this Fact Sheet.

In May 2024 an EDC was approved for construction of a buttress to mitigate the safety concerns identified along the north highwall. The buttress will be comprised of approximately 60 million tons of Non-PAG material that will be sourced from the permitted and approved Liberty East Expansion. The expansion area has been identified to be comprised of approximately 122 million tons of available Non-PAG material. Specific waste rock characterization information for the area in question was provided. The placement of material for the buttress would begin at approximately the 6,600 feet above mean sea level (AMSL) elevation to eliminate the potential for any contact to occur between the future rebounded pit lake (anticipated to be 6,572 ft amsl) and the Non-PAG mitigation material.

### **Investigation and Mitigation of Mine-Impacted Waters (MIWs) and MIW Sources**

MIWs identified in the 1997 Consent Agreement for investigation include, “Intera Pond, Ruth Pit Lake, Green Springs Ponds, The ephemeral Jupiter Pond, Star Pointer Pit Lake, Kimbley Pit Lake, Liberty Pit Lake, The ephemeral Mollie Gibson Seep, The ephemeral Juniper Seep, and Veteran/Tripp Pit Lake.”

During the period 1997 to 2004, initial characterization and evaluation of certain historic MIWs and MIW sources was completed and interim stabilization measures were performed for the purpose of remediation of MIWs and MIW sources including part of the Mollie Gibson ALD, Mollie Gibson Seep, and Mollie Gibson Pond 4; the Jupiter ALD, Jupiter Seep, and Jupiter Pond; and the Kimbley Pit Lake, Green Springs Ponds, and Intera Pond. During the 1999 to 2004 period of Temporary Closure, further site characterization was performed at other historic and recently operating facilities to support final closure planning. Despite this work, no FPPCs were fully approved by the Division until late 2010.

Documentation and specific details related to the characterization, mitigation, and closure implemented at the Robinson Operation to date are on file. Summaries of the work completed on MIWs and MIW sources follow.

Intera MIW: The Intera Pond was located in the topographic low, ephemeral stream valley, downstream of the Puritan and Sunshine ALDs, which were pre-1931 vintage. The trace of the natural drainage in which the dumps were constructed, which is a tributary of Gleason Creek, runs from the current Robinson Mill, beneath the Puritan ALD, which is now covered by the Liberty WRD, through the Intera Pond, northeast to the Juniper Seep, north between the Keystone ALD and the town of Ruth, and then east to its confluence

with Gleason Creek just downstream (south) of the junction of U.S. highway 50 and State Route 485 (Keystone Junction).

The original Intera Pond, with a footprint of approximately three acres, was constructed by placing a fill embankment across the drainage and covering the footprint between the embankment and toe of the Puritan and Sunshine ALDs with a layer of “compacted clay” material. No details or specifications of the original pond construction are available. Both the pond and the ALDs are considered MIW sources.

‘Oxide’ copper was leached from the Puritan and Sunshine ALDs with sulfuric acid and the Intera Pond was used from the 1950’s into the 1970’s to collect the copper leachate emanating from the toe of the upstream ALDs. The copper leachate was treated in a nearby recovery plant by either precipitation, probably onto steel scrap material to make ‘sponge copper’, or with solvent extraction/electro-winning techniques to recover copper metal of relatively high purity. MIW, in the form of acid leachate, continued to emanate from the toe of the ALDs and reported to the pond in the late 1990’s, driven by meteoric water infiltrating the ALDs with a catchment area of approximately 280 acres.

The Intera Drain was constructed in the fall of 1997 after Division approval with an as-built submitted on 18 September 1997. Based on the 1997 as-built report, the Intera Drain was constructed by dewatering the Intera Pond, excavating a 300-foot-long by approximately 22-foot-deep trapezoidal cut in the natural drainage within the southern half of the pond footprint along a northwest-southeast axis; lining the base and sidewalls of the cut with 12-oz/yd<sup>2</sup> geotextile; placing a 12-inch diameter, SDR 26, HDPE slotted collection pipeline along the base of the lined cut and covering the collection pipeline with select, coarse, “rhyolite” waste rock to form a drainage layer enveloped with 12-oz/yd<sup>2</sup> geotextile; and covering the geotextile with a 5-foot layer of select waste rock to complete the collection drain. The design capacity of the drain was to be approximately 500,000 gallons assuming a void ratio of 0.35 within the selected coarse waste rock drainage media.

An inclined well was originally constructed to evacuate the Intera Drain by placing a 24-inch diameter HDPE pipeline along the existing north-facing dump slope at the south end of the drain. The bottom portion of the inclined well casing was slotted, encased in geotextile to prevent migration of fines, and bedded into a “pump drain sump” located at the southeast, downgradient end of the Intera Drain, within the drainage layer material. The pump drain sump was equipped with a dedicated submersible pump attached to a 4-inch diameter SDR 9.3 HDPE discharge pipeline, located within the well casing that discharged to the gravity-flow pipeline to the Liberty Pit sump pump for conveyance by existing pipeline to the Robinson Mill. Submersible pressure transducers, for determining static solution elevation in the drain, and associated instrumentation cables were located in two 3.5-inch diameter HDPE pipelines placed on either side of the well casing to connect the drain instrumentation to a surface control box.

Subsequent closure activities for the Intera Pond included placement, in maximum 15-foot lifts, of 30 to 50 feet of select rhyolite waste rock over the pond and drain areas. This work

was followed by overdumping of the pond and drain areas, and the Puritan, Sunshine, and adjacent Juniper ALDs, with waste rock, which was to be compacted and graded to prevent ponding or storage of meteoric water and to reduce the potential for infiltration of meteoric water through the ALDs and consequently reduce the seepage flow rate into the Intera Drain.

Once waste rock was deposited to an elevation approximately 70 feet above the inclined wellhead and the surface control box, the inclined well casing failed and the well was replaced in July 2000, with a 267.3-foot deep vertical well. Based on the January 2001 as-built report, the drill hole for the replacement well penetrated 246 feet of waste rock material to the top of the Intera Drain, identified by the presence of geotextile material used to encapsulate the drain, which was observed in the drill water return flow. Deeper in the July 2000 drill hole for the replacement well, the coarse, unaltered rhyolite used for drain backfill was intercepted from 246 feet to the bottom of the drain at approximately 256 feet, where geotextile material was again encountered and observed in the drill water return flow. Below the drain, the July 2000 drill hole for the replacement well intercepted limestone to the completion depth of 267.3 feet. Water was encountered at a depth of 240 feet in the drill hole.

The 6-inch diameter well, constructed to a depth of 267 feet, was constructed with mild steel solid casing from 0 to 232 feet, stainless steel solid casing from 232 to 242 feet, a stainless steel screen from 242 to 257 feet, and stainless steel solid casing from 257 to 267 feet with a stainless steel bottom plug. The casing annular space was completely backfilled from the bottom of the hole with sand or gravel, except for the placement of bentonite chips between 192 and 198 feet in the well and cement grout from ground surface to a depth of 10 feet in the well. A 2-inch diameter, 257-foot deep vertical well (PZ-1) was drilled nearby in 2006, to house new drain solution elevation transducers and communication cables. Based on stage curves developed during the original design, the fluid elevation in the Intera Drain shall not exceed 6,917 feet AMSL, which the design documents indicate is the approximate top elevation of the geotextile enveloped drainage layer. However, the design documents also indicate that the crest of the original clay-covered embankment is 6,930 feet AMSL.

An EDC modification was approved by the Division in August 2008 to replace the existing 2-inch diameter, single-wall surface pipeline with a new pipeline to convey Intera Drain MIW solution over a distance of approximately 6,650 feet from the vertical Intera Well to the Robinson Mill for use as process make-up water. The new conveyance pipeline is designed to eliminate freezing problems that occurred frequently with the original surface pipeline.

The Intera Drain Conveyance Pipeline system is constructed of a 2-inch diameter SDR-9 HDPE primary containment pipeline within a 4-inch diameter SDR-17 HDPE secondary containment pipeline. The pipeline is buried in a trench at a depth of 36 to 54 inches below ground surface, to prevent freezing, along an alignment parallel to the A-, B-, C-Pad-to-Mill Draindown Collection and Conveyance System solution conveyance pipeline. The

Intera pipeline high-point, located just west of the crusher between the Intera Drain wellhead and the South Thickener located at the Mill, is equipped with an air-release valve. The design allows both the conveyance pipeline and the secondary containment to drain by gravity away from the air-release valve to either the wellhead or the thickener.

The wellhead end of the pipeline secondary containment is equipped with a leakage detection and collection port (ICPLDP-1), located in a subgrade pre-cast concrete vault, which can be monitored and evacuated if necessary. The Mill-end of the pipeline secondary containment will discharge directly into the Mill process circuit at the South Thickener, where leakage can be monitored and quantified as necessary (ICPLDP-2).

In addition to leak detection and collection at the wellhead and Mill-end of the conveyance pipeline, a leak detection port (ICPLDP-3) was added at a topographic low point in the Intera pipeline alignment on the top of the Liberty WRD. The port consists of a 48-inch diameter, insulated pre-cast concrete manhole riser, approximately 54 inches deep. A blind-flanged, 4-inch diameter tee in the secondary containment pipeline is equipped with a pressure gauge, ball valve, and quick-release fitting to allow safe depressurization of the containment pipeline and removal of any fugitive solution for approved disposal.

Documentation of the inflows reporting to the Intera Drain indicates a 75% reduction of the inflow rate from 20 gpm in late 1997 to approximately 5 gpm in late 2001. This period spanned the initiation of site Temporary Closure in June 1999. However, the Intera Drain inflow rate rose again to approximately 20 gpm between mid-2005 (not long after the September 2004 restart of milling operations) and late 2009, and continued to flow at approximately 20 gpm for several years thereafter. An electrical geophysical survey was performed by Willowstick Technologies, LLC, in October 2009, to investigate for the source of increased Intera flow. The 28 January 2010 final report of the survey identified a possible flow pathway from the vicinity of the Mill Water Ponds to Intera Drain. Various actions were taken, as described below, to eliminate this and other potential contributors of water to the Intera MIW.

A schedule of compliance item was added to the Permit with the 2005 renewal, which required submittal by 30 March 2010, of documentation that the portions of the Liberty and South Tripp/Veteran WRDs contributing MIW to Intera Drain and Green Springs MIWs, respectively, have been compacted and contoured to prevent infiltration of meteoric water and oxygen and promote the controlled runoff of meteoric water reporting to the surface of the WRDs. The Permittee failed to provide the required documentation, which led to issuance of an FOAV and Order by the Division on 26 April 2010. The Permittee appealed the FOAV and Order to the State Environmental Commission (SEC) on 21 May 2010. The Intera Corrective Action Plan (Intera CAP), dated 26 October 2010, was accepted by the Division on 03 November 2010, to resolve the FOAV and Order. On 08 November 2010, the Permittee filed a request with the SEC to withdraw the appeal, which was granted on 22 November 2010. With termination of the appeal, the FOAV and Order is no longer appealable.

The 26 October 2010 Intera CAP required several actions be taken to identify all potential sources of water reporting to the Intera Drain. In accordance with the CAP, the Permittee removed the two water truck fill station standpipe located adjacent to the Mill Water Ponds (completed 30 September 2010) and completed an integrity evaluation of pipelines in the area (completed 29 November 2011) prior to relining the Mill Water Ponds by 15 August 2011 (completed 26 February 2012), in accordance with a Division-approved EDC. A required follow-up electrical geophysical survey after replacement of the Mill Water Ponds was completed 14 January 2012 by Willowstick Technologies, LLC. The 2012 geophysical survey found a significant reduction in conductivity compared to the 2009 survey, suggesting that replacement of the Mill Water Ponds and removal of the water standpipes were successful in reducing infiltration into the Liberty WRD. However, as of 2016, the Intera Drain inflow rate remained near 20 gpm. The Intera CAP also required submittal, by 01 April 2011, of an FPPC with proposed implementation schedule for the Intera MIW and its source area on the Liberty WRD. The CAP called for the construction of an approved passive draindown collection system and pond at the Juniper ALD toe by 30 October 2011, initiation of system testing by 30 November 2011, and completion by 01 October 2012 of an approved engineered cover for the portion of the Liberty WRD that lies within the Intera Drain source area. Due to partial non-compliance with the 26 October 2010 CAP, the Division and RNMC negotiated and signed a Modified Intera CAP, dated 06 October 2011, with revised deadlines.

In response to the Modified Intera CAP, a combined Intera/Juniper FPPC and EDC was submitted in September 2014, and revised and resubmitted in April 2015 in response to Division comments. The EDC is described below in the Juniper MIW section. The FPPC was revised further in response to Division comments, and the Division provided review comments in September of 2017.

In addition to other actions described above to reduce the inflow rate to the Intera Drain, the August 2014 Division approval to replace the single-lined Carr's Pond with a new double-lined pond (described in a separate section above) also has the potential to eliminate a contributing source of water to the Intera MIW. Construction and commissioning of the new Carr's Pond occurred in 2015.

In order to facilitate continued Intera Drain operation during planned overdumping of the eastern portion of the Liberty/TS Dump and subsequent backfilling of the area around the existing wellhead, the Permittee proposed changes to the Intera Drain management facilities on 07 September 2017 and gained subsequent Division approval on 15 March 2018. The existing area around the Intera wellhead was overdumped (2018 – 2019) by approximately 60 feet of waste rock, in two separate phases, which allows positive drainage out of the current topographically low point. Phase 1 backfilling extended approximately half-way across the existing Intera Drain footprint, while Phase 2 filled in the remaining area. After Phase 1 backfilling, RNMC installed PZ-1R from the surface of the waste rock backfill and relocated the existing piping, pump, and transducers to PZ-1R after which the existing MIW-I and PZ-1 were abandoned. PZ-1R is used to evacuate the Intera Drain during the overdumping of the MIW-I and PZ-1 wellheads. MIW-R was installed in the

same manner as PZ-1R once the rest of the existing well head area is overdumped. Once completed, MIW-R became the primary pumping well with PZ-1R remaining as a back-up well. Both wells were tied into the existing Intera MIW pipeline system utilizing the same double walled pipeline that consists of a 2-inch diameter HDPE pipeline within a 4-inch diameter HDPE pipeline.

PZ-1R and MIW-R were notified and constructed in accordance with NAC 534.300 to 534.438, inclusive. A 6-inch diameter mild steel casing extend down to a depth of approximately 296 bgs where the casing then transition into a stainless steel casing to ensure the longevity of the well within the low pH solution. The stainless steel casing extends down 10 feet where it will then transition into a stainless steel screen that was installed within the Intera Drain. The 15-foot screen extended to the floor of the Intera Drain and utilized #10-12 sand to minimize fines migration into the well and to fill the annular space between the screen and the borehole. A solid wall stainless steel pipe extends down 10 feet below the Intera Drain to provide a “wet well” for the pump. The annular space between the solid walled pipe and the borehole is filled with hydrated bentonite pellets up to the floor of the drain to minimize preferential flow paths around the solid walled pipe.

Drilling and construction of the new Intera PZ-1R, and associated pumping and piping system, was complete by June of 2018 and was commissioned on 15 August 2018. Unexpected challenges were encountered while drilling PZ-1R and subsequently gave PZ-1R a narrow operational depth opposed to the currently in place well and piezometer (MIW-I and PZ-1). Rather than abandoning the currently used well and piezometer which have proven their reliability, the Permittee proposed to continue utilizing the existing well and piezometer by raising the well casing and grouted piezometer wire in coordination with backfilling efforts. PZ-1R, which was installed after Phase 1 backfilling, will remain as a back-up well in the event that the primary well fails or requires maintenance. This was approved by the Division on 13 September 2018 and the proposed methods of raising the well head and piezometer were approved by the Division on 26 September 2018.

The Permittee managed solution elevations in the Intera Drain with the pumping of PZ-1R while backfill was placed and MIW-1 was raised. On 07 November 2018 a video was taken of MIW-1 and it was determined that the well casing had failed and that it was not possible to replaceable. Solution elevations were then managed with PZ-1R.

The acidic nature of the solution can damage pump components on a more frequent basis compared to normal freshwater pumps and therefore repairs, maintenance, and replacements are required on an increased frequency. The Permittee attempted to replace the pump in PZ-1R on 25 January 2019 and was unable to. A video camera that was placed down the well on 26 January 2019 determined that the well casing had also failed. The Permittee proposed the construction of a new well (MIW-R) adjacent to MIW-1 on 12 February 2019 and the Division approved the design the same day.

Intera Drain well MIW-R was constructed utilizing 12-inch outside diameter stainless steel casing that extends down to a depth of approximately 293.5 feet bgs where the casing then transitions into a stainless-steel screen that extends down to 312 feet bgs. The 18.5-foot screen extends to the floor of the Intera Drain (313 feet bgs) and utilizes #10-12 sand to minimize fines migration into the well and to fill the annular space between the screen and the borehole. A solid wall stainless steel pipe extends down 12 feet below the Intera Drain to provide a sediment trap for the well. The annular space between the solid walled pipe and the borehole was filled with hydrated bentonite pellets up to the floor of the drain to minimize preferential flow paths around the solid walled pipe.

On 06 December 2018, the Division approved the implementation of a scope of work (SOW) for an investigation into the possible sources of the Intera Drain solution. The SOW finding will be submitted to the Division as an FPPC by 31 December 2022, pursuant with SOC item 4.

Juniper Seep MIW: The original Juniper Seep was located immediately downgradient of the toe of the historic Juniper ALD. The seep dried up after the 1997 construction of the Intera Drain, which facilitated collection of the Intera MIW and commencement of overdumping of the historic Puritan, Sunshine, and Juniper ALDs to create the Liberty WRD. The Juniper Seep MIW resumed flowing intermittently in 2006 at a new location at the toe of the Liberty WRD downgradient from the original seep. Juniper Seep MIW flows increased in 2008, apparently in response to wet weather, a partial slump failure of the toe of the Liberty WRD, and subsequent regrading and stormwater-related construction work by the Permittee to reduce ponding and infiltration of stormwater on the Liberty WRD by focusing runoff into riprap swales down the dump face. Juniper Seep MIW flow rate monitoring commenced in 2012; during the first two years of monitoring, surface flows from the seep ranged from approximately 0.1 gpm to 1.1 gpm. Juniper Seep MIW has poor water quality with a pH of approximately 2 standard units (SU), TDS to 41,000 mg/L, acidity to 27,000 mg/L, and high metals concentrations.

