



ROY R. CELLAN
CORPORATE MANAGER
RECLAMATION

ENVIRONMENTAL, HEALTH, SAFETY
AND GOVERNMENT AFFAIRS

August 8, 2000

U.S. Nuclear Regulatory Commission
Division of Fuel Cycle Safety & Safeguards
Fuel Cycle Licensing Branch, MS T-8A33
11545 Rockville Pike
North Bethesda, MD 20852

Attn: Mr. Philip Ting, Branch Chief

RE: Docket No. 40-8903
License No. SUA-1471
Semi-Annual Environmental Monitoring Report
Period - January through June 2000

Dear Mr. Ting:

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 2000 (January -June) for the Homestake Grants Project.

The content of the attached semi-annual report follows the general theme used for previously submitted reports. Pursuant to License Condition No. 15 of Amendment 31, the ground water data included with the report represents the results received from the point of compliance (POC) wells and the background P for this time period.

In the first half of 1999 Homestake Mining Company constructed a water treatment plant at the Grants site. The plant is designed to process the waters collected from the ground water aquifer and make a product that is suitable for re-injection. Testing of the reverse osmosis systems and the pre-treatment systems was conducted during the second half of 1999. The plant was put into full operation during the second week of January 2000 at a feed rate of approximately 300gpm. The RO product water is being produced at a rate of about 260 gpm for re-injection. Test work is under way to evaluate the effectiveness of the re-injected RO product on the aquifer restoration program.

AIMSSOI Public

If you or your staff have any questions or comments regarding this report, please do not hesitate to contact me at the Grants site (505) 287-4456.

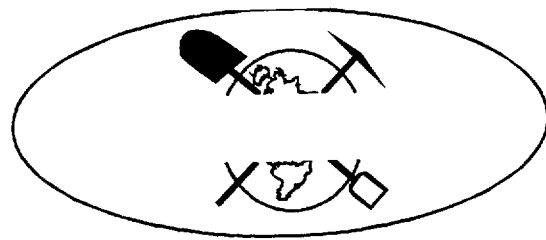
Sincerely,

A handwritten signature in black ink, appearing to read "Roy R. Chane". The signature is fluid and cursive, with a large initial "R" and "C".

Enclosure

xc: Mr. Blair Spilzberg, Chief, Decommissioning Branch, w/enclosure
Ms. Petra Sanchez, Environmental Scientist / RPM, EPA, w/enclosure
Mr. Harold F. Barnes, Director EHSG&A, SFO, wo/enclosure
Mr George Hoffman, Hydro Engineering, wo/enclosure
File HMC Grants

HOMESTAKE MINING COMPANY OF CALIFORNIA GRANTS PROJECT



SEMI-ANNUAL ENVIRONMENTAL REPORT

**JANUARY - JUNE
2000**

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

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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 2000. The submittal of this report to the appropriate Nuclear Regulatory Commission (NRC) Regional Office and New Mexico state agency 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 recontoured and covered with interim cover on the top and radon barrier on the outcrops. Bedding and erosion protection was placed on outcrops. Soil verification of the removal of off-pile contaminated soil is complete, with completion report 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 the previous reporting period Homestake Mining Company constructed a water treatment plant. This plant is designed to process the waters collected from the ground water aquifer and make a product that is suitable for re-injection. The plant experienced some design problems in the pre-treatment portion of the plant, forcing delay of the start-up and testing phase of the operation. This plant began the start-up and testing phase in December 1999 and successfully began full operation at a feed rate of about 300 gpm during the second week of January 2000. The RO product water is being produced at a rate of about 260 gpm for re-injection. Test work is underway to evaluate the effectiveness of the re-injected RO product on the aquifer restoration program.

Homestake's groundwater monitoring program, as outlined in license Condition No. 35, continued as an ongoing program during this 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 are included in the semi-annual environmental monitoring reports. It should be noted that while these POC wells will eventually be used to demonstrate groundwater restoration, they are not representative of off-site effluent levels.

2.0 ENVIRONMENTAL MONITORING PROGRAMS

The monitoring requirements for the site are summarized in Tables 1, 2, and 3. 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 at 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 represent the sites of the nearest residences. The results are presented in Attachment 1.

Homestake uses a Sierra Instruments Model #305-200 High Volume Air Sampler (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's 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 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 (8-97) outlines the sampling frequency and parameters monitored. Additionally, the volumes of water injected and recovered as part of the ground-water cleanup program is monitored on a weekly frequency and the values are documented. A performance review report is submitted by March 31 of each year according to License Condition 35E. In order to comply with 10 CFR 40.65, the groundwater monitoring data for the POC wells and background well P are included in this Semi-Annual Environmental Report. These data are reported in Tables 2.1.1-2.1.9.

The Groundwater Monitoring Table 2 (8-97) was reviewed in 1999. As a result, a new Table 2 was developed, approved by the NMED on October 13, 1999, and submitted for approval by the NRC on September 29, 1999. Although the NMED approved changes in the table in late 1999, the same monitoring program submitted to the NRC in late 1999 has yet to be approved. Therefore, the monitoring program during this monitoring period continued with the Groundwater Monitoring Table 2 (8-97).

The water quality of these POC wells is currently being restored and therefore the reported levels are not representative of effluent from the site. The concentration levels are therefore 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.

4.0 DIRECT RADIATION

Gamma exposure rates are continuously monitored through the use of thermoluminescent dosimeters (TLD) at each of the seven locations identified in Figure 1. Each TLD badge consists of five LiF chips selected for uniform response and placed in a plastic holder. The plastic provides adequate protection from weather for these badges to be used out-of-doors. The TLD's are exchanged semi-annually and analyzed by an approved independent laboratory (currently Eberline Instrument Co.). The integrated levels of direct environmental radiation are recorded for each of the seven locations. HMC #16 is considered the background location for direct radiation. The 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 the U.S. Nuclear Regulatory Guide 4.14 as the smallest concentration of radioactive material sampled that has a 95% probability of being detected, with only a 5% probability that a blank sample will yield a response interpreted to mean that radioactive material is 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 has calculated LLDs, the following formula was utilized:

$$LLD = \frac{4.66 S_b}{3.7 E 4 V Y \exp(-\lambda \Delta t)}$$

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;
Δt	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 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-nat in water	2 E-10 μ Ci/ml
Ra-226, Th-230 in water	2 E-9 μ Ci/ml
Ra-228 in water	1 E-9 μ Ci/ml

U-nat is analyzed by a fluorometric method 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 ANNUAL STATUS REPORT FOR TAILINGS AND EVAPORATION POND EMBANKMENTS

License Condition 12 specifies that periodic inspection of the large and small tailing embankments are made and documented. The results of the inspection for 2000 will be included in the second half Semi-Annual Environmental Report.

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, dated November 15, 1995, and 10 CFR Part 40.65 requires that Homestake submit its 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. Included in this report's attachments are summaries of 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. Individual effluent monitoring program results are more fully discussed in the following paragraphs.

Vegetation and soil samples are no longer required on an annual basis per Amendment 24 to Source Material License.

**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	Continuous Track-etch	Semi-Annual	Gamma Exposure Rate

Table 2 – Groundwater Monitoring Program (8-97)

TABLE 2 – Groundwater Monitoring Program (8-97)

Well Number	Parameters to be Monitored	Frequency of Monitoring
#1 & #2 Deepwell	C	Quarterly
#1 & #2 Deepwell	D	Annually
All Active Injection Wells	Rate & Monthly Total	Monthly
Broadview Acres SUB1, SUB3, 453	A	Semi-Annually
Broadview Acres SUB2	A (except water level)	Semi-Annually
Broadview Acres SUB1, SUB2, SUB3, 434, 446, 453	B (except water level)	Annually
Felice Acres 490, 492, 493, 494	A	Semi-Annually
Felice Acres 490, 492, 493, 494	B	Annually
Murray Acres 802, 844	A	Semi-Annually
Murray Acres 802, 804, 820, 844, WCW	B(no water level in 804)	Annually
Pleasant Valley 688, 835, 846	A (no water level in 835)	Semi-Annually
Pleasant Valley 688, 835, 846	B (no water level in 835)	Annually
Regional 905, 910, 917, 920, 942	B (except water level)	Annually
Site Monitoring Wells B, CW2, CW3, CW4R, PM, WR7, WR11, X, Y	A	Quarterly
Site Monitoring Wells B, CW2, CW3, CW4R, PM, WR7, WR11, X, Y	B & F	Semi-annually
Secondary Site Monitoring Wells BC, B1, BP, D1, DC, DM, DZ, F, FB, I, K2, KM, KZ, M4, MO, N, O, S, SO, SV, T, W, WR5, WR9	A	Semi-annually
Secondary Site Monitoring Wells GH, CW2-1	Water Level Only	Semi-annually

