

**HOMESTAKE MINING COMPANY  
OF  
CALIFORNIA  
GRANTS PROJECT**



**SEMI-ANNUAL ENVIRONMENTAL  
MONITORING REPORT**

**January – June**

**2010**

**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 2010. 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 269-gpm while producing an average of 161-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. HMC-7 is a blank Whatman filter that is analyzed as a lab and filter manufacturer quality check sample. The results are presented in Attachment 1.

Homestake uses Sierra Instruments Model #305-200 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 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 nine 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. Beginning with 2010 deployments, Homestake personnel placed new alpha particle sensitive detectors at the monitoring locations and the exposed detectors are retrieved quarterly rather than semi-annually as was done previously. 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 filtered container, to ambient air. The alpha decay of radon gas contained in the ambient air causes damage tracks on the detector that can be counted after chemically etching. The radon gas concentration can subsequently be calculated by determining the number of tracks per unit area of the detector. The filter over the detector opening inhibits the entrance of any alpha-emitting dust particles. The vendor-provided results are presented in Attachment 2.

The first quarter results from the vendor indicated that two of the detectors could not be processed due to scratches. Since the detectors are sealed within the filter container, Homestake has no control over this and can only report the results as such.

Homestake management had become concerned over the reliance on a single track-etch detector at each location and decided to deploy 3 detectors at each location during the second quarter. Data for all detectors for the second quarter were reported by the vendor and there were no apparent outliers. The data for the second quarter (3/31/10-6/30/10) are reported in Attachment 2. Arithmetic averages of the values for the three detectors are reported along with the standard error for each monitoring location.

### **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. The vendor data report for the first half of 2010 is under question by HMC due to some abnormally low reported values. A request is being made of the vendor to reread all of the dosimeters. The final data will be included in the Semi-Annual Environmental Monitoring Report for the period July through December 2010.

### **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:

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

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);
$3.7 E v$	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);
$\lambda$	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 $\mu$ Ci/ml
Rn-222 in air	30 pCi(d/l)
U-nat in air	1 E-16 $\mu$ Ci/ml
U-rad in water	2 E-10 $\mu$ Ci/ml
Ra-226, Th-230 in water	2 E-10 $\mu$ 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 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	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, HMC1A near Evaporation Pond (EP-3), & HMC16 as a background	Continuous Track-etch	Quarterly	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, SO<sub>4</sub>, Cl, HCO<sub>3</sub>, CO<sub>3</sub>, Na, Ca, Mg, K, NO<sub>3</sub>, U, Se, Mo, Ra-226

D = Ca, Mg, K, Na, HCO<sub>3</sub>, CO<sub>3</sub>, Cl, SO<sub>4</sub>, pH, TDS, Al, As, Ba, Cd, Co, Cu, CN, F, Fe, Pb, Mn, Hg, Mo, Ni, NO<sub>3</sub> as N, Se, Ag, Zn, U, Filtered Ra-226

F = V, Ra-228, Th-230

G = Water Level, SO<sub>4</sub>, 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

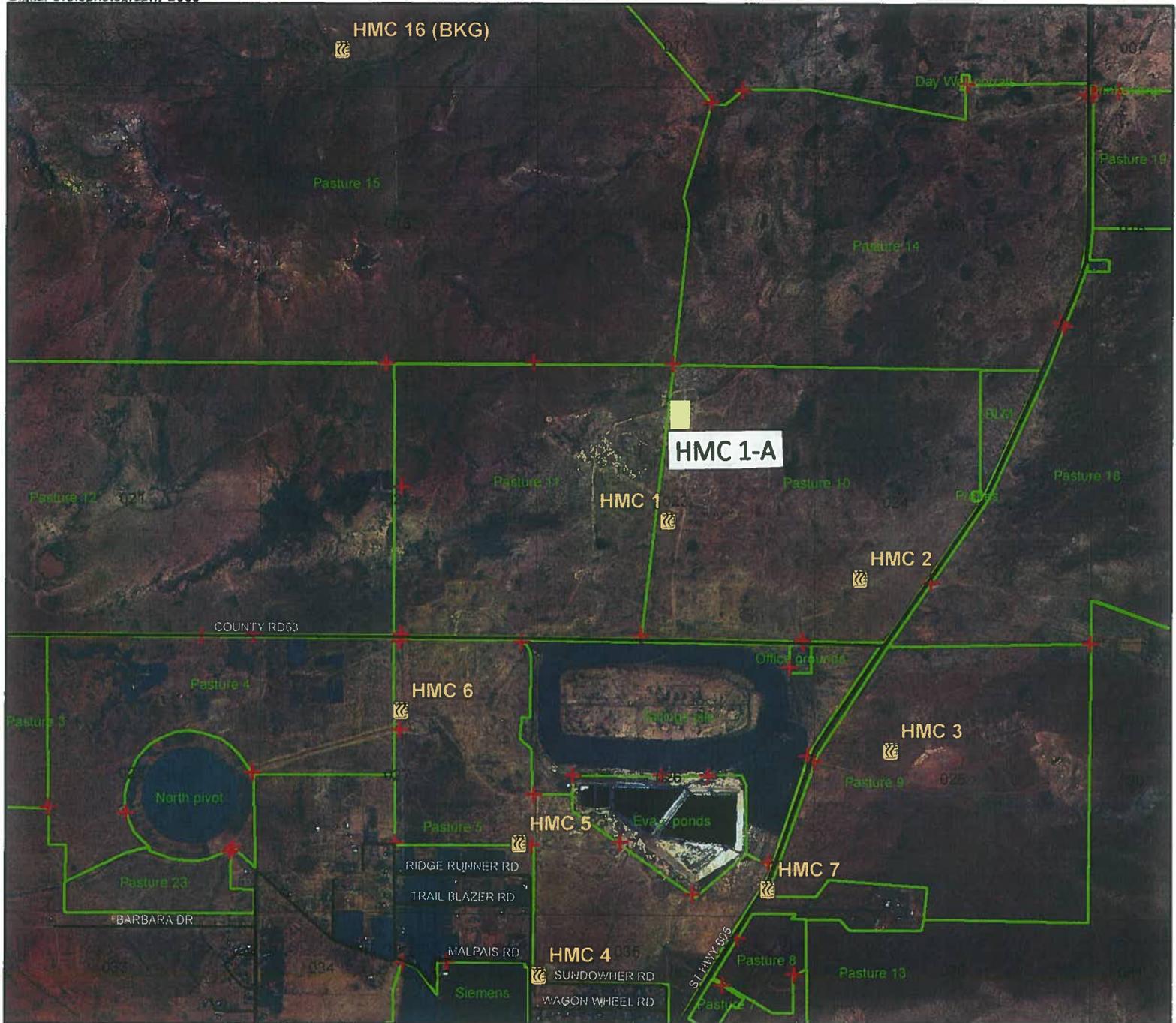
HP-# = Homestake procedure number; RPA = Radiation Protection Administrator;  
RWP = Radiation Work Permit; OSL = Optically Stimulated Luminescence dosimeter

