NOTICE OF DECISION – Bureau of Mining Regulation and Reclamation

Date of Web Posting: 08/08/2025

Deadline for Appeal: 08/18/2025

Ioneer USA Corporation
Rhyolite Ridge Project
WPC Permit NEV2020107

The Administrator of the Nevada Division of Environmental Protection (the Division) has decided to issue renewed Water Pollution Control Permit **NEV2020107** to **Ioneer USA Corporation**. This Permit authorizes the construction, operation, and closure of approved mining facilities in Esmeralda County, Nevada. The Division has been provided with sufficient information, in accordance with Nevada Administrative Code (NAC) 445A.350 through 445A.447, to assure that the waters of the State will not be degraded by this operation, and that public safety and health will be protected.

The Permit will become effective **August 23, 2025**. The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to Nevada Revised Statute (NRS) 445A.605 and NAC 445A.407. All requests for appeals must be filed by 5:00 PM, **August 18, 2025**, on Form 3, with the State Environmental Commission, 901 South Stewart Street, Suite 4001, Carson City, Nevada 89701-5249. For more information, contact Allie Thibault at (775) 687-9404 or visit the Division website at https://ndep.nv.gov/posts/category/land.

Comments were received during the public comment period from John Hadder, Great Basin Resource Watch (GBRW); Patrick Donnelley, Center for Biological Diversity (CBD); and Fermina Stevens, Western Shoshone Defense Project (WSDP). Text of all comments, in some cases excerpted, and the Division response (in *italics*) are included below as part of the Notice of Decision. Please note that the terms "pit" and "quarry" are used interchangeably throughout the Notice of Decision.

GBRW, CBD, and WSDP, Written Comment #1

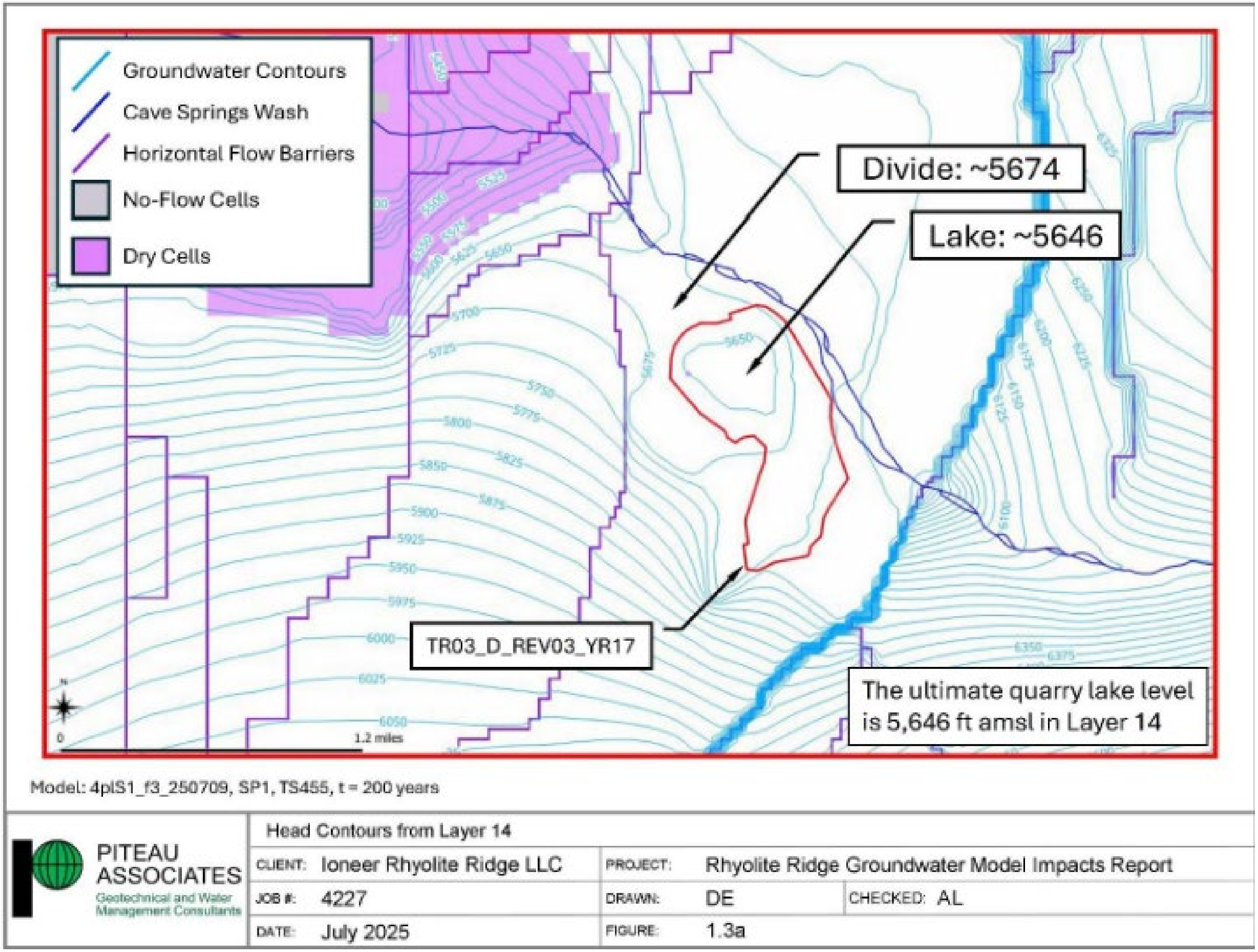
The pit lake could be a flow-through lake

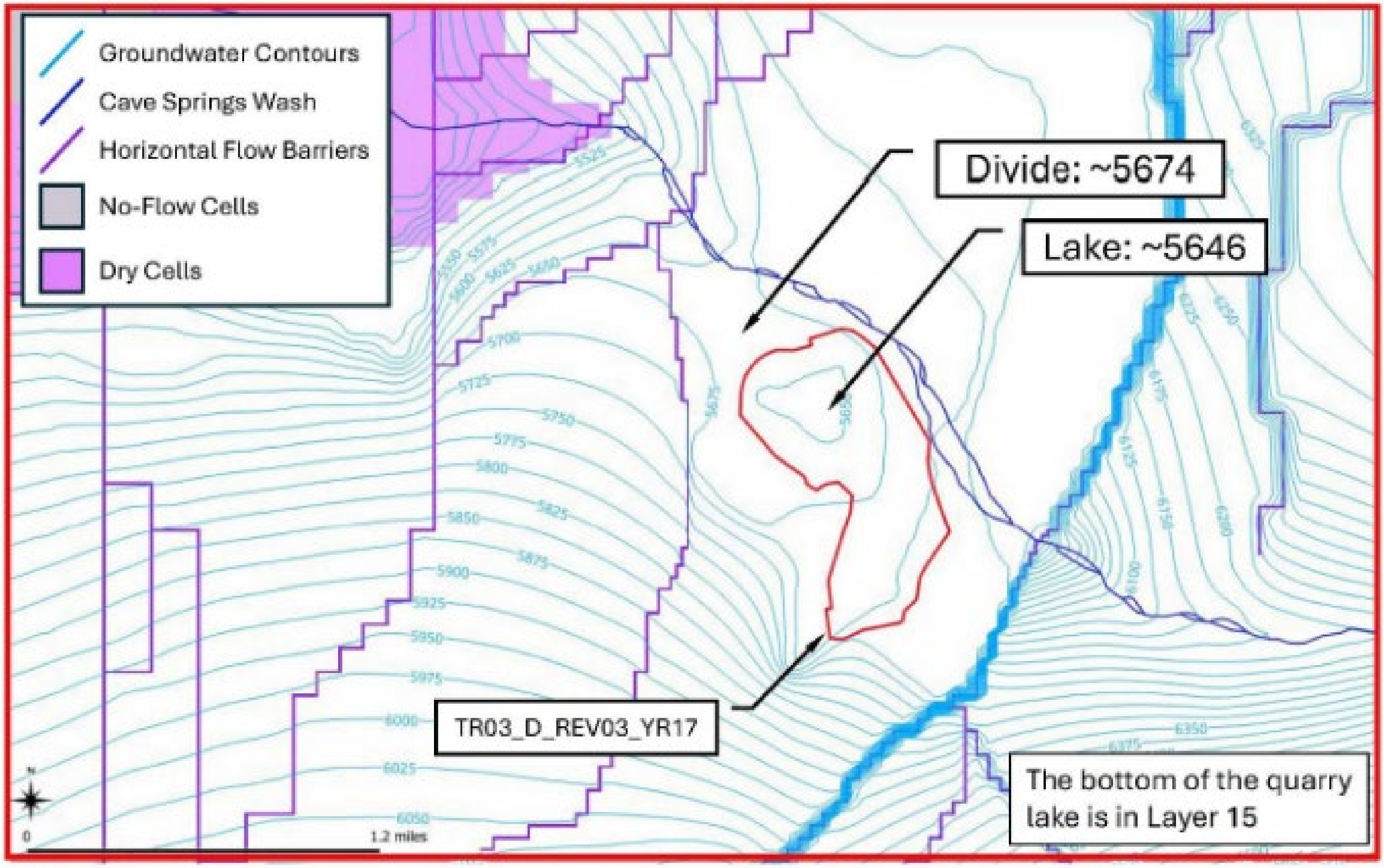
Piteau (2024a) Figure 2.1 shows the long-term pit lake level expected to establish in 60 years after closure. That figure is a sensitivity analysis wherein Piteau considered low and high ET rates and conductivity controlling evaporation from the lake and groundwater flow into the lake. The base case and low- and high-conductivity cases converged on a lake water level of about 5,646 AMSL. The high and low ET cases converged on a lower and higher lake water level. Based on the conceptual model as simulated, the sensitivity analysis provides reasonable certainty regarding the level of the lake.