TABLE 2 – Groundwater Monitoring Program (8-97)

Well Number	Parameters to be Monitored	Frequency of Monitoring
Secondary Site Monitoring Wells BC, B1, BP, CW9, D1, DC, DM, DZ, F, FB, I, K2, KM, KZ, M4, MO, N, ND, O, S, SO, SV, S2, T, W, WR9, WR5	B	Annually
Secondary Site Monitoring Wells 931, 934	B	Semi-Annually
Secondary Site Monitoring Well NC	A B	Quarterly Semi-Annually
Secondary Site Monitoring Wells 929, 933, 945, CW40	B (no water level in 933 or 945)	Semi-Annually
All Active Collection Wells	E	Monthly
All Active Collection Wells	B	Annually
All Active Collection Wells	Collection rate, water level and total volume for week	Weekly
Reversal Wells B, BA, KZ, KF, SO, SP, S1, S2	Water Level	Weekly
E Coll Pond, W Coll Pond	B (W Coll Pond - no water level)	Quarterly
E Coll Pond, W Coll Pond	F	Semi-annually
DQ, M5, S3, S4	B	Quarterly
DQ, M5, S3, S4	F	Semi-annually
Background Wells P, P1, P2	B F	Quarterly Semi-annually
Background Wells DD, Q, R	B & F	Annually

A = Water Level, SO₄, U-Nat, Se, TDSB = Water Level, pH, TDS, SO₄, Cl, HCO₃, CO₃, Na, Ca, Mg, K, NO₃, U-Nat, Se, Mo, Ra-226C = SO₄, TDSD = Ca, Mg, K, Na, HCO₃, CO₃, Cl, SO₄, pH, TDS, Al, As, Ba, Cd, Co, Cr, Cu, CN, F, Fe, Pb, Mn, Hg, Mo, Ni, NO₃ as N, Se, Ag, Zn, U-Nat, Filtered Ra-226E = Water Level, SO₄, U-Nat, TDS

F = V, Ra-228, Th-230

Table 2.1.1 - Water Quality Analyses for Well BP



Billings • Casper • Gillette
Helena • Rapid City

ENERGY LABORATORIES, INC.

SHIPPING: 2393 SALT CREEK HIGHWAY • CASPER, WY 82601

MAILING: P.O. BOX 3258 • CASPER, WY 82602

E-mail: energy@trib.com • FAX: (307) 234-1639

PHONE: (307) 235-0515 • TOLL FREE: (888) 235-0515

WATER ANALYSIS REPORT HOMESTAKE MINING COMPANY

Sample ID:
Sample Date/Time:
Sample Matrix:
Laboratory ID:
Report Date:

BP	BP
02-02-00/09:28	05-02-00/09:11
Water	Water
30650-4	32485-1
March 1, 2000	June 2, 2000

Major Ions	Parameter Code	Method	Units	"Lower Limit of Detection"	Results	Results
Calcium	1	EPA 200.7	mg/L	1.0	216	226
Magnesium	2	EPA 200.7	mg/L	1.0	55.1	58.1
Sodium	4	EPA 200.7	mg/L	1.0	339	366
Potassium	3	EPA 200.7	mg/L	1.0	5.8	4.7
Carbonate	6	SM 2320-B	mg/L	1.0	< 1.0	< 1.0
Bicarbonate	5	SM 2320-B	mg/L	1.0	451	425
Sulfate	8	EPA 200.7	mg/L	1.0	948	1020
Chloride	7	EPA 200.7	mg/L	0.10	197	179
Nitrate + Nitrite as N	39	EPA 335.2	mg/L	0.10	3.46	3.55

Non-Metals						
Total Dissolved Solids @ 180°C	10	SM 2540-C	mg/L	10.0	2240	2390
Alkalinity	75	SM 2320-B	mg/L	1.0	370	349
pH	9	SM 4500-H-B	std. units	0.10	8.05	7.62

Trace Metals						
Chromium	27	EPA 200.7	mg/L	0.05	< 0.05	< 0.05
Molybdenum	36	EPA 200.7	mg/L	0.03	0.31	0.33
Selenium	40	EPA 200.8	mg/L	0.005	0.220	0.337
Vanadium	42	EPA 200.7	mg/L	0.01	< 0.01	< 0.01

Radiometric						
Uranium	15	EPA 200.8	mg/L	0.0003	0.369	1.22
*Uranium Precision ±	244				0.033	0.110
Uranium	113		µCi/mL	2.0E-10	2.5E-07	8.3E-07
*Uranium Precision ±	114				2.2E-08	7.4E-08
Radium 226	45	EPA 903.0	pCi/L	0.2	< 0.2	< 0.2
Radium Error Estimate ±	245				0.2	0.2
Radium 226	256		µCi/mL	2.0E-10	< 2.0E-10	< 2.0E-10
Radium Error Estimate ±	258				2.0E-10	2.0E-10
Radium 228	57	EPA 904.0	pCi/L	1.0	< 1.0	< 1.0
Radium Error Estimate ±	257				0.9	0.9
Radium 228	359		µCi/mL	1.0E-09	< 1.0E-09	< 1.0E-09
Radium Error Estimate ±	360				9.0E-10	9.0E-10
Thorium 230	48	EPA 907.0	pCi/L	0.2	< 0.2	< 0.2
Thorium Error Estimate ±	248				0.2	0.2
Thorium 230	362		µCi/mL	2.0E-10	< 2.0E-10	< 2.0E-10
Thorium Error Estimate ±	363				2.0E-10	2.0E-10

Quality Assurance Data			Target Range		
Anion		meq		32.97	33.5
Cation		meq		30.28	32.2
SM A/C Balance		%	-5 - +5	-4.26	-2.09
Calc TDS		mg/L		2003	2083
TDS A/C Balance		dec. %	0.80 - 1.20	1.12	1.15

*Precision is calculated using standard deviation of mean of replicate analysis multiplied by concentration.

"Lower Limit of Detection" is related to reporting limits suggested by Regulatory Guideline 4.14 in some cases.

msj r:\reports\clients2000\homestake\grants\water\bp\32485-1.xls

COMPLETE ANALYTICAL SERVICES

TRACKING NO. PAGE NO.

30650-4/001

Table 2.1.2 - Water Quality Analyses for Well D1

ENERGY LABORATORIES, INC.

SHIPPING: 2393 SALT CREEK HIGHWAY • CASPER, WY 82601
MAILING: P.O. BOX 3258 • CASPER, WY 82602
E-mail: energy@trib.com • FAX: (307) 234-1639
PHONE: (307) 235-0515 • TOLL FREE: (888) 235-0515

**WATER ANALYSIS REPORT
HOMESTAKE MINING COMPANY**

Sample ID:
Sample Date/Time:
Sample Matrix:
Laboratory ID:
Report Date:

D1	D1
02-02-00/10:18	04-27-00/13:47
Water	Water
30650-5	32414-6
March 1, 2000	June 2, 2000

Major Ions	Parameter Code	Method	Units	"Lower Limit of Detection"	Results	Results
Calcium	1	EPA-200.7	mg/L	1.0	200	209
Magnesium	2	EPA-200.7	mg/L	1.0	45.7	49.2
Sodium	4	EPA-200.7	mg/L	1.0	359	373
Potassium	3	EPA-200.7	mg/L	1.0	6.1	5.4
Carbonate	6	SM 2320-B	mg/L	1.0	< 1.0	< 1.0
Bicarbonate	5	SM 2320-B	mg/L	1.0	520	527
Sulfate	8	EPA-200.7	mg/L	1.0	883	859
Chloride	7	EPA-200.7	mg/L	0.10	208	205
Nitrate + Nitrite as N	39	EPA-353.2	mg/L	0.10	3.46	3.29

Non-Metals						
Total Dissolved Solids @ 180°C	10	SM 2540-C	mg/L	10.0	2140	2130
Alkalinity	75	SM 2320-B	mg/L	1.0	427	432
pH	9	SM 4500-H-B	std. units	0.10	7.96	7.81

Trace Metals						
Chromium	27	EPA 200.7	mg/L	0.05	-	< 0.05
Molybdenum	36	EPA-200.8	mg/L	0.03	1.00	1.22
Selenium	40	EPA-200.8	mg/L	0.005	0.181	0.172
Vanadium	42	EPA-200.8	mg/L	0.01	< 0.01	< 0.01