**Figure 1 – Monitoring & Sampling Locations**

# Homestake Mining Company Properties Grants, NM

## Air Monitoring & Sampling Locations

Digital Orthophotography 2005



Location Id	Sampling Unit	Northing	Easting
HMC 1	Hi-Volume Particulate Monitor, Track -Etch Passive Radon Gas Monitor & OSL Gamma Badge	1547458.838	491370.45
HMC 2	Hi-Volume Particulate Monitor, Track -Etch Passive Radon Gas Monitor & OSL Gamma Badge	1546349.53	495053.16
HMC 3	Hi-Volume Particulate Monitor, Track -Etch Passive Radon Gas Monitor & OSL Gamma Badge	1543048.74	495640.47
HMC 4	Hi-Volume Particulate Monitor, Track -Etch Passive Radon Gas Monitor & OSL Gamma Badge	1538751.127	488918.03
HMC 5	Hi-Volume Particulate Monitor, Track -Etch Passive Radon Gas Monitor & OSL Gamma Badge	1541268.442	488546.31
HMC 6	Hi-Volume Particulate Monitor, Track -Etch Passive Radon Gas Monitor & OSL Gamma Badge	1543813.054	486297.26
HMC 7	Track-Etch Passive Radon Gas Monitor	1540395.708	493293.8
HMC 16 (BKG)	Track-Etch Passive Radon Gas Monitor & OSL Gamma Badge	1556470.456	485135.12

-  Air Monitors
-  Roads
-  Gates
-  Fence Lines
-  Section Lines



FIGURE 1

0 0.25 0.5 1 Miles



## **Attachment 1 – High Volume Air Sampling Results**

**HIGH VOLUME AIR SAMPLING REPORT**

**CLIENT:** Homestake Mining Co  
**PROJECT:** Grants-2nd Quarter 2010 Comp  
**REPORT DATE:** August 6, 2010

**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
C10040034-001 First Quarter 2010 Air Volume in mLs 1.32E+11	<sup>nat</sup> U	7.56E-17	N/A	N/A	1.00E-16	9.00E-14	8.40E-02
	<sup>230</sup> Th	2.32E-17	5.08E-18	2.91E-18	1.00E-16	3.00E-14	7.72E-02
	<sup>226</sup> Ra	3.00E-17	4.57E-18	3.36E-18	1.00E-16	9.00E-13	3.33E-03

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
C10070099-001 Second Quarter 2010 Air Volume in mLs 1.28E+11	<sup>nat</sup> U	1.11E-15	N/A	N/A	1.00E-16	9.00E-14	1.24E+00
	<sup>230</sup> Th	7.10E-17	1.92E-17	7.99E-18	1.00E-16	3.00E-14	2.37E-01
	<sup>226</sup> Ra	1.35E-16	1.04E-17	3.82E-18	1.00E-16	9.00E-13	1.50E-02

LLD's are from 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**

**Client:** Homestake Mining Co  
**Project:** Grants - 1st Quarter 2010 Comp  
**Lab ID:** C10040034-001  
**Client Sample ID:** HMC-1 Hi-Vol Filter

**Report Date:** 05/09/10  
**Collection Date:** 03/30/10  
**Date Received:** 04/01/10  
**Matrix:** Filter

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Vanadium	ND	mg/filter		0.10		SW6020	04/08/10 02:24 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Radium 226	4.0	pCi/Filter			E903.0		04/14/10 14:16 / jah
Radium 226 precision (±)	0.6	pCi/Filter			E903.0		04/14/10 14:16 / jah
Radium 226 MDC	0.4	pCi/Filter			E903.0		04/14/10 14:16 / jah
Thorium 230	3.1	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Thorium 230 precision (±)	0.67	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Thorium 230 MDC	0.38	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Uranium, Activity	10	pCi/Filter		0.20		SW6020	04/08/10 02:24 / ts

**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.



### LABORATORY ANALYTICAL REPORT

**Client:** Homestake Mining Co  
**Project:** Grants-2nd Quarter 2010 Comp  
**Lab ID:** C10070099-001  
**Client Sample ID:** HMC-1

