HOMESTAKE MINING COMPANY OF CALIFORNIA

Grants Reclamation Project

SEMI-ANNUAL
ENVIRONMENTAL MONITORING REPORT

Reporting Period
January- June 2019

U.S. Nuclear Regulatory Commission License SUA-1471
State of New Mexico DP-200

HOMESTAKE
Grants Project

Homestake Mining Company of California

David W. Pierce
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30 August 2019

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RE: Semi-Annual Environmental Monitoring Report for Period January-June 2019, In Accordance with Nuclear Regulatory Commission Docket No. 40-8903, License No. SUA 1471, and New Mexico Environmental Department DP-200 Ground Water Discharge Plan

Dear All:

Pursuant to US Nuclear Regulatory Commission Regulation 10 CFR 40.65, Part 20, and in accordance with the applicable provisions stipulated in ground water discharge permit DP-200 issued by the New Mexico Environmental Department, please find enclosed copies of the Semi-Annual Environmental Report for the first half of 2019 (January-June) for Homestake Mining Company's Grants Reclamation Project.

Thank you for your time and attention on this matter. If you or anyone on your staff has any questions, please contact me at 505.238.9701.

Respectfully,

David W. Pierce

NMSSO1
NMSS

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1.0 INTRODUCTION

This Semi-Annual Environmental Monitoring Report summarizes effluent monitoring data recorded for Homestake Mining Company of California - Grants Project (Homestake) from January through June 2019. The submittal of this report to the appropriate Nuclear Regulatory Commission (NRC) Regional Office and State of New Mexico within 60 days after January 1, and July 1 for each year of operation is required for all uranium mill facilities pursuant to 10 CFR Part 40.65. The monitoring data and the report format have been selected by Homestake representatives to satisfy the requirements of 10 CFR Part 40.65 and Discharge Permit No. 200, dated September 18, 2014

Homestake's monitoring and surveillance program for radioactive effluent releases have been designed to ensure the project's compliance with 10 CFR Part 40, and Part 20 U.S. NRC Standards for Protection Against Radiation and closely approximates programs as described in NRC's Regulatory Guide 4.14, Radiological Effluent and Environmental Monitoring at Uranium Mills. Some effluent monitoring activities differ from those presented in the Regulatory Guide 4.14 as required by Homestake's Radioactive Materials License (SUA-1471).

Recontouring reclamation activities began in September 1993 and mill demolition commenced in late October 1993 and was completed December 10, 1995. A mill decommissioning completion report was submitted in February 1996 and approved by the NRC on January 28, 1999. The large tailings pile (LTP) has been re-contoured and covered with an interim cover on the top and radon barrier on the outslopes. Bedding and erosion protection was placed on the outslopes after placement of the radon barrier. Soil cleanup verification of the off-pile contaminated soil (windblown tailings) is complete; the completion report was submitted December 18, 1995 and approved by the NRC on January 29, 1999.

A summary of the operations of groundwater treatment technologies, as required by DP-200 is provided in Section 3.0.

Homestake's groundwater monitoring program, as outlined in license Condition No. 35, continued throughout the report period. The requirements set forth in Condition No. 35 include the reporting of both radiological and non-radiological water quality parameters for specified wells, as well as the documentation of water injection and collection volumes of the groundwater cleanup system. The performance review of the corrective action program is submitted annually as a separate document and contains the groundwater monitoring information for January 1 through December 31 of each year. In order to meet NRC's requirement for semi-annual reporting, groundwater-monitoring data for the point-of-compliance (POC) wells, pond monitoring wells DD, DD2 and X and background well P are included in this report. It should be noted that while the POC wells will eventually be used to demonstrate groundwater restoration, they are not currently representative of off-site groundwater quality conditions.

2.0 ENVIRONMENTAL MONITORING PROGRAMS

The monitoring requirements for the site are summarized in Table 2-1, Table 2-2, and Table 2-3 attached. Details of the monitoring program are discussed in the following sections:

2.1 Air Particulate Monitoring

Homestake continuously samples total suspended particulates at seven locations around the reclamation site (see Figure 1). Those locations identified as HMC-1, HMC-1A, HMC-2 and HMC-3 are areas at the property boundary expected to have the highest predictable concentrations of airborne radioactive particulates. The predominant wind direction is from the southwest; accordingly, HMC-1, HMC-2 and HMC-3 are generally located downwind from Homestake's reclamation activities. HMC-1A is northeast of EP-3 located north of the mill site. The location identified as HMC-6 represents background conditions for air particulates and is located due west of the large tailings pile at the western most side of the property boundary. Locations HMC-4 and HMC-5 are site proximal to the nearest residences. HMC-7 is a blank Whatman filter that is analyzed as a lab and filter manufacturer quality check sample.

Homestake uses Hi-Q HVP-4300 AFC High Volume Air Samplers (or equivalent) to continuously sample the ambient air at the locations shown in Figure 1. The samples are collected on 8-inch by 10-inch Whatman glass fiber filters (or equivalent), which are changed weekly or more frequently as required by dust loading. Energy Laboratories, Inc. (ELI) analyzes the collected samples quarterly for Natural Uranium, Radium-226 and Thorium-230. Air sampling flow volumes and run times are recorded by HMC and the data are reported to ELI for calculation of average radionuclide concentrations in air particulates.

The results of environmental air particulate monitoring for 1st half 2019 are provided in Attachment 1.

2.2 Radon Gas Monitoring

Radon-222 gas concentrations in ambient outdoor air are monitored on a continuous basis at the nine locations identified in Figure 1. The background location for radon gas is HMC #16, located northwest of the site. Rapidos high-sensitivity track-etch passive radon monitors (PRM) from Radonova (formerly Landauer Radon), or equivalent, are used to continuously monitor radon gas at each sampling location. Homestake personnel place new PRMs quarterly at the monitoring locations and the exposed detectors are retrieved and returned to the vendor for analysis. The PRM detectors measure radon gas concentrations in ambient outdoor air by exposing a special alpha-particle sensitive plastic chip mounted inside a chamber with a membrane filter on one end that is permeable to air and radon gas, but not to dust or solid phase particulate radionuclides. Radon-222 gas from ambient air diffuses through the membrane, and the subsequent decay of radon gas inside the chamber causes imprint tracks on the alpha-sensitive plastic chip that can be enhanced by a chemical etching process and counted after collection. The radon gas concentration is calculated by determining the number of tracks per unit area of the plastic chip. The semi-annual average results are presented in Attachment 2.

2.3 Effluent and Radon Flux Monitoring

Regulations in 10 CFR 40.65 require licensees to estimate and report the quantities of principal radionuclides released to unrestricted areas in gaseous effluents every six months.

Radon-222 was the only gaseous-phase effluent radionuclide released to unrestricted areas in the 1st half 2019. The principal sources of radon-222 at the site are the large tailings pile (LTP) and Small Tailings Pile (STP). Radon-222 releases from components of the water treatment system (the Reverse Osmosis [RO] building and evaporation ponds) are insignificant relative to those of the LTP and STP.

Annual flux measurements for calendar year 2019 will occur in the fall as two separate deployments, consisting of 100 canisters per deployment on the LTP and STP respectively. Deployments will be conducted in accordance with the methods proposed in HMC's response to the NRC's 2017 notice of violation (NOV) regarding an average radon flux rate from the LTP that exceeded the 20 pCi/m^2-s standard given in 10 CFR 40, Appendix A (ERG, 2017 and NRC, 2017). A Radon Flux report for 2019 will be provided in the 2019 2nd half semiannual environmental monitoring report.

On April 20, 2017, the NRC issued a notice of violation for the manner in which average radon flux was measured and calculated for 2015. The 2016 annual flux report, dated January 2017, observed previously existing protocols pending NRC resolution of a regulatory decision on these matters. On April 24-26, 2017 the NRC conducted an onsite inspection, and in associated discussions indicated that side slopes of the LTP, upon which final cover was completed in 1995 (including flux measurements followed by placement of final erosion control material), cannot be used for annual flux estimates unless new flux measurements on the side slopes are conducted. NRC indicated that 100 annual measurements across the top of the LTP, and calculation of the arithmetic mean of the 100 measurements, would be an acceptable approach to meet the requirements of License Condition 36(E) with respect to the LTP. This protocol was observed for 2017 and 2018 annual radon flux measurements as detailed in respective radon flux reports provided in corresponding semiannual environmental monitoring reports.

With respect to the STP, the evaporation pond (EP1) is an operational facility as EP1 operations and disposal of additional materials in the STP will continue. Since the STP is still operational, it can be broken into regions in accordance with EPA Method 115, with the pond being one region of zero flux (28.7 acres), and the remaining areas (earthen surfaces) representing a second region (26 acres). Section 2.1.7 of EPA Method 115 provides an explicit mathematical formula for area-weighted averaging of various regions to determine the overall weighted average flux for the entire pile. Under Method 115, calculation of effluent release of radon from the STP is based on the flux measurement data noted above (100 flux measurements), and a calculated overall area-weighted average flux for the two regions as follows (excerpted from EPA Method 115):

(b) The mean radon flux for the total uranium mill tailings pile shall be calculated as follows.

$$J_s = \frac{J_1A_1 + J_2A_2 + \ldots + J_iA_i}{A_t}$$

where:

J_s = Mean flux for the total pile (pCi/m²-s)
J_i = Mean flux measured in region i (pCi/m²-s)
A_i = Area of region i (m²)
A_t = Total area of the pile (m²)

The radon flux emission rate for the first half of 2019 is assumed equivalent to that measured in 2018. Based on the above information and 2018 flux monitoring results, the calculated average radon flux effluent value for the LTP in 2018 was 51.3 pCi/m²-s as reported in the 2018 Annual Radon Flux Report (HMC, 2018a). With respect to the STP, the arithmetic mean flux for the earthen region of the pile (105,272 m^2 area) in 2018 was 12.7 pCi/m²-sec. The area of EP1 is approximately 116,204 m^2, and this pond area was assigned a value of zero flux. The overall area-weighted average radon flux for the STP in 2018 was calculated as follows:

STP Radon Flux = [(26.7 pCi/m²-s)(105,272 m^2) + (0 pCi/m²-s)(116,204 m^2)] / (221,148 m^2)
= 12.7 pCi/m²-s

Thus, average Rn-222 flux values of 51.3 and 12.7 picocuries per square meter per second (pCi m^{-2} s^{-1}) for the LTP and STP respectively are assumed for first half 2019. Based on the 2018 average flux values (51.3 and 12.7 pCi m^{-2} s^{-1} for the LTP and STP, respectively), along with the approximate areal extent of the applicable surfaces including the top of the LTP (≈ 106 acres) and the entire STP (≈ 54.7 acres), the annual radon emissions from the tailings piles in 2018 were calculated to be 694 Ci and 88.7 Ci respectively. For the first half 2019 semi-annual reporting period only, effluent radon releases are assumed equivalent to half of these values, or 347 Ci and 44.4 Ci for the LTP and STP respectively. Final effluent radon releases for 2019 will be reported in the 2nd half semiannual environmental monitoring report.

3.0 OPERATIONS

3.1 Flow Rates

The monthly influent totals to each of the evaporation ponds are presented in Table 3.1-1 for the 1st half 2019. Inputs to Evaporation Pond 2 were RO brine, zeolite regeneration, tailings sumps, and transfers from the collection pond. Transfers from Evaporation Pond 2 to Evaporation Pond 1 and transfers from Evaporation Pond 1 to Evaporation Pond 3 are presented in this table as well. The influent into the collection ponds was from well 802, and miscellaneous flow from the RO plant which includes any diverted flow, flow from the RO sumps, backwash from the microfiltration system, blow down from the clarifiers and zeolite regeneration. The freeboard measurements taken from the evaporation and collection ponds are tabulated in Table 3.1-2. The readings on the West Collection Pond are taken as either overflowing (O/F) into the East Collection Pond via a spillway or not overflowing (Not O/F). The leak detection volumes pumped for from Evaporation Ponds 2 and 3 are presented in Tables 3.1-3 through 3.1-5. These

three tables give the gallons per day per acre (GPD/AC) with values that exceed 775 GPD/AC highlighted in blue. Pumps in these cells or adjacent cells were adequate to keep up with these rates.

The tailings sump volume, collection and injection totals for the Large Tailings Pile are presented in Table 3.1-6. Injection into the LTP ceased in July 2015. The monthly collection totals broken out by aquifer and restoration area are shown in Table 3.1-7. The monthly injection totals broken out by aquifer and area are presented in Table 3.1-8. The On-Site, South Off-Site, and North Off-site injection water is a combination of San Andres water, zeolite treated water, and RO Product water. The monthly totals for the low concentration and in-situ injectate are presented in Table 3.1-9, which were not operated in the 1st half 2019. The low concentration re-injection ceased operation in July of 2016.

Table 3.1-10 presents the influent totals for the active treatment systems. The inflow to the RO plant averaged 351 gpm in the 1st half 2019 while the inputs to the 300 zeolite and 1200 zeolite cells were 0 and 249 gpm, respectively. Table 3.1-11 presents the total volumes of treated effluent. It also presents the regeneration and brine effluents that were discharged into Evaporation Pond 2 from the treatment systems. The fresh water injection totals from each of the three restoration areas are also presented in this table.

3.2 Reversal Wells

The depth to water measurements for the Reversal Wells are presented in Table 3.2-1. Water levels in alluvial well S5 have been used in place of well S1 for the S1-S2 reversal pair due to the effects of the nearby S injection line on water levels in well S1. Because the operation of the S injection line results in water level changes in both S1 and S2, it is necessary to monitor water levels in well S5 which is closer to the collection area in order to effectively monitor gradient reversal.

3.3 Pond and Pipeline Maintenance

During this semi-annual reporting period, liner repair was performed on the collection ponds and Evaporation Pond 1. Liner repairs are detailed below:

- After the EP-1 re-lining project was deferred until 2020, the East Collection Pond was pumped down approximately one foot between June 3rd and June 10th, 2019. On June 14th, a worker reported a hole in the liner above the water level. During subsequent inspection on June 17, numerous holes were identified in the east and west collection pond liners with many of them below the previous water line(s). HMC was unable to estimate a volume released. A contractor was engaged to make repairs to both liners using Deery Oil #6 and mesh fabric patches. The repairs were initiated on July 10, 2019 and completed on August 6, 2019. The collection ponds are currently being evaluated for re-lining.

- Since the EP-1 re-lining project was deferred to 2020 and residual salts were exposed in EP-1, HMC commenced transferring water from Evaporation Pond #2 (EP-2) on July 11, 2019. The discharge stream into EP-1 resulted in a hole in the

liner on July 23, 2019 and the transfer was stopped that afternoon, leaving an approximate six-inch hole in the liner slightly above the water line. An estimated volume of up to 12,000 gallons of brine was released through the tear.

Repairs were performed on July 31, 2019. Sandbags were used to isolate the tear and then a fabric patch was used to cover the tear prior to application of Deery Oil #6 to seal the tear.

No reportable discharges from impacted water conveyance pipelines to non-authorized areas occurred during this time period. Onsite incidental leaks and spills resulting from equipment failure and/or weather-related are summarized in the leak register maintained at the site.

3.4 Well Drilling and Closures

Nine new wells were drilled on-site during the period from January through June of 2019 as indicated in Table 3.4-1. In addition, former San Andres well #1 Deep was plugged and abandoned in the first half of 2019.

3.5 Facilities Inspections and Maintenance

Facilities, structures, contaminated fluid pipelines, equipment, diversion structures and diversion channels associated with groundwater treatment, and drainages were inspected during the period from January through June of 2019. Minor surface water erosion piping was identified originating on top of the LTP and down the southern slope after several rain events. The erosional subsurface piping channel was backfilled to prevent further erosion in this area.

In addition, the following significant maintenance activities were performed during this semi-annual reporting period on the groundwater treatment systems:

Zeolite Groundwater Treatment

- No significant maintenance activities were performed on the zeolite system in the 1st half 2019.

Reverse Osmosis Groundwater Treatment

- In February 2019, Clarifier 1 was shutdown due to shaft and rake displacement and scheduled for repair and repaint (anticipated back online Dec, 2019);
- In March 2019, anti-scalant was changed on all low pressure units from Vitec 3000 to Vitec 7400 due to silica scaling in the RO membranes;
- In June 2019, an additional 20 micro-filtration modules were installed to lower the flux rate and increase the capacity of the micro-filtration system.

4.0 WATER QUALITY MONITORING

4.1 Groundwater Quality Monitoring

Table 2-2 outlines the water quality sampling frequency and parameters monitored. In addition, the volumes of water injected and recovered as part of the ground-water cleanup program are monitored on a weekly frequency and the rates documented. A performance review report is submitted by March 31 of each year according to License Condition 35E. The groundwater monitoring data for the POC wells, as required to comply with 10 CFR 40.65, are reported in Tables 4.1-1 through 4.1-6 A sample from background well P was collected in the 1st half 2019 (see Table 4.1-4). The water quality of the Point of Compliance (POC) wells is currently being restored; therefore, the reported levels are not representative of steady state aquifer conditions at the present time and the concentration levels are not compared to 10 CFR 20 effluent limits. A hydraulic barrier forces the water in the aquifer near these POC wells to move in the direction of the collection wells where the water is withdrawn and treated. Due to these conditions, water level data on these wells are also not reflective of steady state conditions, and therefore are not reported here.

4.2 Pond Water Quality Monitoring

Table 4.2-1 presents the water quality data associated with the collection and evaporation ponds. The water quality data for the Evaporation Pond alluvial monitoring wells are presented in Table 4.2-2. This table highlights the concentrations that exceed the alluvial site standards in blue. The sulfate and TDS concentrations naturally exceed the site standard in wells DD and DD2. The uranium concentrations in well DD2 naturally exceed the alluvial site standard as they have since this well was drilled. Total concentrations for manganese, selenium, molybdenum and uranium are presented for the ponds and are generally similar to the dissolved concentrations. Table 4 from the Discharge Permit DP-200 requests uranium activity as one of the analytes for monitoring but is not included because it is a calculated value from the uranium concentrations.

4.3 Treated Water Quality Monitoring

Table 4.3-1 presents the effluent water quality analysis from the Post Treatment Tank (SP2). The SP2 sample is collected after mixing of the RO product, zeolite treated and fresh water. This table also shows that all SP2 concentrations in the 1st half 2019 were less than all alluvial site standards for each of these samples.

Table 4.3-2 presents the treated water quality data for the RO product (SP1) and the zeolite treated water (300Z, 1200Z Trains 1 & 2, and 1200Z Trains 3 & 4) with sample constituent concentrations that exceed the alluvial site standards highlighted in blue. All RO product constituent concentrations measured in the 1st half 2019 were less than or equal to the corresponding alluvial site standards. Table 4.3-2 also presents the treated water quality for the zeolite treatment process. In the 1st half 2019, zeolite was used to treat Off-site water for uranium in the 1200 zeolite systems. The zeolite treated water is monitored for the discharge

from the 300 zeolite and Trains 1 & 2 and Trains 3 & 4 from the 1200 systems. No concentrations exceeded the site standards in the 1st half 2019 in the zeolite samples.

5.0 DIRECT RADIATION

Gamma dose rates are continuously monitored using optically stimulated luminescence (OSL) dosimeter badges placed at each of the eight locations identified in Figure-1. HMC #16 is considered the background location for direct radiation. Each OSL badge consists of an aluminum oxide detector within a plastic holder. The plastic provides adequate protection from weather for these badges to be used outdoors. The OSLs are exchanged semi-annually and analyzed by an approved independent laboratory (currently Landauer). The levels of direct environmental radiation are recorded for each of the eight locations. Pertinent sample data are reported in Attachment 3.

