September 30, 2011

Mr. Steve Tarlton,
Management Unit
Radiation Control Program
Hazardous Materials and Waste Management Division
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

Re: Semiannual Effluent Report

Dear Mr. Tarlton,

Please find enclosed the Semiannual Effluent Report for the First (1st) half of 2011 pursuant to RH 18.7.2.

If you have any questions, please contact me.

Sincerely,

Jim Cain
Environmental Coordinator/
Radiation Safety Officer

JC: lb

Attachments

cc: Phil Egidi, CDPHE
Edgar Ethington, CDPHE
Francis Costanzi, EPA
Amory Quinn
John Hamrick

Cotter Corporation
Cañon City Mill, P.O. Box 1750, Cañon City, CO 81215-1750 USA
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COTTER CORPORATION
CANON CITY MILLING FACILITY
EFFLUENT REPORT
JANUARY TO JUNE 2011
September 30, 2011

This report provides quantitative and qualitative data for effluents released from the Canon City Milling Facility (CCMF) restricted area, which is delineated in Annex A to Colorado Radioactive Materials License 369-01.

SITE ACTIVITIES

During the first (1st) half of 2011, no milling operations were conducted. During this period mill staff and contractors worked on:

Mill Staff

- General maintenance and upkeep of site buildings and equipment
- Maintenance of Primary Impoundment solution pool and evaporation cell pool pH level at four (4) or above
- Secondary Impoundment Interim Cover
    - Soil sement applied for dust control
- Repair and maintenance of mobile equipment
- Schwartzwalder Mine support
- Primary Impoundment
    - Repaired and refurbished sprinkler system as needed
    - Ran sprinkler system as needed
    - Moved mobile equipment for disposal – oils drained for use as used oil in shop heater
    - Moved Conex containing Amazon ore for disposal
- Removed and disposed zirc product and chemicals from Zirc Product Building
- Removed equipment from Zirc Product, Sulfation, Demonstration Plant, Grind-Leach, and Boiler
- Drained and removed Caustic Tank
- Draining and removal of oil and other fluids from Zirc Sulfation, Sulfation, Demonstration Plant, Grind-Leach, Boiler and boneyard area in preparation for demolition
- Primary Impoundment, Secondary Impoundment, New Pond 3, and Water Distribution Pond Hypalon repairs as needed
- Records Storage – continued records sorting, indexing and disposal
- Weed mowing site areas
- Outlying property fence repairs
- EC/RSO attended National Jewish Hospital Miner's Clinic Advisory Committee meeting
- Site tours
    - DOE Legacy Management
    - EPA/CDPHE CERCLA groundwater team
    - Fremont County Commissioners

    - Daily Record reporters
- GW/SW sampling
    - Conducted column leach tests for the Dam to Ditch area core samples
    - Assisted contractor in two rounds of TCE in groundwater sampling
- Borrow area and impoundment geotech evaluations
    - Assisted contractors
    - Collected samples for radiological characterization
- Old Met Lab/ Rad Tech Office
    - Cleaned and retrieved usable equipment and materials
    - Assisted contractor performing asbestos and perchlorate evaluation
- Installation of ICP-MS (twice)
- Fiber optic cable relocation
- New electrical power poles for Lab and Maintenance shop
    - Assisted Contractor
- Completed changeover to propane at maintenance shop and lab
    - Assisted Contractor
- Nuclear gauges and well probe sources
    - Removed two (2) Cs-137 nuclear gauges from Yellowcake Product area to storage in Product Storage Building
    - Relocated all nuclear gauges and well probe sources to Conex due to proximity to fine ore bin removal operations
- Cleaned Salvage Shop and started relocating warehouse items
- Solvent Extraction
    - Conducted test work to identify sorbent for solvent disposal
    - Prepared Solvent Extraction Tanks for using sorbent
    - Mixing sorbent with solvent in tankage
- Patched meteorological station evaporation pan
- Constructed new pad for site fuel tanks
- Installed power pole at environmental air sampler CC#2
- YC bird centrifuge
    - Salvaged from Product building
    - Constructed shipping crate
    - Transferred to Denison White Mesa Mill

Contractors

- Relocated Colorado Raffinate pile in Primary Impoundment (Kessler Reclamation)
- Breach selected evaporation cell berms and covered evaporation cells with dirt (Kessler Reclamation)
- Demolished, transported and covered Zirc Sulfation, Rubber Shop, Demonstration Plant, Grind-Leach, Boiler Zirc Product, Secondary Crusher and Fine Ore Bins (Kessler Reclamation)
- Brine System Tank Demolition (Kessler Reclamation)
- TCE in groundwater sampling –two rounds (Nankoweep, Hydrosolutions)
- Asbestos and perchlorate evaluation –Old Met Lab/Rad Tech Office (Landmark Environmental)

- Borrow and impoundment area geotech evaluation (MWH, Precision Sampling, Lyman Henn)
- New electrical power pole installation (Black Hills Energy)
- New propane tank installation (Amerigas)

TRACKING OF RADIOACTIVE MATERIALS

Ores and Materials received from January to June 2011

- Western Slope Ore (uranium-vanadium) – None

Ores and Materials processed from January to June 2011

- Western Slope Ore (uranium-vanadium) – None
- Uranium-Zirconium (U-Zr) Ore – None

Ore and Materials Inventory as of June 30, 2011

- Uranium-Zirconium (U-Zr) Ore – Approximately fifteen thousand (15,000) tons are stored on the new ore pad west of the old catalyst processing building (demonstration plant). In addition, approximately seven hundred (700) tons of U-Zr ore are in ore bins 3 & 4.
- Western Slope Ore (uranium-vanadium) – Approximately six thousand eighty (6,080) tons of SM-18, JD-6, JD-8, and JD-9 ore were stored on ore stockpile #2.
- Amazon Ore – Approximately thirty (30) tons in bulk bags were stored in two (2) sea-pack containers south of the old catalyst processing building (demonstration plant). (This material is for potential pilot process testing.) was disposed in the Primary Impoundment.

Finished Product Inventory as of June 30, 2011

- Vanadium Concentrate – Approximately ninety-nine thousand nine hundred seventy (99,970) pounds of V_2O_5 were stored in 55-gallon drums inside the Product Building.

Material shipped off site from January to June 2011

- Yellowcake Concentrate – None
- Vanadium Concentrate – None

STACK EMISSION MONITORING

A tabulation of the stack releases is provided in Table S0. The laboratory baghouse operated for about 34 hours in the first (1st) half of 2011. The emissions estimate for the first (1st) half of 2011 is based on a sample collected in March 2010. Individual stack sampling reports for 2010 data are located in Table S1. Individual stack sampling reports for 2011 data are located in Table S2. Sample results used for emission estimation for this reporting period are indicated by colored bolding or as otherwise noted on the individual location stack sampling tables. Overall hours of operation and emissions are similar for 2011 versus 2010. For perspective, the uranium emission is less than one (<1) gram per year.

Table S-0
Mill Point Release
1st Half 2011 and 2010

Mill Point Source Release Rates For Jan. - June 2010				
Source	Particulate Radionuclide Release Rate (Ci/6 months)			
	^{Nat}U	^{230}Th	^{226}Ra	^{232}Th
Secondary Crusher Feed Baghouse	*	*	*	*
Secondary Crusher Baghouse	*	*	*	*
Fine Ore Bins Blending Baghouse	*	*	*	*
Laboratory Baghouse**	4.64E-07	1.85E-07	1.32E-07	2.11E-07
Calciner/Barreling Enclosure General Ventilation Baghouse	*	*	*	*
Uranium Oxide Venturi Scrubber	*	*	*	*
Decomposition/Fusion Furnace	*	*	*	*
Total Release Rates	4.64E-07	1.85E-07	1.32E-07	2.11E-07
Mill Point Source Release Rates For June. - Dec. 2010				
Source	Particulate Radionuclide Release Rate (Ci/6 months)			
	^{Nat}U	^{230}Th	^{226}Ra	^{232}Th
Secondary Crusher Feed Baghouse	*	*	*	*
Secondary Crusher Baghouse	*	*	*	*
Fine Ore Bins Blending Baghouse	*	*	*	*
Laboratory Baghouse**	2.62E-08	1.04E-08	7.43E-09	1.19E-08
Calciner/Barreling Enclosure General Ventilation Baghouse	*	*	*	*
Uranium Oxide Venturi Scrubber	*	*	*	*
Decomposition/Fusion Furnace	*	*	*	*
Total Release Rates	2.62E-08	1.04E-08	7.43E-09	1.19E-08
Mill Point Source Release Rates For Jan. -June. 2011				
Source	Particulate Radionuclide Release Rate (Ci/6 months)			
	^{Nat}U	^{230}Th	^{226}Ra	^{232}Th
Secondary Crusher Feed Baghouse	*	*	*	*
Secondary Crusher Baghouse	*	*	*	*
Fine Ore Bins Blending Baghouse	*	*	*	*
Laboratory Baghouse**	3.80E-07	1.51E-07	1.08E-07	1.73E-07
Calciner/Barreling Enclosure General Ventilation Baghouse	*	*	*	*
Uranium Oxide Venturi Scrubber	*	*	*	*
Decomposition/Fusion Furnace	*	*	*	*
Total Release Rates	3.80E-07	1.51E-07	1.08E-07	1.73E-07

Table S-1
Laboratory Baghouse 2010
(AIRS#57)

2010 Month	Sampled Vol. (ml)	Flow Rate (ml/sec)	Est. Op Hours	^{Nat}U uCi/ml	^{Nat}U uCi/sec	^{230}Th uCi/ml	^{230}Th uCi/sec	^{226}Ra uCi/ml	^{226}Ra uCi/sec	^{210}Pb uCi/ml	^{210}Pb uCi/sec	^{210}Po uCi/ml	^{210}Po uCi/sec	^{232}Th uCi/ml	^{232}Th uCi/sec
Jan.	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Feb.	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Mar.	1.56E+06	2.76E+06	28	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Apr.	1.56E+06	2.76E+06	2.5	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
May	1.56E+06	2.76E+06	5	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Jun.	1.56E+06	2.76E+06	5.83	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Jul	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Aug	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Sep	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Oct	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Nov	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Dec	1.56E+06	2.76E+06	2.33	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Op. Hours		Jan. - Jun.	41.33												
		Jul. - Dec.	2.33												
		Jan. - Dec.	43.66												
Average Jan. - Jun.				1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Maximum Jan. - Jun.				1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Average Jul. - Dec.				1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Maximum Jul. - Dec.				1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Average Jan. - Dec.				1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Maximum Jan. - Dec.				1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06

Estimated Monthly Release Rate

2010 Month	^{Nat}U mCi	^{230}Th mCi	^{226}Ra mCi	^{232}Th mCi
Jan.	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Feb.	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mar.	3.14E-04	1.25E-04	8.93E-05	1.43E-04
Apr.	2.81E-05	1.12E-05	7.97E-06	1.28E-05
May	5.61E-05	2.23E-05	1.59E-05	2.55E-05
Jun.	6.54E-05	2.60E-05	1.86E-05	2.97E-05
Jul	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aug	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sep	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Oct	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nov	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dec	2.62E-05	1.04E-05	7.43E-06	1.19E-05
Total Jan. - Jun.	4.64E-04	1.85E-04	1.32E-04	2.11E-04
Total Jul. - Dec.	2.62E-05	1.04E-05	7.43E-06	1.19E-05
Total Jan. - Dec.	4.90E-04	1.95E-04	1.39E-04	2.23E-04

Table S-2
Laboratory Baghouse 2011 (AIRS#57)

2011 Month	Sampled Vol. (ml)	Flow Rate (ml/sec)	Est. Op Hours	^{Nat}U uCi/ml	^{Nat}U uCi/sec	^{230}Th uCi/ml	^{230}Th uCi/sec	^{226}Ra uCi/ml	^{226}Ra uCi/sec	^{210}Pb uCi/ml	^{210}Pb uCi/sec	^{210}Po uCi/ml	^{210}Po uCi/sec	^{232}Th uCi/ml	^{232}Th uCi/sec
Jan.	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Feb.	1.56E+06	2.76E+06	28.8	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Mar.	1.56E+06	2.76E+06	5	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Apr.	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
May	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Jun.	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Jul	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Aug	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Sep	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Oct	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Nov	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
Dec	1.56E+06	2.76E+06	0	1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
	Op. Hours	Jan. - Jun.	33.8333												
		Jul. - Dec.	0												
		Jan. - Dec.	33.8333												
	Average Jan. - Jun.			1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
	Maximum Jan. - Jun.			1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
	Average Jul. - Dec.			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Maximum Jul. - Dec.			1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
	Average Jan. - Dec.			1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06
	Maximum Jan. - Dec.			1.13E-12	3.12E-06	4.49E-13	1.24E-06	3.21E-13	8.86E-07	2.64E-13	7.29E-07	5.77E-13	1.59E-06	5.13E-13	1.42E-06

Estimated Monthly Release Rate

2011 Month	^{Nat}U mCi	^{230}Th mCi	^{226}Ra mCi	^{232}Th mCi
Jan.	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Feb.	3.24E-04	1.29E-04	9.19E-05	1.47E-04
Mar.	5.61E-05	2.23E-05	1.59E-05	2.55E-05
Apr.	0.00E+00	0.00E+00	0.00E+00	0.00E+00
May	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Jun.	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Jul	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aug	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sep	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Oct	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nov	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dec	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total Jan. - Jun.	3.80E-04	1.51E-04	1.08E-04	1.73E-04
Total Jul. - Dec.	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total Jan. - Dec.	3.80E-04	1.51E-04	1.08E-04	1.73E-04

PUBLIC DOSE

Doses to an Individual Member of the Public (IMOP) from all pathways were estimated for 2010 by Two Lines, Inc. A report titled *ESTIMATES OF RADIATION DOSES TO MEMBERS OF THE PUBLIC FROM COTTER 2010 OPERATIONS* is Appendix D of the 2010 Annual Report. The results showed that the maximum potential dose (excluding radon) to a resident was two (**2)** mrem/year compared to the constraint level of ten (**10)** mrem/year and the regulatory limit of twenty-five (**25)** mrem/year. The maximum potential lung and bone doses were four (**4)** mrem/year and sixteen (**16)** mrem/year respectively versus the regulatory limit of twenty-five (**25)** mrem/year.

Including radon, the maximum potential dose was estimated at eleven (**11)** mrem/year versus the regulatory limit of one hundred (**100)** mrem/year from mill sources. Doses to an Individual Member of the Public (IMOP) for 2011 will be provided in the 2011 annual report.

