BASELINE DATA REPORT

Section 2.0

Climatology and Air Quality

JANUARY 2011

Revision 1

Submitted To:

New Mexico Mining and Minerals Division
&
U.S. Forest Service (Cibola National Forest)
&
New Mexico Environment Department

Prepared by:

Roca Honda Resources, LLC
4001 Office Court, Suite 102, Santa Fe, NM 87507

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2.0 Climatology and Air Quality

NMAC 19.10.6.602 D.(13) (a)

Baseline data shall include, as applicable:
(a) A description of the climatological factors representative of the permit area, including precipitation, prevailing winds, and temperature.

2.1 Regional Climate

Climate in the Roca Honda permit area may be classified as arid to semiarid continental, characterized by cool, dry winters, and warm, dry summers. The area is in the north end of climate division 4 (Southwestern Mountains) for New Mexico (Sheppard et al. 1999). Abundant sunshine, low relative humidity, and large annual and diurnal ranges in temperature are characteristics of this climate division, which is a significant distance from any source of oceanic moisture (600 miles from the Pacific Ocean and 800 miles from the Gulf of Mexico).

Winter is the driest season, and what precipitation falls (mostly as snow) is from storms that form in the Pacific Ocean, move inland, and lose most of their moisture in the mountains of California and Arizona. Snow falls from November through March and is light on the valley floors, but increases at higher elevations of the nearby mesas and mountains. The estimated average annual snowfall is 26 inches (660 mm) for the San Juan Basin (U.S. Department of Interior 1980). (Note the use of SI units (International system of units) for climatological data per NM MMD request.)

The wettest period is in late summer and early fall. Approximately half of the annual precipitation in this region falls in this period from July through September, which averages more than 50 days of brief thunderstorms per year. The storms are sometimes heavy and can be accompanied by hail and strong, gusty winds (Baldwin 1973). These storms may bring several inches of rain to small areas in a short time, and runoff frequently causes local flash floods. In addition, precipitation events lasting several days may occur occasionally in September and October when tropical cyclones move into the area from the Gulf of Mexico or Gulf of California.

Estimates of relative humidity for this region are from the soil survey of the McKinley County area (NRCS 2006). Relative humidity is highest in the early morning when it is approximately 70 percent in the winter and 45 percent in the summer. As the day progresses and temperature rises relative humidity typically falls to approximately 40 percent in the winter and 15 to 20 percent in the summer (NRCS 2006). June is usually the driest month, and mid-afternoon relative humidity is typically less than 15 percent. In June, the sun shines approximately 80 to 85 percent of the time, while in the rest of the summer it shines approximately 75 to 80 percent of the time. In winter, sunshine drops to approximately 65 to 70 percent of the time.

The annual rate of evaporation is approximately 75 to 80 inches (1905 mm to 2032 mm) as measured by standard evaporation pans, shown for the region in the Ground Water Atlas of the United States, Segment 2 (Robson and Banta 1995). Net lake evaporation for the region is 30 to 40 inches (762 mm to 1016 mm) per year (New Mexico Interstate Stream Commission and New Mexico Office of the State Engineer 2002). Table 2-1 gives pan evaporation rates for two

measuring stations near the permit area (Mt. Taylor Mill Site and Laguna, New Mexico). Both indicate yearly evaporation rates of about 63 inches (1600 mm) per year.

Table 2-1. Montly Pan Evaporation Rates in inches (mm) for Two Sites near the Permit Area

Location	Period of Record	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Mt. Taylor[1]	1976-1977	-	-	3.83 (97.3)	8.09 (205.5)	9.07 (230.4)	12.08 (306.8)	9.70 (246.4)	8.80 (223.5)	6.36 (164.5)	4.65 (118.1)	-	-	62.58 (1590)
Laguna[3]	1914-2005	-	-	0.00 (0.00)	8.47 (215.1)	9.33 (237.0)	11.98 (304.3)	10.76 (273.3)	8.88 (225.6)	6.83 (173.5)	5.00 (127.0)	1.98 (50.3)	-	63.23 (1606)

[1]Located at the Mt. Taylor Uranium Mill Project Monitoring Site #5
[2]Many stations do not sample during winter months. A "-" indicates no measurement was taken
[3]Source: http://www.wrcc.dri.edu/htmlfiles/westevap.final.html

Large-scale (or synoptic) winds in the region are most frequently from the southwest and west and are strongest between March and June, with the highest average speeds in March. Winds up to 59.9 mph (26.8 meters per second) can accompany frontal activity associated with late winter and spring low pressure systems and thunderstorms (Baldwin 1973). The strong spring winds often bring considerable dust into the area.

Maps produced by the Western Regional Climate Center using precipitation data from 1961 to 1990 indicate that the permit area has an average rainfall of less than 12 inches (304.8 mm). Average statewide precipitation for that same time period was 13.9 inches (351.8 mm) (WRCC 2009b).

2.2 Climatological Factors Representative of the Permit Area

Weather stations near the Roca Honda permit area with available weather statistics include San Mateo and Grants. The San Mateo weather station ceased operation in 1988 and had two separate reporting locations during its history. From 4/4/1918 to 11/19/1958 and again from 2/17/1966 to 2/29/1988, it was located in the community of San Mateo at an elevation of approximately 7,230 feet (ft). From 11/20/1958 to 2/16/1966, the station was located at the Floyd Lee Ranch approximately 1.5 miles southeast of the current Roca Honda weather station, at an elevation of approximately 7,075 ft. Figure 2-1 shows these locations relative to the permit area. These two locations are 1.5 miles apart and at similar elevations and are considered to be a single reporting location or station. This station has a Cooperative Observer Program (COOP) ID of 297918. Records can be accessed from the Western Regional Climate Center website, www.wrcc.dri.edu. The Grants location is at the Grants-Milan Airport approximately 20 miles southwest of the Roca Honda permit area at an elevation of 6,520 ft. This location recorded conditions from 1953 to the present and has a COOP ID of 293682. Records can be accessed from the National Climatic Data Center website, www.ncdc.noaa.gov.

Weather at San Mateo should be very similar to conditions at the Roca Honda permit area because of proximity and similar elevations. The RHR meteorological station was installed in Section 16, as shown on, Figure 2-1 in November 2007 and is at an elevation of 7,257 ft. Temperature and precipitation are similar at the two locations. The largest difference is in temperature. Mean annual temperatures were approximately 45.0° F (7.2° C) and 51.1° F (10.6° C) at San Mateo and Grants, respectively. This difference is consistent with the 600-ft elevation gain from Grants to San Mateo and the expected temperature decrease of approximately 5° F (2.7° C) for each 1,000 ft of elevation (Tuan et al. 1973).

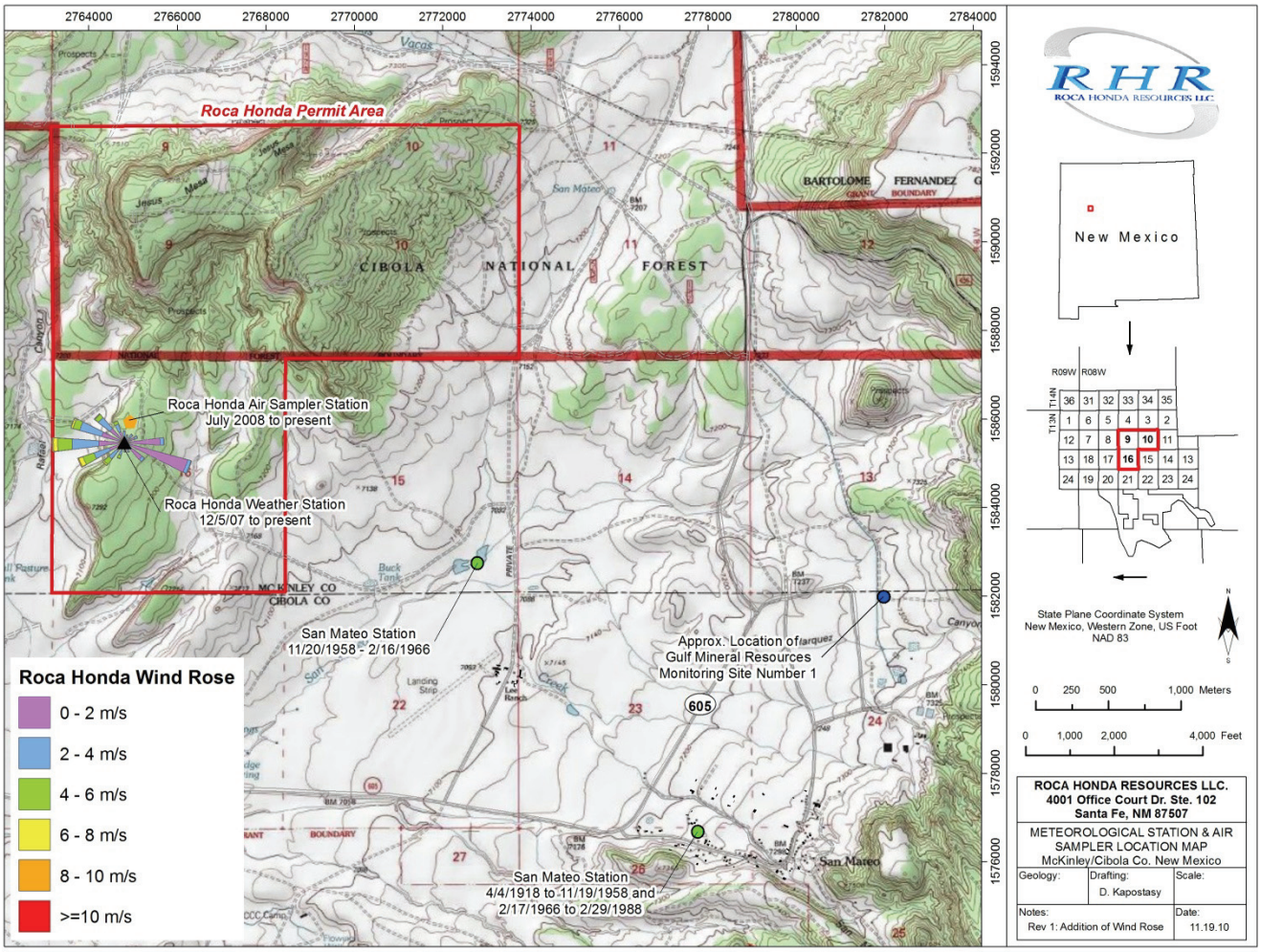


Figure 2-1. Meteorological Station Locations and Air Sampler Location

2.2.1 Precipitation

Annual average precipitation at the San Mateo weather station over the period of record, (i.e., 4/4/1918 - 2/29/1988) was 8.8 inches (224.5 mm) (See Table 2-2). This is less than expected given the elevation of the ranch and probably results from its location on a valley floor with topographic features that rise more than 1,000 ft to the southwest (La Jara Mesa) and east (Mesa Chivato and Mt. Taylor). The topographic features may block precipitation and create a rain shadow.