6.0 SURFACE CONTAMINATION

The Occupational Monitoring Program requirements are summarized in Table 2-3. The aspects related to contamination control are discussed briefly below.

6.1 Personnel Skin and Clothing

The monitoring of personnel for alpha contamination may be required by the RSO depending on the nature of the work being performed as specified in the Radiation Protection Program (RPP) Manual (HMC, 2018b). The applicable procedure is found in SOP 12 (Contamination Surveys) which may or may not be conducted under a radiation work permit (RWP) at the discretion of the Radiation Safety Officer (RSO). Documentation for personnel contamination surveys is maintained in each specific RWP documentation binder or in a binder for miscellaneous surveys as applicable. For the 1st half of 2019, no personnel or clothing above administrative limits (distinguishable from background) were released from the Site.

6.2 Survey of Equipment Prior to Release for Unrestricted Use

Equipment surveys are required for all equipment that is to be removed from Restricted Areas as specified in the RPP (HMC, 2018b). Standard Operating Procedures are used for these surveys. No releases of contaminated material above NRC release criteria were reported during this reporting period.

7.0 LOWER LIMIT OF DETECTION

Homestake representatives have calculated the Lower Limit of Detection (LLD) for each measurement system, where applicable; to more accurately evaluate concentrations of radioactive material measured in the environment surrounding the mill site. The lower limit of detection is defined in U.S. Nuclear Regulatory Guide 8.30 – Appendix B as the smallest concentration of radioactive material that has a 95% probability of being detected. Radioactive

material is "detected" if the value measured on an instrument is high enough to conclude that activity above the system background is probably present. Since the LLD is a function of sample volume, counting efficiency, radiochemical yield, etc., it varies for different sampling and analysis procedures.

For the individual measurement systems for which Homestake calculates LLDs, the following formula is utilized:

$$LLD = \frac{3+4.66\ S_b}{3.7\ E\ 4\ EvY \exp(-\lambda t)}$$

Where:

LLD	is the lower limit of detection (microcuries per milliliter [μCi/ml]);
S_b	is the standard deviation of the instrument background counting rate (counts per second);
3.7 E 4	is the number of disintegrations per second per microcurie;
E	is the counting efficiency (counts per disintegration);
v	is the sample volume (ml);
Y	is the fractional radiochemical yield (when applicable);
λ	is the radioactive decay constant for the particular radionuclide; and;
t	is the elapsed time between sample collection and counting

The value of S_b used in the calculation of the LLD for a particular measurement system will be based on the actual observed variance of the instrument background counting rate. The laboratory has been instructed to report the LLD for each measurement considering all of the parameters associated with the measurement system and the sample size.

The vendor laboratory that performed the analyses reported herein has documented that the LLD for air and water samples will meet or exceed the requirements in Regulatory Guide 4.14. This assumes a minimum water sample size of 1 liter and an air sample volume of 2 E 9 ml. Landauer (vendor lab) reports the LLD for radon-222. The LLDs for the constituents are:

Ra-226, Th-230 in air	1 E-16 μCi/ml
Rn-222 in air	30 pCi(d/l)
U-nat in air	1 E-16 μCi/ml
U-rad in water	2 E-10 μCi/ml
Ra-226, Th-230 in water	2 E-10 μCi/ml

Uranium is analyzed by ICP-MS methods by the current vendor laboratory. In order to determine the LLD, the laboratory has performed the analysis on a blank sample many times and uses the standard deviation of these background measurements to calculate the LLD. This LLD is specified for all analyses as long as the sample size or volume meets the minimum value.

8.0 DATA SUMMARY AND CONCLUSIONS

The summaries of Homestake's effluent monitoring program included in this submittal contain data for each of the regulated parameters released to unrestricted areas. DP-200 and 10 CFR Part 40.65 requires that Homestake submit effluent release monitoring data to the State of New Mexico and the NRC within 60 days of the end of the six-month period ending January 1 and July 1 of each year. Homestake is submitting this report to satisfy the regulatory requirements cited above. The attachments included in this report summarize the results of the effluent monitoring activities conducted by Homestake and pertinent to the required monitoring time period.

The data collected in many of Homestake's effluent monitoring programs can be readily compared to 10 CFR Part 20 Appendix B effluent concentration (EC) values, not for determinations of public dose, but as a qualitative benchmark indicator for identifying effluent levels or trends that could pose a concern in terms of compliance with public dose limits given in 10 CFR 20.1301. During the current reporting period (1st half 2019), Homestake has not exceeded 10 CFR Part 20 EC values in any terrestrial effluents covered by this report. This, of course, does not include the groundwater values at the POC wells as discussed earlier.

REFERENCES

Environmental Restoration Group, Inc. (ERG). 2017. Proposal to address radon flux NOV for the LTP (NRC Docket No. 040-08903/2016-001 License No. SUA-1471). In: Reply to Notice of Violation, Docket No. 040-08903/2016-001, License No. SUA-1471 [Submitted to NRC by Homestake Mining Company of California (HMC) on September 13, 2017].

Homestake Mining Company of California (HMC). 2018a. Semi-Annual Environmental Monitoring Report. Reporting Period January-June 2018. Homestake Grants Reclamation Project, Cibola County, New Mexico. August.

Homestake Mining Company of California (HMC). 2018b. Radiation Protection Program Manual, Revision 2. Homestake Grants Reclamation Project, Cibola County, New Mexico. October 26.

U.S. Nuclear Regulatory Commission (NRC). 2017. NRC Inspection Report 040-08903/2016-001 and Notice of Violation. April 20, 2017.

Table 2-1
Environmental Monitoring Program Excluding Groundwater Monitoring

Table 2-1 - Environmental Monitoring Program Excluding Groundwater Monitoring

Type of Sample	Number	Locations	Method	Frequency	Analytical Parameters
AIR Particulates	4	HMC-1, HMC-1A, HMC-2, HMC-3 at or near the site boundary in sectors that have the highest predicted concentrations of radioactive airborne particulates.	Continuous (High Vol.)	Weekly filter change or more frequently as required. Samples composited and analyzed quarterly.	Natural Uranium, Radium-226, Thorium-230
	2	HMC-4, HMC-5 at site boundary nearest occupied residences	Continuous (High Vol.)	Weekly filter change, or more frequently as required. Samples composited and analyzed quarterly.	Natural Uranium, Radium-226, Thorium-230
	1	HMC-6 background location	Continuous (High Vol.)	Weekly filter change, or more frequently as required. Samples composited and analyzed quarterly.	Natural Uranium, Radium-226, Thorium-230
Radon Gas	9	Locations described in Air - Particulates & HMC-7 on S boundary, HMC-1A near Evaporation Pond (EP-3), & HMC-16 as a background	Continuous Track-etch	Quarterly	Rn-222
DIRECT RADIATION	8	Locations described in Air - Particulates & HMC-16 as a background	OSL	Semi-Annual	Gamma Exposure Rate

Table 2-2
Groundwater Monitoring Program (8-99, as modified by Amendment 34)

Table 2-2 Groundwater Monitoring Program (8-99 as modified by Amendment 34)

Well Number	Parameters to be Monitored	Frequency of Monitoring
#1 & #2 Deep wells	D	Annually
Broadview Acres Wells 446, SUB1, SUB2, SUB3	G	Annually
Felice Acres Wells 490, 492, 493, 494	G	Annually
Murray Acres Wells 802, 844	G	Annually
Pleasant Valley Wells 688, 846	G	Annually
Regional Wells 920, 942	G	Annually
Site Monitoring Wells F, FB, GH, MO, CW2	G	Annually
Collection System Wells	Total Volume	Monthly
Injection System Wells	Total Volume	Monthly
Reversal Wells B, BA, KZ, DZ, SO, SP, S1, S2	Water Level	Weekly
Point of Compliance Wells D1, X, S4	B, F	Annually
Background Well P	B	Annually

B = Water Level, pH, TDS, SO_4, Cl, HCO_3, CO_3, Na, Ca, Mg, K, NO_3, U, Se, Mo, Ra-226
D = Ca, Mg, K, Na, HCO_3, CO_3, Cl, SO_4, pH, TDS, Al, As, Ba, Cd, Co, Cu, CN, F, Fe, Pb, Mn, Hg, Mo, Ni, NO_3 as N, Se, Ag, Zn, U, Filtered Ra-226
F = V, Ra-228, Th-230
G = Water Level, SO_4, U, Se, TDS, Mo

Table 2-3
Occupational Monitoring Program (6-00)

Table 2-3 Occupational Monitoring Program (6-00)

Type of Sample	Number	Locations	Method	Frequency	Analytical Parameters
Lapel Personal Air Sample	As required by RWP	As required by RWP (2 L/min or equivalent)	HP-1	As required by RWP	Alpha, U-Nat
Lapel Personal Air Sampler Calibration	As required by RWP	N/A	HP-1	As required by RWP	Flow rate
Release of Equipment	As required by RWP	Potentially Contaminated Equipment and Materials	HP-4	As required by RWP	Alpha, beta gamma
ALARA	N/A	As required by RPA	HP-6	N/A	As required by RPA
Respiratory Protection	As required by RWP	As required by RWP	HP-7	N/A	N/A
Bioassay	As required by RWP	As required by RWP	HP-8 after mill decommissioning; termination	Baseline, Semi-annual	U-Nat in urine
Instrument Calibration	Variable	Radiation Detection Instruments in use	HP-10	Annually	N/A
Personnel Gamma (OSL)	Variable	Personnel	HP-11	Quarterly	Gamma
Personnel Contamination	As required by RWP	As required by RWP	HP-12	As required by RWP	Alpha
Radiation Protection Training	As required	Mill Site taught by RPA (certified individual) subjects as per Reg Guide 8.31	HP-14 for people working with groundwater or physical work with tailings sand/ slimes	Initial & annual refresher	Training Class & Written Test

HP-# = Homestake procedure number; RPA = Radiation Protection Administrator;
RWP = Radiation Work Permit; OSL = Optically Stimulated Luminescence dosimeter

Tables 3.1-1 through 3.1-11
Flow Rates

Table 3.1-1. Evaporation and Collection Pond Monthly Influent Totals

Evap Pond 1

January	Interval Gallons
Transfer EP-2 to EP-1	0

February	Interval Gallons
Transfer EP-2 to EP-1	0

March	Interval Gallons
Transfer EP-2 to EP-1	11,449,000

April	Interval Gallons
Transfer EP-2 to EP-1	0

May	Interval Gallons
Transfer EP-2 to EP-1	0

June	Interval Gallons
Transfer EP-2 to EP-1	4,332,000

Evap Pond 2

January	Interval Gallons
R.O. Flow to Evaporation Ponds	4,886,622
Tailings Sumps	410,550
Tailings Pile	0
Zeolite Regeneration & Overflow	3,126,000
E Coll Pond to EP-2	1,133,416
February	Interval Gallons
R.O. Flow to Evaporation Ponds	2,943,634
Tailings Sumps	246,510
Tailings Pile	0
Zeolite Regeneration & Overflow	807,700
E Coll Pond to EP-2	1,180,000
March	Interval Gallons
R.O. Flow to Evaporation Ponds	2,083,297
Tailings Sumps	233,930
Tailings Pile	0
Zeolite Regeneration & Overflow	532,300
E Coll Pond to EP-2	1,180,000
April	Interval Gallons
R.O. Flow to Evaporation Ponds	3,135,590
Tailings Sumps	291,270
Tailings Pile	0
Zeolite Regeneration & Overflow	0
E Coll Pond to EP-2	1,180,000
May	Interval Gallons
R.O. Flow to Evaporation Ponds	2,656,900
Tailings Sumps	234,800
Tailings Pile	0
Zeolite Regeneration & Overflow	1,229,645
E Coll Pond to EP-2	1,180,000
June	Interval Gallons
R.O. Flow to Evaporation Ponds	2,387,970
Tailings Sumps	212,940
Tailings Pile	0
Zeolite Regeneration & Overflow	4,286,000
E Coll Pond to EP-2	4,203,691

Evap Pond 3

January	Interval Gallons
Transfer EP-1 to EP-3	0

February	Interval Gallons
Transfer EP-1 to EP-3	0

March	Interval Gallons
Transfer EP-1 to EP-3	554,000

April	Interval Gallons
Transfer EP-1 to EP-3	4,160,900

May	Interval Gallons
Transfer EP-1 to EP-3	13,799,800

June	Interval Gallons
Transfer EP-1 to EP-3	0

Collection Ponds

January	Interval Gallons
Miscellanous RO and Clarifier Flow	1,121,626
Tailings Sumps	0
Zeolite Regeneration	266,400
802	833,500

February	Interval Gallons
Miscellanous RO and Clarifier Flow	1,527,826
Tailings Sumps	0
Zeolite Regeneration	0
802	104,630

March	Interval Gallons
Miscellanous RO and Clarifier Flow	2,277,817
Tailings Sumps	0
Zeolite Regeneration	0
802	104,620

April	Interval Gallons
Miscellanous RO and Clarifier Flow	2,654,504
Tailings Sumps	0
Zeolite Regeneration	0
802	0

May	Interval Gallons
Miscellanous RO and Clarifier Flow	2,002,378
Tailings Sumps	0
Zeolite Regeneration	0
802	0

June	Interval Gallons
Miscellanous RO and Clarifier Flow	2,139,200
Tailings Sumps	0
Zeolite Regeneration	0
802	0

Table 3.1-2. Evaporation and Collection Pond Weekly Freeboard Measurements (feet)

	EP1	EP2	EP3A	EP3B	W Coll	E Coll
1/7/2019	8	6.91	6.9	7	O/F	1.11
1/14/2019	6.5	6.36	8.15	8.14	O/F	3.32
1/21/2019	5.8	6.5	8	6.7	O/F	1.88
1/28/2019	6.5	5.15	7.8	7.8	O/F	2.7
2/4/2019	5.8	5.25	6.7	6.7	O/F	1.8
2/11/2019	8	5.1	7.8	8	O/F	1.4
2/19/2019	5.8	4.88	7.7	7.7	O/F	0.97
2/25/2019	6.19	4.63	7.47	7.7	O/F	1.83
3/4/2019	7.3	5.97	6.8	7.2	O/F	1.22
3/11/2019	4.5	6.47	6.91	7.32	O/F	1.92
3/18/2019	4.5	6.44	6.8	6.8	O/F	1.6
3/25/2019	4.75	6.35	6.12	6.7	O/F	1
4/1/2019	4.75	6.35	7	7	O/F	1.75
4/8/2019	4.5	6.14	7.25	7	O/F	1.27
4/15/2019	6	5.74	7.7	7.6	O/F	1.33
4/22/2019	6	5.38	7.4	7.3	O/F	2.1
4/29/2019	5.9	5.34	6.7	7.2	O/F	1.65
5/6/2019	8.5	5.29	5.6	5.45	O/F	1.3
5/13/2019	10.2	3.46	5.6	5.5	O/F	0.78
5/20/2019	10.5	3.48	5.7	5.6	O/F	1.1
5/28/2019	10.5	3.35	5.7	5.6	O/F	1
6/3/2019	10.75	3.1	5.9	6	O/F	2.85
6/10/2019	10.5	3.93	6	6	O/F	0.9
6/17/2019	10.5	3.9	6.2	6.2	O/F	2.3
6/24/2019	10.75	3.37	3.182	2.83	O/F	5

Note: O/F = Overflowing to East Collection.
Not O/F = Not Overflowing to East Collection.

Table 3.1-3. Evaporation Pond 2 Leak Detection

Date	No. 1			No. 2			No. 3			No. 4			No. 5		
	Reading	Gallons	GPD/AC	Reading	Gallons	GPD/AC	Reading	Gallons	GPD/AC	Reading	Gallons	GPD/AC	Reading	Gallons	GPD/AC
Previous Reading	108,170			1,341,450			392,180			1,059,410			#		
1/7/2019	108,170	0	0	1,344,920	3,470	157	392,160	20	1	1,059,410	0	0	#	0	0
1/14/2019	108,170	0	0	1,346,640	1,720	78	392,160	0	0	1,059,410	0	0	#	0	0
1/21/2019	108,170	0	0	1,353,260	6,620	300	392,160	0	0	1,059,410	0	0	#	0	0
1/28/2019	108,170	0	0	1,374,650	21,390	970	392,160	0	0	1,059,410	0	0	#	0	0
2/4/2019	108,170	0	0	1,420,270	45,620	2,069	415,630	23,470	878	1,059,410	0	0	#	0	0
2/11/2019	108,170	0	0	1,466,970	46,700	2,118	469,650	54,020	2,020	1,059,410	0	0	#	0	0
2/19/2019	108,170	0	0	1,528,430	61,460	2,787	535,980	66,330	2,481	1,059,410	0	0	#	0	0
2/25/2019	173,610	65,440	2,968	1,593,660	65,230	2,958	614,620	78,640	2,941	1,077,880	18,470	747	399,620	0	0
3/4/2019	174,220	610	28	1,598,010	4,350	197	655,930	41,310	1,545	1,093,720	15,840	641	447,630	48,010	1,943
3/11/2019	174,220	0	0	1,598,010	0	0	655,990	60	2	1,094,010	290	12	447,630	0	0
3/18/2019	174,220	0	0	1,598,010	0	0	656,390	400	15	1,094,600	590	24	447,630	0	0
3/25/2019	174,220	0	0	1,598,020	10	0	656,390	0	0	1,094,600	0	0	447,630	0	0
4/1/2019	174,220	0	0	1,598,020	0	0	656,390	0	0	1,094,600	0	0	447,630	0	0
4/8/2019	174,220	0	0	1,598,020	0	0	656,390	0	0	1,094,600	0	0	447,630	0	0
4/15/2019	174,220	0	0	1,598,030	10	0	656,390	0	0	1,094,600	0	0	447,630	0	0
4/22/2019	174,220	0	0	1,598,030	0	0	656,390	0	0	1,094,600	0	0	447,630	0	0
4/29/2019	174,220	0	0	1,598,030	0	0	656,390	0	0	1,094,600	0	0	447,630	0	0
5/6/2019	174,220	0	0	1,598,040	10	0	656,390	0	0	1,094,600	0	0	447,630	0	0
5/13/2019	174,220	0	0	1,616,600	18,560	842	680,600	24,210	905	1,104,060	9,460	383	447,630	0	0
5/20/2019	174,220	0	0	1,656,800	40,200	1,823	705,510	24,910	932	1,115,050	10,990	445	500,530	52,900	2,141
5/28/2019	174,220	0	0	1,699,440	42,640	1,934	733,250	27,740	1,037	1,127,910	12,860	520	556,030	55,500	2,246
6/3/2019	174,220	0	0	1,725,440	26,000	1,179	777,320	44,070	1,648	1,141,300	13,390	542	611,780	55,750	2,256
6/10/2019	174,220	0	0	1,759,670	34,230	1,552	804,420	27,100	1,013	1,154,590	13,290	538	668,670	56,890	2,302
6/17/2019	174,220	0	0	1,796,780	37,110	1,683	819,530	15,110	565	1,165,660	11,070	448	713,990	45,320	1,834
6/24/2019	174,220	0	0	1,798,260	1,480	67	831,670	12,140	454	1,175,800	10,140	410	762,580	48,590	1,966

NOTE: Totalizer readings that result in minor positive or negative volumes should not be given any significance.
GPD/AC = Gallons per day per acre; those that exceed 775 are in bold.
 # = Pump not installed due to collapsed standpipe