Radiometric						
Uranium	15	EPA-200.8	mg/L	0.0003	1.89	1.83
*Uranium Precision ±	244				0.170	0.165
Uranium	113		µCi/mL	2.0E-10	1.3E-06	1.2E-06
*Uranium Precision ±	114				1.2E-07	1.1E-07
Radium 226	45	EPA-903.0	pCi/L	0.2	< 0.2	< 0.2
Radium Error Estimate ±	245				0.2	0.2
Radium 226	256		µCi/mL	2.0E-10	< 2.0E-10	< 2.0E-10
Radium Error Estimate ±	258				2.0E-10	2.0E-10
Radium 228	57	EPA-904.0	pCi/L	1.0	< 1.0	< 1.0
Radium Error Estimate ±	257				1.0	0.9
Radium 228	359		µCi/mL	1.0E-09	< 1.0E-09	< 1.0E-09
Radium Error Estimate ±	360				1.0E-09	9.0E-10
Thorium 230	48	EPA-907.0	pCi/L	0.2	< 0.2	0.2
Thorium Error Estimate ±	248				0.2	0.2
Thorium 230	362		µCi/mL	2.0E-10	< 2.0E-10	2.0E-10
Thorium Error Estimate ±	363				2.0E-10	2.0E-10

Quality Assurance Data			Target Range	
Anion	meq		33.1	32.6
Cation	meq		29.6	30.9
SM A/C Balance	%	-5 - +5	-5.57	-2.63
Calc TDS	mg/L		1978	1980
TDS A/C Balance	dec. %	0.80 - 1.20	1.08	1.08

*Precision is calculated using standard deviation of mean of replicate analysis multiplied by concentration.

"Lower Limit of Detection" is related to reporting limits suggested by Regulatory Guideline 4.14 in some cases.

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Table 2.1.3 - Water Quality Analyses for Well DQ

ENERGY LABORATORIES, INC.

SHIPPING: 2393 SALT CREEK HIGHWAY • CASPER, WY 82601
MAILING: P.O. BOX 3258 • CASPER, WY 82602
E-mail: energy@trib.com • FAX: (307) 234-1639
PHONE: (307) 235-0515 • TOLL FREE: (888) 235-0515

**WATER ANALYSIS REPORT
HOMESTAKE MINING COMPANY**

Sample ID:
Sample Date/Time:
Sample Matrix:
Laboratory ID:
Report Date:

DQ	DQ
11-04-99/14:04	02-02-00/11:03
Water	Water
34310-7	30707-2
December 11, 1999	March 3, 2000

Major Ions	Method	Units	"Lower Limit of Detection"	Results	Results
Calcium	EPA-200.7	mg/L	1.0	358	406
Magnesium	EPA-200.7	mg/L	1.0	157	105
Sodium	EPA-200.7	mg/L	1.0	5290	5000
Potassium	EPA-200.7	mg/L	1.0	14.5	17.6
Carbonate	SM 2320-B	mg/L	1.0	< 1.0	< 1.0
Bicarbonate	SM 2320-B	mg/L	1.0	2620	2320
Sulfate	EPA-200.7	mg/L	1.0	8410	9100
Chloride	EPA-200.7	mg/L	0.10	1090	958
Nitrate + Nitrite as N	EPA-353.2	mg/L	0.10	43.5	31.3

Non-Metals					
Total Dissolved Solids @ 180°C	SM 2540-C Mod.	mg/L	10.0	18800	17600
Alkalinity	SM 2320-B	mg/L	1.0	-	1900
pH	SM 4500-H-B	std. units	0.10	7.97	8.06

Trace Metals					
Chromium	EPA-200.7	mg/L	0.05	< 0.05	< 0.05
Molybdenum	EPA-200.7	mg/L	0.03	83.3	96.7
Selenium	EPA-200.8	mg/L	0.005	3.76	3.47
Vanadium	EPA-200.8	mg/L	0.01	< 0.01	0.04

Radiometric					
Uranium	EPA-200.7	mg/L	1.0	46.0	42.9
*Uranium Precision ±				4.140	3.8610
Uranium		µCi/mL	2.0E-10	3.1E-05	2.9E-05
*Uranium Precision ±				2.8E-06	2.6E-06
Radium 226	EPA-903.0	pCi/L	0.2	4.6	0.4
Radium Error Estimate ±				0.6	0.2
Radium 226		µCi/mL	2.0E-10	4.6E-09	4.0E-10
Radium Error Estimate ±				6.0E-10	2.0E-10
Radium 228	EPA-904.0	pCi/L	1.0	< 1.0	< 1.0
Radium Error Estimate ±				1.2	0.9
Radium 228		µCi/mL	1.0E-09	< 1.0E-09	< 1.0E-09
Radium Error Estimate ±				1.2E-09	9.0E-10
Thorium 230	EPA-907.0	pCi/L	0.2	< 0.2	< 0.2
Thorium Error Estimate ±				0.2	0.2
Thorium 230		µCi/mL	2.0E-10	< 2.0E-10	< 2.0E-10
Thorium Error Estimate ±				2.0E-10	2.0E-10

Quality Assurance Data		Target Range	
Anion	meq	252.00	257
Cation	meq	261.36	247
WYDEQ A/C Balance	%	-5 - +5	-1.98
Calc TDS	mg/L	16823	16886
TDS A/C Balance	dec. %	0.80 - 1.20	1.12

*Precision is calculated using standard deviation of mean of replicate analysis multiplied by concentration.

"Lower Limit of Detection" is related to reporting limits suggested by Regulatory Guideline 4.14 in some cases.

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COMPLETE ANALYTICAL SERVICES

30707R00002



Billings • Casper • Gillette
Helena • Rapid City

ENERGY LABORATORIES, INC.

SHIPPING: 2393 SALT CREEK HIGHWAY • CASPER, WY 82601

MAILING: P.O. BOX 3258 • CASPER, WY 82602

E-mail: energy@trib.com • FAX: (307) 234-1639

PHONE: (307) 235-0515 • TOLL FREE: (888) 235-0515

WATER ANALYSIS REPORT HOMESTAKE MINING COMPANY

Sample ID:
Sample Date/Time:
Sample Matrix:
Laboratory ID:
Report Date:

DQ	DQ
04-27-00/12:54	04-27-00/12:53
Water	Water
32414-7	32414-8
June 2, 2000	June 2, 2000

Major Ions	Parameter Code	Method	Units	"Lower Limit of Detection"	Results	Results
Calcium	1	EPA-200.7	mg/L	1.0	364	349
Magnesium	2	EPA-200.7	mg/L	1.0	140	133
Sodium	4	EPA-200.7	mg/L	1.0	4630	4400
Potassium	3	EPA-200.7	mg/L	1.0	23.9	26.2
Carbonate	6	SM 2320-B	mg/L	1.0	< 1.0	< 1.0
Bicarbonate	5	SM 2320-B	mg/L	1.0	2230	2260
Sulfate	8	EPA-200.7	mg/L	1.0	8330	8260
Chloride	7	EPA-200.7	mg/L	0.10	876	886
Nitrate + Nitrite as N	39	EPA-353.2	mg/L	0.10	20.2	20.7

Non-Metals						
Total Dissolved Solids @ 180°C	10	SM 2540-C	mg/L	10.0	16500	16500
Alkalinity	75	SM 2320-B	mg/L	1.0	1820	1850
pH	9	SM 4500-H-B	std. units	0.10	7.98	7.99

Trace Metals						
Chromium	27	EPA 200.7	mg/L	0.05	-	< 0.05
Molybdenum	36	EPA-200.7	mg/L	0.03	89.0	88.1
Selenium	40	EPA-200.8	mg/L	0.005	2.20	2.37
Vanadium	42	EPA-200.7	mg/L	0.01	< 0.01	< 0.01

Radiometric						
Uranium	15	EPA-200.7	mg/L	1.0	38.0	39.0
*Uranium Precision ±	244				3.42	3.51
Uranium	113		µCi/mL	2.0E-10	2.6E-05	2.6E-05
*Uranium Precision ±	114				2.3E-06	2.4E-06
Radium 226	45	EPA-903.0	pCi/L	0.2	0.3	0.5
Radium Error Estimate ±	245				0.2	0.2
Radium 226	256		µCi/mL	2.0E-10	3.0E-10	5.0E-10
Radium Error Estimate ±	258				2.0E-10	2.0E-10
Radium 228	57	EPA-904.0	pCi/L	1.0	< 1.0	< 1.0
Radium Error Estimate ±	257				0.9	0.9
Radium 228	359		µCi/mL	1.0E-09	< 1.0E-09	< 1.0E-09
Radium Error Estimate ±	360				9.0E-10	9.0E-10
Thorium 230	48	EPA-907.0	pCi/L	0.2	0.3	1.3
Thorium Error Estimate ±	248				0.3	0.6
Thorium 230	362		µCi/mL	2.0E-10	3.0E-10	1.3E-09
Thorium Error Estimate ±	363				3.0E-10	6.0E-10

Quality Assurance Data			Target Range	
Anion	meq		236	236
Cation	meq		232	221
SM A/C Balance	%	-5 - +5	-0.95	-3.31
Calc TDS	mg/L		15569	15277
TDS A/C Balance	dec. %	0.80 - 1.20	1.06	1.08

*Precision is calculated using standard deviation of mean of replicate analysis multiplied by concentration.

