



Homestake Mining Company of California

Alan D. Cox
Project Manager – Grants

20 August 2008

UPS Next Day Air:

Mr. John Buckley, Project Manager
c/o Document Control Desk
Fuel Cycle Facilities Branch (Mailstop T8-A33)
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Materials Safety and Safeguards
U. S. Nuclear Regulatory Commission
11545 Rockville Pike
Two White Flint North
Rockville, MD 20852-2738

RE: **Docket No. 40-8903**
License No. SUA-1471
Semi-Annual Environmental Monitoring Report
Period – January through June 2008

Dear Mr. Buckley:

Pursuant to US Nuclear Regulatory Commission Regulation 10 CFR 40.85 and Part 20, Homestake Mining Company of California hereby submits two (2) copies of their semi-annual report for the first-half of 2008 (January through June) for the Homestake Grants Reclamation Project.

Groundwater data for the project is filed with the year-end semi-annual report pursuant to our current NRC license condition LC-15.

The 600-gpm reverse osmosis (RO) plant operated at an average rate of 281-gpms during the January through June 2008 reporting period. Operating rates for the plant are related to the existing evaporation pond storage volume capacities and associated seasonal forced evaporative spray systems on Evaporations ponds #1 and #2.

Thank you for your time and attention on this matter. If you have any questions or require additional information, please contact me at the Grants office (505) 287-4456, ext. 25 or via cell phone at (505) 400-2794.

Sincerely yours,

HOMESTAKE MINING COMPANY OF CALIFORNIA
Alan D. Cox

Enclosures (2)

xc: Mr. B. Spitzberg, Chief, Decommissioning Branch, w/enclosure
Mr. R. Chase, Barrick - SLC, w/enclosure
Mr. B. Ferdinand, Barrick - SLC, w/enclosure
Mr. G. Hoffman, Hydro Engineering - Casper w/enclosure
Mr. S. Appaji, Region VI EPA - Dallas w/enclosure
Ms. C. Stafford, Director of Library Services, NMSU Grants, w/enclosure

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**HOMESTAKE MINING COMPANY
OF
CALIFORNIA
GRANTS PROJECT**



**SEMI-ANNUAL ENVIRONMENTAL
MONITORING REPORT**

January - June

2008

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

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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 2008. 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.

Homestake's monitoring and surveillance program for radioactive effluent releases have been designed to ensure the project 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 has been re-contoured and covered with interim cover on the top and radon barrier on the outcrops. Bedding and erosion protection was placed on the outcrops 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. In addition, a decommissioning report for the mine ion-exchange (IX) plant was completed and approved on December 22, 1997.

During this reporting period Homestake operated a reverse osmosis water treatment plant as part of the ongoing ground water restoration program at the site. For the operating period from January through June, the RO plant processed an average 281-gpm while producing an average of 196-gpm of product water that was used for re-injection.

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 and background well P will be included in the second half semi-annual environmental monitoring 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 1, Table 2, and Table 3 attached. Details of the monitoring program are discussed in the following sections:

2.1 Air Particulate Monitoring

Homestake continuously samples total suspended particulate at six locations around the reclamation site (see Figure 1). Those locations identified as HMC-1, HMC-2 and HMC-3 are areas at the property boundary expected to have the highest predictable concentrations of airborne radioactive particulate. The predominant wind direction is from the Southwest; accordingly, HMC-1, HMC-2 and HMC-3 are generally located down wind from Homestake's reclamation activities. The location identified as HMC-6 represents background conditions, 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. The results are presented in Attachment 1.

Homestake uses a Sierra Instruments Model #305-200 High Volume Air Samplers (or equivalent) to continuously sample the ambient air of 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 analyzes the collected samples quarterly for Natural Uranium, Radium-226, and Thorium-230.

