COLORADO DIVISION OF RECLAMATION, MINING AND SAFETY
1313 Sherman Street, Room 215, Denver, Colorado 80203 ph(303) 866-3567

REQUEST FOR TECHNICAL REVISION (TR) COVER SHEET

File No.: M- 1977-004 Site Name: Pitch Reclamation Project

County Saguache TR# *(DRMS Use only)*

Permittee: Homestake Mining Company

Operator (If Other than Permittee):

Permittee Representative: Clark Burton - Head of Operations, Asset Development

Please provide a brief description of the proposed revision:

Installation of 1 recirculation/monitoring well in the underground mine workings. Installation of up to 10 boreholes/piezometers in the Indian and Tie Camp rock dumps for characterization of source zones. Continued field-demonstration scale testing of phosphate-based injections. Installation of field-implementation-scale engineered treatment cell (ETC) south of the North Pit Lake to treat the Chester Fault Seeps.

As defined by the Minerals Rules, a Technical Revision (TR) is: "a change in the permit or application which does not have more than a minor effect upon the approved or proposed Reclamation or Environmental Protection Plan." The Division is charged with determining if the revision as submitted meets this definition. If the Division determines that the proposed revision is beyond the scope of a TR, the Division may require the submittal of a permit amendment to make the required or desired changes to the permit.

The request for a TR is not considered "filed for review" until the appropriate fee is received by the Division (as listed below by permit type). Please submit the appropriate fee with your request to expedite the review process. After the TR is submitted with the appropriate fee, the Division will determine if it is approvable within 30 days. If the Division requires additional information to approve a TR, you will be notified of specific deficiencies that will need to be addressed. If at the end of the 30 day review period there are still outstanding deficiencies, the Division must deny the TR unless the permittee requests additional time, in writing, to provide the required information.

There is no pre-defined format for the submittal of a TR; however, it is up to the permittee to provide sufficient information to the Division to approve the TR request, including updated mining and reclamation plan maps that accurately depict the changes proposed in the requested TR.

Required Fees for Technical Revision by Permit Type - Please mark the correct fee and submit it with your request for a Technical Revision.

Permit Type	**Required TR Fee**	**Submitted** (mark only one)
110c, 111, 112 construction materials, and 112 quarries	$216	☐
112 hard rock (not DMO)	$175	☐
110d, 112d(1, 2 or 3)	$1006	☑

PITCH RECLAMATION PROJECT

April 4, 2018

Mr. Dustin Czapla
Environment Protection Specialist
Colorado Division of Reclamation, Mining and Safety
101 South 3rd, Suite 301
Grand Junction, Colorado 81501
Phone: (970) 243-6299
dustin.czapla@state.co.us

RE: 2018 Field Activities to Support Establishment of the Lowest Practical Level for Uranium, 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 the evaluation of alternatives that can be implemented at the Pitch Reclamation Project (**Figure 1** and **Figure 2**) to reduce uranium load to the Colorado Discharge Permit System (CDPS) permit (No. CO0022756) compliance point Outfall 001A (also known as SW-33) and establish the Lowest Practical Level (LPL) for uranium. Pilot testing in 2015 and 2016 and expanded field testing in 2017 involved the injection of a mixture of phosphate and conservative tracer into the historical Pinnacle underground mine workings and the Indian Rock Dump. This program was successful at treating uranium by precipitation as low-solubility phosphate-based minerals. In addition, a pilot-scale engineered treatment cell (ETC) was installed in 2017 to achieve uranium load reduction along Tie Camp drainage. The phosphate injection program and ETC installation were completed using existing and recently completed injection/monitoring wells and limited surface disturbances as approved in previous technical revisions (TR-6, TR-7, and TR-8) to the Colorado Division of Reclamation, Mining and Safety (DRMS) reclamation permit (No. M-1977-004).