"Lower Limit of Detection" is related to reporting limits suggested by Regulatory Guideline 4.14 in some cases.

ENTERED JUL 10 2000

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COMPLETE ANALYTICAL SERVICES

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Table 2.1.4 - Water Quality Analyses for Well M5



Billings • Casper • Gillette
Helena • Rapid City

ENERGY LABORATORIES, INC.

SHIPPING: 2393 SALT CREEK HIGHWAY • CASPER, WY 82601

MAILING: P.O. BOX 3258 • CASPER, WY 82602

E-mail: energy@trib.com • FAX: (307) 234-1639

PHONE: (307) 235-0515 • TOLL FREE: (888) 235-0515

LABORATORY ANALYSIS REPORT HOMESTAKE MINING COMPANY

Sample ID:
Sample Date/Time:
Date Received:
Sample Matrix:
Laboratory ID:
Report Date:

M5	M5
02-03-00/09:19	05/10/00 13:14
-	05/15/2000
Water	Water
30707-5	00-32703-2
March 3, 2000	June 14, 2000

Major Ions	Parameter Code	Method	Units	"Lower Limit of Detection"	Results	Results
Calcium	1	EPA 200.7	mg/L	1.0	223	218
Magnesium	2	EPA 200.7	mg/L	1.0	48.2	49.0
Sodium	4	EPA 200.7	mg/L	1.0	314	350
Potassium	3	EPA 200.7	mg/L	1.0	5.4	3.2
Carbonate	6	SM 2320-B	mg/L	1.0	< 1.0	< 1.0
Bicarbonate	5	SM 2320-B	mg/L	1.0	414	469
Sulfate	8	EPA 200.7	mg/L	1.0	901	890
Chloride	7	EPA 200.7	mg/L	1.0	191	181
Nitrate + Nitrite as N	39	EPA 353.2	mg/L	0.10	3.95	3.29

Non-Metals						
Total Dissolved Solids	10	SM 2540-C	mg/L	10.0	2210	2190
Alkalinity	75	SM 2320-B	mg/L	1.0	339	385
pH	9	SM 4500-H-B	std. units	0.10	7.77	7.94

Trace Metals						
Chromium	27	EPA 200.8	mg/L	0.05	< 0.05	< 0.05
Molybdenum	36	EPA 200.8	mg/L	0.03	1.64	2.30
Selenium	40	EPA 200.8	mg/L	0.005	0.317	0.260
Vanadium	42	EPA 200.8	mg/L	0.01	< 0.01	< 0.01

Radiometric						
Uranium	15	EPA 200.8	mg/L	0.0003	2.36	2.70
*Uranium Precision ±	244				0.212	0.243
Uranium, Rad.	113		µCi/mL	2.0E-10	1.6E-06	1.8E-06
*Uranium Precision ±	114				1.4E-07	1.6E-07
Radium 226	45	EPA 903.0	pCi/L	0.2	< 0.2	< 0.2
Radium Error Estimate ±	245				0.3	0.3
Radium 226	256		µCi/mL	2.0E-10	< 2.0E-10	< 2.0E-10
Radium Error Estimate ±	258				3.0E-10	3.0E-10
Radium 228	57	EPA 904.0	pCi/L	1.0	< 1.0	< 1.0
Radium Error Estimate ±	257				0.9	1.0
Radium 228	359		µCi/mL	1.0E-09	< 1.0E-09	< 1.0E-09
Radium Error Estimate ±	360				9.0E-10	1.0E-09
Thorium 230	48	EPA 907.0	pCi/L	0.2	< 0.2	0.3
Thorium Error Estimate ±	248				0.2	0.3
Thorium 230	362		µCi/mL	2.0E-10	< 2.0E-10	3.0E-10
Thorium Error Estimate ±	363				2.0E-10	3.0E-10

Quality Assurance Data			Target Range	
Anion	meq		31.3	31.6
Cation	meq		29.0	30.3
SM A/C Balance	%	-5 - +5	-3.81	-2.13
Calc TDS	mg/L		1908	1941
TDS A/C Balance	dec. %	0.80 - 1.20	1.16	1.13

*Precision is calculated using standard deviation of mean of replicate analysis multiplied by concentration.

"Lower Limit of Detection" is related to reporting limits suggested by Regulatory Guideline 4.14 in some cases.

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COMPLETE ANALYTICAL SERVICES

32703R00002

Table 2.1.5 - Water Quality Analyses for Well S3



Billings • Casper • Gillette
Helena • Rapid City

ENERGY LABORATORIES, INC.

SHIPPING: 2393 SALT CREEK HIGHWAY • CASPER, WY 82601

MAILING: P.O. BOX 3258 • CASPER, WY 82602

E-mail: energy@trib.com • FAX: (307) 234-1639

PHONE: (307) 235-0515 • TOLL FREE: (888) 235-0515

LABORATORY ANALYSIS REPORT HOMESTAKE MINING COMPANY

Sample ID:
Sample Date/Time:
Date Received:
Sample Matrix:
Laboratory ID:
Report Date:

S3	S3
02-08-00/10:48	05/10/00 14:06
-	05/15/2000
Water	Water
30777-1	00-32703-4
March 1, 2000	June 14, 2000

Major Ions	Parameter Code	Method	Units	"Lower Limit of Detection"	Results	Results
Calcium	1	EPA 200.7	mg/L	1.0	180	178
Magnesium	2	EPA 200.7	mg/L	1.0	46.7	48.1
Sodium	4	EPA 200.7	mg/L	1.0	738	796
Potassium	3	EPA 200.7	mg/L	1.0	7.2	5.0
Carbonate	6	SM 2320-B	mg/L	1.0	< 1.0	< 1.0
Bicarbonate	5	SM 2320-B	mg/L	1.0	668	665
Sulfate	8	EPA 200.7	mg/L	1.0	1520	1540
Chloride	7	EPA 200.7	mg/L	1.0	231	213
Nitrate + Nitrite as N	39	EPA 353.2	mg/L	0.10	2.30	2.21

Non-Metals						
Total Dissolved Solids	10	SM 2540-C	mg/L	10.0	3470	3540
Alkalinity	75	SM 2320-B	mg/L	1.0	548	546
pH	9	SM 4500-H-B	std. units	0.10	7.73	8.10

Trace Metals						
Chromium	27	EPA 200.8	mg/L	0.05	< 0.05	< 0.05
Molybdenum	36	EPA 200.8	mg/L	0.03	9.35	9.68
Selenium	40	EPA 200.8	mg/L	0.005	0.110	0.100
Vanadium	42	EPA 200.8	mg/L	0.01	< 0.01	< 0.01

Radiometric						
Uranium	15	EPA 200.8	mg/L	0.0003	15.0	10.5
*Uranium Precision ±	244				1.35	0.942
Uranium, Rad.	113		µCi/mL	2.0E-10	1.0E-05	7.1E-06
*Uranium Precision ±	114				9.1E-07	6.4E-07
Radium 226	45	EPA 903.0	pCi/L	0.2	< 0.2	< 0.2
Radium Error Estimate ±	245				0.2	0.3
Radium 226	256		µCi/mL	2.0E-10	< 2.0E-10	< 2.0E-10
Radium Error Estimate ±	258				2.0E-10	3.0E-10
Radium 228	57	EPA 904.0	pCi/L	1.0	2.9	< 1.0
Radium Error Estimate ±	257				0.2	1.0
Radium 228	359		µCi/mL	1.0E-09	2.9E-09	< 1.0E-09
Radium Error Estimate ±	360				2.0E-10	1.0E-09
Thorium 230	48	EPA 907.0	pCi/L	0.2	< 0.2	0.3
Thorium Error Estimate ±	248				0.2	0.3
Thorium 230	362		µCi/mL	2.0E-10	< 2.0E-10	3.0E-10
Thorium Error Estimate ±	363				2.0E-10	3.0E-10

Quality Assurance Data			Target Range	
Anion	meq		49.3	49.2
Cation	meq		45.2	47.6
SM A/C Balance	%	-5 - +5	-4.40	-1.60
Calc TDS	mg/L		3068	3123
TDS A/C Balance	dec. %	0.80 - 1.20	1.13	1.13

*Precision is calculated using standard deviation of mean of replicate analysis multiplied by concentration.

