

Submitted by email

May 4, 2026

William Groom
Division of Mining, Land & Water
Alaska Department of Natural Resources
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RE: Johnson Tract Project Reclamation Plan Approval Amendment #1(A20243253RPA.01) – Proposed Reclamation for the Portal Closure, Dewatering Pipeline, and Rapid Infiltration Basin (RIB)

Dear Mr. Groom,

The undersigned community members, fisherman, federally recognized Alaska Native Tribes, businesses, and conservation organizations respectfully submit the following comments for the Johnson Tract Project Reclamation Plan Approval Amendment #1(A20243253RPA.01).

Contango Silver and Gold’s (“Contango”) plan is fatally flawed with substantial omissions, faulty data that underly extensive errors, and unsupportable conclusions. As such, the Alaska Department of Natural Resource (“DNR”) must require Contango to cure its errors in its plan and resubmit to DNR, after which DNR must provide public notice and comment for the revised reclamation plan amendment.

Project & Area Background

Contango is proposing to excavate a mining portal and tunnel for underground mine exploration drilling on Cook Inlet Region Inc. (“CIRI”) land called the Johnson Tract, surrounded by Lake Clark National Park in the headwaters of the Johnson River roughly 13 miles upstream from the Cook Inlet coastline. Exploration is for a proposed underground gold mine with an estimated seven-year mine life. Contango is a publicly traded corporation on the New York and Toronto stock exchanges. Its largest shareholders (owners) are some of the biggest asset management companies on earth, including Franklin, Blackrock, and Vanguard.¹ JT Mining Inc. is a wholly owned subsidiary of Contango. Despite the project being deemed a “critical metals” mine, it is not. The mine would primarily be a gold mine, which is not a critical metal. The very small

¹ <https://www.nasdaq.com/market-activity/stocks/ctgo/institutional-holdings> (accessed April 29, 2026).

amounts of minerals like copper and zinc that would be mined would not play a meaningful role in meeting domestic demand.

The importance of the Johnson River watershed to a healthy and robust Cook Inlet ecosystem cannot be overstated. The Johnson River is an abundant silver salmon and Dolly Varden stream, with chum and pink salmon also present. The mudflats at the mouth of the Johnson River support one of the last remaining healthy razor clam beds left anywhere in Cook Inlet. The Johnson River watershed, including Silver Salmon Creek, hosts one of the highest densities of brown bears in Alaska, with the bears foraging on fish, clams, berries and prolific estuarine sedge grass meadows, amongst other wild foods. Critically endangered Cook Inlet belugas inhabit the area, with the coastline designated as critical habitat for the whales.²



Figure 1 – Critically endangered Cook Inlet beluga whales (circled in red) in the mouth of the Johnson River on September 26, 2025. The whales are likely foraging.³

² 76 Fed. Reg. 20180 (April 11, 2011).

³ Photo credit: Dorien Coray

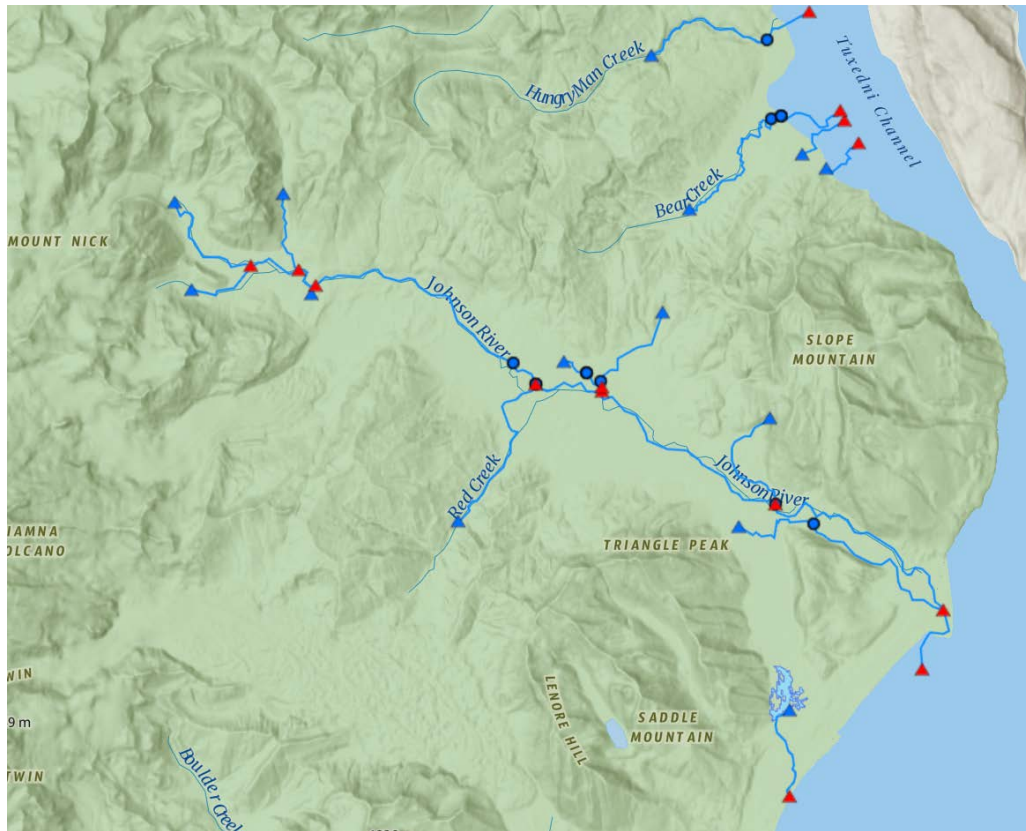


Figure 2 – Alaska Department of Fish & Game’s Anadromous Waters Catalog for the Johnson River, documenting coho, chum, pink, and Dolly Varden (as of April 29, 2026).

The clean water, fish, clams, bears, birds, belugas, and more support a sustainable tourism economy that is incredibly valuable to southcentral Alaska. Lake Clark National Park is an Alaskan and national treasure and drives thousands of visitors annually to the area. The Johnson River provides excellent recreational and sport fishing. The area is one of Alaska’s—and thus the world’s—top bear viewing locations. A 2018 report calculated that the bear viewing economy in Lake Clark National Park alone supports hundreds of local jobs and approximately \$50 million annually,⁴ and those numbers have certainly grown substantially over the ensuing years. The surrounding area hosts setnet commercial salmon fishing sites, the Tuxedni subunit of the Alaska Maritime National Wildlife Refuge and Tuxedni Wilderness, the largest seabird nesting site in Cook Inlet on Chisik Island, and a historic cannery listed on the national register of historic places. Tuxedni Bay and the Lake Clark coastline is also the only known winter foraging area for the endangered belugas,⁵ which are very valuable to Cook Inlet residents.⁶

⁴ Young, T.B and Little, J.M., The Economic Contribution of Bear Viewing to Southcentral Alaska, School of Management University of Alaska Fairbanks (May 2019).

⁵ Castellote, M. et al., Using passive acoustics to identify a quiet winter foraging refuge for an endangered beluga whale population in Alaska, 11 Front. Mar. Sci. 1393380 (July 2024).

⁶ Lew, D.K., Aggregating social benefits of endangered species protection: the case of the Cook Inlet beluga whale (June 2023).