Building on the success of the 2015, 2016, and 2017 pilot and field tests, and in the interest of continued evaluation of potential alternatives to address the other uranium source loads, the following field activities are planned for 2018:

- Installation of one reagent injection/recirculation/monitoring well in or near the underground mine workings (**Figures 2 and 3**).
- Installation of up to ten boreholes/piezometers in the Indian and Tie Camp rock dumps for characterization of potential localized uranium source zones (including two low-grade ore stockpiles, the former leach pad/mine dump area, and the

sediment storage area associated with historical dredging of the Sediment Pond; **Figures 2 and 3**).

- Expanded phosphate-based injections into the underground mine workings and Indian Rock Dump. Associated activities will include the installation of piping to expand the existing network of wells connected to the treatment systems installed in 2017.
- Installation of one field implementation-scale engineered treatment cell (ETC) south of the North Pit Lake to treat Chester Fault Seep surface water and achieve uranium load reduction.
- Implementation of active management strategies, should they become necessary, to control "treatment residuals" (i.e., residual dissolved constituents present in water resulting from reagent usage) in surface water upstream of the CDPS permit outfall (SW-33). In particular, residual phosphate in surface water resulting from phosphate injections will be managed if needed.

HMC hereby requests a Technical Revision to the Pitch Reclamation Project reclamation permit No. M-77-004HR. The following sections provide facility information, the proposed activities to be conducted in 2018 to support alternatives advancement and design, and information on reclamation of disturbed areas following LPL implementation activities. Additional details associated with former field activities are provided in the 2016 Alternatives Analysis Report, submitted to the Water Quality Control Division, the U.S. Environmental Protection Agency, and DRMS on December 6, 2016 (Arcadis 2016).

In advance of the 2018 uranium load reduction field activities, approvals will also be requested from the Water Quality Control Division as required by the CDPS permit and the United States Environmental Protection Agency for Class V aquifer remediation injection well "authorization by rule" in accordance with Title 40 Code of Federal Regulations (40 CFR) Sections 144.24 and 144.84(a).

Monitoring Well Construction and Borehole Advancement

One new recirculation/monitoring well is proposed for use in the injection, recirculation, and/or monitoring of phosphate-based reagents and conservative tracer(s) at the Pitch Reclamation Project. Up to 9 boreholes will be advanced in the Indian and Tie Camp Rock Dumps to identify potential uranium source areas; some may be completed as piezometers based on the presence of subsurface water.

The recirculation/monitoring well will be completed near the underground mine workings (**Figure 3**). The well will be constructed in relatively flat areas adjacent to existing access roads, although surface grading may be required to provide an adequate drill pad. The well is anticipated to be completed in June 2018.

The ten source area characterization boreholes will be advanced in areas that represent potential localized source zones for dissolved uranium. Access to the drilling locations will be along existing roads; however, small access grading may be necessary to reach target locations. Drill pads will be constructed, but will be situated to minimize the amount of surface disturbance. Six of the ten boreholes are currently planned for completion as

piezometers, while the remaining four would be plugged and abandoned following drilling and core collection. However, greater or fewer than six may be completed as piezometers depending on field observations.

Boreholes will be advanced and piezometers/wells will be constructed in accordance with Colorado Office of the State Engineer guidelines. Piezometers and wells will be completed to anticipated depths between 30 and 320 ft below ground surface and will be constructed with 5-inch schedule 80 PVC casing and screen. The screen will have a slot size of 0.020 inches and screen lengths will range from 20 to 100 feet. A silica 10/20 size or similar sand will be used as a screen filter pack. The well annulus will be sealed using a hydrated bentonite seal above the screen interval and a cement and bentonite mixture grout from the bentonite to near the ground surface. The surface stick-up well completion will consist of a 7- to 10-inch steel vault and locking lid cemented in place with concrete. The production PVC casing will be sealed with a locking cap. The well vault will be surrounded by an approximate 4-foot diameter concrete apron sloped to facilitate proper drainage away from the well. Equipment used for the well installation includes drilling equipment and support vehicles. Drill cuttings will be handled as described below.