2.2 Radon Gas Monitoring

Radon gas concentrations are monitored on a continuous basis at the eight locations identified in Figure 1. The background station for radon gas is HMC #16, located Northwest of the site. Landauer Corporation track-etch passive radon monitors (PRM), or the equivalent, are used to continuously monitor radon gas at each sampling location. Semi-annually Homestake personnel place new alpha particle sensitive detectors at the monitoring locations and the exposed detectors are retrieved and returned to Landauer Corporation for analysis. The technique by which the PRM detectors measure radon gas concentrations consists of exposing an alpha-particle sensitive plastic detector, which is mounted in a plastic container, to ambient air. The decay of radon gas contained in the ambient air causes imprint tracks on the alpha-sensitive detector that can then be counted at a later time. The radon gas concentration can subsequently be calculated by determining the number of tracks per unit area of the detector. A filter is placed over the container opening to inhibit the entrance of any alpha-emitting dust particles. The results are presented in Attachment 2.

3.0 WATER QUALITY MONITORING

Table 2 (8-99, as modified by Amendment 34), as attached, 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 and background well P, as required to comply with 10 CFR 40.65, will be included in the July - December Semi-Annual Environmental Report.

4.0 DIRECT RADIATION

Gamma exposure rates are continuously monitored through the use of optically stimulated luminescence (OSL) dosimeter badges placed at each of the seven 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 out-of-doors. The OSL's are exchanged semi-annually and analyzed by an approved independent laboratory (currently Landauer Inc.). The levels of direct environmental radiation are recorded for each of the seven locations. Pertinent sample data are reported in Attachment 3.

5.0 SURFACE CONTAMINATION

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

5.1 Personnel Skin and Clothing

The monitoring of personnel for alpha contamination is required as part of all radiation work permits using standard operating procedures. No releases of personnel or clothing above administrative limits were reported during this reporting period.

5.2 Survey of Equipment Prior to Release for Unrestricted Use

Equipment surveys are required for all equipment that is to be removed from contaminated areas as specified in radiation work permits. Standard Operating Procedures are used for these surveys. No releases of contaminated material above NRC release criteria were reported.

6.0 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);
 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 (milliliters);
 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 E09 ml.

Landauer, Inc (vendor lab) reports the LLD for radon-222. The LLDs for the constituents are:

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

7.0 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, dated November 15, 1995, 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 values. Homestake has not exceeded 10 CFR Part 20 values in any of their effluents monitored during the period covered by this report. This, of course, does not include the ground water values at the POC wells as discussed earlier.

**Table 1 - Environmental Monitoring Program Excluding
Groundwater Monitoring**

Table 1 - Environmental Monitoring Program Excluding Groundwater Monitoring

Type of Sample	Number	Locations	Method	Frequency	Analytical Parameters
AIR Particulates	3	HMC1, HMC2, HMC3 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	HMC4, HMC5 at 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	HMC6 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	8	Locations described in Air - Particulates & HMC7 on S boundary & HMC16 as a background	Continuous Track-etch	Semi-Annual	Rn-222
DIRECT RADIATION	7	Locations described in Air - Particulates & HMC-16 as a background	OSL	Semi-Annual	Gamma Exposure Rate

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

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

Well Number	Parameters to be Monitored	Frequency of Monitoring
#1 & #2 Deepwells	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, KF, 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, SO₄, Cl, HCO₃, CO₃, Na, Ca, Mg, K, NO₃, U, Se, Mo, Ra-226

D = Ca, Mg, K, Na, HCO₃, CO₃, Cl, SO₄, pH, TDS, Al, As, Ba, Cd, Co, Cu, CN, F, Fe, Pb, Mn, Hg, Mo, Ni, NO₃ as N, Se, Ag, Zn, U, Filtered Ra-226

F = V, Ra-228, Th-230

G = Water Level, SO₄, U, Se, TDS, Mo

Table 3 - Occupational Monitoring Program (6-00)

Table 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

Figure 1 – Monitoring & Sampling Locations

HOMESTAKE MINING COMPANY GRANTS PROJECT Monitoring & Sampling Locations

● HMC #0016 (BKG)
◆ OSL #0016 (BKG)