If the pit lake level exceeds the final groundwater level in surrounding aquifers, there could be flow from the pit lake into the aquifers. Piteau (2023) Figure 4.11 shows the piezometric surface 200 years post closure. There is a closed piezometric contour at 5,650 AMSL in the pit; presumably this contour represents groundwater level intersecting with the pit. This groundwater level is only 4 feet higher than the pit lake. The low ET scenario would result in a pit lake higher than the groundwater level which would allow water to discharge into the aquifers.

<u>Division Response 1:</u>

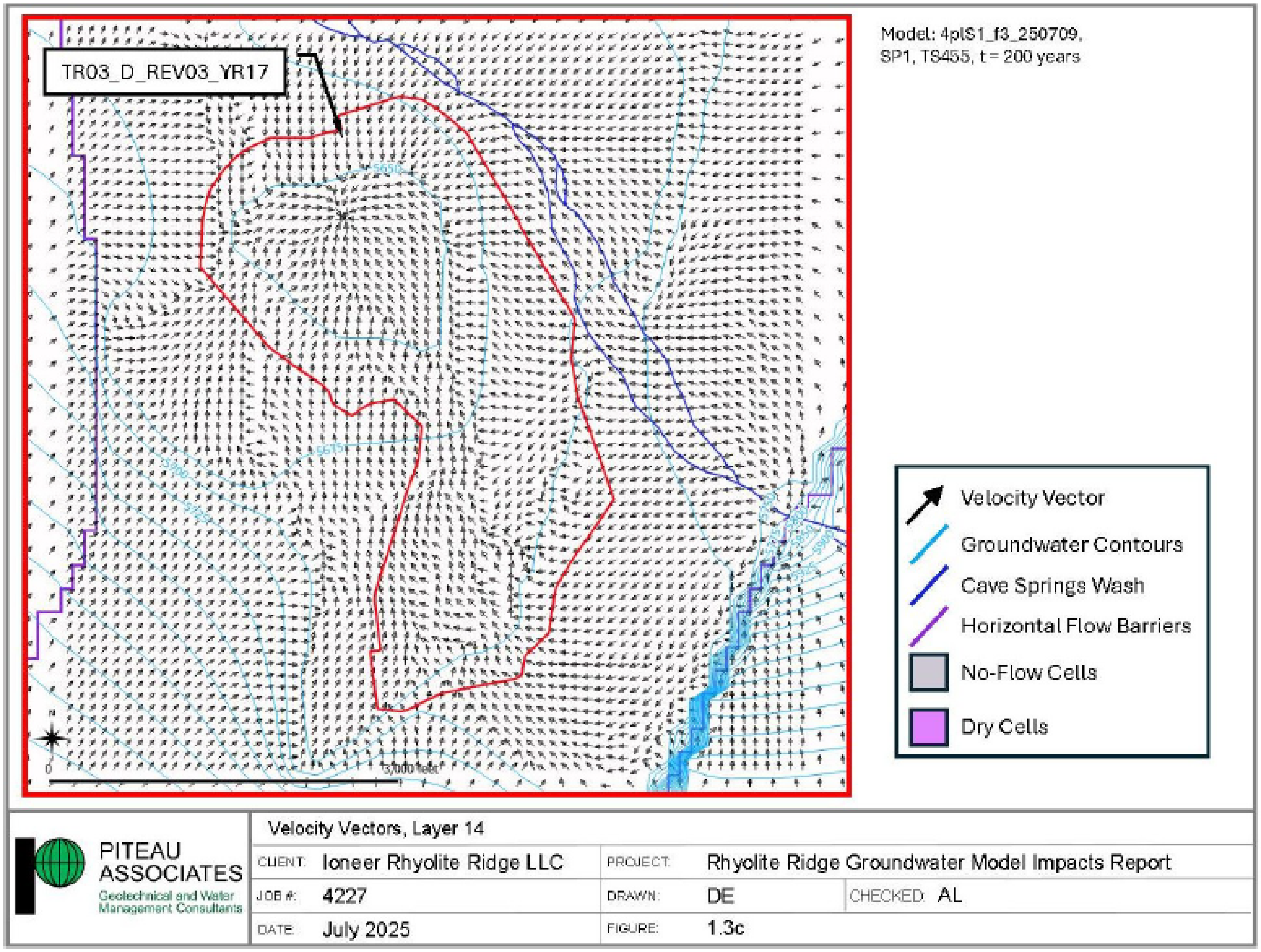
The groundwater divide is at an elevation of approximately 5,674 feet (ft) above mean sea level (amsl) after 200 years of quarry lake recovery. This is higher than the ultimate quarry lake elevation of 5,646 ft amsl providing 28 feet of elevation change, not four-feet of elevation change as stated by GBRW. As stated in Appendix C of the WPCP Application, the final model results show that the quarry lake exists only in layers 14 and 15. Figures 1.3a and 1.3b (below) show groundwater contours for layers 14 and 15 at 200 years post-mining. In both cases, the maps show that the piezometric levels in the aquifer adjacent to the pit lake are always higher than the ultimate quarry level of 5,646 ft amsl. These maps show that the quarry lake is a terminal lake. Figures 1.3c and 1.3d (below) show velocity vectors for layers 14 and 15. In all cases, the vectors along the perimeter of the ultimate quarry outline (labeled with TR03_D_REV03_YR17) show that groundwater gradients are directed inward, towards the quarry lake. Based on a holistic analysis of the model results, the ultimate quarry lake is a terminal lake in all layers.