Table 3.1-4. Evaporation Pond 3A Leak Detection

Cell A Sumps	A-1			A-2			A-3			A-4			A-5		
	Reading	Gallons	GPD/AC	Reading	Gallons	GPD/AC	Reading	Gallons	GPD/AC	Reading	Gallons	GPD/AC	Reading	Gallons	GPD/AC
Previous Reading	70			734,340			303,160			29,990			446,250		
1/7/2019	@	0	0	757,320	22,980	1,272	303,160	0	0	29,990	0	0	453,950	7,700	426
1/14/2019	@	0	0	798,730	41,410	2,293	303,160	0	0	29,990	0	0	474,650	20,700	1,146
1/21/2019	@	0	0	828,680	29,950	1,658	303,160	0	0	29,990	0	0	495,420	20,770	1,150
1/28/2019	@	0	0	842,350	13,670	757	303,160	0	0	29,990	0	0	506,650	11,230	622
2/4/2019	@	0	0	866,130	23,780	1,317	303,160	0	0	29,990	0	0	518,140	11,490	636
2/11/2019	@	0	0	877,940	11,810	654	303,160	0	0	29,990	0	0	527,770	9,630	533
2/19/2019	@	0	0	891,360	13,420	743	303,160	0	0	29,990	0	0	535,810	8,040	445
2/25/2019	@	0	0	897,120	5,760	319	303,160	0	0	29,990	0	0	540,940	5,130	284
3/4/2019	@	0	0	921,950	24,830	1,375	303,160	0	0	29,990	0	0	546,350	5,410	300
3/11/2019	@	0	0	940,540	18,590	1,029	303,160	0	0	29,990	0	0	553,340	6,990	387
3/18/2019	@	0	0	957,340	16,800	930	303,160	0	0	29,990	0	0	557,670	4,330	240
3/25/2019	@	0	0	974,800	17,460	967	303,160	0	0	29,990	0	0	561,140	3,470	192
4/1/2019	@	0	0	990,110	15,310	848	303,160	0	0	29,990	0	0	563,690	2,550	141
4/8/2019	70	0	0	1,001,910	11,800	653	303,160	0	0	29,990	0	0	563,670	0	0
4/15/2019	70	0	0	1,009,540	7,630	422	303,160	0	0	29,990	0	0	563,670	0	0
4/22/2019	70	0	0	1,009,540	0	0	303,160	0	0	29,990	0	0	563,670	0	0
4/29/2019	70	0	0	1,014,690	5,150	285	303,160	0	0	29,990	0	0	565,770	2,100	116
5/6/2019	70	0	0	1,009,540	0	0	303,160	0	0	29,990	0	0	563,670	0	0
5/13/2019	70	0	0	1,025,400	15,860	878	303,160	0	0	29,990	0	0	589,300	25,630	1,419
5/20/2019	70	0	0	1,033,450	8,050	446	303,160	0	0	29,990	0	0	606,870	17,570	973
5/28/2019	70	0	0	1,042,470	9,020	499	303,160	0	0	29,990	0	0	612,020	5,150	285
6/3/2019	70	0	0	1,044,920	2,450	136	303,160	0	0	29,990	0	0	617,580	5,560	308
6/10/2019	70	0	0	1,046,400	1,480	82	303,160	0	0	29,990	0	0	623,840	6,260	347
6/17/2019	70	0	0	1,046,400	0	0	303,160	0	0	29,990	0	0	623,840	0	0
6/24/2019	70	0	0	1,046,710	310	17	303,160	0	0	29,990	0	0	623,850	10	1

NOTE: Totalizer readings that result in minor positive or negative volumes should not be given any significance
GPD/AC = Gallons per day per acre; those that exceed 775 are in bold.
@ = Totalizer not connected

Table 3.1-5. Evaporation Pond 3B Leak Detection

Cell B Sumps	B-1			B-2			B-3			B-4			B-5		
	Reading	Gallons	GPD/AC	Reading	Gallons	GPD/AC	Reading	Gallons	GPD/AC	Reading	Gallons	GPD/AC	Reading	Gallons	GPD/AC
Previous Reading	57,400			508,680			1,564,230			332,380			443,840		
1/7/2019	57,400	0	0	508,680	0	0	1,564,230	0	0	352,930	20,550	1,138	443,840	0	0
1/14/2019	57,400	0	0	508,680	0	0	1,564,230	0	0	374,510	21,580	1,195	443,840	0	0
1/21/2019	57,400	0	0	508,680	0	0	1,564,230	0	0	394,960	20,450	1,132	443,840	0	0
1/28/2019	57,400	0	0	508,680	0	0	1,564,230	0	0	413,880	18,920	1,048	443,840	0	0
2/4/2019	57,400	0	0	508,680	0	0	1,570,680	6,450	357	426,860	12,980	719	443,840	0	0
2/11/2019	57,400	0	0	508,680	0	0	1,585,770	15,090	836	433,570	6,710	372	443,840	0	0
2/19/2019	57,400	0	0	508,680	0	0	1,602,870	17,100	947	438,730	5,160	286	443,840	0	0
2/25/2019	57,400	0	0	508,680	0	0	1,618,760	15,890	880	443,450	4,720	261	443,840	0	0
3/4/2019	57,400	0	0	508,680	0	0	1,635,900	17,140	949	447,830	4,380	243	443,840	0	0
3/11/2019	57,480	80	4	508,680	0	0	1,647,600	11,700	648	452,420	4,590	254	443,840	0	0
3/18/2019	58,810	1,330	74	508,680	0	0	1,662,590	14,990	830	456,930	4,510	250	443,840	0	0
3/25/2019	58,820	10	1	508,680	0	0	1,679,550	16,960	939	458,830	1,900	105	443,840	0	0
4/1/2019	58,860	40	2	508,680	0	0	1,691,010	11,460	635	461,570	2,740	152	443,840	0	0
4/8/2019	62,900	4,040	224	508,680	0	0	1,701,740	10,730	594	467,070	5,500	305	443,840	0	0
4/15/2019	72,510	9,610	532	508,680	0	0	1,715,310	13,570	751	468,810	1,740	96	443,840	0	0
4/22/2019	72,510	0	0	508,680	0	0	1,715,310	0	0	468,810	0	0	443,840	0	0
4/29/2019	82,680	10,170	563	508,680	0	0	1,727,480	12,170	674	478,380	9,570	530	443,840	0	0
5/6/2019	86,070	3,390	188	509,670	990	55	1,736,750	9,270	513	482,780	4,400	244	443,840	0	0
5/13/2019	90,050	3,980	220	509,670	0	0	1,745,260	8,510	471	485,510	2,730	151	443,840	0	0
5/20/2019	94,390	4,340	240	509,670	0	0	1,752,550	7,290	404	487,280	1,770	98	443,840	0	0
5/28/2019	98,590	4,200	233	509,670	0	0	1,758,180	5,630	312	488,990	1,710	95	443,840	0	0
6/3/2019	103,540	4,950	274	509,670	0	0	1,761,790	3,610	200	491,330	2,340	130	443,840	0	0
6/10/2019	108,780	5,240	290	509,670	0	0	1,764,410	2,620	145	492,270	940	52	443,840	0	0
6/17/2019	113,580	4,800	266	509,670	0	0	1,766,420	2,010	111	492,680	410	23	443,840	0	0
6/24/2019	117,960	4,380	243	509,670	0	0	1,766,430	10	1	492,690	10	1	443,840	0	0

NOTE: Totalizer readings that result in minor positive or negative volumes should not be given any significance.
GPD/AC = Gallons per day per acre; those that exceed 775 are in bold.
 # = Pump Maintenance; pumps off line.

Table 3.1-6. Monthly Tailings Collection and Injection Totals

	Sumps (gallons)	Dewatering (gallons)	Injection (gallons)
January	410,550	0	0
February	246,510	0	0
March	233,930	0	0
April	291,270	0	0
May	234,800	0	0
June	212,940	0	0

Table 3.1-7. Monthly Collection Totals by Aquifer and Area (gallons)

	On-Site Collection			South Off-Site Collection				North Off-Site Collection
	Alluvial	Upper Chinle	Middle Chinle	Alluvial	Upper Chinle	Middle Chinle	Lower Chinle	Alluvial
January	12,599,476	6,922,180	2,008,500	2,524,194	0	1,673,806	0	18,881,510
February	7,036,716	5,239,950	952,300	6,753,825	0	2,222,175	0	5,400,160
March	6,613,770	3,226,270	1,046,100	7,610,825	0	1,851,175	0	3,905,340
April	10,202,384	3,536,180	562,800	3,669,690	0	29,310	0	3,532,841
May	9,867,026	2,567,490	464,600	815,570	0	676,270	0	1,820,230
June	8,021,004	3,714,588	1,441,200	3,665,945	0	2,156,055	0	2,608,700

Table 3.1-8. Monthly Injection Totals by Aquifer and Area (gallons)

	On-Site Injection			South Off-Site Injection				North Off-Site Injection
	Alluvial	Upper Chinle	Middle Chinle	Alluvial	Upper Chinle	Middle Chinle	Lower Chinle	Alluvial
January	11,276,608	1,539,780	180,970	7,595,785	0	1,234,315	0	15,290,200
February	5,328,384	833,090	181,160	4,740,575	0	702,025	0	9,325,900
March	6,770,866	655,820	193,220	4,146,290	0	614,110	0	7,370,300
April	8,116,210	2,182,573	249,390	2,897,933	0	742,167	0	5,529,900
May	9,354,240	2,645,970	183,720	2,867,205	0	232,795	0	1,820,230
June	5,262,144	2,276,350	496,160	1,583,905	0	2,612,995	0	5,139,700

Table 3.1-9. Monthly Totals of Low-concentration and In-situ Injectate (gallons)

	L well Collection for Reinjection	*In-situ* Injection
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0

Table 3.1-10. Treatment System Influents Monthly Totals (gallons)

	300 GPM Zeolite	1200 GPM Zeolite	RO Plant
January	0	17,780,700	25,519,238
February	0	11,228,100	14,120,370
March	0	9,782,800	11,597,236
April	0	4,347,100	15,187,124
May	0	2,008,300	13,919,078
June	0	8,844,200	14,199,530

Table 3.1-11. Treatment System Effluent and Fresh Water Monthly Totals (gallons)

	Treatment Systems				Fresh Water Injection		
	Zeolite		RO Plant				
	Treated	Regeneration	Treated	Brine	On-Site	South Off-Site	North Off-Site
January	14,388,300	3,392,400	19,510,990	4,886,622	7,535,374	2,478,996	4,292,630
February	10,420,400	807,700	9,648,910	2,943,634	4,682,712	1,658,849	2,842,439
March	9,250,500	532,300	7,236,122	2,083,297	5,159,735	1,477,195	2,287,070
April	4,347,100	0	9,397,030	3,135,590	7,460,079	1,631,067	2,477,854
May	778,655	1,229,645	9,259,800	2,656,900	7,346,899	1,384,918	813,184
June	4,558,200	4,286,000	9,672,360	2,387,970	4,515,082	1,248,703	1,529,215

Table 3.2-1
Reversal Wells

Table 3.2-1. Depth to Water in Reversal Wells

Well Name	B	BA	DZ	KZ	S2	S5	SM	SN	SO	SP
MP Elev.	6570.9	6571.58	6590.53	6571.72	6573.72	6574.69	6578.74	6579.26	6578.79	6578.66
1/7/2019	39.50	40.97	54.56	35.76	39.45	46.01	42.91	42.92	43.57	41.36
1/14/2019	39.10	40.35		35.83		44.93	42.90	42.89	43.50	43.48
1/21/2019	39.11	41.98	55.69	35.71	39.21	44.83	42.72	42.71	43.33	43.31
1/28/2019	39.10	40.60	54.60	35.40	39.55	45.00	42.93	42.90	43.58	43.53
2/4/2019	39.32	42.69	52.48	35.53	39.51	44.89	42.95	42.77	42.53	42.30
2/11/2019	39.11	41.34	54.24	35.51	41.12	44.81	42.83	42.52	43.45	43.21
2/19/2019	38.98	40.10	53.72	35.51	39.56	44.74	42.89	42.72	43.65	43.30
2/25/2019	39.13	41.00	54.60	35.20		44.90	43.16	42.65	43.80	43.60
3/4/2019	39.01	40.09	53.58	35.49	39.71	44.69	42.98	42.83	44.63	43.36
3/11/2019	38.71	37.35	53.34	35.34	39.74	44.72	43.11	43.24	43.75	42.82
3/18/2019	38.55	40.11	54.05	35.28	39.74	44.80	43.06	42.97	43.83	43.65
3/25/2019	38.90	40.60	54.35	34.95		45.00	43.30	43.05	43.90	43.70
4/1/2019	38.81	38.51	54.51	35.35	39.84	48.29	42.56	42.83	42.83	43.58
4/8/2019	38.81	40.22	54.22	35.44	39.97	44.79	43.19	42.98	43.97	43.67
4/15/2019	38.81	39.71	53.31	35.49	40.07	42.71	43.15	42.90	43.82	43.62
4/22/2019	38.75	40.00	54.00	35.40	40.00	44.75	43.25	43.00	44.00	43.75
4/29/2019	38.68	39.83	53.93	35.26	39.96	44.67	43.24	39.97	39.98	40.24
5/6/2019	38.85	40.00	54.00	35.35	40.05	44.90	43.30	43.10	44.05	43.80
5/13/2019	38.90	40.00	54.15	35.40	40.10	45.00	43.40	42.80	44.10	43.90
5/20/2019	38.75	39.80	54.75	35.45		44.80	43.30	43.00	44.00	43.80
5/28/2019	38.90	40.00	55.05	35.45		44.85	43.40	43.15	44.05	43.90
6/3/2019	38.88	39.92	54.99	35.45	40.00	44.74	43.32	43.06	43.98	43.83
6/10/2019	38.95	40.00	55.50	35.35	40.10	44.90	43.55	43.15	44.15	43.90
6/17/2019	39.05	40.35	54.60	35.50	42.15	44.96	43.40	43.10	44.15	43.90
6/24/2019	39.03	40.40	54.45	39.40		45.23	43.41	43.20	44.20	44.00

Table 3.4-1
Wells Drilled

Table 3.4-1. Wells Drilled and Abandoned

Well Name	Restoration Area
WME-18	On-Site
WME-19	On-Site
WME-20	On-Site
WME-21	On-Site
WME-22	On-Site
BK1c	On-Site
BK1f	On-Site
BK2c	On-Site
BK2f	On-Site

Wells Abandoned

Well Name	Restoration Area
#1 Deep	On-Site

Table 4.1-1
Water Quality Analysis for Well D1

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19030198-005
Client Sample ID: D1

Report Date: 04/03/19
Collection Date: 03/06/19 11:27
Date Received: 03/07/19
Matrix: Aqueous

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
007 Chloride	157	mg/L		1		E300.0	03/11/19 21:48 / ljl
108 Sulfate	719	mg/L	D	2		E300.0	03/11/19 21:48 / ljl
PHYSICAL PROPERTIES							
010 Solids, Total Dissolved TDS @ 180 C	1730	mg/L	D	20		A2540 C	03/08/19 13:33 / adw
METALS, DISSOLVED							
036 Molybdenum	3.8	mg/L		0.02		E200.8	03/19/19 00:00 / ta-a
040 Selenium	0.075	mg/L		0.02		E200.8	03/19/19 00:00 / ta-a
015 Uranium	2.8	mg/L		0.005		E200.8	03/19/19 00:00 / ta-a
***Dissolved Metals subbed to Test America.							
CLIENT PROVIDED FIELD PARAMETERS							
109 Field pH	7.07	s.u.				FIELD	03/06/19 11:27 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.

Table 4.1-2
Water Quality Analysis for Well DD

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19020335-003
Client Sample ID: DD

Report Date: 02/27/19
Collection Date: 02/11/19 10:40
Date Received: 02/12/19
Matrix: Aqueous

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
007 Chloride	70	mg/L	D	2		E300.0	02/15/19 17:45 / ljl
108 Sulfate	2210	mg/L	D	8		E300.0	02/15/19 17:45 / ljl
PHYSICAL PROPERTIES							
010 Solids, Total Dissolved TDS @ 180 C	3730	mg/L	D	40		A2540 C	02/14/19 13:27 / adw
METALS, DISSOLVED							
036 Molybdenum	<0.001	mg/L		0.001		E200.8	02/27/19 03:33 / jcg
040 Selenium	0.107	mg/L		0.001		E200.8	02/22/19 01:16 / jcg
015 Uranium	0.087	mg/L	D	0.008		E200.8	02/25/19 09:06 / jcg
244 Uranium Precision (±)	0.014	mg/L	D	0.001		E200.8	02/25/19 09:06 / jcg
113 Uranium, Activity	5.9E-08	uCi/mL	D	5.0E-09		E200.8	02/25/19 09:06 / jcg
114 Uranium, Activity precision (±)	9.5E-09	uCi/mL	D	8.0E-10		E200.8	02/25/19 09:06 / jcg
CLIENT PROVIDED FIELD PARAMETERS							
109 Field pH	7.22	s.u.				FIELD	02/11/19 10:40 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19050409-001
Client Sample ID: DD

Report Date: 06/20/19
Collection Date: 05/08/19 08:42
Date Received: 05/09/19
Matrix: Aqueous

Analyses	Result	Units	Qual	MCL/ RL QCL	Method	Analysis Date / By
MAJOR IONS						
175 Alkalinity, Total as CaCO3	278	mg/L		5	A2320 B	05/10/19 15:59 / dmb
206 Carbonate as CO3	<5	mg/L		5	A2320 B	05/10/19 15:59 / dmb
505 Bicarbonate as HCO3	339	mg/L		5	A2320 B	05/10/19 15:59 / dmb
007 Chloride	71	mg/L		1	E300.0	05/10/19 20:19 / ljl
108 Sulfate	2120	mg/L	D	4	E300.0	05/10/19 20:19 / ljl
001 Calcium	471	mg/L		0.5	E200.7	05/23/19 04:03 / meh
002 Magnesium	107	mg/L		0.5	E200.7	05/23/19 04:03 / meh
003 Potassium	6.4	mg/L		0.5	E200.7	05/23/19 04:03 / meh
004 Sodium	382	mg/L		0.5	E200.7	05/23/19 04:03 / meh
PHYSICAL PROPERTIES						
010 Solids, Total Dissolved TDS @ 180 C	3590	mg/L	D	40	A2540 C	05/10/19 14:17 / adw
NUTRIENTS						
310 Nitrogen, Nitrate+Nitrite as N	11.1	mg/L		0.1	E353.2	05/10/19 11:49 / dmb
METALS, DISSOLVED						
034 Manganese	0.557	mg/L	D	0.002	E200.7	05/23/19 04:03 / meh
036 Molybdenum	0.002	mg/L		0.001	E200.8	05/30/19 16:12 / tlf
040 Selenium	0.073	mg/L		0.001	E200.8	05/30/19 16:12 / tlf
015 Uranium	0.0956	mg/L	D	0.0008	E200.8	05/30/19 16:12 / tlf
244 Uranium Precision (±)	0.0154	mg/L	D	0.0001	E200.8	05/30/19 16:12 / tlf
113 Uranium, Activity	6.5E-08	uCi/mL	D	5.0E-10	E200.8	05/30/19 16:12 / tlf
114 Uranium, Activity precision (±)	1.0E-08	uCi/mL	D	8.0E-11	E200.8	05/30/19 16:12 / tlf
042 Vanadium	<0.01	mg/L		0.01	E200.8	05/30/19 16:12 / tlf
RADIONUCLIDES, DISSOLVED						
045 Radium 226	0.1	pCi/L	U		E903.0	05/28/19 16:56 / nsr
245 Radium 226 precision (±)	0.1	pCi/L			E903.0	05/28/19 16:56 / nsr
Radium 226 MDC	0.2	pCi/L			E903.0	05/28/19 16:56 / nsr
057 Radium 228	0.06	pCi/L	U		RA-05	05/22/19 15:01 / plj
257 Radium 228 precision (±)	1.4	pCi/L			RA-05	05/22/19 15:01 / plj
Radium 228 MDC	2.3	pCi/L			RA-05	05/22/19 15:01 / plj
048 Thorium 230	0.05	pCi/L	U		E908.0	06/13/19 10:11 / arh
248 Thorium 230 precision (±)	0.06	pCi/L			E908.0	06/13/19 10:11 / arh
Thorium 230 MDC	0.1	pCi/L			E908.0	06/13/19 10:11 / arh
DATA QUALITY						
079 Solids, Total Dissolved - Calculated	3400	mg/L			A1030 E	05/23/19 21:04 / tlf
192 A/C Balance	-3.46	%			A1030 E	05/23/19 21:04 / tlf
194 Anions	52.6	meq/L			A1030 E	05/23/19 21:04 / tlf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19050409-001
Client Sample ID: DD