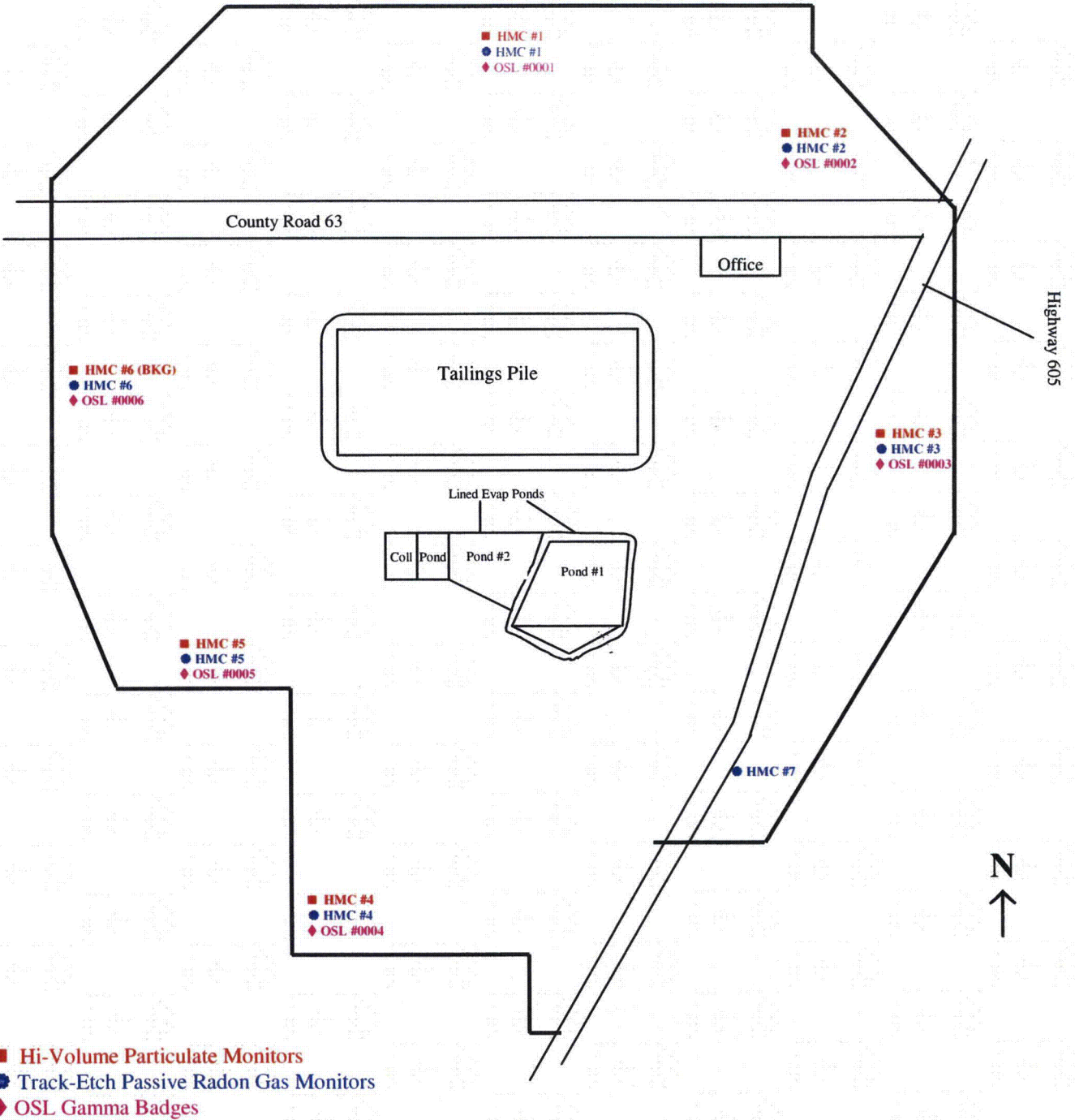


FIGURE 1

Attachment 1 – High Volume Air Sampling Results



HIGH VOLUME AIR SAMPLING REPORT

CLIENT: HOMESTAKE MINING COMPANY - GRANTS, NEW MEXICO
PROJECT: 2nd Quarter 2008 Comp
REPORT DATE: August 12, 2008

SAMPLE ID: HMC 1

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Error Estimate μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C08031250-002 First Quarter 2008 Air Volume in mLs 1.03E+11	^{nat} U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	²³⁰ Th	< 1.00E-16	6.80E-18	1.00E-16	2.00E-14	< 5.00E-01
	²²⁶ Ra	< 1.00E-16	6.80E-18	1.00E-16	9.00E-13	< 1.11E-02