"Lower Limit of Detection" is related to reporting limits suggested by Regulatory Guideline 4.14 in some cases.

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COMPLETE ANALYTICAL SERVICES

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32703R00004

Table 2.1.6 - Water Quality Analyses for Well S4



Billings • Casper • Gillette
Helena • Rapid City

ENERGY LABORATORIES, INC.

SHIPPING: 2393 SALT CREEK HIGHWAY • CASPER, WY 82601

MAILING: P.O. BOX 3258 • CASPER, WY 82602

E-mail: energy@trib.com • FAX: (307) 234-1639

PHONE: (307) 235-0515 • TOLL FREE: (888) 235-0515

LABORATORY ANALYSIS REPORT HOMESTAKE MINING COMPANY

Sample ID:
Sample Date/Time:
Date Received:
Sample Matrix:
Laboratory ID:
Report Date:

S4	S4
02-08-00/11:20	05/10/00 15:12
	05/15/2000
Water	Water
30777-2	00-32703-1
March 1, 2000	June 14, 2000

Major Ions	Parameter Code	Method	Units	"Lower Limit of Detection"	Results	Results
Calcium	1	EPA 200.7	mg/L	1.0	324	383
Magnesium	2	EPA 200.7	mg/L	1.0	73.7	90.6
Sodium	4	EPA 200.7	mg/L	1.0	417	520
Potassium	3	EPA 200.7	mg/L	1.0	8.0	6.3
Carbonate	6	SM 2320-B	mg/L	1.0	< 1.0	< 1.0
Bicarbonate	5	SM 2320-B	mg/L	1.0	426	496
Sulfate	8	EPA 200.7	mg/L	1.0	1570	1830
Chloride	7	EPA 200.7	mg/L	1.0	180	159
Nitrate + Nitrite as N	39	EPA 353.2	mg/L	0.10	2.13	< 0.10

Non-Metals						
Total Dissolved Solids	10	SM 2540-C	mg/L	10.0	3340	3770
Alkalinity	75	SM 2320-B	mg/L	1.0	350	407
pH	9	SM 4500-H-B	std. units	0.10	7.53	7.88

Trace Metals						
Chromium	27	EPA 200.8	mg/L	0.05	< 0.05	< 0.05
Molybdenum	36	EPA 200.8	mg/L	0.03	0.88	0.58
Selenium	40	EPA 200.8	mg/L	0.005	0.147	0.086
Vanadium	42	EPA 200.8	mg/L	0.01	< 0.01	< 0.01

Radiometric						
Uranium	15	EPA 200.8	mg/L	0.0003	10.8	5.38
*Uranium Precision ±	244				0.972	0.484
Uranium, Rad.	113		µCi/mL	2.0E-10	7.3E-06	3.6E-06
*Uranium Precision ±	114				6.6E-07	3.3E-07
Radium 226	45	EPA 903.0	pCi/L	0.2	1.1	0.7
Radium Error Estimate ±	245				0.2	0.2
Radium 226	256		µCi/mL	2.0E-10	1.1E-09	7.0E-10
Radium Error Estimate ±	258				2.0E-10	2.0E-10
Radium 228	57	EPA 904.0	pCi/L	1.0	< 1.0	< 1.0
Radium Error Estimate ±	257				0.9	1.0
Radium 228	359		µCi/mL	1.0E-09	< 1.0E-09	< 1.0E-09
Radium Error Estimate ±	360				9.0E-10	1.0E-09
Thorium 230	48	EPA 907.0	pCi/L	0.2	< 0.2	0.4
Thorium Error Estimate ±	248				0.2	0.4
Thorium 230	362		µCi/mL	2.0E-10	< 2.0E-10	4.0E-10
Thorium Error Estimate ±	363				2.0E-10	4.0E-10

Quality Assurance Data			Target Range		
Anion	meq			44.9	50.8
Cation	meq			40.7	49.5
SM A/C Balance	%		-5 - +5	-4.99	-1.30
Calc TDS	mg/L			2796	3238
TDS A/C Balance	dec. %		0.80 - 1.20	1.19	1.16

*Precision is calculated using standard deviation of mean of replicate analysis multiplied by concentration.

"Lower Limit of Detection" is related to reporting limits suggested by Regulatory Guideline 4.14 in some cases.

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COMPLETE ANALYTICAL SERVICES

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Table 2.1.7 - Water Quality Analyses for Well X



Billings • Casper • Gillette
Helena • Rapid City

ENERGY LABORATORIES, INC.

SHIPPING: 2393 SALT CREEK HIGHWAY • CASPER, WY 82601

MAILING: P.O. BOX 3258 • CASPER, WY 82602

E-mail: energy@trib.com • FAX: (307) 234-1639

PHONE: (307) 235-0515 • TOLL FREE: (888) 235-0515

WATER ANALYSIS REPORT HOMESTAKE MINING COMPANY

Sample ID:
Sample Date/Time:
Sample Matrix:
Laboratory ID:
Report Date:

X	X
02-01-00/14:00	05/10/00 10:28
Water	Water
30650-1	00-32676-2
March 1, 2000	June 7, 2000

Major Ions	Parameter Code	Method	Units	"Lower Limit of Detection"	Results	Results
Calcium	1	EPA 200.7	mg/L	1.0	137	83.4
Magnesium	2	EPA 200.7	mg/L	1.0	37.9	24.2
Sodium	4	EPA 200.7	mg/L	1.0	327	234
Potassium	3	EPA 200.7	mg/L	1.0	6.3	4.8
Carbonate	6	SM 2320-B	mg/L	1.0	1.0	< 1.0
Bicarbonate	5	SM 2320-B	mg/L	1.0	605	538
Sulfate	8	EPA 200.7	mg/L	1.0	562	300
Chloride	7	EPA 200.7	mg/L	0.10	170	72.5
Nitrate + Nitrite as N	39	EPA 353.2	mg/L	0.10	1.69	2.07

Non-Metals						
Total Dissolved Solids	10	SM 2540-C	mg/L	10.0	1710	1130
Alkalinity	75	SM 2320-B	mg/L	1.0	496	441
pH	9	SM 4500-H-B	std. units	0.10	7.96	7.96

Trace Metals						
Chromium	27	EPA 200.8	mg/L	0.05	< 0.05	< 0.05
Molybdenum	36	EPA 200.8	mg/L	0.03	1.31	1.27
Selenium	40	EPA 200.8	mg/L	0.005	0.046	0.027
Vanadium	42	EPA 200.8	mg/L	0.01	0.05	0.04

Radiometric						
Uranium	15	EPA 200.8	mg/L	0.0003	0.650	0.260
*Uranium Precision ±	244				0.059	0.023
Uranium, Rad.	113		µCi/mL	2.0E-10	4.4E-07	1.8E-07
*Uranium Precision ±	114				4.0E-08	1.6E-08
Radium 226	45	EPA 903.0	pCi/L	0.2	< 0.2	< 0.2
Radium Error Estimate ±	245				0.2	0.2
Radium 226	256		µCi/mL	2.0E-10	< 2.0E-10	< 2.0E-10
Radium Error Estimate ±	258				2.0E-10	2.0E-10
Radium 228	57	EPA 904.0	pCi/L	1.0	< 1.0	< 1.0
Radium Error Estimate ±	257				0.9	1.0
Radium 228	359		µCi/mL	1.0E-09	< 1.0E-09	< 1.0E-09
Radium Error Estimate ±	360				9.0E-10	1.0E-09
Thorium 230	48	EPA 907.0	pCi/L	0.2	< 0.2	0.3
Thorium Error Estimate ±	248				0.2	0.3
Thorium 230	362		µCi/mL	2.0E-10	< 2.0E-10	3.0E-10
Thorium Error Estimate ±	363				2.0E-10	3.0E-10

Quality Assurance Data			Target Range	
Anion	meq		26.6	17.3
Cation	meq		24.4	16.5
SM A/C Balance	%	-5 - +5	-4.28	-2.45
Calc TDS	mg/L		1551	998
TDS A/C Balance	dec. %	0.80 - 1.20	1.10	1.13

*Precision is calculated using standard deviation of mean of replicate analysis multiplied by concentration.