Report Date: 06/20/19
Collection Date: 05/08/19 08:42
Date Received: 05/09/19
Matrix: Aqueous

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
DATA QUALITY							
195 Cations	49.1	meq/L				A1030 E	05/23/19 21:04 / tlf
CLIENT PROVIDED FIELD PARAMETERS							
109 Field pH	7.13	s.u.				FIELD	05/08/19 08:42 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Table 4.1-3
Water Quality Analyses for Well DD2

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19050409-002
Client Sample ID: DD2

Report Date: 06/20/19
Collection Date: 05/08/19 09:47
Date Received: 05/09/19
Matrix: Aqueous

Analyses		Result	Units	Qual	MCL/ RL QCL	Method	Analysis Date / By
MAJOR IONS							
175	Alkalinity, Total as CaCO3	292	mg/L		5	A2320 B	05/10/19 16:26 / dmb
206	Carbonate as CO3	<5	mg/L		5	A2320 B	05/10/19 16:26 / dmb
505	Bicarbonate as HCO3	356	mg/L		5	A2320 B	05/10/19 16:26 / dmb
007	Chloride	62	mg/L		1	E300.0	05/10/19 20:34 / ljl
108	Sulfate	1590	mg/L	D	4	E300.0	05/10/19 20:34 / ljl
001	Calcium	350	mg/L		0.5	E200.7	05/23/19 04:08 / meh
002	Magnesium	83.7	mg/L		0.5	E200.7	05/23/19 04:08 / meh
003	Potassium	5.7	mg/L		0.5	E200.7	05/23/19 04:08 / meh
004	Sodium	312	mg/L		0.5	E200.7	05/23/19 04:08 / meh
PHYSICAL PROPERTIES							
010	Solids, Total Dissolved TDS @ 180 C	2740	mg/L	D	20	A2540 C	05/10/19 14:18 / adw
NUTRIENTS							
310	Nitrogen, Nitrate+Nitrite as N	<0.1	mg/L		0.1	E353.2	05/10/19 11:50 / dmb
METALS, DISSOLVED							
034	Manganese	2.58	mg/L	D	0.002	E200.7	05/23/19 04:08 / meh
036	Molybdenum	<0.001	mg/L		0.001	E200.8	05/30/19 16:16 / tlf
040	Selenium	<0.001	mg/L		0.001	E200.8	05/30/19 16:16 / tlf
015	Uranium	0.207	mg/L	D	0.0008	E200.8	05/30/19 16:16 / tlf
244	Uranium Precision (±)	0.0335	mg/L	D	0.0001	E200.8	05/30/19 16:16 / tlf
113	Uranium, Activity	1.4E-07	uCi/mL	D	5.0E-10	E200.8	05/30/19 16:16 / tlf
114	Uranium, Activity precision (±)	2.3E-08	uCi/mL	D	8.0E-11	E200.8	05/30/19 16:16 / tlf
042	Vanadium	<0.01	mg/L		0.01	E200.8	05/30/19 16:16 / tlf
RADIONUCLIDES, DISSOLVED							
045	Radium 226	0.4	pCi/L			E903.0	05/28/19 16:56 / nsr
245	Radium 226 precision (±)	0.2	pCi/L			E903.0	05/28/19 16:56 / nsr
	Radium 226 MDC	0.2	pCi/L			E903.0	05/28/19 16:56 / nsr
057	Radium 228	-0.004	pCi/L	U		RA-05	05/22/19 15:01 / plj
257	Radium 228 precision (±)	1.3	pCi/L			RA-05	05/22/19 15:01 / plj
	Radium 228 MDC	2.2	pCi/L			RA-05	05/22/19 15:01 / plj
048	Thorium 230	0.06	pCi/L	U		E908.0	06/13/19 10:11 / arh
248	Thorium 230 precision (±)	0.06	pCi/L			E908.0	06/13/19 10:11 / arh
	Thorium 230 MDC	0.1	pCi/L			E908.0	06/13/19 10:11 / arh
DATA QUALITY							
079	Solids, Total Dissolved - Calculated	2600	mg/L			A1030 E	05/23/19 21:04 / tlf
192	A/C Balance	-3.42	%			A1030 E	05/23/19 21:04 / tlf
194	Anions	40.8	meq/L			A1030 E	05/23/19 21:04 / tlf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19050409-002
Client Sample ID: DD2

Report Date: 06/20/19
Collection Date: 05/08/19 09:47
Date Received: 05/09/19
Matrix: Aqueous

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
DATA QUALITY							
195 Cations	38.1	meq/L				A1030 E	05/23/19 21:04 / tlf
CLIENT PROVIDED FIELD PARAMETERS							
109 Field pH	7.05	s.u.				FIELD	05/08/19 09:47 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Table 4.1-4
Water Quality Analyses for Well P

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19050092-001
Client Sample ID: P

Report Date: 05/31/19
Collection Date: 05/01/19 13:18
Date Received: 05/02/19
Matrix: Aqueous

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
175 Alkalinity, Total as CaCO3	207	mg/L		5		A2320 B	05/06/19 17:23 / dmb
206 Carbonate as CO3	<5	mg/L		5		A2320 B	05/06/19 17:23 / dmb
505 Bicarbonate as HCO3	253	mg/L		5		A2320 B	05/06/19 17:23 / dmb
007 Chloride	50	mg/L		1		E300.0	05/09/19 22:05 / ljl
108 Sulfate	1050	mg/L	D	2		E300.0	05/09/19 22:05 / ljl
001 Calcium	229	mg/L		0.5		E200.7	05/21/19 21:09 / meh
002 Magnesium	46.7	mg/L		0.5		E200.7	05/21/19 21:09 / meh
003 Potassium	4.6	mg/L		0.5		E200.7	05/23/19 18:15 / meh
004 Sodium	253	mg/L		0.5		E200.7	05/21/19 21:09 / meh
PHYSICAL PROPERTIES							
010 Solids, Total Dissolved TDS @ 180 C	1870	mg/L	D	20		A2540 C	05/06/19 10:47 / adw
NUTRIENTS							
310 Nitrogen, Nitrate+Nitrite as N	5.5	mg/L		0.1		E353.2	05/09/19 11:49 / dmb
METALS, DISSOLVED							
036 Molybdenum	0.001	mg/L		0.001		E200.8	05/16/19 14:04 / jcg
040 Selenium	0.137	mg/L		0.001		E200.8	05/16/19 14:04 / jcg
015 Uranium	0.0267	mg/L		0.0003		E200.8	05/16/19 14:04 / jcg
244 Uranium Precision (±)	0.00431	mg/L		0.00005		E200.8	05/16/19 14:04 / jcg
113 Uranium, Activity	1.8E-08	uCi/mL		2.0E-10		E200.8	05/16/19 14:04 / jcg
114 Uranium, Activity precision (±)	2.9E-09	uCi/mL		3.0E-11		E200.8	05/16/19 14:04 / jcg
042 Vanadium	<0.01	mg/L		0.01		E200.8	05/16/19 14:04 / jcg
RADIONUCLIDES, DISSOLVED							
045 Radium 226	0.3	pCi/L				E903.0	05/23/19 18:37 / nsr
245 Radium 226 precision (±)	0.1	pCi/L				E903.0	05/23/19 18:37 / nsr
Radium 226 MDC	0.1	pCi/L				E903.0	05/23/19 18:37 / nsr
057 Radium 228	-0.6	pCi/L	U			RA-05	05/17/19 16:07 / plj
257 Radium 228 precision (±)	1.2	pCi/L				RA-05	05/17/19 16:07 / plj
Radium 228 MDC	2.0	pCi/L				RA-05	05/17/19 16:07 / plj
048 Thorium 230	-0.007	pCi/L	U			E908.0	05/29/19 10:30 / arh
248 Thorium 230 precision (±)	0.04	pCi/L				E908.0	05/29/19 10:30 / arh
Thorium 230 MDC	0.1	pCi/L				E908.0	05/29/19 10:30 / arh
DATA QUALITY							
079 Solids, Total Dissolved - Calculated	1800	mg/L				A1030 E	05/29/19 16:35 / jlw
192 A/C Balance	-2.54	%				A1030 E	05/29/19 16:35 / jlw
194 Anions	27.8	meq/L				A1030 E	05/29/19 16:35 / jlw
195 Cations	26.4	meq/L				A1030 E	05/29/19 16:35 / jlw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19050092-001
Client Sample ID: P

Report Date: 05/31/19
Collection Date: 05/01/19 13:18
Date Received: 05/02/19
Matrix: Aqueous

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
CLIENT PROVIDED FIELD PARAMETERS							
109 Field pH	7.44	s.u.				FIELD	05/01/19 13:18 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Table 4.1-5
Water Quality Analyses for Well S4

Well S4 Was Not Sampled in the 1st Half of 2019

Table 4.1-6
Water Quality Analyses for Well X

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19020214-006
Client Sample ID: X

Report Date: 03/08/19
Collection Date: 02/07/19 13:58
Date Received: 02/08/19
Matrix: Aqueous

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
007 Chloride	63	mg/L		1		E300.0	02/12/19 00:58 / ljl
108 Sulfate	310	mg/L	D	2		E300.0	02/12/19 00:58 / ljl
PHYSICAL PROPERTIES							
010 Solids, Total Dissolved TDS @ 180 C	823	mg/L		10		A2540 C	02/11/19 13:39 / adw
METALS, DISSOLVED							
036 Molybdenum	0.164	mg/L		0.001		E200.8	02/11/19 20:41 / jcg
040 Selenium	0.010	mg/L		0.001		E200.8	02/11/19 20:41 / jcg
015 Uranium	0.0321	mg/L		0.0003		E200.8	02/11/19 20:41 / jcg
244 Uranium Precision (±)	0.00517	mg/L		0.00005		E200.8	02/11/19 20:41 / jcg
113 Uranium, Activity	2.2E-08	uCi/mL		2.0E-10		E200.8	02/11/19 20:41 / jcg
114 Uranium, Activity precision (±)	3.5E-09	uCi/mL		3.0E-11		E200.8	02/11/19 20:41 / jcg
METALS, TOTAL							
136 Molybdenum	0.178	mg/L		0.001		E200.8	02/23/19 03:40 / jcg
140 Selenium	0.009	mg/L		0.001		E200.8	02/25/19 17:50 / jcg
115 Uranium	0.0386	mg/L		0.0003		E200.8	02/23/19 03:40 / jcg
344 Uranium Precision (±)	0.00624	mg/L		0.00005		E200.8	02/23/19 03:40 / jcg
117 Uranium, Activity	2.6E-08	uCi/mL		2.0E-10		E200.8	02/23/19 03:40 / jcg
118 Uranium, Activity precision (±)	4.2E-09	uCi/mL		3.0E-11		E200.8	02/23/19 03:40 / jcg
CLIENT PROVIDED FIELD PARAMETERS							
109 Field pH	7.44	s.u.				FIELD	02/07/19 13:58 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19040419-007
Client Sample ID: X

Report Date: 05/16/19
Collection Date: 04/08/19 10:02
Date Received: 04/09/19
Matrix: Aqueous

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
007 Chloride	87	mg/L		1		E300.0	04/15/19 18:46 / dmb
108 Sulfate	417	mg/L	D	2		E300.0	04/15/19 18:46 / dmb
PHYSICAL PROPERTIES							
010 Solids, Total Dissolved TDS @ 180 C	1010	mg/L		10		A2540 C	04/11/19 13:12 / adw
METALS, DISSOLVED							
036 Molybdenum	0.144	mg/L		0.001		E200.8	05/08/19 08:13 / jcg
040 Selenium	0.015	mg/L		0.001		E200.8	05/08/19 08:13 / jcg
015 Uranium	0.0385	mg/L		0.0003		E200.8	05/08/19 08:13 / jcg
244 Uranium Precision (±)	0.00622	mg/L		0.00005		E200.8	05/08/19 08:13 / jcg
113 Uranium, Activity	2.6E-08	uCi/mL		2.0E-10		E200.8	05/08/19 08:13 / jcg
114 Uranium, Activity precision (±)	4.2E-09	uCi/mL		3.0E-11		E200.8	05/08/19 08:13 / jcg
CLIENT PROVIDED FIELD PARAMETERS							
109 Field pH	7.25	s.u.				FIELD	04/08/19 10:02 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Table 4.2- 1
Lined Pond Water Quality

Table 4.2-1. Lined Pond Water Quality

Sample Point Name	Date	Temp (deg.C)	pH (f) (std. units)	Conductivity (micromhos/cm)	CO3 (mg/l)	Ca (mg/l)	Cl (mg/l)	HCO3 (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	SO4 (mg/l)	TDS (mg/l)	NO3 (mg/l)
Parameter Code		12	109	51	6	1	7	5	2	3	4	8	10	39
E Coll Pond	2/5/19	7.60	8.60	5067			285					2230	3990	
	4/8/19	11.80	8.72	5524			321					2390	4330	
Evap Pond 1	2/5/19	7.50	9.29	30070			2130					17300	30800	
	4/8/19	10.60	9.17	32030			2300					18600	32000	
Evap Pond 2	2/5/19	7.80	8.83	15290			963					7890	14300	
	4/8/19	11.10	9.07	17890			1180					9190	16200	
Evap Pond 3A	2/11/19	1.60	9.75	56810			7890					29400	66400	
	4/8/19	10.50	9.29	69010			17400					25800	77000	
Evap Pond 3B	2/11/19	1.20	9.46	58940			10600					27600	67000	
	4/8/19	10.60	9.30	69030			9880					25700	68600	
W Coll Pond	4/8/19	11.60	8.81	5398			317					2330	4220	

f = field measurement
t = analyte, total

Table 4.2-1. Lined Pond Water Quality, cont.

Sample Point Name	Date	Mn(t) (mg/l)	Se (mg/l)	Se (t) (mg/l)	Mo (mg/l)	Mo (t) (mg/l)	Unat (mg/l)	Unat (t) (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	Ra226+ Ra228 (pCi/l)	Th230 (pCi/l)	V (mg/l)
Parameter Code		134	40	140	36	136	15	115	45	57	372	48	42
E Coll Pond	2/5/19				9.61	9.72	5.15	5.58					
	4/8/19				10.7	12.1	6.56	6.09					
Evap Pond 1	2/5/19				47	66.1	35	34.9					
	4/8/19				47.3	61.8	36.4	36.1					
Evap Pond 2	2/5/19				35.4	35.3	15	15					
	4/8/19				34.8	38.9	17.4	17					
Evap Pond 3A	2/11/19				222	232	142	139					
	4/8/19				314	373	333	200					
Evap Pond 3B	2/11/19				204	219	140	319					
	4/8/19				236	274	181	173					
W Coll Pond	4/8/19				10.6	10.8	5.85	5.79					

f = field measurement
t = analyte, total

Table 4.2- 2
Evaporation Pond Monitoring Wells Water Quality

Table 4.2-2. Evaporation Pond Monitoring Wells Water Quality

Sample Point Name	Date	WL (feet)	Temp (deg.C)	pH (f) (std. units)	Conductivity (micromhos/cm)	CO3 (mg/l)	Ca (mg/l)	Cl (mg/l)	HCO3 (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)
Parameter Code		13	12	109	51	6	1	7	5	2	3	4
Site Standard Qal aquifer								250				
D1	3/6/19	40.20	13.10	7.07	2262			157				
DD	2/11/19	48.23	13.00	7.22	3843			70				
	5/8/19	48.55	13.40	7.13	3839	<5	471	71	339	107	6.4	382
DD2	5/8/19	45.90	12.50	7.05	3070	<5	350	62	356	83.7	5.7	312
P	5/1/19	38.50	14.70	7.44	2258	<5	229	50	253	46.7	4.6	253
S4	No Sample in the 1st Half of 2019											
X	2/7/19	32.79	15.00	7.44	1211			63				
	4/8/19	32.02	15.50	7.25	1407			87				

Concentrations greater than site standards are in bold.

f = field measurement

Table 4.2-2. Evaporation Pond Monitoring Wells Water Quality, cont.

Sample Point Name	Date	SO4 (mg/l)	TDS (mg/l)	NO3 (mg/l)	Se (mg/l)	Mo (mg/l)	Unat (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	Ra226+ Ra228 (pCi/l)	Th230 (pCi/l)	V (mg/l)
Parameter Code		8	10	39	40	36	15	45	57	372	48	42
Site Standard Qal aquifer		1500	2734	12	0.32	0.1	0.16			5	0.3	0.02
D1	3/6/19	719	1730		0.075	**3.8**	**2.800**					
DD	2/11/19	**2210**	**3730**		0.107	<0.001	0.087					
	5/8/19	**2120**	**3590**	11.1	0.073	0.002	0.096	0.1	0.06	0.16	0.05	<0.01
DD2	5/8/19	**1590**	**2740**	<0.1	<0.001	<0.001	**0.207**	0.40	-0.004	0.400	0.06	<0.01
P	5/1/19	1050	1870	5.5	0.137	0.001	0.027	0.30	-0.60	0.30	-0.01	<0.01
S4	No Sample in the 1st Half of 2019											
X	2/7/19	310	823		0.01	**0.164**	0.0321					
	4/8/19	417	1010		0.015	**0.144**	0.0385					

Concentrations greater than site standards are in **bold**.

f = field measurement

Table 4.3-1
Compliant Water Quality

Table 4.3-1. Compliant Water Quality

Sample Point Name	Date	Temp (deg.C)	pH (f) (std. units)	Conductivity (micromhos/cm)	CO3 (mg/l)	Ca (mg/l)	Cl (mg/l)	HCO3 (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)
Parameter Code		12	109	51	6	1	7	5	2	3	4
Site Standard Qal aquifer							250				
Post Treatment Tank											
SP2	1/29/2019	21.60	7.22	2243	<5	194	186				
	2/27/2019	20.90	6.80	1781	<5	134	131				
	3/26/2019	2.80	6.95	1638	<5	112	119				
	4/30/2019	21.5	6.79	2025	<5	141	150	260	63.3	9.3	297
	5/31/2019	17.9	7.34	1633	<5	142	138				
	6/25/2019	20.2	7	1972	<5	132	142	167	36.8	5.5	163

Concentrations greater than site standards are in bold.

f = field measurement

Table 4.3-1. Compliant Water Quality, cont.