The months of July, August, and September average monthly precipitation amounts for San Mateo are 1.7, 2.2, and 1.1 inches (42.7, 54.9, and 28.2 mm), respectively (Table 2-2). The highest monthly precipitation during any month at San Mateo was 4.4 inches (111.3 mm) in August 1948 (Gulf Mineral Resources Company [GMRC] 1979). The highest single-day precipitation records at the Grants, Thoreau, McGaffey, and Zuni weather stations range from 1.9 to 2.6 inches (48.3 to 66.0 mm) produced by thunderstorms (NRCS 2006). Point Precipitation Frequency Estimates for San Mateo show that high rainfall events can occur (Bonnin et al. 2006).

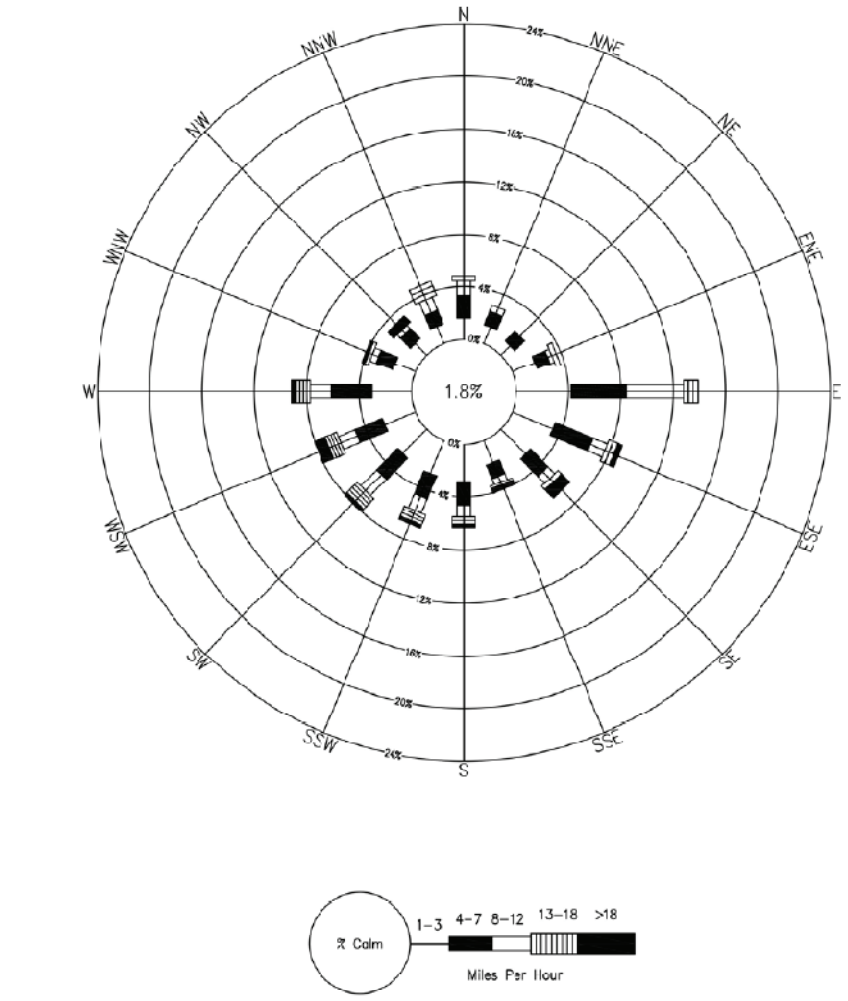
The San Mateo weather station is near the valley floor and receives an annual average snowfall of approximately 11.7 inches (297 mm), which is much less than the average snowfall for some other parts of the San Juan basin. Snowfall increases dramatically above the valley floors. Thoreau, approximately 40 miles west of San Mateo, has a similar elevation but is located on a slope above the valley floor and receives approximately 32.0 inches (813 mm) of snow annually (NRCS 2006).

Table 2-2. Monthly and Annual Climate Summary of Temperature and Precipitation for the San Mateo NM COOP Weather Station

Period of Record: April 4, 1918 to February 29, 1988													
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Average Max. Temperature ° F (° C)	40.6 (4.78)	44.4 (6.89)	51.6 (10.9)	61.0 (16.1)	70.5 (21.4)	81.1 (27.3)	82.9 (28.3)	79.5 (26.4)	73.2 (22.9)	63.0 (17.2)	50.9 (10.5)	41.4 (5.2)	61.7 (16.5)
Average Min. Temperature ° F (° C)	15.4 (-9.22)	19.0 (-7.23)	25.2 (-3.78)	30.7 (-0.72)	40.4 (4.67)	50.0 (10.0)	55.0 (12.8)	53.2 (11.8)	46.3 (7.94)	35.9 (2.17)	25.3 (-3.72)	17.0 (-8.33)	34.4 (1.33)
Average Total Precip. in inches (mm)	0.38 (9.65)	0.29 (7.37)	0.37 (9.40)	0.30 (7.62)	0.49 (12.4)	0.52 (13.2)	1.7 (42.7)	2.2 (54.9)	1.1 (28.2)	0.74 (18.8)	0.45 (11.4)	0.35 (8.89)	8.8 (224.5)
Average Total Snowfall in inches (mm)	3.00 (76.2)	2.30 (58.4)	1.50 (38.1)	0.10 (2.54)	0.10 (2.54)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.30 (7.62)	1.30 (33.0)	3.10 (78.7)	11.7 (297.1)

2.2.2 Prevailing Winds

Local wind conditions at the Roca Honda permit area are affected by topographic features that modify general synoptic wind patterns. Wind measurements were not made at the San Mateo weather station, but several short-term meteorological monitoring stations were established in the middle to late 1970s in the vicinity of the proposed GMRC Mt. Taylor Uranium Mill Project. One of these stations, Monitoring Site No. 1, located 1.5 to 2 miles east-southeast of the Roca Honda permit area and approximately 1 mile north of the community of San Mateo, as shown in Figure 2-1, measured wind direction and speed for 1 year. Figure 2-2 is a wind rose diagram of that data. These measurements are expected to be representative for conditions in the San Mateo valley (GMRC 1979).



Monitoring Site No. 1
Period of Record
FEB. 1976- FEB. 1977

Source: Gulf Mineral Resources, 1979

Figure 2-2. Wind Rose Diagram for GMRC Monitoring Site

2.2.3 Temperature

The monthly and annual climate summary of average temperature and precipitation for the San Mateo weather station shows that temperature extremes have ranged from a low of -35.0° F (-37.2° C) in January 1971 to a high of 102.9° F (39.4° C) in June 1962 (GMRC 1979). Average high and low temperatures are 40.6° F (4.78° C) and 15.4° F (-9.22° C) for the coldest month (January) and are 82.9° F (28.3° C) and 55.0° F (12.8° C) for the warmest month (July), respectively. Average diurnal variation throughout the year at San Mateo is generally 25° F to 30° F (approximately 15° C).

2.3 Site Climatology

The Roca Honda permit area is at an elevation between 7,075 ft and 7,857 ft, which is 0 to 750 ft above the San Mateo Creek valley floor. The highest elevation in the permit area is atop Jesus Mesa in Section 9 at 7,857 ft. As discussed earlier, characteristics of temperature, precipitation, evaporation rates, and wind conditions for the Roca Honda permit area can be estimated from the San Mateo and Grants weather stations and from short-term meteorological monitoring stations established in the mid to late 1970s for the proposed Mt. Taylor Uranium Mill Project.

An RHR meteorological station was installed in Section 16 of the permit area in November 2007 and began recording data at 15:00 on December 5, 2007 (See Figure 2-1). This station will provide site-specific data for the proposed mine. The station is currently recording on hourly intervals and reports temperature, relative humidity, precipitation, wind speed and direction, barometric pressure and will be further modified in accordance with future air permit requirements. A Roca Honda weather station will be operated on an ongoing basis throughout the life of the project.

Current results from the period December 5, 2007 to January 12, 2010 and March 9, 2010 to September 16, 2010 are given in Table 2-3 and Figures 2-3 to 2-6. The meteorological station was shut down during the winter of 2010 so that instruments could be calibrated, and represents a 2 month data gap. These data will supplement historical local meteorological data described above.

Table 2-3. Monthly and Annual Average Climate Summary for the Roca Honda Weather Station

Period of Record: December 5, 2007 to January 12, 2010 and March 9, 2010 to September 16, 2010													
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Average Max. Temp. ° F (°C)	40.5 (4.72)	46.5 (8.08)	52.0 (11.1)	59.0 (15.0)	68.4 (20.2)	78.4 (25.8)	81.0 (27.2)	79.5 (26.4)	73.2 (22.9)	61.2 (16.2)	53.4 (11.9)	38.9 (3.81)	61.0 (16.1)
Average Min. Temp. ° F (°C)	21.1 (-6.07)	26.0 (-3.35)	28.9 (-1.75)	34.9 (1.62)	44.3 (6.84)	53.4 (11.9)	58.8 (14.9)	57.0 (13.9)	50.4 (10.2)	39.1 (3.93)	31.1 (-0.49)	20.3 (-6.50)	38.8 (3.76)
Average Total Precipitation[1] in inches (mm)	0.04 (1.14)	0.03 (0.76)	0.34 (8.76)	0.67 (17.0)	0.50 (12.6)	0.98 (24.9)	2.24 (56.9)	1.37 (34.7)	0.90 (22.9)	0.87 (22.1)	0.12 (3.16)	0.38 (9.65)	8.45 (214.6)
Average Relative Humidity (%)	56.1	47.7	40.1	31.5	31.1	27.5	46.6	42.8	42.0	39.7	43.5	59.9	42.4
Average Wind Speed in mph (m/s)	4.16 (1.86)	5.17 (2.31)	6.13 (2.74)	7.00 (3.13)	6.26 (2.80)	5.48 (2.45)	4.32 (1.93)	4.23 (1.89)	4.05 (1.81)	4.65 (2.08)	4.12 (1.84)	4.79 (2.14)	5.01 (2.24)
Average Wind Direction (deg)	187.0	203.0	222.4	225.9	214.5	210.3	204.4	203.5	194.3	197.5	191.8	207.9	205.2
Average Barometric Pressure (mbar)	1005.3	1016.1	1024.8	1029.1	1035.4	1039.0	1039.6	1035.3	1026.8	1012.1	1004.6	999.78	1022.3

[1]*Precipitation data begins in September 2008 due to a malfunction with the rain gauge*

The data given above represent a small overall sample size (31 months) as compared to the Grants and San Mateo weather stations, but does represent actual site data that will continued to be gathered during the duration of the project average daily, minimum, and maximum temperatures are shown in Figure 2-3. Precipitation data were gathered for a period of 22 months starting in September 2008 after a malfunction of the rain gauge was corrected. Figure 2-4 shows total monthly precipitation. Average monthly wind speed is shown if Figure 2-5. A

wind rose indicating wind speed and direction are shown in Figure 2-6. Prevailing wind direction at the permit area during the sampling period is from the west, west-southwest, west-northwest, northwest, and southwest.

