

STATEMENT OF BASIS FOR MAJOR MODIFICATION
OF ARIZONA POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT NO. AZ0026387

Pursuant to A.A.C. R18-9-B906, on August 18, 2020, ADEQ received an application from Arizona Minerals Inc. (AMI) to modify AZPDES Permit No. AZ0026387, which became effective on January 8, 2018. The modification request is to add Water Treatment Plant 2 (WTP2) and Outfall 002 for discharges from WTP2.

AMI has engaged in remediation of historic site activities under ADEQ's Voluntary Remediation Program (VRP) (capturing and treating mine impacted water from the January Adit, moving historic tailings onto a new lined tailings storage facility), and has also performed exploration activities. AMI now intends to engage in additional exploration activities to more fully assess the economic and technical variability of mining the underground polymetallic mineral deposit (primarily targeting lead, silver, and zinc). This will be accomplished largely through advancement of two existing exploration declines (or shafts), which will necessitate dewatering of the local aquifer in the vicinity of the underground access pathways to allow for their safe advancement. This activity will require a modification to the AZPDES permit to add an additional outfall, and construction of a proposed new water treatment plant (WTP2). The proposed new water treatment plant will be in addition to water treatment plant 1. WTP2 will have discharges from Outfall 002 to Harshaw Creek.

The influent for WTP2 will consist of groundwater from depressurization wells (a small portion of which may come from historic mine workings), underground dewatering activities in shafts or declines, tailings storage facilities (TSF) seepage and stormwater runoff that report to the Underdrain Collection Pond (UDCP), water from the January Adit, other site stormwater, drilling water, and core cutting water. AMI may elect to send treated water from WTP1 to WTP2 for further treatment prior to discharge through Outfall 002. The primary contributor of influent to WTP2 is expected to be natural groundwater from dewatering wells pumped to depressurize the rock to support safe underground exploration. Water from depressurization wells and underground dewatering pumps will compose approximately 90 to 100 percent of the inflow to WTP2. On average, the flow from the UDCP is less than 5 percent of the total inflow and periodic stormwater is also less than 5 percent. The design capacity for WTP2 is 6.48 million gallons per day (MGD). The flow rate will decrease over time, primarily due to lower flows from depressurization wells.

WTP2 will use a two-step treatment process. Treatment techniques consist of total suspended solid (TSS) and metal removal circuit sand ballasted clarification, multimedia filtration, thickener, sludge filter press, and fluid management systems. Step 1 treatment removes suspended solids and uses pH adjustment, the addition of ferric flocculant and sulfide reagents (if required), and clarification to precipitate metals (including selenide) and separate solids. Step 2 uses ion exchange and electro reduction to remove selenite from the water treated by Step 1. Treated water from Step 2 will be reused on site as needed or piped about 700 feet to the east and discharged through an energy dissipater at Outfall 002. Outfall 002 includes an armored diversion berm to direct flow to Harshaw Creek. WTP2 will produce solid residuals. The solid residuals will be clarified from solution, dewatered by filter press, and deposited at the geomembrane-lined Tailing Storage Facility (TSF).

Treated water from WTP2 will be released continuously from Outfall 002 at flow rates up to 4,500 gallons per minute (GPM) or about 6.48 MGD. The highest flow rate is expected to occur in the first years of exploration activities, with flows declining over time. These estimates are based on the Permittee's understanding of aquifer conditions and on-site reuse estimates.

The State of Arizona has adopted water quality standards to protect the designated uses of its surface waters. Streams have been divided into segments and designated uses assigned to these segments. The water quality standards vary by designated use depending on the level of protection required to maintain that use.

Receiving Water	Harshaw Creek (Headwaters to confluence with Sonoita Creek) ADEQ applied the Navigable Waters Protection Rule (NWPR) Screening Toolkit to help the agency assess which waters may be jurisdictional under the Clean Water Act. Application of the NWPR Screening Toolkit shows that a portion of Harshaw Creek is likely a water of the U.S. (WOTUS). Thus, the facility's discharge from Outfall 002 to Harshaw Creek is a point source discharge requiring an AZPDES permit.
River Basin:	Santa Cruz River Basin
Outfall Location:	Outfall 002: Township 23S, Range 16E, Section 4 Latitude 31° 27' 57" N, Longitude 110° 43' 12" W
Designated uses for the receiving water listed above:	Aquatic and Wildlife ephemeral (A&We) Partial Body Contact (PBC) Agricultural Livestock watering (AgL)
Per A.A.C. R18-11-113(D), the water quality standards in the draft AZPDES permit includes discharge limitations and monitoring requirements designed to achieve compliance with A&Wedw standards.	
Therefore, the following uses are being applied to the receiving water:	
<ul style="list-style-type: none"> • Aquatic and Wildlife effluent dependent water (A&Wedw) • Partial Body Contact (PBC) • Agricultural Livestock water (AgL) 	

DETERMINATION OF EFFLUENT LIMITATIONS AND ASSESSMENT LEVELS:

When determining what parameters need monitoring and/or limits included in the draft permit, both technology-based and water quality-based criteria were compared and the more stringent criteria applied.