Figure 3 – Brown bear mother with two cubs in the Lake Clark National Park shoreline estuarine sedge grass meadows near the Johnson River.⁷

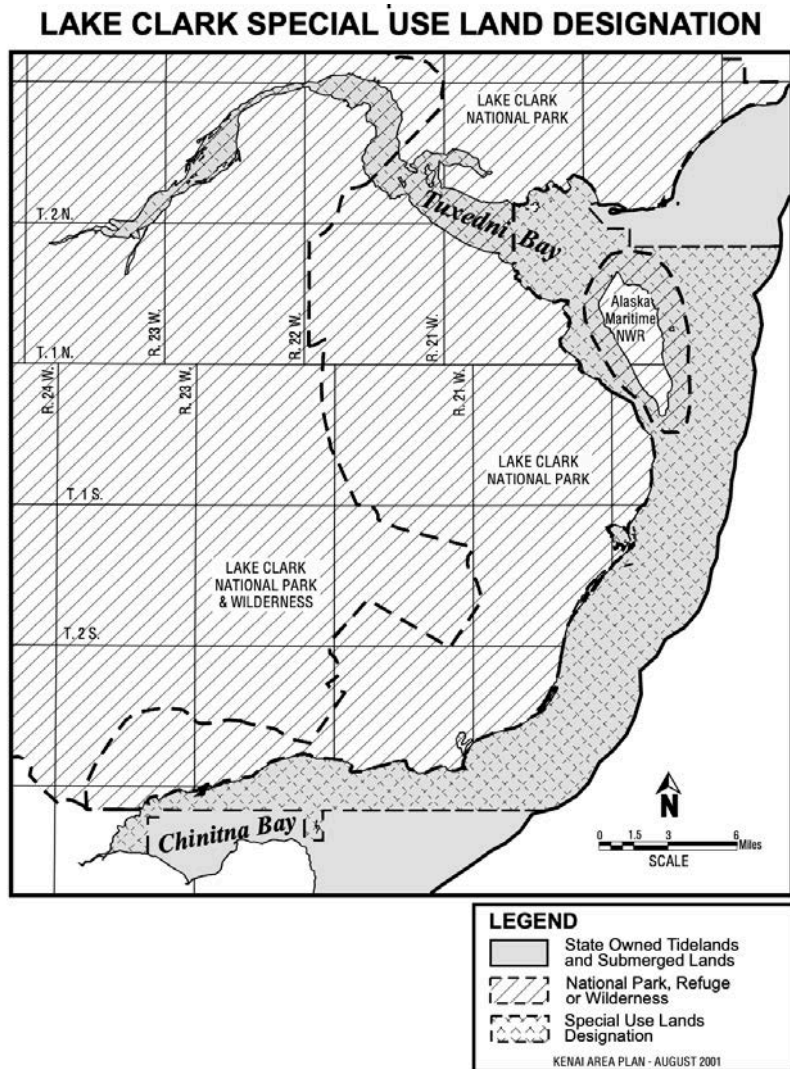
Acknowledging this importance, DNR designated the Lake Clark National Park coastline, including the Johnson River mouth area, as Special Use Lands, “identified as having special resource values needing protection...because of their outstanding public recreation, tourism, and wildlife habitat values.”⁸ The Director’s Decision document states the Lake Clark National Park Special Use Lands “will be protected from activities that may damage the resources for which they were designated,” including “large seabird colonies and saltmarshes used extensively by brown bears, as well as fish spawning, rearing, feeding, and migration grounds.”⁹ Also protected are commercial and sport fisheries, ducks, geese, bald eagles, and seabirds, and commercial

⁷ Photo credit: Brooke Bartleson.

⁸ AK DNR Director’s Decision, Lake Clark, Kenai Fjords, and Resurrection Bay Special Use Lands Designations, Kenai Area Plan (Jan. 2000).

⁹ Id.

lodges and private cabins.¹⁰ The designation requires “future land management action[s]” to be allowed only if deemed to be in the public interest.¹¹



KENAI AREA PLAN - AUGUST 2001

page D-5

Figure 4 – Lake Clark Special Use Land Designation Map.

In analyzing and considering JT Mining Inc.’s reclamation plan amendment application, DNR must consider the significant non-mining beneficial uses of and public interest in a healthy Johnson River watershed, Lake Clark National Park, and Cook Inlet coastline and the sustainability of its fish and wildlife.

¹⁰ Id.

¹¹ Id.

Legal Background

The Alaska Constitution declares that it is the policy of the State to develop its resources “consistent with the public interest.”¹² The Constitution mandates that state agencies conserve “...all natural resources belonging to the state, including land and waters, for the maximum benefit of its people.”¹³ In addition, fish, wildlife, and all other natural resources shall be “maintained on the sustained yield principle, subject to preferences among beneficial uses.”¹⁴

All underground mine projects in Alaska, regardless of land ownership, require a reclamation plan approved by DNR under Alaska Statutes 27.19 (Reclamation) and the Alaska Administrative Code, Title 11, Chapter 97 (Mining Reclamation). That statute requires that, “[a] mining operation shall be conducted in a manner that prevents unnecessary and undue degradation of land and water resources, and the mining operation shall be reclaimed as contemporaneously as practicable with the mining operation to leave the site in a stable condition.”¹⁵ The statute also requires financial assurance to initiate and complete the reclamation plan.¹⁶

Mining reclamation regulations set out requirements that mining companies must adhere to. Miners “shall stabilize and properly seal the openings of all shafts, adits, tunnels, and air vents to underground mine workings after mine closure to ensure protection of the public, wildlife, and the environment.”¹⁷ Miners shall also “reclaim a mined area that has potential to generate acid rock drainage (acid mine drainage) in a manner that prevents the generation of acid rock drainage...”¹⁸ Reclamation plans must include specific information, including “the estimated number of yards or tons of overburden or waste and ore or materials to be mined during each year covered by the plan” and “a time schedule for the reclamation measures.”¹⁹

While a mine operation plan is not required to be included with reclamation plans for mines on private land, “the department recommends that the miner develop a mining plan to help the miner meet the mining standard of AS 27.19.020 and to make the reclamation plan or reclamation letter of intent more effective.”²⁰

¹² Alaska Constitution Art. VIII § 1.

¹³ Alaska Constitution Art. VIII § 2.

¹⁴ Alaska Constitution Art. VIII § 4.

¹⁵ AS § 27.19.020.

¹⁶ AS § 27.19.040.

¹⁷ 11 AAC 97.220.

¹⁸ 11 AAC 97.240.

¹⁹ 11 AAC 97.310.

²⁰ 11 AAC 97.100.

Summary of Reasons to Deny Contango's Permit

Errors and omissions:

- Inconsistently depicting the location of boreholes GT23-002 and GT-003, which were used to predict adit water quality (locations are different in Piteau (2023) vs. Piteau (2025) reports).
- Stating that the Piteau (2025) report includes information on where the tunnel would remain dry, when it does not, declaring with no basis that the tunnel is expected to remain dry to approximately 300 feet from the portal entrance, and using this assumption to plan the location of the portal plug.
- Erroneously reporting that zinc and mercury standards were exceeded in background groundwater quality; this error resulted from using incorrect water quality standards in Piteau (2025), Appendix F.
- Erroneously reporting that alkalinity values exceeded Alaska water quality standards; this error resulted from assuming that alkalinity values higher than the standard indicated an exceedance, when it is values lower than the standard that would indicate a water quality exceedance. All measured values are low, indicating that the native groundwater would not be able to effectively counteract potential acidic inputs from drilling into the deposit.
- Erroneously stating that the Price (1997) document uses a value of ten times the average crustal abundance (ACA) to identify anomalous total metal concentrations when it does not state that, and using an out-of-date version (Price, 1997) of the MEND Prediction Manual when the most recent version is Price (2007). The updated Prediction Manual also does not state that ten times ACA values should be used to identify samples with anomalous total metals concentrations.
- Not conducting sensitivity analyses on groundwater inflow rates, fracture depth from the wall face due to blasting, or groundwater quality, including for estimated nitrate concentrations from blasting. Sensitivity analyses are important for predicted adit water quality and determining whether treatment will be needed before discharging to the rapid infiltration basin (RIB).
- No annual accounting of the estimated number of yards or tons of overburden or waste and ore or materials to be mined during each year covered by the plan.