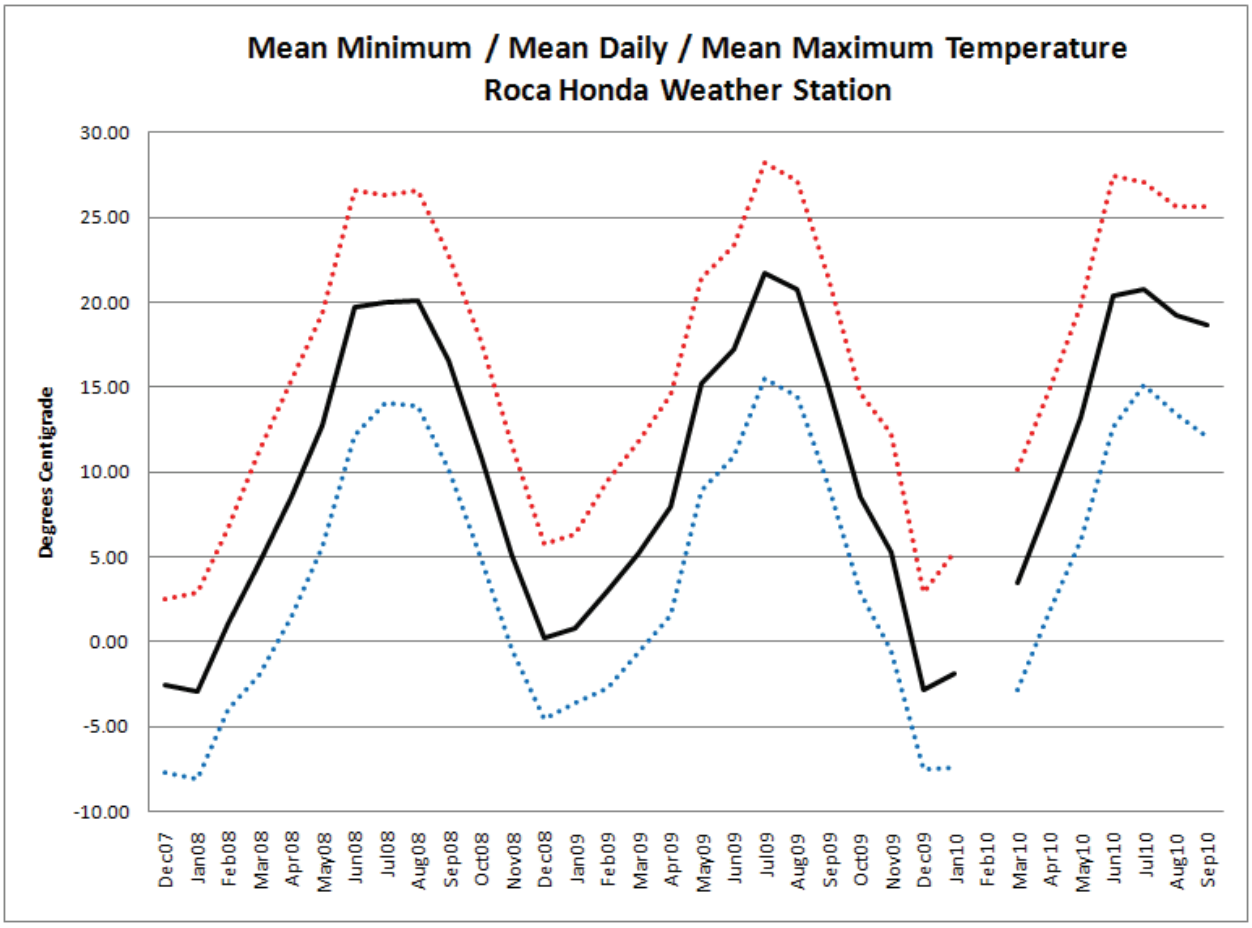


Figure 2-3. Mean Minimum, Maximum and Daily Temperature Data for the Roca Honda Permit Area