Sample Point Name	Date	SO4 (mg/l)	TDS (mg/l)	NO3 (mg/l)	Se (mg/l)	Mo (mg/l)	Unat (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	Ra226+ Ra228 (pCi/l)	Th230 (pCi/l)	V (mg/l)
Parameter Code		8	10	39	40	36	15	45	57	372	48	42
Site Standard Qal aquifer		1500	2734	12	0.32	0.1	0.16			5	0.3	0.02
Post Treatment Tank												
SP2	1/29/2019	766	1750		0.02	0.01	0.06					
	2/27/2019	475	949		0.016	0.00	0.03					
	3/26/2019	771	1970		0.009	0.00	0.01					
	4/30/2019	937	1980	2	0.023	0.01	0.04	<0.1	<1	<1.1	<.2	<0.01
	5/31/2019	438	1150	1.3	0.004	0.01	0.01	0.2	2.1	2.30	<0.1	<0.01
	6/25/2019	580	1190	1.4	0.015	0.01	0.01	0.2	<1.6	<1.8	<0.1	<0.01

Concentrations greater than site standards are in **bold**.

f = field measurement

Table 4.3-2
Treated Water Quality

Table 4.3-2. Treated Water Quality

Sample Point Name	Date	Temp (deg.C)	pH (f) (std. units)	Conductivity (micromhos/cm)	CO3 (mg/l)	Ca (mg/l)	Cl (mg/l)	HCO3 (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)
Parameter Code		12	109	51	6	1	7	5	2	3	4
Site Standard Qal aquifer							250				
							RO Product				
RO SP1	1/29/2019	13.6	5.62	1915			1				
	2/27/2019	15	6.7	2223			14				
	3/26/2019	14.9	5.34	1764			2				
	4/30/2019	18.5	8.24	2972	<5	<0.5	4	<5	<0.5	<0.5	4.9
	5/31/2019	18.5	8.08	5551			5				
	6/25/2019	20.7	6.73	4844	<5	<0.5	5	8	<0.5	<0.5	9
							Zeolite Treated Water				
300Z											
1200Z Trains 1&2											
1200Z Trains 3&4	1/3/2019	19.4	6.29	2097			140				
	1/9/2019	11.8	5.72	2163			145				
	1/17/2019	10.6	5.73	2373			161				
	1/29/2019	11.5	5.97	2329			157				
	2/6/2019	11	4.07	2346			158				
	2/13/2019	13	4.11	3974			164				
	2/21/2019	12	5.89	2427			159				
	2/27/2019	14.6	5.51	2436			160				
	3/6/2019	13.4	5.83	2410			159				
	3/13/2019		5.85				161				
	4/17/2019	12.5	6.85	2478			154				
	4/25/2019	16	6.55	2501			164				
	6/13/2019	16.7	5.71	2437			160				
	6/20/2019	17.4	6.11	2438			162				
	6/25/2029	17.9	5.87	2445			163				

Concentrations greater than site standards are in bold.

f = field measurement

Table 4.3-2. Treated Water Quality, cont.

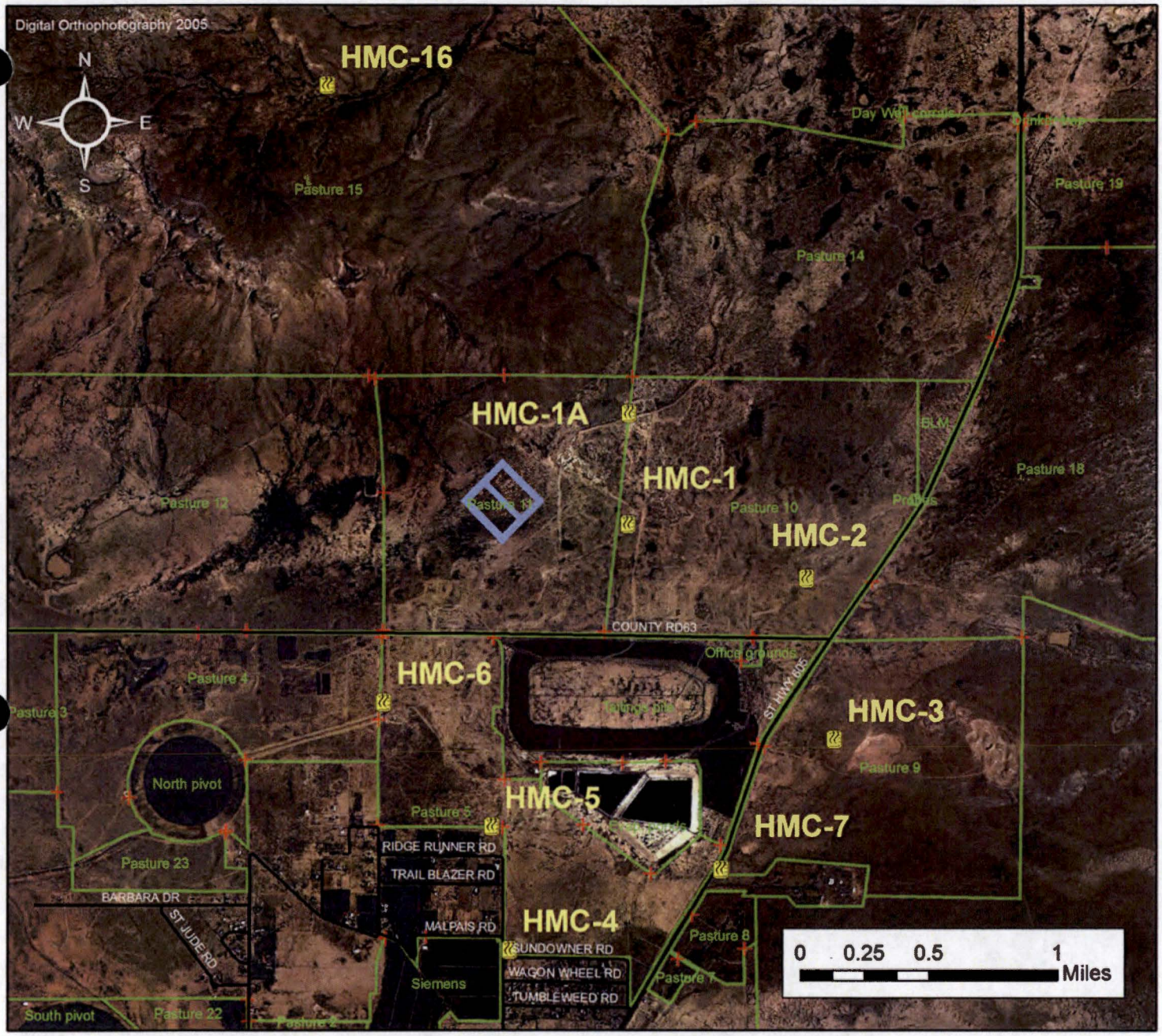
Sample Point Name	Date	SO4 (mg/l)	TDS (mg/l)	NO3 (mg/l)	Se (mg/l)	Mo (mg/l)	Unat (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	Ra226+ Ra228 (pCi/l)	Th230 (pCi/l)	V (mg/l)
Parameter Code		8	10	39	40	36	15	45	57	372	48	42
Site Standard Qal aquifer		1500	2734	12	0.32	0.1	0.16			5	0.3	0.02
RO Product												
RO SP1	1/29/2019	1	13		<0.001	0.006	0.0026					
	2/27/2019	57	129		<0.005	0.0093	0.007					
	3/26/2019	2	<10		<0.001	0.009	0.0006					
	4/30/2019	3	17	0.4	<0.001	0.018	0.0005	<0.1	<1.5	<1.6	<0.1	<0.01
	5/31/2019	4	35	0.8	0.001	0.019	0.0061	<0.2	<2.1	<2.3	<0.9	<0.01
	6/25/2019	4	29	0.9	0.001	0.023	0.0021	<0.2	<1.5	<1.7	<0.1	<0.01
Zeolite Treated Water												
300Z												
1200Z Trains 1&2												
1200Z Trains 3&4	1/3/2019	906	1650		0.033	0.012	0.0739					
	1/9/2019	943	1690		0.03	0.01	0.102					
	1/17/2019	964	1770		0.04	0.033	0.14					
	1/29/2019	974	1830		0.037	0.012	0.127					
	2/6/2019	1010	1810		0.039	0.002	0.0698					
	2/13/2019	1030	1850		0.039	0.002	0.122					
	2/21/2019	1070	1960		0.039	0.045	0.0073					
	2/27/2019	1060	1940		0.047	0.018	0.014					
	3/6/2019	1060	1900		0.048	0.013	0.021					
	3/13/2019	1060	1920		0.041	0.013	0.036					
	4/17/2019	1180	1980		0.037	0.011	0.0274					
	4/25/2019	1120	2010		0.039	0.02	0.0578					
	6/13/2019	1090	1930		0.044	0.013	0.0377					
	6/20/2019	1090	1950		0.04	0.014	0.02					
	6/25/2029	1100	1950		0.04	0.015	0.0202					

Concentrations greater than site standards are in bold.

f = field measurement

Figure 1 – Monitoring & Sampling Locations

FIGURE 1 : HMC Air Monitoring & Sampling Locations - Grants, NM



Location ID	Sampling Unit	Northing	Easting
HMC-1	Hi-Vol Particulate (Air), Track-Etch Cup (Radon), OSL Badge (Gamma)	1547458.8	491370.5
HMC-1A	Hi-Vol Particulate (Air), Track-Etch Cup (Radon), OSL Badge (Gamma)	1549715.8	491387.7
HMC-2	Hi-Vol Particulate (Air), Track-Etch Cup (Radon), OSL Badge (Gamma)	1546349.5	495053.2
HMC-3	Hi-Vol Particulate (Air), Track-Etch Cup (Radon), OSL Badge (Gamma)	1543048.7	495640.5
HMC-4	Hi-Vol Particulate (Air), Track-Etch Cup (Radon), OSL Badge (Gamma)	1538751.1	488918.0
HMC-5	Hi-Vol Particulate (Air), Track-Etch Cup (Radon), OSL Badge (Gamma)	1541268.4	488546.3
HMC-6	Hi-Vol Particulate (Air), Track-Etch Cup (Radon), OSL Badge (Gamma)	1543813.1	486297.3
HMC-7	Track-Etch Cup (Radon)	1540395.7	493293.8
HMC-16	Track-Etch Cup (Radon), OSL Badge (Gamma)	1556470.5	485135.1

Location
Road
Gate
EP-3
Fence Line
Section Line

HOMESTAKE

Attachment 1
High Volume Air Sampling Results
(first half of 2019)

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ANALYTICAL SUMMARY REPORT

May 30, 2019

Homestake Mining Co
Hwy 605
Grants, NM 87020

Work Order: C19040289 Quote ID: C5150
Project Name: Grants

Energy Laboratories, Inc. Casper WY received the following 8 samples for Homestake Mining Co on 4/5/2019 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C19040289-001	HMC-1	03/31/19 00:00	04/05/19	Filter	Metals by ICP/ICPMS, Total Composite of two or more samples Client Provided Field Parameters Metals, Total Digestion, Total Metals Digestion, Total Metals, Radiochemistry Radiochemistry Air Filter Compliance Calculations RAD-AIR, Routine Radiological Reports RAD Alternate Unit Reporting Air Filters Radium 226 Thorium, Isotopic
C19040289-002	HMC-1A	03/31/19 00:00	04/05/19	Filter	Same As Above
C19040289-003	HMC-2	03/31/19 00:00	04/05/19	Filter	Same As Above
C19040289-004	HMC-3	03/31/19 00:00	04/05/19	Filter	Same As Above
C19040289-005	HMC-4	03/31/19 00:00	04/05/19	Filter	Same As Above
C19040289-006	HMC-5	03/31/19 00:00	04/05/19	Filter	Same As Above
C19040289-007	HMC-6	03/31/19 00:00	04/05/19	Filter	Same As Above
C19040289-008	HMC-7	03/31/19 00:00	04/05/19	Filter	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 2393 Salt Creek Hwy., Casper, WY 82601, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager .

Report Approved By:

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19040289-001
Client Sample ID: HMC-1

Report Date: 05/30/19
Collection Date: 03/31/19
Date Received: 04/05/19
Matrix: Filter

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL							
Vanadium	<0.10	mg/filter		0.10		SW6020	05/20/19 13:56 / jcg
METALS, IN AIR							
Uranium	<1.5E-10	mg/L		1.5E-10		SW6020	05/15/19 17:05 / jcg
Uranium, Activity	<1.0E-16	uCi/mL		1.0E-16		SW6020	05/15/19 17:05 / jcg
RADIONUCLIDES - IN AIR							
Radium 226	1.0E-17	uCi/mL				E903.0	04/29/19 14:39 / nsr
Radium 226 precision (±)	3.3E-18	uCi/mL				E903.0	04/29/19 14:39 / nsr
Radium 226 MDC	3.8E-18	uCi/mL				E903.0	04/29/19 14:39 / nsr
Thorium 230	2.7E-18	uCi/mL				E908.0	04/24/19 06:18 / arh
Thorium 230 precision (±)	1.7E-18	uCi/mL				E908.0	04/24/19 06:18 / arh
Thorium 230 MDC	2.5E-18	uCi/mL				E908.0	04/24/19 06:18 / arh
RADIONUCLIDES - IN AIR - PER FILTER							
Radium 226	1.5	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Radium 226 precision (±)	0.49	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Radium 226 MDC	0.56	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230	0.40	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230 precision (±)	0.25	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230 MDC	0.38	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Uranium, Activity	5.6	pCi/Filter		0.20		RADCALC	05/29/19 19:45 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE							
Radium 226, % of EFF	1.0E-03	%				RADCALC	05/29/19 19:46 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL				RADCALC	05/29/19 19:46 / sec
Radium 226, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
Thorium 230, % of EFF	9.0E-03	%				RADCALC	05/29/19 19:46 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL				RADCALC	05/29/19 19:46 / sec
Thorium 230, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
Uranium Natural, % of EFF	4.0E-02	%				RADCALC	05/29/19 19:46 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL				RADCALC	05/29/19 19:46 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Air Filtering Volume	1.48E+08	L				FIELD	03/31/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: May 30, 2019

SAMPLE ID: HMC-1

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19040289-001	^{nat}U	4E-17	N/A	N/A	1E-16	9E-14	4E-02
First Quarter 2019	^{230}Th	3E-18	2E-18	3E-18	1E-16	3E-14	9E-03
Air Volume in mLs	^{226}Ra	1E-17	3E-18	4E-18	1E-16	9E-13	1E-03
1.48E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19040289-002
Client Sample ID: HMC-1A

Report Date: 05/30/19
Collection Date: 03/31/19
Date Received: 04/05/19
Matrix: Filter

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL							
Vanadium	<0.10	mg/filter		0.10		SW6020	05/23/19 05:30 / jcg
METALS, IN AIR							
Uranium	<1.5E-10	mg/L		1.5E-10		SW6020	05/15/19 17:25 / jcg
Uranium, Activity	<1.0E-16	uCi/mL		1.0E-16		SW6020	05/15/19 17:25 / jcg
RADIONUCLIDES - IN AIR							
Radium 226	1.6E-17	uCi/mL				E903.0	04/29/19 14:39 / nsr
Radium 226 precision (±)	4.3E-18	uCi/mL				E903.0	04/29/19 14:39 / nsr
Radium 226 MDC	3.7E-18	uCi/mL				E903.0	04/29/19 14:39 / nsr
Thorium 230	7.7E-18	uCi/mL				E908.0	04/24/19 06:18 / arh
Thorium 230 precision (±)	1.5E-18	uCi/mL				E908.0	04/24/19 06:18 / arh
Thorium 230 MDC	1.9E-18	uCi/mL				E908.0	04/24/19 06:18 / arh
RADIONUCLIDES - IN AIR - PER FILTER							
Radium 226	2.3	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Radium 226 precision (±)	0.62	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Radium 226 MDC	0.54	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230	1.1	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230 precision (±)	0.21	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230 MDC	0.28	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Uranium, Activity	5.4	pCi/Filter		0.20		RADCALC	05/29/19 19:45 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE							
Radium 226, % of EFF	2.0E-03	%				RADCALC	05/29/19 19:46 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL				RADCALC	05/29/19 19:46 / sec
Radium 226, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
Thorium 230, % of EFF	3.0E-02	%				RADCALC	05/29/19 19:46 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL				RADCALC	05/29/19 19:46 / sec
Thorium 230, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
Uranium Natural, % of EFF	4.0E-02	%				RADCALC	05/29/19 19:46 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL				RADCALC	05/29/19 19:46 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Air Filtering Volume	1.44E+08	L				FIELD	03/31/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: May 30, 2019

SAMPLE ID: HMC-1A

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19040289-002	^{nat}U	4E-17	N/A	N/A	1E-16	9E-14	4E-02
First Quarter 2019	^{230}Th	8E-18	1E-18	2E-18	1E-16	3E-14	3E-02
Air Volume in mLs	^{226}Ra	2E-17	4E-18	4E-18	1E-16	9E-13	2E-03
1.44E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19040289-003
Client Sample ID: HMC-2

Report Date: 05/30/19
Collection Date: 03/31/19
Date Received: 04/05/19
Matrix: Filter

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL							
Vanadium	<0.10	mg/filter		0.10		SW6020	05/23/19 05:35 / jcg
METALS, IN AIR							
Uranium	<1.5E-10	mg/L		1.5E-10		SW6020	05/15/19 17:30 / jcg
Uranium, Activity	<1.0E-16	uCi/mL		1.0E-16		SW6020	05/15/19 17:30 / jcg
RADIONUCLIDES - IN AIR							
Radium 226	2.2E-17	uCi/mL				E903.0	04/29/19 14:39 / nsr
Radium 226 precision (±)	5.4E-18	uCi/mL				E903.0	04/29/19 14:39 / nsr
Radium 226 MDC	4.0E-18	uCi/mL				E903.0	04/29/19 14:39 / nsr
Thorium 230	6.9E-18	uCi/mL				E908.0	04/24/19 06:18 / arh
Thorium 230 precision (±)	1.3E-18	uCi/mL				E908.0	04/24/19 06:18 / arh
Thorium 230 MDC	1.9E-18	uCi/mL				E908.0	04/24/19 06:18 / arh
RADIONUCLIDES - IN AIR - PER FILTER							
Radium 226	3.3	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Radium 226 precision (±)	0.81	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Radium 226 MDC	0.60	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230	1.0	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230 precision (±)	0.20	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230 MDC	0.28	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Uranium, Activity	7.7	pCi/Filter		0.20		RADCALC	05/29/19 19:45 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE							
Radium 226, % of EFF	2.0E-03	%				RADCALC	05/29/19 19:46 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL				RADCALC	05/29/19 19:46 / sec
Radium 226, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
Thorium 230, % of EFF	2.0E-02	%				RADCALC	05/29/19 19:46 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL				RADCALC	05/29/19 19:46 / sec
Thorium 230, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
Uranium Natural, % of EFF	6.0E-02	%				RADCALC	05/29/19 19:46 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL				RADCALC	05/29/19 19:46 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Air Filtering Volume	1.51E+08	L				FIELD	03/31/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: May 30, 2019

SAMPLE ID: HMC-2

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19040289-003	^{nat}U	5E-17	N/A	N/A	1E-16	9E-14	6E-02
First Quarter 2019	^{230}Th	7E-18	1E-18	2E-18	1E-16	3E-14	2E-02
Air Volume in mLs	^{226}Ra	2E-17	5E-18	4E-18	1E-16	9E-13	2E-03
1.51E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19040289-004
Client Sample ID: HMC-3

Report Date: 05/30/19
Collection Date: 03/31/19
Date Received: 04/05/19
Matrix: Filter