Assumptions that lead to underestimating predicted adit discharge concentrations or increase uncertainty in the predicted concentrations:

- Using a blast zone radius of only 0.5 m from the tunnel walls.
- Not considering blasting impacts on fracture density in the Piteau (2023) or (2025) reports.
- Using groundwater quality results from only two boreholes, neither of which were completed for groundwater quality monitoring, and only one of which was sampled close to the location of the proposed adit.

- Conducting the humidity cell tests for only 40 weeks on samples with low acid generation and acid neutralization potential.
- Conducting humidity cell tests for only 40 weeks when pH and alkalinity values were decreasing, acidity values were increasing, and metal concentrations were not stable.
- Using ten times average crustal abundance (ACA) values to identify samples with elevated total metal concentrations when lower multiples of ACA values are more commonly used.
- Using only three samples for longer term leach testing when static testing results indicated that additional samples had elevated metal concentrations and should have been tested given the importance of estimating adit discharge concentrations.
- Ignoring the initial higher metal concentrations associated with first flush releases from the humidity cell tests.
- Using water quality results from samples collected during only one time of year when concentrations would likely be lower, given the seasonal groundwater elevation variability.
- Not providing tables showing the results of background or contact groundwater quality used to estimate source term values.
- Assuming that drilling the adit will actually result in lower concentration in groundwater discharging at the RIB than if the adit were not drilled (that is, *predicting that drilling the adit will result in cleaner groundwater flowing to the RIB than if the adit were not drilled*).

Assumptions that will underestimate predicted adit discharge volumes and not be protective of adit releases:

- Not considering increases in groundwater inflow to the adit during summer months following spring break-up and summer precipitation, which will underestimate flow requiring discharge at the RIB.
- Not requiring a release valve in the proposed portal plug to prevent groundwater blowouts.
- Assuming that absolutely no seepage will emanate from the portal plug in perpetuity, and that no monitoring will be needed after five years.

Other Issues:

- Excessively overestimating the RIB disposal rate.
- Not including a plan for ventilation shaft reclamation.
- Financial assurances are lower than even the minimums recommended by DNR.²¹

²¹ Dowl, Mine Closure and Reclamation Cost Estimation Guidelines: Indirect Cost Categories, prepared for the Alaska Department of Natural Resources and the Alaska Department of Environmental Conservation, DOWL Engineering, Fairbanks, AK, (April 2015).

- Inadequate schedule for the completion of reclamation activities.

These issues are discussed in more detail in “Appendix A – Technical Comments” below.

We also attach and include by reference the comment letter on this reclamation plan amendment by the Center for Science in Public Participation and the issues raised therein.²²

Conclusion

Given the extensive deficiencies, errors, and omissions in this reclamation plan amendment, DNR cannot assure that fish, wildlife, and all other natural resources in the Johnson River watershed, Lake Clark National Park, and the Cook Inlet coastline will be maintained on the sustained yield principle and consistent with the public interest. DNR cannot show that it is conserving all natural resources belonging to the state for the maximum benefit of its people, especially considering the vital importance of this area to myriad small Alaskan businesses and the regional economy.

This reclamation plan does not show that it will leave the site in a stable condition and prevent unnecessary and undue degradation of land and water resources. It also does not show that adequate financial assurance will be secured to initiate and complete the reclamation plan.

This comment letter extensively documents the failure of the applicant to show that they will stabilize and properly seal the exploration adit and tunnel to ensure protection of the public, wildlife, and the environment and prevent acid mine drainage. The plan amendment provided by Contango excludes required information.

While not required, the lack of a mine operation plan as recommended by DNR shows Contango’s contempt for meeting the statutory and regulatory standards, resulting in an ineffective reclamation plan.

DNR must deny Contango’s reclamation plan amendment and require them to cure the extensive flaws detailed in this comment letter. DNR must provide public notice and comment on such a revised reclamation plan amendment.

²² Center for Science in Public Participation, Comments on Reclamation Plan Amendment #1 (May 4, 2026).

Sincerely,

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Dr. Ann Harding
Auk Ecological Consulting

Cooper Freeman
Alaska Director
Center for Biological Diversity

Traditional Chief Gary Harrison
Council Chairman & Elder
Chickaloon Village Traditional Council

Jeff Mow
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Anna-Maria Mueller, PhD
Tuxedni Community Member

Jim Lazar
Tuxedni Fisherman, Leaseholder

Dustin Solberg
Tuxedni Commercial Setnet Fisherman

Appendix A – Technical Comments

Groundwater Quality Results and Issues

The two reports with groundwater quality results are the Piteau Associates (“Piteau”) 2023 and 2025 reports. The source term report²³ used groundwater quality results from Piteau 2025.²⁴ Only two locations were used: GT23-002, at a lower elevation of 289 m amsl (265 m below ground surface (bgs)) near the proposed adit, and GT23-003, at a higher elevation of 582 m amsl (32 m bgs) near the water table.²⁵ Both locations appear to be in the same borehole at different depths, as shown in Figure 3, but a similar diagram in Piteau²⁶ shows them as two separate boreholes next to each other. In either case, using only two samples, only one of which is near the proposed adit, does not represent the potential variability in groundwater quality along the length of the proposed adit.

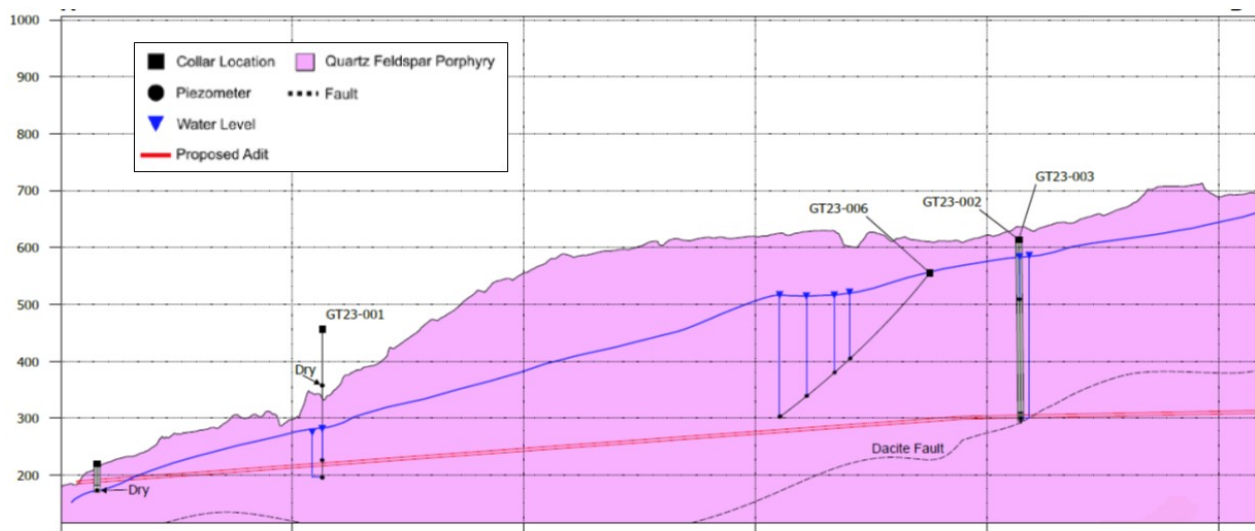


Figure 5 - Cross section showing the location of boreholes. Note that the Dacite Fault appears to cross the proposed adit at or near borehole GT23-002. The orebody (not shown) is located to the right of the diagram near the upgradient end of the proposed adit, and the portal would be on the left end of the diagram.²⁷

The 2025 Piteau report concludes that groundwater chemistry is generally of very good quality, but concentrations of antimony, iron, zinc, and mercury exceed EPA primary and secondary

²³ pHase (2025b).