**Report Date:** 08/06/10  
**Collection Date:** Not Provided  
**Date Received:** 07/02/10  
**Matrix:** Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Vanadium	0.22	mg/filter		0.10		SW6020	07/31/10 10:48 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Radium 226	17.2	pCi/Filter			E903.0		07/19/10 12:43 / trs
Radium 226 precision (±)	1.3	pCi/Filter			E903.0		07/19/10 12:43 / trs
Radium 226 MDC	0.5	pCi/Filter			E903.0		07/19/10 12:43 / trs
Thorium 230	9.1	pCi/Filter			E907.0		07/20/10 09:10 / dmf
Thorium 230 precision (±)	2.5	pCi/Filter			E907.0		07/20/10 09:10 / dmf
Thorium 230 MDC	1.0	pCi/Filter			E907.0		07/20/10 09:10 / dmf
Uranium, Activity	140	pCi/Filter		0.20		SW6020	07/31/10 10:48 / ts

**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  
**PROJECT:** Grants-2nd Quarter 2010 Comp  
**REPORT DATE:** August 6, 2010

**SAMPLE ID:** HMC-1-A

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
C10040034-001 First Quarter 2010 Air Volume in mLs 1.32E+11	<sup>nat</sup> U	7.56E-17	N/A	N/A	1.00E-16	9.00E-14	8.40E-02
	<sup>230</sup> Th	2.32E-17	5.08E-18	2.91E-18	1.00E-16	3.00E-14	7.72E-02
	<sup>226</sup> Ra	3.00E-17	4.57E-18	3.36E-18	1.00E-16	9.00E-13	3.33E-03

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
C10070099-002 Second Quarter 2010 Air Volume in mLs 1.36E+11	<sup>nat</sup> U	6.95E-16	N/A	N/A	1.00E-16	9.00E-14	7.72E-01
	<sup>230</sup> Th	5.51E-17	1.39E-17	5.49E-18	1.00E-16	3.00E-14	1.84E-01
	<sup>226</sup> Ra	6.60E-17	8.13E-18	4.46E-18	1.00E-16	9.00E-13	7.33E-03

LLD's are from 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

**Client:** Homestake Mining Co  
**Project:** Grants-2nd Quarter 2010 Comp  
**Lab ID:** C10070099-002  
**Client Sample ID:** HMC-1-A

**Report Date:** 08/06/10  
**Collection Date:** Not Provided  
**Date Received:** 07/02/10  
**Matrix:** Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Vanadium	0.18	mg/filter		0.10		SW6020	07/31/10 11:02 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Radium 226	9.0	pCi/Filter				E903.0	07/19/10 12:43 / trs
Radium 226 precision (±)	1.1	pCi/Filter				E903.0	07/19/10 12:43 / trs
Radium 226 MDC	0.6	pCi/Filter				E903.0	07/19/10 12:43 / trs
Thorium 230	7.5	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Thorium 230 precision (±)	1.9	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Thorium 230 MDC	0.75	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Uranium, Activity	94	pCi/Filter		0.20		SW6020	07/31/10 11:02 / ts

**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  
**PROJECT:** Grants-2nd Quarter 2010 Comp  
**REPORT DATE:** August 6, 2010

**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
C10040034-002 First Quarter 2010 Air Volume in mLs 1.42E+11	<sup>nat</sup> U	6.83E-17	N/A	N/A	1.00E-16	9.00E-14	7.58E-02
	<sup>230</sup> Th	2.98E-17	5.59E-18	2.09E-18	1.00E-16	3.00E-14	9.92E-02
	<sup>226</sup> Ra	4.04E-17	5.35E-18	3.55E-18	1.00E-16	9.00E-13	4.49E-03

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
C10070099-003 Second Quarter 2010 Air Volume in mLs 1.14E+11	<sup>nat</sup> U	1.26E-15	N/A	N/A	1.00E-16	9.00E-14	1.40E+00
	<sup>230</sup> Th	1.55E-16	3.49E-17	8.06E-18	1.00E-16	3.00E-14	5.17E-01
	<sup>226</sup> Ra	2.21E-16	1.50E-17	4.86E-18	1.00E-16	9.00E-13	2.46E-02

LLD's are from 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

Client: Homestake Mining Co  
 Project: Grants - 1st Quarter 2010 Comp  
 Lab ID: C10040034-002  
 Client Sample ID: HMC-2 Hi-Vol Filter

Report Date: 05/09/10  
 Collection Date: 03/30/10  
 Date Received: 04/01/10  
 Matrix: Filter

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Vanadium	ND	mg/filter		0.10		SW6020	04/08/10 02:35 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Radium 226	5.7	pCi/Filter			E903.0		04/14/10 14:16 / jah
Radium 226 precision (±)	0.8	pCi/Filter			E903.0		04/14/10 14:16 / jah
Radium 226 MDC	0.5	pCi/Filter			E903.0		04/14/10 14:16 / jah
Thorium 230	4.2	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Thorium 230 precision (±)	0.79	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Thorium 230 MDC	0.30	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Uranium, Activity	9.7	pCi/Filter		0.20		SW6020	04/08/10 02:35 / ts

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.