ENVIRONMENTAL AIR MONITORING

Environmental Air Samplers (Particulates)

A location map of the Environmental Air Samplers (particulates) is included as Figure EA-1. Radon Track Etch Measurement Devices and Environmental TLDs are co-located at these collection points. Annual Average Particulate Concentrations for the period 1979 through 2010 are presented in figures EA-2 (A and B) through EA-11 (A and B). Average Annual Radon and TLD measurements are shown in figures RN-2 and RN-3 and in TLD-2 and TLD-3, respectively.

The Environmental Air sampler particulate data generally indicates radionuclide concentrations which are approximately one hundred (100) times below the regulatory Effluent Concentration limits with the exception of ^{230}Th, which generally has been ten (10) times below the limit. The EA figures are divided into an A and a B figure which show the concentration history in exponential format (A) as well as percent of the regulatory limit (B).

Average particulate concentrations for the three (3) most recent semiannual periods in 2010 and 2011 are shown in Table EA-0. Results of the quarterly air sampling and percent Effluent Concentration (EC) are shown in Tables EA-1 and EA-2 for 2009 and 2010 respectively. The Effluent Concentration (EC) limits are displayed on these tables as they appear in Part 4 Appendix B Table 2 of the *Rules and Regulations*. The limits are also displayed in the heading in parentheses as compared to the highest average concentration for each radionuclide. Explanation of the solubility classification selection and use of less than LLD values in calculating averages is presented in Appendix A and B respectively.

Review and comparison of the data generally indicates typical concentrations within historical levels. Further examination of the data for the recent quarterly and semiannual periods shows steady to mostly lower concentrations except for AS-202 East Boundary and AS-204 West Boundary that were slightly higher for 230Th and for natU, respectively. Note that uranium concentrations were adjusted for fourth quarter data after second half 2010 semiannual report but prior to submission of the 2010 annual report.

- All ^{nat}U values were less than one percent (<1%), ^{230}Th less than three percent (<3%) and ^{226}Ra less than one tenth percent (<0.1%) of the limit

- Lead-210 results at all monitoring locations are controlled by global ^{222}Rn concentrations (The primary source of ^{210}Pb in air is global radon ^{222}Rn). Radon-222 emanates from the soil and is dispersed through the atmosphere. The ^{222}Rn decay products build in as the parent decays. The short–lived decay products of ^{222}Rn attach to dust particles and are carried long distances with the air. Pb-210 is the longest-lived of the ^{222}Rn decay products. The ^{210}Pb concentration in air varies with location. The average ground level concentrations in selected states are as follows (NCRP, 1992):

State	^{210}Pb concentration	
	uBq/m^3	uCi/ml
California	600	1.6 E-14
Illinois	1500	4.1 E-14
Ohio	300	8.1 E-15
Massachusetts	700	1.9 E-14

NCRP Report No. 94 (NCRP, 1992) cites a mean concentration for the north temperate latitude of 0.6 mBq/m^3 (1.5E-14 uCi/ml). The report also states that "It appears that re-suspension of soil is not a significant contributor to air concentrations since the ratio of Pb-210 to U-238 in surface soil is only about 2 … while the ratio in air is about 1000." The Pb-210 concentration in air in the vicinity of the Cotter mill is within the range of the average values reported for various locations.

Reference: *National Council on Radiation Protection and Measurements* (NCRP). 1992. NCRP Report No. 94, "Exposure of the Population in the United States and Canada from Natural Background Radiation". NCRP Bethesda, MD.

- Lead-210 results were generally lower for January to June 2011 versus July to December 2010
- Thorium-232 results for all sampling locations hover around background and the detection limit in the range of E-17 uCi/ml to E-16 uCi/ml.
- The AS-202 East Boundary location had the highest percent of the effluent concentration (EC) limits in the first (1st) half of 2011 for ^{nat}U at zero point four percent (0.4 %) and AS-204 West Boundary ^{230}Th at two point nine percent (2.9%). All ^{226}Ra results are less than zero point one percent (0.1 %). **This means that all samplers monitored for the** January to June 2011 **period for the radioactive particulates excluding ^{210}Pb, which as noted above is controlled by global radon concentrations, when combined are less than five percent (<5%) of the regulatory limit.**

The outlying locations, Canon City #2, Lincoln Park #2, and OroVerde #3 are located at residences as shown on Figure EA-1 while AS-210 and AS-212 are at locations between the site boundary and actual residences. All radionuclide particulate results include background, which is viewed to be represented by Canon City #2.

Total particulate (dust loading) levels for the environmental air samplers are shown as a monthly average on Figure EA-12 for 2010 and EA-13 for 2011. AS-204 for June 2011 was somewhat elevated. This also coincides with the uranium and thorium data for the fourth quarter 2011. The dust measurements generally indicate concentrations at the boundary locations to be lower than particulate levels in residential areas. This is likely attributable to unpaved roads without dust control and, more traffic in residential areas with subsequent re-suspension of particulate as compared to the milling facility area.

The AS-202 East Boundary Supplemental Air Sampler denoted as AS-136 and AS-209 Mill Entrance Road (designated as AS-140) showed typical results. An additional sampler AS-143 was co-located with AS-204 West Boundary sampler in 2009 to monitor impoundment activities. A few slightly elevated readings are shown. However, most were below ten percent (10%) of EC indicating good dust control.

Additional samplers were placed in various locations nearby buildings undergoing demolition. Some elevated concentrations are noted particularly one sample during pull down of the fine ore bins yet no influence is seen at the boundary locations. Likewise these project samplers indicate good control when compared to the Occupational Limit (DAC), once again one fine ore bin sample was elevated. Gross alpha activity is measured from filter papers used at the seven (7) locations and are presented as a percentage of the Environmental Concentration (EC) limit (Figure EA-14 and EA-15) and of the Derived Air Concentration (DAC). (Figure EA-16)

Management of the tailings area dust control continued by soil covering, mulch application, application of soil binding agents, as well as covering as much of the tailings beach as possible with available water and use of a sprinkling system in accordance with the Air Permit Compliance Plan has provided sufficient dust control. The Primary Impoundment solution level was approximately 5,574 at the end of the first (1^{st}) half of 2010. The sprinkler system that was initially installed on the tailings beach adjacent to the evaporation cells in May 2003 continues to be used and additional sprinklers have been added and/or moved as needed for dust control. In addition watering during demolition, shearing, concrete breaking, loading and haulage provided good dust control during demolition activities

Figure EA-1
Environmental Air and Vegetation Sampling Locations

Table EA – 0
Environmental Air Monitoring
Average Concentration

Class Y ^{Nat}U (uCi/ml) EC=9E-14 (90E-15)			
Location	Jan. - Jun. 2010	Jul. - Dec. 2010	Jan-Jun 2011
AS-202 East Boundary	4.79E-16	4.26E-16	3.98E-16
AS-203 South Boundary	2.90E-16	1.72E-16	1.04E-16
AS-204 West Boundary	6.43E-16	1.83E-16	2.71E-16
AS-206 North Boundary	2.05E-16	1.27E-16	7.08E-17
AS-209 Mill Entrance Road	4.94E-16	2.86E-16	2.22E-16
AS-210 Shadow Hills Estates	2.28E-16	1.44E-16	7.82E-17
AS-212 Nearest Resident	2.47E-16	2.07E-16	1.20E-16
Canon City #2	2.35E-16	1.20E-16	8.14E-17
Lincoln Park #2	2.38E-16	1.34E-16	8.80E-17
OroVerde #3	1.78E-16	1.08E-16	3.64E-17
QC Truck	1.01E-16	3.24E-17	1.27E-18

Class W ^{230}Th (uCi/ml)EC = 2E-14 (20E-15)			
Location	Jan. - Jun. 2010	Jul. - Dec. 2010	Jan-Jun 2011
AS-202 East Boundary	4.84E-16	4.96E-16	5.83E-16
AS-203 South Boundary	2.31E-16	2.43E-16	1.89E-16
AS-204 West Boundary	8.15E-16	5.80E-16	5.61E-16
AS-206 North Boundary	7.55E-17	8.96E-17	2.56E-17
AS-209 Mill Entrance Road	6.98E-16	3.96E-16	2.92E-16
AS-210 Shadow Hills Estates	1.57E-16	2.14E-16	1.22E-16
AS-212 Nearest Resident	1.40E-16	2.12E-16	1.69E-16
Canon City #2	9.61E-17	5.84E-17	3.75E-17
Lincoln Park #2	1.06E-16	8.61E-17	8.52E-17
OroVerde #3	8.67E-17	6.76E-17	4.09E-17
QC Truck	2.99E-17	4.65E-17	4.77E-18

Class W ^{226}Ra (uCi/ml) EC = 9E-13 (900E-15)			
Location	Jan. - Jun. 2010	Jul. - Dec. 2010	Jan-Jun 2011
AS-202 East Boundary	1.57E-16	1.33E-16	9.76E-17
AS-203 South Boundary	7.54E-17	6.87E-17	3.89E-17
AS-204 West Boundary	2.93E-16	2.09E-16	1.48E-16
AS-206 North Boundary	3.42E-17	5.11E-17	1.18E-17
AS-209 Mill Entrance Road	1.27E-16	9.39E-17	7.11E-17
AS-210 Shadow Hills Estates	3.16E-17	5.26E-17	2.44E-17
AS-212 Nearest Resident	6.43E-17	8.13E-17	3.38E-17
Canon City #2	4.30E-17	3.70E-17	2.33E-17
Lincoln Park #2	3.98E-17	4.23E-17	1.67E-17
OroVerde #3	2.34E-17	3.07E-17	3.98E-18
QC Truck	2.00E-17	1.29E-17	4.67E-18

Class D ^{210}Pb (uCi/ml) EC = 6E-13 (60E-14)			
Location	Jan. - Jun. 2010	Jul. - Dec. 2010	Jan-Jun 2011
AS-202 East Boundary	1.89E-14	2.27E-14	1.85E-14
AS-203 South Boundary	1.54E-14	2.17E-14	1.44E-14
AS-204 West Boundary	1.78E-14	2.53E-14	1.33E-14
AS-206 North Boundary	1.82E-14	2.35E-14	1.72E-14
AS-209 Mill Entrance Road	1.72E-14	2.15E-14	1.61E-14
AS-210 Shadow Hills Estates	1.69E-14	2.23E-14	1.54E-14
AS-212 Nearest Resident	1.58E-14	2.22E-14	1.69E-14
Canon City #2	1.68E-14	2.23E-14	1.67E-14
Lincoln Park #2	1.66E-14	2.26E-14	1.61E-14
OroVerde #3	1.68E-14	2.49E-14	1.58E-14
QC Truck	1.17E-16	2.45E-16	1.16E-16

Class Y ^{232}Th (uCi/ml)EC=4E-15(400E-17)			
Location	Jan. - Jun. 2010	Jul. - Dec. 2010	Jan-Jun 2011
AS-202 East Boundary	3.69E-17	3.13E-17	1.30E-17
AS-203 South Boundary	2.64E-17	1.71E-17	1.87E-17
AS-204 West Boundary	3.86E-17	2.07E-17	1.35E-17
AS-206 North Boundary	3.06E-17	3.60E-17	1.33E-17
AS-209 Mill Entrance Road	2.52E-17	2.14E-17	2.04E-17
AS-210 Shadow Hills Estates	2.84E-17	3.89E-17	2.06E-17
AS-212 Nearest Resident	2.29E-17	2.09E-17	1.30E-17
Canon City #2	3.98E-17	3.31E-17	2.96E-17
Lincoln Park #2	4.83E-17	4.38E-17	3.02E-17
OroVerde #3	3.28E-17	1.95E-17	1.60E-17
QC Truck	7.58E-18	2.00E-17	6.83E-18

Table EA-1
Environmental Air Monitoring
2010

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class Y ^{Nat}U (uCi/ml) EC = 9E-14 (90E-15)										
Location										
		% of EC		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	6.69E-16	0.7%	2.89E-16	0.3%	5.78E-16	0.6%	2.74E-16	0.3%	4.53E-16	0.5%
AS-203 South Boundary	4.12E-16	0.5%	1.68E-16	0.2%	2.25E-16	0.3%	1.19E-16	0.1%	2.31E-16	0.3%
AS-204 West Boundary	7.30E-16	0.8%	5.57E-16	0.6%	2.20E-16	0.2%	1.46E-16	0.2%	4.13E-16	0.5%
AS-206 North Boundary	2.19E-16	0.2%	1.90E-16	0.2%	1.92E-16	0.2%	6.27E-17	0.1%	1.66E-16	0.2%
AS-209 Mill Entrance Road	4.75E-16	0.5%	5.13E-16	0.6%	4.40E-16	0.5%	1.32E-16	0.1%	3.90E-16	0.4%
AS-210 Shadow Hills Estates	3.11E-16	0.3%	1.44E-16	0.2%	2.06E-16	0.2%	8.23E-17	0.1%	1.86E-16	0.2%
AS-212 Nearest Resident	3.10E-16	0.3%	1.84E-16	0.2%	3.19E-16	0.4%	9.61E-17	0.1%	2.27E-16	0.3%
Canon City #2	3.30E-16	0.4%	1.41E-16	0.2%	1.66E-16	0.2%	7.44E-17	0.1%	1.78E-16	0.2%
Lincoln Park #2	3.00E-16	0.3%	1.77E-16	0.2%	1.71E-16	0.2%	9.74E-17	0.1%	1.86E-16	0.2%
OroVerde #3	2.62E-16	0.3%	9.43E-17	0.1%	1.65E-16	0.2%	5.13E-17	0.1%	1.43E-16	0.2%
QC Truck	1.95E-16	0.2%	7.30E-18	0.0%	5.30E-17	0.1%	1.18E-17	0.0%	6.67E-17	0.1%

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class W ^{230}Th (uCi/ml) EC = 2E-14 (20E-15)										
Location										
		% of EC		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	6.25E-16	3.1%	3.43E-16	1.7%	5.19E-16	2.6%	4.73E-16	2.4%	4.90E-16	2.4%
AS-203 South Boundary	1.77E-16	0.9%	2.86E-16	1.4%	2.23E-16	1.1%	2.64E-16	1.3%	2.37E-16	1.2%
AS-204 West Boundary	7.30E-16	3.7%	9.00E-16	4.5%	8.49E-16	4.2%	3.10E-16	1.6%	6.97E-16	3.5%
AS-206 North Boundary	1.71E-17	0.1%	1.34E-16	0.7%	8.27E-17	0.4%	9.65E-17	0.5%	8.25E-17	0.4%
AS-209 Mill Entrance Road	3.42E-16	1.7%	1.05E-15	5.3%	5.75E-16	2.9%	2.18E-16	1.1%	5.47E-16	2.7%
AS-210 Shadow Hills Estates	1.22E-16	0.6%	1.92E-16	1.0%	2.26E-16	1.1%	2.02E-16	1.0%	1.85E-16	0.9%
AS-212 Nearest Resident	7.73E-17	0.4%	2.02E-16	1.0%	2.76E-16	1.4%	1.49E-16	0.7%	1.76E-16	0.9%
Canon City #2	6.81E-17	0.3%	1.24E-16	0.6%	7.31E-17	0.4%	4.37E-17	0.2%	7.73E-17	0.4%
Lincoln Park #2	6.52E-17	0.3%	1.47E-16	0.7%	4.58E-17	0.2%	1.26E-16	0.6%	9.62E-17	0.5%
OroVerde #3	5.49E-17	0.3%	1.19E-16	0.6%	8.28E-17	0.4%	5.25E-17	0.3%	7.72E-17	0.4%
QC Truck	9.49E-18	0.0%	5.03E-17	0.3%	2.69E-17	0.1%	6.61E-17	0.3%	3.82E-17	0.2%