Surface Disturbance

Drilling and Monitoring Well Completion

A total of approximately 1.3 acres of previously-disturbed or reclaimed ground will be used during drilling and completion of recirculation/monitoring well and investigation boreholes (**Figure 3**), which includes placement of impacted drill cuttings in the Tie Camp disposal cell (**Figure 3**. The disturbed areas will be reclaimed once the piezometers/wells are no longer being used as part of reagent injections and long-term monitoring associated with uranium load reduction system implementation and/or site characterization, as described below. Boreholes not completed as piezometers will be plugged/abandoned and reclaimed after drilling and sampling has been completed.

Drill cuttings will be screened using a hand-held Geiger-Mueller (GM) meter and segregated at the surface. Material that exhibits elevated counts per minute (cpm) relative to local background will be isolated for disposal in the low-grade ore disposal cell adjacent to Tie Camp drainage (**Figure 3**) in accordance with the terms of the Radioactive Materials License. Drill cuttings that do not exhibit elevated cpm readings relative to background will be spread and incorporated into the surface at the drilling locations.

Reagent Injection/Recirculation Infrastructure

To facilitate larger scale water recirculation and phosphate injection activities, additional conveyance piping will be installed adjacent to recirculation wells in the underground mine workings. These activities, which are anticipated to result in negligible disturbance of reclaimed areas, are as follows:

- Installation of fencing around injection well infrastructure at the top of the Indian Rock Dump (**Figure 2**).

- High-density polyethylene (HDPE) plastic piping associated with water conveyance and electrical conduits at the underground mine workings phosphate injection system will be extended to run to wells P-5, P-12, and P-16 (**Figure 2)**. Installation will be performed in a manner consistent with pipe installation conducted in 2017. Specifically:
    - Piping running along access roads and on steep grades will be maintained aboveground, secured to the ground using stakes and wire harness.
    - Piping will be buried or transmitted through an installed culvert at locations where piping crosses existing access roads.
    - Piping running parallel to access roads and/or drainage ditches will either be secured adjacent to the roads/ditches or placed into the drainage and away from roadways for safety purposes.
    - Piping will be HDPE welded, flanged, or a combination.

ETC Field Implementation

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 3**). 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.

Treatment Residuals Management

Activities associated with the treatment residuals management program include staging of equipment (including but not limited to plastic water storage tanks/totes, flow meters, pumps, conveyance piping, and secondary reagent containment) at points adjacent to the North Pit Lake and Indian drainage (**Figure 3**). This equipment will be staged on flat ground and will require no additional surface disturbance in 2018. Fencing will be installed along the perimeter of equipment staging areas as necessary.

Reclamation of 2018 Disturbed Areas

Surface disturbances and infrastructure installed in 2018 requiring eventual reclamation will include drilling disturbances, recirculation/monitoring wells that will require eventual

plugging and abandonment, and infrastructure associated with LPL activities. Reclamation of 2018 disturbed areas will include the following:

- Disturbances associated with drilling will be temporary. These areas will be restored to pre-drilling conditions immediately following drilling with the exception of small access roads that will be used to facilitate well/piezometer maintenance (**Figure 3**).
- The proposed wells/piezometers will be used as part of the long-term monitoring program associated with uranium load reduction system implementation and source zone characterization. When warranted, the wells will be abandoned in accordance with Rule 16 of the Colorado Water Well Construction Rules.
- Injection platforms installed in 2017 and conveyance piping installed in 2017 and 2018 will be maintained across multiple seasons to support LPL activities. Reclamation of disturbed areas following the completion of injection activities will include removal of piping and engineered structures.
- Disturbed ground in each area will be re-contoured and revegetated, with grading for drainage, scarifying/harrowing, and fertilizing to be conducted as necessary for proper reclamation.