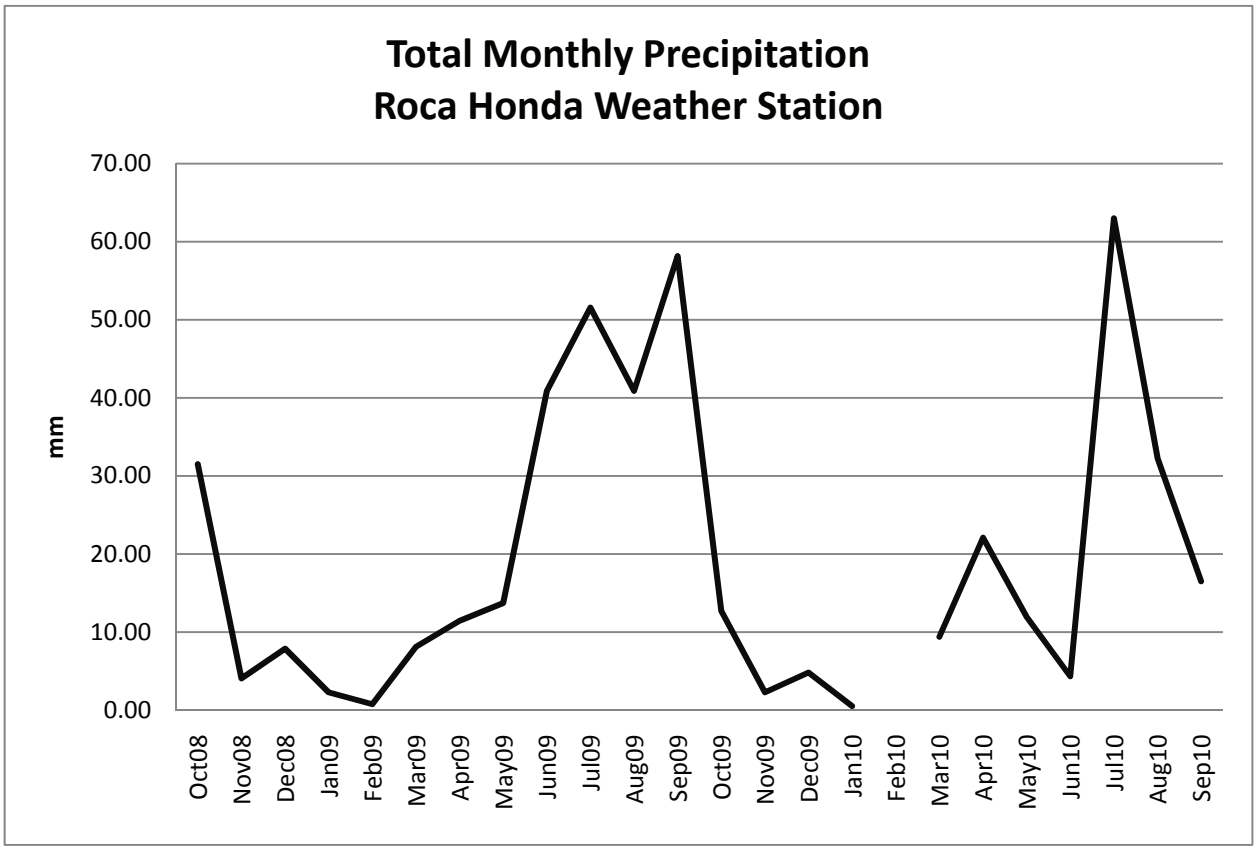


Figure 2-4. Total Monthly Precipitation for the Roca Honda Permit Area

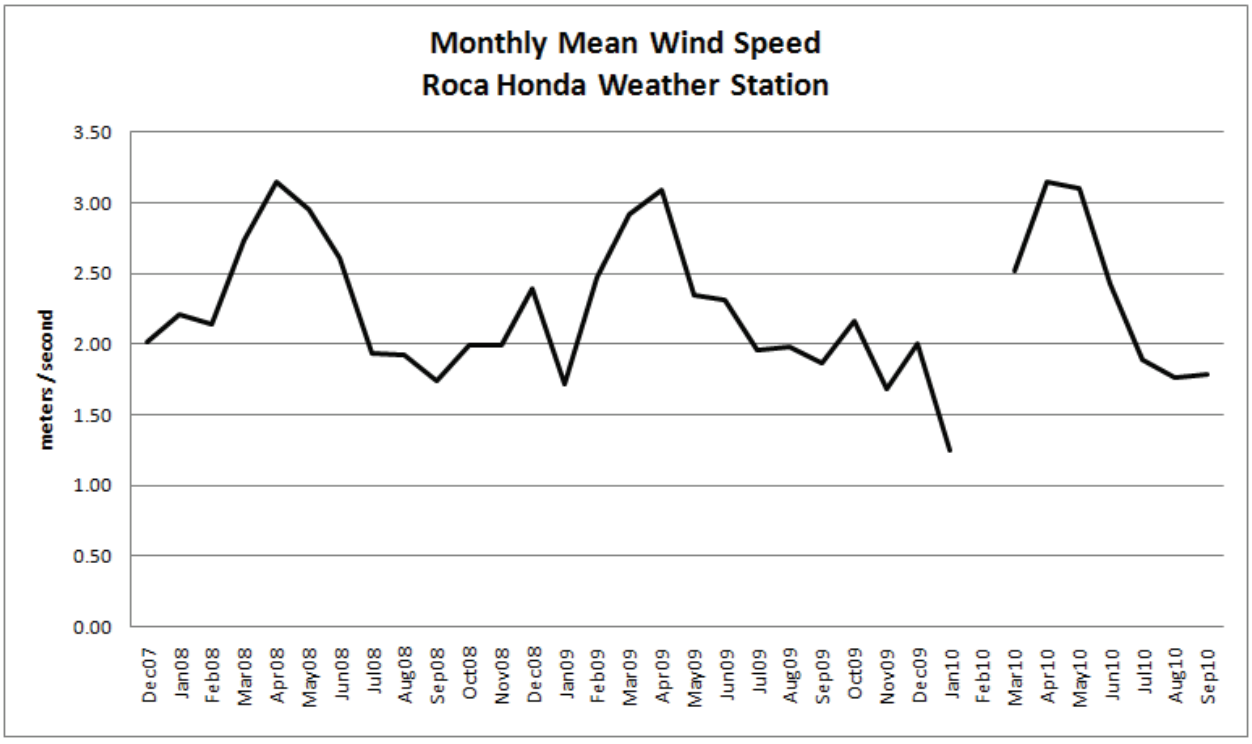


Figure 2-5. Monthly Mean Wind Speed for the Roca Honda Permit Area

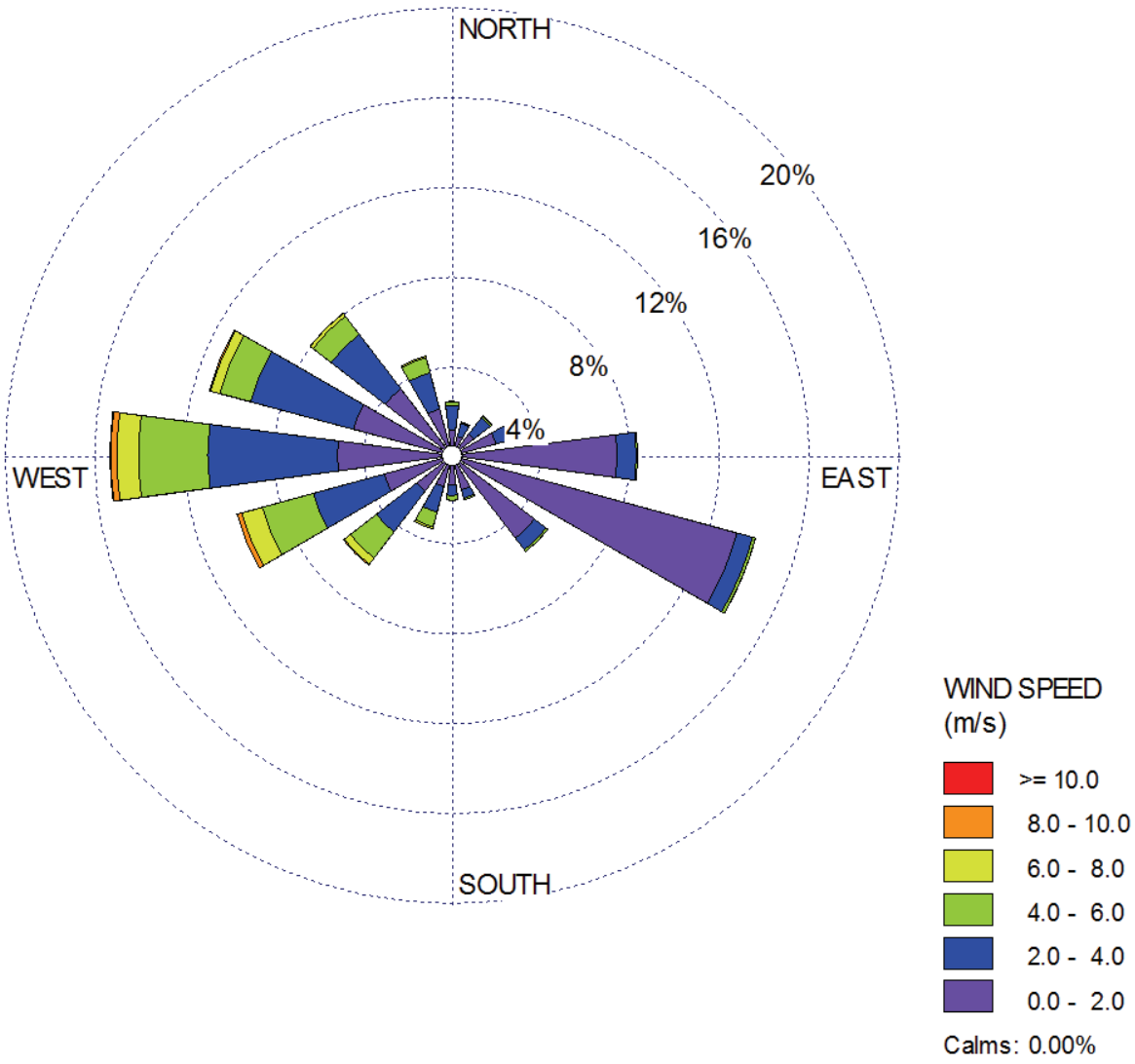


Figure 2-6. Wind Rose Diagram for Roca Honda Weather Station (Sec. 16, T13N, R08W)

The data provided in Table 2-3 are for the lower elevation areas at the Roca Honda permit area. Projected temperature values for the top of Jesus Mesa and the high mesa in Section 10 will be approximately 3.5° F (1.9° C) colder than at the Roca Honda weather station. This is because temperature decreases approximately 5° F (2.7° C) for every 1,000 ft of elevation gain. The higher elevations of these mesa tops will also cause a localized orographic effect increasing both rain and snowfall totals on the mesas compared to values recorded at the Roca Honda weather station. Monthly pan evaporation rate measurements at one monitoring site for the Mt. Taylor Uranium Mill Project were highest in June, about 12 inches (304.8 mm), and lower, 8 to 10 inches (203.2 to 254.0 mm) in April, May, July, and August (GMRC 1979). Total evaporation for the year was approximately 63 inches (1600 mm). Pan evaporation rates in the Roca Honda permit area are expected to be similar. Pan evaporation will be measured at the Roca Honda weather station beginning in 2011.

2.4 Site Air Quality

The Roca Honda permit area is located in the Southwestern Mountains – Augustine Plains Intrastate Air Quality Control Region in northwestern NM. The entire area has been classified by the U.S. Environmental Protection Agency (EPA) as National Ambient Air Quality Standards (NAAQS) attainment area (EPA 2007a). The Clean Air Act of 1990 required EPA to set NAAQS for six criteria pollutants considered harmful to public health and the environment. An "attainment area," for any of the air pollutants, is an area which is shown by monitored data or air quality modeling not to exceed the ambient air quality standard for such pollutant. Further, there are no Prevention of Significant Deterioration Class I areas in Northwestern NM (EPA 2007b). Total suspended particulate matter (TSP) is an additional regulated air constituent of air quality concern in New Mexico. Natural sources of TSP in the area typically include wind-blown dust and vehicle traffic on unpaved roads. The Roca Honda weather station and particulate monitoring will be improved in 2011 to meet the air permit requirements for modeling.

An air quality monitoring station was installed at the Roca Honda permit area in Section 16, as shown on Figure 2-1, for the purpose of monitoring background levels of radioparticulates, radon, and gamma activity. The station was installed in July, 2008 and has been in continuous operation to date and will continue in 2011. Tables 2-4 to 2-8 show the results of the first eight quarters of sampling.

Individual air filter samples collected on a bi-weekly basis (and sent to the lab quarterly) were analyzed for levels of gross-alpha and gross-beta (Table 2-4). A compilation of all the bi-weekly samples for one quarter is analyzed for radium-226 and thorium isotopes (Table 2-5), and uranium isotopes and total uranium (Table 2-6). Radon concentrations are measured using alpha-track detectors which are collected on a quarterly basis (Table 2-7). Gamma is measured using thermoluminescent dosimeters which are also collected on a quarterly basis (Table 2-8). A control dosimeter is located inside the RHR Grants, NM office. The control and field dosimeters are collected the same day and shipped to the laboratory for analysis.

Sampling results are illustrated in Figures 2-7 to 2-11. The results for the bi-weekly airborne alpha and beta counts are shown in Figures 2-7a/b. The average activity levels for radium and thorium isotopes are shown in Figures 2-8 a/b/c/d/e. Figure 2-9 shows the total uranium isotope level for the each sample over the period; the average level for the combined isotopes U-234, U-235 and U-238 is 0.7 pCi. Figure 2-10 illustrates the airborne radon gas monitoring results; each data point is the average of two samples. In Figure 2-11, the difference between the corresponding environmental gamma dosimeter and the control gamma dosimeter is illustrated.

The trends for all species reported in Tables 2-4 to 2-8, and illustrated in Figures 2-7 to 2-11, are stable and show the expected random distributions for the individual data points. These data provide a stable baseline for comparison with future samples.

Table 2-4. Gross Alpha/Gross Beta (results to date)