²⁴ Piteau at Appendix F (2025).

²⁵ Piteau at Table 3.1 (2023).

²⁶ Piteau at Fig. 4.4 (2023).

²⁷ Piteau at Fig. 1.6 (2025).

drinking water standards and/or Alaska water quality standards.²⁸ Antimony concentrations exceeded the EPA’s primary drinking water standard of 0.006 mg/L in one location, GT23-002, in August and September 2023 and August and October 2024. All measured antimony concentrations exceeded the standard and ranged from 0.010 to 0.0287 mg/L.²⁹ Iron concentrations exceeded the EPA’s secondary value of 0.3 mg/L in only one sample, GT23-003, on August 20, 2023. While iron alone isn’t necessarily an issue, if it is present in groundwater in a reduced environment and enters streams, it can oxidize and armor the bottom, degrading habitat for aquatic insects and potentially for fish.

The Piteau 2023 report notes that local mineralization near the orebody and/or along the Dacite Fault could affect groundwater quality, and a decline in groundwater quality is expected as underground mineral exploration drilling reaches the orebody.³⁰ Such a trend would make sense because of increased mineralization closer to the deposit, but not enough groundwater samples were collected along the length of the proposed adit to evaluate this assumption.

An important omission in the Amendment is a description of adit water quality monitoring. Adit water quality should be monitored throughout the advanced exploration process to determine whether discharge at the RIB meets applicable standards. The only monitoring mentioned in the Amendment is annual inspection of the portal plug for stability and to determine if there is discharge of mine water from the portal.³¹ Portal plug monitoring would last for a period of only five years.³² Uncertainties related to the stability and effectiveness of the portal plug, especially considering climate change, should require a release valve at the portal to prevent groundwater blowout.

Hydrogeologic Results and Issues

The Piteau 2023 report is focused on estimating inflow to the proposed exploration adit during reclamation. Estimated groundwater inflow to the adit should rely on measured hydraulic conductivity (K) values in the bedrock but should also consider the increased fracturing and K values resulting from blasting of the adit. A “blast zone” radiating outward from the tunnel walls was not considered in the Piteau 2023 or the Piteau 2025 reports. In fact, blasting is not mentioned or considered in either Piteau report. Sensitivity analyses only included low and high

²⁸ Piteau at 8 (2025). Zinc and mercury concentrations in groundwater did not actually exceed EPA secondary or Alaska water quality standards, but an error in Appendix F makes it appear as if they did. The EPA secondary standard for zinc is listed as 5 µg/L but should be 5 mg/L (or 5,000 µg/L). For mercury, the table in Appendix F lists the EPA standard as 2 ng/L, but it should be 2 µg/L (2,000 ng/L), and the Alaska chronic/criterion continuous value for mercury is 0.77 µg/L (770 ng/L).

²⁹ Piteau at Appendix F (2025).

³⁰ Piteau at 3 (2023).

³¹ Contango at 10 (2026).

³² Contango at 12 (2026).

K values, which will not account for increased fracturing from blasting.³³ A fracture depth of only 0.5 m from the adit wall was assumed to estimate the volume of wall rock available for oxidation as part of the source term calculations.³⁴ According to the State of Nevada guidance for predicting water quality impacts from mining, blast-induced fracturing can extend up to ~50 ft from the wall.³⁵ Underestimating reactive wall rock mass for the proposed JT Project adit will lead to underpredicting concentrations in water draining from the adit.

The Piteau 2023 report does note that groundwater inflow to the adit is controlled by faults, the degree of fracturing, clay gouge (which would largely apply to the faults), and alteration minerals.³⁶ Piteau also states that sudden increases in adit inflows could occur when the adit crosses zones with more fracturing or faulting.³⁷ Estimates of K values are highly uncertain due to the lack of understanding of where the adit would intersect fractured zones, and this adds to the uncertainty about inflow rates and water quality.

Modeling by Piteau indicated that groundwater inflow to the adit will persist at a value of at least 1,400 L/min (23 L/sec) consistently for 30 years.³⁸ This is the value used by pHase for source term calculations. However, actual groundwater inflow to the adit is estimated to be higher, especially in summer months following spring break-up and summer precipitation.³⁹ Fieldwork and sampling only took place over a few days in the summer and fall of 2023 and 2024, and seasonal variability was not adequately evaluated. The Piteau 2025 report notes that groundwater elevations in the quartz-feldspar-porphyry (QFP), the rock type in which the adit is planned to be driven, can drop by up to 130 m in the winter and rise by up to 200 m after spring break-up when substantial recharge occurs.⁴⁰ This large seasonal variability in groundwater elevations, as shown in Figure 5, should require a portal plug with a release valve to prevent blowouts and to allow monitoring of groundwater elevation and water quality behind the proposed portal plug during and after reclamation is completed.

³³ Piteau at 16-17 (2023).

³⁴ pHase at 8 (2025b).

³⁵ Nevada Division of Environmental Protection, Guidance for Geochemical Modeling at Mine Sites, Bureau of Mining Regulation and Reclamation at 12 (2021).

³⁶ Piteau at 12 (2023).

³⁷ Piteau at 13, 16 (2023).

³⁸ Piteau at 16 (2023).

³⁹ Piteau at 16 (2025).

⁴⁰ Piteau at 6 (2025).