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Error Estimate μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C08070053-001 Second Quarter 2008 Air Volume in mLs 1.43E+11	^{nat} U	1.06E-15	N/A	1.00E-16	9.00E-14	1.18E+00
	²³⁰ Th	< 1.00E-16	1.94E-17	1.00E-16	2.00E-14	< 5.00E-01
	²²⁶ Ra	< 1.00E-16	1.75E-17	1.00E-16	9.00E-13	< 1.11E-02

N/A not applicable for ICP-MS

LLD = Lower Limit of Detection per Regulatory Guide 4.14

All LLDs were met

*Effluent Concentrations per 10 CFR Part 20 Appendix B Table 2, Effluent Concentration



HIGH VOLUME AIR SAMPLING REPORT

CLIENT: HOMESTAKE MINING COMPANY - GRANTS, NEW MEXICO
PROJECT: 2nd Quarter 2008 Comp
REPORT DATE: August 12, 2008

SAMPLE ID: HMC 2

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Error Estimate μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C08031250-003 First Quarter 2008 Air Volume in mLs 1.44E+11	^{nat} U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	²³⁰ Th	< 1.00E-16	1.04E-17	1.00E-16	2.00E-14	< 5.00E-01
	²²⁶ Ra	< 1.00E-16	6.25E-18	1.00E-16	9.00E-13	< 1.11E-02

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Error Estimate μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C08070053-002 Second Quarter 2008 Air Volume in mLs 1.38E+11	^{nat} U	1.06E-15	N/A	1.00E-16	9.00E-14	1.18E+00
	²³⁰ Th	< 1.00E-16	1.60E-17	1.00E-16	2.00E-14	< 5.00E-01
	²²⁶ Ra	< 1.00E-16	1.60E-17	1.00E-16	9.00E-13	< 1.11E-02

N/A not applicable for ICP-MS

LLD = Lower Limit of Detection per Regulatory Guide 4.14

All LLDs were met

*Effluent Concentrations per 10 CFR Part 20 Appendix B Table 2, Effluent Concentration



HIGH VOLUME AIR SAMPLING REPORT

CLIENT: HOMESTAKE MINING COMPANY - GRANTS, NEW MEXICO
PROJECT: 2nd Quarter 2008 Comp
REPORT DATE: August 12, 2008

SAMPLE ID: HMC 3

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Error Estimate μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C08031250-004 First Quarter 2008 Air Volume in mLs 1.36E+11	^{nat} U	2.19E-16	N/A	1.00E-16	9.00E-14	2.43E-01
	²³⁰ Th	< 1.00E-16	1.03E-17	1.00E-16	2.00E-14	< 5.00E-01
	²²⁶ Ra	< 1.00E-16	6.62E-18	1.00E-16	9.00E-13	< 1.11E-02

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Error Estimate μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C08070053-003 Second Quarter 2008 Air Volume in mLs 1.35E+11	^{nat} U	5.23E-15	N/A	1.00E-16	9.00E-14	5.81E+00
	²³⁰ Th	< 1.00E-16	1.84E-17	1.00E-16	2.00E-14	< 5.00E-01
	²²⁶ Ra	< 1.00E-16	1.62E-17	1.00E-16	9.00E-13	< 1.11E-02

N/A not applicable for ICP-MS

LLD = Lower Limit of Detection per Regulatory Guide 4.14

All LLDs were met

*Effluent Concentrations per 10 CFR Part 20 Appendix B Table 2, Effluent Concentration



HIGH VOLUME AIR SAMPLING REPORT

CLIENT: HOMESTAKE MINING COMPANY - GRANTS, NEW MEXICO
PROJECT: 2nd Quarter 2008 Comp
REPORT DATE: August 12, 2008

SAMPLE ID: HMC 4

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Error Estimate μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C08031250-005 First Quarter 2008 Air Volume in mLs 1.41E+11	^{nat} U	1.06E-16	N/A	1.00E-16	9.00E-14	1.18E-01
	²³⁰ Th	< 1.00E-16	7.09E-18	1.00E-16	2.00E-14	< 5.00E-01
	²²⁶ Ra	< 1.00E-16	7.80E-18	1.00E-16	9.00E-13	< 1.11E-02