	Sample ID	Collection Time	Gross-Alpha 900 DC	Gross-Alpha +/-	Gross-Beta 900 DC	Gross-Beta +/-	Units
2008 QTR3 July - Sept	RH-01-2008-08-22-F	10:20:00 AM	1.38	0.6	14.2	2.7	pCi/Sample
	RH-01-2008-09-08-F	10:20:00 AM	1.36	0.6	13.4	2.6	pCi/Sample
	RH-01-2008-09-24-F	11:30:00 AM	0.89	0.56	16.6	2.9	pCi/Sample
	RH-01-2008-09-24-F	11:30:00 AM	1.11	0.48	15	3.1	pCi/Sample
	RH-01-2008-10-08-F	10:55:00 AM	1.09	0.56	14.9	2.8	pCi/Sample
2008 QTR4 Oct - Dec	RH-01-2008-10-27-F	10:36:00 AM	2.82	0.92	17.8	3.3	pCi/Sample
	RH-01-2008-11-06-F	1:54:00 PM	1.14	0.57	9.3	2	pCi/Sample
	RH-01-2008-11-19-F	10:43:00 AM	0.87	0.48	7.8	1.7	pCi/Sample
	RH-01-2008-12-04-F	2:00:00 PM	2.16	0.79	15.3	2.9	pCi/Sample
	RH-01-2008-12-18-F	1:12:00 PM	0.72	0.45	7.4	1.7	pCi/Sample
	RH-01-2008-12-31-F	10:10:00 AM	0.09	0.23	6.2	1.5	pCi/Sample
2009 QTR1 Jan - Mar	RH-01-2009-01-14-F	11:47:00 AM	1.91	0.74	9.2	2	pCi/Sample
	RH-01-2009-01-29-F	1:17:00 PM	1.57	0.66	12.7	2.5	pCi/Sample
	RH-01-2009-02-12-F	9:35:00 AM	1.35	0.62	9	1.9	pCi/Sample
	RH-01-2009-03-05-F	11:18:00 AM	0.95	0.54	14.4	2.8	pCi/Sample
	RH-01-2009-03-19-F	10:00:00 AM	0.68	0.43	11.5	2.3	pCi/Sample
	RH-01-2009-03-31-F	9:48:00 AM	0.38	0.36	10.2	2.1	pCi/Sample
2009 QTR2 Apr - June	RH-01-2009-04-14-F	9:45:00 AM	1.73	0.71	8.3	1.8	pCi/Sample
	RH-01-2009-04-29-F	11:35:00 AM	1.76	0.72	11.4	2.3	pCi/Sample
	RH-01-2009-05-26-F	9:10:00 AM	3.4	1.0	19.8	3.6	pCi/Sample
	RH-01-2009-06-03-F	2:30:00 PM	0.79	0.46	9.0	1.9	pCi/Sample
	RH-01-2009-06-16-F	4:30:00 PM	0.81	0.49	9.5	2.0	pCi/Sample
	RH-01-2009-07-06-F	10:00:00 AM	0.73	0.46	14.5	2.8	pCi/Sample
2009 QTR3 July - Sept	RH-01-2009-08-03-F	1:45:00 PM	3.09	0.99	21.1	3.9	pCi/Sample
	RH-01-2009-08-18-F	12:45:00 PM	1.10	0.54	7.8	1.7	pCi/Sample
	RH-01-2009-08-31-F	11:55:00 AM	1.34	0.61	14.4	2.8	pCi/Sample
	RH-01-2009-09-16-F	2:45:00 PM	1.6	0.68	13.1	2.6	pCi/Sample
	RH-01-2009-09-29-F	10:15:00 AM	0.92	0.52	13.3	2.6	pCi/Sample
2009 QTR4 Oct - Dec	RH-01-2009-10-19-F	10:55:00 AM	2.6	0.91	16.1	3.1	pCi/Sample
	RH-01-2009-11-06-F	12:15:00 PM	1.84	0.74	14.8	2.9	pCi/Sample
	RH-01-2009-11-23-F	10:05:00 AM	2.66	0.91	21.4	3.9	pCi/Sample
	RH-01-2009-12-14-F	9:50:00 AM	1.59	0.69	19.9	3.7	pCi/Sample
	RH-01-2010-01-04-F	9:55:00 AM	1.02	0.54	14.4	2.8	pCi/Sample
2010 QTR1 Jan - Mar	RH-01-2010-02-03-F	10:00:00 AM	4.5	1.3	28.6	5.1	pCi/Sample
	RH-01-2010-02-17-F	10:35:00 AM	1.63	0.68	11.3	2.3	pCi/Sample
	RH-01-2010-03-09-F	11:00:00 AM	1.61	0.69	16.5	1.5	pCi/Sample
	RH-01-2010-03-31-F	9:15:00 AM	1.02	0.55	15.2	2.9	pCi/Sample
2010 QTR2 Apr - June	RH-01-2010-04-14-F	12:30:00 PM	1.09	0.56	9.9	2.1	pCi/Sample
	RH-01-2010-05-04-F	11:25:00 AM	1.59	0.69	10.9	2.3	pCi/Sample
	RH-01-2010-05-18-F	1:00:00 PM	1.25	0.60	10.4	2.2	pCi/Sample
	RH-01-2010-06-01-F	1:05:00 PM	1.5	0.66	11.4	2.3	pCi/Sample
	RH-01-2010-06-21-F	3:30:00 PM	1.19	0.59	17	3.2	pCi/Sample
	RH-01-2010-07-07-F	6:00:00 PM	0.69	0.45	12.2	2.5	pCi/Sample

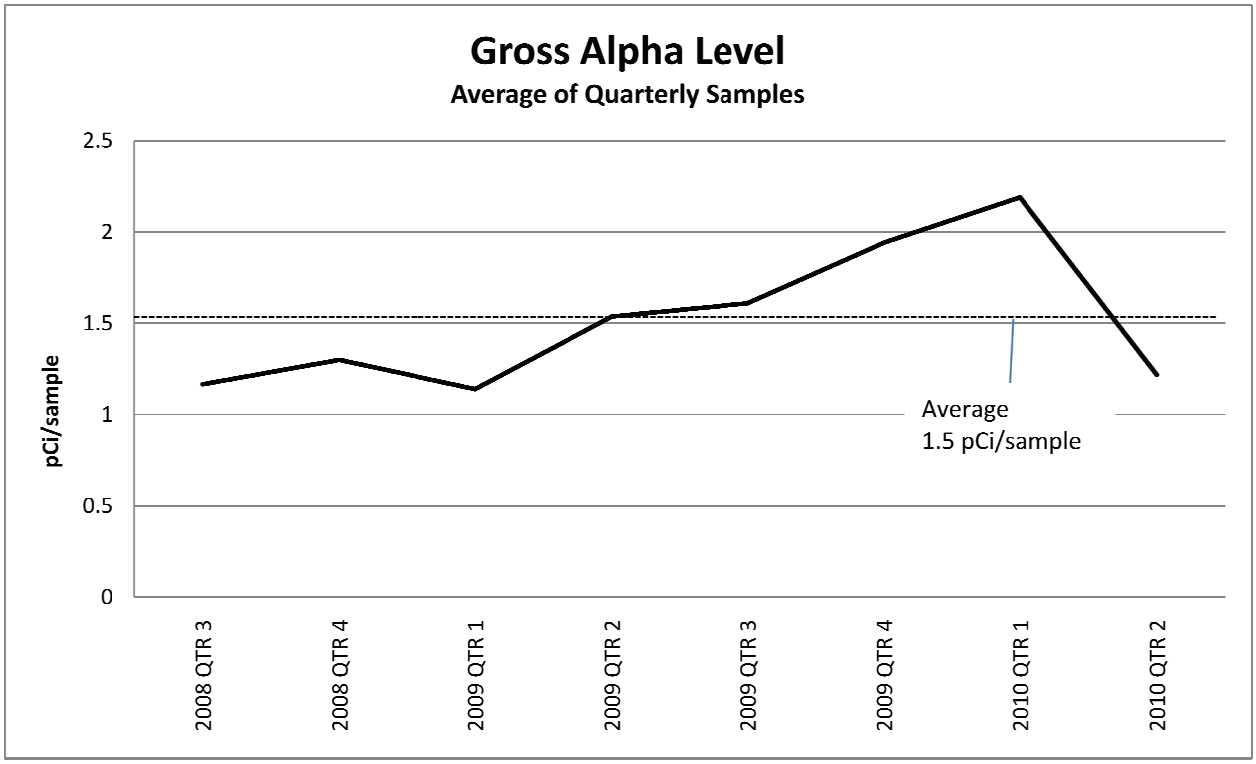


Figure 2-7. Gross Alpha Air Filter Sampling (Source: Table 2-4)

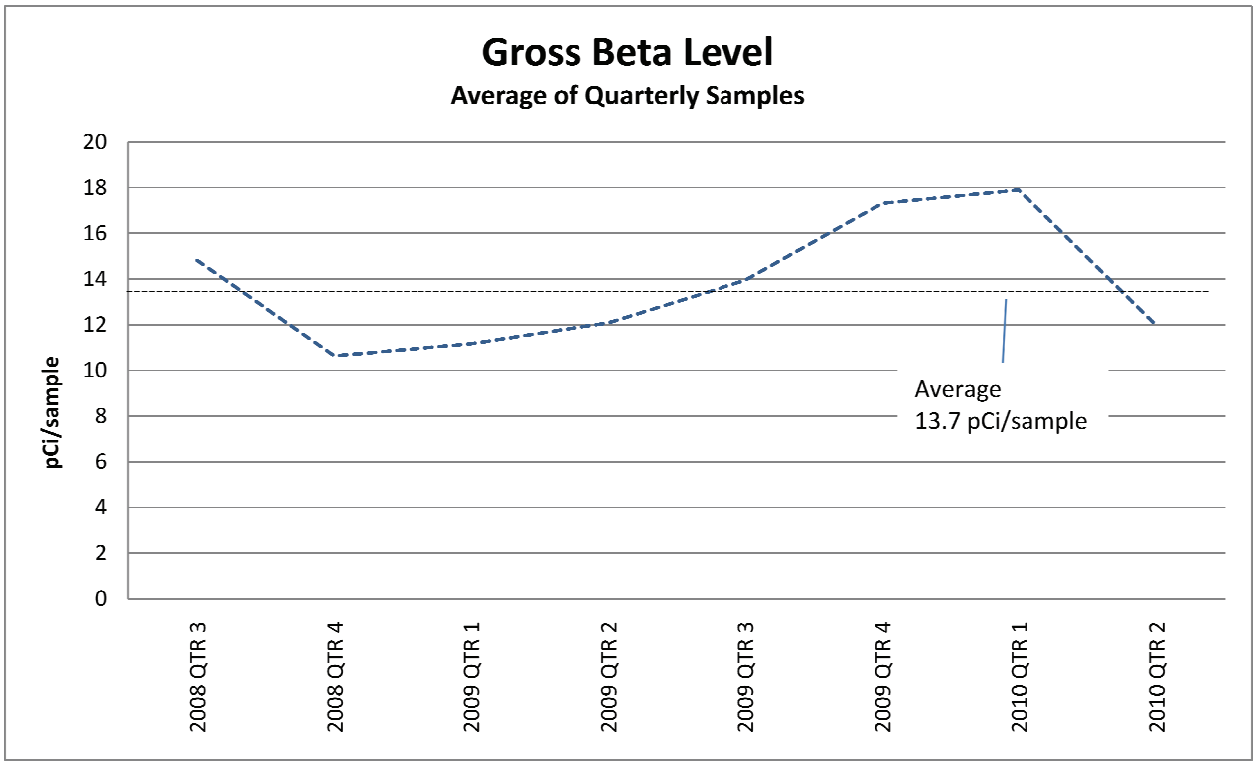


Figure 2-8. Gross Beta Air Filter Sampling (Source: Table 2-4)

Table 2-5. Radium and Thorium Isotopes (results to date)