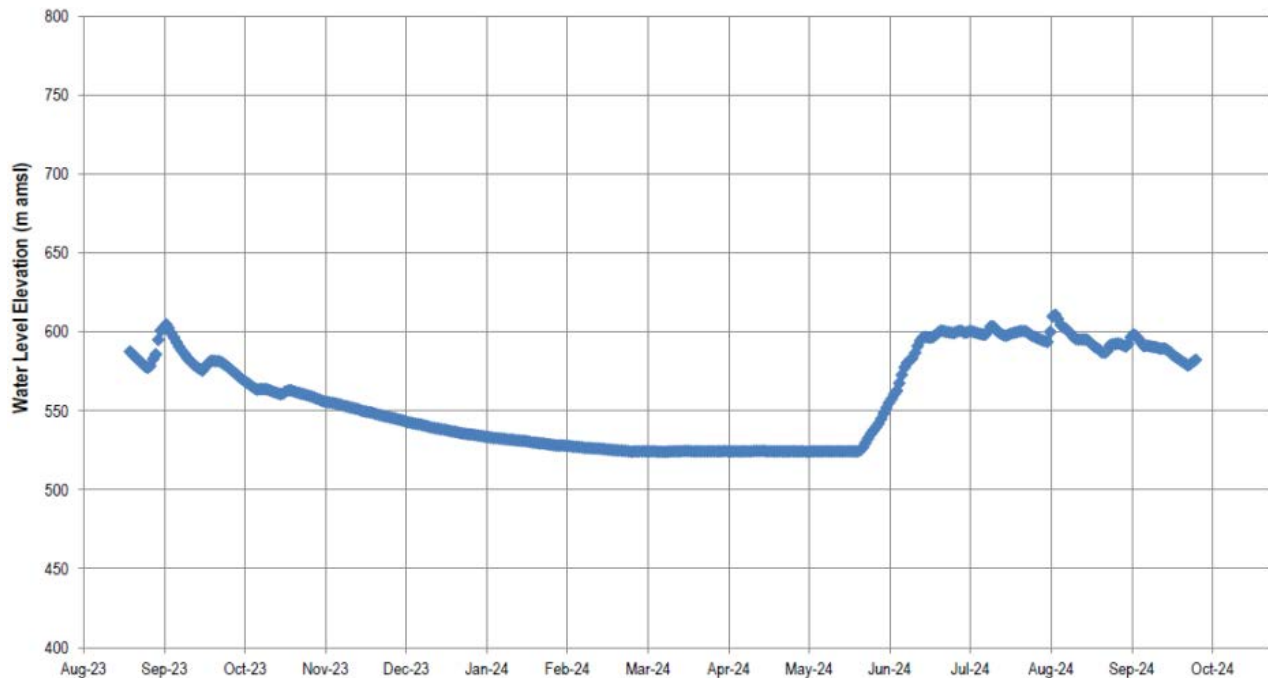


Figure 6 - GT23-002 hydrograph. Groundwater elevation trends in the deeper borehole used for water quality predictions.⁴¹

Further, the Amendment states “Hydrogeological investigations indicate that the tunnel is expected to remain dry to approximately 300 feet from the portal entrance (Piteau, 2025).” However, the Piteau report cited does not include any information on where the tunnel would remain dry – and in fact does not mention the tunnel, the portal, or the portal plug at all.

Geochemistry Results and Issues

The available documents with geochemistry results include pHase (2024) on static test results, pHase (2025a) on kinetic test results, and pHase (2025b) on source terms. The source terms were used as inputs to a model that estimated the quality of water draining from the adit and being discharged through the RIB. Each report builds on the previous report: that is, the source term estimates are based primarily on the kinetic test results, and the selection of kinetic test samples was based on the static test results. Geochemical considerations and results are discussed and summarized briefly in the Amendment.⁴²

Static test results (pHase, 2024)

The locations of static test samples are shown in Figure 6. All samples were analyzed for acid-base accounting (ABA) and total metal content, ten of the 2023 samples were subjected to short-

⁴¹ Piteau at Fig. D-2 (2025).

⁴² Contango at Section 2.1.2 (2026).

term leach testing using shake flask extraction (SFE) with a 3:1 liquid to solid ratio, and nine of the 2023 samples were subjected to net acid generation (NAG) tests.⁴³

The JT deposit, as identified in 2022, is shown in gold on the left side of Figure 6. All samples were collected in the QFP unit of the Talkeetna Formation. Fifteen drill core samples collected in 2023 and five in 2022 were considered representative of potential waste rock from the proposed exploration adit: JT23ABA-001 – JT23ABA-009 and JT23ABA-011 – JT23ABA-016 in 2023 and JT22ABA-009 – JT22ABA-013 in 2022. In fact, many of these 20 samples are located at a distance from the adit itself, which is estimated to have a radius of approximately 5 meters.⁴⁴ For example, eight samples (JT22ABA-001 to JT22ABA-008) were collected in 2022 that, according to pHase,⁴⁵ are representative of the proposed exploration adit, but as shown in Figure 6, only three are close to the adit (JT22ABA-002, -008, and -007), with JT22ABA-007 being at the adit entrance.

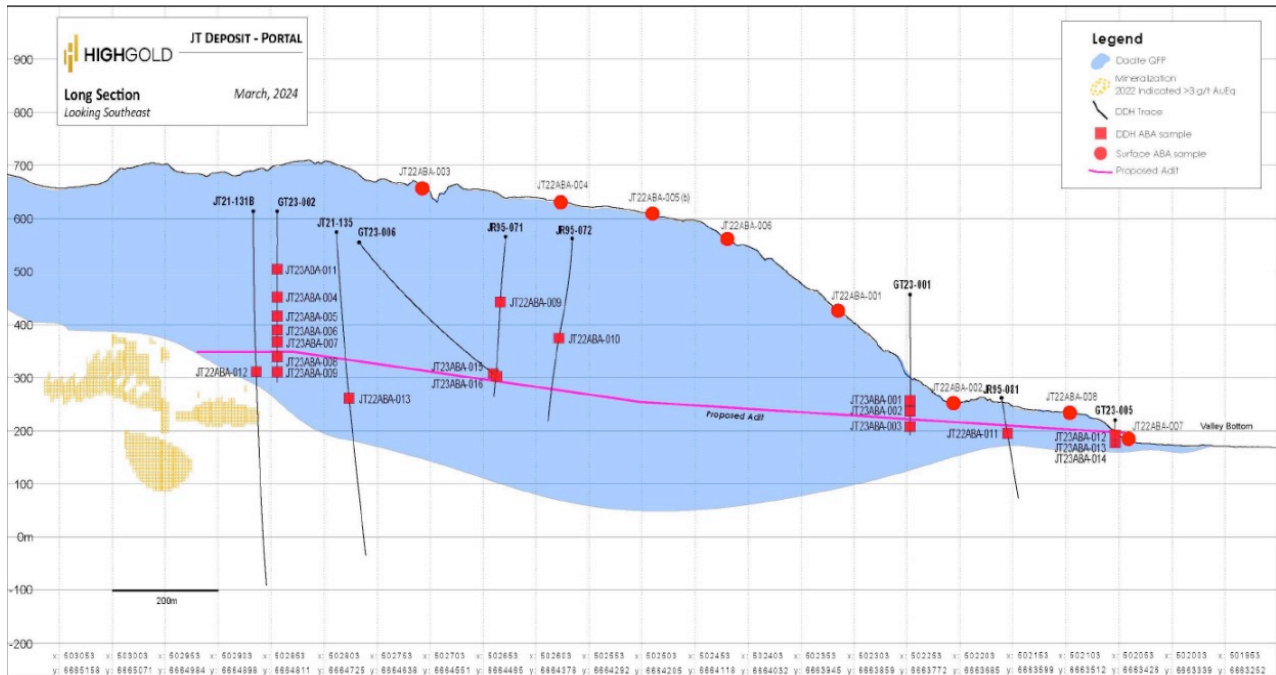


Figure 7 - Cross section showing the proposed exploration adit and static test sample locations.⁴⁶

Acid-base Accounting: As noted in pHase 2024, the rock types in and surrounding the JT deposit are expected to have “fairly limited neutralization potential” in terms of carbonate minerals, which provide the most reliable neutralization of acid drainage. In addition to having low neutralization potential (NP), the JT samples also have low acid production potential (AP). When

⁴³ See pHase at Table 3-2 (2024).

⁴⁴ Piteau at pg. 14 (2023a); pHase at 2 (2025b).

⁴⁵ pHase, at Table 3-1 (2024).

⁴⁶ pHase at Fig. 3.2 (2024).

samples have low NP and low AP, kinetic tests on the samples should be run for longer periods of time.

The highest percent sulfur in the samples collected was 0.107% in sample JT22ABA-005. This value and the arsenic concentration were considered anomalously high by HighGold,⁴⁷ and another sample, JT22ABA-005b,⁴⁸ was collected and analyzed; this sample had lower % sulfur (0.005%) and a lower total arsenic content. If the original sample is indeed anomalous, the highest % sulfur value would be 0.027% in sample GT23ABA-008.⁴⁹ It is clear that the AP and NP of these samples are low, and taken by themselves, the ABA results suggest the rock samples would have a low potential to generate acid. But the use of outlier and anomalous categorization of samples is highly questionable, as some of the plots show that some of the concentrations identified as outliers are in fact not. Overall, these conclusions cannot be validly confirmed without more sample testing.

