



PITCH RECLAMATION PROJECT

August 23, 2018

Mr. Dustin Czapla
Environmental Protection Specialist
Colorado Division of Reclamation, Mining and Safety
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RE: Request for Approval of Surface Discharge of Treated Seep Water at the Pitch Reclamation Project, Colorado Division of Reclamation, Mining and Safety Reclamation Permit Number M-1977-004

Dear Mr. Czapla:

Homestake Mining Company (HMC) is continuing to advance alternatives that can be implemented at the Pitch Reclamation Project to reduce uranium load to the Colorado Discharge Permit System (CDPS) permit (Number CO0022756) compliance point Outfall 001A (also known as SW-33) and establish the Lowest Practical Level (LPL) for uranium. The proposed activities for 2018 were communicated to the Colorado Division of Reclamation, Mining and Safety (DRMS) earlier this year in a Request for Technical Revision (TR request, dated April 4, 2018), with approval of TR-9 granted by DRMS via correspondence dated April 18, 2018.

As described in the TR-9 request, one of the alternatives currently being advanced by HMC includes use of biochemical reactor-based engineered treatment cells (ETCs). The construction and implementation of the 2018 ETCs for treating Chester Fault Seep water has thus far followed the description included in the TR-9 request:

An intermediate-scale field implementation ETC will be constructed in 2018, which will involve mechanical regrading/berm construction and emplacement of reactive media for removing dissolved uranium from groundwater and redirected surface water. This ETC will be staged south of the North Pit Lake and will be constructed to intercept surface water routed from the Chester Fault Seeps [Figure 1]. Surface disturbances associated with this installation include the following:

- *Mechanical regrading within a series of rectangular zones, with a total disturbed area of approximately 0.3 acre.*
- *Emplacement of above ground conveyance piping leading into and out of the ETC, directing water from CFS/CFS-2 and into Indian drainage upstream of the Indian Rock Dump culvert (Figure 3).*
- *Leveling of ground surfaces adjacent to the Mine Shop Area and road maintenance as necessary to facilitate access, staging, and handling of equipment and ETC media. This surface disturbance will be limited and consistent with road maintenance activities routinely conducted at the Pitch Reclamation Project.*

To date, the ETCs have been constructed and saturated with water from the CFS locations as planned. However, field parameter monitoring of the current ETC effluent (which includes field phosphate measurements) suggests that the phosphate concentrations in the effluent are high relative to the SW-33 Outfall annual median total phosphorus limit of 0.11 mg/L established in Water Quality Control Commission Regulations 31 and 35. Specifically, the phosphorus concentration in the ETC effluent is approximately 35 mg/L, which after dilution in Indian drainage (upstream of the Sediment Pond and the outfall [SW-33]; Figure 1) would yield concentrations near 0.3 mg/L phosphorus in surface water.

The elevated phosphorus in the ETC effluent is believed to be a temporary situation due to the dissolution of soluble compounds associated with the organic media mixture, such as the cow/sheep manure compost. The observed effluent phosphorus concentration is considerably higher than those observed in the 2017 drum-scale tests (on the order of 1 mg/L or less with continued operation), further suggesting that the elevated concentration in the ETC effluent is temporary.

Based on these phosphorus concentrations, HMC is proposing to discharge the initial ETC effluent onto the land surface (specifically, onto the Indian Rock Dump), rather than discharging directly into the surface water drainage that eventually discharges to Indian Creek. In this way, the ETC effluent will effectively be used as a liquid fertilizer, serving to enhance rock dump revegetation efforts.

This proposed land surface discharge will substantially reduce the risks of phosphorus in surface water while posing little to no secondary concerns. Specifically:

- The ETC effluent would be deposited on an area of the Indian Rock Dump between the phosphate reagent injection system extraction and injection wells currently in operation for the treatment of uranium (Figure 2). The water would be discharged to the surface via perforated piping that stretches across the face of the dump, broadcasting the solution such that it contacts a large area of the dump and

percolates in rather than running off. The dissolved constituents would remain near the surface where deposited or infiltrate to depth.