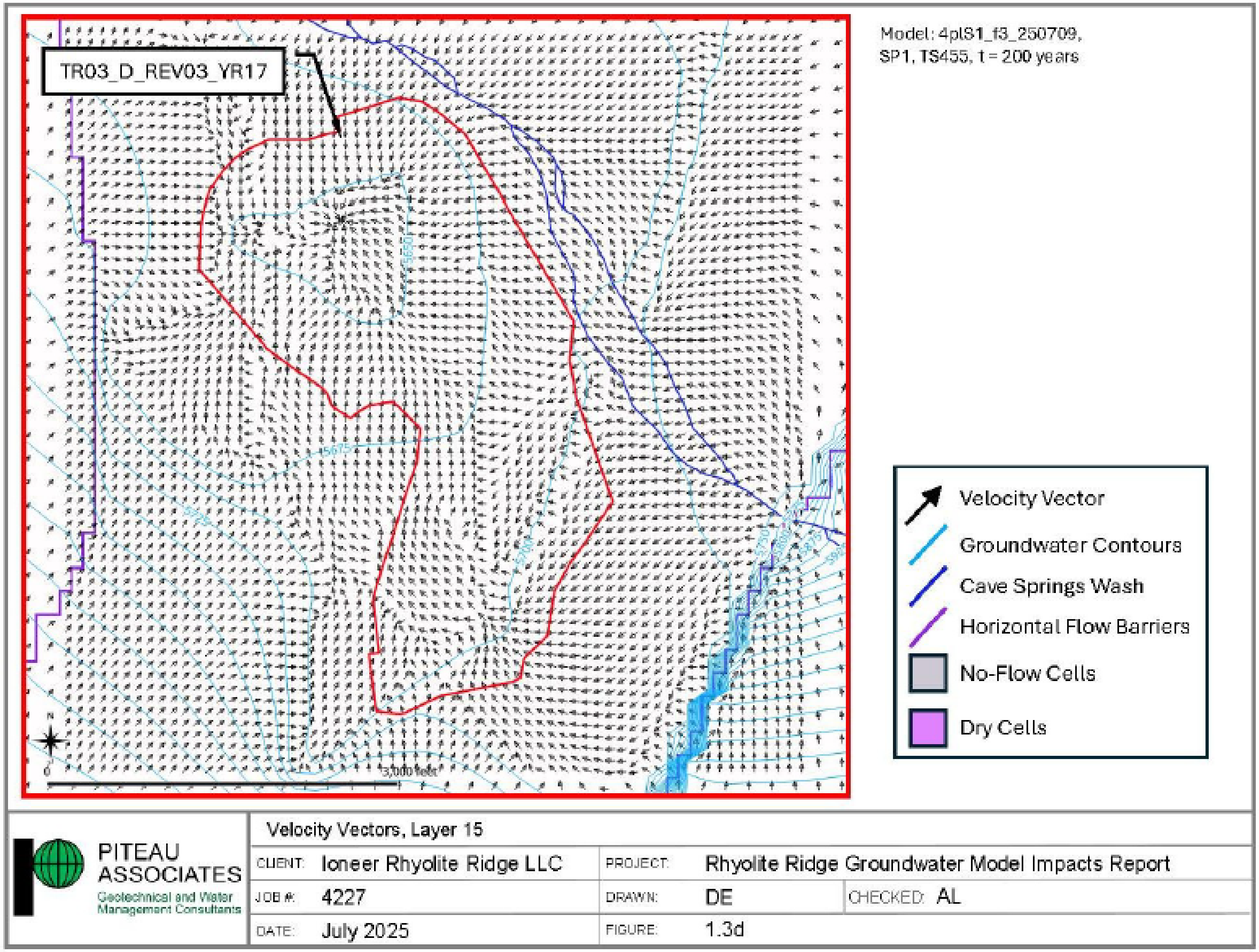

Groundwater Contours
Cave Springs Wash
Horizontal Flow Barriers
No-Flow Cells
Dry Cells
Divide: ~5674
Lake: ~5646
TR03_D_REV03_YR17
The ultimate quarry lake level is 5,646 ft amsl in Layer 14
1.2 miles
Model: 4plS1_f3_250709, SP1, TS455, t = 200 years
Head Contours from Layer 14
PITEAU ASSOCIATES
Geotechnical and Water Management Consultants
CLIENT: Ioneer Rhyolite Ridge LLC
PROJECT: Rhyolite Ridge Groundwater Model Impacts Report
JOB #: 4227
DRAWN: DE
CHECKED: AL
DATE: July 2025
FIGURE: 1.3a



Model: 4plS1_f3_250709, SP1, TS455, t = 200 years

PITEAU ASSOCIATES Geotechnical and Water Management Consultants	Head Contours from Layer 15			
	CLIENT: Ioneer Rhyolite Ridge LLC	PROJECT: Rhyolite Ridge Groundwater Model Impacts Report		
	JOB #: 4227	DRAWN: DE	CHECKED: AL	
	DATE: July 2025	FIGURE: 1.3b		


TR03_D_REV03_YR17
Model: 4plS1_f3_250709,
SP1, TS455, t = 200 years
Velocity Vector
Groundwater Contours
Cave Springs Wash
Horizontal Flow Barriers
No-Flow Cells
Dry Cells
PITEAU ASSOCIATES
Geotechnical and Water Management Consultants
Velocity Vectors, Layer 14
CLIENT: Ioneer Rhyolite Ridge LLC
PROJECT: Rhyolite Ridge Groundwater Model Impacts Report
JOB #: 4227
DRAWN: DE
CHECKED: AL
DATE: July 2025
FIGURE: 1.3c


TR03_D_REV03_YR17
Model: 4plS1_f3_250709,
SP1, TS455, t = 200 years
Velocity Vector
Groundwater Contours
Cave Springs Wash
Horizontal Flow Barriers
No-Flow Cells
Dry Cells
3,000 feet
PITEAU ASSOCIATES
Geotechnical and Water Management Consultants
Velocity Vectors, Layer 15
CLIENT: Ioneer Rhyolite Ridge LLC
PROJECT: Rhyolite Ridge Groundwater Model Impacts Report
JOB #: 4227
DRAWN: DE
CHECKED: AL
DATE: July 2025
FIGURE: 1.3d

<u>GBRW, CBD, and WSDP, Written Comment #2</u>

There is good evidence to suggest that the pit lake evaporation as simulated is too high. Piteau applies an ET rate for the pit lake of 90.7 in/yr pan evaporation rate which yields a 63.5 in/y pit lake evaporation rate. Because the pit lake will be below the pit walls and sheltered from the wind, 0.7 may be an inappropriate pan coefficient which causes Piteau to overestimate the evaporation. Too much evaporation would simulate the pit lake lower than would otherwise be accurate. A higher pit lake level resulting from lower evaporation could cause the pit lake to be flow-through.

<u>Division Response 2:</u>

A lake coefficient of 0.7 was applied to the pan evaporation rate of 90.7 in/yr resulting in 63.5 in/yr. The 0.7 coefficient accounts for a variety of factors including pan heating, wind, aspect, and shading. While there may be some additional wind shielding during the early stages of pit filling, these largely are not present when the lake rises higher in the pit. Moreover, sensitivity analysis conducted by Piteau in their 2024 Pit Lake Model indicates that the model is not particularly sensitive to evaporation rates, and that a decrease in evaporation rate of up to 25% does not have significant impact in the final Pit Lake configuration.

<u>GBRW, CBD, and WSDP, Written Comment #3</u>

Also Piteau did not consider vertical gradients in the groundwater. Piteau (2023) Figure 4.11 shows piezometric surface in model layer 14. However, more layers intersect the pit lake. Some layers could have a lower piezometric surface and pit lake water could discharge into those layers. The modeler should present the piezometric surface for all layers connected to the lake and should also present the flux across the pit lake/geologic layer boundary. Inflow from the lake into just one layer is still a flow- through lake.

<u>Division Response 3:</u>

Comment noted. Please see 2024 renewal application, Appendix D, for the current pit lake modeling technical memorandum, which addresses vertical gradients.

<u>GBRW, CBD, and WSDP, Written Comment #4</u>

When the water levels are this close, it is critical to consider temporal factors that could cause the pit lake to rise and fall. The model considers steady state conditions, meaning steady recharge and ET rates. Recharge in the Great Basin is not constant from year to year. Seasonal factors would likely cause the water level to rise and fall. A large runoff or recharge event could cause the lake level to rise and flow into one of the groundwater layers. It is essential that the factors just described be considered especially when the pit lake level is so close to the piezometric surface.

Division Response 4:

Comment Noted. Please see Division Response 1 and 2 for further discussion

GBRW, CBD, and WSDP, Written Comment #5

The renewal application states that the pit lake will be terminal, and thus also assumes there will be no groundwater quality impacts. The factsheet states that the steady state pit lake water level will be at about 5,644 feet amsl and,

“The final pit lake level will be approximately 176 feet below the pre-mining groundwater elevation resulting in a hydraulic sink. Using sensitivity analyses, the pit lake model accounted for varying climate conditions and predicted hydraulic sink conditions for all simulations, with final pit lake levels ranging from approximately 168.5 to 189 feet below the surrounding groundwater elevation.” (p. 10)

Using the pre-mining groundwater level provides only a rough estimation and is typically an inaccurate way to assess whether the pit lake will be terminal. As discussed above, Figure 4.11 from Piteau 2023 shows the expected groundwater level post-mining, which is a better assessment of whether the pit lake has the potential to be flow-through. Using this more realistic comparison there is only about a 4 foot difference in the expected pit lake level and post-mining groundwater level around the pit, and not the range of 168.5 to 189 feet mentioned in the factsheet. Clearly, seasonal variations or even a high pit wall runoff could raise the water level and cause pit lake water to flow into the surrounding groundwater.

Division Response 5:

Comment Noted. The fact sheet is updated as additional information is received. Please see Division Response 1 for further details.

GBRW, CBD, and WSDP, Written Comment #6

The pre-mining and post-mining water table will not be flat but sloped across the pit. A lake would be a flat surface. The question not considered in the renewal application or supporting documents is whether that flat surface exceeds the recovered groundwater level at any point along its perimeter or provides sufficient pressure into a confined aquifer intersected by the lake to cause flow.

Division Response 6:

The model simulates pre-mining sloping groundwater and a post-mining flat pit lake. There is no point along the perimeter of the quarry where the post-mining water table is estimated to drop below the lake level.

GBRW, CBD, and WSDP, Written Comment #7

The analysis fails for two reasons:(1) a failure to consider seasonal flows or annual dry periods and, (2) assuming the evaporation rate from the lake is too high.

Division Response 7:

Comment Noted. Please see Division Responses 2 and 8 for further discussion.

GBRW, CBD, and WSDP, Written Comment #8

The predictive modeling uses an annual time step for 200 years (HGL 2020b, p 25). Therefore, the modeling does not account for seasonal variability or long-term dry conditions. Groundwater levels that respond to recharge by rising tens of feet could cause significant fluctuations in the pit lake. Due to differing geologic formations intersecting the quarry, the groundwater level may recover at different rates around the pit. It is possible that quarry water could enter formations either seasonally or after the rapid recovery from a long-term drought. Due to the steep groundwater gradient to the northwest, groundwater could reach the pathway down the drainage and discharge into Fish Lake Valley.

Division Response 8:

There is no indication in any of the model runs that the lake will become flow-through. . Please see Division Response 1 for further discussion.

GBRW, CBD, and WSDP, Written Comment #9

The pit lake level could fluctuate, possibly wetting and drying reactive rock or (2) even allowing the pit lake to occasionally flow through. Being flow-through is especially important because the groundwater divide is just 4 feet above the pit lake level; it is easy to imagine fluctuations around that based on high flow periods as mentioned above.