"Lower Limit of Detection" is related to reporting limits suggested by Regulatory Guideline 4.14 in some cases.

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COMPLETE ANALYTICAL SERVICES

00-32676-2

Table 2.1.8 - Water Quality Analyses for Well Y



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PHONE: (307) 235-0515 • TOLL FREE: (888) 235-0515

WATER ANALYSIS REPORT HOMESTAKE MINING COMPANY

Sample ID:
Sample Date/Time:
Sample Matrix:
Laboratory ID:
Report Date:

Y	Y
02-01-00/14:30	05/10/00 09:51
Water	Water
30650-2	00-32676-3
March 1, 2000	June 7, 2000

Major Ions	Parameter Code	Method	Units	"Lower Limit of Detection"	Results	Results
Calcium	1	EPA 200.7	mg/L	1.0	275	184
Magnesium	2	EPA 200.7	mg/L	1.0	58.2	49.0
Sodium	4	EPA 200.7	mg/L	1.0	790	620
Potassium	3	EPA 200.7	mg/L	1.0	9.7	8.3
Carbonate	6	SM 2320-B	mg/L	1.0	< 1.0	< 1.0
Bicarbonate	5	SM 2320-B	mg/L	1.0	665	635
Sulfate	8	EPA 200.7	mg/L	1.0	1700	1180
Chloride	7	EPA 200.7	mg/L	0.10	337	222
Nitrate + Nitrite as N	39	EPA 353.2	mg/L	0.10	4.34	3.12

Non-Metals						
Total Dissolved Solids	10	SM 2540-C	mg/L	10.0	3700	3120
Alkalinity	75	SM 2320-B	mg/L	1.0	545	521
pH	9	SM 4500-H-B	std. units	0.10	7.97	7.92

Trace Metals						
Chromium	27	EPA 200.8	mg/L	0.05	< 0.05	< 0.05
Molybdenum	36	EPA 200.8	mg/L	0.03	12.9	8.78
Selenium	40	EPA 200.8	mg/L	0.005	1.77	0.896
Vanadium	42	EPA 200.8	mg/L	0.01	< 0.01	< 0.01

Radiometric						
Uranium	15	EPA 200.8	mg/L	0.0003	5.76	3.77
*Uranium Precision ±	244				0.518	0.339
Uranium, Rad.	113		µCi/mL	2.0E-10	3.9E-06	2.5E-06
*Uranium Precision ±	114				3.5E-07	2.3E-07
Radium 226	45	EPA 903.0	pCi/L	0.2	< 0.2	0.4
Radium Error Estimate ±	245				0.2	0.2
Radium 226	256		µCi/mL	2.0E-10	< 2.0E-10	4.0E-10
Radium Error Estimate ±	258				2.0E-10	2.0E-10
Radium 228	57	EPA 904.0	pCi/L	1.0	2.4	< 1.0
Radium Error Estimate ±	257				0.2	1.0
Radium 228	359		µCi/mL	1.0E-09	2.4E-09	< 1.0E-09
Radium Error Estimate ±	360				2.0E-10	1.0E-09
Thorium 230	48	EPA 907.0	pCi/L	0.2	< 0.2	0.3
Thorium Error Estimate ±	248				0.2	0.3
Thorium 230	362		µCi/mL	2.0E-10	< 2.0E-10	3.0E-10
Thorium Error Estimate ±	363				2.0E-10	3.0E-10

Quality Assurance Data			Target Range	
Anion	meq		56.15	41.5
Cation	meq		53.20	40.5
SM A/C Balance	%	-5 - +5	-2.71	-1.27
Calc TDS	mg/L		3523	2596
TDS A/C Balance	dec. %	0.80 - 1.20	1.05	1.20

*Precision is calculated using standard deviation of mean of replicate analysis multiplied by concentration.

"Lower Limit of Detection" is related to reporting limits suggested by Regulatory Guideline 4.14 in some cases.

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COMPLETE ANALYTICAL SERVICES

Table 2.1.9- Water Quality Analyses for Background Well P



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Helena • Rapid City

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PHONE: (307) 235-0515 • TOLL FREE: (888) 235-0515

WATER ANALYSIS REPORT HOMESTAKE MINING COMPANY

Sample ID:
Sample Date/Time:
Sample Matrix:
Laboratory ID:
Report Date:

P	P
03-07-00/09:11	05/09/00 15:05
Water	Water
31332-1	00-32676-1
April 13, 2000	June 7, 2000

Major Ions	Parameter Code	Method	Units	"Lower Limit of Detection"	Results	Results
Calcium	1	EPA 200.7	mg/L	1.0	214	201
Magnesium	2	EPA 200.7	mg/L	1.0	45.2	43.6
Sodium	4	EPA 200.7	mg/L	1.0	231	228
Potassium	3	EPA 200.7	mg/L	1.0	6.0	5.5
Carbonate	6	SM 2320-B	mg/L	1.0	< 1.0	< 1.0
Bicarbonate	5	SM 2320-B	mg/L	1.0	250	251
Sulfate	8	EPA 200.7	mg/L	1.0	917	858
Chloride	7	EPA 200.7	mg/L	0.10	56.2	45.4
Nitrate + Nitrite as N	39	EPA 353.2	mg/L	0.10	8.27	7.77

Non-Metals						
Total Dissolved Solids	10	SM 2540-C	mg/L	10.0	1790	1800
Alkalinity	75	SM 2320-B	mg/L	1.0	205	207
pH	9	SM 4500-H-B	std. units	0.10	8.11	8.00

Trace Metals						
Chromium	27	EPA 200.8	mg/L	0.05	< 0.05	< 0.05
Molybdenum	36	EPA 200.8	mg/L	0.03	< 0.03	< 0.03
Selenium	40	EPA 200.8	mg/L	0.005	0.09	0.133
Vanadium	42	EPA 200.8	mg/L	0.01	< 0.01	< 0.01

Radiometric						
Uranium	15	EPA 200.8	mg/L	0.0003	0.020	0.052
*Uranium Precision ±	244				0.002	0.005
Uranium, Rad.	113		μCi/mL	2.0E-10	1.4E-08	3.5E-08
*Uranium Precision ±	114				1.2E-09	3.2E-09
Radium 226	45	EPA 903.0	pCi/L	0.2	< 0.2	0.9
Radium Error Estimate ±	245				0.3	0.2
Radium 226	256		μCi/mL	2.0E-10	< 2.0E-10	9.0E-10
Radium Error Estimate ±	258				3.0E-10	2.0E-10
Radium 228	57	EPA 904.0	pCi/L	1.0	< 1.0	< 1.0
Radium Error Estimate ±	257				0.8	1.0
Radium 228	359		μCi/mL	1.0E-09	< 1.0E-09	< 1.0E-09
Radium Error Estimate ±	360				8.0E-10	1.0E-09
Thorium 230	48	EPA 907.0	pCi/L	0.2	< 0.2	0.3
Thorium Error Estimate ±	248				0.2	0.3
Thorium 230	362		μCi/mL	2.0E-10	< 2.0E-10	3.0E-10
Thorium Error Estimate ±	363				2.0E-10	3.0E-10

Quality Assurance Data			Target Range	
Anion	meq		25.4	23.9
Cation	meq		24.7	23.7
SM A/C Balance	%	-5 - +5	-1.49	-0.29
Calc TDS	mg/L		1632	1542
TDS A/C Balance	dec. %	0.80 - 1.20	1.10	1.17

*Precision is calculated using standard deviation of mean of replicate analysis multiplied by concentration.

"Lower Limit of Detection" is related to reporting limits suggested by Regulatory Guideline 4.14 in some cases.