Analyses	Result	Units	Qual	MCL/ RL QCL	Method	Analysis Date / By
METALS, TOTAL						
Vanadium	<0.10	mg/filter		0.10	SW6020	05/23/19 05:40 / jcg
METALS, IN AIR						
Uranium	3.5E-10	mg/L		1.5E-10	SW6020	05/15/19 17:35 / jcg
Uranium, Activity	2.4E-16	uCi/mL		1.0E-16	SW6020	05/15/19 17:35 / jcg
RADIONUCLIDES - IN AIR						
Radium 226	2.1E-17	uCi/mL			E903.0	04/29/19 14:39 / nsr
Radium 226 precision (±)	5.3E-18	uCi/mL			E903.0	04/29/19 14:39 / nsr
Radium 226 MDC	3.8E-18	uCi/mL			E903.0	04/29/19 14:39 / nsr
Thorium 230	1.2E-17	uCi/mL			E908.0	04/24/19 06:18 / arh
Thorium 230 precision (±)	2.4E-18	uCi/mL			E908.0	04/24/19 06:18 / arh
Thorium 230 MDC	1.7E-18	uCi/mL			E908.0	04/24/19 06:18 / arh
RADIONUCLIDES - IN AIR - PER FILTER						
Radium 226	3.2	pCi/Filter			RADCALC	05/29/19 19:45 / sec
Radium 226 precision (±)	0.79	pCi/Filter			RADCALC	05/29/19 19:45 / sec
Radium 226 MDC	0.57	pCi/Filter			RADCALC	05/29/19 19:45 / sec
Thorium 230	1.8	pCi/Filter			RADCALC	05/29/19 19:45 / sec
Thorium 230 precision (±)	0.35	pCi/Filter			RADCALC	05/29/19 19:45 / sec
Thorium 230 MDC	0.25	pCi/Filter			RADCALC	05/29/19 19:45 / sec
Uranium, Activity	35.5	pCi/Filter		0.20	RADCALC	05/29/19 19:45 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE						
Radium 226, % of EFF	2.0E-03	%			RADCALC	05/29/19 19:46 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL			RADCALC	05/29/19 19:46 / sec
Radium 226, LLD	1.0E-16	uCi/mL			RADCALC	05/29/19 19:46 / sec
Thorium 230, % of EFF	4.0E-02	%			RADCALC	05/29/19 19:46 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL			RADCALC	05/29/19 19:46 / sec
Thorium 230, LLD	1.0E-16	uCi/mL			RADCALC	05/29/19 19:46 / sec
Uranium Natural, % of EFF	2.7E-01	%			RADCALC	05/29/19 19:46 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL			RADCALC	05/29/19 19:46 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL			RADCALC	05/29/19 19:46 / sec
CLIENT PROVIDED FIELD PARAMETERS						
Air Filtering Volume	1.48E+08	L			FIELD	03/31/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: May 30, 2019

SAMPLE ID: HMC-3

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19040289-004	^{nat}U	2E-16	N/A	N/A	1E-16	9E-14	3E-01
First Quarter 2019	^{230}Th	1E-17	2E-18	2E-18	1E-16	3E-14	4E-02
Air Volume in mLs	^{226}Ra	2E-17	5E-18	4E-18	1E-16	9E-13	2E-03
1.48E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19040289-005
Client Sample ID: HMC-4

Report Date: 05/30/19
Collection Date: 03/31/19
Date Received: 04/05/19
Matrix: Filter

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL							
Vanadium	0.34	mg/filter		0.10		SW6020	05/23/19 05:45 / jcg
METALS, IN AIR							
Uranium	2.5E-10	mg/L		1.5E-10		SW6020	05/15/19 17:55 / jcg
Uranium, Activity	1.7E-16	uCi/mL		1.0E-16		SW6020	05/15/19 17:55 / jcg
RADIONUCLIDES - IN AIR							
Radium 226	8.0E-17	uCi/mL				E903.0	04/29/19 14:39 / nsr
Radium 226 precision (±)	1.6E-17	uCi/mL				E903.0	04/29/19 14:39 / nsr
Radium 226 MDC	4.5E-18	uCi/mL				E903.0	04/29/19 14:39 / nsr
Thorium 230	5.6E-17	uCi/mL				E908.0	04/24/19 06:18 / arh
Thorium 230 precision (±)	1.1E-17	uCi/mL				E908.0	04/24/19 06:18 / arh
Thorium 230 MDC	2.9E-18	uCi/mL				E908.0	04/24/19 06:18 / arh
RADIONUCLIDES - IN AIR - PER FILTER							
Radium 226	9.6	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Radium 226 precision (±)	2.0	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Radium 226 MDC	0.54	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230	6.7	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230 precision (±)	1.3	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230 MDC	0.35	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Uranium, Activity	20.1	pCi/Filter		0.20		RADCALC	05/29/19 19:45 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE							
Radium 226, % of EFF	9.0E-03	%				RADCALC	05/29/19 19:46 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL				RADCALC	05/29/19 19:46 / sec
Radium 226, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
Thorium 230, % of EFF	1.9E-01	%				RADCALC	05/29/19 19:46 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL				RADCALC	05/29/19 19:46 / sec
Thorium 230, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
Uranium Natural, % of EFF	1.9E-01	%				RADCALC	05/29/19 19:46 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL				RADCALC	05/29/19 19:46 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Air Filtering Volume	1.20E+08	L				FIELD	03/31/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: May 30, 2019

SAMPLE ID: HMC-4

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19040289-005	^{nat}U	2E-16	N/A	N/A	1E-16	9E-14	2E-01
First Quarter 2019	^{230}Th	6E-17	1E-17	3E-18	1E-16	3E-14	2E-01
Air Volume in mLs	^{226}Ra	8E-17	2E-17	5E-18	1E-16	9E-13	9E-03
1.20E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19040289-006
Client Sample ID: HMC-5

Report Date: 05/30/19
Collection Date: 03/31/19
Date Received: 04/05/19
Matrix: Filter

Analyses	Result	Units	Qual	MCL/ RL QCL	Method	Analysis Date / By
METALS, TOTAL						
Vanadium	<0.10	mg/filter		0.10	SW6020	05/23/19 05:50 / jcg
METALS, IN AIR						
Uranium	<1.5E-10	mg/L		1.5E-10	SW6020	05/15/19 21:16 / jcg
Uranium, Activity	<1.0E-16	uCi/mL		1.0E-16	SW6020	05/15/19 21:16 / jcg
RADIONUCLIDES - IN AIR						
Radium 226	2.2E-17	uCi/mL			E903.0	04/29/19 14:39 / nsr
Radium 226 precision (±)	5.9E-18	uCi/mL			E903.0	04/29/19 14:39 / nsr
Radium 226 MDC	4.3E-18	uCi/mL			E903.0	04/29/19 14:39 / nsr
Thorium 230	7.4E-18	uCi/mL			E908.0	04/24/19 06:18 / arh
Thorium 230 precision (±)	1.4E-18	uCi/mL			E908.0	04/24/19 06:18 / arh
Thorium 230 MDC	2.0E-18	uCi/mL			E908.0	04/24/19 06:18 / arh
RADIONUCLIDES - IN AIR - PER FILTER						
Radium 226	3.0	pCi/Filter			RADCALC	05/29/19 19:45 / sec
Radium 226 precision (±)	0.80	pCi/Filter			RADCALC	05/29/19 19:45 / sec
Radium 226 MDC	0.58	pCi/Filter			RADCALC	05/29/19 19:45 / sec
Thorium 230	0.99	pCi/Filter			RADCALC	05/29/19 19:45 / sec
Thorium 230 precision (±)	0.19	pCi/Filter			RADCALC	05/29/19 19:45 / sec
Thorium 230 MDC	0.27	pCi/Filter			RADCALC	05/29/19 19:45 / sec
Uranium, Activity	12.4	pCi/Filter		0.20	RADCALC	05/29/19 19:45 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE						
Radium 226, % of EFF	2.0E-03	%			RADCALC	05/29/19 19:46 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL			RADCALC	05/29/19 19:46 / sec
Radium 226, LLD	1.0E-16	uCi/mL			RADCALC	05/29/19 19:46 / sec
Thorium 230, % of EFF	2.0E-02	%			RADCALC	05/29/19 19:46 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL			RADCALC	05/29/19 19:46 / sec
Thorium 230, LLD	1.0E-16	uCi/mL			RADCALC	05/29/19 19:46 / sec
Uranium Natural, % of EFF	1.0E-01	%			RADCALC	05/29/19 19:46 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL			RADCALC	05/29/19 19:46 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL			RADCALC	05/29/19 19:46 / sec
CLIENT PROVIDED FIELD PARAMETERS						
Air Filtering Volume	1.34E+08	L			FIELD	03/31/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: May 30, 2019

SAMPLE ID: HMC-5

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19040289-006	^{nat}U	9E-17	N/A	N/A	1E-16	9E-14	1E-01
First Quarter 2019	^{230}Th	7E-18	1E-18	2E-18	1E-16	3E-14	2E-02
Air Volume in mLs	^{226}Ra	2E-17	6E-18	4E-18	1E-16	9E-13	2E-03
1.34E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19040289-007
Client Sample ID: HMC-6

Report Date: 05/30/19
Collection Date: 03/31/19
Date Received: 04/05/19
Matrix: Filter

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL							
Vanadium	<0.10	mg/filter		0.10		SW6020	05/23/19 05:55 / jcg
METALS, IN AIR							
Uranium	<1.5E-10	mg/L		1.5E-10		SW6020	05/15/19 21:20 / jcg
Uranium, Activity	<1.0E-16	uCi/mL		1.0E-16		SW6020	05/15/19 21:20 / jcg
RADIONUCLIDES - IN AIR							
Radium 226	1.7E-17	uCi/mL				E903.0	04/29/19 14:39 / nsr
Radium 226 precision (±)	4.4E-18	uCi/mL				E903.0	04/29/19 14:39 / nsr
Radium 226 MDC	4.3E-18	uCi/mL				E903.0	04/29/19 14:39 / nsr
Thorium 230	7.4E-18	uCi/mL				E908.0	04/24/19 06:18 / arh
Thorium 230 precision (±)	1.4E-18	uCi/mL				E908.0	04/24/19 06:18 / arh
Thorium 230 MDC	1.9E-18	uCi/mL				E908.0	04/24/19 06:18 / arh
RADIONUCLIDES - IN AIR - PER FILTER							
Radium 226	2.3	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Radium 226 precision (±)	0.58	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Radium 226 MDC	0.57	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230	0.98	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230 precision (±)	0.19	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Thorium 230 MDC	0.25	pCi/Filter				RADCALC	05/29/19 19:45 / sec
Uranium, Activity	5.7	pCi/Filter		0.20		RADCALC	05/29/19 19:45 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE							
Radium 226, % of EFF	2.0E-03	%				RADCALC	05/29/19 19:46 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL				RADCALC	05/29/19 19:46 / sec
Radium 226, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
Thorium 230, % of EFF	2.0E-02	%				RADCALC	05/29/19 19:46 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL				RADCALC	05/29/19 19:46 / sec
Thorium 230, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
Uranium Natural, % of EFF	5.0E-02	%				RADCALC	05/29/19 19:46 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL				RADCALC	05/29/19 19:46 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL				RADCALC	05/29/19 19:46 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Air Filtering Volume	1.32E+08	L				FIELD	03/31/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: May 30, 2019

SAMPLE ID: HMC-6

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19040289-007	^{nat}U	4E-17	N/A	N/A	1E-16	9E-14	5E-02
First Quarter 2019	^{230}Th	7E-18	1E-18	2E-18	1E-16	3E-14	2E-02
Air Volume in mLs	^{226}Ra	2E-17	4E-18	4E-18	1E-16	9E-13	2E-03
1.32E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19040289-008
Client Sample ID: HMC-7

Report Date: 05/30/19
Collection Date: 03/31/19
Date Received: 04/05/19
Matrix: Filter

Analyses	Result	Units	Qual	MCL/ RL QCL	Method	Analysis Date / By
METALS, TOTAL						
Vanadium	<0.10	mg/filter		0.10	SW6020	05/23/19 06:00 / jcg
METALS, IN AIR						
Uranium	0.00042	mg/L	L	0.000022	SW6020	05/15/19 21:25 / jcg
Uranium, Activity	2.9E-10	uCi/mL	L	1.5E-11	SW6020	05/15/19 21:25 / jcg
RADIONUCLIDES - IN AIR						
Radium 226	5.3E-10	uCi/mL	U		E903.0	04/29/19 14:39 / nsr
Radium 226 precision (±)	4.6E-10	uCi/mL			E903.0	04/29/19 14:39 / nsr
Radium 226 MDC	6.2E-10	uCi/mL			E903.0	04/29/19 14:39 / nsr
Thorium 230	1.9E-10	uCi/mL	U		E908.0	04/24/19 06:18 / arh
Thorium 230 precision (±)	1.9E-10	uCi/mL			E908.0	04/24/19 06:18 / arh
Thorium 230 MDC	3.2E-10	uCi/mL			E908.0	04/24/19 06:18 / arh
RADIONUCLIDES - IN AIR - PER FILTER						
Radium 226	0.50	pCi/Filter	U		RADCALC	05/18/19 16:32 / sec
Radium 226 precision (±)	0.44	pCi/Filter			RADCALC	05/18/19 16:32 / sec
Radium 226 MDC	0.59	pCi/Filter			RADCALC	05/18/19 16:32 / sec
Thorium 230	0.18	pCi/Filter	U		RADCALC	05/18/19 16:32 / sec
Thorium 230 precision (±)	0.18	pCi/Filter			RADCALC	05/18/19 16:32 / sec
Thorium 230 MDC	0.31	pCi/Filter			RADCALC	05/18/19 16:32 / sec
Uranium, Activity	0.27	pCi/Filter		0.20	RADCALC	05/18/19 16:32 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE						
Radium 226, % of EFF	5.9E+04	%			RADCALC	05/18/19 16:32 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL			RADCALC	05/18/19 16:32 / sec
Radium 226, LLD	1.0E-16	uCi/mL			RADCALC	05/18/19 16:32 / sec
Thorium 230, % of EFF	6.3E+05	%			RADCALC	05/18/19 16:32 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL			RADCALC	05/18/19 16:32 / sec
Thorium 230, LLD	1.0E-16	uCi/mL			RADCALC	05/18/19 16:32 / sec
Uranium Natural, % of EFF	3.2E+05	%			RADCALC	05/18/19 16:32 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL			RADCALC	05/18/19 16:32 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL			RADCALC	05/18/19 16:32 / sec
CLIENT PROVIDED FIELD PARAMETERS						
Air Filtering Volume	1	L			FIELD	03/31/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
L - Lowest available reporting limit for the analytical method used.

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: May 30, 2019

SAMPLE ID: HMC-7

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19040289-008	^{nat}U	2E-18	N/A	N/A	1E-16	9E-14	2E-03
First Quarter 2019	^{230}Th	1E-18	1E-18	2E-18	1E-16	3E-14	4E-03
Air Volume in mLs	^{226}Ra	4E-18	3E-18	4E-18	1E-16	9E-13	4E-04
1.40E+11							

Air Volumes on this page based on average of quarterly set; accompanying standard report uses a 1 L default volume.

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226

Day for Lead-210

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Homestake Mining Co **Work Order:** C19040289 **Report Date:** 05/23/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW6020										Analytical Run: ICPMS4-C_190515A
Lab ID: QCS		Initial Calibration Verification Standard								05/15/19 13:20
Uranium		0.0192	mg/L	0.00030	96	90	110			
Lab ID: ICSA		Interference Check Sample A								05/15/19 13:25
Uranium		2.16E-05	mg/L	0.00030						
Lab ID: ICSAB		Interference Check Sample AB								05/15/19 13:30
Uranium		9.73E-05	mg/L	0.00030						
Method: SW6020										Batch: 53630
Lab ID: MB-53630		Method Blank				Run: ICPMS4-C_190515A				05/15/19 16:50
Uranium		9E-05	mg/L	2E-05						
Lab ID: LCS2-53630		Laboratory Control Sample				Run: ICPMS4-C_190515A				05/15/19 16:55
Uranium		0.0978	mg/L	2.2E-05	89	85	115			
Lab ID: C19040289-001ADIL		Serial Dilution				Run: ICPMS4-C_190515A				05/15/19 17:10
Uranium		1.55E-10	mg/L	1.5E-10		0	0	3.1	20	
Lab ID: C19040289-001APDS		Post Digestion/Distillation Spike				Run: ICPMS4-C_190515A				05/15/19 17:15
Uranium		1.06E-09	mg/L	1.5E-10	89	75	125			
Method: SW6020										Analytical Run: ICPMS4-C_190520A
Lab ID: QCS		Initial Calibration Verification Standard								05/20/19 12:39
Vanadium		0.0505	mg/L	0.010	101	90	110			
Lab ID: ICSA		Interference Check Sample A								05/20/19 12:44
Vanadium		-0.00327	mg/L	0.010						
Lab ID: ICSAB		Interference Check Sample AB								05/20/19 12:49
Vanadium		0.0161	mg/L	0.010						
Method: SW6020										Batch: 53635
Lab ID: MB-53635		Method Blank				Run: ICPMS4-C_190520A				05/20/19 13:40
Vanadium		0.002	mg/filter	7E-05						
Lab ID: LCS2-53635		Laboratory Control Sample				Run: ICPMS4-C_190520A				05/20/19 13:46
Vanadium		0.10	mg/filter	0.10	98	70	130			
Lab ID: C19040289-001BDIL		Serial Dilution				Run: ICPMS4-C_190520A				05/20/19 14:01
Vanadium		0.035	mg/filter	0.10		0	0		10	
Lab ID: C19040289-001BPDS		Post Digestion/Distillation Spike				Run: ICPMS4-C_190520A				05/20/19 14:06
Vanadium		0.082	mg/filter	0.10	99	85	115			

Qualifiers:

RL - Analyte reporting limit.

MDC - Minimum detectable concentration

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Homestake Mining Co **Work Order:** C19040289 **Report Date:** 05/23/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW6020									Analytical Run: ICPMS4-C_190522A	
Lab ID: QCS		Initial Calibration Verification Standard							05/22/19 17:15	
Vanadium		0.0488	mg/L	0.010	98	90	110			
Lab ID: ICSA		Interference Check Sample A							05/22/19 17:20	
Vanadium		-0.00180	mg/L	0.010						
Lab ID: ICSAB		Interference Check Sample AB							05/22/19 17:25	
Vanadium		0.0180	mg/L	0.010						
Method: SW6020									Batch: 53635	
Lab ID: MB-53635		Method Blank				Run: ICPMS4-C_190522A			05/23/19 05:25	
Vanadium		ND	mg/filter	7E-05						

Qualifiers:

RL - Analyte reporting limit.

MDC - Minimum detectable concentration

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Homestake Mining Co **Work Order:** C19040289 **Report Date:** 05/18/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E903.0										Batch: 53630
Lab ID: LCS-53630		Laboratory Control Sample				Run: G542M-2_190416C				04/29/19 14:39
Radium 226		95.8	pCi/L		96	80	120			
Lab ID: MB-53630	3	Method Blank				Run: G542M-2_190416C				04/29/19 14:39
Radium 226		0.05	pCi/L							U
Radium 226 precision (±)		0.08	pCi/L							
Radium 226 MDC		0.1	pCi/L							
Lab ID: C19040289-001AMS		Sample Matrix Spike				Run: G542M-2_190416C				04/29/19 14:39
Radium 226		3.45E-06	pCi/L		91	70	130			
Lab ID: C19040289-001AMSD		Sample Matrix Spike Duplicate				Run: G542M-2_190416C				04/29/19 14:39
Radium 226		3.26E-06	pCi/L		86	70	130	5.6	20	

Qualifiers:

RL - Analyte reporting limit.