Division Response 9:

There is no indication in the analysis that the lake will become flow-through. Please see Division Response 1 for further discussion.

GBRW, CBD, and WSDP, Written Comment #10

Several things could be done to more accurately model this. For one, Piteau could specify recharge by month to reflect seasonality. To reflect drought, they could change the rates by year. This would require consideration of stochasticity in the annual precipitation, but there is plenty of research about that, including how recharge actually occurs maybe once a decade rather than being spread evenly among years. They also need to be more careful about where the recharge actually occurs because this affects the calibrated hydrologic parameters and the beginning of the flow paths.

Commenters recommends that NDEP request that Piteau inprove [sic] the accuracy as discussed in the above paragraph.

Division Response 10:

Comment Noted. Schedule of Compliance Item 4 in Permit section I.B.4 requires the Permittee to submit to the Division for approval a work plan for the updated Groundwater and Pit Lake models.

GBRW, CBD, and WSDP, Written Comment #11

Piteau applies an ET rate for the pit lake that is too high. It uses a 90.7 in/yr pan evaporation rate which yields a 63.5 in/y quarry lake evaporation rate. Because the pit lake will be below pit walls and sheltered from the wind, 0.7 may be an inappropriate pan coefficient which causes Piteau to overestimate the evaporation. Too much evaporation would simulate the quarry lake lower than would otherwise be accurate. A higher pit lake level resulting from lower evaporation could cause the quarry lake to be flow- through.

The evidence therefore is that the pit lake will likely have periods during which it is flow-through and discharges into surrounding groundwater.
NDEP needs to require Ioneer to address the flow-through scenario as likely even if intermittent and provide a defensible mitigation plan to avoid groundwater contamination.

Division Response 11:

Comment Noted. Please see Division Response 2.

GBRW, CBD, and WSDP, Written Comment #12

NDEP needs to request Ioneer to consider an alternative where the mine pit is backfilled to avoid a mining pit lake or seasonal wetland in the pit area.

Carefully implemented backfilling will eliminate the permanent groundwater draw from a mining pit lake. Judicious development of the mining pit and choice of backfill will allow groundwater to flow through the pit without degrading groundwater. This is approach is becoming more common and is being implemented in Nevada. For example, the Water Pollution Control Permit application submitted by Kinross mining corp for the Bald Mountain Mine in March 2018 describes a plan for backfilling of the “Top Pit,” which would have a pit lake if not backfilled. The objective for backfilling this pit is, “To avoid groundwater depletion, any pit where the pit bottom is at or below the groundwater elevation, is to be backfilled using material that meets the criteria as presented in Section 3.2.2.” The proposed Rhyolite Ridge mine pit lake would be large and have an even greater effect on groundwater.

Backfilling the pit in this way would also serve an effective mitigation component to surface waters, wetlands, and springs that would be affected by the long-term drawdown from the pit lake. In addition this type of mitigation is also a way to preserve spring sources.

Monitoring wells will need to be established to up and down gradients from the backfill pit to determine whether groundwater quality is being affected. If so, a mitigation scheme of pump and treat will likely be needed. Even if the pit is not backfilled it is likely that there will be flow through at times, so a monitoring network and a plan to pump and treat would still be needed.

In the Great Basin where water is scarce it is irresponsible to allow a pit lake to form where the water will be wasted, since access is not allowed.

Division Response 12:

Comment Noted. The Division does not have regulatory authority to require Permittees to consider alternative management techniques.

GBRW, CBD, and WSDP, Written Comment #13

The pit Lake water quality forecast systematically underestimates the load of acidity and other solutes by ignoring the fact that sulfide S reacts over time.

As background, the method used to simulate aqueous chemical reactions in the proposed pit lake seems sound. Specifically, the method of adding solute loads to the lake as volumes of waters that represent the various sources, where each waters has a complete chemical analysis, simplifies (and thus clarifies) the model approach, and implements the task of mixing solutes and simulating aqueous reactions using the well verified USGS geochemical model PHREEQC.

But the wall rock around the proposed pit and the rock that is proposed for the partial backfill contains appreciable sulfide (up to 1.94% sulfide S), and include some net-acid generating rock (HydroGeoLogic 20205, Appendix C, Summary of ABA and NAG pH Results; Piteau 20226, Figure 4.3 Wall Rock exposed and covered by backfill [TR03_D Plan]; and Piteau 2022, section 4.3 Geochemical Unit Description, Pages 34 and 35). As demonstrated in the kinetic tests ("humidity cells") conducted on rocks from the Rhyolite Ridge deposit (and as demonstrated in essentially all humidity cell tests), the rate at which solutes are released by sulfide minerals is limited by the kinetics of the oxidation process. Thus the model of solute leaching from runoff and eventual flooding of the Rhyolite Ridge pit needs to account for the duration over which that rock has been exposed to the atmosphere.

Piteau's description of the model does identify the fact that the duration of wall-rock exposure to the atmosphere affects the concentration in rock leachate: "The geochemical composition of run-off depends on the exposure of rock in contact with water and the frequency of precipitation that rinses the rock exposure" (Piteau 2022, Section 4.2.4 pit Wall runoff, Page 31). That is, less frequent rinsing means that there is a longer period for soluble oxidation products to accumulate between rinses, thus producing higher concentration in rinsate.

But in implementation, the model ignores entirely the duration over which sulfide-bearing wall rock is exposed to the atmosphere, and instead assumes that the concentrations of water leaving each rock type is constant over the entire duration of the model simulation. (These constant aqueous solutions, "geochemical profiles," are assumed to represent runoff from the various sulfide-bearing pit wall-rock types, or the flushing of accumulated solutes deeper in the pit wall rock when they are submerged; Piteau Associates 2022, Table 4.5 Base Case runoff chemistry [average final 8 weeks of humidity cell tests], and Table 4.6 Base Case flushing chemistry [average weeks 0-4 of humidity cell tests.])
The underestimate introduced by this model assumption is particularly extreme when considering the "slug of accumulated weathering products [that] is released into the lake from the reactive zone near the water line" (Piteau 2022, 4.3.1 Mass Loading Profiles, Page 36). This describes the fractured rock zone that is behind the pit face, and is only flushed to the pit lake when submerged by the lake surface. As the lake reaches its final elevation, the leachate will carry the solutes accumulated after oxidizing for ~40 years; but this is simulated in the model by assuming it is equal to the concentration observed after oxidizing a rock sample in a lab test for one week. In fact, sulfide-bearing rock that oxidizes for 40 years will undoubtedly have released much more soluble pollutants than the same rock oxidized for a week.

Beyond the problem with the variable durations of oxidation, the assumption that the concentration measured in a controlled laboratory kinetic test would accurately represent field conditions is entirely arbitrary. For the type of highly soluble elements released by sulfide mineral oxidation, there is no basis for assuming that the concentration in a rigorous laboratory kinetic test (water:rock ratio 1:1) would match the concentrations observed under field conditions, where hydraulic flow and the associated water:rock ratios vary widely.

The remedy is to alter the model so that it incorporates an explicit estimate for the rate at which sulfide S oxidizes in exposed pit wall, and the duration over which wall rock is exposed to the atmosphere before it is flooded. With this approach, the load of solutes released from the wall rock by oxidation can then be loaded to the pit lake as appropriate, based on when they are flushed with runoff or groundwater.

NDEP should require Ioneer to correct the error discussed above, update the load of acidity and other solutes, and reevaluate the toxicity of the mining pit lake. In addition reassess the ecological pit lake risk.

Division Response 13:

Geochemical and hydrogeological studies, including Pit Lake Studies, Fate and Transport Models, and Ecological Risk Assessments, are ongoing investigations in the Water Pollution Control Permit per section I.N. Updated models that reflect changing site conditions are required at least once every permit renewal and with every change that materially affects the predictive model.

GBRW, CBD, and WSDP, Written Comment #14

Modeling analysis incorrectly ignores long term leaching

Piteau (Piteau 2022) states in their pit lake modeling that, “After initial flushing, submerged backfill is assumed to be non-reactive and no further solutes are released.” It is possible that oxidation processes could largely discontinue once the backfill is inundated and dissolved oxygen is consumed. However, leaching from the backfill could continue for many years even hundreds of years as it does for the backfill at the proposed Thacker Pass project. The assumption used by Piteau is very non-conservative and BLM should require Piteau to lift that assumption in the pit lake (pit lake) analysis.

Division Response 14:

Comment noted. Please see Division responses 12 and 13 for further discussion. .

GBRW, CBD, and WSDP, Written Comment #15

The plans for post-closure management do not to account for the unresolvable uncertainty in model forecast of pit-lake water-quality, particularly with respect to anticipating lake treatment for arsenic and antimony.