An EDC was approved by the Division in April 2015 to install nine monitoring wells at the Project, three of which (JUN-1, JUN-2, and JUN-3) were associated with the then not yet constructed Juniper MIW collection system. The existing monitoring wells W-9A and W-9B, located downgradient of the Juniper Seep, were plugged and abandoned to make room for the new Juniper MIW Evaporation Pond. The three new wells are located further north and downgradient of W-9A and W-9B, adjacent to the Juniper drainage, and just north of the new pond.

Another EDC was approved by the Division in June 2015 for construction of the Juniper MIW Collection System and the associated Juniper Evaporation Pond. The EDC was submitted along with an FPPC for the Intera and Juniper MIWs and their source areas, as required by the Modified Intera CAP. The collection system consists of two cut-off trenches and associated piping to collect and convey the Juniper MIW to the new evaporation pond. The Juniper MIW Collection System and Juniper Evaporation Pond were constructed in 2015 and commissioned in 2015-2016.

The collection system will be overdumped as part of the planned northeastward expansion of the Liberty/TS WRD. The ultimate northeast toe of the Liberty/TS WRD will be located immediately south of the new double-lined Juniper Evaporation Pond. A minimum 6-foot tall rockfall protection berm is constructed between the ultimate dump toe and the pond to protect the pond and associated infrastructure from material raveling off of the dump.

The upper cut-off trench is located approximately 120 feet north of the previous 2006-2015 Liberty/TS WRD toe, and measures approximately 15 feet deep by 170 feet long, spanning the entire width of the native Juniper drainage. The lower cut-off trench is located approximately 180 feet north of the upper cut-off trench. The lower cut-off trench is approximately 10 feet deep and 50 feet long, and serves as a backup to collect any MIW flow that gets past the upper cut-off trench. Both cut-off trenches feature a steeper 0.5H:1V up-gradient (south) sidewall and a lower-angle 2H:1V downgradient sidewall, a minimum 3-foot wide (south to north) flat bottom, and a 60-mil HDPE liner placed on the entire downgradient (north) sidewall and bottom only. The subgrade under the HDPE liner is wheel compacted. The cut-off trenches are filled with inert drain rock, which is enclosed on all sides with 8-oz/yd<sup>2</sup> geotextile. Within the trenches, the geotextile overlies the HDPE liner on the bottom and north sidewall. The geotextile/drain-rock envelope extends upward 2 feet above the surrounding ground surface to capture any future flows along the pre-overdumping ground surface. An overlying 2-foot thick layer of sand or non-PAG waste rock protects the geotextile/drain-rock envelope from damage during future waste-rock overdumping.

A 3-inch diameter perforated HDPE collection pipe lies on the geotextile on the bottom of each cut-off trench, running east-west. A 3-inch diameter non-perforated primary HDPE conveyance pipeline penetrates the cut-off trench liner at the base of the north sidewall and tees into the perforated collection pipe at the east-west midpoint of each trench. At the upper cut-off trench, a 6-inch diameter non-perforated HDPE secondary conveyance pipeline (which contains the 3-inch diameter non-perforated primary HDPE conveyance pipeline) also penetrates, and is booted to, the cut-off trench liner. Contrastingly, at the lower cut-off trench, the 6-inch diameter non-perforated HDPE secondary conveyance pipeline terminates immediately under the cut-off trench liner, and the 3-inch diameter non-perforated HDPE primary conveyance pipeline is booted to the cut-off trench liner. In both cases, the upgradient end of the 6-inch diameter HDPE secondary conveyance pipeline is sealed such that any flow within the secondary pipe will represent leakage from the primary conveyance pipeline.

The upper cut-off trench conveyance pipeline connects with the lower cut-off trench conveyance pipeline at a wye located about 70 feet north of the lower cut-off trench. The pipeline conveys Juniper MIW northward from the cut-off trenches to the Juniper Evaporation Pond at a minimum 0.5% grade to facilitate passive drainage. The total distance from the upper cut-off trench to the evaporation pond is approximately 1,100 feet. The conveyance pipeline provides greater capacity (39 gpm) than required for anticipated MIW flow rates. As noted above, the 3-inch diameter, SDR 17, HDPE conveyance pipes

are contained within 6-inch diameter, SDR 17, HDPE secondary pipes. The dual-walled conveyance pipe system is buried a minimum of 4 feet below the pre-overdumping ground surface within a pipeline trench. Two 2-inch diameter PVC conduits carrying transducer wires from piezometer PZ-4 are buried alongside the conveyance pipeline for most of the conveyance pipeline run. Within the trench, the upper 12 inches of subgrade under the conveyance pipeline is moisture conditioned and compacted to at least 90% maximum dry density, Modified Proctor (ASTM Method D1557). Over the pipeline, general fill is placed in 12-inch loose lifts and compacted to the same specification. The Permit includes monitoring requirements for the MIW at the conveyance pipeline outfall to the pond (JCP-F), and for any leakage from the primary conveyance pipe observed in the secondary pipe (JCP-LDP).

As part of the June 2015 EDC, piezometer PZ-4 was outfitted with two transducers. The collar of PZ-4 was enclosed within an 18-inch diameter ADS pipe, capped with a 2-foot by 2-foot by ½-inch thick steel plate, and buried under a 7-foot layer of compacted bedding sand to protect it from future waste rock overdumping. The two transducer cables are each contained in a separate 2-inch diameter buried PVC conduit that intersects and then follows the Juniper MIW conveyance pipeline trench. A solar-powered data logger box for the PZ-4 transducers is installed at the Juniper Evaporation Pond crest near the outfall of the MIW conveyance pipeline.

Construction of the Juniper Evaporation Pond was required by the Modified Intera CAP, and approved by the Division as part of the June 2015 EDC, to provide containment for the Juniper MIW. The trapezoidal pond has an average length (east-west) of approximately 350 feet, an average width (north-south) of 275 feet north-south, and a maximum depth of 12 feet. Pond capacities are approximately 4.7 million gallons at the 2-foot minimum freeboard level, and approximately 6.1 million gallons at the crest. From bottom up, the pond liner system consists of the upper 12 inches of subgrade (or structural fill) moisture conditioned and compacted to 95% maximum dry density (ASTM Method D1557), a 60-mil smooth HDPE secondary liner, an HDPE geonet layer for leak detection, and an 80-mil HDPE single-sided textured primary liner with textured side up. Eight-inch diameter ballast tubes constructed of HDPE liner filled with sand are placed on the pond bottom to stabilize it in windy conditions when the pond is empty or nearly so. The pond bottom is graded toward the southeast corner where the LCRS sump is constructed between the primary and secondary liners. A geosynthetic clay layer (GCL) is installed beneath the secondary HDPE liner, only under the LCRS sump, to decrease further the subbase permeability in that area. The LCRS sump is constructed with drain rock fully enclosed within 8-oz/yd<sup>2</sup> geotextile. Evacuation of the LCRS sump is accomplished by using a pump mounted within a 6-inch diameter HDPE riser pipe that has a perforated lower end installed within the LCRS sump. The LCRS riser pipe extends up the pond sidewall between the liners and daylights at the pond crest (monitoring point JNP-LDS).

Water balance calculations indicate that in years with average precipitation and evaporation, the Juniper Evaporation Pond can contain a sustained MIW inflow of up to 2.2 gpm, and the precipitation from the 100-year, 24-hour storm event falling within the

pond perimeter, while maintaining the 2-foot minimum freeboard required in the Permit. Further calculations indicate that if the pond were subjected to the wettest 7-year period on record at the Ruth weather station (years 2003-2009), while receiving a sustained MIW inflow of 2.2 gpm, and including an additional 100-year, 24-hour storm event (which would far exceed the Division's minimum design criteria), the pond would still maintain a 1-foot freeboard.

Final permanent closure of the Juniper Evaporation Pond will include conversion to a backfilled evaporation cell once the MIW flow rate declines sufficiently for the evaporation cell to accommodate the flow. Water balance calculations suggest that the MIW inflow rate may need to be less than 1.1 gpm before conversion to an evaporation cell to maintain a 2-foot minimum freeboard in the evaporation cell.

Aside from the MIW collected in the upper and lower cut-off trenches, the Juniper Evaporation Pond is not designed to collect any other seepage or stormwater related to the Liberty/TS WRD. The EDC includes construction of a compacted stormwater vee channel along the toe of the native side slope on either side of the Juniper drainage upstream (south) of the pond. These two vee-channels are designed to convey stormwater from the 100-year, 24-hour storm event, and possibly infiltrated meteoric water once the channels are overdumped by the Liberty/TS WRD, to a central notch in the rockfall protection berm at the ultimate toe of the Liberty/TS WRD. From that point, the comingled water from the two vee-channels is directed via a riprap apron, with a median boulder diameter ( $D_{50}$ ) of 8 inches, into a 25-foot wide compacted trapezoidal stormwater channel that wraps around the south, west, and north sides of the Juniper Evaporation Pond and discharges into an existing stormwater channel adjacent to the Keystone ALD. The trapezoidal Juniper Evaporation Pond Stormwater Channel is constructed with a 6-inch thick layer of riprap having a  $D_{50}$  of 3 inches. The Permit requires water quality monitoring of the water in the Juniper Evaporation Pond Stormwater Channel at the northeast corner of the pond (monitoring point JSW), and requires that water discharged from the channel shall meet applicable water quality standards, including a pH of 6.0 – 9.0 SU.

In September of 2019, the Division approved of the conversion of the Juniper Evaporation Pond to the Juniper E-Cell. The Juniper E-Cell is designed to manage, via passive evaporation, a sustained draindown flowrate of 0.2 gpm under the average precipitation scenario. The E-Cell is sized to provide full containment of draindown inflow during the wettest seven-year period on record and sized to store direct precipitation from the 500-year, 24-hour storm event while maintaining a 2-foot freeboard. The resulting maximum storage capacity of 605,000 gallons is provided by the soil/backfill (117,000 gallons) and the available space above the backfill to the pond crest (488,000 gallons).

The Juniper E-Cell is a double synthetically lined and leak detected system which utilizes a 60-mil smooth secondary liner and an 80-mil single side textured (texture side up) primary liner that overlays a geotextile. Draindown flows are distributed within the backfill material via a piping network installed in parallel geotextile lined trenches on 10-foot centers. The distribution piping consists of 4-inch diameter perforated corrugated

polyethylene pipe placed at the base of the trench which is then backfilled with drain gravel and wrapped in the geotextile. An in-line sampling port was constructed for draindown chemistry sampling, flow monitoring, and secondary conveyance pipeline monitoring, which consists of flow/no flow monitoring of the 6-inch pipeline surrounding the 3-inch diameter primary conveyance pipeline. An internal stand-pipe piezometer was installed to monitor static water levels, and potentially water quality, within the E-Cell backfill.

Green Springs Seep MIW: The Green Springs Transfer Pond was constructed in mid-1998, to collect MIW emanating from the historic earthen Green Springs ponds and the toe of the historic Green Springs ALD, components that have been overdumped in the process of constructing the South Tripp WRD. A French drain, constructed downgradient of the historic components, collects MIW seepage and conveys it to the Green Springs Transfer Pond through a buried HDPE pipeline.

The pond was designed as a transfer pond, rather than a permanent storage pond, and was constructed with a single layer of 60-mil HDPE liner placed over a compacted soil base. The original design included an inflow structure and outfall pipeline. The latter conveyed solution to an injection pump located at the tailings impoundment BOC to introduce the MIW into the reclaim water pipeline at approximately 10 gpm. Since the 1999 Temporary Closure, flow reporting to the pond averaged less than ½ gpm, which is considerably less than the design flow. The outfall system was disconnected during the Temporary Closure period because evaporative loss maintained the pond solution below the minimum 2-foot freeboard. On 21 September 2012, the MIW flow was diverted from the Green Springs Transfer Pond to the recently constructed Division-approved Green Springs Evaporation Cell. The Transfer Pond was permanently closed in 2015 in accordance with a Division-approved FPPC, and the final closure report was approved by the Division on 20 November 2015.

The 26 October 2010 Intra CAP requires several actions be taken to address the Green Springs MIW. Among them are requirements to submit a specific FPPC by 01 May 2011 (completed 17 August 2011), that will result in permanent closure of the MIW source area portion of the South Tripp WRD and conversion of the existing pond to a double-lined, leak detected evaporation cell or similar with post-closure monitoring. Implementation of the FPPC must be completed by 31 December 2011 (completed 30 December 2011).

In response to the Intra CAP, a new Green Springs Evaporation Cell was approved by the Division and constructed by 30 December 2011. The Division approved the commissioning of the Evaporation Cell on 18 September 2012. The completed Evaporation Cell is located immediately west of the existing Green Springs Transfer Pond. The square Evaporation Cell is 5 feet deep with the cell bottom measuring 50 feet by 50 feet. The Evaporation Cell is constructed as follows from bottom up: the upper 12 inches of native subgrade compacted to a minimum 90% of maximum dry density (ASTM Method D1557); a 60-mil smooth HDPE secondary liner; a geonet leak detection layer; a 80-mil single-textured HDPE primary liner (textured side up); a 20-oz/yd<sup>2</sup> non-woven geotextile layer; and 3 feet of general fill compacted to 85-90% maximum dry density (ASTM

Method D1557). The cell sidewalls and crest are covered with approximately 1 foot of compacted general fill. A solution distribution pipe network is installed approximately 6 inches above the primary liner within the general fill in the cell bottom. Distribution pipes are a series of parallel 4-inch diameter perforated CPE pipe placed 8 feet on center, connected to a 4-inch diameter perforated CPE distribution header pipe. The distribution pipes are laid in the bottom of geotextile-encased (8-oz/yd<sup>2</sup> non-woven) drain-rock-filled trenches approximately 12 inches deep and 18 inches wide within the general fill in the cell. The Evaporation Cell includes a drain-rock filled LCRS between the primary and secondary liners, which is accessed by a 6-inch diameter HDPE riser pipe that runs up the southwest sidewall of the cell between the liners and is booted through the primary liner at the cell crest to daylight as the capped LCRS monitoring port GSECLDP.

The Green Springs Evaporation Cell is fed by a buried 3-inch diameter SDR 17 HDPE primary pipe within a 6-inch diameter SDR 17 HDPE secondary pipe. The primary pipe connects to the buried 4-inch diameter single-walled HDPE Green Springs MIW transfer pipe within a subgrade epoxy-coated steel containment junction box located a short distance northeast of the Green Springs Transfer Pond. The junction box contains valves to facilitate flow control to either the Transfer Pond or the Evaporation Cell. A sampling port for the influent MIW is located on the double-lined northeast crest of the Evaporation Cell. It consists of a capped, vertically-mounted, 18-inch diameter SDR 17 HDPE pipe with factory-welded base that receives MIW from the pipe-in-pipe MIW feed line and conveys it to the Evaporation Cell distribution header pipe. In the Evaporation Cell, an overflow pipe (4-inch diameter non-perforated CPE pipe) connected to the distribution header daylights on the surface of the general fill in the cell bottom. The overflow pipe will flow if the distribution pipe network and drain-rock trenches become saturated. The Evaporation Cell also features a vertical 6-inch diameter HDPE monitoring port located within the southeast quadrant of the cell that is used to measure solution depth and freeboard in the cell and to obtain solution samples for analysis. The perforated and sand-encased lower section of the monitoring port is seated on the cell bottom within 18 inches of drain rock.

The Green Springs Transfer Pond was permanently closed in 2015 in accordance with the approved FPPC and the final closure report was approved in November of 2015.

Jupiter Seep MIW: The Jupiter Seep MIW occurs in a natural ephemeral drainage located on the northeast toe of the Jupiter ALD. The original collection system was constructed in mid-2001. A minor modification was approved by the Division in April 2008, in preparation for resumption of mining and expansion of the Ruth Pit and construction of the expanded Ruth and Jupiter WRDs. To facilitate continued monitoring and quantification of flow from the Jupiter ALD Seep, the existing seepage collection area was modified and the sampling point was relocated to accommodate expansion of the waste rock facility. The seep area was excavated to improve alignment of the existing seepage route and a drainage trench was constructed to a new discharge point downstream. The new excavated seep was lined with 12-oz/yd<sup>2</sup> geotextile and backfilled with gravel to direct collected flow to an excavated trench approximately 3 feet wide and 2 feet deep.

The 2008 seepage collection design, for the portions of the collection drain that will be overdumped, consists of a 12-inch thick base compacted to 90% maximum dry density (ASTM Method D1557), placement of a 4-inch diameter perforated CPE collection pipeline along the bottom of the trench, backfilling with inert drain rock to 12 inches above the collection pipeline, folding the geotextile over the drain rock, and backfilling the remainder of the trench with general fill that is nominally compacted. Where the trench will not be overdumped, no geotextile was placed, the 4-inch diameter perforated CPE pipe transitions to a solid 4-inch diameter CPE pipe, and only general fill, compacted to 90% maximum dry density (ASTM Method D1557), was used to backfill the trench above the pipeline. The trench gradient will be maintained at a minimum 1% grade.

The original approved design includes a solid conveyance pipeline that daylight at a designated point, downstream along the existing seepage flow path, where sampling could be performed with a bucket or similar container. However, since the required construction as-builts had not been received at the time of the 2010 Permit renewal, and due to the extremely poor quality of the solution emanating from the seep, the Division determined that all buried pipeline conveyances for the Jupiter Seep must be constructed with secondary containment and the sampling point was relocated to the point of discharge into the Jupiter Pond. A Permit schedule of compliance item required construction of an approved design by 01 August 2012. An EDC for construction of a new Jupiter pipeline and evaporation cell pond, after remediation of contaminated soil in the area, was received 08 August 2012, and approved in June 2013. MIW-contaminated soil in the former Jupiter Pond area and in the drainage upstream of the pond was excavated to 6 to 12 feet deep, or to bedrock, whichever was shallower, and transported to the C-Pad Disposal Area. The Division approved leaving deeper contaminated soils in place in the footprint of the new lined evaporation cell. Construction of the new pipeline, evaporation cell, and stormwater diversions, commenced in July 2013, and was completed in the summer of 2014.