Table EA-1
Environmental Air Monitoring
2010

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class W ^{226}Ra (uCi/ml) EC = 9E-13 (900E-15)										
Location		*% of EC*		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	1.86E-16	0.0%	1.28E-16	0.0%	1.66E-16	0.0%	1.00E-16	0.0%	1.45E-16	0.0%
AS-203 South Boundary	4.92E-17	0.0%	1.02E-16	0.0%	6.25E-17	0.0%	7.50E-17	0.0%	7.21E-17	0.0%
AS-204 West Boundary	2.31E-16	0.0%	3.56E-16	0.0%	3.12E-16	0.0%	1.06E-16	0.0%	2.51E-16	0.0%
AS-206 North Boundary	2.43E-17	0.0%	4.40E-17	0.0%	6.03E-17	0.0%	4.19E-17	0.0%	4.26E-17	0.0%
AS-209 Mill Entrance Road	7.65E-17	0.0%	1.78E-16	0.0%	1.30E-16	0.0%	5.83E-17	0.0%	1.11E-16	0.0%
AS-210 Shadow Hills Estates	3.15E-17	0.0%	3.17E-17	0.0%	6.53E-17	0.0%	3.99E-17	0.0%	4.21E-17	0.0%
AS-212 Nearest Resident	8.18E-17	0.0%	4.67E-17	0.0%	1.05E-16	0.0%	5.74E-17	0.0%	7.28E-17	0.0%
Canon City #2	5.45E-17	0.0%	3.15E-17	0.0%	5.65E-17	0.0%	1.75E-17	0.0%	4.00E-17	0.0%
Lincoln Park #2	4.18E-17	0.0%	3.77E-17	0.0%	2.53E-17	0.0%	5.93E-17	0.0%	4.10E-17	0.0%
OroVerde #3	3.33E-17	0.0%	1.35E-17	0.0%	3.60E-17	0.0%	2.53E-17	0.0%	2.70E-17	0.0%
QC Truck	3.50E-17	0.0%	4.92E-18	0.0%	1.09E-17	0.0%	1.48E-17	0.0%	1.64E-17	0.0%

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class D ^{210}Pb (uCi/ml) EC = 6E-13 (60E-14)										
Location		*% of EC*		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	2.19E-14	3.7%	1.58E-14	2.6%	2.11E-14	3.5%	2.44E-14	4.1%	2.08E-14	3.5%
AS-203 South Boundary	1.89E-14	3.2%	1.20E-14	2.0%	1.76E-14	2.9%	2.59E-14	4.3%	1.86E-14	3.1%
AS-204 West Boundary	2.04E-14	3.4%	1.52E-14	2.5%	2.30E-14	3.8%	2.75E-14	4.6%	2.15E-14	3.6%
AS-206 North Boundary	1.81E-14	3.0%	1.82E-14	3.0%	2.19E-14	3.6%	2.50E-14	4.2%	2.08E-14	3.5%
AS-209 Mill Entrance Road	2.05E-14	3.4%	1.82E-14	3.0%	2.02E-14	3.4%	2.28E-14	3.8%	2.04E-14	3.4%
AS-210 Shadow Hills Estates	1.97E-14	3.3%	1.39E-14	2.3%	1.95E-14	3.2%	2.52E-14	4.2%	1.96E-14	3.3%
AS-212 Nearest Resident	1.71E-14	2.8%	1.40E-14	2.3%	1.97E-14	3.3%	2.47E-14	4.1%	1.89E-14	3.1%
Canon City #2	1.98E-14	3.3%	1.45E-14	2.4%	1.91E-14	3.2%	2.56E-14	4.3%	1.97E-14	3.3%
Lincoln Park #2	1.96E-14	3.3%	1.39E-14	2.3%	1.92E-14	3.2%	2.61E-14	4.3%	1.97E-14	3.3%
OroVerde #3	1.96E-14	3.3%	1.37E-14	2.3%	2.19E-14	3.7%	2.79E-14	4.7%	2.08E-14	3.5%
QC Truck	< 2.25E-16	0.0%	< 1.39E-14	2.3%	2.52E-16	0.0%	< 4.78E-16	0.1%	1.89E-15	0.3%

Table EA-1
Environmental Air Monitoring
2010

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class Y ^{232}Th (uCi/ml) EC = 4E-15 (400E-17)										
Location		*% of EC*		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	3.77E-17	0.6%	3.60E-17	0.6%	3.31E-17	0.6%	2.95E-17	0.5%	3.41E-17	0.6%
AS-203 South Boundary	3.67E-17	0.6%	1.62E-17	0.3%	2.34E-17	0.4%	1.08E-17	0.2%	2.18E-17	0.4%
AS-204 West Boundary	4.49E-17	0.7%	3.24E-17	0.5%	1.88E-17	0.3%	2.25E-17	0.4%	2.97E-17	0.5%
AS-206 North Boundary	2.88E-17	0.5%	3.24E-17	0.5%	4.57E-17	0.8%	2.63E-17	0.4%	3.33E-17	0.6%
AS-209 Mill Entrance Road	2.25E-17	0.4%	2.79E-17	0.5%	2.05E-17	0.3%	2.24E-17	0.4%	2.33E-17	0.4%
AS-210 Shadow Hills Estates	2.79E-17	0.5%	2.89E-17	0.5%	4.38E-17	0.7%	3.40E-17	0.6%	3.37E-17	0.6%
AS-212 Nearest Resident	2.43E-17	0.4%	2.16E-17	0.4%	1.46E-17	0.2%	2.72E-17	0.5%	2.19E-17	0.4%
Canon City #2	4.09E-17	0.7%	3.87E-17	0.6%	4.58E-17	0.8%	2.04E-17	0.3%	3.64E-17	0.6%
Lincoln Park #2	4.18E-17	0.7%	5.48E-17	0.9%	3.21E-17	0.5%	5.54E-17	0.9%	4.60E-17	0.8%
OroVerde #3	3.87E-17	0.6%	2.70E-17	0.4%	2.24E-17	0.4%	1.65E-17	0.3%	2.61E-17	0.4%
QC Truck	< 2.09E-17	0.3%	4.72E-18	0.1%	1.85E-17	0.3%	2.14E-17	0.4%	1.38E-17	0.2%

EC=Effluent Concentration
(Regulatory Limit from 6CR
Part 4, Appendix B)

"<" are below detection limit and are
taken as ½ that value when calculating
an average concentration (shown in red)

Table EA-2
Environmental Air Monitoring
2011

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class Y ^{Nat}U (uCi/ml) EC = 9E-14 (90E-15)										
Location										
		% of EC		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary		2.40E-16	0.3%		5.57E-16	0.6%				3.98E-16	0.4%
AS-203 South Boundary		8.90E-17	0.1%		1.19E-16	0.1%				1.04E-16	0.1%
AS-204 West Boundary		7.01E-17	0.1%		4.73E-16	0.5%				2.71E-16	0.3%
AS-206 North Boundary		4.88E-17	0.1%		9.29E-17	0.1%				7.08E-17	0.1%
AS-209 Mill Entrance Road		9.43E-17	0.1%		3.49E-16	0.4%				2.22E-16	0.2%
AS-210 Shadow Hills Estates		4.68E-17	0.1%		1.09E-16	0.1%				7.82E-17	0.1%
AS-212 Nearest Resident		5.47E-17	0.1%		1.85E-16	0.2%				1.20E-16	0.1%
Canon City #2		5.14E-17	0.1%		1.11E-16	0.1%				8.14E-17	0.1%
Lincoln Park #2		5.74E-17	0.1%		1.19E-16	0.1%				8.80E-17	0.1%
OroVerde #3		3.32E-17	0.0%		3.96E-17	0.0%				3.64E-17	0.0%
QC Truck	<	2.17E-18	0.0%	<	2.90E-18	0.0%				1.27E-18	0.0%

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class W ^{230}Th (uCi/ml) EC = 2E-14 (20E-15)										
Location										
		% of EC		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary		7.34E-16	3.7%		4.32E-16	2.2%				5.83E-16	2.9%
AS-203 South Boundary		2.47E-16	1.2%		1.30E-16	0.7%				1.89E-16	0.9%
AS-204 West Boundary		2.06E-16	1.0%		9.17E-16	4.6%				5.61E-16	2.8%
AS-206 North Boundary	<	6.91E-18	0.0%		4.77E-17	0.2%				2.56E-17	0.1%
AS-209 Mill Entrance Road		1.33E-16	0.7%		4.51E-16	2.3%				2.92E-16	1.5%
AS-210 Shadow Hills Estates		1.56E-17	0.1%		2.27E-16	1.1%				1.22E-16	0.6%
AS-212 Nearest Resident		9.06E-17	0.5%		2.47E-16	1.2%				1.69E-16	0.8%
Canon City #2	<	6.72E-18	0.0%		7.16E-17	0.4%				3.75E-17	0.2%
Lincoln Park #2		8.08E-17	0.4%		8.96E-17	0.4%				8.52E-17	0.4%
OroVerde #3	<	5.88E-18	0.0%		7.89E-17	0.4%				4.09E-17	0.2%
QC Truck	<	1.07E-17	0.1%	<	8.36E-18	0.0%				4.77E-18	0.0%

Table EA-2
Environmental Air Monitoring
2011

Location	1st Quarter		2nd Quarter		3rd Quarter	4th Quarter	Average	
Class W ^{226}Ra (uCi/ml) EC = 9E-13 (900E-15)								
Location		*% of EC*		*% of EC*	*% of EC*	*% of EC*		*% of EC*
AS-202 East Boundary	1.03E-16	0.0%	9.20E-17	0.0%			9.76E-17	0.0%
AS-203 South Boundary	3.89E-17	0.0%	3.89E-17	0.0%			3.89E-17	0.0%
AS-204 West Boundary	4.03E-17	0.0%	2.56E-16	0.0%			1.48E-16	0.0%
AS-206 North Boundary	< 6.42E-18	0.0%	2.04E-17	0.0%			1.18E-17	0.0%
AS-209 Mill Entrance Road	3.80E-17	0.0%	1.04E-16	0.0%			7.11E-17	0.0%
AS-210 Shadow Hills Estates	1.75E-17	0.0%	3.13E-17	0.0%			2.44E-17	0.0%
AS-212 Nearest Resident	3.15E-17	0.0%	3.60E-17	0.0%			3.38E-17	0.0%
Canon City #2	1.56E-17	0.0%	3.10E-17	0.0%			2.33E-17	0.0%
Lincoln Park #2	< 4.48E-18	0.0%	3.12E-17	0.0%			1.67E-17	0.0%
OroVerde #3	< 4.60E-18	0.0%	5.65E-18	0.0%			3.98E-18	0.0%
QC Truck	< 6.62E-18	0.0%	6.03E-18	0.0%			4.67E-18	0.0%

Location	1st Quarter		2nd Quarter		3rd Quarter	4th Quarter	Average	
Class D ^{210}Pb (uCi/ml) EC = 6E-13 (60E-14)								
Location		*% of EC*		*% of EC*	*% of EC*	*% of EC*		*% of EC*
AS-202 East Boundary	1.87E-14	3.1%	1.84E-14	3.1%			1.85E-14	3.1%
AS-203 South Boundary	1.51E-14	2.5%	1.36E-14	2.3%			1.44E-14	2.4%
AS-204 West Boundary	1.08E-14	1.8%	1.58E-14	2.6%			1.33E-14	2.2%
AS-206 North Boundary	1.82E-14	3.0%	1.63E-14	2.7%			1.72E-14	2.9%
AS-209 Mill Entrance Road	1.67E-14	2.8%	1.54E-14	2.6%			1.61E-14	2.7%
AS-210 Shadow Hills Estates	1.70E-14	2.8%	1.38E-14	2.3%			1.54E-14	2.6%
AS-212 Nearest Resident	1.93E-14	3.2%	1.44E-14	2.4%			1.69E-14	2.8%
Canon City #2	1.79E-14	3.0%	1.55E-14	2.6%			1.67E-14	2.8%
Lincoln Park #2	1.75E-14	2.9%	1.47E-14	2.5%			1.61E-14	2.7%
OroVerde #3	1.68E-14	2.8%	1.47E-14	2.5%			1.58E-14	2.6%
QC Truck	< 2.50E-16	0.0%	< 2.13E-16	0.0%			1.16E-16	0.0%

Table EA-2
Environmental Air Monitoring
2011

Location	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Average
Class Y ^{232}Th (uCi/ml) EC = 4E-15 (400E-17)					
Location					
	% of EC	*% of EC*	*% of EC*	*% of EC*	*% of EC*
AS-202 East Boundary	< 9.04E-18	0.2%	2.15E-17	0.4%			1.30E-17	0.2%
AS-203 South Boundary	< 6.52E-18	0.1%	3.41E-17	0.6%			1.87E-17	0.3%
AS-204 West Boundary	< 2.91E-18	0.0%	2.56E-17	0.4%			1.35E-17	0.2%
AS-206 North Boundary	< 1.03E-17	0.2%	2.14E-17	0.4%			1.33E-17	0.2%
AS-209 Mill Entrance Road	< 5.94E-18	0.1%	3.79E-17	0.6%			2.04E-17	0.3%
AS-210 Shadow Hills Estates	< 9.54E-18	0.2%	3.64E-17	0.6%			2.06E-17	0.3%
AS-212 Nearest Resident	< 5.41E-18	0.1%	2.34E-17	0.4%			1.30E-17	0.2%
Canon City #2	1.75E-17	0.3%	4.16E-17	0.7%			2.96E-17	0.5%
Lincoln Park #2	1.36E-17	0.2%	4.68E-17	0.8%			3.02E-17	0.5%
OroVerde #3	< 9.31E-18	0.2%	2.73E-17	0.5%			1.60E-17	0.3%
QC Truck	< 9.63E-18	0.2%	8.85E-18	0.1%			6.83E-18	0.1%