The meteoric water mobility procedures (MWMP) tests presented in the 2025 Interim Geochemical Assessment points to five constituents of particular concern. Specifically, the “exceedance frequency analysis indicates that As, Sb, TDS, SO4, and Mn may exceed Profile I reference values in contact waters” (Piteau 2025). The acid-base accounting results from rock in Rhyolite Ridge Mine deposit make a case that the Rhyolite Ridge pit lake water will have near-neutral pH. But these 5 solutes do tend to leach from rock at elevated concentrations, and two of them, antimony and arsenic, are of particular concern because they have high toxicity to humans and tend to be soluble under neutral to alkaline pH. Again from the Interim Geochemical Assessment: "Sb [antimony] exceeds its Profile I reference value in 79% of all samples, with exceedance frequencies of >88% in all material types, except for the lacustrine and volcanic units which have exceedance frequencies of 38% and 57%, respectively"; and "the Profile I exceedance frequency for As [arsenic] is 87% across the complete dataset, with a minimum of 62% for lacustrine materials and >86% for all other units" (Piteau 2025). These results indicate that, in general, the concentrations of soluble arsenic and antimony across the Rhyolite Ridge deposit rocks are significantly elevated relative to the Nevada Profile I concentrations. This high regional concentration of arsenic and antimony, in combination with the presence some acid-generating rock, indicates a particular risk. Specifically, sulfide-mineral oxidation and associated acidic leachate adding to the pit lake is likely to solubilize arsenic and antimony bound in sulfide minerals and adsorbed on the surface of iron oxides, and thus increase the load of these metals relative to loads released from MWMP tests.

A response to this concern begins with recognizing that uncertainty in the model used to forecast future water quality in the pit lake is large, which reflects poorly defined values for key parameters (e.g., porosity in wall rock and diffusivity of oxygen into rock fragments), and model assumptions that cause systematic underestimates of pollutant loads to the lake (i.e., excluding a rigorous accounting for the duration over which sulfide minerals in the quarry-lake wall rock oxidize before being flushed to the lake) (Piteau 2024a). Rather than contest the accuracy of the Rhyolite Ridge quarry lake water-quality model, we ask that closure requirements include creation of a long-term fund for perpetual management of the Rhyolite Ridge quarry lake, and that this fund be sufficient to cover the cost of active treatment of the pit lake for arsenic, antimony, and manganese in order to maintain concentrations of these pollutants below established thresholds for ecological and human-health risk.

NDEP should require plans for post-closure management to account for the unresolvable uncertainty in model forecast of quarry-lake water-quality, particularly with respect to anticipating lake treatment for arsenic and antimony.

<u>Division Response 15:</u>

NAC 445A.447 requires that the permittee submit a Final Plan for Permanent Closure for all sources identified by the Division at least two years before the anticipated permanent closure of the facility. To aid in this planning the Division requires regular monitoring and updated reports, including requiring updated Pit Lake Models, Fate and Transport Models, and Geochemical Characterization Reports per Part I.N of the Permit.

GBRW, CBD, and WSDP, Written Comment #16

The currently used pit lake water quality model doers[sic] not account for new data.

The expanded data set described in the 2025 Interim Geochemical Assessment indicates that the criterion NPR < 1.2 is a generally reliable indicator of which rock will actually produce acidic leachate under field conditions [i.e., "NPR is a good predictor of PAG behaviour according to NAG test results. As such, it is proposed that PAG classification should be defined as NPR <1.2." (Piteau 2025)]. Further, this 2025 geochemical assessment notes that, across all representative samples of rocks, "(33%) display uncertain PAG potential" (Piteau 2025). Thus, while the additional environmental analyses demonstrate convincingly that the quarry wall and waste rock exposed by the Rhyolite Ridge mine will be, on average, net-neutralizing, they also demonstrate that an appreciable fraction of the excavated rock will be net-acid generating, particularly from rock units G6, Tbx, S3, Tlv, and M4 [see figure Figure 3.7 [sic], NAG pH - Neutralization Potential Ratio (NPR) cross plot colored by lithology (top) and PAG classification (bottom). Reference lines at NPR 1.2 and NAG pH 4.5 reference lines (Piteau 2025)]. This acid-generating fraction of the exposed rock will probably produce the majority of load of sulfate and soluble metals to pit lake,and thus need to be included in the estimate of future water-quality in the pit lake.

NDEP needs to require the pit-lake water quality model needs to be updated to incorporate the additional environmental analyses (acid-base accounting, humidity cells, and MWMP tests) on waste- and pit-wall rock. Commenters is aware of the schedule of compliance item on this, but this data should be incorporated into the current renewal – see comment below.

Division Response 16:

Comment noted. In addition to the Schedule of Compliance item for completion of the model, the Permittee is constrained to not mine below the water table by the current Permit . The Division feels these are sufficient assurances to issue a renewed permit at this time, given the ongoing nature of such investigations.

GBRW, CBD, and WSDP, Written Comment #17

Overall, NDEP should independently assess the water quality analysis and solute loading into the pit lakes. The project needs contingency funds to provide long-term monitoring and management of the pit lake water in the short term, and to provide perpetual management far into the future.

Division Response 17:

Comment noted. Determination of required financial assurance is outside the scope of the Division's decision to issue or deny a Water Pollution Control Permit.

GBRW, CBD, and WSDP, Written Comment #18

Ioneer analyzed only two tailings samples with widely divergent properties.

NewFields (2020a)7 measured the geotechnical properties of only two samples of tailings, referred to as “Vat 3” and “IBC Cycle 1” (see Fig. 3a). The two samples had very different geotechnical properties. The specific gravities of the fine-grained tailings were either 2.42 or 2.68 (see Fig. 3b), while the percentages of fine-grained tailings were either 15.3% or 27.3% (see Fig. 3c). For sample “Vat 3,” the dry density after maximum compaction was 71.3 pounds per cubic feet, which was achieved at the optimum geotechnical water content for maximum compaction of 20.6% (see Fig. 3d). For sample “IBC Cycle 1,” the dry density after maximum compaction was 79.2 pounds per cubic feet, which was achieved at the optimum geotechnical water content of 30.7% (see Fig. 3d). For an unexplained reason, the shear strength parameters (cohesion and friction angle) were measured using the direct shear test on “Vat 3” and the triaxial test on “IBC Cycle 1,” so that it is difficult to compare the two samples (see Fig. 2e). Finally, the hydraulic conductivity of “Vat 3”\ was two orders of magnitude greater than that of “IBC Cycle 1” (see Fig. 3f).

In summary, the geotechnical parameters of the tailings that will be used to construct the SOSF are very poorly known. For a filtered tailings storage facility, one of the most important parameters is the optimum geotechnical water content, which is known only to be somewhere in the range of 20-30% (see Fig. 3d).

NDEP needs to require more geotechnical data from Ioneer so the operation and long-term management of the facility can be assessed.

Division Response 18:

Current designs and stability analysis for the Spent Ore Storage Facility submitted by Ioneer in Appendix J of their 2020 Application for Water Pollution Control permit meets the requirements of NAC 445A.437. The two samples referred to are two different waste streams from the processing plant. One is of the vat leach tails while the other is the salt created in the process. Since the samples are from two very different processes the characteristics of each are different. For more information on the samples see Appendix J of the Application.

GBRW, CBD, and WSDP, Written Comment #19

The Appropriate Method For Measuring Water Content Has Not Yet Been Determined.

NewFields (2020a) obtained very different water contents for the two samples, depending upon the drying temperature and the drying time. For “IBC Cycle 1,” geotechnical water contents ranged from 34.8% to 39.9% for drying at 60°C and ranged from 45.5% to 48.4% for drying at 110°C (see Fig. 4a), thus also showing the very different water contents of subsamples of “IBC Cycle 1.” An additional sample “Vat 4” showed geotechnical water contents of 33.0% and 37.0% for drying at 60°C and 110°C, respectively (see Fig. 4a). For an unspecified sample, the measured geotechnical water contents ranged from 38.3% to 41.5% for drying from 24 to 48 hours (see Fig. 4b). NewFields (2020a) never resolved the issue as to the correct procedure for measuring the geotechnical water content of tailings, but acknowledged that it was a crucial issue. According to NewFields (2020a), “Based on the data, it has been determined that the drying temperature has an effect on the measured moisture content … The influence of temperature and time on the measured moisture contents indicates that absorbed, structural water is present in the spent ore. This phenomena has implications on additional laboratory testing so that data reported by different entities is comparable. More importantly, it has implications for construction, operations and field control of compacted spent ore and composite waste materials.”

NDEP needs to require Ioneer to determine how to measure water content to understand the drainage volume of the facility.

<u>Division Response 19:</u>

In the original WPCP application, the Permittee states that the maximum dry density (MDD) and optimum moisture content (OMC) shall be determined in accordance with ASTM D1557. Further, structural sections of the Spent Ore Storage Facility has a specified moisture content of ±5% of OMC and a compaction requirement of 95% of MDD. This meets the requirements of NAC 445A.433(f). The Permit also requires, per Part I.D.4 and I.D.5, the Spent Ore Storage Facility to be monitored for fluid head in the facility and the pond for the quality of any solution captured, respectively.