### LABORATORY ANALYTICAL REPORT

**Client:** Homestake Mining Co  
**Project:** Grants-2nd Quarter 2010 Comp  
**Lab ID:** C10070099-003  
**Client Sample ID:** HMC-2

**Report Date:** 08/06/10  
**Collection Date:** Not Provided  
**Date Received:** 07/02/10  
**Matrix:** Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Vanadium	0.31	mg/filter		0.10		SW6020	07/31/10 11:08 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Radium 226	25.2	pCi/Filter				E903.0	07/19/10 12:43 / trs
Radium 226 precision (±)	1.7	pCi/Filter				E903.0	07/19/10 12:43 / trs
Radium 226 MDC	0.6	pCi/Filter				E903.0	07/19/10 12:43 / trs
Thorium 230	18	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Thorium 230 precision (±)	4.0	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Thorium 230 MDC	0.92	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Uranium, Activity	140	pCi/Filter		0.20		SW6020	07/31/10 11:08 / ts

**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  
**PROJECT:** Grants-2nd Quarter 2010 Comp  
**REPORT DATE:** August 6, 2010

**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
C10040034-003 First Quarter 2010 Air Volume in mLs 1.23E+11	<sup>nat</sup> U	1.84E-16	N/A	N/A	1.00E-16	9.00E-14	2.05E-01
	<sup>230</sup> Th	3.46E-17	6.07E-18	3.25E-18	1.00E-16	3.00E-14	1.15E-01
	<sup>226</sup> Ra	5.14E-17	5.57E-18	3.17E-18	1.00E-16	9.00E-13	5.71E-03

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
C10070099-004 Second Quarter 2010 Air Volume in mLs 1.20E+11	<sup>nat</sup> U	4.00E-15	N/A	N/A	1.00E-16	9.00E-14	4.44E+00
	<sup>230</sup> Th	9.60E-17	2.01E-17	5.13E-18	1.00E-16	3.00E-14	3.20E-01
	<sup>226</sup> Ra	9.45E-17	9.65E-18	4.51E-18	1.00E-16	9.00E-13	1.05E-02

LLD's are from 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

**Client:** Homestake Mining Co  
**Project:** Grants - 1st Quarter 2010 Comp  
**Lab ID:** C10040034-003  
**Client Sample ID:** HMC-3 Hi-Vol Filter

**Report Date:** 05/09/10  
**Collection Date:** 03/30/10  
**Date Received:** 04/01/10  
**Matrix:** Filter

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Vanadium	ND	mg/filter		0.10		SW6020	04/08/10 02:40 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Radium 226	6.3	pCi/Filter				E903.0	04/14/10 14:16 / jah
Radium 226 precision (±)	0.7	pCi/Filter				E903.0	04/14/10 14:16 / jah
Radium 226 MDC	0.4	pCi/Filter				E903.0	04/14/10 14:16 / jah
Thorium 230	4.3	pCi/Filter				E907.0	04/09/10 08:56 / dmf
Thorium 230 precision (±)	0.75	pCi/Filter				E907.0	04/09/10 08:56 / dmf
Thorium 230 MDC	0.40	pCi/Filter				E907.0	04/09/10 08:56 / dmf
Uranium, Activity	23	pCi/Filter		0.20		SW6020	04/08/10 02:40 / ts

**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.



**LABORATORY ANALYTICAL REPORT**

**Client:** Homestake Mining Co  
**Project:** Grants-2nd Quarter 2010 Comp  
**Lab ID:** C10070099-004  
**Client Sample ID:** HMC-3

**Report Date:** 08/06/10  
**Collection Date:** Not Provided  
**Date Received:** 07/02/10  
**Matrix:** Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Vanadium	0.15	mg/filter		0.10		SW6020	07/31/10 11:15 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Radium 226	11.3	pCi/Filter				E903.0	07/19/10 12:43 / trs
Radium 226 precision (±)	1.2	pCi/Filter				E903.0	07/19/10 12:43 / trs
Radium 226 MDC	0.5	pCi/Filter				E903.0	07/19/10 12:43 / trs
Thorium 230	12	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Thorium 230 precision (±)	2.4	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Thorium 230 MDC	0.62	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Uranium, Activity	480	pCi/Filter		0.20		SW6020	07/31/10 11:15 / ts

**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  
**PROJECT:** Grants-2nd Quarter 2010 Comp  
**REPORT DATE:** August 6, 2010

**SAMPLE ID:** HMC-4

Quarter/Date Sampled Air Volume	Radionuclide	Concentration $\mu\text{Ci/mL}$	Counting Precision $\mu\text{Ci/mL}$	MDC $\mu\text{Ci/mL}$	L.L.D. $\mu\text{Ci/mL}$	Effluent Conc.* $\mu\text{Ci/mL}$	% Effluent Concentration
C10040034-004 First Quarter 2010 Air Volume in mLs 1.32E+11	<sup>nat</sup> U	8.91E-17	N/A	N/A	1.00E-16	9.00E-14	9.90E-02
	<sup>230</sup> Th	1.63E-17	4.68E-18	3.48E-18	1.00E-16	3.00E-14	5.45E-02
	<sup>226</sup> Ra	3.32E-17	4.76E-18	3.36E-18	1.00E-16	9.00E-13	3.68E-03

Quarter/Date Sampled Air Volume	Radionuclide	Concentration $\mu\text{Ci/mL}$	Counting Precision $\mu\text{Ci/mL}$	MDC $\mu\text{Ci/mL}$	L.L.D. $\mu\text{Ci/mL}$	Effluent Conc.* $\mu\text{Ci/mL}$	% Effluent Concentration
C10070099-005 Second Quarter 2010 Air Volume in mLs 1.29E+11	<sup>nat</sup> U	3.23E-15	N/A	N/A	1.00E-16	9.00E-14	3.59E+00
	<sup>230</sup> Th	3.96E-17	1.20E-17	8.64E-18	1.00E-16	3.00E-14	1.32E-01
	<sup>226</sup> Ra	6.34E-17	7.15E-18	3.64E-18	1.00E-16	9.00E-13	7.04E-03

LLD's are from 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

Client: Homestake Mining Co  
 Project: Grants - 1st Quarter 2010 Comp  
 Lab ID: C10040034-004  
 Client Sample ID: HMC-4 Hi-Vol Filter