Sample ID	Ra-226 E903.1	Ra-226 +/-	Th-228 D3972-90M	Th-228 +/-	Th-229 D3972-90M	Th-230 D3972-90M	Th-230 +/-	Th-232 D3972-90M	Th-232 +/-	Units
RH-01-2008-QTR-3	0.17	0.4	0.34	0.21	13.0	0.37	0.23	0.11	0.1	pCi/Sample
RH-01-2008-QTR-4	0	0.31	0.19	0.27	29.3	0.54	0.27	0.28	0.14	pCi/Sample
RH-01-2009-QTR-1	-0.13	0.5	0.22	0.17	11.7	0.57	0.26	0.36	0.13	pCi/Sample
RH-01-2009-QTR-2	0.24	0.31	0.37	0.31	13.0	0.41	0.30	0.13	0.11	pCi/Sample
RH-01-2009-QTR-3	-0.04	0.33	0.3	0.23	9.4	0.35	0.23	0.14	0.10	pCi/Sample
RH-01-2009-QTR-4	0.11	0.33	0.26	0.38	9.7	0.25	0.32	0.11	0.16	pCi/Sample
RH-01-2010-QTR-1	0.24	0.3	0.22	0.31	12.5	0.18	0.27	0.04	0.10	pCi/Sample
RH-01-2010-QTR-2	0.47	0.33	0.8	0.56	7.1	-0.06	0.34	0.23	0.21	pCi/Sample
Average over Period	0.13		0.34		13.3	0.33		0.18		pCi/Sample

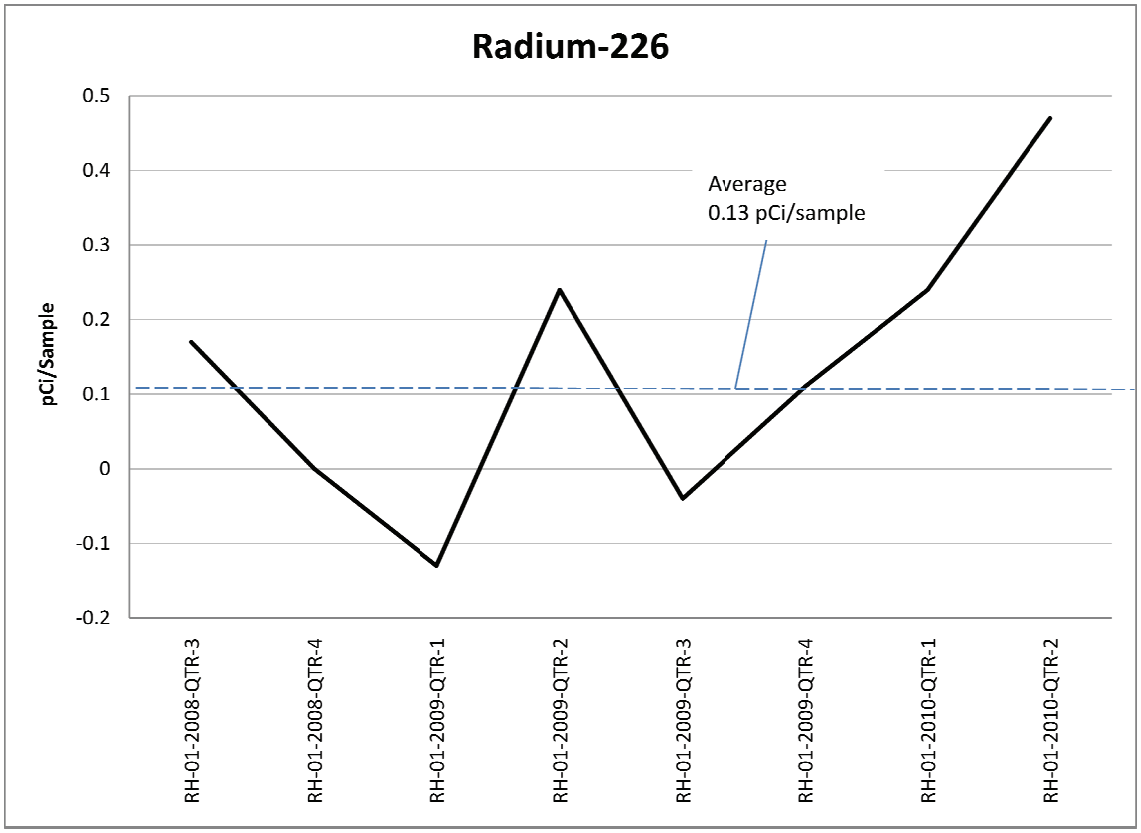


Figure 2-9. Trend of Radium-226 Sampling (Source: Table 2-5)

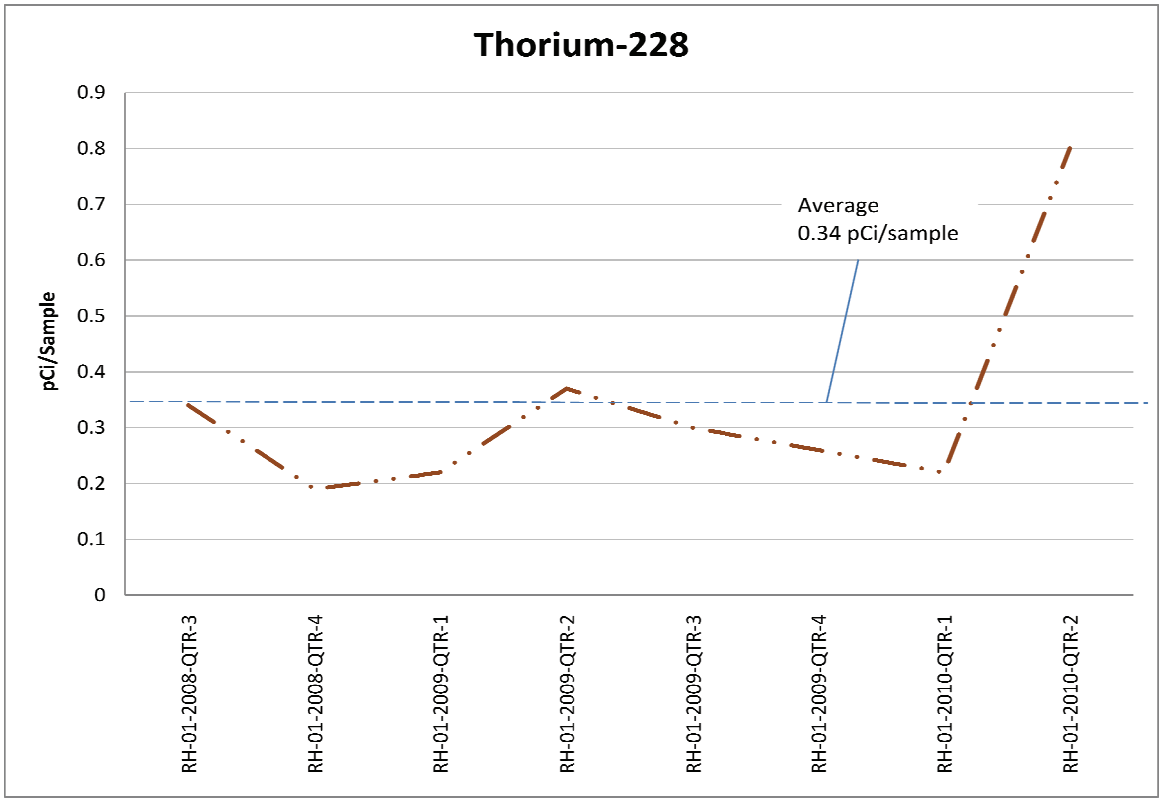


Figure 2-10. Trend of Thorium-228 Sampling (Source: Table 2-5)

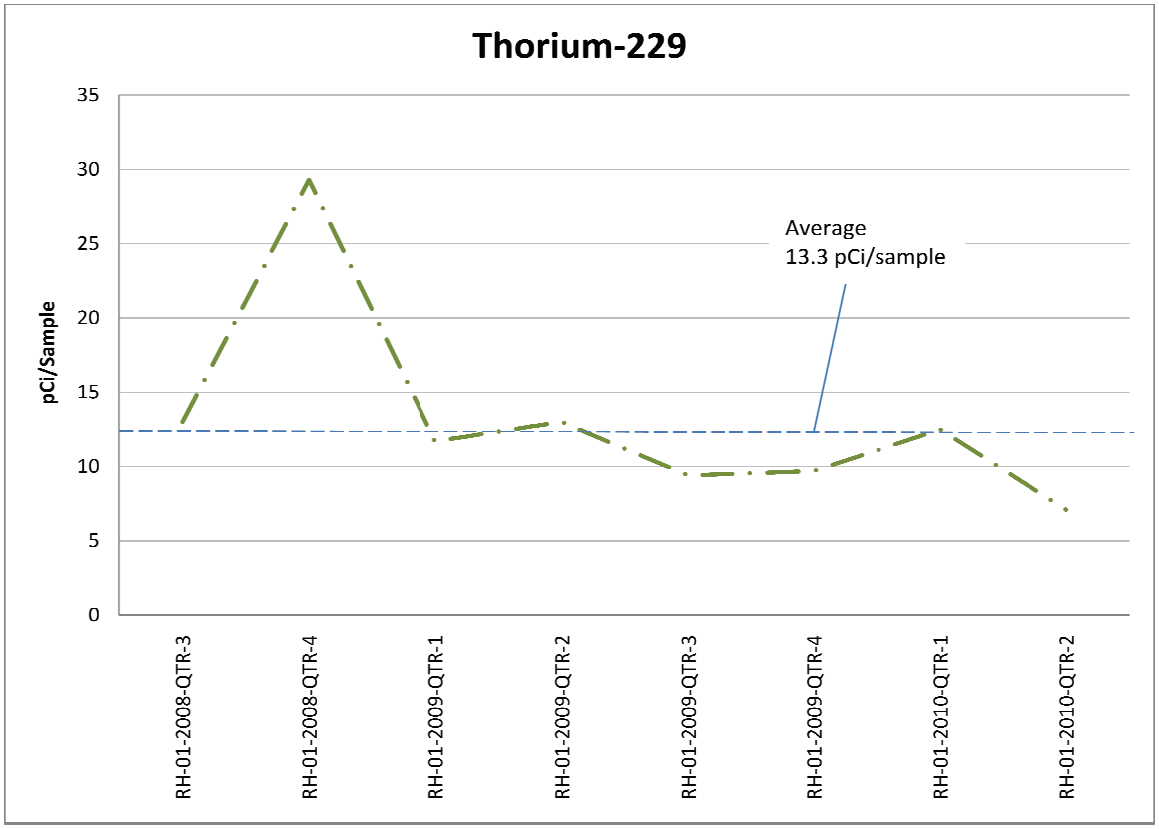


Figure 2-11. Trend of Thorium-229 Sampling (Source: Table 2-5)