- Although it is unlikely that phosphate would percolate to the saturated zone (over 100 feet deep), if it did, it would contribute to the phosphate currently being injected into the saturated zone for the treatment of dissolved uranium. Accordingly, the phosphate applied to the surface would not pose a concern beyond the phosphate already approved to be injected as part of the 2018 phosphate injection program.
- Laboratory analysis of the ETC effluent solution is currently underway; therefore, the uranium concentration in the ETC effluent concentration is not currently known. However, based on the reducing conditions of the ETC effluent (effluent dissolved oxygen of 0.64 mg/L versus approximately 6 mg/L in influent; effluent oxidation-reduction potential of -280.8 mV versus approximately +60 mV in influent), and the performance of the 2017 drum-scale treatment cell (reduction in uranium concentration from 0.8 mg/L to less than 0.008 mg/L [greater than 99% removal]), it is currently anticipated that the uranium concentration in the ETC effluent is less than current surface water concentrations across the site. Regardless, since the ETCs are capturing water that would otherwise have discharged directly to surface water, surface discharge of ETC effluent would not result in greater uranium mass loading to surface water.
- The Indian Rock Dump application of ETC water would be temporary and would only be continued as long as phosphorus concentrations in the water would exceed 0.11 mg/L following dilution in the on-site drainages. At that time, ETC effluent would be discharged into the drainage downstream of the North Pit Lake per the plan approved with the 2018 Request.
- As described in the 2018 Request, a treatment residuals management program is currently in place for mitigating phosphate in surface water if it is observed. Currently, the phosphate injection programs are operating as described in the 2018 Request, and the treatment residuals management program has not become necessary for maintaining phosphorus below compliance limits at the outfall.

Based on a previous informal discussion between Dale Davis (former HMC site manager), Michael Hay (Arcadis U.S., Inc., present on behalf of HMC), and DRMS representatives held during a 2017 site inspection, it is HMC's understanding that DRMS is not concerned about discharge of phosphate-containing water to the land surface as part of a phosphate residuals management program. However, we are issuing this letter to communicate the proposed plan to DRMS, ensure that DRMS does not have any concerns over this plan, and to further verify that the plan does not require a Technical Revision to the reclamation permit. We have also recently confirmed that this modification does not require approval from the Water Quality Control Division. As summarized above, this discharge is not anticipated to pose risks to surface water or groundwater; in contrast, it is anticipated that this discharge may enhance vegetation regrowth on the rock dump surface, thereby aiding in other reclamation efforts at the site. The ETC program is currently on hold, and

as such, we thank you very much in advance for your timely response. If you have any questions or require further information, please contact me at 505-252-9615.

Sincerely,



Dave Wykoff, on behalf of
Clark Burton
Homestake Mining Company
Director of Closure Operations

CC: Dave Wykoff – Homestake Mining Company, Site Manager
Kevin Hamatake – Homestake Mining Company, EHS and Closure Manager
Adam Sarman – Homestake Mining Company, Project Evaluation Manager
Mike Hay – Arcadis, U.S., Inc.

Figures

Figure 1 – Monitoring Locations

Figure 2 – Proposed Temporary ETC Effluent Water Discharge Zone

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LEGEND:

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|--|--|--|--|
| | Proposed Recirculation/Monitoring Well (Tentative) | | Engineered Treatment Cell (ETC) System |
| | Proposed Surface Water Monitoring Location (Tentative) | | Existing Treatment Residuals Management Staging Location |
| | Existing Recirculation/Monitoring Well | | Proposed Treatment Residuals Management Staging Location (Tentative) |
| | Existing Surface Water Monitoring Location | | |
| | CDPS Permit Compliance Point | | |