Technology-based Limitations:

As outlined in 40 CFR Part 440:

Portions of the influent to WTP2 that will be discharged from Outfall 002 after treatment are subject to the requirements specified under 40 CFR Part 440, Ore Mining and Dressing Point Source Category. Subpart J; Copper, Lead, Zinc, Gold, Silver, and Molybdenum Ores subcategory, applies to mines that produce copper, lead, zinc, gold, silver, or molybdenum ores, singly or in combination, from open-pit or underground operations.

40 CFR 440.103(a) establishes discharge limitations applicable to mine drainage. The following limitations represent the degree of discharge reduction attainable by the application of the best available technology economically achievable (BAT):

Parameter	<u>30-day Average (mg/L)</u>	<u>Daily Maximum (mg/L)</u>
Cadmium	0.05	0.10
Copper	0.15	0.30
Lead	0.30	0.60
Mercury	0.001	0.002
Zinc	0.75	1.5

40 CFR 440.102(a) establishes the following limitation that represents the degree of discharge reduction attainable for mine drainage by the application of the best practicable control technology currently available (BPT):

Parameter	<u>30-day Average (mg/L)</u>	<u>Daily Maximum (mg/L)</u>
Total suspended solids (TSS)	20	30
pH	Within the range of 6.0 to 9.0	

There are no other applicable technology-based effluent limitations for Outfall 002 beyond the limitations on the discharge of process wastewater as specified in 40 CFR Part 440 Subparts J and L.

Numeric Water Quality Standards:

As outlined in A.A.C. R18-11-109 and Appendix A:

Per 40 CFR 122.44(d)(1)(ii), (iii) and (iv), discharge limits must be included in the permit for parameters with "reasonable potential" (RP), that is, those known to be or expected to be present in the effluent at a level that could potentially cause any applicable numeric water quality standard to be exceeded. RP refers to the possibility, based on the statistical calculations using the data submitted, or consideration of other factors to determine whether the discharge may exceed the Water Quality Standards. The procedures used to determine RP are outlined in the Technical Support Document for Water Quality-based Toxics Control (TSD) (EPA/505/2-90-001). In most cases, the highest reported value for a parameter is multiplied by a factor (determined from the variability of the data and number of samples) to determine a "highest estimated value". This value is then compared to the lowest applicable Water Quality Standard for the receiving water. If the value is greater than the standard, RP exists and a water quality-based effluent limitation (WQBEL) is required in the permit for that parameter. RP may also be determined from best professional judgement (BPJ) based on knowledge of the treatment facilities and other factors.

This is a new treatment system and effluent (discharge) data are not yet available, however the Permittee has characterized the influent and treatment processes to show that numeric water quality standards will be met. As the water treatment plant is not yet constructed, there are no effluent samples from WTP2. The water quality for effluent from WTP2 is characterized by examination of influent to WTP2, the performance of similar treatment plants, and the results of treatability studies for WTP2. Based on this knowledge, RP is determined from BPJ and WQBELs were established for cadmium, copper, lead, mercury, and zinc.

The proposed permit limits and assessment levels for Outfall 002 added by this permit modification were established using a methodology developed by EPA. Long Term Averages (LTA) were calculated for each designated use and the lowest LTA was used to calculate the average monthly limit (AML) and maximum daily limit (MDL) necessary to protect all uses. This methodology takes into account criteria, effluent variability, and the number of observations taken to determine compliance with the limit and is described in Chapter 5 of the TSD. Limits based on A&W criteria were developed using the "two-value steady state wasteload allocation" described on page 99 of the TSD. When the limit is based on human health criteria, the monthly average was set at the level of the applicable standard and a daily maximum limit was determined as specified in Section 5.4.4 of the TSD. For cadmium, copper, lead, mercury, and zinc, A&W criteria are more stringent than human-health criteria, therefore limits were based on A&W criteria and derived using the two-value steady state wasteload allocation referenced above. For parameters in Table 2.b, additional RP analysis will be conducted based on effluent data subsequent to that data becoming available.