Summary

An integral component to establishing a practical, technically achievable, and sustainable LPL is the development of alternatives for uranium load reduction at this high elevation mine site with limited year-round access. Pilot testing and system implementation ongoing since 2015 has been successful at treating uranium in the underground mine workings and near the toe of the Indian Rock Dump, including desired attenuation of the injected phosphate. The success of these tests was based on observed uranium removal and phosphate attenuation within injection zones and immediately downgradient. Achieving meaningful load reductions in surface water will require ongoing phosphate injection system operation and optimizations, along with continued expansion of other LPL-based strategies, such as use of ETCs. To achieve this goal, 2018 activities will include the expansion of the phosphate injection system at the underground mine workings, continued operation of the phosphate injection systems at the underground mine workings and Indian Rock Dump (with a surface water treatment residuals management program in place), construction of an ETC for treatment of Chester Fault seepage downstream of the North Pit Lake, and characterization of potential discrete uranium sources within the Indian and Tie Camp rock dumps. Anticipated surface disturbances associated with these activities are conservatively estimated at approximately 1.6 acres (including 1.3 acres associated with drilling activities and 0.3 acre associated with ETC implementation). If you have any questions or require further information regarding this submittal, please contact me at (505) 252-9615.

Sincerely,

Dave Wykoff, on behalf of
Clark Burton
Homestake Mining Company
Head of Operations, Asset Development

CC: Russ Means – DRMS
Adam Sarman – Homestake Mining Company, Project Evaluation Manager
Dave Wykoff – Homestake Mining Company, Site Manager
Mike Hay – Arcadis, U.S., Inc.

References

Arcadis. 2016. Draft Alternatives Analysis and Lowest Practical Level Update. Prepared for Homestake Mining Company. December.