MDC - Minimum detectable concentration

ND - Not detected at the reporting limit.

U - Not detected at minimum detectable concentration

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Homestake Mining Co **Work Order:** C19040289 **Report Date:** 05/18/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E908.0										Batch: 53630
Lab ID: LCS-53630		Laboratory Control Sample				Run: EGG-ORTEC_190417A				04/24/19 06:18
Thorium 230		55.4	pCi/L		111	80	120			
Lab ID: C19040289-002AMS		Sample Matrix Spike				Run: EGG-ORTEC_190417A				04/24/19 06:18
Thorium 230		2.30E-06	pCi/L		108	70	130			
Lab ID: C19040289-002AMSD		Sample Matrix Spike Duplicate				Run: EGG-ORTEC_190417A				04/24/19 06:18
Thorium 230		2.36E-06	pCi/L		111	70	130	2.5	20	
Lab ID: MB-53630	3	Method Blank				Run: EGG-ORTEC_190417A				04/24/19 06:18
Thorium 230		0.2	pCi/L							U
Thorium 230 precision (±)		0.2	pCi/L							
Thorium 230 MDC		0.4	pCi/L							

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

Work Order Receipt Checklist

Homestake Mining Co

C19040289

Login completed by: Tessa Parke
Reviewed by: Steve Carlston
Reviewed Date: 4/8/2019

Date Received: 4/5/2019
Received by: adw
Carrier name: Next Day Air

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☐	No ☐	Not Applicable ☑
Container/Temp Blank temperature:	°C		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

None

ENERGY LAB
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Page _____ of _____

Account Information (Billing information)

Company/Name	Homestake Mining Company
Contact	Kyle Martinez
Phone	1-505-287-1606
Mailing Address	P.O. Box 98
City, State, Zip	Grants, NM, 87020
Email	kmartinez1@barrick.com
Receive Invoice	☐Hard Copy ☐Email
Receive Report	☐Hard Copy ☐Email
Purchase Order	
Quote	
Bottle Order	

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	SAME
City, State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email
Special Report/Formats:	☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other_____

Comments

TR# 1Z82235884
55961079

See Air Volumes Below!

Project Information

Project Name, PWSID, Permit, etc.	GRANTS
Sampler Name	Kyle Martinez
Sampler Phone	1-505-287-1606
Sample Origin State	NM
EPA/State Compliance	☐ Yes ☐ No

URANIUM MINING CLIENTS MUST indicate sample type.
☐ NOT Source or Byproduct Material
☐ Source/Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11e.(2) Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	Total Uranium	Total RA226	Total TH 230	Total Vanadium	See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
1	HMC-1	1st	Q			X	X	X	X			5.13E+10
2	HMC-1A					X	X	X	X			4.52E+10
3	HMC-2	2019				X	X	X	X			4.97E+10
4	HMC-3					X	X	X	X			4.58E+10
5	HMC-4					X	X		X			4.38E+10
6	HMC-5	Composite				X	X	X	X			4.47E+10
7	HMC-6					X	X	X	X			4.58E+10
8	HMC-7					X	X	X	X			N/A
9												
10												C19040289

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Kyle Martinez	4-4-19 / 1400				
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
				[illegible]	4-5-19 10:56	Ashley Williamson

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check_____	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-10/18 v.3

ANALYTICAL SUMMARY REPORT

August 09, 2019

Homestake Mining Co
Hwy 605
Grants, NM 87020

Work Order: C19070169 Quote ID: C5150
Project Name: Grants

Energy Laboratories, Inc. Casper WY received the following 8 samples for Homestake Mining Co on 7/3/2019 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C19070169-001	HMC-1		07/03/19	Filter	Metals by ICP/ICPMS, Total Client Provided Field Parameters Metals, Total Digestion, Total Metals Digestion, Total Metals, Radiochemistry Radiochemistry Air Filter Compliance Calculations RAD-AIR, Routine Radiological Reports RAD Alternate Unit Reporting Air Filters Radium 226 Thorium, Isotopic
C19070169-002	HMC-1A		07/03/19	Filter	Same As Above
C19070169-003	HMC-2		07/03/19	Filter	Same As Above
C19070169-004	HMC-3		07/03/19	Filter	Same As Above
C19070169-005	HMC-4		07/03/19	Filter	Same As Above
C19070169-006	HMC-5		07/03/19	Filter	Same As Above
C19070169-007	HMC-6		07/03/19	Filter	Same As Above
C19070169-008	HMC-7		07/03/19	Filter	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 2393 Salt Creek Hwy., Casper, WY 82601, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager .

Report Approved By:

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19070169-001
Client Sample ID: HMC-1

Report Date: 08/09/19
Collection Date: Not Provided
Date Received: 07/03/19
Matrix: Filter

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL							
Vanadium	<0.10	mg/filter		0.10		SW6020	07/15/19 21:32 / jcg
METALS, IN AIR							
Uranium	7.7E-10	mg/L		1.5E-10		SW6020	07/13/19 01:12 / jcg
Uranium, Activity	5.2E-16	uCi/mL		1.0E-16		SW6020	07/13/19 01:12 / jcg
RADIONUCLIDES - IN AIR							
Radium 226	1.7E-17	uCi/mL				E903.0	08/05/19 16:52 / ajl
Radium 226 precision (±)	1.1E-17	uCi/mL				E903.0	08/05/19 16:52 / ajl
Radium 226 MDC	1.5E-17	uCi/mL				E903.0	08/05/19 16:52 / ajl
Thorium 230	9.5E-18	uCi/mL				E908.0	07/19/19 15:27 / nsr
Thorium 230 precision (±)	1.8E-18	uCi/mL				E908.0	07/19/19 15:27 / nsr
Thorium 230 MDC	3.7E-18	uCi/mL				E908.0	07/19/19 15:27 / nsr
RADIONUCLIDES - IN AIR - PER FILTER							
Radium 226	2.5	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Radium 226 precision (±)	1.6	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Radium 226 MDC	2.1	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230	1.3	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230 precision (±)	0.26	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230 MDC	0.51	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Uranium, Activity	73.1	pCi/Filter		0.20		RADCALC	08/08/19 17:35 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE							
Radium 226, % of EFF	2.0E-03	%				RADCALC	08/08/19 17:36 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL				RADCALC	08/08/19 17:36 / sec
Radium 226, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
Thorium 230, % of EFF	3.0E-02	%				RADCALC	08/08/19 17:36 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL				RADCALC	08/08/19 17:36 / sec
Thorium 230, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
Uranium Natural, % of EFF	5.8E-01	%				RADCALC	08/08/19 17:36 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL				RADCALC	08/08/19 17:36 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Air Filtering Volume	1.41E+08	L				FIELD	06/30/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: August 9, 2019

SAMPLE ID: HMC-1

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19070169-001	^{nat}U	5E-16	N/A	N/A	1E-16	9E-14	6E-01
Second Quarter 2019	^{230}Th	1E-17	2E-18	4E-18	1E-16	3E-14	3E-02
Air Volume in mLs	^{226}Ra	2E-17	1E-17	1E-17	1E-16	9E-13	2E-03
1.41E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19070169-002
Client Sample ID: HMC-1A

Report Date: 08/09/19
Collection Date: Not Provided
Date Received: 07/03/19
Matrix: Filter

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL							
Vanadium	<0.10	mg/filter		0.10		SW6020	07/15/19 21:46 / jcg
METALS, IN AIR							
Uranium	5.3E-10	mg/L		1.5E-10		SW6020	07/13/19 01:42 / jcg
Uranium, Activity	3.6E-16	uCi/mL		1.0E-16		SW6020	07/13/19 01:42 / jcg
RADIONUCLIDES - IN AIR							
Radium 226	1.7E-17	uCi/mL				E903.0	08/05/19 16:52 / ajl
Radium 226 precision (±)	8.6E-18	uCi/mL				E903.0	08/05/19 16:52 / ajl
Radium 226 MDC	1.4E-17	uCi/mL				E903.0	08/05/19 16:52 / ajl
Thorium 230	1.0E-17	uCi/mL				E908.0	07/19/19 15:26 / nsr
Thorium 230 precision (±)	2.0E-18	uCi/mL				E908.0	07/19/19 15:26 / nsr
Thorium 230 MDC	3.4E-18	uCi/mL				E908.0	07/19/19 15:26 / nsr
RADIONUCLIDES - IN AIR - PER FILTER							
Radium 226	2.5	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Radium 226 precision (±)	1.2	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Radium 226 MDC	2.1	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230	1.5	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230 precision (±)	0.29	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230 MDC	0.49	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Uranium, Activity	51.6	pCi/Filter		0.20		RADCALC	08/08/19 17:35 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE							
Radium 226, % of EFF	2.0E-03	%				RADCALC	08/08/19 17:36 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL				RADCALC	08/08/19 17:36 / sec
Radium 226, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
Thorium 230, % of EFF	3.0E-02	%				RADCALC	08/08/19 17:36 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL				RADCALC	08/08/19 17:36 / sec
Thorium 230, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
Uranium Natural, % of EFF	4.0E-01	%				RADCALC	08/08/19 17:36 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL				RADCALC	08/08/19 17:36 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Air Filtering Volume	1.45E+08	L				FIELD	06/30/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: August 9, 2019

SAMPLE ID: HMC-1A

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19070169-002	^{nat}U	4E-16	N/A	N/A	1E-16	9E-14	4E-01
Second Quarter 2019	^{230}Th	1E-17	2E-18	3E-18	1E-16	3E-14	3E-02
Air Volume in mLs	^{226}Ra	2E-17	9E-18	1E-17	1E-16	9E-13	2E-03
1.45E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19070169-003
Client Sample ID: HMC-2

Report Date: 08/09/19
Collection Date: Not Provided
Date Received: 07/03/19
Matrix: Filter

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL							
Vanadium	<0.10	mg/filter		0.10		SW6020	07/15/19 21:50 / jcg
METALS, IN AIR							
Uranium	2.7E-10	mg/L		1.5E-10		SW6020	07/13/19 01:45 / jcg
Uranium, Activity	1.8E-16	uCi/mL		1.0E-16		SW6020	07/13/19 01:45 / jcg
RADIONUCLIDES - IN AIR							
Radium 226	1.8E-17	uCi/mL				E903.0	08/05/19 16:52 / ajl
Radium 226 precision (±)	9.4E-18	uCi/mL				E903.0	08/05/19 16:52 / ajl
Radium 226 MDC	1.4E-17	uCi/mL				E903.0	08/05/19 16:52 / ajl
Thorium 230	3.1E-17	uCi/mL	U			E908.0	08/02/19 08:46 / nsr
Thorium 230 precision (±)	6.6E-18	uCi/mL				E908.0	08/02/19 08:46 / nsr
Thorium 230 MDC	9.2E-17	uCi/mL				E908.0	08/02/19 08:46 / nsr
RADIONUCLIDES - IN AIR - PER FILTER							
Radium 226	2.7	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Radium 226 precision (±)	1.4	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Radium 226 MDC	2.1	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230	4.7	pCi/Filter	U			RADCALC	08/08/19 17:35 / sec
Thorium 230 precision (±)	1.0	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230 MDC	14.0	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Uranium, Activity	27.4	pCi/Filter		0.20		RADCALC	08/08/19 17:35 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE							
Radium 226, % of EFF	2.0E-03	%				RADCALC	08/08/19 17:36 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL				RADCALC	08/08/19 17:36 / sec
Radium 226, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
Thorium 230, % of EFF	1.0E-01	%				RADCALC	08/08/19 17:36 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL				RADCALC	08/08/19 17:36 / sec
Thorium 230, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
Uranium Natural, % of EFF	2.0E-01	%				RADCALC	08/08/19 17:36 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL				RADCALC	08/08/19 17:36 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Air Filtering Volume	1.52E+08	L				FIELD	06/30/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: August 9, 2019

SAMPLE ID: HMC-2

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19070169-003	^{nat}U	2E-16	N/A	N/A	1E-16	9E-14	2E-01
Second Quarter 2019	^{230}Th	3E-17	7E-18	9E-17	1E-16	3E-14	1E-01
Air Volume in mLs	^{226}Ra	2E-17	9E-18	1E-17	1E-16	9E-13	2E-03
1.52E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19070169-004
Client Sample ID: HMC-3

Report Date: 08/09/19
Collection Date: Not Provided
Date Received: 07/03/19
Matrix: Filter

Analyses	Result	Units	Qual	MCL/ RL QCL	Method	Analysis Date / By
METALS, TOTAL						
Vanadium	<0.10	mg/filter		0.10	SW6020	07/15/19 21:54 / jcg
METALS, IN AIR						
Uranium	7.7E-10	mg/L		1.5E-10	SW6020	07/13/19 01:49 / jcg
Uranium, Activity	5.2E-16	uCi/mL		1.0E-16	SW6020	07/13/19 01:49 / jcg
RADIONUCLIDES - IN AIR						
Radium 226	2.8E-17	uCi/mL			E903.0	08/05/19 16:52 / ajl
Radium 226 precision (±)	1.1E-17	uCi/mL			E903.0	08/05/19 16:52 / ajl
Radium 226 MDC	1.4E-17	uCi/mL			E903.0	08/05/19 16:52 / ajl
Thorium 230	1.0E-17	uCi/mL			E908.0	07/19/19 15:27 / nsr
Thorium 230 precision (±)	2.0E-18	uCi/mL			E908.0	07/19/19 15:27 / nsr
Thorium 230 MDC	3.5E-18	uCi/mL			E908.0	07/19/19 15:27 / nsr
RADIONUCLIDES - IN AIR - PER FILTER						
Radium 226	4.0	pCi/Filter			RADCALC	08/08/19 17:35 / sec
Radium 226 precision (±)	1.6	pCi/Filter			RADCALC	08/08/19 17:35 / sec
Radium 226 MDC	2.0	pCi/Filter			RADCALC	08/08/19 17:35 / sec
Thorium 230	1.5	pCi/Filter			RADCALC	08/08/19 17:35 / sec
Thorium 230 precision (±)	0.28	pCi/Filter			RADCALC	08/08/19 17:35 / sec
Thorium 230 MDC	0.51	pCi/Filter			RADCALC	08/08/19 17:35 / sec
Uranium, Activity	75.3	pCi/Filter		0.20	RADCALC	08/08/19 17:35 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE						
Radium 226, % of EFF	3.0E-03	%			RADCALC	08/08/19 17:36 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL			RADCALC	08/08/19 17:36 / sec
Radium 226, LLD	1.0E-16	uCi/mL			RADCALC	08/08/19 17:36 / sec
Thorium 230, % of EFF	3.0E-02	%			RADCALC	08/08/19 17:36 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL			RADCALC	08/08/19 17:36 / sec
Thorium 230, LLD	1.0E-16	uCi/mL			RADCALC	08/08/19 17:36 / sec
Uranium Natural, % of EFF	5.8E-01	%			RADCALC	08/08/19 17:36 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL			RADCALC	08/08/19 17:36 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL			RADCALC	08/08/19 17:36 / sec
CLIENT PROVIDED FIELD PARAMETERS						
Air Filtering Volume	1.44E+08	L			FIELD	06/30/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: August 9, 2019

SAMPLE ID: HMC-3

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19070169-004	^{nat}U	5E-16	N/A	N/A	1E-16	9E-14	6E-01
Second Quarter 2019	^{230}Th	1E-17	2E-18	4E-18	1E-16	3E-14	3E-02
Air Volume in mLs	^{226}Ra	3E-17	1E-17	1E-17	1E-16	9E-13	3E-03
1.44E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19070169-005
Client Sample ID: HMC-4

Report Date: 08/09/19
Collection Date: Not Provided
Date Received: 07/03/19
Matrix: Filter

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL							
Vanadium	0.30	mg/filter		0.10		SW6020	07/15/19 21:57 / jcg
METALS, IN AIR							
Uranium	5.2E-10	mg/L		1.5E-10		SW6020	07/13/19 01:53 / jcg
Uranium, Activity	3.5E-16	uCi/mL		1.0E-16		SW6020	07/13/19 01:53 / jcg
RADIONUCLIDES - IN AIR							
Radium 226	1.1E-16	uCi/mL				E903.0	08/05/19 16:52 / ajl
Radium 226 precision (±)	3.0E-17	uCi/mL				E903.0	08/05/19 16:52 / ajl
Radium 226 MDC	1.9E-17	uCi/mL				E903.0	08/05/19 16:52 / ajl
Thorium 230	6.1E-17	uCi/mL				E908.0	07/19/19 15:27 / nsr
Thorium 230 precision (±)	1.2E-17	uCi/mL				E908.0	07/19/19 15:27 / nsr
Thorium 230 MDC	7.7E-18	uCi/mL				E908.0	07/19/19 15:27 / nsr
RADIONUCLIDES - IN AIR - PER FILTER							
Radium 226	12.1	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Radium 226 precision (±)	3.3	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Radium 226 MDC	2.0	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230	6.7	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230 precision (±)	1.3	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230 MDC	0.85	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Uranium, Activity	38.9	pCi/Filter		0.20		RADCALC	08/08/19 17:35 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE							
Radium 226, % of EFF	1.0E-02	%				RADCALC	08/08/19 17:36 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL				RADCALC	08/08/19 17:36 / sec
Radium 226, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
Thorium 230, % of EFF	2.0E-01	%				RADCALC	08/08/19 17:36 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL				RADCALC	08/08/19 17:36 / sec
Thorium 230, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
Uranium Natural, % of EFF	3.9E-01	%				RADCALC	08/08/19 17:36 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL				RADCALC	08/08/19 17:36 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Air Filtering Volume	1.10E+08	L				FIELD	06/30/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: August 9, 2019

SAMPLE ID: HMC-4

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19070169-005	^{nat}U	4E-16	N/A	N/A	1E-16	9E-14	4E-01
Second Quarter 2019	^{230}Th	6E-17	1E-17	8E-18	1E-16	3E-14	2E-01
Air Volume in mLs	^{226}Ra	1E-16	3E-17	2E-17	1E-16	9E-13	1E-02
1.10E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19070169-006
Client Sample ID: HMC-5

Report Date: 08/09/19
Collection Date: Not Provided
Date Received: 07/03/19
Matrix: Filter

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL							
Vanadium	<0.10	mg/filter		0.10		SW6020	07/15/19 22:16 / jcg
METALS, IN AIR							
Uranium	1.4E-09	mg/L		1.5E-10		SW6020	07/13/19 01:56 / jcg
Uranium, Activity	9.7E-16	uCi/mL		1.0E-16		SW6020	07/13/19 01:56 / jcg
RADIONUCLIDES - IN AIR							
Radium 226	2.8E-17	uCi/mL				E903.0	08/05/19 16:52 / ajl
Radium 226 precision (±)	1.3E-17	uCi/mL				E903.0	08/05/19 16:52 / ajl
Radium 226 MDC	1.7E-17	uCi/mL				E903.0	08/05/19 16:52 / ajl
Thorium 230	1.2E-17	uCi/mL				E908.0	07/19/19 15:27 / nsr
Thorium 230 precision (±)	2.3E-18	uCi/mL				E908.0	07/19/19 15:27 / nsr
Thorium 230 MDC	5.3E-18	uCi/mL				E908.0	07/19/19 15:27 / nsr
RADIONUCLIDES - IN AIR - PER FILTER							
Radium 226	3.4	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Radium 226 precision (±)	1.5	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Radium 226 MDC	2.1	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230	1.4	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230 precision (±)	0.27	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230 MDC	0.64	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Uranium, Activity	117	pCi/Filter		0.20		RADCALC	08/08/19 17:35 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE							
Radium 226, % of EFF	3.0E-03	%				RADCALC	08/08/19 17:36 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL				RADCALC	08/08/19 17:36 / sec
Radium 226, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
Thorium 230, % of EFF	4.0E-02	%				RADCALC	08/08/19 17:36 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL				RADCALC	08/08/19 17:36 / sec
Thorium 230, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
Uranium Natural, % of EFF	1.1E+00	%				RADCALC	08/08/19 17:36 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL				RADCALC	08/08/19 17:36 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Air Filtering Volume	1.21E+08	L				FIELD	06/30/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: August 9, 2019