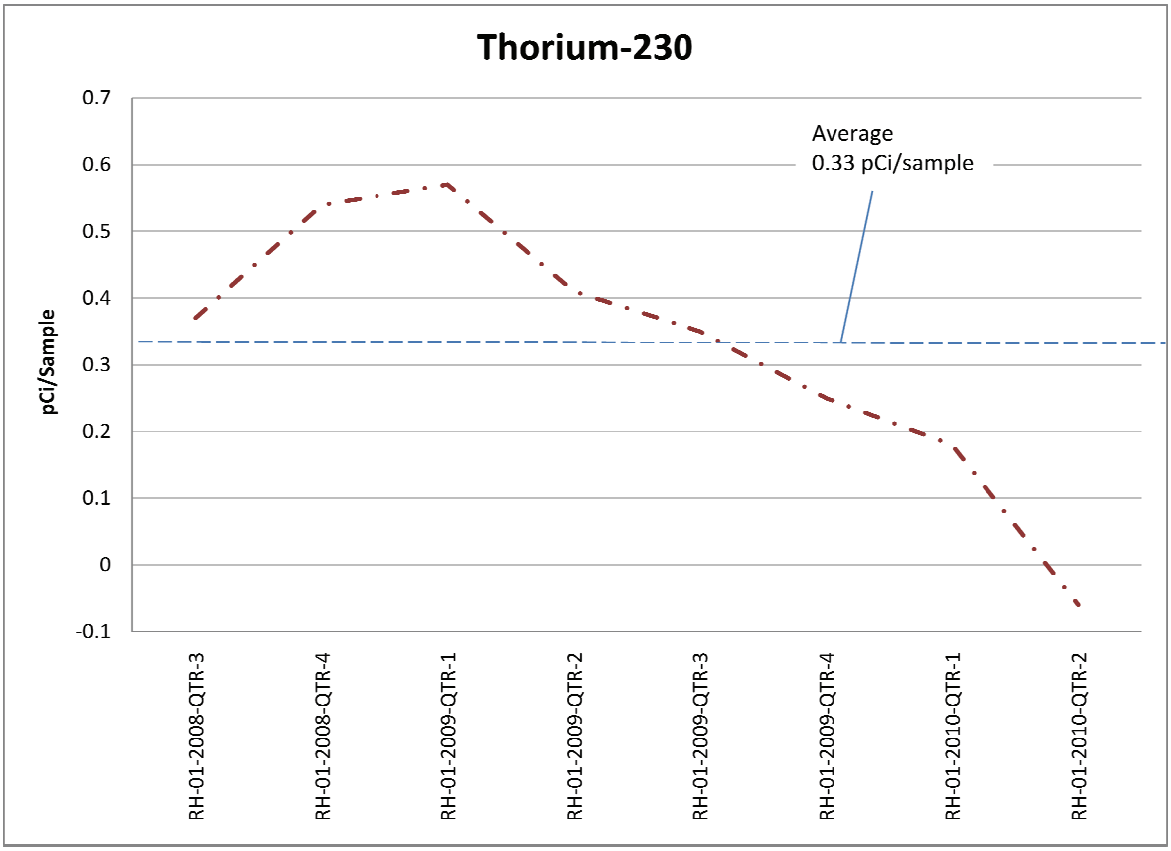


Figure 2-12. Trend of Thorium-230 Sampling (Source: Table 2-5)

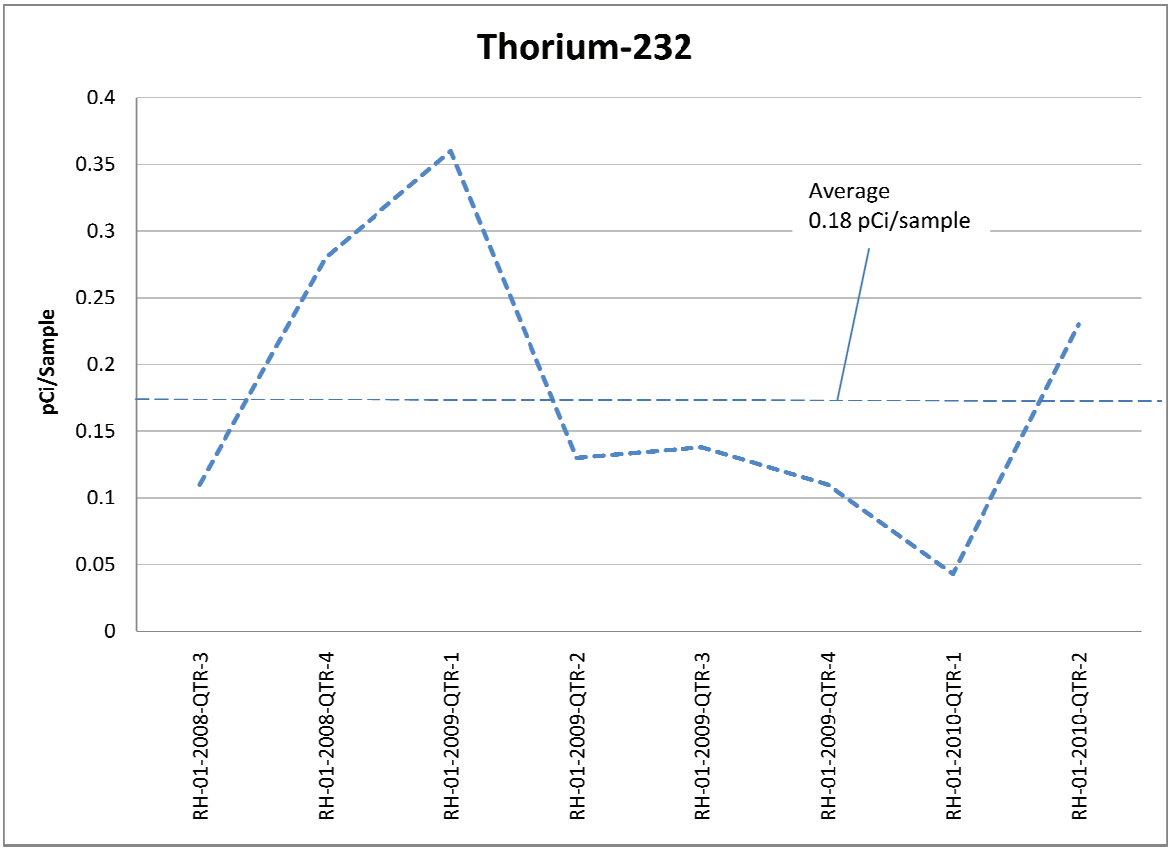


Figure 2-13. Trend of Thorium-232 Sampling (Source: Table 2-5)

Table 2-6. Uranium Isotopes (results to date)

Sample ID	U-234		U-235		U-238		Total U		Units
	D3972-90M	+/-	D3972-90M	+/-	D3972-90M	+/-	D3972-90M	+/-	
RH-01-2008-QTR-3	0.33	0.25	0.02	0.16	0.17	0.18	0.52	0.35	pCi/Sample
RH-01-2008-QTR-4	0.74	0.37	0	0.17	0.19	0.18	0.93	0.44	pCi/Sample
RH-01-2009-QTR-1	0.52	0.3	0.13	0.16	0.09	0.14	0.74	0.37	pCi/Sample
RH-01-2009-QTR-2	0.53	0.24	0.024	0.098	0.31	0.19	0.86	0.32	pCi/Sample
RH-01-2009-QTR-3	0.46	0.31	0.08	0.19	0.55	0.34	1.09	0.49	pCi/Sample
RH-01-2009-QTR-4	0.15	0.2	0.17	0.13	0.04	0.14	0.22	0.3	pCi/Sample
RH-01-2010-QTR-1	0.15	0.13	0.076	0.093	0.1	0.11	0.32	0.19	pCi/Sample
RH-01-2010-QTR-2	0.35	0.21	0.02	0.11	0.21	0.16	0.58	0.29	pCi/Sample

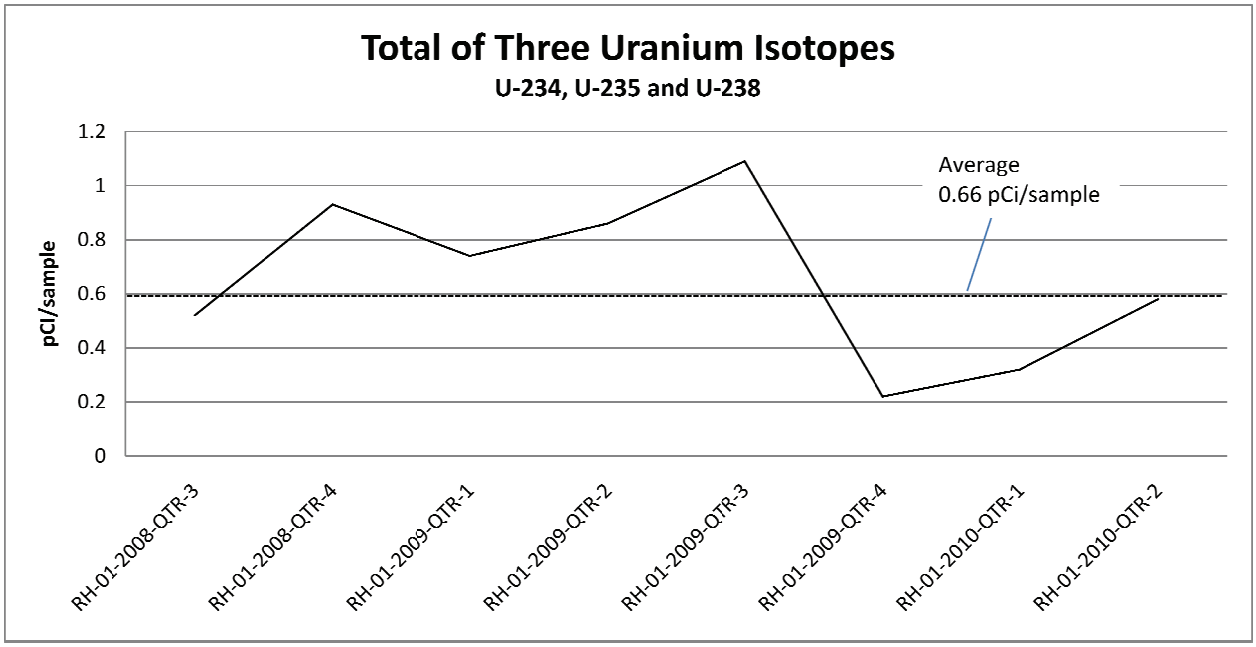


Figure 2-14. Total Uranium Isotopes (Source: Table 2-6).