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Error Estimate μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C08070053-004 Second Quarter 2008 Air Volume in mLs 1.36E+11	^{nat} U	2.22E-15	N/A	1.00E-16	9.00E-14	2.47E+00
	²³⁰ Th	1.08E-16	5.96E-17	1.00E-16	2.00E-14	5.39E-01
	²²⁶ Ra	< 1.00E-16	1.56E-17	1.00E-16	9.00E-13	< 1.11E-02

N/A not applicable for ICP-MS

LLD = Lower Limit of Detection per Regulatory Guide 4.14

All LLDs were met

*Effluent Concentrations per 10 CFR Part 20 Appendix B Table 2, Effluent Concentration



HIGH VOLUME AIR SAMPLING REPORT

CLIENT: HOMESTAKE MINING COMPANY - GRANTS, NEW MEXICO
PROJECT: 2nd Quarter 2008 Comp
REPORT DATE: August 12, 2008

SAMPLE ID: HMC 5

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Error Estimate μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C08031250-006 First Quarter 2008 Air Volume in mLs 1.36E+11	^{nat} U	2.05E-16	N/A	1.00E-16	9.00E-14	2.28E-01
	²³⁰ Th	< 1.00E-16	6.62E-18	1.00E-16	2.00E-14	< 5.00E-01
	²²⁶ Ra	< 1.00E-16	5.88E-18	1.00E-16	9.00E-13	< 1.11E-02

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Error Estimate μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C08070053-005 Second Quarter 2008 Air Volume in mLs 1.43E+11	^{nat} U	3.76E-15	N/A	1.00E-16	9.00E-14	4.17E+00
	²³⁰ Th	< 1.00E-16	3.46E-17	1.00E-16	2.00E-14	< 5.00E-01
	²²⁶ Ra	< 1.00E-16	1.32E-17	1.00E-16	9.00E-13	< 1.11E-02

N/A not applicable for ICP-MS

LLD = Lower Limit of Detection per Regulatory Guide 4.14

All LLDs were met

*Effluent Concentrations per 10 CFR Part 20 Appendix B Table 2, Effluent Concentration



HIGH VOLUME AIR SAMPLING REPORT

CLIENT: HOMESTAKE MINING COMPANY - GRANTS, NEW MEXICO
PROJECT: 2nd Quarter 2008 Comp
REPORT DATE: August 12, 2008

SAMPLE ID: HMC 6

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Error Estimate μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C08031250-007 First Quarter 2008 Air Volume in mLs 1.23E+11	^{nat} U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	²³⁰ Th	< 1.00E-16	7.32E-18	1.00E-16	2.00E-14	< 5.00E-01
	²²⁶ Ra	< 1.00E-16	7.32E-18	1.00E-16	9.00E-13	< 1.11E-02

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Error Estimate μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C08070053-006 Second Quarter 2008 Air Volume in mLs 1.36E+11	^{nat} U	2.37E-15	N/A	1.00E-16	9.00E-14	2.63E+00
	²³⁰ Th	7.42E-16	2.39E-16	1.00E-16	2.00E-14	3.71E+00
	²²⁶ Ra	7.40E-16	4.96E-17	1.00E-16	9.00E-13	8.22E-02

N/A not applicable for ICP-MS

LLD = Lower Limit of Detection per Regulatory Guide 4.14

All LLDs were met

*Effluent Concentrations per 10 CFR Part 20 Appendix B Table 2, Effluent Concentration



HIGH VOLUME AIR SAMPLING REPORT

CLIENT: HOMESTAKE MINING COMPANY - GRANTS, NEW MEXICO
PROJECT: 2nd Quarter 2008 Comp
REPORT DATE: August 12, 2008

SAMPLE ID: HMC 7

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Error Estimate μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C08031250-008 First Quarter 2008 ** Air Volume in mLs 1.00E+11	^{nat} U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	²³⁰ Th	< 1.00E-16	8.00E-18	1.00E-16	2.00E-14	< 5.00E-01
	²²⁶ Ra	< 1.00E-16	6.00E-18	1.00E-16	9.00E-13	< 1.11E-02

** Sample had no volume, for calculations it was assumed to be representative of a blank at 1.0E+11 mLs.

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Error Estimate μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C08070053-007 Second Quarter 2008 ** Air Volume in mLs 1.00E+11	^{nat} U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	²³⁰ Th	< 1.00E-16	5.00E-18	1.00E-16	2.00E-14	< 5.00E-01
	²²⁶ Ra	< 1.00E-16	8.00E-18	1.00E-16	9.00E-13	< 1.11E-02