As part of the 2013 EDC approval, a new seep connection box was constructed a short distance downstream from the buried seepage collection area to connect the existing single-walled 4-inch diameter collection pipe to the new double-walled Jupiter Seep MIW transfer pipeline. The seep connection box is located inside a precast concrete vault accessed via a manhole. The transfer pipeline, which consists of a 3-inch diameter HDPE primary pipe within a 6-inch diameter HDPE secondary pipe, runs from the seep connection box down to the new Jupiter Evaporation Cell, buried within crushed rock at least 1-foot beneath the existing ground surface. A leak detection port (JTP-LDP) for monitoring flow, if any, in the secondary pipe is located at the evaporation cell. Jupiter Seep MIW flow monitoring (JTP-F) is also required at the primary pipe discharge to the evaporation cell.

The original Jupiter Pond construction pre-dates the stabilization measures completed in June 2001. The pond was not modified with the 2008 minor modification. The 2001 stabilization work involved raising the existing downstream pond embankment elevation 7 feet with alluvial or equivalent oxide or mixed oxide/sulfide waste rock material and adding a geotextile- and riprap-lined spillway. The new fill material was compacted and

as-built data indicate the specified minimum 92% maximum dry density (ASTM Method D1557) was achieved at all test locations. No permeability testing was documented in the as-built report. The as-built capacity of the Jupiter Pond with raised embankment, to the 6679.45-foot AMSL elevation of the spillway invert, was 2.8 acre-feet (approximately 920,000 gal), which was considered adequate to contain the flow generated by a 100-year/24-hour storm event reporting to the upgradient catchment area. As with the conveyance pipeline, the Division has determined that the poor quality solution that could emanate from the seep mandates the Jupiter Pond be replaced with a double-lined and leak detected pond. The pond construction requirement is contained in the same schedule of compliance item that requires containment for the conveyance pipeline.

During October 2002, at the request of the Division, the Permittee excavated a stormwater diversion channel, measuring approximately 2 feet deep and 8 to 10 feet wide, along the east side of the drainage in which the Jupiter Pond is located. The diversion channel was designed to divert the 100-year/24-hour storm event flow from the adjacent western nose of the upper Lane City WRD and keep it from entering the Jupiter Pond catchment area. However, the diversion channel was covered during placement of alluvial cover on the Lane City WRD and its current effectiveness is unknown.

The Jupiter Evaporation Cell, which was constructed as part of the 2013 EDC approval, is lined with a 60-mil smooth HDPE secondary liner, overlain by an 80-mil MicroSpike<sup>®</sup> HDPE combination primary liner and LCRS layer. The subbase under the evaporation cell was built up with stabilizing layers of minus 4-inch- and minus 2-inch-diameter rock placed at the bottom of the excavation where contaminated soils were excavated, followed by placement of 12-inch thick lifts of non-PAG backfill, compacted to 90% maximum dry density (ASTM Method D1557), and a final approximately 3-inch thick liner bedding layer. Above the primary liner, the interior side walls of the evaporation cell are overlain with 12-oz/yd<sup>2</sup> non-woven geotextile, and the bottom of the evaporation cell is overlain with a layer of leveling sand, which is overlain in turn by 10-oz/yd<sup>2</sup> FabriNet Geocomposite<sup>®</sup> (composite geonet and geotextile material) to help distribute the MIW in the evaporation cell. The MIW solution is conveyed to a network of 6-inch diameter perforated CPE distribution pipes, enclosed in 12-oz/yd<sup>2</sup> non-woven geotextile, which sits on top of the FabriNet layer in the bottom of the evaporation cell. The evaporation cell is backfilled with a 36-inch thickness of non-PAG general fill compacted to 90% Modified Proctor (ASTM Method D1557), and covered with a 9-inch thickness of non-PAG riprap with a D<sub>50</sub> of 4 inches.

The Permit requires monitoring of the evaporation cell LCRS sump (JEC-LDS), and fluid depth and chemistry of the MIW contained in the evaporation cell via an 8-inch diameter HDPE vertical monitoring port (JEC) mounted within the evaporation cell.

Mollie Gibson Seep MIW: The Mollie Gibson Seep MIW is located on the north toe of the historic Millie Gibson ALD, upon which the A-Pad is constructed. Seepage was originally collected in four “ponds” – actually unlined surface depressions – identified as Mollie Gibson Ponds 1, 2, 3E and 3W and located downgradient of the ALD. An unlined

stormwater pond, identified as Mollie Gibson Pond 4, was constructed at a later date adjacent the toe of the ALD where MIW collected.

Measures implemented during Temporary Closure documented in May 2002, included construction of 3-foot high diversion berms to divert stormwater flow around the seep area, backfilling topographic low areas to prevent surface ponding, regrading the north boundary of the ALD to minimize solution ponding, regrading two elevated benches on the ALD to maximize runoff, reduce ponding, and direct flow to Pond 4, raising the Pond 4 embankment by 6 feet using imported fill, and constructing an armored emergency spillway. Lime was mixed with soil and placed to a depth of approximately 12 inches over 40% of the Pond 4 base and allowed to form a crust. There is no record that the Pond 4 remediation measures included an engineered compaction or lining. A weir box, for solution flow measurement, was placed downstream of the seep but no lined containment was required for the seepage MIW, which continued to discharge to Pond 3W.

A minor modification was approved by the Division in April 2008, in preparation for resumption of mining and expansion of the Ruth Pit and for construction of the new Ruth and Jupiter waste rock facilities. To facilitate continued monitoring and quantification of flow from the Mollie Gibson Seep, the existing seepage collection area was modified and the sampling point relocated to accommodate expansion of the existing waste rock facilities. The seep area was excavated to improve alignment of the existing seepage route and a drainage trench was constructed to a new discharge point downstream. The excavated seep was lined with 12-oz/yd<sup>2</sup> geotextile and backfilled with gravel to direct collected flow to an excavated trench approximately 3 feet wide and 2 feet deep.

Following discussions with the Division to address the need for additional engineering designs for proper final closure of the Mollie Gibson MIW and associated ponds prior to overdumping with waste rock, the Permittee submitted three individual EDCs in May 2010. Following review and revision, the EDCs were approved in September 2010 for: 1) closure of Mollie Gibson Pond 4; 2) closure of Mollie Gibson ponds 1, 2, 3E, and 3W; and 3) construction of a new MIW seepage conveyance pipeline with secondary containment and a new double-lined and leak detected Mollie Gibson Seepage Management Pond.

Final closure of Mollie Gibson Pond 4 required treatment of contained MIW with lime to achieve a minimum pH of at least 6.5 SU prior to transport by water truck for introduction, in accordance with Intera MIW protocols as a proxy, to the Mill process circuit via the thickeners. Following MIW removal, the pond was backfilled with coarse limestone waste rock and alluvium covered with a final minimum 1-foot-thick compacted layer of alluvium fill compacted to at least 95% maximum dry density (ASTM Method D1557) as confirmed with eight in-situ nuclear moisture-density tests. The compacted final cover was constructed with a minimum 1% north gradient to provide a free-draining surface.

Final closure of Mollie Gibson ponds 1, 2, 3E, and 3W required removal of approximately 88,000 gallons of Pond 3W MIW inventory with a vacuum truck for introduction into the Mill process circuit at an approximately 225 gpm approved limit. Ponds 1, 2, and 3E were

dry at the time of closure. The ponds were backfilled with characterized alluvium in 1-foot loose lifts compacted to at least 95% maximum dry density (ASTM Method D1557) with the final surfaces graded to drain at a minimum 1% to the north and west. The pond compaction was confirmed with a total of 37 nuclear moisture-density tests. The compacted pond fill thickness ranges from 6 feet in Pond 2 to 12 feet in Pond 1.

Following backfilling of the ponds, a compacted fill layer was constructed over the remaining Mollie Gibson surface area by placing alluvium in 1-foot loose lifts, compacted to at least 95% maximum dry density (ASTM Method D1557) and graded to drain to the north and west at a minimum 1% gradient. The cover layer compaction was confirmed with 28 nuclear moisture-density tests.

Construction of the Mollie Gibson Seepage Management Pond required construction of an upgradient rockfall protection berm and stormwater diversion channel. The 1,400-foot long diversion channel, constructed as a 3-foot deep vee-shaped cut into native soil, will convey stormwater flows from the compacted cover Mollie Gibson area along a path between the southeast side of the pond and the future northwest toe of the expanded Mollie Gibson ALD into the natural drainage to the northeast. The channel is unlined except for the addition of riprap over a layer of 12-oz/yd<sup>2</sup> geotextile along a deepened 90-foot section located southwest of the pond and a 50-foot section at the intersection of the channel and the existing access road.

The rockfall protection berm is located between the future northwest toe of the expanded Mollie Gibson ALD and the stormwater diversion channel. The berm extends approximately 100 feet beyond the east and west limits of the Mollie Gibson Seepage Management Pond, which it is primarily designed to protect. The 6-foot high compacted earth berm was constructed of characterized borrow material. The design compaction was to be at least 90% maximum dry density (ASTM Method D1557) but 95% maximum dry density was achieved as confirmed by 21 nuclear moisture-density tests.

The Mollie Gibson Seepage Management Pond has an elongated trapezoidal-shaped footprint with the long axis aligned southwest-northeast along the trace of the historic Mollie Gibson area drainage. The pond is approximately 10 feet deep and measures 550 to 600 feet long by 120 to 250 feet wide at the interior crest. The total storage capacity of the pond at the crest is 1.2 million gallons, and 850,000 gallons with a 2-foot freeboard, which is sufficient to contain the average MIW seepage flow rate plus the 100-year/24-hour storm event flow. The pond operating depth, using a post-overdumping water balance prediction, should vary seasonally between 2 and 4 feet with bird netting used instead of bird balls to enhance evaporation. For the period 2012 through 2015, Mollie Gibson Seep MIW inflow to the Mollie Gibson Seepage Management Pond (MG-TP monitoring point in the Permit) ranged from 0.2 gpm to 1 gpm.

Excavated native soils, placed in 1-foot thick loose lifts, were compacted to at least 95% maximum dry density (ASTM Method D1557) to construct the pond embankment. The pond subbase was either scarified to a depth of 12 inches or filled with native soil, as

necessary, which was also compacted to at least 95% maximum dry density. All pond construction compaction was confirmed with 48 nuclear moisture-density tests.

The prepared subbase was covered with a layer of 12-oz/yd<sup>2</sup> geotextile, a layer of AGRU 60 mil Super GripNet® HDPE for the secondary liner, and a layer of AGRU 80 mil smooth HDPE for the primary liner. The AGRU Super GripNet® liner material incorporates spikes on the bottom side for added friction and pegs on the top side to create an LCRS when covered with the smooth primary liner.

The LCRS reports to a subgrade collection sump located between the primary and secondary liners in the northeast corner of the pond. The sump measures approximately 4-foot square by 2-foot deep and is backfilled with drainage gravel enveloped in a layer of 12-oz/yd<sup>2</sup> geotextile. Collected solution may be evacuated from the sump through a 6-inch diameter HDPE riser, sandwiched between the liners, which daylight at the pond crest.

To prevent ponding of stormwater in a low lying area between the north embankment toe of the Mollie Gibson Seepage Management Pond and County Road 1146 (44A), backfill was placed and compacted to 95% maximum dry density. The surface of the compacted slope was constructed with a 2% to 3% gradient toward the existing roadside stormwater control channel. Approximately 800 feet of new roadside stormwater control channel, formed as a 2-foot deep vee-ditch, was constructed upstream of the pond to collect and divert roadside stormwater flows into the existing channel downstream of the pond.

Two monitor wells were installed in December 2010 adjacent to the downgradient (W-21A) and upgradient (W-21B) perimeter of the Mollie Gibson Seepage Management Pond. The wells replace monitor wells W-4A and W-4B, which were located closer to the upgradient ALD toe and were abandoned earlier in 2010 without prior Division authorization in anticipation of future waste rock overdumping in that area. Due to the overdumping of the Mollie Gibson ALD and subsequent closure of the Mollie Gibson Seepage Management Pond (discussed below), both monitoring wells needed to be abandoned and were replaced by monitoring well W-3ARR which monitors water quality downgradient of both the Mollie Gibson ALD and E-Cell.

The existing single-wall seepage conveyance pipeline was replaced with a new 960-foot long, 3-inch diameter HDPE primary pipeline inside a 6-inch diameter HDPE secondary containment pipeline. Both pipelines pass through a pipeline protection berm to discharge at the southwest corner of the Mollie Gibson Seepage Management Pond. The new pipeline was placed 3 feet below ground surface within a trench with a 12-inch thick compacted (90% maximum dry density) subbase and backfilled with general fill compacted to at least 90% maximum dry density (ASTM Method D1557). Compaction was verified with seven nuclear moisture density tests of the subbase and 20 tests of the backfill.

The new primary conveyance pipeline was connected to the existing 4-inch diameter perforated seepage collection pipeline with a short piece of perforated 3-inch diameter pipeline and stainless steel clamps embedded within geotextile-wrapped gravel. The

downgradient limit of the gravel was bermed with compacted bentonite-amended native soil to form a low permeability catchment to direct seepage into the conveyance pipeline. Inspection of the existing collection system indicated no damage had occurred as a result of construction activities.

An EDC approved by the Division on 11 June 2018 permitted the construction of the Mollie Gibson Evaporation Cell (E-Cell). The new Mollie Gibson E-Cell was constructed approximately 0.75 miles northeast of the existing seepage management pond and has approximate surface dimensions of 170 feet by 116 feet. The cell is a double-lined and leak detected pond, utilizing a textured 80-mil high density polyethylene (HDPE) liner as the primary liner and a 60-mil HDPE drain liner (texture side up) as the secondary liner. The drain liner allows for the rapid transport of any fluid to the leak collection and recovery sump (LCRS), which has a capacity of approximately 3,500 gallons. The LCRS is located at the low point of the pond and is between the primary and secondary liners. The sump is filled with select drain gravel wrapped in an 8 ounce per square yard (oz/yd<sup>2</sup>) geotextile that is overlain by the 80-mil HDPE primary liner. An 8-inch diameter perforated leak detection pipe that transitions into a solid walled pipe that is placed within the drainage gravel allows for the Permittee to remove solution in the event that there is leakage from the primary liner.

A 20 oz/yd<sup>2</sup> geotextile was placed over the primary E-Cell liner to provide liner protection during the placement of backfill material. A minimum of 3 feet of select alluvial soil was placed in the cell to provide sufficient volume and surface area to eliminate, through evaporation, the combined draindown and precipitation generated on an annual basis. A 6-inch thick layer of drain rock was placed above the backfilled alluvium to minimize the generation of dust. A minimum of 1-foot of alluvial soil is placed over exposed liner around the perimeter of the E-cell for liner protection. A piezometer was installed within the backfilled material to allow for sample collection and monitoring of the fluid depth and freeboard. The piezometer consists of a vertical 6-inch diameter HDPE pipeline that has a perforated section that extends up approximately 2 feet from the floor of the pond. The perforated or slotted section of the pipeline will be surrounded by filter sand to minimize the amount of fines that can enter the piezometer.

Draindown flows are transported to the Mollie Gibson E-cell by the extended seepage conveyance pipeline. The conveyance pipeline consists of a solid walled 4-inch diameter standard dimensional rasion (SDR) 17 pipeline placed within an 8-inch diameter SDR 17 pipeline for protection and secondary containment. The conveyance pipeline is buried in a trench a minimum of 4-feet below the native ground surface. Any material used in the subgrade or in the backfilled material within the trench had maximum diameter of 1-inch, within 12-inches of the pipe, to protect and minimize any potential damage to the secondary containment pipeline. Draindown flows will be distributed by buried 4-inch diameter perforated corrugated polyethylene pipes that are surrounded by drainage gravel and wrapped in 8 oz/yd<sup>2</sup> geotextile. The distribution pipelines are buried approximately 2-feet below the surface of the E-cell.

Closure of the Mollie Gibson Seepage Collection Pond was completed in the second half of 2019 in accordance with approved plans. The draindown conveyance piping was utilized and extended to route seepage to the newly constructed Mollie Gibson E-Cell with other sections being capped and buried in place. Pond closure consisted of the removal and disposal of pond solutions at the mill and the placement and the burying of pond sediments and pond secondary synthetic liner on top of the North B-Pad. The primary synthetic liner was hauled and disposed of in the on-site Class III landfill.

Once the liner was removed, the pond footprint was backfilled with parts of the pond embankments and imported fine grained alluvium and non-PAG waste rock. The fill was compacted over the pond footprint and graded to drain meteoric water to the north and west from the pond footprint.

Historic Acid Leached Material Management: Due to continued pit expansions, mining of historic ALM sources was required to expose or gain access to ore in the Ruth Pit. The Division considers these ALM sources to be “spent-ore” and requires that the materials be stabilized in accordance with NAC 445A.430. Once these materials are mined, they are transported to designated disposal areas where interim measures are utilized to minimize contact with meteoric water and a synthetic liner is required to cover the entire area prior to overdumping or closure cover placement.

An 54-acre, co-disposal location within the Jupiter dump was designated and approved by the Division for the placement for ALM. The disposal location utilized two allocated areas for material placement designated as Phase I and Phase II. Once placement has been completed, the ALM material will be covered by a minimum 10-foot thick layer of non-PAG waste rock as an interim cover. Once mining and placement is complete, the area will be covered with a 40-mil LLDPE geomembrane liner and will be overlain with a minimum of 3-feet of growth medium or non-PAG waste rock as liner protection. As of the 2022 renewal, the 11-acre Phase I area has been covered by a minimum 10-foot thick layer of non-PAG waste rock as an interim cover.

Kimbley Dump ALM was mined from the Kimbley Pit from 2011 through 2014 to expose underlying copper ore. ALM that was mined was routed to either the 54-acre Jupiter Dump or the 34-acre Ruth Dump ALM area, which uses the same closure strategy as the Jupiter dump ALM storage area, but with a 60-mil LLDPE liner opposed to a 40-mil LLDPE liner.

On 25 August 2017, the Division approved an EDC and FPPC for the removal and closure of the Mollie Gibson ALM Material that was mined during the 2017 expansion of the Ruth West pit, Ruth West 4. This material was relocated to an additional 17-acre disposal area within the Jupiter Dump, specifically designated for ALM disposal. ALM placed in this location utilized the same closure described above for the 34-acre Ruth ALM storage area.