<u>GBRW, CBD, and WSDP, Written Comment #20</u>

There is no reliable stability analysis [for the Spent Ore Storage Facility]

It is difficult to connect the properties that were assumed in the stability analyses (see Fig. 5) with the properties that were measured in the two tailings samples (see Figs. 2a-e). For example, NewFields (2020a) states that the tailings in the structural zone will be compacted to 95% of their maximum dry density. On that basis, and based on the measured maximum dry densities, optimum geotechnical water contents, and 95% compaction, the compacted wet weights of samples “Vat 3” and “IBC Cycle 1” would be 81.7 and 90.7 pounds per cubic feet, respectively. Thus, it is difficult to understand and it is not explained how NewFields (2020a) arrived at a unit weight of 100 pounds per cubic foot for the structural zone (see Fig. 4). The geotechnical parameters for the common fill and the alluvium were not related to measurements, but were only estimates that were defended by recourse to “experience.” According to NewFields (2020a):

“Local alluvium will be sourced for common fill and a conservative frictional strength was considered for the stability evaluation for the SOSF and the Underdrain Pond embankments … The site is underlain by dense to very dense alluvium. Any loose materials at the ground surface will be stripped, as necessary, and the surface compacted prior to facility development. The unit weight and shear strength of this material were estimated based on our regional experience."

In addition, the stability analyses assumed a low water table without justification. Specifically, they assumed that the water table within the filtered tailings facility would be only 5 feet above the geomembrane. According to NewFields (2020a), "The phreatic surface [water table] within the SOSF was conservatively modeled five feet above the geomembrane, representing minor accumulation of draindown fluid along the liner." The assumption was not conservative in any way because, due to precipitation, surface runoff, water contained within the tailings, and the ongoing consolidation of the tailings (which reduces the pore space), the water table can often rise to one- third to one-half of the height of the filtered tailings stack. In fact, the very same month (April 2020), NewFields (2020b)8 carried out stability analyses for the clay tailings filter stack (CTFS) at the Thacker Pass mine that assumed that the water table will rise to one-half of the height of the tailings stack. Moreover, both sets of stability analyses made the same assumption that draindown of water within the tailings stack would be negligible.

NDEP needs to require Ioneer connect the properties that were assumed in the stability analyses to allow for the evaluation of stability.

<u>Division Response 20:</u>

The NewFields (2020a) report provides justification for the properties used for the stability analysis. The report states, "the unit weight was based on existing moisture-unit weight relationships with the material compacted to 95% of the maximum dry unit weight." The applied unit weight value was taken from consideration of measured moisture density relationships in the laboratory for spent ore (modified Proctor) as presented in Section 3 of the report. The bulk unit weight at the optimum moisture content from the laboratory data was approximately 86pcf (Vat3 sample) to approximately 103pcf (IBC Cycle 1 sample). The evaluation applied the upper end of that range for the structural fill.

The bulk unit weights for all materials were considered in the stability evaluation. Refer to Appendix E of the report, which presents the material property tables on the limit equilibrium stability output graphics.

<u>GBRW, CBD, and WSDP, Written Comment #21</u>

The Application and supporting documents do not consider the consequences of failure of the tailings storage facility.

Despite the finding that the SOSF will be unstable in response to an earthquake with a return period of 475 years, there is no discussion of the consequences of failure of the SOSF and there does not seem to be any available document that discusses this question. The first and obvious question is the destination of the tailings after failure of the filtered tailings stack. The EIS needs to analyze the effect of failure especially given that the Tailings disposal facility (SOSF) is in the drainage.

The need for a dam break analysis is emphasized in numerous mining industry guidance documents. According to the SME (Society for Mining, Metallurgy and Exploration) Tailings Management Handbook, “While many designs are robust, it is industry practice to perform a tailings breach assessment (TBA) so that the consequences of failure are known and mitigation measures and emergency response can be developed in the unlikely event of failure” (Clohan and Kidner, 2022).9 According to the International Commission on Large Dams (ICOLD), “The tailings dam breach assessment is used to assess the potential tailings transport and flooding downstream of the dam and to map the extent of land disturbance” (ICOLD, 2022). According to Safety First: Guidelines for Responsible Mine Tailings Management, “The time it takes for a tailings flood to reach a community must be calculated based on a dam break study conducted for the specific tailings disposal facility … An analysis of public liability resulting from the tailings facility failure must be updated on a yearly basis and made publicly available. It must be based on the worst-case outcomes derived from dam break studies …” (Morrill et al., 2022).

In response to the catastrophic failure of a tailings dam at Brumadinho, Brazil, in January 2019, which resulted in 272 deaths, including 258 mineworkers, the International Council on Mining & Metals (ICMM), the United Nations Environment Programme (UNEP), and Principles for Responsible Investment (PRI) released the Global Industry Standard on Tailings Management (GISTM) on August 5, 2020 (ICMM- UNEP-PRI, 2020). Company Members of ICMM were obligated to fully comply with the GISTM by August 5, 2023 (ICMM, 2020, 2021). Although Ioneer is not a Company Member, it is noteworthy that Association Members of ICMM include the Australasian Institute of Mining and Metallurgy (AusIMM), the International Lithium Association (ILiA), the Minerals Council of Australia (MCA), the US-based National Mining Association (NMA), and the US-based Society for Mining, Metallurgy and Exploration (SME)(ICMM, 2024). Thus, the expectation for compliance with the GISTM is well-established in Australia, the USA, and the lithium mining industry.

Requirement 2.3 of the GISTM states that mining companies must “Develop and document a breach analysis for the tailings facility using a methodology that considers credible failure modes, site conditions, and the properties of the slurry … the results should include estimates of the physical area impacted by a potential failure, flow arrival times, depth and velocities, and depth of material deposition” (ICMM-UNEP- PRI, 2020). According to Requirement 2.4, “In order to identify the groups most at risk,” mining companies must “refer to the updated tailings facility breach analysis to assess and document potential human exposure and vulnerability to tailings facility credible failure scenarios” (ICMM-UNEP-PRI, 2020). According to Requirement 15.1, mining companies must “Provide local authorities and emergency services with sufficient information derived from the breach analysis to enable effective disaster management planning” (ICMM-UNEP-PRI, 2020).

The key word in the preceding requirements is “credible.” Thus, the need for a dam break analysis depends upon whether failure is “credible.” According to the GISTM, “The term ‘credible failure mode’ is not associated with a probability of this event occurring” (ICMM-UNEP-PRI, 2020). Thus, “credible” simply means “physically possible,” no matter how unlikely. According to Safety First: Guidelines for Responsible Mine Tailings Management, a “credible failure mode” is “a physically possible sequence of events that could potentially end in tailings dam failure” (Morrill et al., 2022). Failure of the SOSF is certainly credible, since NewFields (2020) has shown the SOSF will be unstable in response to an earthquake with a 475-year return period (see Fig. 6).

The requirements of the Australian Committee on Large Dams are also included here simply because Ioneer is an Australian company. According to ANCOLD (2019), “The Dam Failure Consequence Category is determined by evaluating the consequences of dam failure with release of water and tailings through a risk assessment process. This will lead to selection of appropriate design parameters to manage the risks. The assessment is undertaken by considering the potential failure modes of the facility and the resulting consequences to the business, the social and natural environment and the potential for loss of life …” ANCOLD (2019) also emphasizes that the dam break study is an essential component of the emergency plan, which should be updated annually. According to ANCOLD (2019), “A Dam Safety Emergency Plan (DSEP), in conjunction with appropriate emergency authority planning, should be prepared for tailings dams where any persons, infrastructure or environmental values could be at risk should the dam collapse or fail … The DSEP should include an appropriate dam break study with the conservative assumption of liquid tailings flow in the event of dam failure unless a more sophisticated analysis of water and/or tailings flow can be justified. DSEP’s are to be updated annually and tested at regular intervals.”

NDEP needs to require Ioneer to supply a credible failure analysis. Failure of the tailings will very likely result in significant toxics reaching waters of the State, so an plan should be in place to prepare for this possibility. This is particularly important given that a tailings facility of this type is new for Nevada and novel in general.

Division Response 21:

The stability analysis for the Spent Ore Storage Facility, submitted as Appendix J of Ioneer’s 2020 application for Water Pollution Control Permit, meets the requirements of NAC 445A.433(1)(f). As a result of the analysis in Appendix J, the design was modified to include an additional 15-foot of containment surrounding the facility to capture any material that may shift in a seismic event resulting in keeping process material on containment.

GBRW, CBD, and WSDP, Written Comment #22

The WPCP application has no plan for ensuring the appropriate water content proper compaction.

The outcome of the analyses of tailings properties and the stability analyses in NewFields (2020a) is the design criteria for the SOSF. The optimum geotechnical water content is stated as the range 25-35% (see Fig. 7), which is quite a large range. The design criteria do not state how the water content will be measured or why the range of 20-30% that was found for the two tailings samples (see Fig. 3d) is irrelevant. The line below states the geotechnical water content of the tailings as 35-75% (see Fig. 7), which presumably means the expected water content as the tailings leave the filter presses. Thus, the filtered tailings are expected to be far wetter than optimum and there is no discussion of any plan for obtaining the appropriate water content for proper compaction. For reference, based on a bulk dry density of 75 pounds per cubic foot, and a particle specific gravity range of 2.4-2.6 (see Fig. 7), the saturated geotechnical water content would be in the range 41.6-44.8%, so that the expectation is that much of the filtered tailings will be over-saturated (with considerable free water) after leaving the filter presses. It will be impossible to safely construct the filtered tailings storage facility with such over- saturated tailings.