** Sample had no volume, for calculations it was assumed to be representative of a blank at 1.0E+11 mLs.

N/A not applicable for ICP-MS

LLD = Lower Limit of Detection per Regulatory Guide 4.14

All LLDs were met

*Effluent Concentrations per 10 CFR Part 20 Appendix B Table 2, Effluent Concentration



ANALYTICAL SUMMARY REPORT

May 04, 2008

Homestake Mining Company
Hwy 601
Grants, NM 87020

Workorder No.: C08031250 Quote ID: C775 - Hi-Vol Filters

Project Name: Grants

Energy Laboratories, Inc. received the following 8 samples from Homestake Mining Company on 3/31/2008 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C08031250-001	HMC-8 Hi-Vol Filter Comp		03/31/08	Filter	Composite of two or more samples Metals, Total Digestion, Total Metals Radium 226 Thorium, Isotopic
C08031250-002	HMC-1 Hi-Vol Filter Comp		03/31/08	Filter	Same As Above
C08031250-003	HMC-2 Hi-Vol Filter Comp		03/31/08	Filter	Same As Above
C08031250-004	HMC-3 Hi-Vol Filter Comp		03/31/08	Filter	Same As Above
C08031250-005	HMC-4 Hi-Vol Filter Comp		03/31/08	Filter	Same As Above
C08031250-006	HMC-5 Hi-Vol Filter Comp		03/31/08	Filter	Same As Above
C08031250-007	HMC-6 Hi-Vol Filter Comp		03/31/08	Filter	Same As Above
C08031250-008	HMC-7 Hi-Vol Filter Comp		03/31/08	Filter	Same As Above

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:


STEVE CARLSTON



ANALYTICAL SUMMARY REPORT

August 12, 2008

Homestake Mining Co
Hwy 605
Grants, NM 87020

Workorder No.: C08070053

Project Name: Grants 2nd Quarter 2008 Comp

Energy Laboratories, Inc. received the following 8 samples from Homestake Mining Co on 7/1/2008 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C08070053-001	HMC-1 Hi-Vol Filter Comp		07/01/08	Filter	Metals, Total Digestion, Total Metals Radium 226 Thorium, Isotopic
C08070053-002	HMC-2 Hi-Vol Filter Comp		07/01/08	Filter	Same As Above
C08070053-003	HMC-3 Hi-Vol Filter Comp		07/01/08	Filter	Same As Above
C08070053-004	HMC-4 Hi-Vol Filter Comp		07/01/08	Filter	Same As Above
C08070053-005	HMC-5 Hi-Vol Filter Comp		07/01/08	Filter	Same As Above
C08070053-006	HMC-6 Hi-Vol Filter Comp		07/01/08	Filter	Same As Above
C08070053-007	HMC-7 Hi-Vol Filter Comp		07/01/08	Filter	Same As Above
C08070053-008	HMC-8 Hi-Vol Filter Comp		07/01/08	Filter	Same As Above

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:



QA/QC Summary Report

Client: Homestake Mining Company
Project: Grants

Report Date: 05/04/08
Work Order: C08031250

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8 Batch: 18182									
Sample ID: C08031265-004FMS	Sample Matrix Spike								
Uranium	0.163	mg/L	0.00030	100	70	130			
Run: ICPMS2-C_080422A 04/23/08 00:46									
Sample ID: C08031265-004FMSD	Sample Matrix Spike Duplicate								
Uranium	0.163	mg/L	0.00030	99	70	130	0.4	20	
Run: ICPMS2-C_080422A 04/23/08 00:50									
Method: E200.8 Analytical Run: ICPMS2-C_080422A									
Sample ID: CCB	Continuing Calibration Blank								
Uranium	9.00E-07	mg/L	0.00030						04/22/08 23:39
Sample ID: CCV	Continuing Calibration Verification Standard								
Uranium	0.0606	mg/L	0.00030	101	90	110			04/22/08 23:44
Method: E903.0 Batch: R99765									
Sample ID: C08031250-001AMS	Sample Matrix Spike								
Radium 226	50.9	pCi/Filter		74	70	130			04/14/08 10:35
Run: TENNELEC-2_080403A									
Sample ID: C08031250-001AMSD	Sample Matrix Spike Duplicate								
Radium 226	51.7	pCi/Filter		75	70	130	1.5	25.3	04/14/08 12:05
Run: TENNELEC-2_080403A									
Sample ID: MB-18182	Method Blank								
Radium 226	0.4	pCi/L							04/15/08 07:40
Run: TENNELEC-2_080403A									
Sample ID: LCS-18182	Laboratory Control Sample								
Radium 226	8.6	pCi/L		64	70	130			04/15/08 09:11
Run: TENNELEC-2_080403A S									
- LCS failed. The MB, MS, and MSD are acceptable so the batch is approved.									
Method: E907.0 Batch: 18182									
Sample ID: C08031250-008AMS	Sample Matrix Spike								
Thorium 230	40.3	pCi/Filter	0.20	86	70	130			04/07/08 16:00
Run: EGG-ORTEC_080407B									
Sample ID: C08031250-008AMSD	Sample Matrix Spike Duplicate								
Thorium 230	41.3	pCi/Filter	0.20	89	70	130	2.3	30	04/07/08 16:00
Run: EGG-ORTEC_080407B									
Sample ID: LCS-18182	Laboratory Control Sample								
Thorium 230	42.1	pCi/Filter	0.20	85	70	130			04/07/08 16:00
Run: EGG-ORTEC_080407B									
Sample ID: MB-18182	Method Blank								
Thorium 230	0.4	pCi/Filter							04/07/08 16:00
Run: EGG-ORTEC_080407B									

Qualifiers:

RL - Analyte reporting limit.
 S - Spike recovery outside of advisory limits.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Homestake Mining Company

Report Date: 05/04/08

Project: Grants

Work Order: C08031250

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW6020									Batch: 18182
Sample ID: MB-18182	Method Blank					Run: ICPMS2-C_080422A			04/22/08 23:07
Uranium	ND	mg/filter	6E-05						
Sample ID: LCS1-18182	Laboratory Control Sample					Run: ICPMS2-C_080422A			04/22/08 23:11
Uranium	0.0499	mg/filter	0.00030	95	75	125			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Homestake Mining Co
Project: Grants 2nd Quarter 2008 Comp

Report Date: 08/02/08
Work Order: C08070053

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E903.0									Batch: 19031
Sample ID: C08070134-001EMS	Sample Matrix Spike								Run: BERTHOLD 770_080717C 07/23/08 21:14
Radium 226	81	pCi/L		104	70	130			
Sample ID: C08070134-001EMSD	Sample Matrix Spike Duplicate								Run: BERTHOLD 770_080717C 07/23/08 21:14
Radium 226	79	pCi/L		102	70	130	2.3	24.5	
Sample ID: MB-19031	Method Blank								Run: BERTHOLD 770_080717C 07/23/08 22:55
Radium 226	-0.6	pCi/L							U
Sample ID: LCS-19031	Laboratory Control Sample								Run: BERTHOLD 770_080717C 07/23/08 22:55
Radium 226	15	pCi/L		97	70	130			
Method: E907.0									Batch: 19031
Sample ID: C08070118-001AMS	Sample Matrix Spike								Run: EGG-ORTEC_080714B 07/21/08 15:28
Thorium 230	103	pCi/Filter	0.20	112	70	130			
Sample ID: C08070118-001AMSD	Sample Matrix Spike Duplicate								Run: EGG-ORTEC_080714B 07/21/08 15:30
Thorium 230	90.4	pCi/Filter	0.20	99	70	130	13	30	
Sample ID: LCS-19031	Laboratory Control Sample								Run: EGG-ORTEC_080714B 07/21/08 15:33
Thorium 230	52	pCi/L	0.20	104	70	130			
Sample ID: MB-19031	Method Blank								Run: EGG-ORTEC_080714B 07/18/08 12:39
Thorium 230	0.3	pCi/L							U
Method: E907.0									Batch: R105160
Sample ID: C08061293-137CMS	Sample Matrix Spike								Run: EGG-ORTEC_080729A 07/30/08 17:05
Thorium 230	437	pCi/g-dry	0.10	104	70	130			
Sample ID: C08061293-137CMSD	Sample Matrix Spike Duplicate								Run: EGG-ORTEC_080729A 07/30/08 14:47
Thorium 230	449	pCi/g-dry	0.10	109	70	130	2.5	30	
Sample ID: LCS-19114	Laboratory Control Sample								Run: EGG-ORTEC_080729A 07/30/08 12:12
Thorium 230	0.460	pCi/g-dry	0.10	98	70	130			
Sample ID: MB-19114	Method Blank								Run: EGG-ORTEC_080729A 07/30/08 14:47
Thorium 230	0.002	pCi/g-dry							U