Table 2-7. Radon Alpha-track (results to date)

Year	Quarter	Detector #	Install Date	Ending Date	Sample ID	Exposure (pCi/L-days)	Avg. Radon Conc. (pCi/L)
2008	3	4728810	7/28/2008	10/10/2008	RH-1-2008-10-10-A	30.0	0.4
2008	3	4728811	7/28/2008	10/10/2008	RH-1-2008-10-10-B	30.0	0.4
2008	4	4735440	10/10/2008	12/31/2008	RH-1-2008-12-31-B	141.9	1.7
2008	4	4735454	10/10/2008	12/31/2008	RH-1-2008-12-31-A	132.5	1.6
2009	1	4735519	12/31/2008	3/31/2009	RH-1-2009-3-31-A	88.6	1
2009	1	4735520	12/31/2008	3/31/2009	RH-1-2009-3-31-B	58.3	0.6
2009	2	4761325	3/31/2009	7/6/2009	RH-1-2009-7-06-A	56.4	0.6
2009	2	4761326	3/31/2009	7/6/2009	RH-1-2009-7-06-B	53.4	0.6
2009	3	4784087	7/6/2009	9/29/2009	RH-1-2009-9-29-A	30.7	0.4
2009	3	4784088	7/6/2009	9/29/2009	RH-1-2009-9-29-B	41.8	0.5
2009	4	4797458	9/29/2009	1/4/2010	RH-1-2010-1-4-A	31.1	0.3
2009	4	4797459	9/29/2009	1/4/2010	RH-1-2010-1-4-B	30.0*	0.3*
2010	1	4794184	1/4/2010	3/31/2010	RH-1-2010-3-31-A	35.2	0.4
2010	1	4794185	1/4/2010	3/31/2010	RH-1-2010-3-31-B	30.0*	0.3*
2010	2	4795747	3/31/2010	7/2/2010	RH-1-2010-07-02-A	68.7	0.7
2010	2	4795748	3/31/2010	7/2/2010	RH-1-2010-07-02-B	63.6	0.7

*Less than indicated value

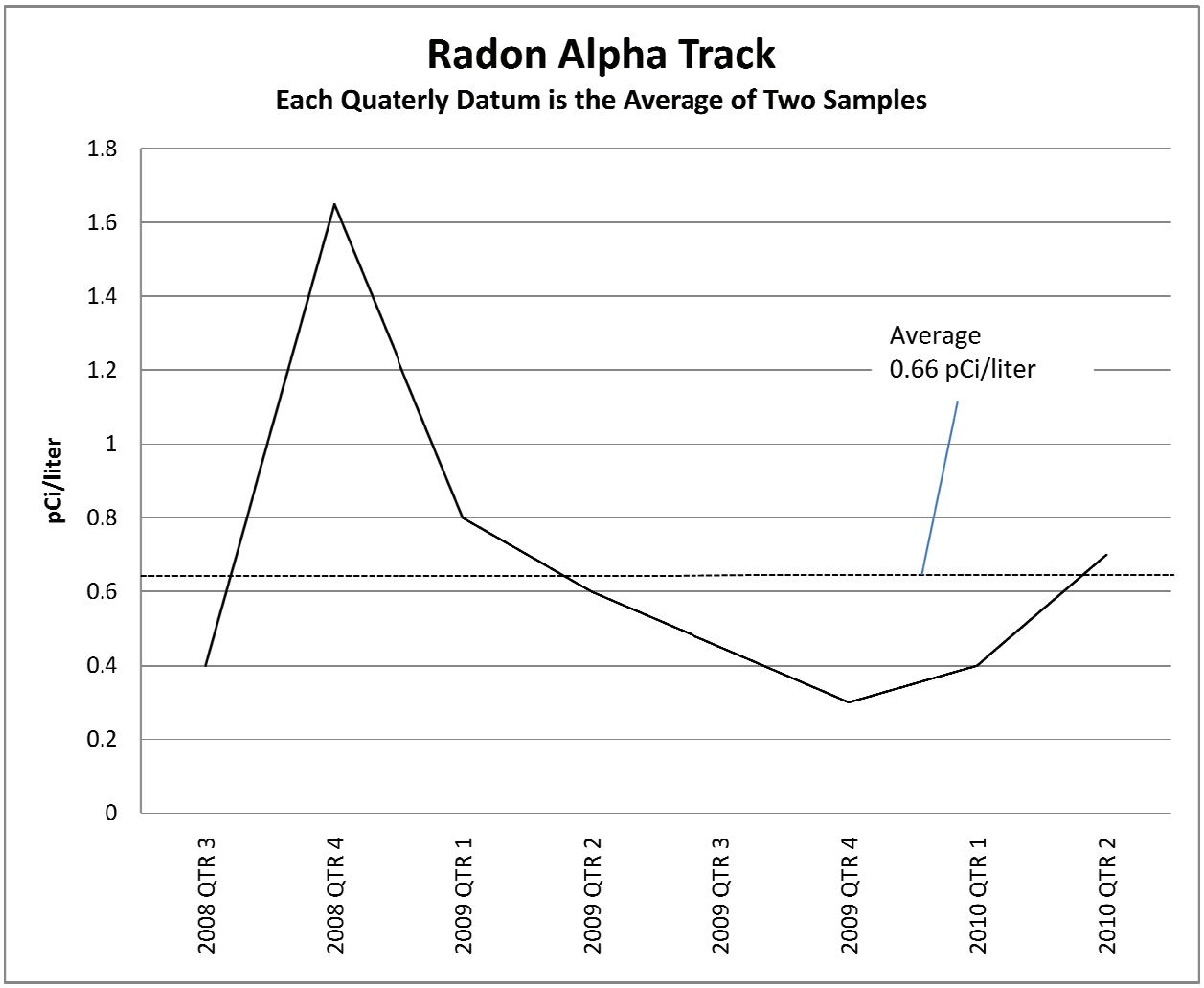


Figure 2-15. Radon Alpha-track (Source: Table 2-7)

Table 2-8. Gamma Thermoluminescent Dosimeters (results to date)

Year	2008	2008	2009	2009	2009	2009	2010	2010	Units
Quarter	3	4	1	2	3	4	1	2	
Control - Daily	24	32	30	25	34	28	32	26	mR
Environmental	27	35	39	33	33	31	35	27	mR

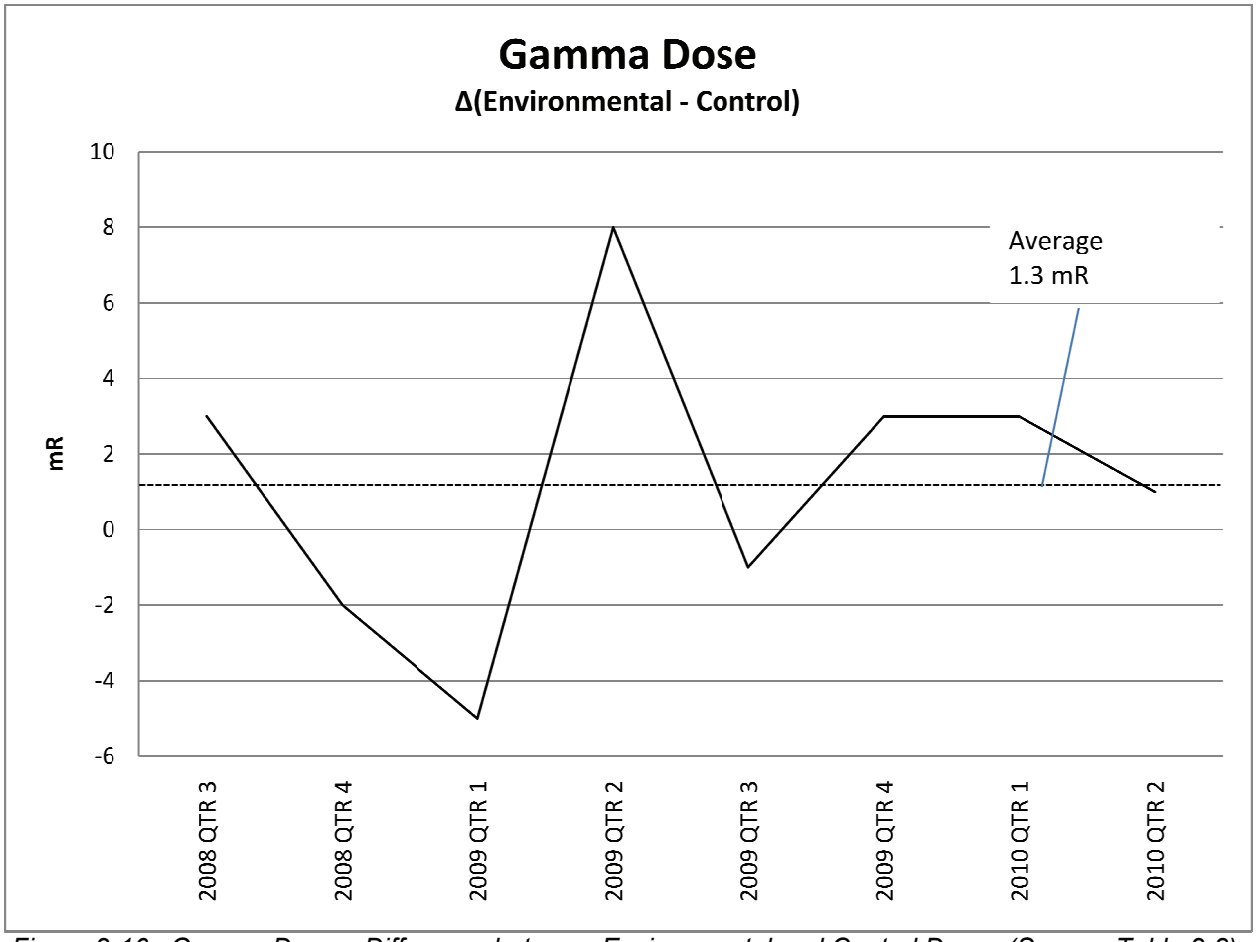


Figure 2-16. Gamma Dose – Difference between Environmental and Control Doses (Source: Table 2-8)

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