Figure EA - 2A
Environmental Air
Average Annual ^{Nat}U Concentration
1979-2011

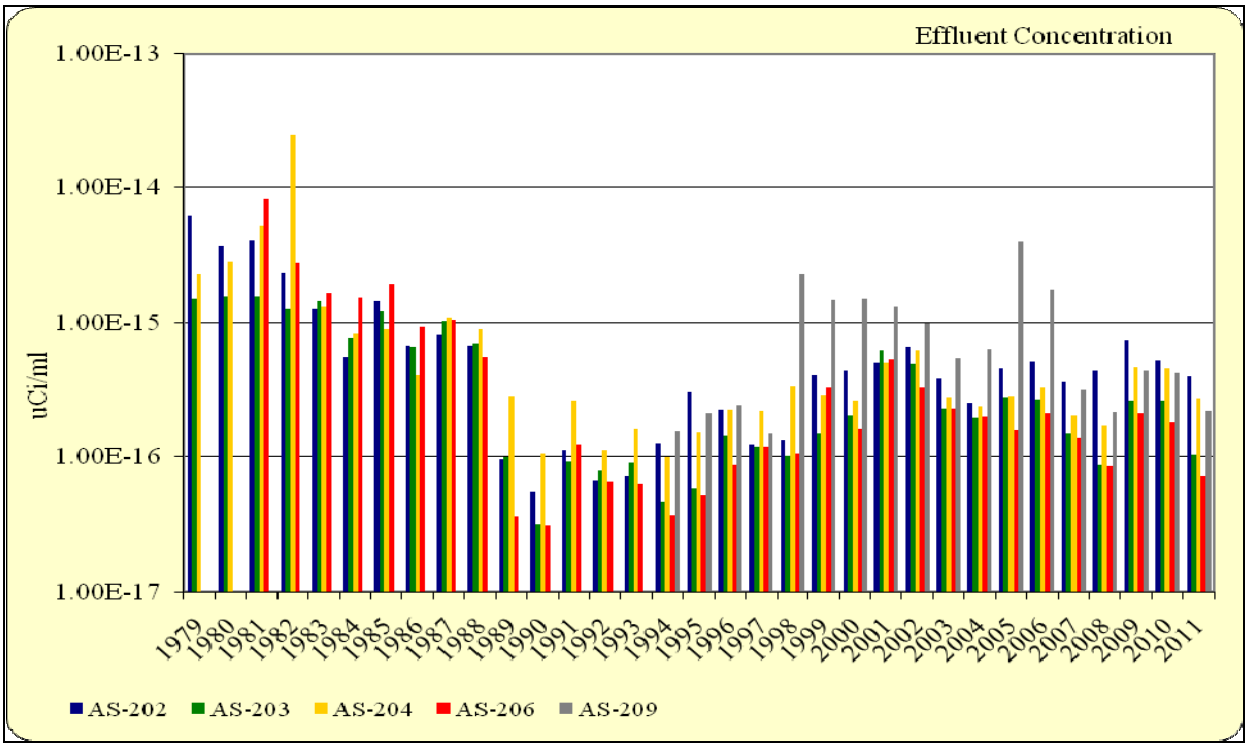


Figure EA - 2B
Environmental Air
Average Annual ^{Nat}U Concentration
1979-2011

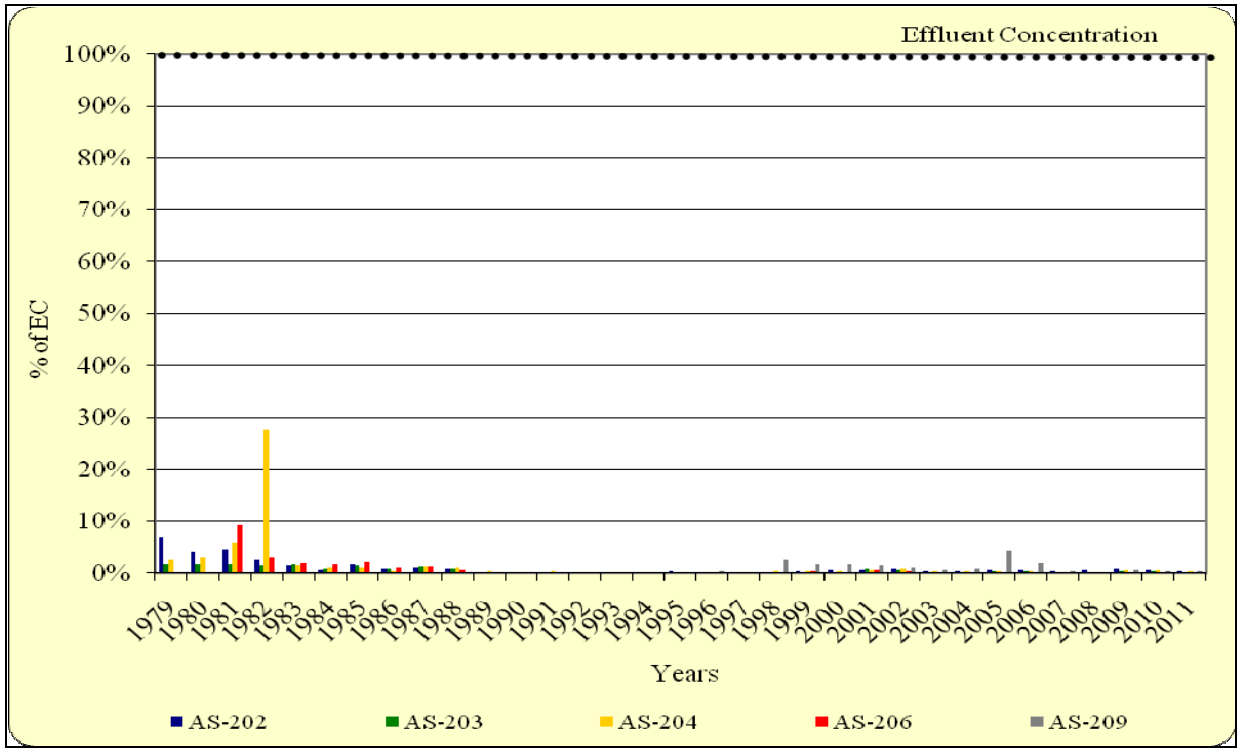


Figure EA - 3A
Environmental Air
Average Annual ^{Nat}U Concentration
1979-2011

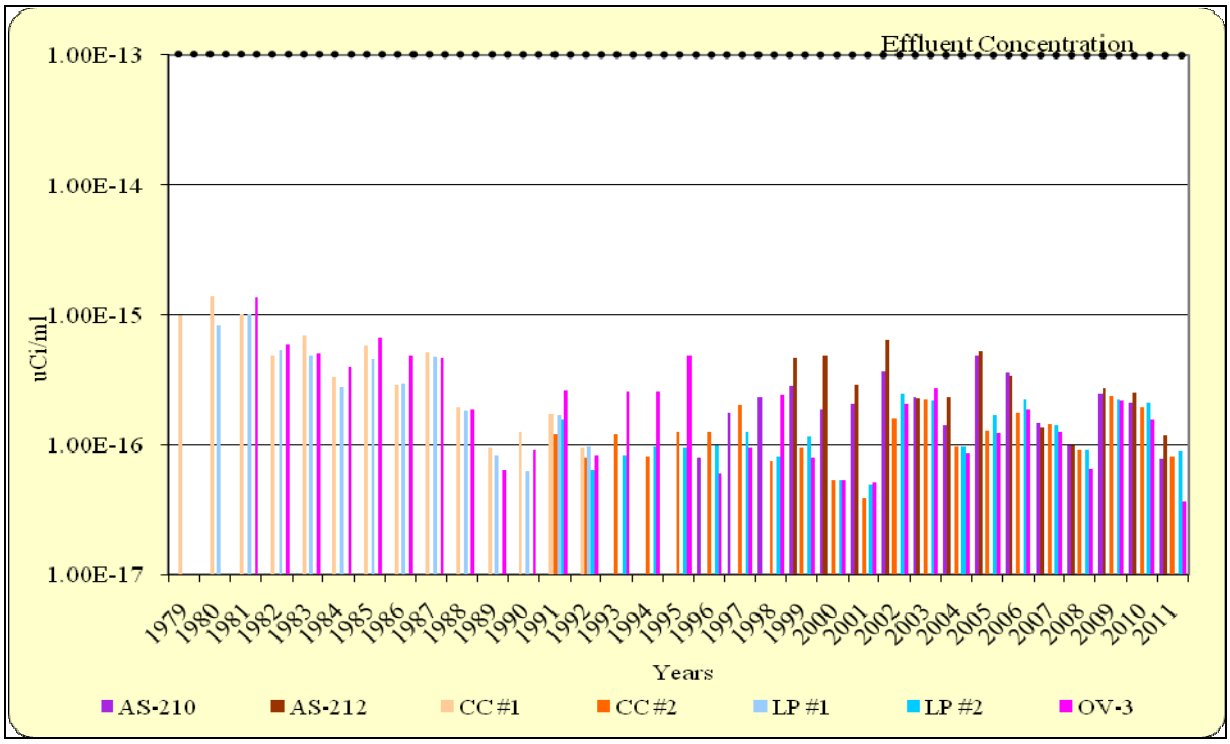


Figure EA - 3B
Environmental Air
Average Annual ^{Nat}U Concentration
1979-2011

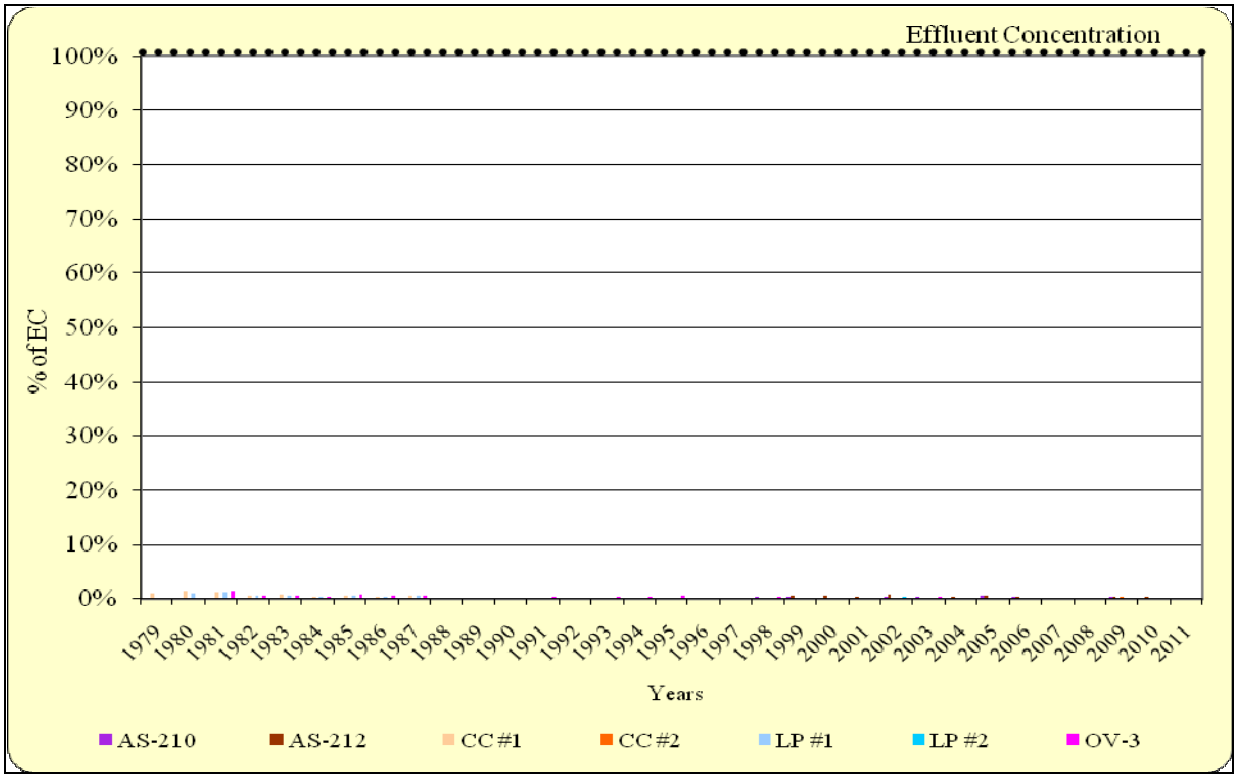


Figure EA - 4A
Environmental Air
Average Annual ^{230}Th Concentration
1979-2011

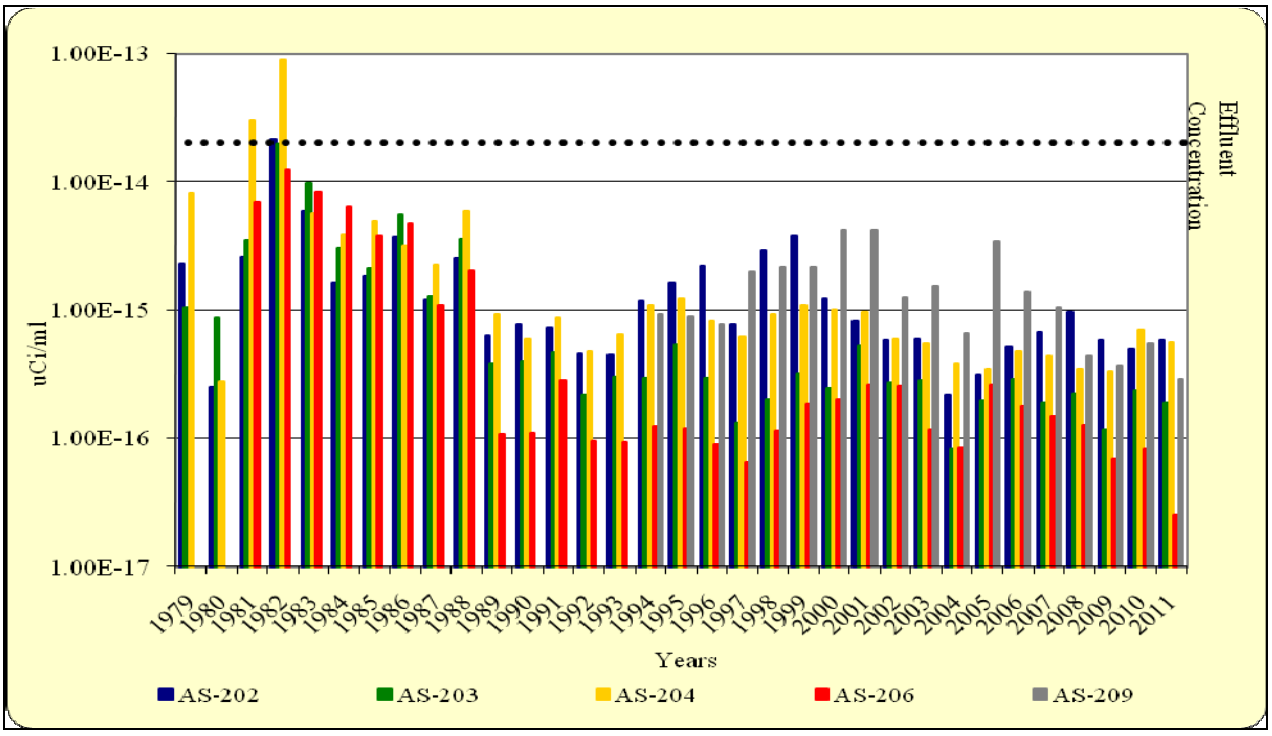