Report Date: 05/09/10  
 Collection Date: 03/30/10  
 Date Received: 04/01/10  
 Matrix: Filter

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Vanadium	0.11	mg/filter		0.10		SW6020	04/08/10 02:45 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Radium 226	4.4	pCi/Filter			E903.0		04/14/10 14:16 / jah
Radium 226 precision (±)	0.6	pCi/Filter			E903.0		04/14/10 14:16 / jah
Radium 226 MDC	0.4	pCi/Filter			E903.0		04/14/10 14:16 / jah
Thorium 230	2.2	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Thorium 230 precision (±)	0.62	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Thorium 230 MDC	0.46	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Uranium, Activity	12	pCi/Filter		0.20		SW6020	04/08/10 02:45 / ts

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.

### LABORATORY ANALYTICAL REPORT

**Client:** Homestake Mining Co  
**Project:** Grants-2nd Quarter 2010 Comp  
**Lab ID:** C10070099-005  
**Client Sample ID:** HMC-4

**Report Date:** 08/06/10  
**Collection Date:** Not Provided  
**Date Received:** 07/02/10  
**Matrix:** Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Vanadium	0.20	mg/filter		0.10		SW6020	07/31/10 11:22 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Radium 226	8.2	pCi/Filter				E903.0	07/19/10 12:43 / trs
Radium 226 precision (±)	0.9	pCi/Filter				E903.0	07/19/10 12:43 / trs
Radium 226 MDC	0.5	pCi/Filter				E903.0	07/19/10 12:43 / trs
Thorium 230	5.1	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Thorium 230 precision (±)	1.5	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Thorium 230 MDC	1.1	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Uranium, Activity	420	pCi/Filter		0.20		SW6020	07/31/10 11:22 / ts

**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  
**PROJECT:** Grants-2nd Quarter 2010 Comp  
**REPORT DATE:** August 6, 2010

**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
C10040034-005 First Quarter 2010 Air Volume in mLs 1.37E+11	<sup>nat</sup> U	1.01E-16	N/A	N/A	1.00E-16	9.00E-14	1.13E-01
	<sup>230</sup> Th	1.81E-17	4.35E-18	1.42E-18	1.00E-16	3.00E-14	6.04E-02
	<sup>226</sup> Ra	2.24E-17	3.89E-18	3.12E-18	1.00E-16	9.00E-13	2.49E-03

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
C10070099-006 Second Quarter 2010 Air Volume in mLs 1.28E+11	<sup>nat</sup> U	8.32E-15	N/A	N/A	1.00E-16	9.00E-14	9.25E+00
	<sup>230</sup> Th	5.56E-17	1.77E-17	1.02E-17	1.00E-16	3.00E-14	1.85E-01
	<sup>226</sup> Ra	7.29E-17	8.09E-18	4.07E-18	1.00E-16	9.00E-13	8.10E-03

LLD's are from 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

Client: Homestake Mining Co  
 Project: Grants - 1st Quarter 2010 Comp  
 Lab ID: C10040034-005  
 Client Sample ID: HMC-5 Hi-Vol Filter

Report Date: 05/09/10  
 Collection Date: 03/30/10  
 Date Received: 04/01/10  
 Matrix: Filter

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Vanadium	ND	mg/filter		0.10		SW6020	04/08/10 02:50 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Radium 226	3.1	pCi/Filter			E903.0		04/14/10 14:16 / jah
Radium 226 precision (±)	0.5	pCi/Filter			E903.0		04/14/10 14:16 / jah
Radium 226 MDC	0.4	pCi/Filter			E903.0		04/14/10 14:16 / jah
Thorium 230	2.5	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Thorium 230 precision (±)	0.60	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Thorium 230 MDC	0.19	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Uranium, Activity	14	pCi/Filter	D	2.0	SW6020		04/08/10 02:50 / ts

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 interference.

### LABORATORY ANALYTICAL REPORT

**Client:** Homestake Mining Co  
**Project:** Grants-2nd Quarter 2010 Comp  
**Lab ID:** C10070099-006  
**Client Sample ID:** HMC-5

**Report Date:** 08/06/10  
**Collection Date:** Not Provided  
**Date Received:** 07/02/10  
**Matrix:** Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Vanadium	0.22	mg/filter		0.10		SW6020	07/31/10 11:28 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Radium 226	9.3	pCi/Filter				E903.0	07/19/10 12:43 / trs
Radium 226 precision (±)	1.0	pCi/Filter				E903.0	07/19/10 12:43 / trs
Radium 226 MDC	0.5	pCi/Filter				E903.0	07/19/10 12:43 / trs
Thorium 230	7.1	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Thorium 230 precision (±)	2.3	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Thorium 230 MDC	1.3	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Uranium, Activity	1100	pCi/Filter		0.20		SW6020	07/31/10 11:28 / ts

**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  
**PROJECT:** Grants-2nd Quarter 2010 Comp  
**REPORT DATE:** August 6, 2010

**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
C10040034-006 First Quarter 2010 Air Volume in mLs 1.38E+11	<sup>nat</sup> U	1.07E-16	N/A	N/A	1.00E-16	9.00E-14	1.19E-01
	<sup>230</sup> Th	4.35E-17	9.38E-18	3.51E-18	1.00E-16	3.00E-14	1.45E-01
	<sup>226</sup> Ra	6.77E-17	6.43E-18	3.28E-18	1.00E-16	9.00E-13	7.52E-03