Details regarding the closure of the 34-acre area Ruth Dump ALM area are discussed in the above section titled “*Heap Leach Pad and Facility Construction and Closure*”

The continued expansion of the Ruth West pit (Ruth West 5) necessitated the need for additional Mollie Gibson ALM material to be placed within a 36-acre designated ALM placement area on the Liberty Dump. The ALM placed in this location would be managed and covered as described above. This proposed ALM placement location was approved by the Division in November of 2018 and interim capping with non-PAG (10 feet on top and 2 feet on sides) was completed by mid-September 2021 to protect waters of the State prior to liner installation.

Any ALM remaining above the Ruth Pit Rim will be graded to prevent ponding of meteoric water and covered with a geomembrane liner plus 3-feet of non-PAG overliner material, or a 12-inch thick layer of compacted LHCSL covered by a minimum of 5-feet of non-PAG waste rock. Additionally, as this area is also an active haul road, a 2-foot layer of non-PAG wasterock will be placed over the remaining exposed ALM outside the pit perimeter berm until such time as the geomembrane liner can be placed.

ALM remaining in the Ruth Pit wall following mining will be characterized and stabilized in place as warranted, based in part on the results of the updated Pit Lake Studies.

### **Lane City WRD Closure**

The Lane City WRD is an historic waste rock storage facility constructed parallel to Gleason Creek along the southern creek bank. The dump is roughly linear along a north-northwest alignment, measures approximately 4,500 feet long by 400 feet wide, and has a maximum height of about 150 feet above the toe on the creek bank. The Lane City WRD contains large amounts of potentially acid generating (PAG) sulfide waste rock and is situated perpendicular to smaller drainages reporting to Gleason Creek.

Several partial reclamation efforts occurred from 2001, which included regrading of slopes, construction of drop channel structures to minimize erosion, and local placement of an average 6-inch thick alluvium cover followed by seeding. A 2007 Permit schedule of compliance item required a CAP to determine a source of poor groundwater quality in downgradient monitor well R-A. The work related to the Well R-A CAP was completed in late 2010 and included additional slope contouring, diversion of upgradient tributaries around the WRD, placement of a compacted low permeability soil layer along the upgradient face of the WRD to prevent infiltration of surface run-on, and verification of the minimum 6-inch thick cover placement over the entire WRD surface. Additional alluvium will be placed in areas identified with thin cover prior to final seeding. The WRD will require continued vegetation monitoring and enhancement and management of surface acid rock drainage. A final closure report for the Lane City WRD was finally submitted 10 January 2012 and approved by the Division 31 May 2012 with a provision that the WRD must be monitored quarterly for acid-rock-drainage (ARD) staining. Stained areas must be repaired with additional cover within 90 days of discovery.

## **Plan for Use of Mine-Impacted Waters - The Four-Step Protocol**

A key requirement and outcome of the 1997 Consent Agreement is development and implementation of what has become known as the “Four-Step Protocol” (the Protocol). The Protocol enables the use of site historic Mine-Impacted Waters and impacted waters from other sources as Robinson Mill make-up water while meeting water quality discharge limits at the Giroux Wash Tailings Impoundment. Based on sampling and characterization of MIWs, the Protocol is comprised of the following steps, which were originally described in Section 5.2 of the “Work Plan: Robinson Operation”, attached to the 1997 Consent Agreement as Exhibit ‘F’, and as modified in February 2011 for consistency with current regulation and the Permit:

- 1) “System Characterization”, which includes but is not limited to, sample collection, laboratory analysis, and metallurgical evaluation to determine process options and management issues. A sampling and analysis plan must be submitted to the Division for review and approval prior to characterization field work;
- 2) “Bench Scale Testing”, to determine the maximum mixing rate for use of each MIW in the mill circuit that will maintain Permit compliance, using representative samples collected in step 1 above. Cumulative effects of other MIW contributions must be accounted for by adding new samples of each previously approved MIW to the mill process circuit sample at a ratio representative of the maximum anticipated rate of addition. Maximum individual MIW addition rates may need to be reduced to prevent exceedances at the BOC ;
- 3) “Mill Circuit Use”, which requires submittal of Bench Scale Testing data to the Division, Division approval, a 5-day written notice to the Division of the intent to use the MIW in the mill circuit at the established rate, fortnightly (every two weeks) sampling at the outfall to the Giroux Wash Tailings Storage Facility (TSSEP for WAD cyanide only) and at the Barge Operating Channel (TS-SBOC for Profile I-R) for two months and quarterly thereafter, with 14-day turnaround and all data to be submitted in the next quarterly monitoring report. As warranted upon receipt of analytical results, adjustments shall be made to maintain compliance with Permit conditions; and
- 4) “Final Water Source Management”, which requires that, once MIW is removed from a particular source or contained pursuant to Division approval, the MIW source area shall be stabilized in accordance with a Division-approved FPPC followed by submittal of a final closure report to the Division for review and approval.

Previously approved maximum rates for introduction of the Kimbley MIW, Intera MIW, and ABC MIW to the mill circuit were replaced in June 2013 with revised maximum introduction rates determined by the first Division approved MIW cumulative bench test. The Ruth Pit MIW was also included in the same cumulative bench test, but its maximum introduction rate remained unchanged. That cumulative bench test did not include the Liberty Pit MIW or the Mollie Gibson MIW, so those MIWs may not be introduced to the mill circuit concurrently with other MIWs until a cumulative bench test that includes them

is approved. The previously approved maximum introduction rates are still in effect for the Liberty Pit MIW and Mollie Gibson MIW, provided that the MIW character has not worsened significantly, and provided that each MIW is introduced to the mill at a time when no other MIWs are being introduced.

In June 2025 an EDC was approved for the construction of Liberty Pit Mine Impacted Water (MIW) booster system. RNMC has constructing an expansion of the MIW dewatering system to include the Liberty Pit. The Liberty Pit dewatering pipeline is tied into the existing reclaim pipeline that runs from the tailings facility to the Mill at the Break Tank. The tie-in point of MIW solution is within the positively charged reclaim line at the break tank. The solution is topographically bound to report downgradient to the Mill as a source of makeup water.

### **Deep Ruth Shaft Cover and Final Closure**

The minor modification approved in April 2008, for resumption of mining and expansion of the Ruth Pit and construction of the new Ruth and Jupiter waste rock facilities, contained a conceptual design for placing a permanent cover over the Deep Ruth Shaft to allow overdumping by the expanded waste rock facilities. The conceptual design was determined by the Permittee to be impractical and uneconomic for implementation. Subsequently, an alternative design and FPPC for the Deep Ruth Shaft were submitted as a separate EDC, along with the EDC for closure of the Mollie Gibson ponds, in May 2010. Following design revisions requested by the Division, the EDC was approved by the Division in September 2010.

Little detailed information about the Deep Ruth Shaft construction exists. The shaft collar opening measured approximately 32 feet 4 inches long by 7 feet 6 inches wide and was rimmed with a thick layer of concrete for which construction details are unknown. In the area of the shaft, alluvium extends from surface to a depth of approximately 25 feet and overlies limestone that extends at least 250 feet further below the alluvium. Ruth Mineralized Block groundwater occurs at a depth of approximately 330 feet below ground surface.

In accordance with the approved FPPC and based on information in the as-built and final closure report dated 20 January 2011, the Deep Ruth Shaft was backfilled to surface elevation during October 2010 with characterized Ely Limestone waste rock. The limestone may help neutralize water in the shaft that has exhibited slightly low pH values historically. A total of 28,350 tons of nominal <18-inch diameter backfill material was placed using direct dumping and a conveyor belt. The tonnage placed was nearly 90% more than the original design estimate of 15,000 tons and is believed to be related to variations in shaft dimension at depth and migration of backfill material into lateral drifts adjoining the shaft. The volume exceedance is considered a reasonable indication the entire shaft volume has been backfilled.

Following placement of backfill, a reinforced concrete shaft cover slab was constructed in accordance with the design specification. The slab measures 3 feet thick, 36 feet 4 inches long, and 11 feet 6 inches wide to create a minimum 2-foot overlap on all sides of the shaft collar and support loads generated by a minimum 300-foot thick cover of overdumped waste rock. Rebar was placed in both directions along the top and bottom of the slab on 12-inch centers. Concrete cylinder testing for 7-, 14-, and 28-day intervals, indicates the finished concrete exhibited 14-day compressive strength in excess of 4,000 psi. The finished slab was covered with a minimum 5-foot thick compacted layer of alluvium to protect it from rock damage during overdumping.

The steel headframe, hoist equipment, and other related infrastructure were dismantled and removed, without Division knowledge or approval, during the period 2008-2009. The final closure report indicates the headframe was dismantled and salvaged by V&S Consulting of Duluth, Minnesota, but the disposition of other equipment was not specified.

### **In-Pit Dewatering Systems**

Ruth-Kimbley Pit Dewatering Pipeline System: A Pit Dewatering Pipeline System was constructed, probably no earlier than 1997, to convey MIW from the Ruth and Kimbley pits for use in the Robinson Mill. The Ruth-Kimbley pipeline system consists of three primary pipeline sections:

- The Kimbley Pit Dewatering Pipeline; a 3,050-foot long section of 10-inch diameter HDPE SDR 11 pipe that conveys MIW from the Kimbley Pit to the Ruth Booster Pump;
- The Ruth Pit Dewatering Pipeline; a 3,500-foot long section of 12-inch diameter HDPE SDR 11 pipe that conveys MIW from the Ruth Pit to the Ruth Booster Pump; and
- The Ruth Booster Pump-to-Robinson Mill Pipeline; a 21,000-foot long pipeline, which conveys MIW from the Ruth Booster Pump to the Robinson Mill for use in the process circuit and is comprised of multiple sections of HDPE pipe (SDR 7.3 and/or 11) ranging in diameter from 10-inch to 20-inch, with the smallest diameter at the Mill-end of the pipeline.

As-built records are available for dewatering pipeline construction beginning with the Kimbley Pit Dewatering Pipeline, completed in February 2009, with additional modification in January 2010. The Permit limits the flow rate of each MIW introduced to the mill circuit to either the maximum flow approved via the Protocol, or the flow rate equivalent to 90% of the lowest maximum pressure rating for the conveyance piping used, whichever rate is lower.

An EDC modification was approved by the Division in March 2010 to upgrade an existing 2,100-foot long section of 10-inch diameter HDPE SDR 11 pipe to 14-inch diameter HDPE pipe (SDR 7.3 and/or 11). This change may allow an increase in system pumping capacity

but the flow rate must not exceed Permit limits. However, testing in accordance with the Protocol limited the maximum MIW introduction rate at the Mill to 1,195 gpm for Kimbley Pit MIW (30 January 2009 report) and 4,332 gpm for Ruth Pit MIW (16 November 2010 report). Deteriorating Kimbley Pit water quality during 2010 prompted the Division to rescind the pumping authorization for the Kimbley Pit MIW and require a new cumulative Four-Step Protocol to determine a new maximum pumping rate for Kimbley MIW to the Mill prior to any further pumping from the Kimbley Pit Lake.

An EDC modification was approved by the Division in February 2013 for an upgraded road crossing over the Ruth Pit MIW pipeline to provide heavy equipment access to a new fuel island located between the Ruth and Liberty Pits west of the old Kennecott buildings. The 16-inch diameter HDPE Ruth Pit MIW pipeline is placed inside a 30-inch diameter SDR 11 HDPE secondary pipe where it goes under the road. An 18-inch diameter potable water pipeline and a 30-inch diameter HDPE non-MIW dewatering pipeline from the Ruth Pit area are also present at the same road crossing and are placed within 30-inch diameter and 42-inch diameter SDR 11 HDPE secondary pipes, respectively. The secondary pipes are surrounded by pipe bedding material compacted to 92% of maximum dry density (ASTM Method D1557), which is overlain by a minimum 5-foot layer of random fill compacted to 90% of maximum dry density (ASTM Method D1557). The road wearing course is constructed on top of the 5-foot fill layer. The ABC leach pad draindown MIW pipeline is in this general vicinity also, but is believed to be slightly south of this road crossing buried under at least 5 feet of compacted fill.

An August 2013 EDC approval by the Division (see below) to tie in a Kimbley temporary dewatering pipeline to the Ruth North dewatering pipeline, which connects to the main Ruth MIW pipeline, required upgrades to provide secondary containment for air vents and drain valves on the existing Ruth MIW pipeline between the booster pump station above the southwest rim of the Ruth Pit (RBPS-SWR) and the mill. At the air vents and drain valves, 35-gallon HDPE stock tanks were installed to collect any spillage and drainage, respectively. A vacuum truck collects and conveys the spillage and drainage to the mill. The RBPS-SWR pump station was also outfitted with 80-mil HDPE-lined secondary containment installed on a subbase constructed with a 4-inch thick layer of general fill compacted to 95% maximum dry density (ASTM Method D1557) over an 8-inch thick layer of subgrade compacted to 90% maximum dry density (ASTM Method D1557). The lined secondary containment has a capacity greater than 110% of the 4,512-gallon steel primary booster tank.

An EDC was approved by the Division, in October of 2016, for the realignment and modification to the Ruth MIW dewatering pipeline. Heavy duty horizontal centrifugal dewatering pumps were sized to provide a flow rate between 1,200 to 2,500 gpm to a feed tank located in the northern saddle of the current pit configuration between the eastern and western portions of the Ruth Pit. The 21,000 gallon MIW feed tank contains agitators to maintain consistent mixing and prevent the deposition of solids in the feed tank. The feed tank is mounted with the pump skid that contain a high pressure, multi-stage pump capable of pumping MIW to the Mill without the addition of booster pumps. The pumps discharge

into a 12-inch steel pipeline that extends to an approximate elevation of 6,975 feet at which point the pipeline changes to a 16-inch HDPE PE4710 SDR 7.3 pipe that continues to the Ruth Pit crest elevation of 7,300 feet. A new Phase 1 segment of HDPE pipeline was constructed, to convey Ruth MIW from the in-pit pipeline, around the A-Pad and down to the existing Ruth MIW pipeline to the southwest of A-Pad. A notification of construction for the Phase II alignment was approved by the Division on 07 November 2017.

The Ruth MIW Dewatering Pipeline and Pumping system Phase 2 alignment was proposed to accommodate the Ruth Pit expansion and the placement of waste rock north of the pit. The Phase 2 alignment included the construction of approximately 2,275 feet of new 14-inch HDPE SDR 11 pipeline north of the Phase 1 pipeline alignment and the construction of two pipeline culverts along the Phase 2 alignment. A haul road pipeline culvert and a light-vehicle pipeline culvert were constructed to allow for the protection of the 14-inch diameter Ruth Dewatering Pipeline at road intersections and allow for visual leak detection of the buried sections. The haul road culvert consists of a combination of 24 and 30-inch diameter HDPE pipeline culverts and the light vehicle road culvert utilized an 18-inch HDPE diameter pipeline. Both culverts were buried a minimum of 3 feet below the road surface.

The Ruth MIW Phase 3 and 4 alignments, approved as an EDC on 25 September 2019, authorized the realignment and relocating of approximately 4,400 feet of 14-inch diameter HDPE standard dimensional ratio SDR 11 pipeline during the Phase 3 realignment and approximately 4,150 feet of 14-inch diameter HDPE SDR 11 pipeline during the Phase 4 realignment. The Phase 3 alignment placed the Ruth MIW Dewatering Pipeline west of the ultimate pit to accommodate the Ruth West 5 expansion. After the ultimate footprint of the Ruth Pit was established, the Phase 4 alignment moved the pipeline to the inside edge of the Ruth Pit haul road adjacent to the safety berm to accommodate the expanded Keystone WRD during reclamation and closure.

Kimbley Pit Dewatering System: An EDC modification was approved by the Division in August 2013 for a new Kimbley Pit temporary dewatering pipeline. The temporary pipeline was located on the east, south, and southwest sides of the Kimbley Pit and on the north side of the Ruth Pit. Because the Kimbley temporary dewatering pipeline was located within the ultimate footprint of the expanded Kimbley Pit, it was intended for temporary use only until a more permanent pipeline located largely outside of the ultimate Kimbley Pit was approved and constructed. In accordance with the Permit, the temporary pipeline was decommissioned and permanently closed before 01 February 2014 pursuant to a Division-approved FPPC.

The 8-inch diameter HDPE Kimbley temporary dewatering pipeline conveyed acidic Kimbley Pit MIW from the Kimbley Pit Lake and nearby dewatering well RE-1P to a point on the north side of the Ruth Pit where the pipeline tied into the existing 14-inch diameter HDPE Ruth Pit North dewatering pipeline (which was already connected to north Ruth dewatering wells RW-22 and AGT-12). An approximately 4,000 foot section of the Kimbley temporary dewatering pipeline was contained within a 24-inch diameter HDPE

secondary pipe to convey any leakage from the primary pipeline back into the Kimbley Pit. The Kimbley temporary dewatering pipeline, and the Ruth MIW pipelines it tied into, were primarily placed on the ground surface, but were buried at road crossings where they are contained within a secondary pipe or culvert, and are covered by at least 5 feet of fill compacted to 95% maximum dry density (ASTM Method D1557). All wells connected to the pipelines are protected from backflow contamination with check valves. No air vents or drain valves were installed on the Kimbley temporary dewatering pipeline, but several air vents and drain valves located on the existing main Ruth MIW pipeline required upgrading with secondary containment as a result of the tie-in with the Kimbley temporary dewatering pipeline.

An EDC approved by the Division in November 2013 authorized the removal of the Kimbley temporary dewatering pipeline and use of the same rerouted piping material for construction of the more permanent Kimbley Pit Dewatering Pipeline (KPDP), mentioned above. Because non-corrosion-resistant components of the RBPS-SWR booster pump station (e.g., a mild steel surge tank) were not upgraded as previously required, the Permittee agreed to a new Permit limit requiring that the Kimbley MIW shall be pumped to the mill only when an equal or greater flow rate of the neutral pH Ruth MIW is being pumped to the mill through the RBPS-SWR booster pump station.