Figure EA - 4B
Environmental Air
Average Annual ^{230}Th Concentration
1979-2011

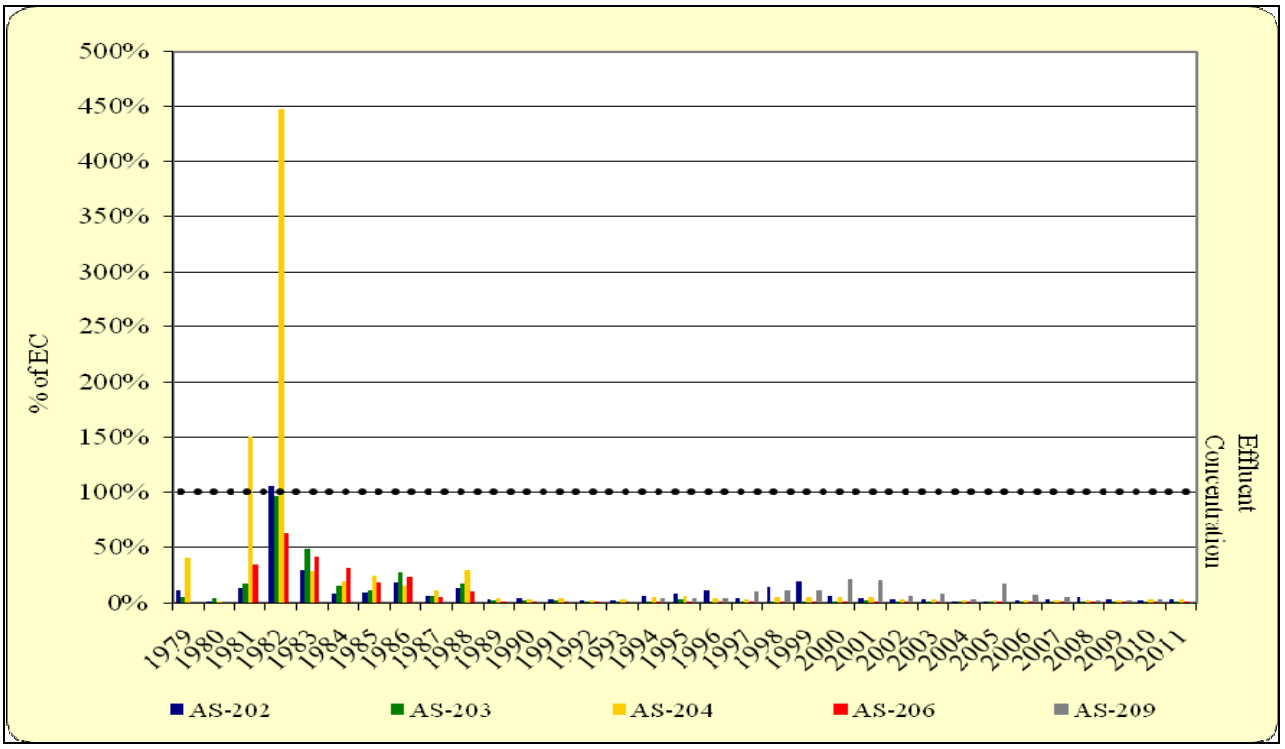


Figure EA - 5A
Environmental Air
Average Annual ^{230}Th Concentration
1979-2011

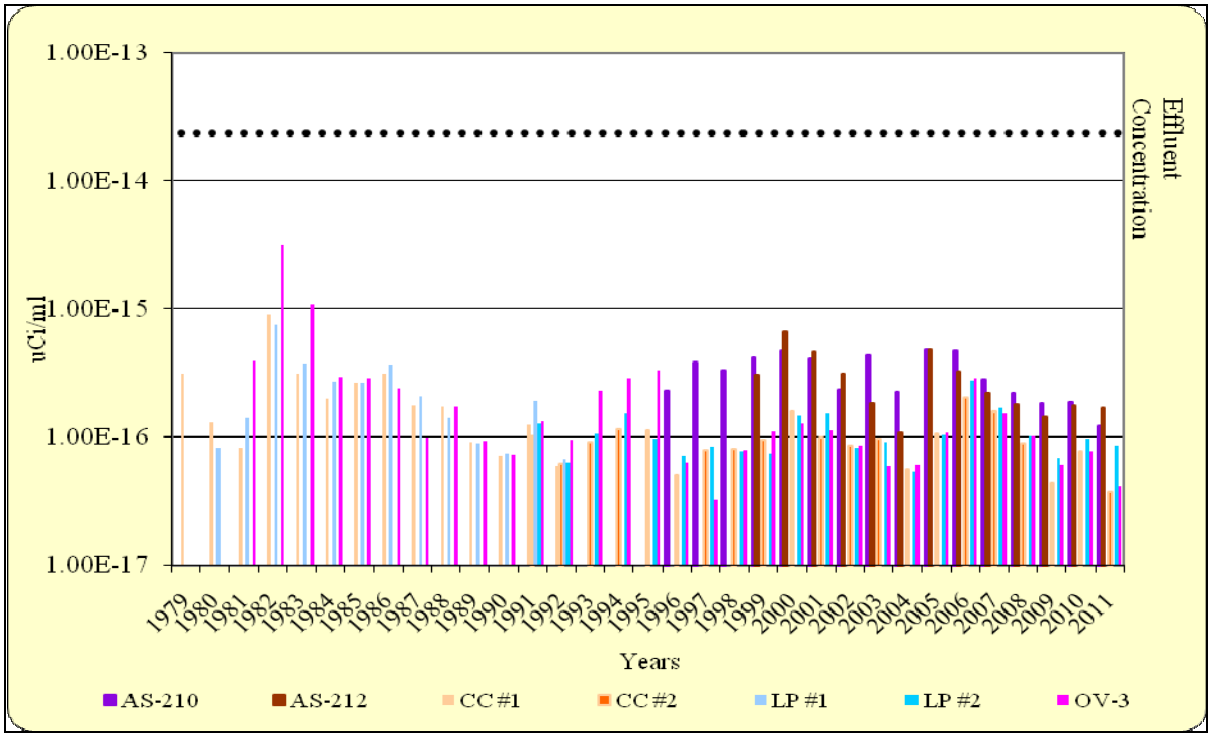


Figure EA - 5B
Environmental Air
Average Annual ^{230}Th Concentration
1979-2011

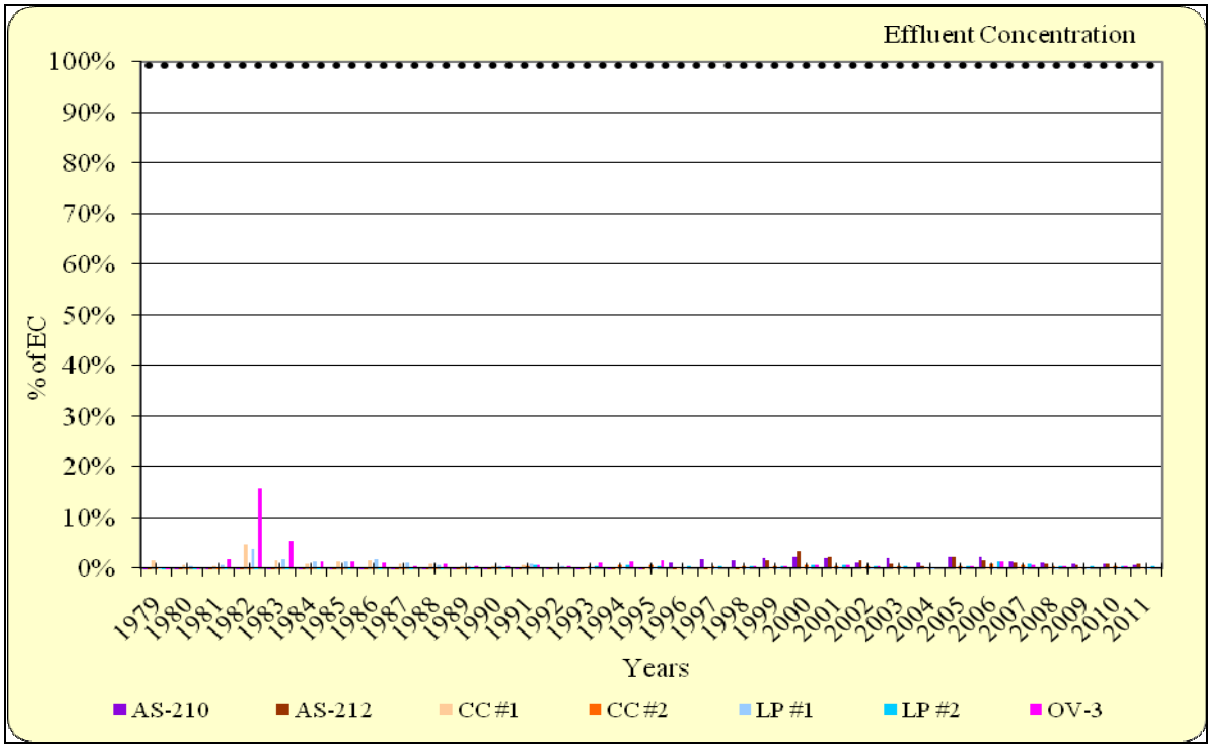


Figure EA-6A
Environmental Air
Average Annual ^{226}Ra Concentration
1979-2011

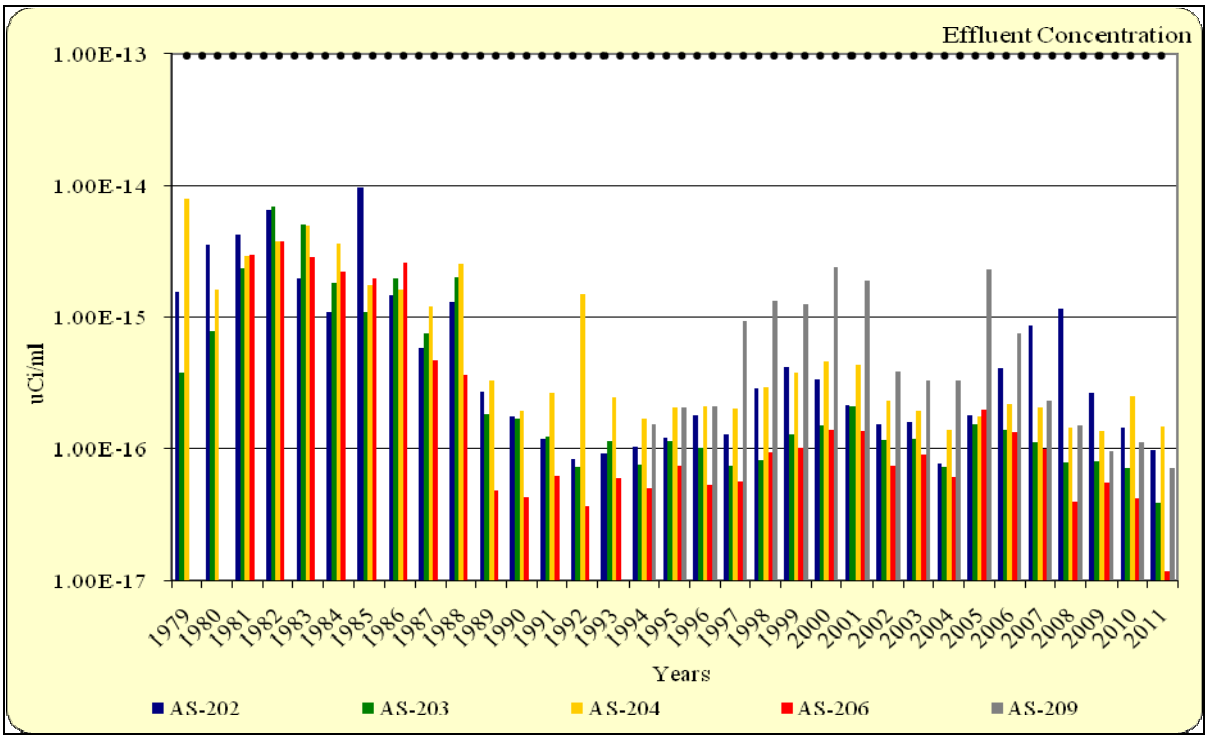


Figure EA-6B
Environmental Air
Average Annual ^{226}Ra Concentration
1979-2011