Total Metal Content and Short-term Leach Testing: The samples were analyzed for total metal content using an aqua regia digestion.⁵⁰ The results are presented and discussed in Section 4.3 of the pHase 2024 report. The values were compared to ten times the average crustal abundance (ACA). The reference the pHase 2024 report provides for using ten times ACA values is Price (1997). This document is an older draft version of the 2009 Prediction Manual by Price that is consistently referenced for mine waste studies (Price, 2009), and the 2009 Prediction Manual is in the process of being updated by MEND. Upon review, the Price (1997) document has no reference to using ten times ACA values to identify elevated or anomalous concentrations, and neither does the Price (2009) document. The pHase 2004 report uses a Wikipedia reference for the ACA values. One of the most common sources of ACA values used by geochemists is Yaroshevsky (2006).⁵¹ Dividing the measured total metal concentration by the ACA value for an element can be used to identify potential mineral deposits and environmental contamination. Total metal concentrations sometimes relate to the leachability of the metal, but the total metal content does not indicate the mineralogic association of the metal or the form in which the metal occurs in the sample. A comparison of the SFE leachate concentration with the total element concentration shows a weak positive correlation between total and soluble arsenic concentrations.⁵² And it is important to note that the short-term leach test, SFE, will not provide an estimate of the long-term leachability of the sample.

⁴⁷ pHase at 22 (2024).

⁴⁸ It is unclear how similar new sample JT22ABA-005B is to the “anomalous” sample JT22ABA-005. The original sample was a grab sample, while the replacement sample was the only chip sample collected. And the replacement sample was collected from a location 10 meters higher in elevation (pHase, 2024, Appendix A.). The proposed source of contamination is “low quality jewelry,” but no further explanation is provided (Appendix F, pg. 3). In any case, the samples are located on the surface and are not likely relevant for estimating adit rock characteristics.

⁴⁹ See pHase at Table 4-1 (2024).

⁵⁰ pHase at 7 (2024).

⁵¹ Yaroshevsky, A.A., Abundances of Chemical Elements in the Earth’s Crust, 44 *Geochemistry International* 48 (2006).

⁵² pHase at 19 (2024).

Using values from Yaroshevsky (2006) for intermediate or acidic rocks and the more typical three times ACA values (rather than 10 times)⁵³ would lead to elevated total metal concentrations for the following elements and samples, assuming sample JT22ABA-005 has an anomalously high arsenic concentration (which as noted above is a problematic assumption):

- Arsenic in JT23ABA-013 and JT23ABA-014 (using an ACA value of 1.8 ppm)
- Cadmium in JT23ABA-012 (using an ACA value of 0.1 ppm)
- Antimony in JT23ABA-012 (using an ACA value of 0.2 ppm).

A simple comparison between the measured total metal concentration and the ACA value was used in part to identify samples for short-term leach testing and humidity cell testing. However, looking at whether the sample has multiple elevated metal concentrations could be a better way to identify samples for further geochemical testing – especially in a polymetallic deposit such as the JT deposit.

Although metal concentrations are low in most samples, JT23ABA-012 does have the highest measured concentrations of cadmium, antimony, mercury, and lead, and among the highest measured concentrations of manganese.⁵⁴ Some background groundwater quality samples also had higher concentrations of antimony. JT23ABA-012 was collected at a location close to the proposed adit opening (see Fig. 6). This sample also had the highest measured antimony concentrations in the short-term leach tests.⁵⁵

Based on the results of the static testing, three samples were selected for humidity cell testing: JT23ABA-007, -013, and -015. Sample JT23ABA-013 was selected to evaluate potential arsenic leaching, but sample JT23ABA-014 had higher total arsenic values (26 vs 6 ppm). Given the importance of estimating adit discharge concentrations, additional samples should have been subjected to kinetic testing. For example, samples JT23ABA-001, -002, -003, located close to the proposed adit, had higher copper and manganese concentrations; JT23ABA-003 also had higher arsenic, cobalt, chromium, copper, manganese and molybdenum concentrations. Because of its higher metal concentrations in solid and leached samples, JT23ABA-012, JT23ABA-014, and JT23ABA-003 should have also been subjected to long-term kinetic testing.

Kinetic test results (pHase, 2025a)

For kinetic testing, more samples should have been tested, the samples should have been weathered before testing, the higher initial concentrations should have been considered when developing source terms, and the tests should have been run for longer periods of time. If the tests are still ongoing, the results after 60 weeks or longer should be published in an amended document.

⁵³ Yaroshevsky at 51 (2006).

⁵⁴ pHase at Table 4-2 (2024).

⁵⁵ pHase at Table 4-3 (2024).

In addition to not applying kinetic testing to enough samples, especially those with higher solid phase concentrations, the humidity cell tests (HCTs) were not run for a long enough time. The three samples were only run for 40 weeks. According to Price, “[e]xperience shows that stabilization [of the HCTs] often takes 40 weeks, and can sometimes take over 60 weeks, and significant changes may take place even after several years.”⁵⁶

As noted in above, when samples have low NP and low AP values, as shown by the ABA results, kinetic tests on the samples should be run for longer periods of time, and silicate and sulfate production rates should be measured (Maest and Kuipers, 2005; Li, 2000).⁵⁷ Scharer et al. (2000) also note that wastes with neutral drainage will have slower sulfide oxidation rates but can nonetheless produce elevated concentrations of sulfate, base cations, and metals. Slower oxidation rates require longer humidity cell or column testing periods to determine how the acidity will evolve over time. The paste pH values for the samples were all in the neutral to alkaline pH range, and pH values from the HCTs were neutral, at least for the first 40 weeks.⁵⁸

Another issue with the HCT results is that the release rates were not based on steady state values in many cases. As shown in Figure 7, pH values appear to be dropping over time for all three HCT samples. Release rates should be based on concentrations that are stable over at least the last five weeks of testing.⁵⁹ No definition of “stable” is mentioned in the pHase 2025a report, but the changes in pH values do not meet the definition in Price (2009).

Similarly, and more noticeably, metal concentrations in the HCTs were not “stable” in most cases, yet release rates were calculated based on the variable results. Results for arsenic and manganese concentrations are shown in Figure 8, and results for cadmium and cobalt were even more variable.⁶⁰

⁵⁶ Price at 18-6 (2009).

⁵⁷ Maest, A.S. and Kuipers, J.R., Predicting Water Quality at Hardrock Mines (2005);

⁵⁸ See pHase at Table 4-1 (2024).

⁵⁹ Price at 18-12 (2009).

⁶⁰ See pHase at Fig. 4-2 (2025a).