Like the Kimbley temporary dewatering pipeline, the KPDP consisted of an 8-inch diameter, SDR 7.3, HDPE pipeline. The KPDP was 9,878 feet long, and followed a more northerly course than the Kimbley temporary dewatering pipeline. The pipeline ran from the Kimbley Pit Lake barge up the Wedge Pit ramp, and around the northeast and northwest sides of the South B-leach pad, to a tie-in with the existing 14-inch diameter HDPE Ruth Pit North dewatering pipeline near the northeast corner of A-Pad. Two short spur pipelines tied into the KPDP from Kimbley dewatering well AGT-9P (which was unrelated to the Alta Gold Tailings, and was later mined through without proper well abandonment during Kimbley Pit mining) and Ruth North dewatering well K-3P. Another Kimbley dewatering well, RE-1P, was not connected to the KPDP, but discharged directly into the Kimbley Pit near the pump barge via a 2-inch diameter HDPE pipe. RE-1P pumping was allowed only when the Kimbley Pit barge pump was pumping Kimbley MIW to the mill via the KPDP.

Unlike the Kimbley temporary dewatering pipeline, the KPDP was a single-walled surface pipeline, except at three haul-road crossings where it was double-walled and buried a minimum of 5 feet below the road surface with non-PAG general fill compacted to 95% of maximum dry density (ASTM Method D1557) overlying a 12-inch thick native soil base that was also compacted to 95% of maximum dry density. The KPDP and all wells tied into it were equipped with check valves to prevent backflow. Air vents at local high points and drain valves at local low points were equipped with secondary containment tubs to prevent and collect leakage. Drainage flow and spillage from the secondary containment tubs are evacuated into a vacuum truck as needed and transported to a tailings thickener at the mill. All KPDP pipe fittings were constructed of corrosion-resistant materials because of the acidic character of the Kimbley Pit dewatering water.

An EDC was approved by the Division in December 2014, after the completion of mining in the Kimbley Pit, for modification of the Ruth MIW pipeline and repurposing of much of the KPDP to create the new Ruth South MIW Dewatering Pipeline (RSDP). The RSDP utilizes the existing 8-inch diameter KPDP to convey dewatering water from dewatering well AGT-12P eastward (opposite direction from the previous westward uphill pumping of Kimbley Pit MIW through the same pipe) down to the east side of the Kimbley Pit, then up to the new Ruth East in-pit booster pump station located on a divide between the south side of the Kimbley Pit and the northeast side of the Ruth East Pit. Incidentally, well AGT-12P is unrelated to the Alta Gold Tailings material. At the Ruth East booster station, a 14-inch diameter dewatering pipeline from the Ruth and Ruth East pits joins the RSDP. The RSDP continues up and out of the Ruth East Pit, through the new South Route Booster Pump Station, and along the south pit rim to a relocated RBPS-SWR booster pump station (approximately 800 feet southwest of the previous RBPS-SWR location), where it joins the existing 14-inch diameter HDPE Ruth MIW pipeline. Dewatering wells K-3P, RW-22, and RE-1P may also be connected to the RSDP, using check valves to prevent backflow into the wells. The RSDP is located on the surface, except where it is sleeved in secondary pipe under haul road crossings. Air vent valves and drain valves at high and low points, respectively, are outfitted with 35-gallon HDPE stock tubs for secondary containment. Both booster pump stations that are located outside of the pits, RBPS-SWR and the South Route Booster Pump Station, are constructed with the same materials, specifications, and capacities as the previous RBPS-SWR, except a 60-mil HDPE liner is used instead of 80-mil. Isolation and check valves at the booster pump stations are corrosion resistant.

With construction of the RSDP, portions of the previous Ruth and Kimbley dewatering pipelines, and the previous RBPS-SWR pump station, were permanently closed pursuant to regulation.

Liberty Pit Dewatering System: An EDC was approved by the Division in June 2011 to construct a pump and pipeline system to remove impounded water from the Liberty Pit. As discussed in the section below, the Small Liberty Pit Lake water exhibits low pH and elevated metal concentrations. The adjacent Main Liberty Pit Lake exhibits better water quality but must be evacuated in anticipation of a resumption of mining in the Liberty Pit.

Four-Step Protocol testing of the combined waters was performed in parallel to the EDC design development. The bench testing determined that a blend of 25% (125 gpm) Small Liberty Pit Lake water and 75% (375 gpm) Main Liberty Pit Lake water could be introduced into the mill circuit at a rate of 500 gpm without creating an adverse effect on water quality at the BOC. The factor limiting the test flow rate to 500 gpm at the proposed mix ratio is an exceedance of the Profile I reference value for fluoride at higher bench scale consumption rates.

The dewatering system allows comingling of the two source waters into a single pipeline that connects to the Ruth-Kimbley dewatering pipeline. The design accommodates a maximum pumping rate of 900 gpm from the Main Liberty Pit Lake and 300 gpm from the Small Liberty Pit Lake, far in excess of the authorized pumping rate based on the Four-

Step Protocol results. The system design is comprised of a standard vertical turbine pump mounted on an existing barge in the Main Liberty Pit and a small stainless steel vertical turbine pump mounted on an existing barge in the Small Liberty Pit Lake. Each pump is equipped with instantaneous flow rate and cumulative volume flow meters.

The Main Pit Lake pump is connected to a 10-inch diameter, 5,000 foot long HDPE pipeline that ties into a skid-mounted, self-priming, in-line booster pump connected to the Ruth-Kimbley dewatering pipeline. The booster pump provides additional injection pressure of approximately 85 pounds per square inch. The Small Pit Lake pump is connected to a 6-inch diameter, 200-foot long HDPE pipeline that connects to the 10-inch diameter line from the Main Pit Lake pump. All pipeline connections are equipped with valves to prevent backflow along the system.

### **Pit Lake Studies and Ecological Risk Assessments**

A pit lake study (PLS) and screening level ecological risk assessment (SLERA) were submitted to the Division on 30 August 2005 to fulfill a Permit schedule of compliance item. However, based on actual conditions experienced since submittal of the 2005 Plan and changes to the mine plan, another Permit schedule of compliance item required the Permittee to submit to the Division, by 01 August 2011 for review and approval, a new PLS and SLERA for all potential pit lakes or impounded surface waters that may form as a result of mining or related activities. The revised PLS and SLERA were received 12 July 2011, but the 02 August 2011 Division response rejected them as being inadequate. Further revisions of the PLS and/or SLERA were received 17 October 2011, 12 July 2012, 10 October 2012, 15 April 2013, 04 June 2014, and 21 August 2014. All were also rejected as being inadequate, as they failed to address previously documented Division concerns. Among the concerns was that the predicted water quality for some pit lakes (e.g., Liberty, Kimbley, and Tripp-Veteran) exceeded Division Profile III reference values, which are based on ecological toxicity data, and therefore, a more detailed ecological risk assessment (ERA) was required to go beyond the previous SLERAs. The next pit lake study and ERA, dated 15 April 2015, were provisionally approved by the Division on 17 February 2016. As a result of the PLS and ERA approval, the previously approved Interim Mine Plan (described below in the Kimbley Pit and Waste Rock Management Plan sections) was no longer necessary, and was terminated by the Division on 17 February 2016.

Beginning with the June 2011 renewal, the Permit has also included a requirement for submittal of an updated PLS and ERA for review and approval with each application for renewal of the Permit and with each application to modify the Permit that could affect the PLS and ERA. In 2015, the Permittee developed a new mine plan that will focus all future mining in the Ruth East and Ruth West Pits and abandon previous plans for further mining in the Liberty and Tripp-Veteran Pits. Accordingly, an interim PLS was approved by the Division in August 2016 to allow commencement of the RE-3 and RW-4 expansions of the Ruth East and Ruth West Pits, respectively.

The 2005 PLS and SLERA identified existing and future pit lakes in the Liberty Pit, Ruth Pit, and Kimbley Pit, and a future pit lake in the Tripp-Veteran Pit. The Tripp-Veteran Pit had not yet penetrated the water table in 2005, but did shortly thereafter. Ten years later, when the 2015 PLS and ERA were submitted, a small lake had formed in the Tripp-Veteran Pit, the Liberty Main Pit Lake and Liberty East Pit Lake had been dewatered, limited additional mining had occurred in the Liberty Pit, the Ruth Pit Lake had been dewatered in support of major deepening of the Ruth West Pit, the Ruth East Pit had been created, and the Star Pointer Pit had been backfilled. Also by 2015, the Kimbley Pit Lake had been dewatered, the Kimbley Pit had been deepened and then backfilled above the predicted groundwater rebound level, and the Wedge Pit had been created and also backfilled above the predicted groundwater rebound level.

The 2015 PLS and ERA was improved over previous versions in including a greater amount of humidity cell test (HCT) data, groundwater elevations and water quality data from several new monitoring wells, geochemical model calibration with historic pit lake water quality data from the Liberty Main and Liberty East Pit Lakes, comparisons of pit lake model results and backfill groundwater geochemical model results for the Kimbley and Wedge Pits, and sensitivity analyses for the thickness of pit wall damaged rock zones used in the model, an unmixed scenario for the combined Ruth Pit Lake, and a rapid filling scenario of the Liberty East Pit Lake. In the following sections, each pit is described separately with regard to predicted pit lakes, predicted ecological risk, potential for groundwater degradation, and other related topics.

Liberty Pit: During the 2010 Permit renewal, the Liberty Pit contained a larger 'Main' pit lake and a shallow 'East' pit lake. The Liberty East Pit Lake exhibited poor water quality in the form of elevated metal concentrations and low pH (2-3 SU), while the Liberty Main Pit Lake exhibited much better water quality with circumneutral pH. To bring the East pit lake into compliance, the Division added a schedule of compliance item to the Permit requiring construction of an approved system to neutralize or eliminate the Liberty East Pit Lake and a demonstration that impoundment of surface water by the Liberty East Pit Lake has been minimized by 31 August 2011. This led to construction of the approved Liberty Pit dewatering system (see above) and construction of a 100-year/24-hour stormwater diversion structure above the southeast rim of the Liberty Pit. The Division approved commissioning of the dewatering system on 08 September 2011, and received a satisfactory as-built report for the stormwater diversion on 12 June 2012. Subsequent mining in the Liberty Pit modified the pit in the vicinity of the previous Liberty Main Pit Lake. As of 2022, the Liberty Main Pit Lake has reformed, but the Liberty East Pit Lake has remained dry.

An EDC to install three new monitoring wells (W-23, W-24R, and W-25) in the vicinity of the Liberty Pit was approved by the Division in March 2013. The new wells were required by the Division to provide more data on groundwater quality and static water levels for input into future revisions of the PLS.

The 2015 PLS predicts that both the Liberty Main and Liberty East Pit Lakes will represent evaporative sinks with no groundwater outflow. The 2015 PLS predicts that the final stage for the Liberty Main Pit Lake will be reached at 6,550 feet AMSL (26 acres) 115 years after the end of mining, and the final stage for the Liberty East Pit Lake will be reached at 6,468 feet AMSL (40 acres) approximately 150 years after the end of mining. The long predicted filling time is based on hydrologic data indicating that a low permeability zone on the south side of the Liberty Pit isolates the pit from the productive aquifer of the adjoining South Hydrogeologic Block. Pit lake water quality modeling predicts that all constituents will meet Division Profile III reference values in the Liberty Main Pit Lake, except fluoride at 4.8 mg/L. For the Liberty East Pit Lake, modeling for the normal filling scenario, without rapid filling or other mitigation, predicts poor water quality with Profile III exceedances for pH (4.76 SU), aluminum (9.2 mg/L), cadmium (16 mg/L), copper (4.0 mg/L), fluoride (14 mg/L), thallium (0.037 mg/L), and TDS (15,000 mg/L). Rapid filling the Liberty East Pit Lake with clean groundwater pumped from the South Hydrogeologic Block over a three- to six-month period is predicted to result in much improved water quality, with lower magnitude Profile III exceedances for cadmium (0.18 mg/L) and fluoride (4.8 mg/L).

The 2015 ERA includes an identification of representative wildlife species (big game species, upland game species, other game species, small mammals and bats, and nongame birds) that may utilize the Robinson pit lakes for water. The ERA compares toxicity criteria for the selected wildlife species with the predicted pit lake water concentrations to assess ecological risk. Humans and livestock were excluded from the risk assessment because the Permittee plans to use fences to restrict their access to all pit lakes. The 2015 ERA concludes that the predicted concentrations of Profile III constituents in the Liberty Main Pit Lake and the Liberty East Pit Lake, rapid filling scenario, will not exceed species-specific toxicity criteria for any of the selected wildlife species. However, the Liberty East Pit Lake, normal filling scenario, is predicted to present a low-moderate risk to some terrestrial species for aluminum and thallium, and a moderate risk to several terrestrial species and a few avian species for thallium. The Division will require mitigation of the Liberty East Pit Lake, either via the rapid filling scenario or another mitigation strategy, to eliminate such ecological risks.

With the planned resumption of mining in the Liberty Pit, the Division (as part of the 2021 Major Modification) received a revised pit lake study for the Liberty Main and East Pit Lakes. The Permittee proposes to expand the existing Liberty East Pit to the east approximately 1,180 feet and lower the pit floor from its current elevation of 6,560 feet amsl down to an elevation of 6,300 feet amsl. While mining will only occur in the Liberty East Pit, the Liberty Main Pit Lake is predicted to have a water outflow component to Liberty East Pit and therefore was reevaluated as well. The Liberty East Pit Lake is predicted to be a hydraulic sink for the surrounding area.

The Liberty East Pit Lake is predicted to be of improved quality over the historic acidic pit lake due to the decrease in submerged PAG Kmp exposure within the pit from 35% to 14%, additional alkalinity loading from groundwater and the Liberty Main Pit, and from the

overall larger lake mass that will mitigate seasonal fluctuations that have been observed in the past. The Liberty Main and Liberty East Pit Lakes are predicted to rebound to elevations of 6,572 feet amsl and 6,480 feet amsl, respectively. The Liberty Main Pit Lake is predicted to begin flowing into the Liberty East Pit Lake 10-years after mining at an elevation of 6,535 feet amsl.

Geochemical Base Case modeling results predict that the Liberty East Pit will have initial exceedances of cadmium (first year), copper (first 50 years) and an exceedance of fluoride throughout the 200-year modeling period while meeting all other Profile III reference values. The Liberty Main Pit Lake is predicted to have initial exceedances of fluoride (5 years) and manganese (first 50 years) over the 200-year modeling period. The decrease in concentrations is attributed to the outflow of the Liberty Main Pit Lake into the Liberty East Pit Lake 10-years after the cessation of dewatering.

An ERA was performed as part of the modeling efforts and evaluated the potential risk to receptors utilizing chemistry from the no mineral suppression (MPS) scenario presented in the pit lake study and in accordance with Division guidance. This MPS scenario resulted in Profile III exceedances of copper and fluoride over the model duration for Liberty Main and aluminum, cadmium, copper, fluoride, and TDS over the model duration for Liberty East. When these no MPS concentrations were compared to site-specific and species-specific toxicity criteria, it was determined that only aluminum and TDS in the Liberty East Pit Lake would exceed the non-observable-adverse-effects-level (NOAEL) based toxicity reference values (TRVs) and Profile III reference values, respectively. As such, harmful effects to potential wildlife cannot be ruled out. However, when compared to the lowest-observed-adverse-effects level TRVs for aluminum, all concentrations of aluminum throughout the 200-year model run produced hazard quotients (HQs) of less than 1.0. Likewise, when compared to the NOAEL based TRVs and Profile III reference values, the aluminum and TDS concentrations predicted under the Base Case scenario, for which reasonable mineral precipitation is not suppressed, all concentrations of aluminum and TDS through the 200-year model run produced HQs below 1.0 and are not likely to cause ecological risk.

Tripp-Veteran Pit: The historic Tripp Pit (east) and Veteran Pit (west) have now merged into one large pit. The eastern portion of the Tripp-Veteran Pit is partly backfilled above the predicted water rebound level. A small pit lake was present in the bottom of the pit for several years, but was dry in 2015. The 2015 PLS predicts the final stage of the Tripp-Veteran Pit Lake will be reached at 6,102 feet AMSL (11 acres) approximately 23 years after the end of mining at the site. Pit lake water quality modeling predicts that all constituents will meet Division Profile III reference values in the Tripp-Veteran Pit Lake, except fluoride at 2.1 mg/L. The 2015 ERA concludes that the predicted concentrations of Profile III constituents in the Tripp-Veteran Pit Lake will not exceed species-specific toxicity criteria for any of the selected wildlife species.

The 2015 PLS predicts that the Tripp-Veteran Pit Lake will include an outflow of 66 gpm to groundwater southwest of the pit. The predicted pit lake water quality is better than the

background groundwater reference values for the Tripp-Veteran Hydrogeologic Block, but exceeds background groundwater reference values for sulfate (predicted value 900 mg/L, reference value 500 mg/L) and TDS (predicted value 1,300 mg/L, reference value 1,000 mg/L) for the Giroux Wash Hydrogeologic Block, which is located a short distance to the southwest of the pit in the predicted groundwater outflow zone. In follow-up to this predicted groundwater exceedance, the April 2015 EDC approval (described above) included the installation of new monitoring well P-3, located a short distance southwest of the Tripp-Veteran Pit, to obtain additional groundwater elevation and water quality data in the predicted pit lake groundwater outflow zone. Monitoring well P-3 was installed in June 2015, and as of March/April 2016, had a static water elevation of 6,034 feet AMSL and good water quality that meets all Giroux Wash Hydrogeologic Block reference values. Well P-3 will continue to be monitored for any impacts related to the predicted Tripp-Veteran Pit Lake groundwater outflow zone.

The 2015 PLS and ERA is now obsolete for the Tripp-Veteran Pit, because it includes additional mining in the Tripp-Veteran Pit that is no longer part of the mine plan as of 2017, and because the new data from new monitoring well P-3 must be incorporated into the PLS. Therefore, a schedule of compliance item added to the Permit as part of the August 2016 Division approval of an expansion of the Ruth East and Ruth West Pits requires a revised PLS and ERA, in part to update the model for the Tripp-Veteran Pit. The revised PLS and ERA were submitted to the Division in early 2017 and approved by the Division in October of 2018.

Minor Mod approved in October 2024 for a layback and deepening of the Tripp-Veteran Pit. The proposed expansion will mainly expand the Veteran Pit to the north consuming portion of the existing North Tripp Dump and deepening the pit floor to approximately 5,800 feet amsl.