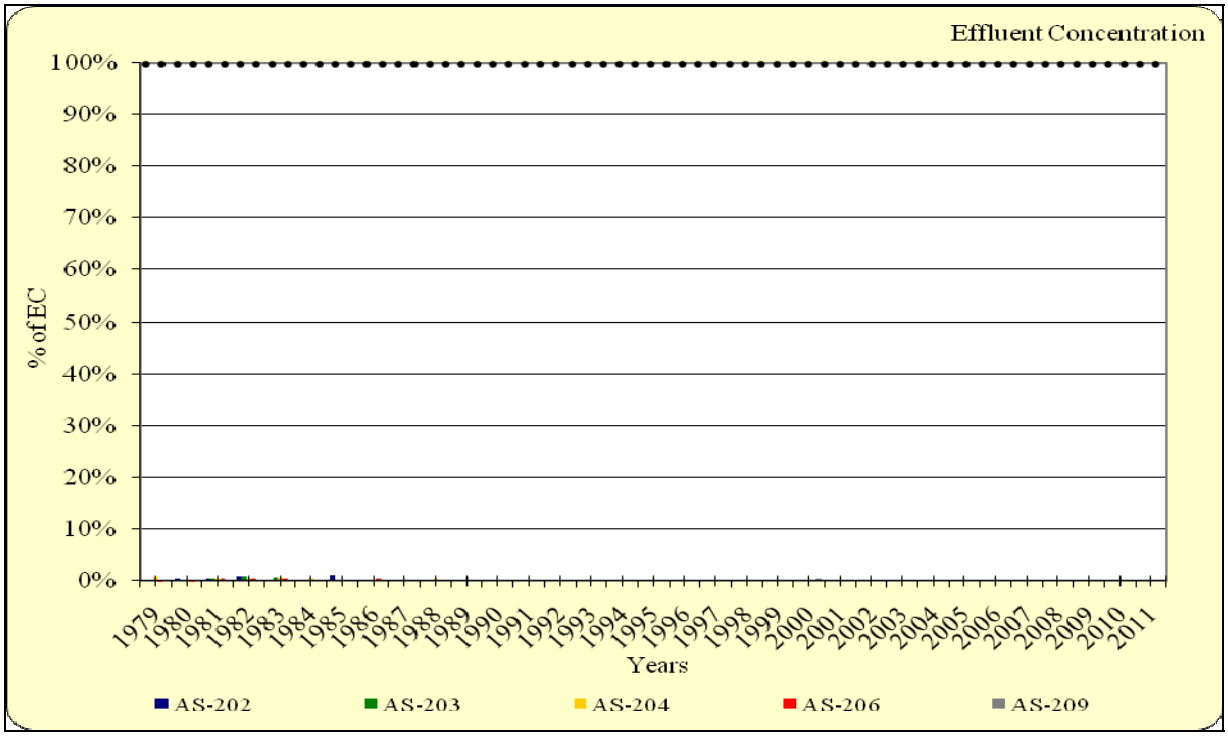


Figure EA-7A
Environmental Air
Average Annual ^{226}Ra Concentration
1979-2011

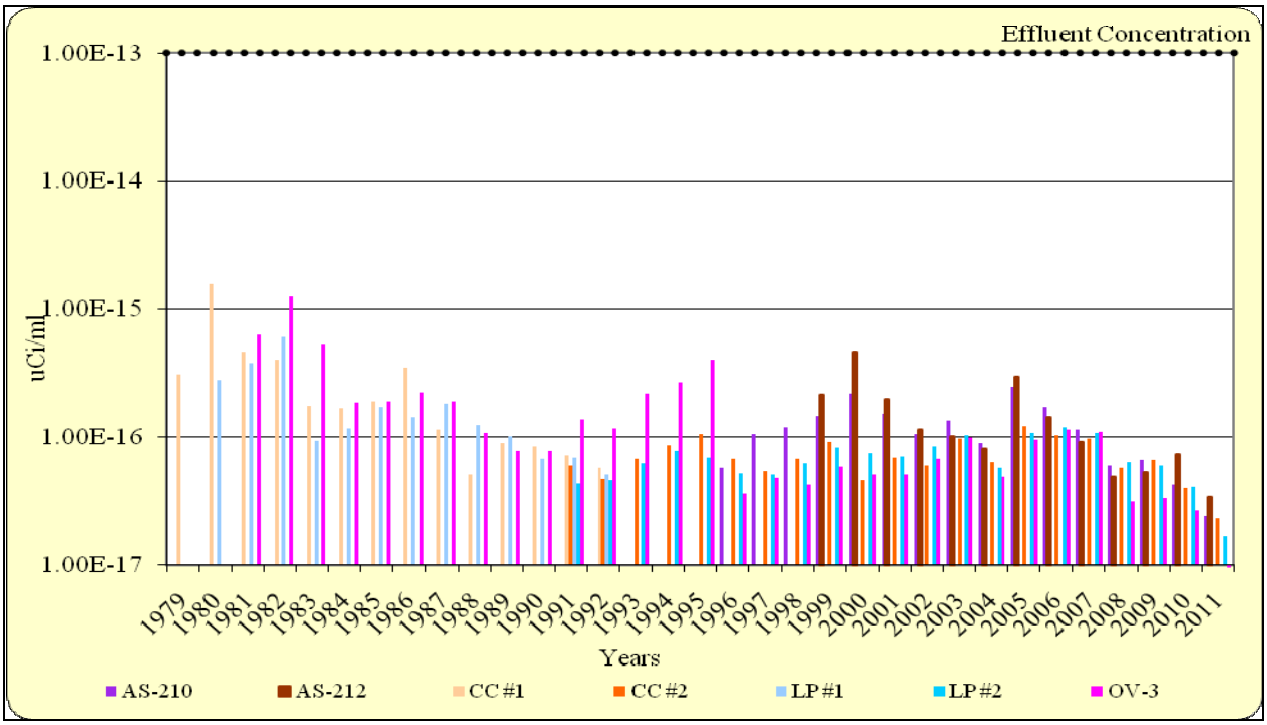


Figure EA-7B
Environmental Air
Average Annual ^{226}Ra Concentration
1979-2011

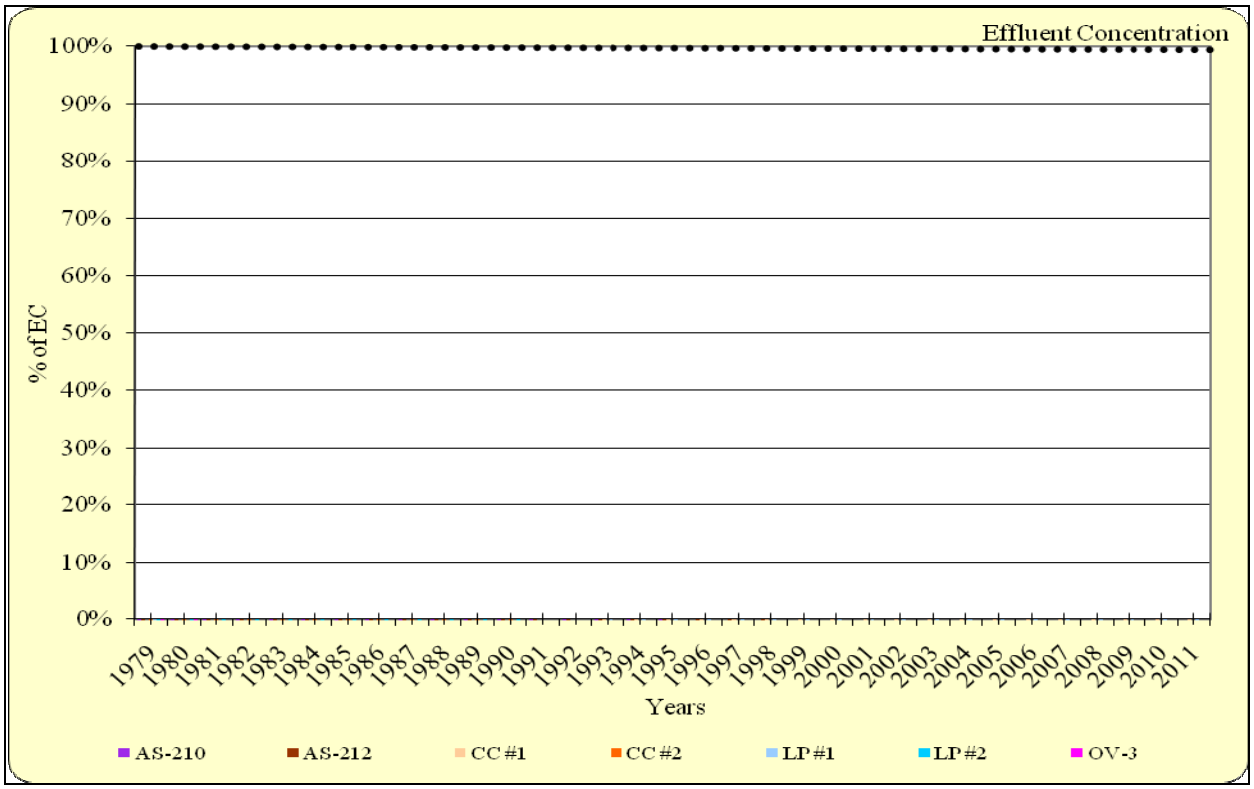


Figure EA-8A
Environmental Air
Average Annual ^{210}Pb Concentration
1979-2011

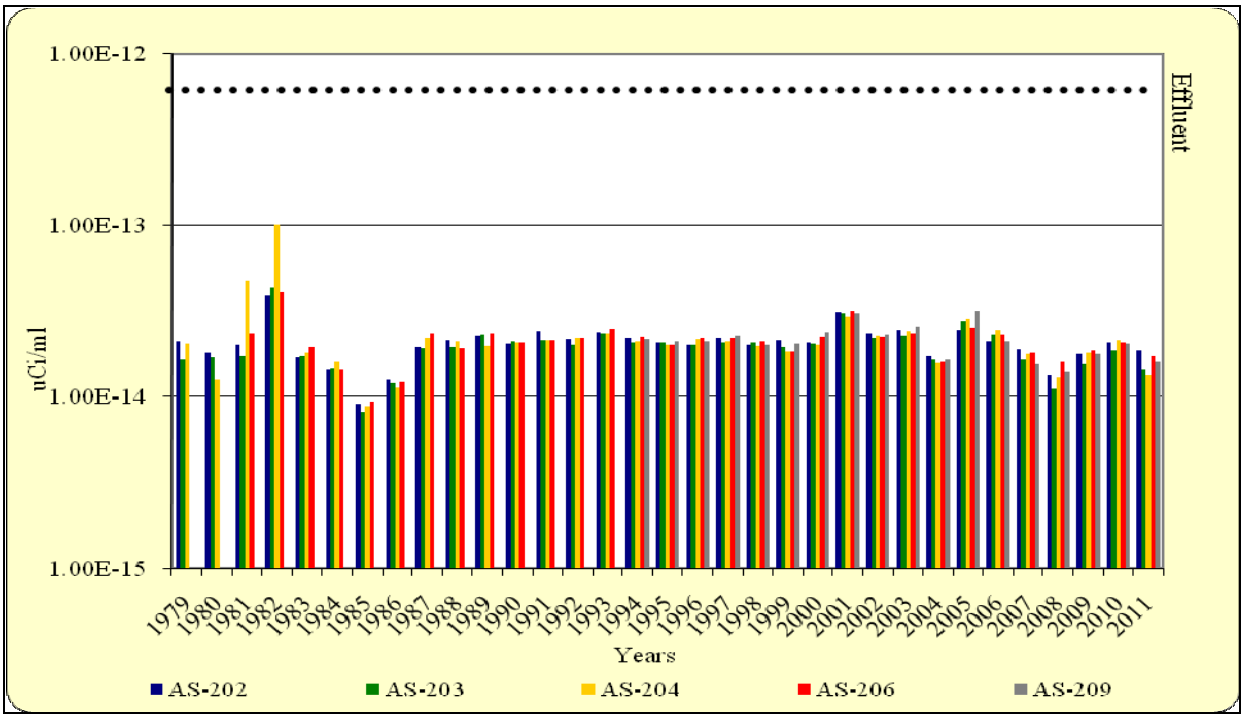


Figure EA-8B
Environmental Air
Average Annual ^{210}Pb Concentration
1979-2011

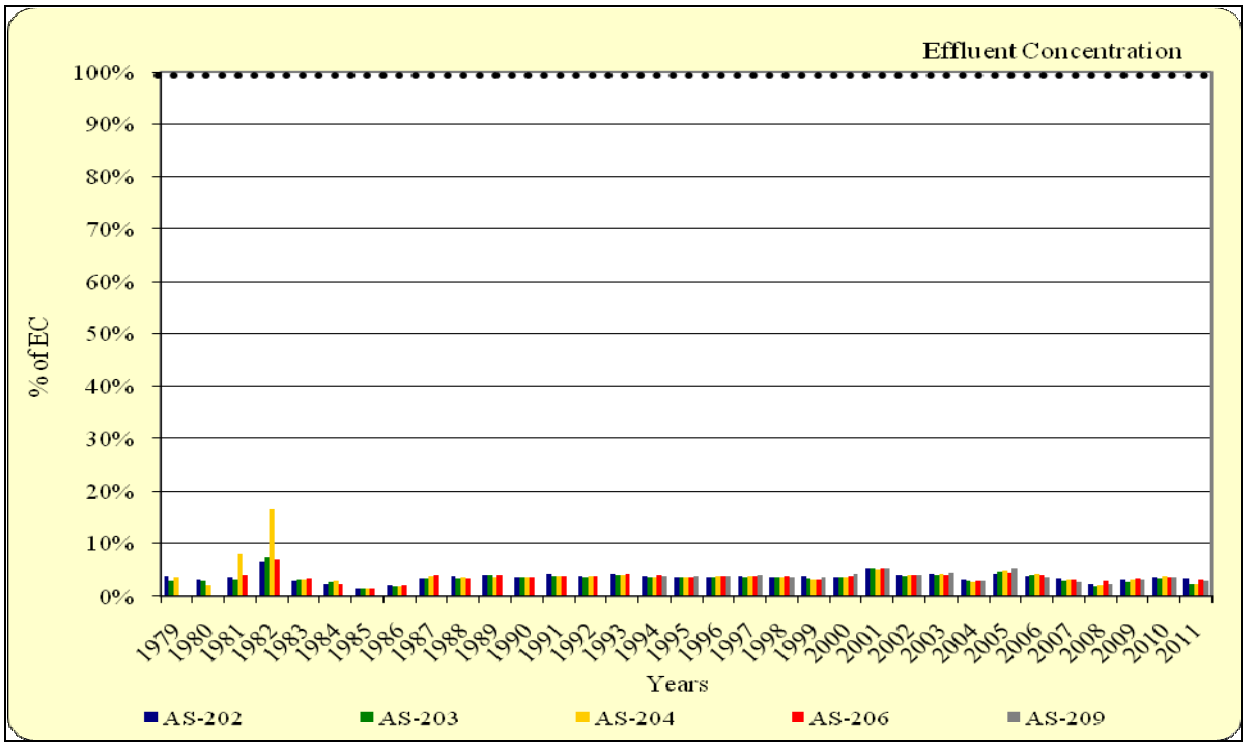


Figure EA-9A
Environmental Air
Average Annual ^{210}Pb Concentration
1979-2011