SAMPLE ID: HMC-5

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19070169-006	^{nat}U	1E-15	N/A	N/A	1E-16	9E-14	1E+00
Second Quarter 2019	^{230}Th	1E-17	2E-18	5E-18	1E-16	3E-14	4E-02
Air Volume in mLs	^{226}Ra	3E-17	1E-17	2E-17	1E-16	9E-13	3E-03
1.21E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19070169-007
Client Sample ID: HMC-6

Report Date: 08/09/19
Collection Date: Not Provided
Date Received: 07/03/19
Matrix: Filter

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL							
Vanadium	<0.10	mg/filter		0.10		SW6020	07/15/19 22:20 / jcg
METALS, IN AIR							
Uranium	2.8E-10	mg/L		1.5E-10		SW6020	07/13/19 02:00 / jcg
Uranium, Activity	1.9E-16	uCi/mL		1.0E-16		SW6020	07/13/19 02:00 / jcg
RADIONUCLIDES - IN AIR							
Radium 226	1.0E-17	uCi/mL	U			E903.0	08/05/19 16:52 / ajl
Radium 226 precision (±)	7.1E-18	uCi/mL				E903.0	08/05/19 16:52 / ajl
Radium 226 MDC	1.8E-17	uCi/mL				E903.0	08/05/19 16:52 / ajl
Thorium 230	1.4E-17	uCi/mL				E908.0	07/19/19 15:27 / nsr
Thorium 230 precision (±)	2.7E-18	uCi/mL				E908.0	07/19/19 15:27 / nsr
Thorium 230 MDC	4.2E-18	uCi/mL				E908.0	07/19/19 15:27 / nsr
RADIONUCLIDES - IN AIR - PER FILTER							
Radium 226	1.2	pCi/Filter	U			RADCALC	08/08/19 17:35 / sec
Radium 226 precision (±)	0.84	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Radium 226 MDC	2.2	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230	1.7	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230 precision (±)	0.32	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Thorium 230 MDC	0.49	pCi/Filter				RADCALC	08/08/19 17:35 / sec
Uranium, Activity	22.7	pCi/Filter		0.20		RADCALC	08/08/19 17:35 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE							
Radium 226, % of EFF	1.0E-03	%				RADCALC	08/08/19 17:36 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL				RADCALC	08/08/19 17:36 / sec
Radium 226, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
Thorium 230, % of EFF	5.0E-02	%				RADCALC	08/08/19 17:36 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL				RADCALC	08/08/19 17:36 / sec
Thorium 230, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
Uranium Natural, % of EFF	2.1E-01	%				RADCALC	08/08/19 17:36 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL				RADCALC	08/08/19 17:36 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL				RADCALC	08/08/19 17:36 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Air Filtering Volume	1.18E+08	L				FIELD	06/30/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

ENERGY LABORATORIES
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CASPER, WY
Toll Free: 888.235.0515 • 307.235.0515 • F: 307.234.1639
PO Box 247, Casper, WY 82602-0247 • 2393 Salt Creek Hwy (82601)

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: August 9, 2019

SAMPLE ID: HMC-6

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19070169-007	^{nat}U	2E-16	N/A	N/A	1E-16	9E-14	2E-01
Second Quarter 2019	^{230}Th	1E-17	3E-18	4E-18	1E-16	3E-14	5E-02
Air Volume in mLs	^{226}Ra	1E-17	7E-18	2E-17	1E-16	9E-13	1E-03
1.18E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Homestake Mining Co
Project: Grants
Lab ID: C19070169-008
Client Sample ID: HMC-7

Report Date: 08/09/19
Collection Date: Not Provided
Date Received: 07/03/19
Matrix: Filter

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL							
Vanadium	<0.10	mg/filter		0.10		SW6020	07/15/19 22:23 / jcg
METALS, IN AIR							
Uranium	<0.00068	mg/L	D	0.00068		SW6020	07/17/19 03:45 / jcg
Uranium, Activity	<4.6E-10	uCi/mL	D	4.6E-10		SW6020	07/17/19 03:45 / jcg
RADIONUCLIDES - IN AIR							
Radium 226	-4.8E-10	uCi/mL	U			E903.0	08/05/19 16:52 / ajl
Radium 226 precision (±)	1.5E-09	uCi/mL				E903.0	08/05/19 16:52 / ajl
Radium 226 MDC	2.2E-09	uCi/mL				E903.0	08/05/19 16:52 / ajl
Thorium 230	3.0E-10	uCi/mL	U			E908.0	07/19/19 15:27 / nsr
Thorium 230 precision (±)	3.8E-10	uCi/mL				E908.0	07/19/19 15:27 / nsr
Thorium 230 MDC	6.1E-10	uCi/mL				E908.0	07/19/19 15:27 / nsr
RADIONUCLIDES - IN AIR - PER FILTER							
Radium 226	-0.46	pCi/Filter	U			RADCALC	08/06/19 15:02 / sec
Radium 226 precision (±)	1.4	pCi/Filter				RADCALC	08/06/19 15:02 / sec
Radium 226 MDC	2.1	pCi/Filter				RADCALC	08/06/19 15:02 / sec
Thorium 230	0.28	pCi/Filter	U			RADCALC	08/06/19 15:02 / sec
Thorium 230 precision (±)	0.36	pCi/Filter				RADCALC	08/06/19 15:02 / sec
Thorium 230 MDC	0.58	pCi/Filter				RADCALC	08/06/19 15:02 / sec
Uranium, Activity	<0.20	pCi/Filter		0.20		RADCALC	08/06/19 15:02 / sec
RADIOCHEMISTRY AIR FILTER COMPLIANCE							
Radium 226, % of EFF	-5.0E+04	%				RADCALC	08/06/19 15:05 / sec
Radium 226, EFF Week	9.0E-13	uCi/mL				RADCALC	08/06/19 15:05 / sec
Radium 226, LLD	1.0E-16	uCi/mL				RADCALC	08/06/19 15:05 / sec
Thorium 230, % of EFF	9.9E+05	%				RADCALC	08/06/19 15:05 / sec
Thorium 230, EFF Year	3.0E-14	uCi/mL				RADCALC	08/06/19 15:05 / sec
Thorium 230, LLD	1.0E-16	uCi/mL				RADCALC	08/06/19 15:05 / sec
Uranium Natural, % of EFF	0.0E+00	%				RADCALC	08/06/19 15:05 / sec
Uranium Natural, EFF Year	9.0E-14	uCi/mL				RADCALC	08/06/19 15:05 / sec
Uranium Natural, LLD	1.0E-16	uCi/mL				RADCALC	08/06/19 15:05 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Air Filtering Volume	1	L				FIELD	06/30/19 00:00 / ***

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Homestake Mining Co - Grants
PROJECT: Grants
REPORT DATE: August 9, 2019

SAMPLE ID: HMC-7

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D.+ µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C19070169-008	^{nat}U	< 2E-18	N/A	N/A	1E-16	9E-14	0E+00
Second Quarter 2019	^{230}Th	2E-18	3E-18	4E-18	1E-16	3E-14	7E-03
Air Volume in mLs	^{226}Ra	-3E-18	1E-17	2E-17	1E-16	9E-13	-4E-04
1.33E+11							

+LLD's are from NRC Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226

Day for Lead-210

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Homestake Mining Co **Work Order:** C19070169 **Report Date:** 07/18/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW6020										Analytical Run: ICPMS5-C_190712A
Lab ID: QCS		Initial Calibration Verification Standard								07/12/19 15:32
Uranium		0.0190	mg/L	0.00030	95	90	110			
Lab ID: ICSA		Interference Check Sample A								07/12/19 16:02
Uranium		2.21E-05	mg/L	0.00030						
Lab ID: ICSAB		Interference Check Sample AB								07/12/19 16:06
Uranium		3.24E-06	mg/L	0.00030						
Method: SW6020										Batch: 54383
Lab ID: MB-54383		Method Blank				Run: ICPMS5-C_190712A				07/13/19 01:04
Uranium		ND	mg/L	0.0001						
Lab ID: LCS2-54383		Laboratory Control Sample				Run: ICPMS5-C_190712A				07/13/19 01:08
Uranium		0.0933	mg/L	0.00014	89	85	115			
Lab ID: C19070169-001ADIL		Serial Dilution				Run: ICPMS5-C_190712A				07/13/19 01:30
Uranium		7.57E-09	mg/L	2.3E-10		0	0	0.4	20	
Lab ID: C19070169-001APDS		Post Digestion/Distillation Spike				Run: ICPMS5-C_190712A				07/13/19 01:34
Uranium		2.45E-08	mg/L	1.5E-10	94	75	125			
Method: SW6020										Analytical Run: ICPMS5-C_190715A
Lab ID: QCS		Initial Calibration Verification Standard								07/15/19 17:55
Vanadium		0.0503	mg/L	0.010	101	90	110			
Lab ID: ICSA		Interference Check Sample A								07/15/19 18:07
Vanadium		-0.000104	mg/L	0.010						
Lab ID: ICSAB		Interference Check Sample AB								07/15/19 18:10
Vanadium		0.0208	mg/L	0.010						
Method: SW6020										Batch: 54395
Lab ID: MB-54395		Method Blank				Run: ICPMS5-C_190715A				07/15/19 21:20
Vanadium		0.0009	mg/filter	0.0002						
Lab ID: LCS2-54395		Laboratory Control Sample				Run: ICPMS5-C_190715A				07/15/19 21:24
Vanadium		0.10	mg/filter	0.10	99	70	130			
Lab ID: C19070169-001BDIL		Serial Dilution				Run: ICPMS5-C_190715A				07/15/19 21:35
Vanadium		0.055	mg/filter	0.10		0	0		10	N
Lab ID: C19070169-001BPDS		Post Digestion/Distillation Spike				Run: ICPMS5-C_190715A				07/15/19 21:39
Vanadium		0.32	mg/filter	0.10	106	85	115			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

N - The analyte concentration was not sufficiently high to calculate a RPD for the serial dilution test.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Homestake Mining Co **Work Order:** C19070169 **Report Date:** 07/18/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **SW6020**									Analytical Run: ICPMS5-C_190717A	
Lab ID: **QCS**		Initial Calibration Verification Standard							07/16/19 16:32	
Uranium		0.0189	mg/L	0.00030	95	90	110			
Lab ID: **ICSA**		Interference Check Sample A							07/16/19 16:51	
Uranium		1.10E-05	mg/L	0.00030						
Lab ID: **ICSAB**		Interference Check Sample AB							07/16/19 16:54	
Uranium		1.80E-06	mg/L	0.00030						
Method: **SW6020**									Batch: 54383	
Lab ID: **MB-54383**		Method Blank				Run: ICPMS5-C_190717A			07/17/19 03:34	
Uranium		ND	mg/L	0.0001						
Lab ID: **LCS2-54383**		Laboratory Control Sample				Run: ICPMS5-C_190717A			07/17/19 03:37	
Uranium		0.0899	mg/L	0.00014	85	85	115			
Lab ID: **C19070169-008ADIL**		Serial Dilution				Run: ICPMS5-C_190717A			07/17/19 03:49	
Uranium		ND	mg/L	0.0034		0	0		20	
Lab ID: **C19070169-008APDS**		Post Digestion/Distillation Spike				Run: ICPMS5-C_190717A			07/17/19 03:52	
Uranium		0.250	mg/L	0.00070	92	75	125			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Homestake Mining Co **Work Order:** C19070169 **Report Date:** 08/09/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E903.0**										Batch: 54383
Lab ID: **LCS-54383**		Laboratory Control Sample				Run: G542M_190730B				08/05/19 16:52
Radium 226		111	pCi/L		109	80	120			
Lab ID: **MB-54383**	3	Method Blank				Run: G542M_190730B				08/05/19 16:52
Radium 226		0.3	pCi/L							U
Radium 226 precision (±)		0.3	pCi/L							
Radium 226 MDC		0.4	pCi/L							
Lab ID: **C19070169-002AMS**		Sample Matrix Spike				Run: G542M_190730B				08/05/19 16:52
Radium 226		1.29E-06	pCi/L		96	70	130			
Lab ID: **C19070169-002AMSD**		Sample Matrix Spike Duplicate				Run: G542M_190730B				08/05/19 16:52
Radium 226		1.25E-06	pCi/L		92	70	130	3.7	20	

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Homestake Mining Co **Work Order:** C19070169 **Report Date:** 08/09/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E908.0										Batch: 54383
Lab ID: LCS-54383		Laboratory Control Sample				Run: EGG-ORTEC_2_190716B				07/19/19 15:27
Thorium 230		54.3	pCi/L		108	80	120			
Lab ID: MB-54383	3	Method Blank				Run: EGG-ORTEC_2_190716B				07/19/19 15:27
Thorium 230		0.4	pCi/L							U
Thorium 230 precision (±)		0.4	pCi/L							
Thorium 230 MDC		0.6	pCi/L							
Lab ID: C19070169-001AMS		Sample Matrix Spike				Run: EGG-ORTEC_2_190716B				07/19/19 15:27
Thorium 230		8.12E-07	pCi/L		113	70	130			
Lab ID: C19070169-001AMSD		Sample Matrix Spike Duplicate				Run: EGG-ORTEC_2_190716B				07/19/19 15:26
Thorium 230		7.32E-07	pCi/L		102	70	130	10	20	

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

Work Order Receipt Checklist

Homestake Mining Co

C19070169

Login completed by: Dorian Quis
Reviewed by: Steve Carlston
Reviewed Date: 7/4/2019

Date Received: 7/3/2019
Received by: aew
Carrier name: NDA

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☐	No ☐	Not Applicable ☑
Container/Temp Blank temperature:	n/a°C n/a		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

None

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Chain of Custody & Analytical Request Record

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Page _____ of _____

Account Information (Billing Information)

Company/Name	Homestake Mining Company
Contact	Kyle Martinez
Phone	1-505-287-1606
Mailing Address	P.O. Box 98
City, State, Zip	Grants, NM, 87020
Email	kmartinez1@barrick.com
Receive Invoice ☐Hard Copy ☐Email	Receive Report ☐Hard Copy ☐Email
Purchase Order / Quote / Bottle Order	

Report Information (If different than Account Information)

Company/Name	
Contact	
Phone	SAME
Mailing Address	
City, State, Zip	
Email	
Receive Report ☐Hard Copy ☐Email	

Special Report/Formats:
☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other_____

Comments

TR# 1282235884
5798 2150

See air volumes below.

Project Information

Project Name, PWSID, Permit, etc.	GRANTS
Sampler Name: Kyle Martinez	Sampler Phone: 1-505-287-1606
Sample Origin State: NM	EPA/State Compliance ☐ Yes ☐ No

URANIUM MINING CLIENTS MUST Indicate sample type.
☐ NOT Source or Byproduct Material
☐ Source/Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11e.(2) Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	Total Uranium	Total RA226	Total TH230	Total Vanadium	See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
1 HMC-1	2nd	Qtr									1.43E+07
2 HMC-1A											1.47E+07
3 HMC-2											1.44E+07
4 HMC-3	2019										1.48E+07
5 HMC-4											1.07E+07
6 HMC-5											1.22E+07
7 HMC-6	Composite										1.17E+07
8 HMC-7											N/A
9											C19020169
10											

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Kyle Martinez	7-2-19 / 1300				
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check_____	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-10/18 v.3

Tracey Archer

From: Chuck Farr <ChuckFarr@ERGOFFICE.COM>
Sent: Wednesday, July 03, 2019 8:08 AM
To: Tracey Archer
Cc: Martinez, Kyle
Subject: FW: 2nd QTR flow Volumes

Tracy –

We adjusted the HMC hi-vol air flow volumes for air particulates. Please note the flow volumes (in milliliters) below for the samples just sent up to you.

Thanks much, contact me with any questions, and have a great July 4th.

Chuck Farr
ERG

From: Martinez, Kyle <kmartinez1@barrick.com>
Sent: Wednesday, July 3, 2019 6:19 AM
To: Chuck Farr <ChuckFarr@ERGOFFICE.COM>
Subject: 2nd QTR flow Volumes

Total Sampling Volume for Quarter (mL)							
1	1A	2	3	4	5	6	7
1.41E+11	1.45E+11	1.52E+11	1.44E+11	1.10E+11	1.21E+11	1.18E+11	n/a

Kyle Martinez

Kyle Martinez
Relief Supervisor/Rad Tech
Grants Reclamation Project
Homestake Mining Company
505-287-1606

Attachment 2

Radon Gas Monitoring Results

Attachment 2 - Radon Gas Monitoring Results

Track-Etch Passive Survey

Location	Monitoring Period	Rn Concentration (µCi/ml)	Uncertainty - 2 S.D. (µCi/ml)	LLD (µCi/ml)
HMC #1(average) N Outer Perimeter	1/7/19 - 7/2/19	5.3E-10	1.1E-10	3.4E-10
HMC #1-A (average) N Outer Perimeter	1/7/19 - 7/2/19	5.0E-10	1.3E-10	3.4E-10
HMC #2 (average) NE Outer Perimeter	1/7/19 - 7/2/19	6.1E-10	1.3E-10	3.4E-10
HMC #3 (average) E Outer Perimeter	1/7/19 - 7/2/19	4.6E-10	1.2E-10	3.4E-10
HMC #4 (average) S Outer Perimeter	1/7/19 - 7/2/19	5.9E-10	1.3E-10	3.4E-10
HMC #5 (average) N of Nearest Residence	1/7/19 - 7/2/19	5.1E-10	1.3E-10	3.4E-10
HMC #6 (average) W of Outer Perimeter	1/7/19 - 7/2/19	4.3E-10	1.3E-10	3.4E-10
HMC #7 (average) S Boundary	1/7/19 - 7/2/19	5.5E-10	1.3E-10	3.4E-10
HMC #16 (average) Background	1/7/19 - 7/2/19	2.5E-10	1.1E-10	3.4E-10

Attachment 3
Environmental Gamma Radiation Results

Attachment 3 - Environmental Gamma Radiation Results
OSL Perimeter Monitoring Stations

Direct Radiation Measurements

Location	Monitoring Period	Dose Rate (mrem/6 mo)	Error (mrem/6 mo)*
HMC #1 N Outer Perimeter	1/1/19 - 6/30/19	56	5.5
HMC #1-A N Outer Perimeter	1/1/19 - 6/30/19	54.4	5.3
HMC #2 NE Outer Perimeter	1/1/19 - 6/30/19	65.2	6.4
HMC #3 E Outer Perimeter	1/1/19 - 6/30/19	60.4	5.9
HMC #4 S Outer Perimeter	1/1/19 - 6/30/19	71.6	7.0
HMC #5 N of Nearest Residence	1/1/19 - 6/30/19	63.8	6.3
HMC #6 Background	1/1/19 - 6/30/19	60.2	5.9
HMC #16	1/1/19 - 6/30/19	59	5.8

*Error is 1.96 std. dev.