NDEP should require Ioneer to provide a credible plan for ensuring appropriate water content for proper compaction.

Division Response 22:

Appropriate compaction and water content for structural zones will be determined using ASTM D1557, as stated in engineered stamped drawings for the construction of the Spent Ore Storage Facility submitted in the 2020 permit application, Appendix J. Additionally, a monitoring requirement has been added to the permit, Section I.D.14, for quarterly monitoring of the Spent Ore Storage Facility for physical stability and evidence of sloughing.

GBRW, CBD, and WSDP, Written Comment #23

The tailings management plan is very preliminary for a mining project at such an advanced stage.

Because of the high risk that tailings storage poses to a mining project, the plan for the tailings storage facility needs to proceed at a faster pace than the other aspects of the project. According to the SME Tailings Management Handbook, “The level of engineering complete for a TSF [Tailings Storage Facility] is greater than the level of engineering required for the rest of a mining project to support permitting requirements” (Henderson and Morrison, 2022).17 The SME Tailings Management Handbook quantifies that level of engineering by stating that, prior to producing the Definitive Feasibility Study, 70-90% of the engineering for the tailings storage facility should have been completed (see Fig. 8).

Figs. 9a-b taken from the SME Tailings Management Handbook give more specific examples as to what it means for 70-90% of the engineering to be completed prior to producing the Definitive Feasibility Study. In terms of tailings sampling, not only should samples be available from a pilot plant (which should be completed prior to producing the Feasibility Study), but samples should be "available from additional confirmatory test work" (Henderson and Morrison, 2022; see Fig. 9a). In terms of tailings characterization, the engineering should be at the stage of "no additional work required" (Henderson and Morrison, 2022; see Fig. 8a).

In terms of the design basis, not only should the design be complete (which should be the case prior to producing the Feasibility Study), but the design should be "final" with "design criteria fully agreed to by owner and designer" (Henderson and Morrison, 2022; see Fig. 9a). In terms of the failure consequence classification, not only should a preliminary dam breach analysis have been carried out (which should have been completed prior to producing the Pre-Feasibility Study), but the dam breach analysis should be at the stage of being "refined as needed including using rheological parameters" (Henderson and Morrison, 2022; see Fig. 9b).

Since the Engineering Design Report by NewFields (2020) and the Definitive Feasibility Study were completed in the same month (April 2020), the DFS was completed with inadequate information, according to mining industry standards.

Division Response 23:

Monitoring of Processes is regulated under NAC 445A.440, 445A.441, 445A.442 and 445A.443. Under these requirements, permittees are required to monitor processes, report any variations of any element being monitored, and submit to the Division for approval operating plans that detail how they will protect Waters of the State, and update these plans continually with changing conditions. Ioneer is in compliance with these regulations.

GBRW, CBD, and WSDP, Written Comment #24

The WPCP application and supporting documents do not contain sufficient information regarding the drainage of fluid from the tailings disposal facility (SOSF), potential for leakage, or needs for long-term management.

The SOSF would be designed as a zero discharge facility. Under Nevada regulations "zero-discharge" does not mean that there will be no drainage. What it does mean is that no drainage is allowed to be released into the environment. The application and supporting documents do not indicate what the drainage will be, which is not surprising since the tailings disposal facility remains largely undeveloped as discussed above. However, the amount of fluid that is draining and over what time horizon is essential in evaluating what active management will be needed and for the public to be able to evaluate the plan as required by Nevada regulations.

Division Response 24:

As stated by the commenter, under the current permit no drainage is permitted to be discharged into the environment. Any draindown that may occur from the Spent Ore Storage Facility (SOSF) will be captured by the SOSF Underdrain Pond, and will be managed or evaporate until no more draindown occurs. This is verified using regular monitoring and inspections by the Division. Should there be any indication that this is not sufficient to contain process fluids, the permittee will be required to submit updated plans or procedures that adequately manage the draindown with no discharge to the environment.

GBRW, CBD, and WSDP, Written Comment #25

The application and supporting documents also fail to provide an estimated volumetric draindown profile. The engineering design report only states, “It is anticipated that the operational draindown from the SOSF [Spent Ore Storage Facility] will be minimal” (Newfields 2020b)7. This is an inadequate description. The Newfields report does discuss on page 19 the requirements for the “underdrain pond storage” where Table 6-1 notes an “assumed” infiltration rate of 1,425 gallons per minute (GPM) for the entire tailings facility footprint. But this only applies to a 100-year storm event. There is no estimate of drainage from the tailings facility under normal operation.

The Geo-logic draindown report (Geo-logic 2020)18 does not assess the actual field conditions. There is no mention of compaction of the tailings in with the Geo-logic report or the Newfields reports. Compaction much be taken into account to estimate the drainage of the tailings. The WPCP application and supporting document would lead one to believe that except for a significant rain event there will be no drainage from the tailings during or after operations. There will certainly be drainage and likely at all times.

The application and supporting documents provide no justification to support the next statement: “Drainage is expected to cease shortly after the ET cover is established.” The ET cover is a mitigation to prevent water from infiltrating into the tailings disposal facility (SOSF) and requires evaluation.

NDEP needs to require disclosure and associated analysis of anticipated normal operational draindown as well as the anticipated post mining draindown over time that includes accounting for compaction.

Division Response 25:

The sizing calculations of the SOSF Underdrain Pond reported by Newfield in Table 6-1 of Appendix J of the 2020 Application for Water Pollution Control Permit are for normal operating conditions, not exclusively for the 100-year storm event. Specifically, the 854,840 gallons calculated using a 1,425 gpm infiltration rate for the entire footprint of the facility for 10 hours of stead state flow is the designed normal operating volume of this facility. The normal operating volume is only a portion of the overall storage requirement of the pond, which also includes meteoric infiltration from the 100-year, 24-hour storm event, and runoff from exposed liner areas with three feet of freeboard. These specifics meet the requirements for pond sizing in NAC 445A.435.

GBRW, CBD, and WSDP, Written Comment #26

Toxicity and treatment of the drainage water from the tailings facility is not clear.

Tailings drainage is likely to be highly toxic based on the Rhyolite Ridge Baseline Geochemical Characterization Report (HGL 2020b)4 and later by Piteau (Piteau 2024b)19. The Meteoric Water Mobility Profile table shows some results for the three ore processing waste streams destined for the tailing dump (SOSF). It is not clear, but will be assumed here, from the application and supporting document if these test results represent the expected chemical profile of the drainage at least initially. There is no analysis on how the chemical profile would change over time, which is important for planning future management.

The mobility test shows extremely high levels of TDS, sulfate, boron, aluminum, magnesium, sodium, fluorine, and low pH for the Sulfate Salt Residue and Spent Ore (tailings). There are also high levels of a number of other metals such as arsenic, thallium, uranium, and chromium to name a few, especially in the Sulfate Salt Residue. Indeed if this is representative of drainage there will need to be a plan for drainage management. There are also high levels of a number of other metals such as arsenic, thallium, uranium, and chromium to name a few, especially in the Sulfate Salt Residue. While these are planned to be mixed with non-acid generating material for storage that composes about 85% of the total bulk weight, the final nature of this mixture and storage is unclear from existing application and geochemical analysis materials. Without a precise indication of how these materials will be layered for storage, it is unclear what the final leachate's characteristics will be.

NDEP needs to require that Ioneer provide an estimation of the chemical profile of drainage during operations and post-mining over time. And include a description of how the toxic drainage is to be managed during operations and post mining.

Division Response 26:

Any draindown that may occur from the Spent Ore Storage Facility (SOSF) will be captured by the SOSF Underdrain Pond, and will evaporate or be managed until no more draindown is occurring. Process fluids captured in the SOSF Underdrain Pond are subject to regular testing and monitoring, as detailed in Part I.D.5 of the Permit.

<u>GBRW, CBD, and WSDP, Written Comment #27</u>

NDEP should require a statistical analysis or research on liner failures to predict potential leakage from the liner. Given the level of toxicity anticipated for any drainage from the tailings disposal facility, detailed scrutiny is needed to ensure that the drainage where the facility is to be located will not be polluted.

<u>Division Response 27:</u>

The design of the facility meets the minimum design criteria as required per NAC 445A.437. Additionally, per the Permit, Ioneer is required to monitor the water quality downgradient of the facility. The results from the data collected will be provided to the NDEP regularly for review.

<u>GBRW, CBD, and WSDP, Written Comment #28</u>

Provide more detail on the expected fraction of net-acid generating rock that will be produced over the project mine life.