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COMPLETE ANALYTICAL SERVICES

Table 3 - Occupational Monitoring Program

Table 3 - Occupational Monitoring Program

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 eq.)	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 Equip.	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	6 months or less	N/A
Personnel Gamma (TLD)	Variable	Personnel	HP-11	Quarterly	Gamma
Personnel Contam.	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; TLD = Thermoluminescent Dosimeter

Figure 1 – Monitoring & Sampling Locations

HOMESTAKE MINING COMPANY GRANTS PROJECT Monitoring & Sampling Locations

- HMC #0016 (BKG)
- ◆ TLD #0016 (BKG)

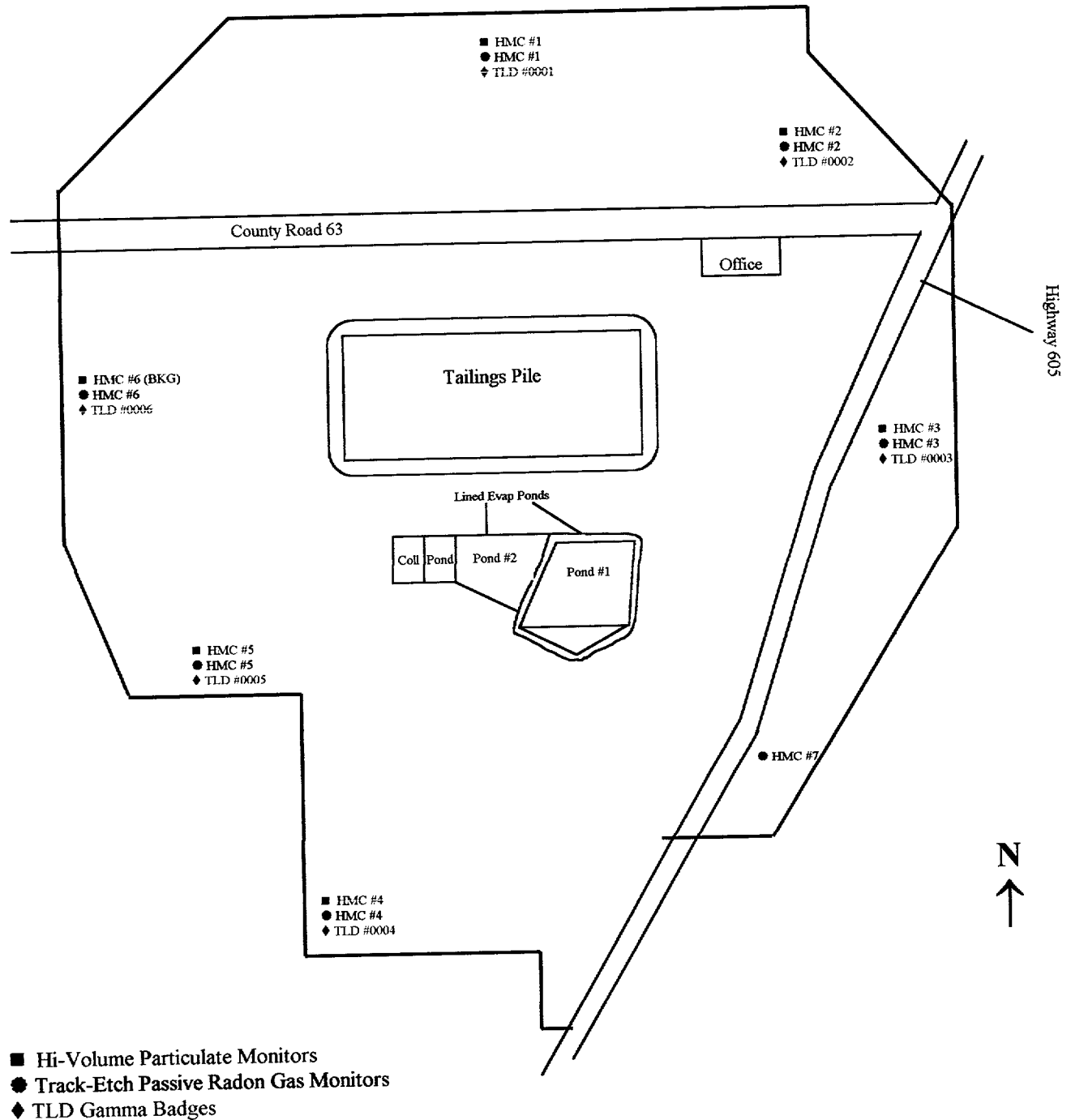


FIGURE 1

Attachment 1 – High Volume Air Sampling Results



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Helena • Rapid City

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HIGH VOLUME AIR SAMPLING REPORT

CLIENT: HOMESTAKE MINING COMPANY - GRANTS, NEW MEXICO

REPORT DATE: July 24, 2000

SAMPLE ID: HMC 1

Quarter/Date Sampled		Conc.	Error Est.	L.L.D.	Effluent Conc.*	% of Effluent
Air Volume	Radionuclide	$\mu\text{Ci/mL}$	$\mu\text{Ci/mL}$	$\mu\text{Ci/mL}$	$\mu\text{Ci/mL}$	Concentration
31661-1	^{235}U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
First Quarter 2000	^{230}Th	< 1.00E-16	1.28E-17	1.00E-16	2.00E-14	< 5.00E-01
Air Volume in mLs	^{226}Ra	< 1.00E-16	7.11E-18	1.00E-16	9.00E-13	< 1.11E-02
1.33E+11						
33918-1	^{235}U	1.79E-15	N/A	1.00E-16	9.00E-14	1.99E+00
Second Quarter 2000	^{230}Th	< 1.00E-16	9.12E-18	1.00E-16	2.00E-14	< 5.00E-01
Air Volume in mLs	^{226}Ra	< 1.00E-16	7.82E-18	1.00E-16	9.00E-13	< 1.11E-02
1.45E+11						

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

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COMPLETE ANALYTICAL SERVICES

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HIGH VOLUME AIR SAMPLING REPORT

CLIENT: HOMESTAKE MINING COMPANY - GRANTS, NEW MEXICO

REPORT DATE: July 24, 2000

SAMPLE ID: HMC 2

Quarter/Date Sampled	Air Volume	Radionuclide	Conc. μCi/mL	Error Est. μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% of Effluent Concentration
31661-2 First Quarter 2000	Air Volume in mLs 1.37E+11	^{nat} U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
		²³⁰ Th	1.39E-16	2.62E-17	1.00E-16	2.00E-14	6.97E-01
		²²⁶ Ra	< 1.00E-16	5.52E-18	1.00E-16	9.00E-13	< 1.11E-02
33918-2 Second Quarter 2000	Air Volume in mLs 1.46E+11	^{nat} U	1.74E-15	N/A	1.00E-16	9.00E-14	1.94E+00
		²³⁰ Th	< 1.00E-16	6.47E-18	1.00E-16	2.00E-14	< 5.00E-01
		²²⁶ Ra	< 1.00E-16	6.47E-18	1.00E-16	9.00E-13	< 1.11E-02

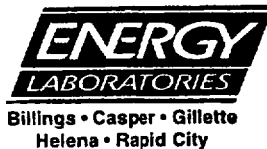
N/A not applicable for ICP-MS

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

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HIGH VOLUME AIR SAMPLING REPORT

CLIENT: HOMESTAKE MINING COMPANY - GRANTS, NEW MEXICO

REPORT DATE: July 24, 2000

SAMPLE ID: HMC 3

Quarter/Date Sampled		Conc.	Error Est.	L.L.D.	Effluent Conc.*	% of Effluent
Air Volume	Radionuclide	$\mu\text{Ci/mL}$	$\mu\text{Ci/mL}$	$\mu\text{Ci/mL}$	$\mu\text{Ci/mL}$	Concentration
31661-3	^{235}U	1.24E-16	N/A	1.00E-16	9.00E-14	1.37E-01
First Quarter 2000	^{230}Th	< 1.00E-16	1.04E-17	1.00E-16	2.00E-14	< 5.00E-01
Air Volume in mLs	^{226}Ra	< 1.00E-16	5.18E-18	1.00E-16	9.00E-13	< 1.11E-02
1.46E+11						
33918-3	^{235}U	6.02E-15	N/A	1.00E-16	9.00E-14	6.69E+00
Second Quarter 2000	^{230}Th	< 1.00E-16	6.56E-18	1.00E-16	2.00E-14	< 5.00E-01
Air Volume in mLs	^{226}Ra	< 1.00E-16	2.63E-18	1.00E-16	9.00E-13	< 1.11E-02
1.44E+11						

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

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HIGH VOLUME AIR SAMPLING REPORT**CLIENT: HOMESTAKE MINING COMPANY - GRANTS, NEW MEXICO****REPORT DATE: July 24, 2000****SAMPLE ID: HMC 4**

Quarter/Date Sampled Air Volume	Radionuclide	Conc. $\mu\text{Ci/mL}$	Error Est. $\mu\text{Ci/mL}$	L.L.D. $\mu\text{Ci/mL}$	Effluent Conc.* $\mu\text{Ci/mL}$	% of Effluent Concentration
31661-4 First Quarter 2000 Air Volume in mLs 1.38E+11	^{235}U	2.42E-16	N/A	1.00E-16	9.00E-14	2.69E-01
	^{230}Th	< 1.00E-16	1.51E-17	1.00E-16	2.00E-14	< 5.00E-01
	^{226}Ra	< 1.00E-16	9.59E-18	1.00E-16	9.00E-13	< 1.11E-02
33918-4 Second Quarter 2000 Air Volume in mLs 1.41E+11	^{235}U	1.05E-14	N/A	1.00E-16	9.00E-14	1.17E+01
	^{230}Th	< 1.00E-16	1.21E-17	1.00E-16	2.00E-14	< 5.00E-01
	^{226}Ra	< 1.00E-16	1.07E-17	1.00E-16	9.00E-13	< 1.11E-02