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
C10070099-007 Second Quarter 2010 Air Volume in mLs 1.41E+11	<sup>nat</sup> U	1.65E-15	N/A	N/A	1.00E-16	9.00E-14	1.83E+00
	<sup>230</sup> Th	5.97E-17	1.60E-17	6.79E-18	1.00E-16	3.00E-14	1.99E-01
	<sup>226</sup> Ra	7.11E-17	7.53E-18	3.64E-18	1.00E-16	9.00E-13	7.90E-03

LLD's are from 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**

**Client:** Homestake Mining Co  
**Project:** Grants - 1st Quarter 2010 Comp  
**Lab ID:** C10040034-006  
**Client Sample ID:** HMC-6 Hi-Vol Filter

**Report Date:** 05/09/10  
**Collection Date:** 03/30/10  
**Date Received:** 04/01/10  
**Matrix:** Filter

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Vanadium	0.28	mg/filter		0.10		SW6020	04/08/10 02:56 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Radium 226	9.3	pCi/Filter			E903.0		04/14/10 14:16 / jah
Radium 226 precision (±)	0.9	pCi/Filter			E903.0		04/14/10 14:16 / jah
Radium 226 MDC	0.5	pCi/Filter			E903.0		04/14/10 14:16 / jah
Thorium 230	6.0	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Thorium 230 precision (±)	1.3	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Thorium 230 MDC	0.48	pCi/Filter			E907.0		04/09/10 08:56 / dmf
Uranium, Activity	15	pCi/Filter		0.20		SW6020	04/08/10 02:56 / ts

**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.



### LABORATORY ANALYTICAL REPORT

**Client:** Homestake Mining Co  
**Project:** Grants-2nd Quarter 2010 Comp  
**Lab ID:** C10070099-007  
**Client Sample ID:** HMC-6

**Report Date:** 08/06/10  
**Collection Date:** Not Provided  
**Date Received:** 07/02/10  
**Matrix:** Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Vanadium	0.22	mg/filter		0.10		SW6020	07/31/10 12:02 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Radium 226	10.0	pCi/Filter				E903.0	07/19/10 12:43 / trs
Radium 226 precision (±)	1.1	pCi/Filter				E903.0	07/19/10 12:43 / trs
Radium 226 MDC	0.5	pCi/Filter				E903.0	07/19/10 12:43 / trs
Thorium 230	8.4	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Thorium 230 precision (±)	2.3	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Thorium 230 MDC	0.96	pCi/Filter				E907.0	07/20/10 09:10 / dmf
Uranium, Activity	230	pCi/Filter		0.20		SW6020	07/31/10 12:02 / ts

**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.

## ANALYTICAL SUMMARY REPORT

May 09, 2010

Homestake Mining Co

Hwy 605

Grants, NM 87020

Workorder No.: C10040034

Quote ID: C775 - Hi-Vol Filters

Project Name: Grants - 1st Quarter 2010 Comp

Energy Laboratories, Inc. received the following 7 samples for Homestake Mining Co on 4/1/2010 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C10040034-001	HMC-1 Hi-Vol Filter	03/30/10 00:00	04/01/10	Filter	Metals by ICP/ICPMS, Total Digestion, Total Metals Radium 226 Thorium, Isotopic
C10040034-002	HMC-2 Hi-Vol Filter	03/30/10 00:00	04/01/10	Filter	Same As Above
C10040034-003	HMC-3 Hi-Vol Filter	03/30/10 00:00	04/01/10	Filter	Same As Above
C10040034-004	HMC-4 Hi-Vol Filter	03/30/10 00:00	04/01/10	Filter	Same As Above
C10040034-005	HMC-5 Hi-Vol Filter	03/30/10 00:00	04/01/10	Filter	Same As Above
C10040034-006	HMC-6 Hi-Vol Filter	03/30/10 00:00	04/01/10	Filter	Same As Above
C10040034-007	HMC-7 Filter Comp	03/30/10 00:00	04/01/10	Filter	Same As Above

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

The results as reported relate only to the item(s) submitted for testing.

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

Report Approved By:

**Steven E. Carlston**  
**Technical Director**



# ANALYTICAL SUMMARY REPORT

August 06, 2010

Homestake Mining Co  
Hwy 605  
Grants, NM 87020

Workorder No.: C10070099      Quote ID: C775 - Hi-Vol Filters

Project Name: Grants-2nd Quarter 2010 Comp

Energy Laboratories, Inc. received the following 8 samples for Homestake Mining Co on 7/2/2010 for analysis.

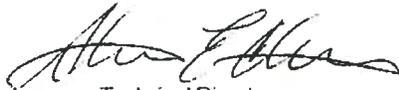
Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C10070099-001	HMC-1		07/02/10	Air	Metals by ICP/ICPMS, Total Digestion, Total Metals Radium 226 Thorium, Isotopic
C10070099-002	HMC-1-A		07/02/10	Air	Same As Above
C10070099-003	HMC-2		07/02/10	Air	Same As Above
C10070099-004	HMC-3		07/02/10	Air	Same As Above
C10070099-005	HMC-4		07/02/10	Air	Same As Above
C10070099-006	HMC-5		07/02/10	Air	Same As Above
C10070099-007	HMC-6		07/02/10	Air	Same As Above
C10070099-008	HMC-7 Filter Comp		07/02/10	Air	Same As Above

This report was prepared by Energy Laboratories, Inc., 2393 Salt Creek Hwy., Casper, WY 82601. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

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

Report Approved By:

  
Technical Director

Digitally signed by  
Steve Carlston

Date: 2010.08.10 16:52:53 -06:00



## QA/QC Summary Report

Client: Homestake Mining Co  
 Project: Grants - 1st Quarter 2010 Comp

Report Date: 05/09/10  
 Work Order: C10040034

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E903.0</b>										
Batch: R132098										
Sample ID: LCS-25726		Laboratory Control Sample								
Radium 226		16.7	pCi/Filter	113		70	130			
Run: BERTHOLD 770-1_100421A										04/27/10 20:17
Sample ID: MB-25726	3	Method Blank								
Radium 226		-0.3	pCi/Filter							U
Radium 226 precision (±)		0.08	pCi/Filter							
Radium 226 MDC		0.2	pCi/Filter							
Run: BERTHOLD 770-1_100421A										04/27/10 20:17
Sample ID: C10040460-001AMS		Sample Matrix Spike								
Radium 226		15	pCi/g-dry	115		70	130			
Run: BERTHOLD 770-1_100421A										04/27/10 20:17
Sample ID: C10040460-001AMSD		Sample Matrix Spike Duplicate								
Radium 226		16	pCi/g-dry	120		70	130	4.7		14.9
Run: BERTHOLD 770-1_100421A										04/27/10 20:17
<b>Method: E903.0</b>										
Batch: 25726										
Sample ID: C10040001-001FMS		Sample Matrix Spike								
Radium 226		23	pCi/L	112		70	130			
Run: BERTHOLD 770-2_100407A										04/14/10 14:16
Sample ID: C10040001-001FMDS		Sample Matrix Spike Duplicate								
Radium 226		23	pCi/L	111		70	130	0.9		20
Run: BERTHOLD 770-2_100407A										04/14/10 14:16
Sample ID: LCS-25726		Laboratory Control Sample								
Radium 226		16.6	pCi/Filter	112		70	130			
Run: BERTHOLD 770-2_100407A										04/14/10 17:21
Sample ID: MB-25726	3	Method Blank								
Radium 226		-0.3	pCi/Filter							U
Radium 226 precision (±)		0.1	pCi/Filter							
Radium 226 MDC		0.3	pCi/Filter							
Run: BERTHOLD 770-2_100407A										04/14/10 17:21

**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

**Client:** Homestake Mining Co  
**Project:** Grants - 1st Quarter 2010 Comp

**Report Date:** 05/09/10  
**Work Order:** C10040034

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E907.0</b>										Batch: 25726
<b>Sample ID: C10040040-003AMS</b>	Sample Matrix Spike			Run: EGG-ORTEC_100407D			04/12/10 08:47			
Thorium 230		68.3	pCi/Filter	114		70	130			
<b>Sample ID: C10040040-003AMSD</b>	Sample Matrix Spike Duplicate			Run: EGG-ORTEC_100407D			04/12/10 08:47			
Thorium 230		61.6	pCi/Filter	91		70	130	10	29.8	
<b>Sample ID: LCS-25726</b>	Laboratory Control Sample			Run: EGG-ORTEC_100407D			04/12/10 08:47			
Thorium 230		4.96	pCi/Filter	100		70	130			
<b>Sample ID: MB-25726</b>	3	Method Blank			Run: EGG-ORTEC_100407D			04/12/10 08:47		
Thorium 230		-0.06	pCi/Filter							U
Thorium 230 precision (±)		0.1	pCi/Filter							
Thorium 230 MDC		0.2	pCi/Filter							

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## QA/QC Summary Report

Client: Homestake Mining Co  
Project: Grants - 1st Quarter 2010 Comp

Report Date: 05/09/10  
Work Order: C10040034

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW6020										Batch: 25726
Sample ID: MB-25726		Method Blank								04/07/10 12:48
Uranium		0.0004	mg/L	1E-05						
Sample ID: LCS2-25726		Laboratory Control Sample								04/07/10 12:54
Uranium		0.103	mg/L	0.00030	103	85	115			
Sample ID: C10040040-003AMS		Sample Matrix Spike								04/07/10 13:46
Uranium		0.191	mg/filter	0.00030	103	75	125			
Sample ID: C10040040-003AMSD		Sample Matrix Spike Duplicate								04/07/10 13:51
Uranium		0.190	mg/filter	0.00030	100	75	125	0.7	20	

### Qualifiers:

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## QA/QC Summary Report

**Client:** Homestake Mining Co  
**Project:** Grants-2nd Quarter 2010 Comp

**Report Date:** 08/06/10  
**Work Order:** C10070099

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method:</b> E903.0										Batch: 26600
<b>Sample ID:</b> C10070099-004AMS		Sample Matrix Spike				Run: G542M_100709B				07/19/10 12:43
Radium 226		52.8	pCi/Filter		84	70	130			
<b>Sample ID:</b> C10070099-004AMSD		Sample Matrix Spike Duplicate				Run: G542M_100709B				07/19/10 12:43
Radium 226		64.0	pCi/Filter		105	70	130	19	22.4	
<b>Sample ID:</b> LCS-26600		Laboratory Control Sample				Run: G542M_100709B				07/19/10 12:43
Radium 226		15.8	pCi/Filter		106	70	130			
<b>Sample ID:</b> MB-26600	3	Method Blank				Run: G542M_100709B				07/19/10 12:43
Radium 226		-0.04	pCi/Filter							U
Radium 226 precision (±)		0.2	pCi/Filter							
Radium 226 MDC		0.3	pCi/Filter							

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U - Not detected at minimum detectable concentration