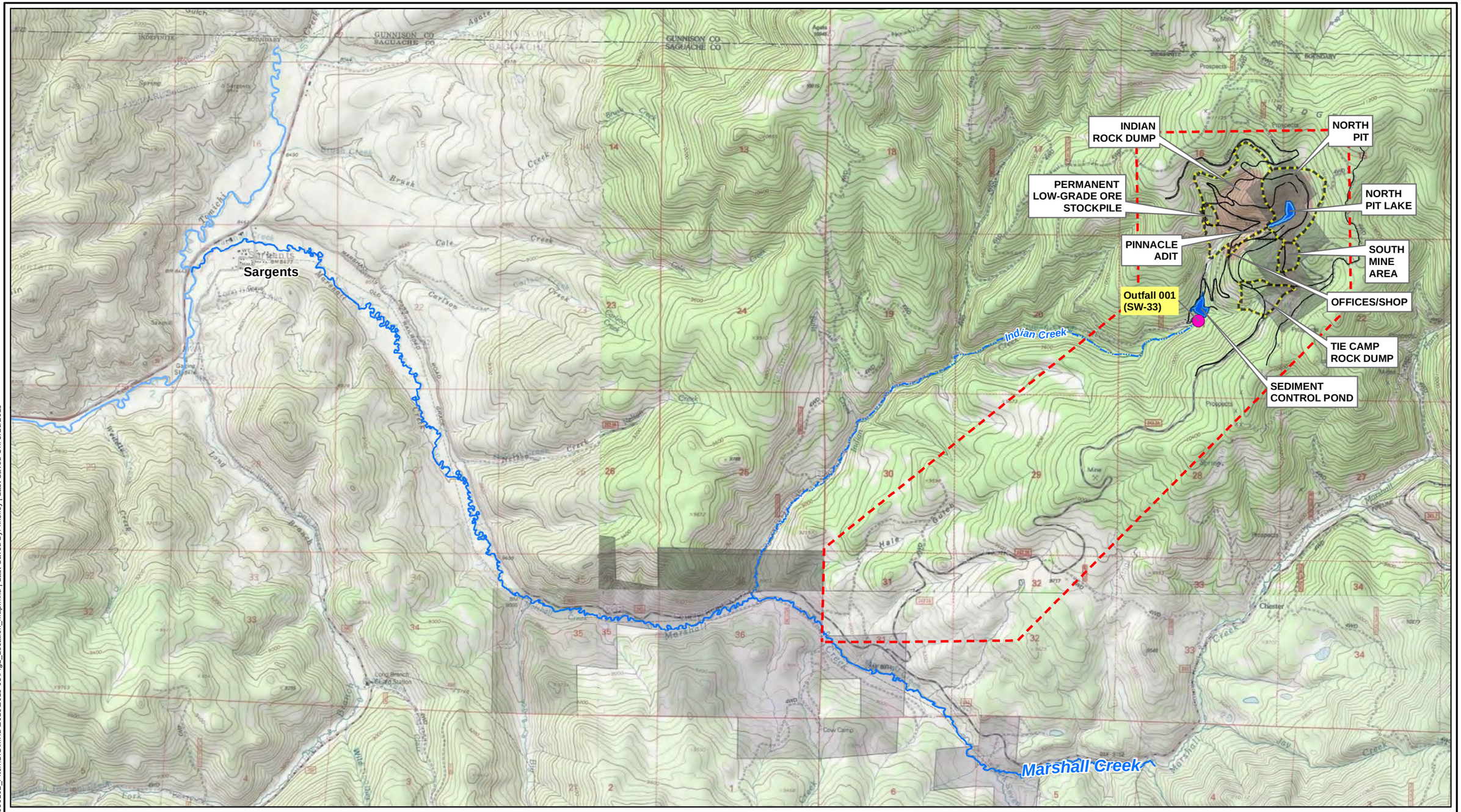
Figures

Figure 1 – Location Map

Figure 2 – Monitoring Locations

Figure 3 – 2018 Surface Disturbance Areas

Figures



Legend

- Sample Points
- Colorado Division of Reclamation, Mining, and Safety (DRMS) Permit Boundary
- Facility Areas
- Marshall Creek
- Indian Creek
- Tomichi Creek

Notes:

Source: USGS 7.5' Quadrangles of Sargents, Chester, Sargents Peak, and Paholone Peak, Colorado