Effluent Limitations and Monitoring Requirements:

In the draft permit, effluent limitation and monitoring requirements are incorporated as Table 1.c, Table 2.b, and Table 3 for Outfall 002. These additional tables represent the conditions and requirements that must be met for WTP2 discharges from Outfall 002 to Harshaw Creek.

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Table 1.c. Discharge Limitations and Monitoring

Parameter	Maximum Allowable Discharge Limits (1)(2)		Monitoring Requirement (3)	
	Monthly Average	Daily Maximum	Monitoring Frequency	Sample Type(6)
Discharge Flow (MGD)	REPORT (4)	REPORT	Continuous	Metered
Cadmium (5)(6)	3.69 µg/L	7.40 µg/L	1x / quarter	8-hour composite
Copper(5)(6)	16 µg/L	33 µg/L	1x / quarter	8-hour composite
Hardness (CaCO_3) – Discharge(5)	REPORT [mg/L]	REPORT [mg/L]	1x / quarter	8-hour composite
Lead(5)	5.68 µg/L	11.4 µg/L	1x / quarter	8-hour composite
Mercury	0.01 µg/L	0.02 µg/L	1x / quarter	8-hour composite
Suspended Solids, Total (TSS)	20 mg/L	30 mg/L	1x / quarter	8-hour composite
Zinc(5)(6)	130 µg/L	262 µg/L	1x / quarter	8-hour composite
pH(7)	Not less than 6.5 standard units (S.U.) nor greater than 9.0 S.U.		1x / week	Discrete

Footnotes:

- (1) µg/L = micrograms per liter; mg/L = milligrams per liter
- (2) Metals discharge limits are for total recoverable metals unless specified.
- (3) Testing must coincide with the Whole Effluent Toxicity Test (WET) samples, if any, taken during that monitoring period as per Part I.C, Table 3 of the permit. See Part III of the permit.
- (4) Monitoring and reporting required. No limit set at this time. In addition to the average and maximum flows reported on the Discharge Monitoring forms, daily discharge flow shall be recorded on the **Discharge Flow Record** provided in Appendix B. See Part II.B for reporting requirements.
- (5) The effluent must be tested for hardness at the same time that these metal samples are taken. Limits listed are based on the lower range of estimated WTP2 influent hardness of 258 mg/L as CaCO_3 . This number may be adjusted once effluent hardness data becomes available. Please see the hardness definition in Appendix A, Part B.
- (6) For the purposes of this permit, an “8-hour composite” sample has been defined as a flow-proportioned mixture of two or more discrete samples (aliquots) obtained at equal time intervals over an 8-hour period (if only two samples are collected, they should be taken approximately 8 hours apart). The volume of each aliquot shall be directly proportional to the discharge flow rate at the time of sampling.
- (7) pH must be measured at the time of sampling and do not require use of a certified laboratory. Measurements must be obtained in accordance with the applicable method and must meet all method quality assurance/quality control requirements to be considered valid data.

Table 2.b. Trace Substance Monitoring

Parameter	Assessment Levels (1) (2)	Monitoring Requirements (3)	
	Concentration	Monitoring Frequency	Sample Type
Antimony	491 µg/L	1x / quarter	8-hour composite
Arsenic	123 µg/L	1x / quarter	8-hour composite
Beryllium	4.3 µg/L	1x / quarter	8-hour composite
Chromium, total (5)	1000 µg/L	1x / quarter	8-hour composite
Chromium VI (D) (5)	8.0 µg/L	1x / quarter	8-hour composite
Cyanide	7.9 µg/L	1x / quarter	8-hour composite
Hardness (CaCO_3) - discharge (4)	Report [mg/L]	1x / quarter	8-hour composite
Iron	819 µg/L	1x / quarter	8-hour composite
Nickel (4)	94.9 µg/L	1x / quarter	8-hour composite
Nitrogen, Total Kjeldahl (TKN) or Nitrate/Nitrite as N	Report [mg/L]	1x / quarter	8-hour composite
Selenium	2 µg/L	1x / quarter	8-hour composite
Silver (4)	8.19 µg/L	1x / quarter	8-hour composite
Thallium	75 µg/L	1x / quarter	8-hour composite

Footnotes:

- (1) Concentration values are calculated based on Arizona Water Quality Standards. Monitoring and reporting required.
- (2) All metals effluent Assessment Levels are for total recoverable metals, except for chromium VI, for which the assessment levels listed are dissolved.
- (3) Testing must coincide with the Whole Effluent Toxicity Test (WET) samples, if any, taken during that monitoring period as per Part I.C, Table 3 of the permit. See Part IV of the permit.
- (4) Assessment levels listed are based on the lower range of estimated WTP2 influent hardness of 258 mg/L as CaCO_3 . This number may be adjusted once effluent hardness data becomes available. The effluent must be tested for hardness at the same time that these metal samples are taken. Please see the hardness definition in Appendix A, Part B.
- (5) If total chromium exceeds 8 µg/L, the permittee must conduct sampling for chromium VI for the remainder of the permit. Otherwise, monitoring for chromium VI is not required.

TABLE 3: WET Testing

Effluent Characteristic (1)	Action Levels		Monitoring Requirements	
	Daily Maximum (2) (3)	Monthly Median (3)	Monitoring Frequency(6)	Sample Type
Acute Toxicity (4) <i>Pimephales promelas</i> (Fathead minnow)	N/A	Fail	1x within 6 months of commencing discharge & 1 time within 12 months after first test	8-hour composite
Acute Toxicity (4) <i>Ceriodaphnia dubia</i> (Water flea)	N/A	Fail	1x within 6 months of commencing discharge & 1 time within 12 months after first test	8-hour composite
Chronic Toxicity <i>Pseudokirchneriella subcapitata</i> (Green algae) (5)	1.6 TUC	1.0 TUC	1x within 6 months of commencing discharge & 1 time within 12 months after first test	8-hour composite
Chronic Toxicity <i>Pimephales promelas</i> (Fathead minnow)	1.6 TUC	1.0 TUC	1x within 6 months of commencing discharge & 1 time within 12 months after first test	8-hour composite
Chronic Toxicity <i>Ceriodaphnia dubia</i> (Water flea)	1.6 TUC	1.0 TUC	1x within 6 months of commencing discharge & 1 time within 12 months after first test	8-hour composite

Footnotes:

- (1) See Part IV for additional requirements for testing and reporting Whole Effluent Toxicity (WET).
- (2) Since completion of one chronic WET test takes more than 24 hours, the daily maximum is considered to be the highest allowable test result.
- (3) If chronic toxicity is detected above the Action Levels in this table or an acute test fails, the permittee must perform follow-up testing. See Part IV for details.
- (4) The requirement for an acute test applies only when duration of discharge doesn't allow for chronic tests to be conducted. See Part III.
- (5) Formerly known as *Selenastrum capricornutum* or *Raphidocelis subcapitata*.
- (6) Monitoring shall be conducted on samples collected concurrently with samples collected for monitoring required in Part I.A. See Part III.A

Antidegradation:

Antidegradation rules have been established under A.A.C. R18-11-107 to ensure that existing surface water quality is maintained and protected. The discharge from January Mine WTP2 (Outfall 002) will be to a water with Tier 1 antidegradation protection. Effluent quality limitations and monitoring requirements have been established under the proposed permit to ensure that the discharge will meet the applicable water quality standards, and applicable technology-based effluent limitations have also been considered and incorporated as effluent limits where they are more stringent than water quality-based limits. As long as the permittee maintains consistent compliance with these provisions, the designated uses of the receiving water will be presumed protected, and the facility will be deemed to meet currently applicable antidegradation requirements under A.A.C. R18-11-107.

Anti-Backsliding Considerations:

"Anti-backsliding" refers to statutory (Section 402(o) of the Clean Water Act) and regulatory (40 CFR 122.44(l)) requirements that prohibit the renewal, reissuance, or modification of an existing NPDES permit that contains effluent limits, permit conditions, or standards that are less stringent than those established in the previous permit. The rules and statutes do identify exceptions to these circumstances where backsliding is acceptable. This permit has been reviewed and drafted with consideration of anti-backsliding concerns. All existing permit effluent limits for Outfall 001 have not been modified.

Public Notice (A.A.C. R18-9-A907) / Public Comment Period:

These changes are considered a major modification. This proposed modification will be public noticed for a 30-day comment period prior to issuance of the final permit decision.

EPA Review (A.A.C. R18-9-A908(C)):

A copy of this draft permit modification any revisions made to this draft as a result of public comments received will be sent to EPA Region 9 for review. If EPA objects to a provision of the draft, ADEQ will not issue the permit until the objection is resolved.

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