## QA/QC Summary Report

**Client:** Homestake Mining Co  
**Project:** Grants-2nd Quarter 2010 Comp

**Report Date:** 08/06/10  
**Work Order:** C10070099

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E907.0</b>										Batch: 26600
<b>Sample ID: C10070099-008AMS</b>	Sample Matrix Spike					Run: EGG-ORTEC_100714B		07/16/10 13:13		
Thorium 230		25.3	pCi/Filter	107		70	130			
<b>Sample ID: C10070099-008AMSD</b>	Sample Matrix Spike Duplicate					Run: EGG-ORTEC_100714B		07/16/10 13:13		
Thorium 230		25.0	pCi/Filter	107		70	130	1.2	35.7	
<b>Sample ID: LCS-26600</b>	Laboratory Control Sample					Run: EGG-ORTEC_100714B		07/16/10 13:13		
Thorium 230		4.45	pCi/Filter	97		70	130			
<b>Sample ID: MB-26600</b>	3 Method Blank					Run: EGG-ORTEC_100714B		07/16/10 13:13		
Thorium 230		-0.2	pCi/Filter							U
Thorium 230 precision (±)		0.10	pCi/Filter							
Thorium 230 MDC		0.1	pCi/Filter							

**Qualifiers:**

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## QA/QC Summary Report

**Client:** Homestake Mining Co  
**Project:** Grants-2nd Quarter 2010 Comp

**Report Date:** 08/06/10  
**Work Order:** C10070099

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: SW6020</b>										Batch: 26600
<b>Sample ID: MB-26600</b>	2	Method Blank								Run: ICPMS2-C_100730B 07/31/10 10:01
Uranium		3E-05	mg/filter	2E-05						
Vanadium		0.04	mg/filter	0.003						
<b>Sample ID: LCS2-26600</b>	2	Laboratory Control Sample								Run: ICPMS2-C_100730B 07/31/10 10:35
Uranium		0.11	mg/filter	0.00030	109	70	130			
Vanadium		0.12	mg/filter	0.10	86	70	130			
<b>Sample ID: C10070099-008AMS4</b>	2	Sample Matrix Spike								Run: ICPMS2-C_100730B 07/31/10 12:16
Uranium		0.056	mg/filter	0.00030	110	75	125			
Vanadium		0.088	mg/filter	0.0010	110	75	125			
<b>Sample ID: C10070099-008AMSD</b>	2	Sample Matrix Spike Duplicate								Run: ICPMS2-C_100730B 07/31/10 12:23
Uranium		0.056	mg/filter	0.00030	110	75	125	0.1	20	
Vanadium		0.085	mg/filter	0.0010	104	75	125	3.7	20	

**Qualifiers:**

RL - Analyte reporting limit.

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MDC - Minimum detectable concentration

## **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	12/31/09 - 3/31/10	**	**	**	**
Hi-Vol #2 NE Outer Perimeter	12/31/09 - 3/31/10	1.3E-09	2.1E-10	13	3.3E-10
Hi-Vol #3 E Outer Perimeter	12/31/09 - 3/31/10	**	**	**	**
Hi-Vol #4 S Outer Perimeter	12/31/09 - 3/31/10	1.1E-09	1.9E-10	11	3.3E-10
Hi-Vol #5 N of Nearest Residence	12/31/09 - 3/31/10	1.5E-09	3.0E-10	15	3.3E-10
Hi-Vol #6 W of Outer Perimeter	12/31/09 - 3/31/10	1.1E-09	2.5E-10	11	3.3E-10
HMC #7 S Boundary	12/31/09 - 3/31/10	9.0E-10	2.2E-10	9	3.3E-10
HMC #16 Background	12/31/09 - 3/31/10	7.0E-10	1.9E-10	7	3.3E-10

Hi-Vol #1 (average) N Outer Perimeter	3/31/10 - 6/30/10	1.3E-09	2.0E-10	1.3E+01	3.3E-10
Hi-Vol #1-A (average) N Outer Perimeter	3/31/10 - 6/30/10	1.4E-09	2.1E-10	1.4E+01	3.3E-10
Hi-Vol #2 (average) NE Outer Perimeter	3/31/10 - 6/30/10	1.3E-09	2.0E-10	1.3E+01	3.3E-10
Hi-Vol #3 (average) E Outer Perimeter	3/31/10 - 6/30/10	9.0E-10	1.6E-10	9.0E+00	3.3E-10
Hi-Vol #4 (average) S Outer Perimeter	3/31/10 - 6/30/10	1.4E-09	2.1E-10	1.4E+01	3.3E-10
Hi-Vol #5 (average) N of Nearest Residence	3/31/10 - 6/30/10	1.3E-09	2.0E-10	1.3E+01	3.3E-10
Hi-Vol #6 (average) W of Outer Perimeter	3/31/10 - 6/30/10	1.1E-09	1.8E-10	1.1E+01	3.3E-10
HMC #7 (average) S Boundary	3/31/10 - 6/30/10	9.0E-10	1.6E-10	9.0E+00	3.3E-10
HMC #16 (average) Background	3/31/10 - 6/30/10	6.3E-10	1.2E-10	6.3E+00	3.3E-10

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

\*\* Processing irregularity

**Attachment 3 - Environmental Gamma Radiation Results (Data currently being reevaluated)**

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	1/1/2010 - 6/30/2010	1	0.1
Hi-Vol #2 NE Outer Perimeter	1/1/2010 - 6/30/2010	19	1.9
Hi-Vol #3 E Outer Perimeter	1/1/2010 - 6/30/2010	14	1.4
Hi-Vol #4 S Outer Perimeter	1/1/2010 - 6/30/2010	19	1.9
Hi-Vol #5 N of Nearest Residence	1/1/2010 - 6/30/2010	23	2.3
Hi-Vol #6 W of Outer Perimeter	1/1/2010 - 6/30/2010	16	1.6
#16 Background	1/1/2010 - 6/30/2010	7	0.7

\*Error is 1.96 std. dev.