An updated PLS for the Tripp-Veteran Pit was submitted as part of the Minor Modification. The modification to the Tripp-Veteran Pit is predicted to result in the formation of an approximately 300 feet deep flow-through pit lake adjacent to the partially backfilled Tripp sub-pit. The model predicts that the pit lake will recover to approximately 6,089 ft amsl between 30- and 50-years post the cessation of mine dewatering. Groundwater outflows from the Veteran Pit Lake could be as high as 52 gpm as the pit lake begins to fill. Groundwater outflows from the pit lake at equilibrium could be as low as approximately 12 gpm as predicted by the original base case model or as high as 17 to 27 gpm considering the model residuals.

The 2031 Veteran PLS's base case model suggests that the pit lake will have water quality that will meet Profile 3 reference values and will exceed Profile 1 reference values in manganese and sulfate. Manganese is expected to reach 3.7 mg/l by 150 years after the discontinuation of groundwater dewatering. The pit lake is predicted to have a manganese concentration of 0.7 mg/l during the first year. Sulfate is expected to reach 518 mg/l, just over the Profile 1 reference value of 500 mg/l by 200 years post closure and the discontinuation of groundwater dewatering.

Pit lake water is anticipated to discharge to the adjacent Giroux Wash hydrochemical block. The Giroux Wash hydrochemical block's water quality standards were based on the 1997 Geomega report referenced in the TCR and approved by the Division. The Giroux Wash hydrochemical block's water quality reference values for sulfate and manganese were set equal to Profile I, 500 mg/l and 0.1 mg/l respectively. Revised studies will be required with the next permit Renewal per WPCP Part I.N.1 and I.N.4.

An EDC was approved in June 2025 for the construction of three new monitoring wells (P-3R, P-4, and P-5) to be installed down gradient of the Veteran Tripp Pit. The installation of the new wells is intended to monitor water chemistry and groundwater level to evaluate potential groundwater impacts associated with the predicted flowthrough pit lake. The as-built for the three wells was submitted on September 15, 2025, and is undergoing Division review at the time of this revision. As discussed with RNMC on 05 May 2025, the next iteration of the pit lake study must include a discussion of pit lake monitoring and evaluate the need for deeper monitoring well(s) to better align with the bottom of the pit.

Ruth West and Ruth East Pits: In their final configuration the Ruth West Pit and Ruth East Pit will be joined above 6,550 feet AMSL via a saddle on an internal bedrock ridge that separates the lower portions of the two pits. The 2015 PLS predicted the formation of two separate pit lakes for the first 19 years after mining and dewatering cease, and then the Ruth West Pit Lake will begin spilling over the 6,550-foot saddle into the Ruth East Pit Lake. The combined Ruth Pit Lake will fill quickly, reaching 95% full (6,585 feet AMSL) 28 years after the cessation of mining and dewatering, and 100% full (6,633 feet AMSL) approximately 70 years after mining and dewatering cease. The filling rate will be rapid because both pits penetrate the carbonate aquifer of the South Hydrogeologic Block in their south walls. The South Block will contribute over 80% of the water in the combined Ruth Pit Lake.

The Ruth East Pit is separated from the Kimbley Pit by another bedrock saddle with final elevation of 6,550 feet AMSL. If the Kimbley Pit was not backfilled above the final stage elevation of the combined Ruth Pit Lake, the Kimbley Pit Lake would ultimately join with the Ruth Pit Lake, forming a large Ruth/Kimbley Pit Lake with a combined area of 279 acres. However, the Kimbley Pit was backfilled in 2015 and 2016, thus precluding a 41-acre pit lake in the Kimbley Pit. Therefore, the combined Ruth West/Ruth East Pit Lake, without the Kimbley Pit Lake, will cover a total area of 237 acres (146-acre Ruth West lobe, plus 92-acre Ruth East lobe). The Kimbley Pit is described separately below.

Owing to the large contribution of clean water from the South Hydrogeologic Block, the 2015 PLS predicts good water quality both for the separate Ruth West and Ruth East Pit Lakes before they combine, and for the later combined Ruth Pit Lake, with no exceedances of Division Profile III reference values. Therefore, the separate and combined Ruth pit lakes will not exceed species-specific toxicity criteria for any of the selected wildlife species.

The 2015 PLS predicts that the combined Ruth Pit Lake will include a groundwater outflow zone, which will flow at a predicted rate of 123 gpm to the north and northwest from the north side of the Ruth West Pit. The groundwater outflow will occur in areas of the north pit wall where the Ruth West Pit has intercepted the Pennsylvanian Ely Limestone Formation and historic underground workings. The underground workings are connected to the previously capped Deep Ruth Shaft, which is now buried beneath the Ruth WRD. The partially caved underground workings are exposed in the Ruth West Pit walls and are not safely accessible. The 2015 PLS predicts that the water in the Ruth pit lakes will not exceed any Profile I groundwater reference values, and no groundwater degradation is predicted to result from the Ruth West Pit groundwater outflow zone. As part of the April 2015 EDC approval, three new monitoring wells (P-1A, P-1B, and P-2) were installed in the predicted outflow zone north and northwest of the Ruth West Pit to monitor groundwater elevations and water quality before and after formation of the Ruth West Pit Lake. Monitoring results from wells P-1A, P-1B, and P-2 indicate exceedances of applicable hydrogeologic block reference values (Ruth South Block for P-1A and P-1B, and Ruth Mineralized Block for P-2) for iron, magnesium, manganese, sulfate, and TDS before formation of the Ruth West Pit Lake. These wells will continue to be monitored for impacts related to the predicted Ruth West Pit Lake groundwater outflow zone.

The overdumping of the Keystone Dump (discussed below) resulted in the placement of waste rock within the location of monitoring wells P-1A, P-1B, and P-2. Replacement monitoring wells P-1BR and P-1AR were installed in locations which would intercept the groundwater outflow component from the Ruth West Pit downgradient of the expanded Keystone Dump, but P-1AR was unsuccessful in reaching the interpreted groundwater zone and was subsequently abandoned. Due to the distance from the outflow zone to well P-1B, the Division required that P-1B and P-2 be replaced after the overdumping of the Keystone Dump was completed. This was incorporated into the Permit as SOC Item 03 (Renewal 2021, Revision 00). Additional details regarding these wells can be found in a 17 January 2019 correspondence titled *“EDC for the Plugging and Abandonment of 7 Monitoring Wells in the Keystone Dump Expansion Area”*.

In August 2016, the Division provisionally approved an interim PLS for expansions RE-3 and RW-4 of the Ruth East and Ruth West Pits, respectively. The RE-3 expansion will lower the ultimate Ruth East Pit floor to an elevation of 6,100 feet AMSL. The RW-4 expansion will lower the Ruth West Pit floor to an elevation of 5,950 feet AMSL. The 2016 interim PLS includes representative static characterization of the ultimate pit walls of the Ruth East and Ruth West Pits after the RE-3 and RW-4 expansions, but does not include new HCT data or comprehensive pit lake modeling, because of the short timeframe before commencement of the new pit expansion. In accordance with a new schedule of compliance item added to the Permit with the August 2016 Division approval, a fully revised PLS and ERA, including new HCT data and revised modeling, shall be submitted by 30 April 2017. Among other changes, the revised PLS and ERA must incorporate new data from monitoring wells P-1A, P-1B, and P-2 located in the predicted Ruth West Pit groundwater outflow zone. Based on a preliminary sensitivity analysis performed on the 2015 PLS using the new static characterization data for the RE-3 and RW-4 expansions,

the chemistry and hydrology of the Ruth East and Ruth West pit lakes is not expected to change significantly as a result of the RE-3 and RW-4 expansions. The PLS and ERA were submitted to the Division in early 2017 and were approved by the Division on 15 October 2018.

In March of 2019, the Division received a revised pit lake study for the further expansion of the Ruth West Pit (Ruth West 5 [RW-5]). The RW-5 expansion proposed to deepen the western half of the Ruth West pit floor from 5,950 feet amsl to 5,700 feet amsl. The expansion will remove between 300 and 500 feet of material in the western portion of the pit, exposing new rock and modifying the distribution of rock material in the ultimate pit wall. Based on the overall distribution of primary material types, the expansion is anticipated to benefit pit lake chemistry by reducing the relative percentages of PAG materials and increasing non-PAG exposure. The kinetic database utilized for modeling wall rock leaching consisted of 11 newly collected HCTs and 36 pre-existing and eligible HCTs (within 200 feet of the ultimate pit wall surface and test was performed utilizing modern ASTM 5744 standards).

The geochemical model evaluated the chemistry of the backfilled Kimbley Pit, the Ruth East Pit, and the expanded Ruth West Pit since they are hydraulically linked and combine above the 6,550 foot elevation. The Ruth West pit lake recovers first and will overflow into the Ruth East pit approximate 60-years after closure. The Kimbley backfill is anticipated to recover slowly until the Ruth East Pit lake reaches the 6,550 foot elevation and overflows into the backfill. After initial inundation by Ruth East water, the backfill will permanently discharge to the Ruth East pit lake.

Over the 200-year modeled period, the Ruth combined pit lake is predicted to be of good quality, possessing circum-neutral pH, and high alkalinity while meeting all Division Profile I reference or established background concentrations. The Ruth West and Ruth East pit lake chemistries are anticipated to have early Profile III exceedances prior to the South Hydrogeologic Block becoming the primary source of water inflow to the pit lakes. Due to the Ruth East pit lake being predicted to have mildly acidic waters during the first 45-years of filling, the Division required that a lime amendment plan or other mitigative measures be implemented to minimize risk to terrestrial and avian life, pursuant to NAC 445A.429.

Prior to the submittal of a lime amendment plan or other mitigative measure, the Ruth East highwall began to show signs instability in the area of the C-Pad and B-Pad with surface cracks appearing near the toe of the C-Pad and through the B-Pad E-Cell. Due to this instability, the Permittee analyzed the ability for short- and long-term backfilling to stabilize the pit walls. This analysis displayed that both short and long term backfilling efforts would have a marked increase in the static and pseudostatic FOS. For more information regarding the stability of the Ruth East highwall, please see the above section "*C-Pad Stability*".

A revised pit lake study was completed which now included the backfilling of the Ruth East Pit with approximately 97 million tons of non-PAG waste rock which has a weighted

ANP/AGP ratio of 4.35. The results of this modeling effort, which utilized similar methods to previously approved models, predicted that the RW-5 pit lake would meet all Profile I reference value or established background concentrations. The outflow component from the Ruth West Pit is predicted to be approximately the same as previously predicted (~122 gpm). Due to the backfilling of the Ruth East Pit with non-PAG material, which neutralizes the early predicted acidic lake conditions of the Ruth East Pit, mitigative measures are not required.

Kimbley Pit: Stabilization measures, implemented in the Kimbley Pit during Temporary Closure following characterization of pit lake waters and surrounding potential sources, were completed in 2002. Stabilization measures included backfilling of the 'Kimbley Small Pond' with neutralizing waste to remediate acidic solution and create an infiltration barrier; covering the sulfide berm with neutralizing waste rock; and regrading the surface to direct stormwater over carbonate bedrock prior to discharge into the Kimbley Pit Lake.

At the time of the 2005 PLS, the Kimbley Pit contained the Kimbley Main Pit Lake (approximately 1.2 acres) and the Kimbley Shallow Pond (approximately 0.5 acre), considered contiguous water bodies separated by a low permeability berm, which together comprised the 1.7 acre Kimbley Pit Lake with a 2005 surface elevation of 6,723.5 feet AMSL. Based on pit lake water chemistry collected through the second quarter 2005, the mean constituent concentrations in the pit water and the hydraulic gradient between the pit lake waters and groundwater suggest potential to degrade waters of the State, specifically groundwater, with Profile-I exceedances for TDS, magnesium, chloride, sulfate, thallium, and uranium. The 2005 PLS proposed evaluation for in-pit treatment or management through future mining of the Ruth Pit that could encompass the Kimbley Pit.

Kimbley Pit was dewatered concurrently with mining in 2009 and 2010. The MIW was conveyed by a dedicated 10-inch diameter HDPE MIW pipeline to a booster pump and on to the Mill through the existing Ruth MIW pipeline for use in the process circuit. Mining through 2010 lowered the pit floor and changed its shape. The resultant single pit lake exhibited much poorer water quality (pH 2-3 SU and elevated metals concentrations) than the Kimbley Pit Lakes prior to the 2009-2010 mining.

In August 2012, the Permittee proposed additional mining in Kimbley Pit, but in accordance with schedule of compliance items in the Permit, the Division required additional characterization and modeling to support revision and approval of the WRMP and the PLS and ERA prior to the resumption of mining. With approval of the Interim Mine Plan on 05 April 2013, the Division approved the resumption of mining in the Kimbley and Liberty Pits. This final mining in Kimbley Pit occurred in 2013-2014, after which the Kimbley Pit was partially backfilled with non-PAG waste rock starting in 2015. The Division required that the backfill include only non-PAG waste rock to 6,700 feet AMSL (above the predicted groundwater rebound elevation), above which PAG waste rock may be placed (and encapsulated within non-PAG waste rock) in accordance with the WRMP. As of 2022, the Kimbley Pit had been backfilled to the 7,000 feet AMSL elevation.

An EDC to install three new monitoring wells (W-26, W-27, and W-28) in the vicinity of the Kimbley and Wedge Pits was approved by the Division in March 2013. The new wells were required by the Division to provide more data on groundwater quality and static water levels for input into future revisions of the PLS. In September 2013, the Division approved a new proposed location for not-yet-installed monitoring well W-28, just east of the Jupiter WRD. In the same approval, the requirement to install well W-27 was retracted, due to a lack of a suitable location south of the Kimbley Pit that was not on a pit high wall, a haul road, an active WRD, or in a different hydrogeologic block than the pit lake. It took three attempts to install W-26, so the final monitoring well, installed in 2014, is labeled W-26RR. W-28 was dry, so it was plugged and abandoned, and replacement monitoring well W-28R was installed nearby in 2014.

The 2015 PLS includes two Kimbley Pit scenarios for comparative purposes: one with no backfill and the re-establishment of the Kimbley Pit Lake, and one with the approved non-PAG backfill above the predicted groundwater rebound elevation; the latter scenario reflects the actual case implemented at the site. For the hypothetical pit lake scenario, the 2015 PLS predicts the formation of a separate Kimbley Pit Lake as an evaporative sink for 22 years after the cessation of mining and dewatering. At 22 years the combined Ruth Pit Lake would begin overflowing into the hypothetical Kimbley Pit Lake, and the combined Ruth/Kimbley Pit Lake would reach its final stage of 6,633 feet AMSL (279 acres total, including a 41-acre Kimbley Pit lobe) 70 years after the cessation of mining and dewatering. The 2015 PLS predicts that prior to combining with the Ruth Pit Lake the hypothetical Kimbley Pit Lake water quality would exceed Division Profile III reference values for pH (2.9 SU), aluminum (82 mg/L), cadmium (0.12 mg/L), copper (15 mg/L), and fluoride (19 mg/L). The 2015 PLS predicts that after the hypothetical Kimbley Pit Lake combined with the Ruth Pit Lake, no further exceedances of Profile III reference values would occur. Wildlife toxicity data used in the 2015 ERA indicate that prior to combining with the Ruth Pit Lake, the hypothetical Kimbley Pit Lake water quality would present a moderate-high risk to terrestrial wildlife for aluminum.

In the actual scenario, in which the Kimbley Pit was backfilled in 2015 with non-PAG waste rock to at least 6,700 feet AMSL, the 2015 PLS predicts that groundwater will rebound within the non-PAG backfill to a final elevation of 6,633 feet AMSL (same as the predicted final stage of the combined Ruth Pit Lake) 32 years after the cessation of mining and dewatering. The groundwater gradient in the Kimbley backfill is predicted to be toward the combined Ruth Pit Lake; however, the predicted magnitude of groundwater discharge from the Kimbley backfill to the combined Ruth Pit Lake is very low at 2.8 gpm total. The 2015 PLS predicts that 10 years after the cessation of mining, the groundwater quality within the Kimbley backfill will exceed the Saxton Mineralized Hydrogeologic Block reference values for beryllium (0.007 mg/L), cadmium (0.094 mg/L), iron (244 mg/L), magnesium (155 mg/L), manganese (4.4 mg/L), sulfate (1,750 mg/L), TDS (3,410 mg/L), and zinc (9.8 mg/L); however, the 2015 PLS predicts that all of these groundwater exceedances will naturally decrease below reference values 50 years after mining ends, except for cadmium (0.010 mg/L) and manganese (1.4 mg/L). Despite these predicted

exceedances of hydrogeologic block reference values, the predicted groundwater quality within the Kimbley backfill is significantly better than that of the actual groundwater detected in monitoring well AGT-9P within the Kimbley Pit. The groundwater at well AGT-9P was previously degraded, apparently as a result of historic acid leaching at the site prior to the current mining operation. Therefore, according to the 2015 PLS, the Kimbley backfill scenario will cause no further groundwater degradation, and will also eliminate the potential for adverse risk to terrestrial wildlife that an open Kimbley Pit Lake would present.

Wedge Pit: The Wedge Pit is located immediately northeast of the Kimbley Pit. The Permittee mined the Wedge Pit in 2009 and 2010, and backfilled the pit through 2015 with non-PAG waste rock above the predicted groundwater rebound elevation. A pit lake was never observed in the Wedge Pit, which is believed to be a result of groundwater drawdown related to on-going pumping at production well K-2P, located approximately 1 mile northwest of the Wedge Pit.

The 2015 PLS includes two Wedge Pit scenarios for comparative purposes: a hypothetical scenario with no backfill and the establishment of a Wedge Pit Lake, and the actual scenario implemented at the site with the approved non-PAG backfill above the predicted groundwater rebound elevation. For the hypothetical pit lake scenario, the 2015 PLS predicts the formation of a small (2 acre) Wedge Pit Lake which would reach a final stage of 6,566 feet AMSL 22 years after the cessation of groundwater pumping at K-2P and the termination of dewatering of the South Hydrogeologic Block. The hypothetical Wedge Pit Lake water quality would meet all Profile III reference values except fluoride (2.65 mg/L). The 2015 ERA concludes that the pit lake water would not exceed species-specific toxicity criteria for any of the selected wildlife species.