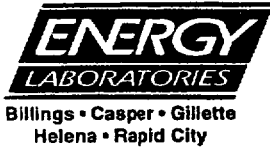
N/A not applicable for ICP-MS

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

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HIGH VOLUME AIR SAMPLING REPORT**CLIENT: HOMESTAKE MINING COMPANY - GRANTS, NEW MEXICO****REPORT DATE: July 24, 2000****SAMPLE ID: HMC 5**

Quarter/Date Sampled Air Volume	Radionuclide	Conc. $\mu\text{Ci/mL}$	Error Est. $\mu\text{Ci/mL}$	L.L.D. $\mu\text{Ci/mL}$	Effluent Conc.* $\mu\text{Ci/mL}$	% of Effluent Concentration
31661-5 First Quarter 2000 Air Volume in mLs 1.44E+11	^{nat} U	5.33E-16	N/A	1.00E-16	9.00E-14	5.92E-01
	²³⁰ Th	< 1.00E-16	9.19E-18	1.00E-16	2.00E-14	< 5.00E-01
	²²⁶ Ra	< 1.00E-16	5.25E-18	1.00E-16	9.00E-13	< 1.11E-02
33918-5 Second Quarter 2000 Air Volume in mLs 1.44E+11	^{nat} U	6.21E-14	N/A	1.00E-16	9.00E-14	6.90E+01
	²³⁰ Th	< 1.00E-16	1.18E-17	1.00E-16	2.00E-14	< 5.00E-01
	²²⁶ Ra	< 1.00E-16	2.63E-18	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

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HIGH VOLUME AIR SAMPLING REPORT**CLIENT: HOMESTAKE MINING COMPANY - GRANTS, NEW MEXICO****REPORT DATE: July 24, 2000****SAMPLE ID: HMC 6**

Quarter/Date Sampled Air Volume	Radionuclide	Conc. $\mu\text{Ci/mL}$	Error Est. $\mu\text{Ci/mL}$	L.L.D. $\mu\text{Ci/mL}$	Effluent Conc.* $\mu\text{Ci/mL}$	% of Effluent Concentration
31661-6 First Quarter 2000 Air Volume in mLs 1.46E+11	^{235}U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	^{230}Th	< 1.00E-16	7.77E-18	1.00E-16	2.00E-14	< 5.00E-01
	^{226}Ra	< 1.00E-16	6.47E-18	1.00E-16	9.00E-13	< 1.11E-02
33918-6 Second Quarter 2000 Air Volume in mLs 1.42E+11	^{235}U	6.15E-15	N/A	1.00E-16	9.00E-14	6.84E+00
	^{230}Th	< 1.00E-16	7.99E-18	1.00E-16	2.00E-14	< 5.00E-01
	^{226}Ra	< 1.00E-16	6.65E-18	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

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RADIOCHEMICAL QUALITY ASSURANCE REPORT - HOMESTAKE MINING COMPANY

Laboratory ID Range:

Sample Matrix:

Sample Date:

Date Received:

Report Date:

31661-1-7

Air Filter

1st Quarter 2000

03-29-00

April 21, 2000

Method	Relative Percent Difference ¹	Spike Recovery (Percent) ²	LCS Recovery (Percent)	Method Blank µCi/mL	Date Analyzed	Analyst
--------	--	---	------------------------------	---------------------------	------------------	---------

Laboratory #:

Uranium:

20596-2

20596-3

200.8

0.0

96

-

<1.00E-16

04-05-00

TS

Laboratory #:

Radium-226:

31704-5

31704-4

RA-81

903.0

0.54*

92

97

<1.00E-16

04-13-00

RS

Laboratory #:

Thorium-230:

31700-1

31700-1

AS-28

907.0

14.4

106

115

<1.00E-16

04-10-00

PH

Digestion:

Volume

Units

SW3050

1.89

Liter

03-31-00

RCB

*Replicate Error Ratio used instead of RPD. See note (3).

- (1) These values are an assessment of analytical precision. The acceptance range is 0-20% for sample results above 10 times the reporting limit. This range is not applicable to samples with results below 10 times the reporting limit.
- (2) These values are an assessment of analytical accuracy. They are a percent recovery of the spike addition. ELI performs a matrix spike on 10 percent of all samples for each analytical method.
- (3) These values are an assessment of analytical precision. The acceptance range is 0-2% for sample results below 10 times the reporting limit. This range is not applicable to samples with results above 10 times the reporting limit.

Report Approved By:

STEVEN W. CONLING
DATA VALIDATOR

Reviewed By:

STEVEN E. CONLING
CHARGES SUPERVISOR

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TEACHING CO. PAGE NO.
31704-00-101



**RADIOCHEMICAL QUALITY ASSURANCE REPORT
HOMESTAKE MINING COMPANY**

Laboratory ID Range:

33918-1-7

Sample Matrix:

Air Filter

Sample Date:

2nd Quarter 2000

Date Received:

06-29-00

Report Date:

July 24, 2000

	<u>Method</u>	<u>Relative Percent Difference¹</u>	<u>Spike Recovery (Percent)²</u>	<u>LCS Recovery (Percent)</u>	<u>Method Blank μCi/mL</u>	<u>Date Analyzed</u>	<u>Analyst</u>
Laboratory #:		33920-1	33920-2				
Uranium:	200.8	1.23	101	-	< 1.00E-16	07-11-00	ts
Laboratory #:		33960-1	33960-2		RA-171		
Radium-226:	903.0	15.7	96	105	< 1.00E-16	07-18-00	rs
Laboratory #:		33918-7	33918-7		AS-62		
Thorium-230:	907.0	10.5	94	100	< 1.00E-16	07-13-00	ph
		<u>Volume</u>	<u>Units</u>				
Digestion:	SW3050	1.89	Liter			07-10-00	rcb

(1) These values are an assessment of analytical precision. The acceptance range is 0-20% for sample results above 10 times the reporting limit. This range is not applicable to samples with results below 10 times the reporting limit.

(2) These values are an assessment of analytical accuracy. They are a percent recovery of the spike addition. ELI performs a matrix spike on 10 percent of all samples for each analytical method.

Report Approved By:

D. R. G. A.

Reviewed By:

C. R. G. A.
C. R. G. A.
Project Manager

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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	1/3/2000 - 6/23/2000	1.4E-09	3.4E-10	14	1.7E-10
Hi-Vol #2 NE Outer Perimeter	1/3/2000 - 6/23/2000	1.5E-09	3.6E-10	15	1.7E-10
Hi-Vol #3 E Outer Perimeter	1/3/2000 - 6/23/2000	1.2E-09	3.2E-10	12	1.7E-10
Hi-Vol #4 S Outer Perimeter	1/3/2000 - 6/23/2000	1.9E-09	4.1E-10	19	1.7E-10
Hi-Vol #5 N of Nearest Residence	1/3/2000 - 6/23/2000	1.2E-09	3.2E-10	12	1.7E-10
Hi-Vol #6 W of Outer Perimeter	1/3/2000 - 6/23/2000	1.1E-09	3.1E-10	11	1.7E-10
HMC #7 S Boundary	1/3/2000 - 6/23/2000	1.0E-09	2.9E-10	10	1.7E-10
HMC #16 Background	1/3/2000 - 6/23/2000	9.0E-10	2.7E-10	9	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
TLD Perimeter Survey

Direct Radiation Measurements

Location	Monitoring Period	Exposure Rate (mrem/qr)	Error (mrem/qr)*
Hi-Vol #1 N Outer Perimeter	1/1/2000 - 7/7/2000	23.0	0.8
Hi-Vol #2 NE Outer Perimeter	1/1/2000 - 7/7/2000	28.2	10.3
Hi-Vol #3 E Outer Perimeter	1/1/2000 - 7/7/2000	22.8	2.8
Hi-Vol #4 S Outer Perimeter	1/1/2000 - 7/7/2000	33.7	8.8
Hi-Vol #5 N of Nearest Residence	1/1/2000 - 7/7/2000	30.9	8.0
Hi-Vol #6 W of Outer Perimeter	1/1/2000 - 7/7/2000	30.9	8.0
#16 Background	1/1/2000 - 7/7/2000	26.0	3.3

*Error is 1.96 std. dev.