The environmental analyses conducted to determine the potential for Rhyolite Ridge waste rock (“overburden”) to produce acidic leachate seem internally consistent and similar to results from other Nevada mines. Specifically, where the static acid/base accounting indicates that a rock has over 20% excess net-neutralizing potential, it generally didn’t produce acidic leachate in a kinetic humidity-cell test. Conversely, rock that does have excess acid-generating potential tended to begin producing acidic leachate with a few weeks after exposure to water and air. Collectively, the standard acid/base accounting analyses, supported with the much larger date set of “surrogate” estimates for acid/base accounting that used whole-rock analyses, make a strong case that waste rock produced each year, and from each lithologic unit, will, on average, be net neutralizing. The presence of excess acid-neutralizing potential in the Rhyolite Ridge deposit is a positive news for the environment.

The problem is that the Overburden Management Plan is entirely focused on the averages, and gives almost no information on the specific mass of waste rock that will be net-acid generating, and that will thus need to be handled selectively to reduce the potential for acidic runoff or other detrimental environmental exposure.

From the executive summary, the interim overburden management plan “quantifies the volumes and masses of different lithologic groups to be excavated, identifies the bulk ARD properties of each, estimates the potential for impacts from a bulk standpoint, and combines those attributes to produce guidelines for overburden rock placement and management.”

The problem is that the overburden management plan is estimating impacts “from a bulk standpoint.” But the waste rock won’t be homogeneously blended, so the impacts won’t be from bulk characteristics, but rather from specific areas that have excess acid-generating material.

Here are two examples where the overburden management plan can be improved:
(1) Table 4.2. Average Acid-Base Accounting Properties for Lithologic Units - This table shows the average acid-base accounting for each lithologic unit, and also provides a helpful comparison of these results that are based on actual acid/base analyses relative to the estimated "surrogate" values from whole-rock. But there is no indication of the fraction of rock from each lithologic unity that is expected to generate acidic leachate.

(2) Table 5.2: Yearly Schedule of Overburden Placement to West OSF (from IMC, 2022) - This presents estimates for the mass of rock scheduled for disposal in the West OSF, but gives no indication about how much of the rock each year will probably be net-acid generating and thus possibly subject to selective handing.

NDEP should require Ioneer's Overburden Management Plan to provide estimates for how much net acid-generating rock will be produced from each lithologic unit during each year of projected mine operation.

Division Response 28:

The Overburden Management Plant provided with the application met the requirements for a plan for the management of waste rock per NAC 445A.398(4). Table 6.1 of the Rhyolite Ridge Overburden Management Plan dated August 2024 includes the Yearly Weighted Neutralization Potential Ratio for the West, South, and Quarry Infill Overburden Storage Facilities (OSF's), which limits the ratio of PAG to non-PAG material permitted in each OSF.

GBRW, CBD, and WSDP, Written Comment #29 [Excerpted]

OPERATING AND POST-CLOSURE STABILITY OF THE OPEN PIT

The following comments and recommendations are based on an analysis of Dr. Steven Emerman (report attached) based on documentation available for the Draft EIS, which to our knowledge is the same as was submitted for the original WPCP and this major modification.

Division Response 29:

Comments and concerns regarding pit stability are noted. The Division does not have any regulatory authority over pit stability at this time.

GBRW, CBD, and WSDP, Written Comment #30

The extended sampling appears to be statistically representative of the expanded deposit, based on the distribution of total sulfur in the exploration-assay dataset relative to the static test data (Figure 3-1 Cumulative frequency distributions for total sulfur for the in-pit exploration assay dataset and static test work dataset, Piteau 2025)21.

The Interim Geochemical Assessment for Rhyolite Ridge Overburden and Ore classifies the meteoric water mobility procedure (MWMP) data as “kinetic tests” (Piteau 2025). But the MWMP test is a single, short-duration (8-hr) extraction of solutes from rock using at a 1:1 water: rock ratio by mass. Because the MWMP test does not collect multiple samples over time, it is not generally referred to as “kinetic test.” In contrast, in mine-waste analysis, the term “kinetic test” is usually reserved for humidity cell tests, which measure effluent concentration in regular (e.g., weekly) water extracts in order to estimate the rate of sulfide mineral oxidation over time.

NDEP should make this clarification and correction in terminology to avoid public confusion.

Division Response 30:

Comment noted

GBRW, CBD, and WSDP, Written Comment #31

According to the NDEP prepared factsheet (p.11)

“The 2025 major modification changed the shape of the quarry and the future pit lake. An updated pit lake study and ecological risk assessment were completed, which showed that the future pit lake would have generally the same depth and chemistry as in the previous study and would also pose no greater risk to wildlife than previously determined. However, this study did not include the updated geochemical data collected as part of the expanded geochemical characterization study, as it was in the process of being collected and analyzed at the time of the study. Since the mine plan of operations does not include mining below the water table for some time after initial mining operations, schedule of compliance items were added to the 2025 permit to submit an updated pit lake study and ecological risk assessment that include the new geochemical data prior to mining below the level of groundwater.”

Commenters does not support allowing the WPCP to be final while there is still outstanding data that could affect the understanding of the nine operations and proposed management plans. For example, if the new data shows that there will be more PAG material, then the chemical profile of the pit lake is likely to be different and potentially require a change in management. Given that the pit lake could be flow- through this means that there needs to be a plan for addressing contamination of groundwater.

The full consequences of the mine plan are therefore not available to the public for review of the permit. So, various management plans for waste rock, the pit lake, and even potentially the tailings facility are not final given the proposed mine plan. Thus, mitigation plans that maybe important to be developed before the mining operations begins that could result in a more environmentally sound management of the mine may not be possible later due to irreversible aspects of the mine advancement.

Division Response 31:

Comment noted. If data provided during routine sampling varies significantly, Part I.D.7 of the Permit requires the Permittee update the associated plans and models.

GBRW, CBD, and WSDP, Written Comment #32

We expect that the proposed monitoring network for the pit and pit lake will be insufficient.

Figure 1 of the monitoring plan dated July 2024 illustrates the existing and proposed locations for groundwater monitoring. Given that the pit lake has a reasonable likelihood of exhibiting flow-through and some times and potentially seasonally driven flow through additional monitoring wells around the perimeter of the expected pit lake boundary should be considered especially on the down-gradient portion. A reassessment of flow-through involving expanding the model layers for examination of flow through could also yield information about the need for screening at various levels. Multiple screening levels should be standard procedure

NDEP should require a reassessment of the pit lake for flow through to determine where additional monitoring wells maybe needed and appropriate screening.

Division Response 32:

Comment Noted. Geochemical and hydrogeological studies, including Pit Lake Studies, are ongoing investigations in the Water Pollution Control Permit per section I.N. Updated models that reflect changing site conditions are required at least once every permit renewal and with every change that materially affects the predictive model. Monitoring locations are updated with each permit renewal based in part on updated modeling.

GBRW, CBD, and WSDP, Written Comment #33

The tailings waste facility (SOSF) groundwater monitoring is inadequate.

Especially given the uncertainty in how the tailings waste facility will perform more monitoring locations are needed to ensure that escaping polluted water from the facility is detected as soon as possible. The monitoring well map (Westland 2024, Figure 1) shows only one monitoring well. At a bear minimum there should be one up-gradient monitoring well to the southeast. As discussed in detail above there is significant uncertainly regarding the tailings waste facility (SOSF), and if the facility is to be constructed based on the information currently available then the environmentally protective measure would be to have more monitoring wells and surrounding the facility.

Commenters recommend that NDEP add a schedule of compliance for a deeper evaluation of the tailings waste facility with respect to groundwater monitoring needs. NDEP should require at least an up-gradient monitoring well.

Division Response 33:

Monitoring of the Spent Ore Storage Facility (SOSF) will rely on using intra well comparison (identifying impacts by observed changes in chemistry in a well). This is a reasonable and standard approach given the nature of the solutions being managed in the SOSF (high TDS). At this time there is no added value to an upgradient well in this area.

GBRW, CBD, and WSDP, Written Comment #34

There appears to be few groundwater monitoring wells of the waste rock backfill in the mine pit.

There are only two monitoring wells for the pit backfill areas, and significant portions of the pit backfill area to the south there are no monitoring wells. If these portions are expected infiltrate with groundwater, then monitoring wells will be needed there as well to detect possible contaminate leaching. There should also be more (at least one) up-gradient monitoring wells of backfill areas that are expected to be infiltrated.

NDEP should include as a schedule of compliance an assessment of groundwater monitoring of the pit backfill areas where groundwater infiltration is expected, and require at least one up-gradient monitoring well of infiltrated backfill.

Division Response 34:

Comment noted. Stormwater diversion channels are proposed to be constructed above the Waste Rock Storage Facilities, which will convey all stormwater around the facility. The Waste Rock Facility that is in the quarry infill area is above the modeled groundwater rebound and will not be inundated with water. The proposed and exiting monitoring is adequate.

GBRW, CBD, and WSDP, Written Comment #35

In general, there are many aspects of the Rhyolite Ridge mine plan that are left unclear, so that the full consequences of the mine and its environmental footprint cannot be assessed. As a result complete mitigation and management plans cannot possibly exist. We do not support the renewal and major modification of this permit.

Division Response 35:

Comment noted.