The hypothetical Wedge Pit Lake would include a small groundwater discharge of 0.5-1.6 gpm to bedrock northeast of the Wedge Pit in the Robinson Canyon Hydrogeologic Block. The pit lake water is predicted to exceed Robinson Canyon Hydrogeologic Block reference values for sulfate (639 mg/L) and TDS (1075 mg/L), but meets all reference values for the adjacent Saxton Mineralized Hydrogeologic Block. However, nearby Robinson Canyon bedrock monitoring well R-H already exceeds Robinson Canyon hydrologic block reference values for manganese, sulfate, TDS, and other constituents, either due to natural conditions or historic mining impacts prior to the current Project; therefore, the hypothetical Wedge Pit Lake would not degrade groundwater further.

In the actual scenario, in which the Wedge Pit was backfilled with non-PAG waste rock as high as 6,850 feet AMSL in 2015, the 2015 PLS predicts that groundwater will rebound within the non-PAG backfill to a final elevation of 6,566 feet AMSL (same as the predicted final stage of the Wedge Pit Lake, because the groundwater inflow rate is predicted to be much greater than the evaporation rate from the pit lake), 18 years after the cessation of groundwater pumping at K-2P and the termination of dewatering of the South Hydrogeologic Block. The groundwater gradient in the Wedge Pit backfill is predicted to be to bedrock in the Robinson Canyon Hydrogeologic Block; however, the predicted

magnitude of groundwater discharge is very low at 1.6 gpm total. The 2015 PLS predicts that the groundwater in the Wedge Pit backfill will not exceed Robinson Canyon Hydrogeologic Block reference values, except for manganese (1.0 mg/L). As stated above, nearby Robinson Canyon bedrock monitoring well R-H already exceeds Robinson Canyon Hydrologic Block reference values for manganese, sulfate, TDS, and other constituents, either due to natural conditions or historic mining impacts prior to the current Project; therefore, the Wedge Pit backfill is not expected to degrade groundwater further.

## **Waste Rock Management**

At the Robinson Operation, ARD seeps and puddles have been documented associated with the historic ALDs, some of the historic pre-1990s WRDs, and with the late-1990s to current Liberty WRD. Localized groundwater degradation was documented in the vicinity of the Intera Drain prior to the construction of the current Liberty WRD. The purpose of the WRMP is to characterize the waste rock proposed for future mining and demonstrate no potential for degradation of waters of the State (either surface water or groundwater) if the proposed waste rock management and final permanent closure methods are used. The 26 October 2010 Intera CAP requires submittal of a revised and complete site-wide WRMP. The following revisions of the WRMP have been submitted by RNMC and rejected by the Division because they provide insufficient information and fail to address previous Division concerns: 18 February 2010; 04 March 2010; 06 June 2011; 29 May 2012; and 30 January 2014. Some of the main Division concerns include, but are not limited to, over-reliance on characterization data from other pits and previously mined waste rock, over-averaging of characterization data, failure to demonstrate that the proposed management plan will not degrade waters of the State or cause acid seeps, and failure to provide critical data on source, character, and available volume of oxide waste rock to be used to cover the PAG waste rock.

The 2010 renewal of the Permit, effective 22 June 2011, included new schedule of compliance items that prohibit initiating mining or pit backfill activities not previously approved until a revised WRMP and a revised pit lake predictive model and ecological risk assessment are approved. New mining in Liberty Pit and Kimbley Pit was delayed due to this requirement, until an Interim Mine Plan was approved in April 2013. The Interim Mine Plan allows mining in the Liberty and Kimbley Pits until June 2014 (later extended to 31 August 2014, 28 February 2015, 15 July 2015, 31 December 2015, and 01 April 2016), in lieu of an approved WRMP and pit lake study, provided that a bond is posted for: 1) ten years of neutralization of acid pit lakes that may form, and 2) a cap consisting of synthetic liner overlain by a suitable thickness of growth media to cover all waste rock generated from the Liberty and Kimbley Pits. With Division approval of a revised pit lake study and ecological risk assessment on 17 February 2016, the Interim Mine Plan was terminated.

Revision 5.1 of the WRMP, dated 09 May 2014, adequately addresses many Division concerns, but still fails to address some major issues, such as providing containment for historic ALM that the Permittee has mined or plans to mine, and committing to more than

1-foot thickness of non-PAG cover on certain WRDs that exhibit a greater potential to degrade waters of the State. Therefore, Revision 5.1 was provisionally approved by the Division in June 2014 with additional requirements inserted into the Permit to address deficiencies in the WRMP.

Beginning with the June 2014 modification, the Permit requires that prior to mining historic ALM the Permittee must obtain Division approval of either a clear demonstration that the ALM does not have the potential to degrade waters of the State, or a TPPC (or FPPC, as appropriate), and appropriate reclamation bonding, to install a synthetically lined cap, or equivalent, over the material where it will be placed on the WRDs. The TPPC or FPPC must also include stabilization measures pursuant to NAC 445A.430 to inhibit meteoric water from migrating through any remaining material left in the mined ALD. The June 2014 Permit modification included a new schedule of compliance item requiring submittal of the first TPPC for mining ALM. Another schedule of compliance item was added at the same time requiring revision of a sampling plan proposed in the WRMP for additional characterization of ALM that the Permittee planned to mine for the purpose of determining whether it has the potential to degrade waters of the State. The Permit was also modified in June 2014 to require mitigation for ARD accumulations within 90 days after discovery and associated quarterly reporting of mitigation actions performed. Permit monitoring requirements were modified to require an annual as-built drawing of end-of-year dump configurations, and an annual recalculation of the total site-wide tonnages of non-PAG material required and available for all uses specified in the WRMP, the Permit, and any other approvals. The annual recalculation must determine the required and available non-PAG tonnages both for the next calendar year and the remaining mine life according to the current mine plan. The Permittee must address any anticipated shortfalls of non-PAG material by identifying additional sources of non-PAG material as warranted and implementing a plan to representatively characterize the additional material to verify its adequacy. Finally, the Permit was modified in June 2014 to require, unless otherwise approved, a minimum 1-foot vertical thickness of non-PAG cover material on all final outer surfaces of WRDs, except a minimum 2-foot cover thickness is required on the Jupiter WRD and a synthetically-lined cap with minimum 3-foot cover is required on the Liberty/TS WRD.

An EDC was approved by the Division in April 2015 to revise the PAG/non-PAG cutoff for mined material, tailings, and other beneficiation waste material, from the standard value of 1.2 for the ratio of acid neutralization potential to acid generation potential (ANP/AGP), which is established in the Division guidance document, "*Waste Rock, Overburden, and Ore Evaluation*," to a new value of 0.3 for ANP/AGP. The new 0.3 cutoff value is based on the results of 174 HCTs performed at the site from 1993 to 2014. The HCT data indicate overwhelmingly that mined material and tailings from the Robinson Operation that exhibit an ANP/AGP ratio greater than or equal to 0.3 do not generate acid. Two documented exceptions are a Tertiary rhyolite sample and a sample of efflorescent salts, both of which had unreliable ANP/AGP determinations due to a non-standard analytical method that may underestimate AGP, because it omits soluble sulfates that may be present in the sample. Aside from those two samples, all samples that generated acid exhibited ANP/AGP ratios

less than 0.3. In this analysis, to be considered acid generating, a sample must have had at least two pH measurements below 5.5 SU during the HCT procedure.

However, not all samples that exhibit an ANP/AGP ratio less than 0.3 generated acid during the HCT procedure; in fact, less than 50% of HCTs with ANP/AGP less than 0.3 generated acid. With approval of the EDC, the Permit was modified such that future HCTs must be initiated only for materials that have ANP/AGP less than 0.3. However, several on-going HCTs on samples with ANP/AGP ratios between 0.3 and 1.2 will continue to run to provide long-term confirmation of the previous results. Approval of the new 0.3 cutoff authorizes the Permittee to manage all materials having ANP/AGP values greater than or equal to 0.3 as non-PAG, and only the materials having ANP/AGP values less than 0.3 as PAG. As a result, going forward, the tonnage of material on-site that must be managed as PAG will be significantly less than with the previous cutoff value of 1.2, and a much greater tonnage of non-PAG material will be available for caps and covers. This change has repercussions for both the WRMP and the pit lake study; therefore, both documents were updated accordingly.

In August 2016, the Division provisionally approved interim Comprehensive WRMP 6 for expansions RE-3 and RW-4 of the Ruth East and Ruth West Pits, respectively. The interim WRMP includes representative static characterization of the 240 million tons of waste rock to be mined in the RE-3 and RW-4 expansions, but does not include new HCT data or revised hydrogeologic modeling, because of the short timeframe before commencement of the new pit expansion. In accordance with a new schedule of compliance item added to the Permit with the August 2016 Division approval, a full Revision 6 of the WRMP, including new HCT data and revised hydrogeologic modeling, shall be submitted by 31 March 2017. Revision 6 was submitted to the Division on 14 April 2017 and an interim approval was given by the Division on 21 December 2018. Responses to the Divisions comments were received on 05 November 2019 and were approved on 07 May 2020.

Based on the static characterization, the RE-3 and RW-4 expansions are expected to generate similar proportions of PAG waste rock to non-PAG waste rock as encountered in the previous phase of mining in the Ruth East and Ruth West Pits for the Pennsylvanian Ely Limestone (Pel), Cretaceous monzonite porphyry (Kmp), Mississippian Chainman Shale (Mc), and Tertiary rhyolite (Tr). A slightly greater proportion of PAG waste rock than encountered in the previous Ruth East and Ruth West mine phase is expected from the Permian Rib Hill Sandstone (Prh), silicification with pyrite alteration (SilPy), and Ely Limestone skarn alteration (Pel-Sk), which together account for a total of 34% of all waste rock (PAG and non-PAG) to be generated from the RE-3 and RW-4 expansions. PAG waste rock will continue to be encapsulated within non-PAG waste rock as per the previous WRMP. Spent ore mined from the A-Pad and the Mollie Gibson ALD as part of the Ruth West RW-4 expansion was capped with a geomembrane liner and growth-media cover to achieve chemical stabilization in accordance with NAC 445A.430.

Comprehensive WRMP 7 was received by the Division on 12 December 2019. This WRMP characterized a new layback in the Ruth West Pit (RW-5) that is anticipated to

produce approximately 210 million tons of waste rock. Waste rock from this expansion will be routed to and over-dump the historic Keystone Dump to create a new and expanded Keystone WRF. This expansion is anticipated to create a lower proportion of PAG for all rock types (discussed above) than the previously approved RW-4 expansion, with the exception of SilPy. Geochemical characterization was tied to the extensive site exploration database by correlating total sulfur and calcium content from boreholes to acid generating potential and acid neutralizing potential ratios of collected samples. This displayed the ability of the exploration data to capture the ABA ratios of encountered materials and resulted in the development of 18 lithology/ABA specific chemical release functions that were utilized to model possible seepage quality based on anticipated tonnage. Infiltration modeling was developed based on hydraulic parameters collected from samples of cover materials, run-of-mine waste, and the historic Keystone Dump materials.

Results of this modeling predict that once the Keystone WRF is regraded and covered, that 11% and 2% of the mean annual precipitation will infiltrate the non-PAG armored side slopes and evapotranspirative cover, respectively. The regraded non-PAG armored side slopes (~ 350 acres) were assumed to have no vegetation (although available information suggests it would support vegetation) and only the top (~80 acres) portion of the dump was assumed to have a 1-foot thick evapotranspirative closure cover, however, the Permittee has committed to increase this thickness to 5-feet.

The geochemical model predicts that aluminum, iron, copper, manganese, and zinc (and to a lesser extent arsenic, cadmium, lead, and thallium) could exceed the Divisions Profile I reference values at the base of the WRF during initial draindown of the waste rock. However, attenuation in the vadose zone would result in no exceedances at the groundwater table.

Comprehensive WRMP 7.1 is a revision that captures the mining of the Liberty East Expansion and the reconfiguration of the Keystone WRF due to the routing of Ruth West 5 non-PAG to the Ruth East 3 Pit which will be backfilled to stabilize the highwall of the pit in the area of the C-Pad and B-Pad E-cell (See page 61 for more discussion regarding C-Pad stability). Comprehensive WRMP 7.1 utilized the same modeling methodology of WRMP 5.1 and 6, but with newly collected data from the Liberty East Expansion and previously collected data from Ruth West 5, due to a portion of the waste rock already being placed on the Keystone WRF.

The Liberty East Expansion is anticipated to produce 108 million tons of material and an overall lower proportions of PAG materials than previous Ruth Pit expansions. Similarly to Comprehensive WRMP 7, the geochemical characterization was tied to the extensive site exploration database and resulted in the development of 22 lithology/ABA specific chemical release functions that were utilized to model possible seepage quality based on anticipated tonnage. Infiltration modeling was developed based on hydraulic parameters collected from samples of cover materials, run-of-mine waste, and the historic Keystone Dump materials.

The slightly smaller and reconfigured Keystone WRF, once regraded, will exhibit similar infiltration rates to those predicted by Comprehensive WRMP 7. The regraded non-PAG armored side slopes (~ 300 acres) were assumed to have no vegetation (although available information suggests it would support vegetation) and only the top (~100 acres) portion of the dump was assumed to have a 1-foot thick evapotranspirative closure cover. As stated above, the Permittee has committed to increase this thickness to 5-feet. These assumptions result in a conservative infiltration value that will be validated or revised based on an upcoming test plot program that will further evaluate the ability of the proposed cover materials. The test plot study will be submitted as an EDC in accordance with SOC Item 5 of the Permit (Revision 00, Renewal 2021).

The geochemical model predicts that the overall aggregate ANP:AGP ratio for the Liberty East layback will be 5.25, which indicates that more acid consuming materials will be produced than acid generating from this expansion. The model predicts that aluminum, arsenic, beryllium, cadmium, copper, fluoride, iron, manganese, sulfate, thallium, and zinc could exceed Division Profile I reference or established background values at the base of the dump. However, it is anticipated that attenuation in the vadose zone will result in seepage that meets all Profile I or established background values at the groundwater table.

In February 2025 an NFR was Approved to Change the Keystone WRDF Footprint. The Keystone WRDF was initially designed to accommodate access to a corridor that contained a below ground water conveyance line that delivered potable water to the nearby town of Ruth. Recently, RNMC has worked collaboratively with the Ruth General Improvement District (GID) and has provided an alternative well and pipeline located off the active mine property to replace the previous water system. The historic water delivery line has been disconnected and abandoned in place with the pumps no longer supplying them with water. These efforts have provided RNMC with an opportunity to better utilize the surrounding area around the Keystone WRDF to allow for a better post mining landform to be created. The revised feature will reduce surface water collection points by eliminating a large valley that would have otherwise been observed.

### **Petroleum-Contaminated Soil Management**

An EDC was approved by the Division on 25 November 2008 for construction of a Petroleum-Contaminated Soil (PCS) Temporary Storage Pad (PCS Pad). The PCS Pad is located approximately 700 feet west of the truck shop, adjacent to the existing hazardous waste storage yard from which it is hydraulically isolated. The PCS Pad is used to store PCS material until it is shipped off-site for licensed disposal. Two PCS bioremediation facilities (one with three cells located east of the Liberty Pit and the other with one cell located west of the D-Pad leach facility) were permanently closed pursuant to an approved FPPC in 2010.

The PCS Pad consists of an 8-inch-thick concrete slab, with #4 steel reinforcement bars placed each way on 12 inch centers to form a horizontal grid, measuring 128 feet long by 110 feet wide. The subgrade for the concrete slab is a prepared 6-inch-thick aggregate

layer compacted in excess of the calculated 95% maximum dry density as verified by five nuclear density tests. Containment capacity of approximately 40,312 gallons, well in excess of 110% of the volume reporting to the PCS Pad from the 25-year/24-hour storm event (approximately 21,394 gallons), is provided by a 6- to 18-inch high concrete stemwall along the east side of the concrete slab and below the base of a 6-inch high concrete roll curb along the other three sides of the slab. Maximum PCS Pad containment volume, to the top of the 6-inch roll curb, is approximately 93,797 gallons. Waterstops were installed along all joints between the concrete slab and the adjacent stemwall and roll curbs. The base of the PCS Pad is sloped to the east, toward a 6-foot long by 3-foot wide by 3-foot deep solution collection and evacuation sump. Collected solution must be evacuated to approved containment.

A PCS Management Plan was approved by the Division on 12 February 2018, for the disposal of PCS within a 40-acre portion of the South Tripp Dump. The 40-acre area within the South Tripp Dump was chosen as the disposal location due to the depth to ground water (approximately 800 feet), the underlying soil types (sandstone and limestone), and the low number of potential receptors.

A risk assessment was completed in which site specific target levels (SSTLs) were established for each constituent of potential concern. Individual and cumulative carcinogenic target health risk limits of  $1 \times 10^{-5}$  and  $1 \times 10^{-6}$ , respectively, were utilized in the risk assessment. Additional input parameters for the risk assessment included default parameters as well as those based on information from previously performed site specific investigations. Based on a site conceptual model, the only potential complete exposure pathway was determined to be direct contact with tap water by an industrial receptor. This however is unlikely, due to the nearest existing production well to the disposal area being approximately 3-miles upgradient from the PCS disposal location and in a different hydrogeologic block. The risk assessment utilized a conservative approach and used a production well distance of 2,300 feet for the nearest receptor. The assessment concluded that the PCS disposal site does not appear to pose a current or future potential threat to human health of the environment.

Measures will be conducted, including source identification and analytical testing, to ensure that the PCS disposed of within the 40-acre area on the South Tripp Dump is not hazardous. PCS material disposed of within the approved disposal areas will be covered annually with two feet of compacted soil to minimize the amount of meteoric water contact with the PCS material. If any of the constituents of potential concern exceed the SSTLs, the contingency plan will be followed, which may include the generation of a revised, more detailed risk assessment.

A modification to the site PCS management plan was approved by the Division on 22 February 2021 and permitted the disposal of wash bay sediments on the South Tripp Dump in a designated 30-acre disposal location. The location was chosen due to the depth to groundwater (approximately 800 feet), the distance to the nearest water supply wells (greater than 3 miles), groundwater flow direction, and the absence of receptors.