N

0 3,000 6,000 Feet

PITCH RECLAMATION PROJECT
HOMESTAKE MINING COMPANY
SARGENTS, COLORADO

LOCATION MAP

ARCADIS

FIGURE 1

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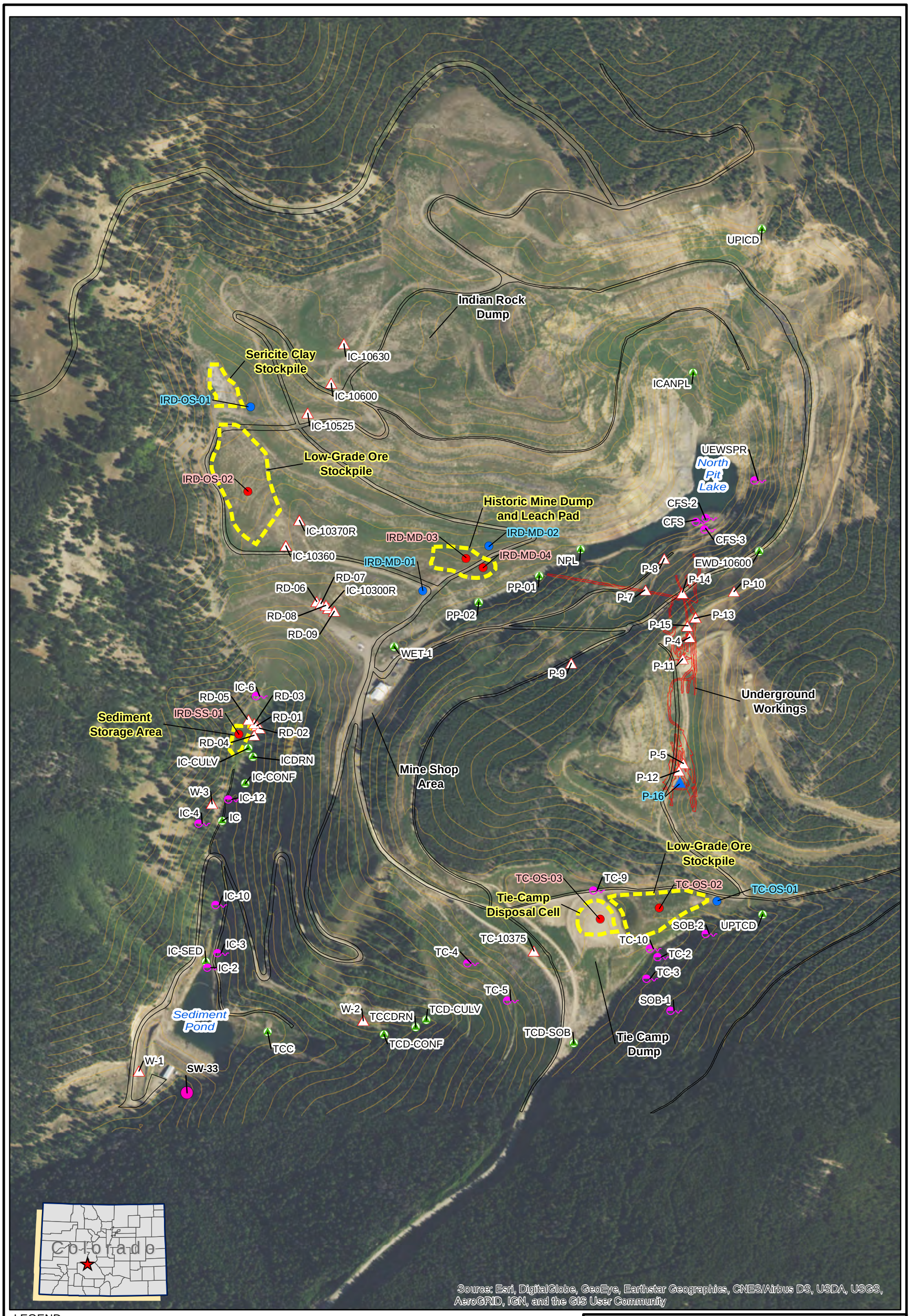

LEGEND:

- Existing Surface Water Monitoring Location
- Existing Well
- Seep/Spring
- Proposed Soil Boring Location
- Proposed Peizometer Location
- Proposed Well Location
- Outfall Location
- Contour 25 feet
- Roads
- Stockpile
- 10,300 Level Underground Mine

0 530 1,060 Feet

PITCH RECLAMATION PROJECT
HOMESTAKE MINING COMPANY
SARGENTS, COLORADO

MONITORING LOCATIONS

ARCADIS

FIGURE 2

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Sericite Clay Stockpile
IRD-OS-01
Low-Grade Ore Stockpile
IRD-OS-02
Indian Rock Dump
Historic Mine Dump and Leach Pad
IRD-MD-02
IRD-MD-03
IRD-MD-04
IRD-MD-01
North Pit Lake
Proposed Treatment Residuals Management Staging Location (Tentative)
ETC Effluent
ETC Proposed Location
Mine Shop Area
Underground Workings
Sediment Storage Area
IRD-SS-01
P-16
Existing Treatment Residuals Management Staging Location
Low-Grade Ore Stockpile
TC-OS-03
TC-OS-02
TC-OS-01
Tie-Camp Disposal Cell
Tie Camp Dump
Sediment Pond
Colorado

LEGEND:

- Proposed Soil Boring Location
- Proposed Peizometer Location
- Proposed Well Location
- Proposed Surface Water Monitoring Location (Tentative)
- Drill Pad
- Contour 25 feet
- Roads
- Stockpile
- 10,300 Level Underground Mine
- Proposed Engineered Treatment Cell (ETC) System
- Existing Treatment Residuals Management Staging Location
- Proposed Treatment Residuals Management Staging Location (Tentative)
- Planned Access Road

0 530 1,060 Feet

PITCH RECLAMATION PROJECT
HOMESTAKE MINING COMPANY
SARGENTS, COLORADO

2018 SURFACE DISTURBANCE AREAS

ARCADIS

FIGURE 3

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