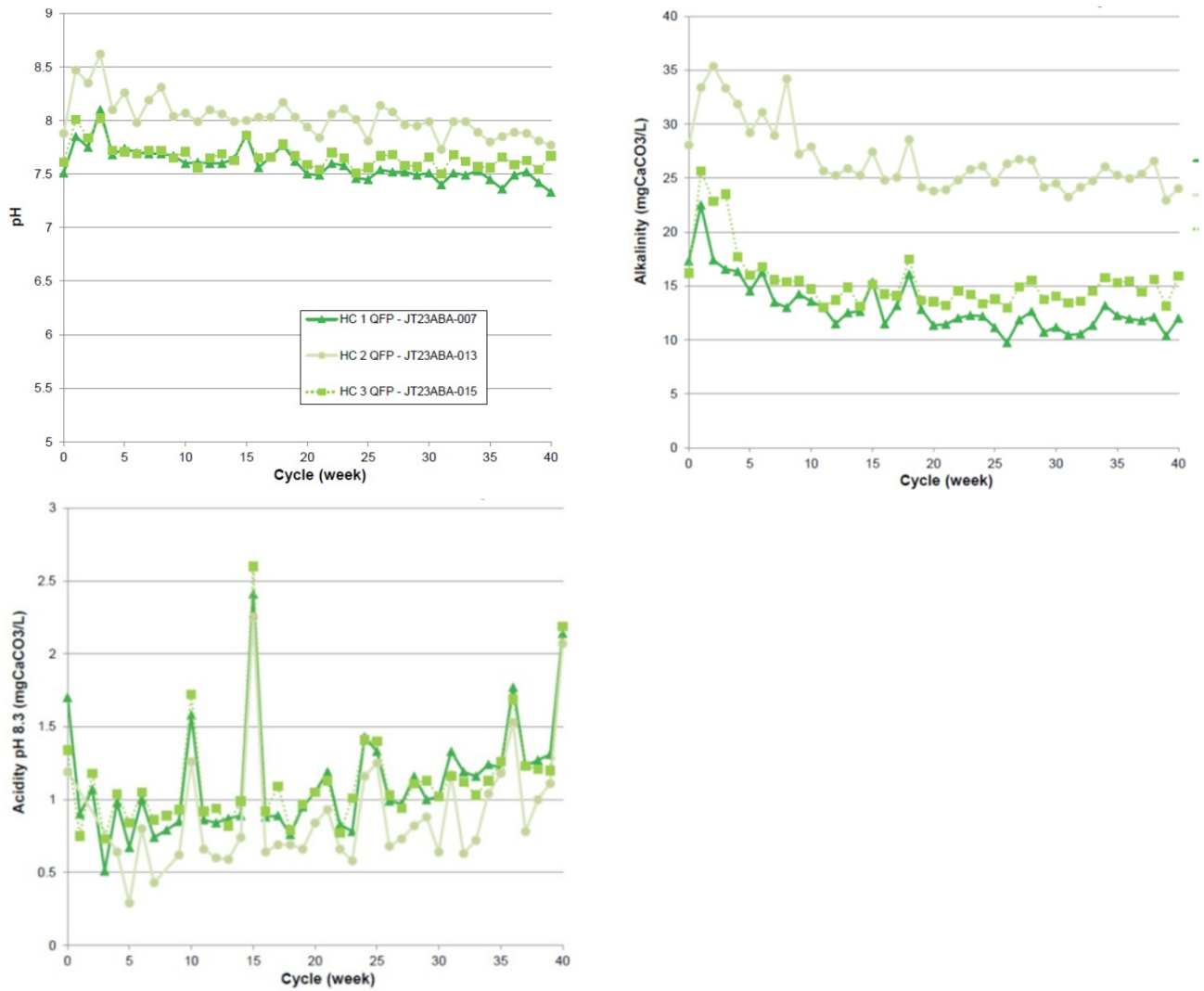


Figure 8 - Humidity cell results for the three selected samples: pH, alkalinity, and acidity. The pH values appear to be decreasing over time for all three samples; alkalinity values could be relatively “stable” for HC1 but are still decreasing for HC2 and could be increasing for HC3. Acidity values are increasing over time for all three samples. The short test duration increases uncertainty about the longer term acid generation potential of the samples.⁶¹

⁶¹ pHase at Appendix E (2025a).

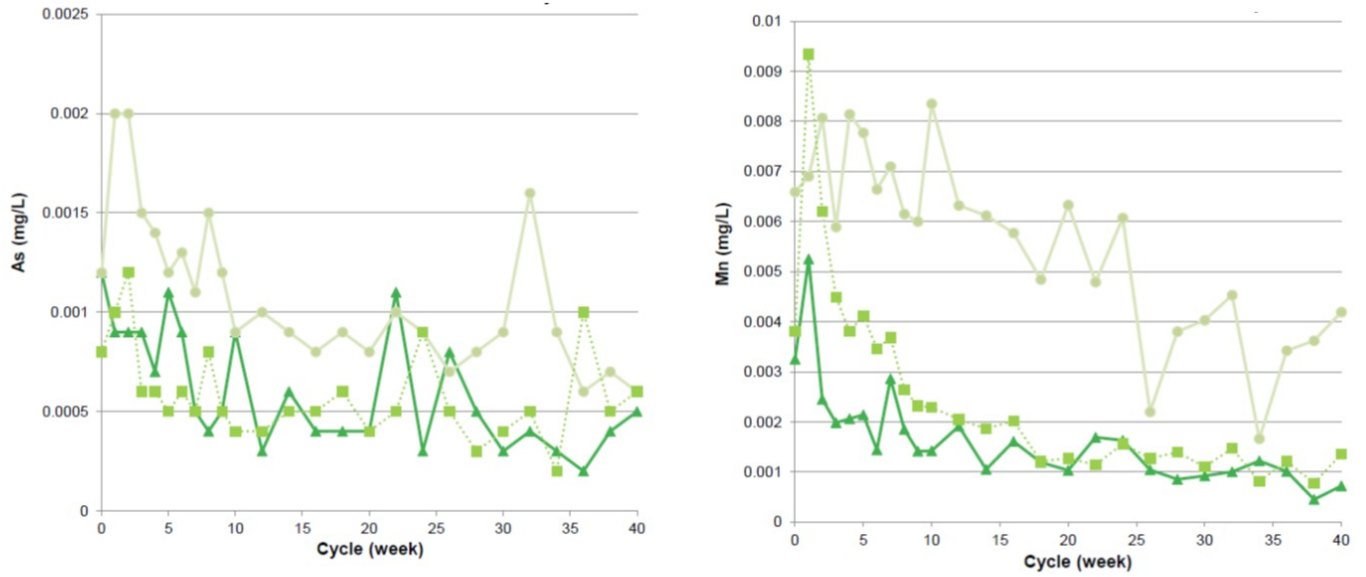


Figure 9 - Variability in arsenic and manganese concentrations over time in humidity cell tests.⁶²

⁶² pHase at Appendix E, see Fig. 4 for legend (2025a).

Finally, pHase 2025a completely ignored the higher initial concentrations that were evident for many parameters.⁶³ Initial higher concentrations (known as “early flush”) give a better idea of what soluble metals would be released for oxidized weathered rocks/materials (Maest and Nordstrom, 2017). Rock samples used in HCTs should be weathered prior to conducting the tests if one of the goals is to examine the release of dissolved salts from mined materials (Maest and Nordstrom, 2017). It is unknown if the samples used by pHase were weathered before testing.

Source term estimates (pHase, 2025b)

Source terms are used to estimate the quality of water draining from the proposed adit. Source terms were calculated using results from static and kinetic testing, groundwater quality, estimated nitrate concentrations from blasting, and the estimated rate of groundwater inflow to the proposed adit.

The source term report by pHase 2025b contains questionable conclusions. This report relies on results from each of the other reports discussed above. Therefore, shortcomings in static testing, kinetic testing, groundwater quality, and hydrogeology studies are all reflected in the source term estimates. In addition, the source term estimate report does not adequately explain the reasoning for its selection of input parameters or assumptions and does not evaluate reasonable ranges in the input parameters used.

An important question to consider is whether the adit drainage will require active treatment before being discharged, either during adit development or as part of reclamation. Based on the source term estimates, Contango assumes that no active water treatment will be necessary, and a rapid infiltration basin (RIB) can be safely used to discharge the untreated adit water. However, the assumptions and inputs to the source term estimates raise concerns about the validity of this assumption.