Approximately 20,000 gallons of wash bay water are generated per week and will be disposed of in a 15-acre area over a six-month period. Following this six-month period, the other half of the designated area will be utilized. The wash bay water will be applied to this area at a rate of 150 gpm with a spray width of 100 feet and in a manner to minimize ponding. Soil sampling of the disposal area will be conducted on at least an annual basis on each of the 15-acre areas and compared to determined background concentrations. Soil samples will be tested for volatile organic compounds and semi-volatile organic compounds in accordance with the Permit. The disposal area will be covered annually by two feet of re-compacted cover material.

A modification to the site PCS management plan was approved by the Division on 22 March 2023 and permitted the disposal of wash bay sediments and PCS on the Jupiter Dump in a designated 9-acre disposal location. The location was chosen due to the depth to groundwater (approximately 670 feet), the distance to the nearest water supply wells (greater than 1 mile), and the groundwater flow direction away from the supply wells.

An EDC to construct a new replacement SW Energy truck wash and demolish the old one was approved on 04 April 2023. The new SW Energy truck wash will have a double lined 32,000 gal pond with 2 feet of freeboard to catch any runoff from the truck wash pad. The SW Energy truck wash pad is sealed with water stops and reports to a sealed sediment basin and oil water separator and then to the forementioned pond. The sediment basin and oil water separator will be cleaned out as needed. The new SW Energy Truck Wash Pond was built but the new pad and wash building were never built.

An EDC was approved in May 2025 to construct a new truck wash facility to be located on the north side of the truck shop to be a full replacement of the existing truck wash facility. The new Truck Wash Bay Facility will include a large vehicle bay to wash the mine haul truck and support equipment fleet, and a small vehicle wash bay for service trucks and light vehicles. The facility will include a water recycling system for water reuse. The Wash Reclaim System will include a concrete Primary Settling Pit, Secondary Settling Pit, and Pickup Pit. All containment concrete will be constructed with waterstops. The Primary Settling Pit has a capacity of 22,660 Gallons. The Secondary Settling Pit has a capacity of 20,640 Gallons, and the Pickup Pit has a capacity of 4,712 Gallons. The capacity is measured from the pit floors to the weir elevation between the Primary and Secondary Pits.

An Oil Skimmer will be mounted to the wall of the Secondary Settling Pit to wick away oil from the water surface. Oil from the skimmer will be collected in barrel set in a concrete containment adjacent to the Secondary Settling Pit. Disposal of the oil will be by RNMC. Three Wash Recycle Modules, two for the Large Vehicle Wash Bay and one for the Small Vehicle Wash Bay, will be installed inside a Mechanical Building adjacent to the Settling and Pickup Pits. Piping, electrical, controls and HVAC will also be installed in the Mechanical Building.

## Profile I-R Monitoring Reduction

In June of 2018, the Division gave approval for a modification to the radionuclide chemistry sample and collection analysis. In the submitted engineering design change, the Permittee proposed to substitute the quarterly Profile I-R analysis (which includes gross alpha, radium-226 + radium-228, and uranium), for specified wells, to a modified Profile I analysis that utilizes uranium as a surrogate for the full Profile I-R radiochemistry analysis. The U.S. Environmental Protection Agency (EPA) specifies that the maximum contaminant level (MCL) for gross alpha (a combination of all alpha emitting particles including thorium, polonium, etc.), Radium-226 + Radium-228, and uranium are 15 picocuries per liter (pCi/L), 5 pCi/L, and 0.03 milligrams per liter (mg/L), respectively. The Division's Profile I-R reference value list incorporates gross alpha, radium-226 + radium-228, and uranium, with the same standards established by the EPA, in addition to the standard Profile I reference value list.

The EPA provides opportunities to substitute gross alpha results for uranium in the event that gross alpha does not exceed 15 pCi/L and gross alpha may also be substituted for radium-226 in the event that gross alpha is less than 3 pCi/L. Supporting information for the rule identifies a naturally occurring uranium conversion factor of 0.67 pCi/μg to convert uranium mass (μg/L) to uranium activity (pCi/L). The Permittee will utilize the same method of substitution, but by performing the substitution in reverse, to determine a gross alpha concentration. The calculated gross alpha concentration will then be compared to the established MCL's and substitution limits. If an exceedance is noted for two consecutive quarters, the monitoring point will initiate analysis for the full Profile I-R reference list during the following quarter. Compiled monitoring data, collected since the third quarter of 2011, displayed that utilizing uranium as a surrogate for the full Profile I-R analysis would indicate, in most cases, when an exceedance is present. Based on analysis of the data, the Permittee proposed a uranium "trigger level" of 0.01 mg/L (6.7 pCi/L).

During the Division's review of the submitted radiochemistry results, there appeared to be some instances where a correlation between the total measured gross alpha, radium-226 + radium-228, and uranium could not be determined. Due to this discrepancy, the Division requested that select monitoring wells have at least one sampling event, in which thorium-230 was analyzed in addition to the other full Profile I-R Division radiochemistry constituents, to try and determine the other contributions to the gross alpha activity. While thorium-230 does not have a specific applicable drinking water standard, it is summed into the gross-alpha concentration and if a site-specific conversion determined, could be a way to further refine the proposed "trigger-level".

Overall, the results of additional analysis displayed that thorium-230 did not play a significant role in the overall calculated gross-alpha concentrations and would not be able to assist in the "trigger-level" calculations. Therefore, the Division removed the required analysis for thorium-230, with the caveat that analysis could be requested if determined necessary in the future.

Pursuant to the EPA's radiochemistry rule, gross alpha can be substituted for radium-226 in the event that the gross alpha activity is less than 3 pCi/L. However, a standard radium-226 activity of 1.5 pCi/L is assigned and that value is added to the radium-228 activity to determine compliance with the radium-226 + radium-228 MCL. In the event that the gross alpha activity is greater than 3 and less than 5 pCi/L, the radium-226 activity is considered to be equivalent with the gross alpha activity. The radium-226 activity value is then added to the radium-228 activity to determine compliance with the radium-226 + radium-228 MCL. If the gross alpha value exceeds 5 pCi/L, an analysis for radium-226 + radium-228 activity must be performed.

In the submitted EDC, the proposed uranium "trigger level" is 0.01 mg/L or 6.7 pCi/L (when using the EPA approved conversion factor). Utilizing this uranium trigger level could result in a potential exceedance of the radium-226 + radium-228 MCL without the ability to detect it. However, after reviewing the submitted radium-226 + radium-228 activity data, only five sampling events in five separate wells have had an activity of greater than 3 pCi/L, with most ranging between 1 and 2 pCi/L. Due to this, the Division will not require an analysis for radium-226 + radium-228 unless the uranium trigger level is exceeded for two consecutive quarters, in which case the full Profile I-R radiochemistry analysis would be required.

### **C. Receiving Water Characteristics**

The historic Robinson Mining District straddles a regional groundwater and surface water divide. North and east of the divide, groundwater and surface water flows are toward Robinson Canyon and past Ely into Steptoe Valley, which is a terminal basin with a playa. West and south of the divide, groundwater and surface flows are toward Giroux Wash and Jakes Wash, which are tributaries to the White River. The White River, in turn, is a tributary to the Colorado River.

Surface water drainages throughout the mine site are ephemeral, flowing only in response to major precipitation events. North and east of the regional surface water divide, unnamed tributaries within the mine site flow northeasterly towards Gleason Creek, which flows easterly through the town of Ely before turning northward into Steptoe Valley. West and south of the divide, surface drainage flows in a generally southerly direction through unnamed ephemeral tributaries into Giroux Wash and Jakes Wash. Ephemeral unnamed drainages located in the central portions of the Robinson Operation are located in closed basins. Runoff resulting from the 100-year/24-hour storm event is diverted around the regulated process components including the Mill and concentrator circuit, the gold heap leach facilities, and the Giroux Wash Tailings Impoundment.

All mined areas must meet the requirements of NAC 445A.429. That is, mined areas must not release contaminants that have a potential to degrade the waters of the State, and bodies of water that are a result of mine pits penetrating the water table must not create an impoundment which has the potential to degrade waters of the State or has the potential to affect adversely the health of human, terrestrial, or avian life.

Local groundwater flow at the Robinson Operation is complex and is controlled by a variety of structural and hydraulic attributes of the subsurface geologic formations. More than 68 drill holes, many of which were completed as monitoring wells, were originally used to characterize site groundwater conditions. As of the 2016 Permit renewal, groundwater data had been obtained from 240 wells at the site, although many of those had been abandoned or were not monitored for the Permit. Depth to groundwater varies throughout the site, ranging from 3 to 944 feet below ground surface, with depth varying principally by hydrogeologic block. Shallow groundwater is associated with discontinuous, perched alluvial aquifers. Most permanent aquifers throughout the site are located at depths in excess of 100 feet. Groundwater quality also varies, depending upon the hydrogeologic block.

Faulting in the mine area is significant, compartmentalizing the groundwater into at least 12 distinct hydrogeologic blocks. Most of these blocks have unique groundwater characteristics, such as hydraulic conductivity, water depth, and water quality. Detailed information is located in Division files and the Permit application materials.

Mine dewatering in the South Hydrogeologic Block has depressed the groundwater elevation in the town of Ely near Murry Springs. The Permittee has refurbished existing wells and drilled new wells to supplement the affected Ely drinking water requirements.

Extensive studies were commissioned by predecessor operators in 1997 and 1998 to characterize the chemistry, water quality, and geochemical evolution of site groundwater in each hydrogeologic block. The studies identified a representative baseline monitoring well in each hydrogeologic block that exhibits little or no anthropogenic impacts to groundwater quality based primarily on isotopic and trace element analyses. Water quality data from the baseline monitoring wells were used to establish the representative pre-anthropogenic background groundwater chemistry for each hydrogeologic block.

The following Table shows the pre-anthropogenic background groundwater concentrations in each hydrogeologic block that are naturally elevated above current Profile I-R reference values, as observed in the designated hydrogeologic block baseline monitoring wells. Background concentrations for all other Profile I-R parameters that are not listed in the Table are lower than the respective Profile I-R reference values. The background values listed in the Table represent mean concentrations (mg/L) in the baseline monitoring wells plus two standard deviations. These elevated background values are used together with the Profile I-R reference values for the other Profile I-R parameters to represent hydrogeologic block reference values. Any exceedances of hydrogeologic block reference values observed in groundwater wells that are caused by a mining operation represent groundwater degradation. The data and associated footnotes in the Table are taken from the Permittee's 24 January 2008 response to Division comments on background groundwater quality.

Hydrogeologic Block	Baseline Well	Antimony (mg/L)	Arsenic (mg/L)	Cadmium (mg/L)	Iron (mg/L)
Saxton South	SKKR-13M	-	0.046	-	7.850 <sup>b</sup>
Saxton North	SKKR-13M	-	0.046	-	7.850 <sup>b</sup>
Saxton Mineralized	R-C	-	0.025	-	4.706
Robinson Canyon	K-2P	-	0.011	-	-
Smith Valley	NRC-1P	-	0.013	-	-
Ruth North	W-6B	-	0.017	-	7.475 <sup>a</sup>
Ruth South	W-6B	-	0.017	-	7.475 <sup>a</sup>
Ruth Mineralized	W-12	-	0.063	-	10.31
South	WCC-2MR	-	0.012	-	-
Weary Flats	W-7	0.008	0.019	0.009	-
Tripp-Veteran	R-F	-	0.011	-	2.023 <sup>c</sup>
Giroux Wash	WCC-G1R	-	0.016	-	-
Hydrogeologic Block	Manganese (mg/L)	Nitrate + Nitrite as N (mg/L)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Uranium (mg/L)
Saxton South	0.302	-	-	-	-
Saxton North	0.302	-	-	-	-
Saxton Mineralized	0.156	-	1370	2163	-
Robinson Canyon	-	-	547.8	1033	-
Smith Valley	-	-	-	-	-
Ruth North	0.306 <sup>a</sup>	-	901.6	1587	-
Ruth South	0.306 <sup>a</sup>	-	901.6	1587	-
Ruth Mineralized	1.375	-	709.3	1227	-
South	-	-	-	-	-
Weary Flats	4.069	-	1232 <sup>b</sup>	1770	0.050 <sup>c</sup>
Tripp-Veteran	0.117	-	942.4 <sup>c</sup>	1653 <sup>c</sup>	-
Giroux Wash	-	91.45 <sup>d</sup>	-	-	-

- a) Erratic rise in concentration beginning 2002 with unknown cause precludes establishment of a reliable background value at time of report;
- b) Value may require recalculation in future due to long-term decreasing trend;
- c) Long-term increasing trend apparently associated with a major water level drop in 1998 precludes establishment of a reliable background value at time of report;
- d) This background value is accepted for the immediate vicinity of well WCC-G1R only. Other wells in the Giroux Wash Block are subject to Division Profile I-R reference values for all nitrogen-based parameters unless it is demonstrated that the background concentration typically exceeds a reference value;
- e) Value is provisional due to the small number of data points.

The groundwater studies described above, combined with subsequent monitoring data, indicate that many monitoring wells at the site meet all hydrogeologic block reference values. Other monitoring wells, especially certain wells in the Saxton South Block, Saxton North Block, Ruth South Block, Weary Flats Block, and Tripp-Veteran Block, exhibit groundwater that exceeds some hydrogeologic block reference values, but the exceedances appear to be natural due to mineralization associated with the ore deposit. Still other wells exhibit groundwater that has been degraded above hydrogeologic block reference values as a result of mining operations, either the historic mining operations (e.g., MIWs and MIW sources in the Saxton Mineralized Block, Ruth Mineralized Block, Ruth North Block, and Robinson Canyon Block), or the current mining operation (e.g., Giroux Wash Block). The Permittee is actively mitigating historic and current groundwater degradation at the site in accordance with Division requirements.

The Permit requires monitoring of three weather stations at the Robinson Operation for various weather parameters that are necessary for calculations related to design, operation, and closure of components at the site. The three stations are the Giroux Wash Weather Station, Administration Area Weather Station, and Ruth Overlook Weather Station. An EDC was approved by the Division in April 2016 to relocate the Ruth Overlook Weather Station to accommodate future expansion of the Ruth West Pit. The new location is south of the Ruth West Pit, which is southeast of its previous location.

#### **D. Procedures for Public Comment**

The Notice of the Division's intent to issue a Permit authorizing the facility to construct, operate and close, subject to the conditions within the Permit, is being published on the Division website: <https://ndep.nv.gov/posts/category/land>. The Notice is being mailed to interested persons on the Bureau of Mining Regulation and Reclamation mailing list. Anyone wishing to comment on the proposed Permit can do so in writing within a period of 30 days following the date the public notice is posted to the Division website. The comment period can be extended at the discretion of the Administrator. All written comments received during the comment period will be retained and considered in the final determination.

A public hearing on the proposed determination can be requested by the applicant, any affected State or intrastate agency, or any interested agency, person or group of persons. The request must be filed within the comment period and must indicate the interest of the person filing the request and the reasons why a hearing is warranted.

Any public hearing determined by the Administrator to be held must be conducted in the geographical area of the proposed discharge or any other area the Administrator determines to be appropriate. All public hearings must be conducted in accordance with NAC 445A.403 through NAC 445A.406.

#### **E. Proposed Determination**

The Division has made the tentative determination to issue the renewed and modified Permit.

**F. Proposed Limitations, Schedule of Compliance, Monitoring, Special Conditions**

See Section I of the Permit.

**G. Rationale for Permit Requirements**

The facility is located in an area where annual evaporation is greater than annual precipitation. Groundwater depth varies across the site, generally exceeding 100 feet in most locations, and there are several ephemeral creeks as well as perennial and ephemeral seeps and springs as shown in the Assessment of Area of Review of the application. Regardless, the facility must operate under a standard of performance that authorizes no discharge except for excess accumulations that are a result of a storm event in excess of the 25-year/24-hour storm event flow for which containment must be provided. The primary emphasis for identification of escaping process solutions shall be placed on aspects including routine inspection of facilities, proper construction and operation of the facilities, and monitoring, including respective leak detection systems, piezometers, and groundwater wells located throughout the facility. Required Giroux Wash Tailings Impoundment operations include subaerial deposition of tailings, to reduce permeability and enhance tails desiccation, and controls, such as monitoring the depth and the quality of solution in the supernatant pool and the BOC. Facilities shall be monitored in accordance with Permit conditions and current Operating Plans.

**H. Federal Migratory Bird Treaty Act**

Under the Federal Migratory Bird Treaty Act, 16 U.S. Code 701-718, it is unlawful to kill migratory birds without license or Permit, and no Permits are issued to take migratory birds using toxic ponds. The Federal list of migratory birds (50 Code of Federal Regulations 10, 15 April 1985) includes nearly every bird species found in the State of Nevada. The U.S. Fish and Wildlife Service (the Service) is authorized to enforce the prevention of migratory bird mortalities at ponds and tailings impoundments. Compliance with State Permits may not be adequate to ensure protection of migratory birds for compliance with provisions of Federal statutes to protect wildlife.

Open waters attract migratory waterfowl and other avian species. High mortality rates of birds have resulted from contact with toxic ponds at operations utilizing toxic substances. The Service is aware of two approaches that are available to prevent migratory bird mortality: 1) physical isolation of toxic water bodies through barriers (e.g. by covering with netting), and 2) chemical detoxification. These approaches may be facilitated by minimizing the extent of the toxic water. Methods which attempt to make uncovered ponds unattractive to wildlife are not always effective. Contact the U.S. Fish and Wildlife Service at 1340 Financial Boulevard, Suite 234, Reno, Nevada 89502-7147, (775) 861-6300, for additional information.

Prepared by: **Matthew Schulenberg**

Date: **21 June 2022**

Revision 00: Permit Renewal and Major Modification; effective **07 July 2022**;

Modified by: **Keith Johnson, P.E.**

Date: **23 May 2023**

Revision 01: EDC to add two additional monitoring wells, one replacement monitoring well, and one additional pumpback well. Non-fee Review for the addition of sodium hydrosulfide for the suppression of Zink. EDC removed the old truck wash and added new truck wash and overflow pond.

Revision 02: Major Modification for the expansion of the Giroux Wash TSF.

DRAFT