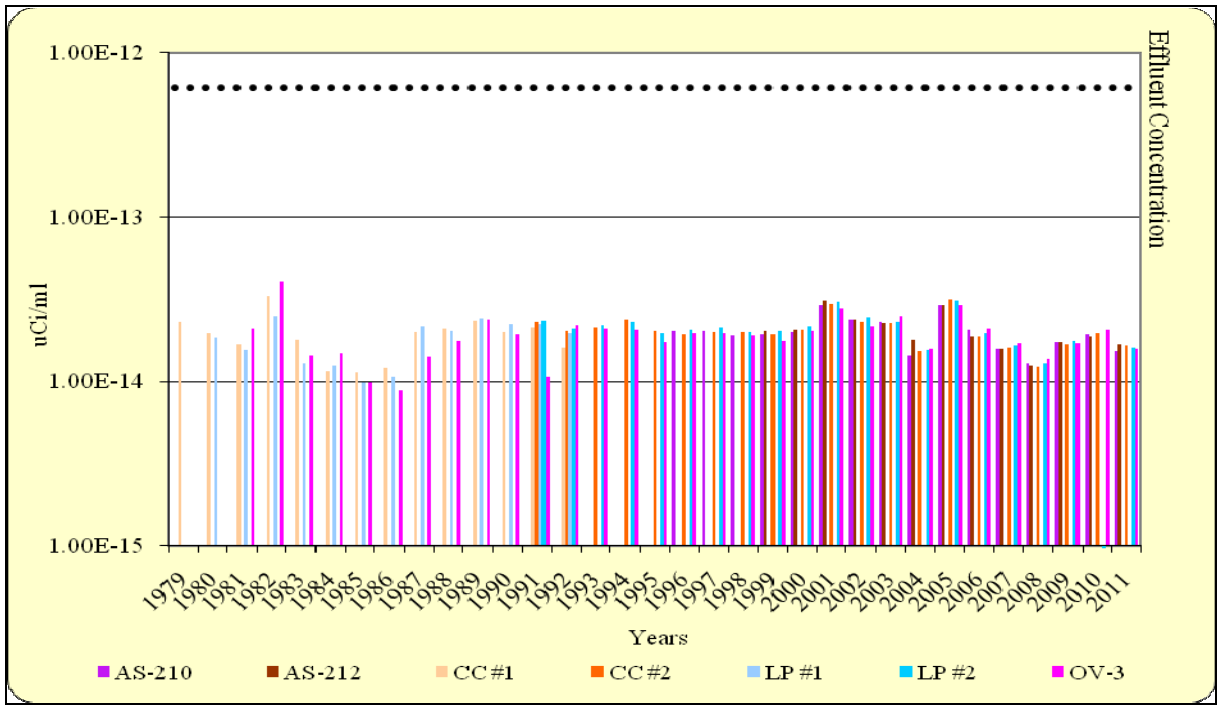


Figure EA-9B
Environmental Air
Average Annual ^{210}Pb Concentration
1979-2011

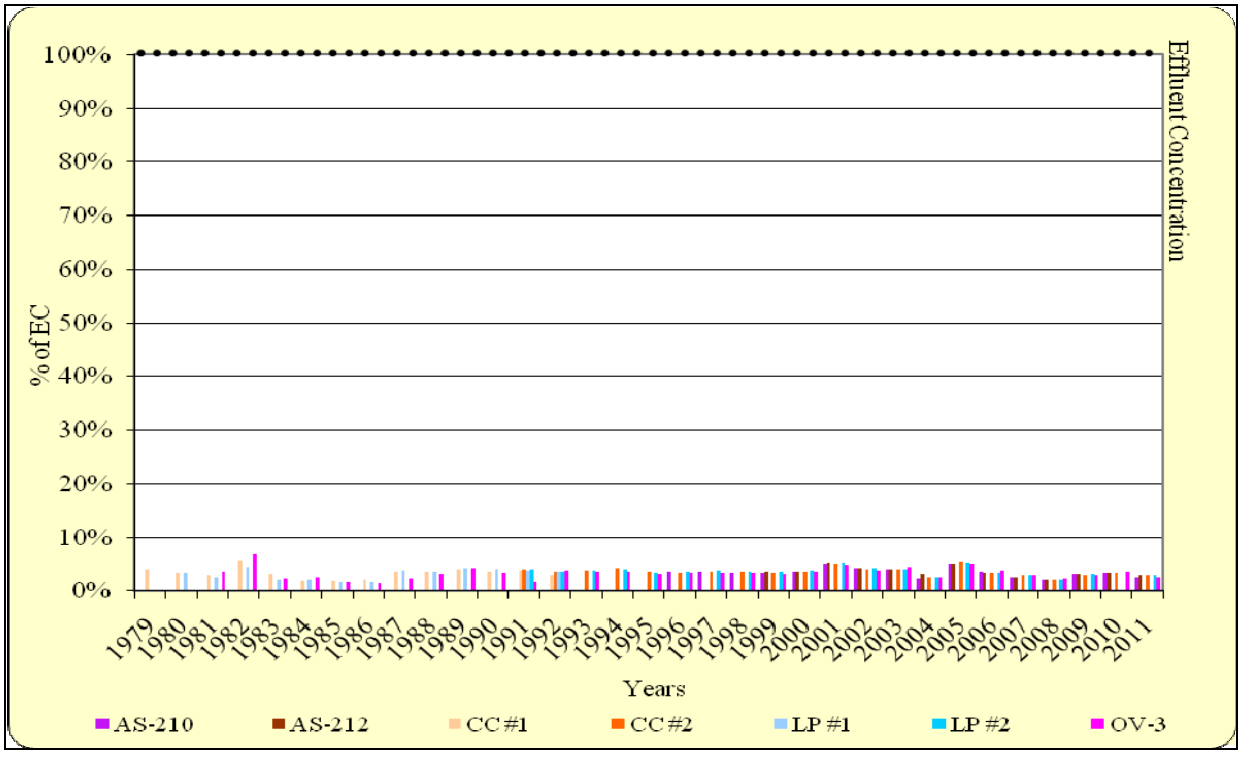


Figure EA-10A
Environmental Air
Average Annual ^{232}Th Concentration
1979-2011

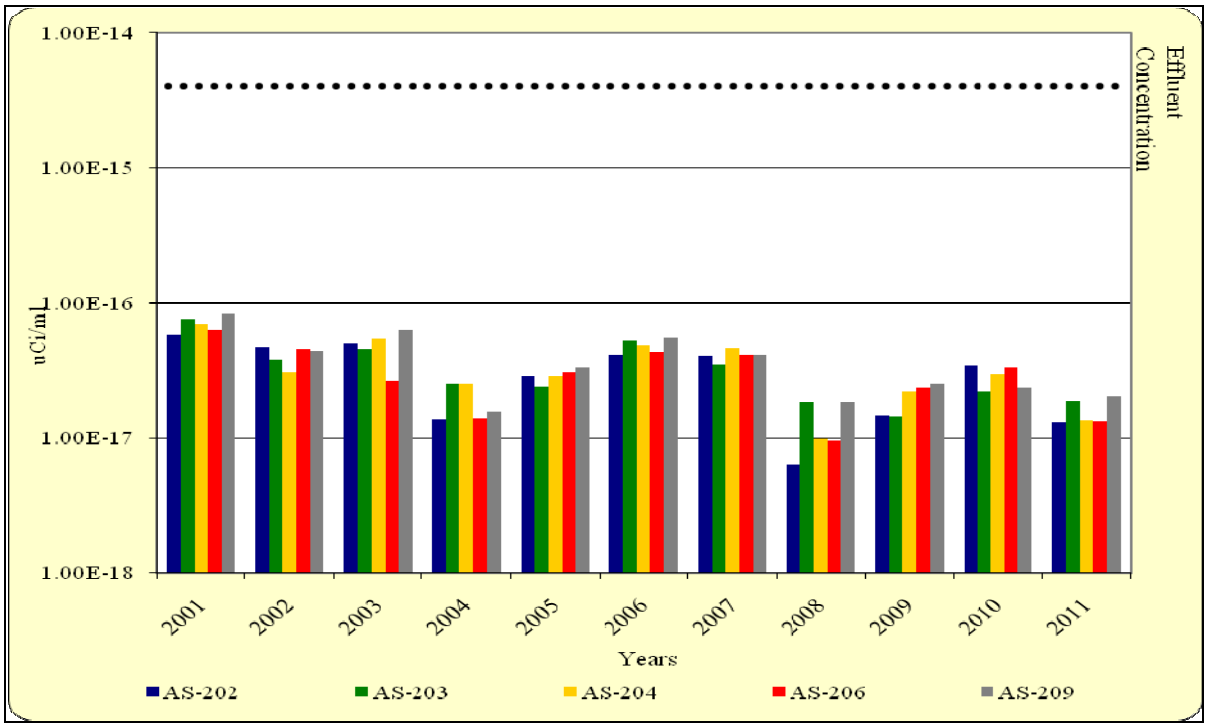


Figure EA-10B
Environmental Air
Average Annual ^{232}Th Concentration
1979-2011

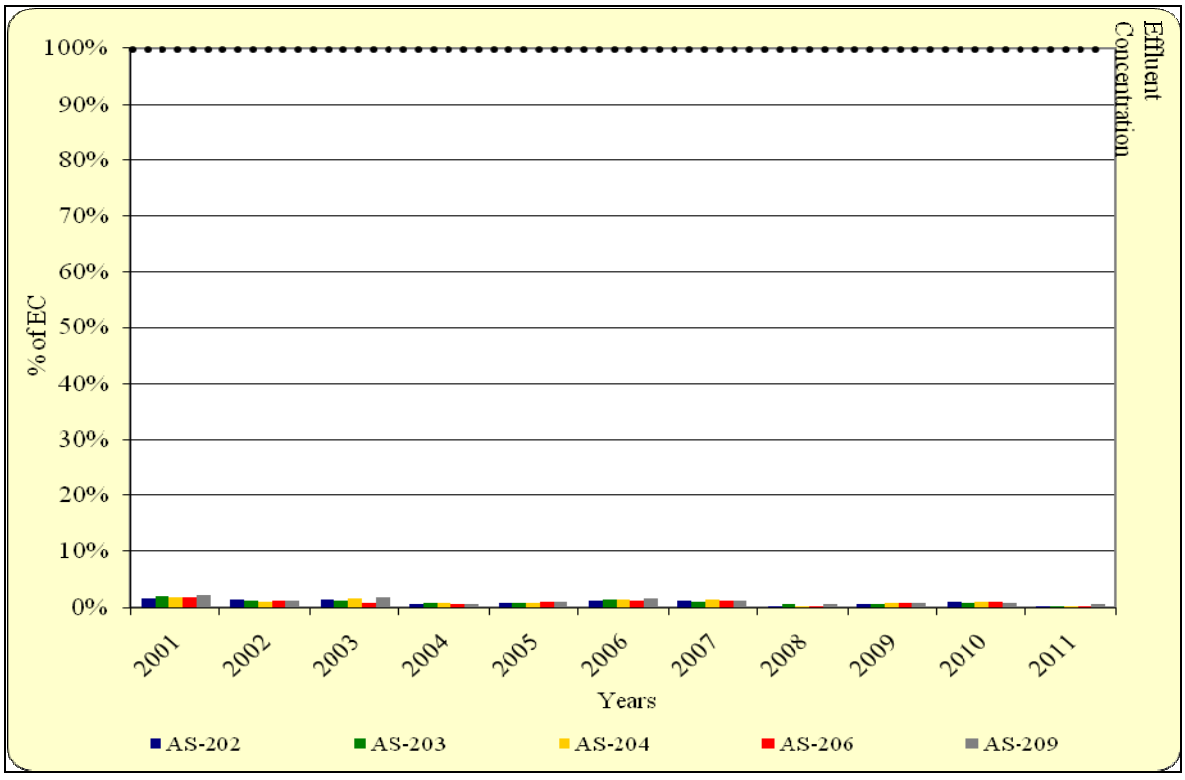


Figure EA - 11A
Environmental Air
Average Annual ^{232}Th Concentration
1979-2011

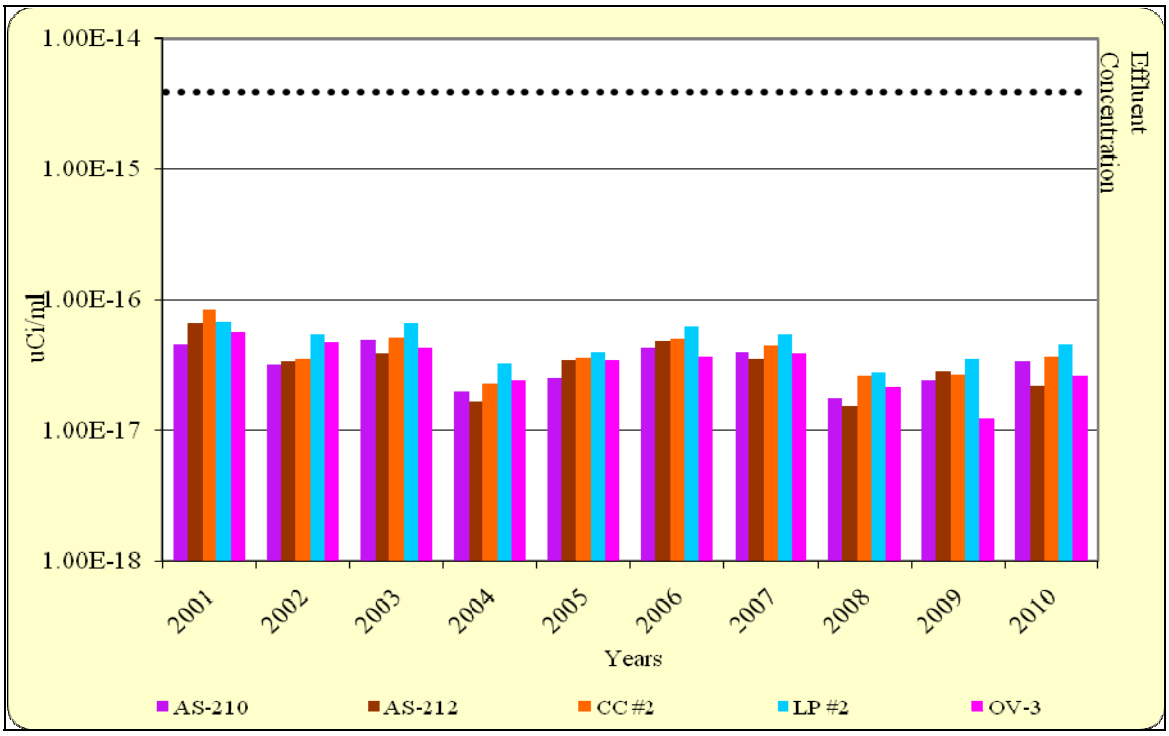


Figure EA - 11B
Environmental Air
Average Annual ^{232}Th Concentration
1979-2011