No information on the final groundwater quality used in the source term model is provided in the pHase 2025b report. The 50th and 90th percentile humidity cell release rates for each parameter were evaluated, but no sensitivity evaluations were included on groundwater quality; groundwater influx rates; nitrate concentrations from blasting; fracture depth from the wall face due to blasting; scaling factors for particle size, temperature, wetted wall area in the adit, or oxygen availability. No scaling factors were used for grain size or oxygen availability (both were set at 1, which will not decrease HCT release rates). Scaling factors for temperature and flow path effects (the percent of surfaces in the adit in contact with water) were estimated at 0.3 and 0.5 respectively. Using values below 1 will decrease the HCT release rates and result in lower contact water concentration estimates.

⁶³ pHase at Tables 4-3 and 4-4 (2025a).

The inflow to the adit used in source term calculations was a single value of 23 L/sec, which is the estimated minimum influx rate. This value is assumed to be the long-term influx consistently entering the adit 30 years after it is completed.⁶⁴ Using the minimum influx will underestimate volumes of mine-influenced water discharged at the RIB and potentially the volume requiring treatment. The minimum influx value used assumptions about hydraulic conductivity, fractures, and faults that have not been confirmed and do not take blasting of the tunnel into account as discussed above.

The background groundwater quality in the source term estimates used results from only two sample locations, GT23-002 (deeper, screened from 304-319 m bgs) and GT23-003 (shallow, screened from 23-32 m bgs). Both locations are from the same or very nearby open standpipe piezometers, as shown in Figure 4. Although the samples were from different screened interval depths, the boreholes were not completed as proper water quality monitoring wells but rather as piezometers only designed to measure groundwater elevations/depths/pressures. All samples were collected in August or September when water levels were highest.⁶⁵ Therefore, the water quality does not reflect seasonal variability. Four samples were collected and analyzed from GT23-002, and three samples were collected and analyzed from GT23-003.

To arrive at source term estimates, groundwater quality was mixed with the scaled-up source term concentrations in a ratio ranging from 10% groundwater/90% contact water to 90% groundwater/10% contact water,⁶⁶ presumably to reflect a range in “hydrology conditions.” Neither the contact water nor the groundwater concentrations used to calculate source terms were shown in the pHase (2026b) report. Table 5-1 shows the results of mixing in mg/L for all parameters except pH (in s.u.). Although not provided directly, the results reflect an assumption that contact water will actually have lower concentrations of most constituents, including most metals, than background groundwater. Therefore, **pHase 2025b is predicting that drilling the adit will result in cleaner groundwater reporting to the RIB than if the adit were not drilled.** This conclusion is not supportable by experience or common sense, and the shortcomings described in this letter can be used to explain why pHase reached this unsupportable conclusion.

Groundwater Pressure Issues

There is a concerning lack of integration and detail between hydrology, hydraulic conductivity, portal plug design, and rapid infiltration basin (RIB) design, including water pressure build up at the portal plug and the lack of information on infiltration capacity.

⁶⁴ pHase at 9 (2025b).

⁶⁵ See Piteau at Fig. D-2 (2025).

⁶⁶ pHase at 9 (2025b).

It is assumed that the tunnel itself, which slopes down towards the portal entrance, will act as a drain. However, it is also assumed that the first 100 meters of the adit will remain dry. These are inconsistent assumptions, given that reports expect no pumps to be needed.

The QFP is categorized as either massive QFP – which is relatively homogenous and has the lowest groundwater inflow rate – or fractured QFP – with higher inflows. Although most of the adit is expected to be in the massive QFP, some is not. It is expected that tunneling will move through some lenses of water that will result in sudden inrushes. The risk is high enough that Piteau says it is important to drill cover holes 150-200m ahead of the adit for advance warning. Piteau says, “[a]s the adit progresses, the effective management of groundwater inflows will become progressively more crucial.”⁶⁷

Even if it is assumed that no drilling into mineralized rock occurs, and that it is only the exploration adit in the generally benign QFP geology, the adit is expected to receive a minimum of 360 gallons per minute due to groundwater recharge. By using the term “seepage” in the phrase “the portal plug is designed to fully prevent seepage,”⁶⁸ Contango waves off what is a significant rate of water flow. A single 30-foot “plug” near the entrance to the adit is intended to prevent groundwater from moving out of the adit after closure. Contango claims a “factor of safety” of 3.9 “shows the design is very stable over time and there will be no seepage,” with no information on how the plug was designed and what informed the design. There appears to be no consideration of the water pressure that will build up – no relief valve to ensure the portal plug doesn’t blow out and no consideration that pressure will force water through fractures to the surface or to the overlying aquifer. Shotcrete plugs can and do blow out.

Rapid Infiltration Basin Issues

Drawing from the combined reports, it appears that there will be a minimum of 1400 liters per minute (360 gallons per minute) that has to be dewatered with much larger flows expected. There is nothing in the documents that indicates how much dust and debris from the drilling will be transferred to the groundwater that will have to be constantly dewatered once it is encountered. In the pHase reports, there is a short discussion of nitrates from ANFO, which indicates there will be blasting, which will contribute more material to be picked up by the groundwater as it traverses the site.

The RIB drawing in the reclamation plan shows a field of 15 feet by 15 feet (225 sq. ft) with four 12-inch slotted HDPE pipes each 15 feet long. There is no rationale provided for this design decision. The Piteau reports indicate that the groundwater would go through existing interstitial space since it will naturally flow into the drift once that level is reached.

With a disposal field of 225 sq. ft, this computes to a percolation rate of 1.64 gallons per minute, per square feet, which is beyond excessive. This kind of rate is usually only seen in direct

⁶⁷ Piteau at 23 (2023).

⁶⁸ Contango at Section 2.1.1 (2026).

discharge to an aquifer (like an injected well), while this design sits on a gravel bed and appears more like a conventional leach field design.

Without any data provided on the design, it appears that the design's intended flow rate is physically incompatible and defies standard geotechnical limits. Failure of the system due to this farcical design could lead to unfiltered water, erosion, and other environmental contamination into the headwaters of the Johnson River.

Ventilation Shaft Omission

Even if only the exploration adit is developed, with no further tunnel or drilling for ore, a 2km long tunnel will need ventilation. The plan does not consider whether ventilation shafts will require additional ground disturbance or new conduits between groundwater and surface water, how those will be closed, and how those may affect the reclamation bond. This is a major omission.

Reclamation Bond Issues

Compared to other recent reclamation plans in Alaska, JT Mining's bond contingency cost of 6% is low. For example, the Reclamation Plan for the Anarraaq and Aktigiruaq Exploration Program uses 10%.⁶⁹ Although JT Mining says that their cost estimates for the amended plan will be added to their 2024 reclamation cost estimates, there has been no adjustment for inflation to the 2024 budget.

Lack of Adequate Schedule & Required Information

The plan states that reclamation activities will be completed after "the portal is no longer required for site activities."⁷⁰ This essentially creates a perpetual permit as the company can claim the portal is "still required" for decades to avoid completing reclamation activities. DNR must require a schedule for the completion of reclamation activities that is contemporaneous, enforceable and timebound.

The regulations also require "the estimated number of yards or tons of overburden or waste and ore or materials to be mined during each year covered by the plan." The plan amendment did not provide this data broken down by each year of operation, and therefore the plan is incomplete.

⁶⁹ Reclamation Plan Anarraaq and Aktigiruaq Exploration Program, Appendix B, Phase 1 – Exploration Access Road and Surface Pad Construction. https://dnr.alaska.gov/mlw/mining/large-mines/anarraaq-aktigiruaq/pdf/other/aaep_phase1poo.b_2022.pdf

⁷⁰ Contango at 11 (2026).