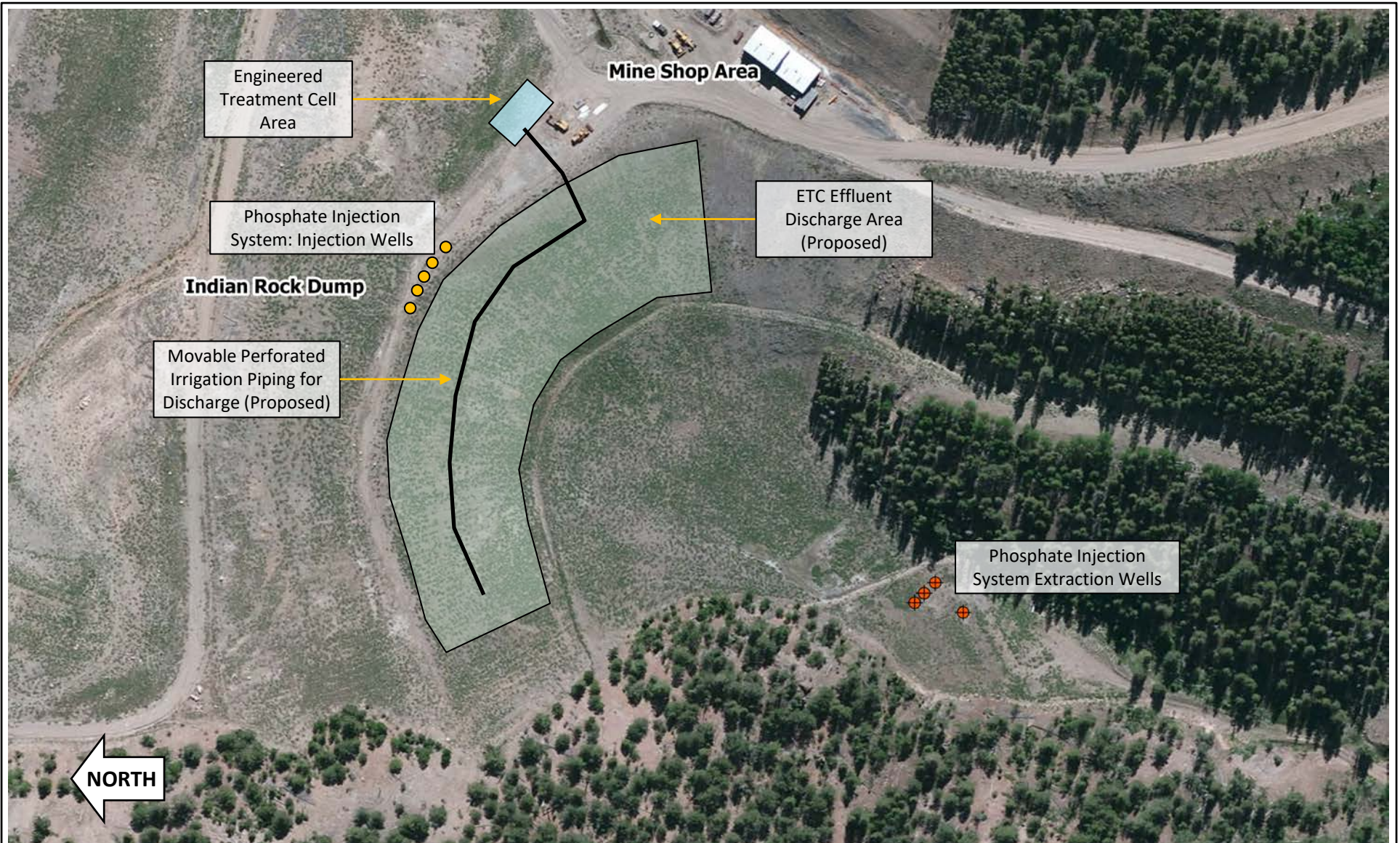


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MONITORING LOCATIONS



FIGURE
1



PITCH RECLAMATION PROJECT
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PROPOSED TEMPORARY ETC EFFLUENT
WATER DISCHARGE ZONE

 **ARCADIS**

FIGURE
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