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

U - Not detected at minimum detectable concentration



QA/QC Summary Report

Client: Homestake Mining Co
Project: Grants 2nd Quarter 2008 Comp

Report Date: 08/02/08
Work Order: C08070053

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW6020									Batch: 19031
Sample ID: MB-19031	Method Blank								Run: ICPMS2-C_080721A 07/21/08 12:37
Uranium	4E-05	mg/filter	2E-05						
Sample ID: LCS1-19031	Laboratory Control Sample								Run: ICPMS2-C_080721A 07/21/08 12:43
Uranium	0.0528	mg/filter	0.00030	100	80	120			
Sample ID: C08070118-005AMS	Sample Matrix Spike								Run: ICPMS2-C_080724A 07/25/08 01:08
Uranium	0.468	mg/filter	0.00057	94	75	125			
Sample ID: C08070118-005AMSD	Sample Matrix Spike Duplicate								Run: ICPMS2-C_080724A 07/25/08 01:12
Uranium	0.493	mg/filter	0.00057	99	75	125	5.3	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Attachment 2 - Radon Gas Monitoring Results

Attachment 2 - Radon Gas Monitoring Results
Track-Etch Passive Survey

Location	Monitoring Period	Rn Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\mu\text{Ci/ml}$)	% Limit* (%)	LLD ($\mu\text{Ci/ml}$)
Hi-Vol #1 N Outer Perimeter	1/3/08 - 6/26/08	1.4E-09	2.2E-10	14	1.7E-10
Hi-Vol #2 NE Outer Perimeter	1/3/08 - 6/26/08	1.6E-09	2.4E-10	16	1.7E-10
Hi-Vol #3 E Outer Perimeter	1/3/08 - 6/26/08	1.4E-09	2.3E-10	14	1.7E-10
Hi-Vol #4 S Outer Perimeter	1/3/08 - 6/26/08	1.8E-09	2.6E-10	18	1.7E-10
Hi-Vol #5 N of Nearest Residence	1/3/08 - 6/26/08	2.2E-09	2.2E-10	22	1.7E-10
Hi-Vol #6 W of Outer Perimeter	1/3/08 - 6/26/08	1.6E-09	2.4E-10	16	1.7E-10
HMC #7 S Boundary	1/3/08 - 6/26/08	1.3E-09	2.1E-10	13	1.7E-10
HMC #16 Background	1/3/08 - 6/26/08	1.3E-09	2.2E-10	13	1.7E-10

*Limit of $1\text{E-}8 \mu\text{Ci/ml}$ for radon-222 with daughters removed as given in 10 CFR20, Appendix B, Table 2

Attachment 3 - Environmental Gamma Radiation Results

Attachment 3 - Environmental Gamma Radiation Results
OSL Perimeter Survey

Direct Radiation Measurements

Location	Monitoring Period	Exposure Rate (mrem/6 mo)	Error (mrem/6 mo)*
Hi-Vol #1 N Outer Perimeter	1/1/08 - 6/30/08	4	0.4
Hi-Vol #2 NE Outer Perimeter	1/1/08 - 6/30/08	23	2.3
Hi-Vol #3 E Outer Perimeter	1/1/08 - 6/30/08	15	1.5
Hi-Vol #4 S Outer Perimeter	1/1/08 - 6/30/08	16	1.6
Hi-Vol #5 N of Nearest Residence	1/1/08 - 6/30/08	20	2.0
Hi-Vol #6 W of Outer Perimeter	1/1/08 - 6/30/08	21	2.1
#16 Background	1/1/08 - 6/30/08	16	1.6

*Error is 1.96 std. dev.