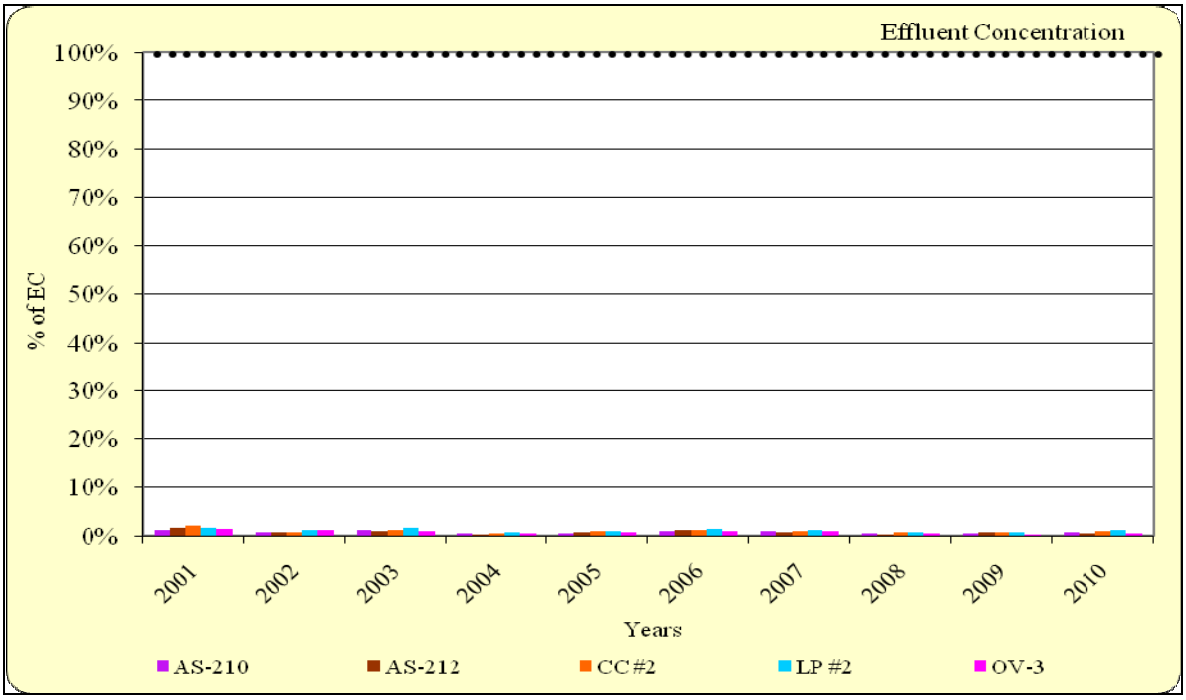
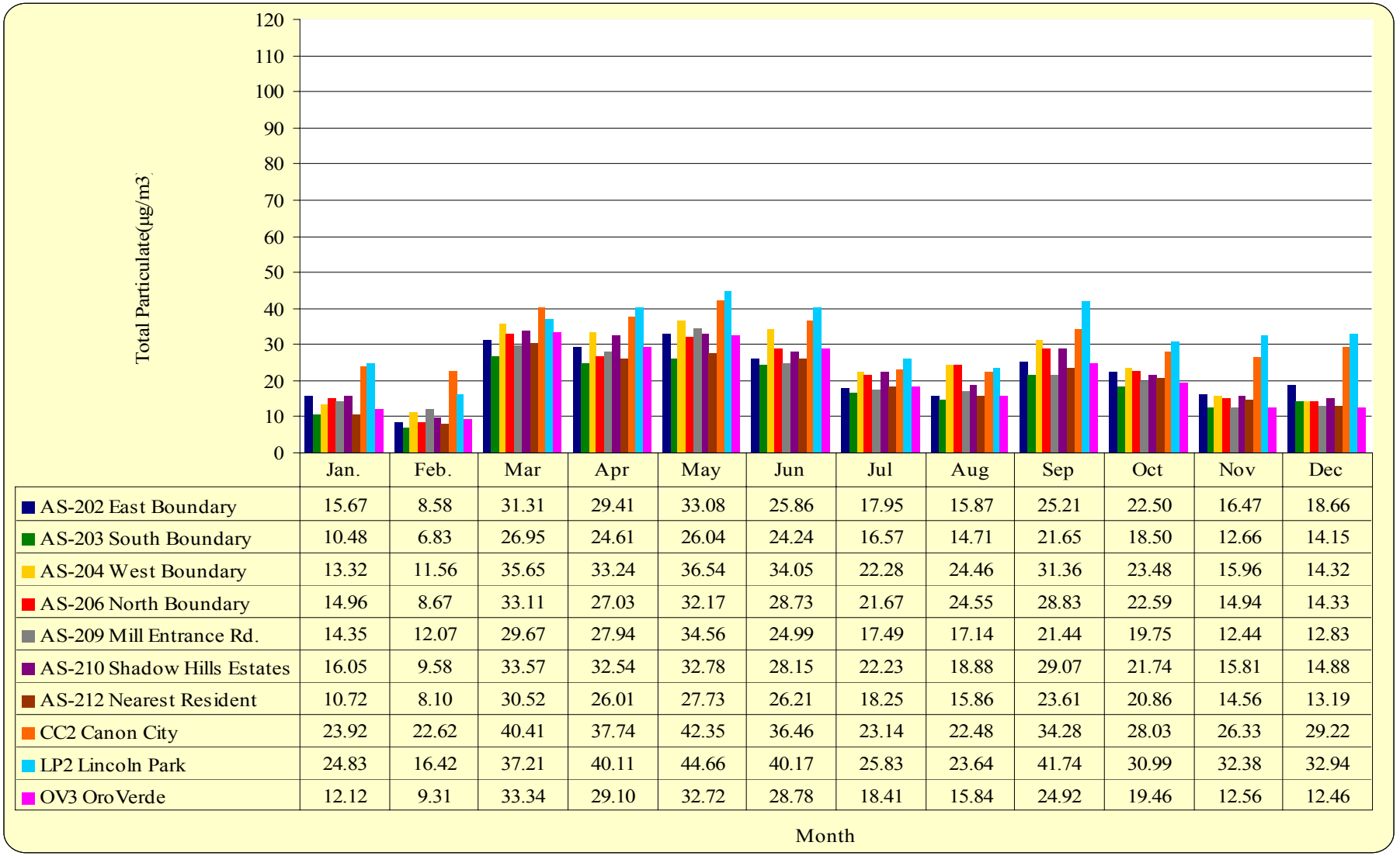
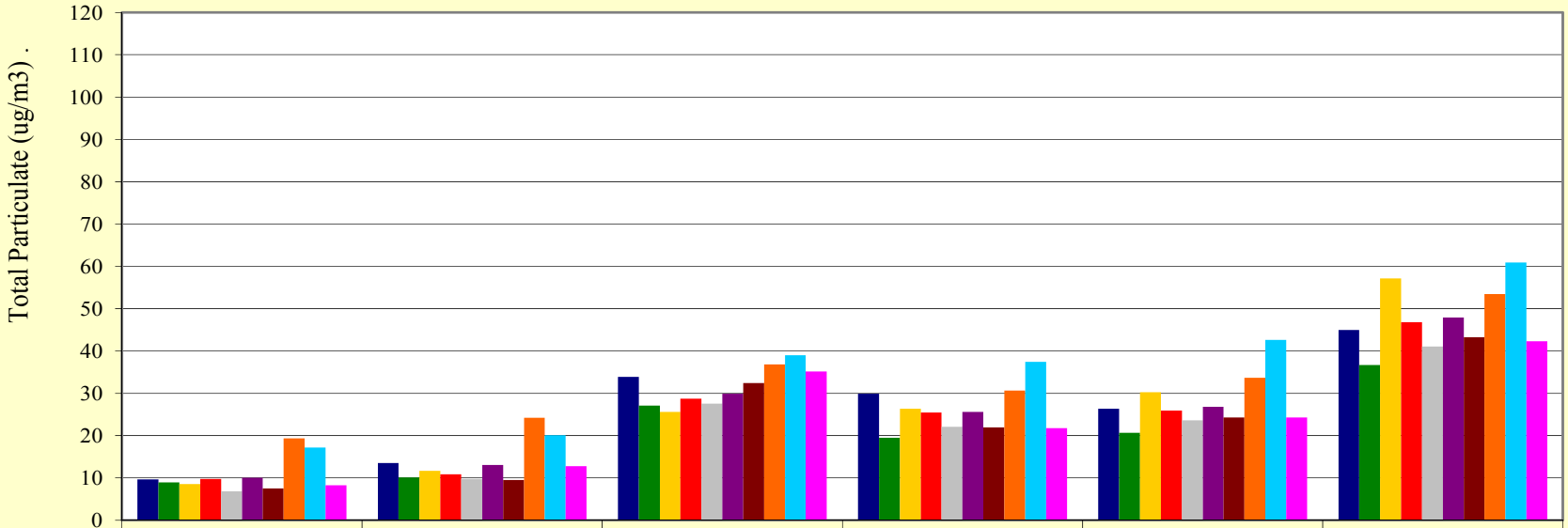


Figure EA-12
Environmental Air
Monthly Average Total Particulate
January through December 2010



	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AS-202 East Boundary	15.67	8.58	31.31	29.41	33.08	25.86	17.95	15.87	25.21	22.50	16.47	18.66
AS-203 South Boundary	10.48	6.83	26.95	24.61	26.04	24.24	16.57	14.71	21.65	18.50	12.66	14.15
AS-204 West Boundary	13.32	11.56	35.65	33.24	36.54	34.05	22.28	24.46	31.36	23.48	15.96	14.32
AS-206 North Boundary	14.96	8.67	33.11	27.03	32.17	28.73	21.67	24.55	28.83	22.59	14.94	14.33
AS-209 Mill Entrance Rd.	14.35	12.07	29.67	27.94	34.56	24.99	17.49	17.14	21.44	19.75	12.44	12.83
AS-210 Shadow Hills Estates	16.05	9.58	33.57	32.54	32.78	28.15	22.23	18.88	29.07	21.74	15.81	14.88
AS-212 Nearest Resident	10.72	8.10	30.52	26.01	27.73	26.21	18.25	15.86	23.61	20.86	14.56	13.19
CC2 Canon City	23.92	22.62	40.41	37.74	42.35	36.46	23.14	22.48	34.28	28.03	26.33	29.22
LP2 Lincoln Park	24.83	16.42	37.21	40.11	44.66	40.17	25.83	23.64	41.74	30.99	32.38	32.94
OV3 OroVerde	12.12	9.31	33.34	29.10	32.72	28.78	18.41	15.84	24.92	19.46	12.56	12.46

Figure EA-13
Environmental Air
Monthly Average Total Particulate
January through June 2011



	Jan.	Feb.	Mar	Apr	May	Jun
AS-202	9.64	13.49	33.86	29.87	26.36	44.97
AS-203	8.93	10.13	27.07	19.51	20.67	36.71
AS-204	8.55	11.63	25.64	26.38	30.26	57.15
AS-206	9.74	10.84	28.71	25.42	25.92	46.78
AS-209	6.84	9.75	27.49	22.08	23.60	41.01
AS-210	10.02	13.05	29.87	25.58	26.77	47.93
AS-212	7.52	9.53	32.41	21.89	24.25	43.26
CC2	19.30	24.24	36.85	30.63	33.63	53.44
LP2	17.17	20.08	38.95	37.39	42.57	60.93
OV3	8.27	12.79	35.16	21.77	24.29	42.27

Month

Figure EA - 14
Supplemental Environmental Air Samplers
2008 - 2011

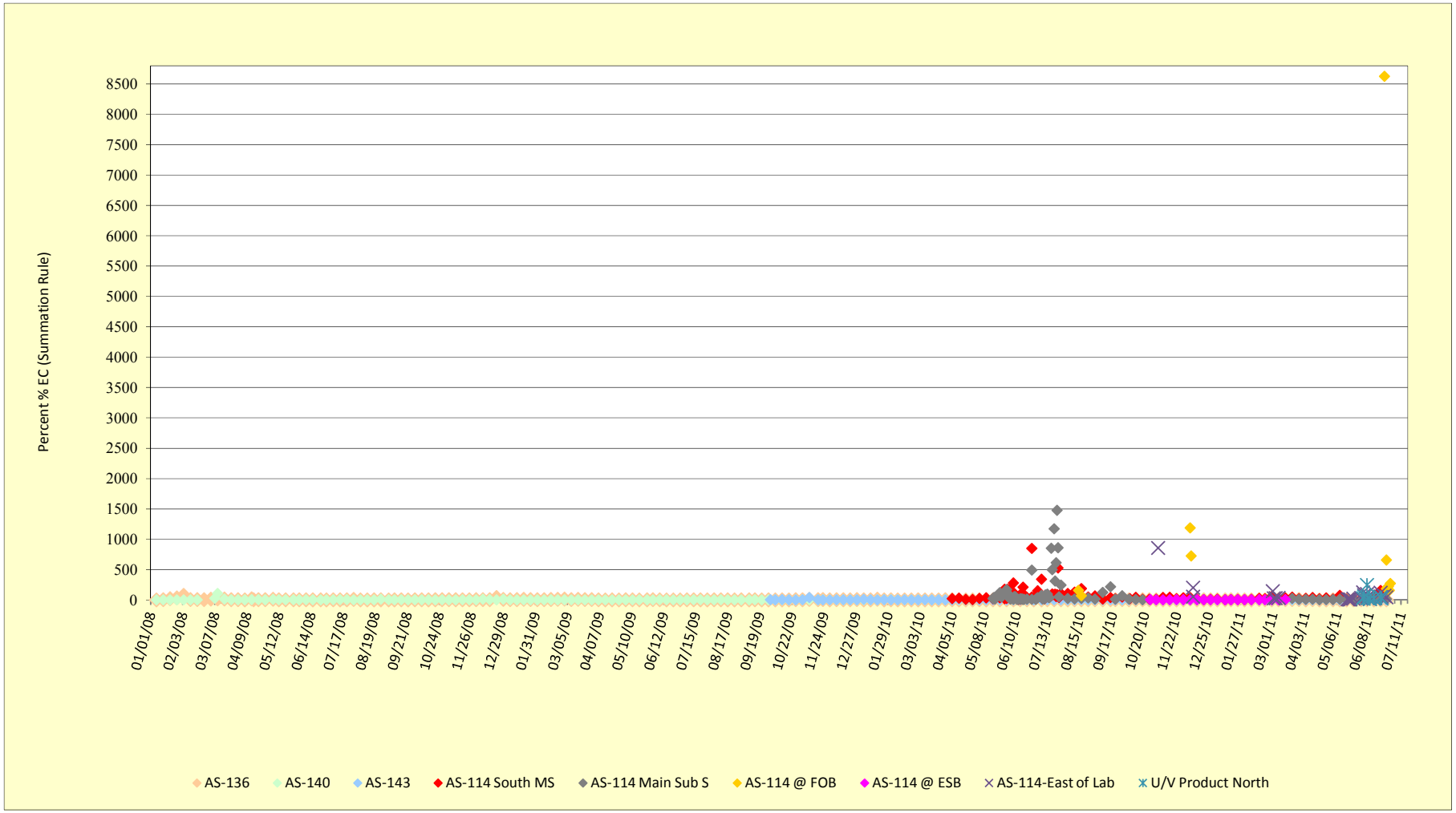


Figure EA - 15
Supplemental Environmental Air Samplers
(%EC)
2008 – 2011

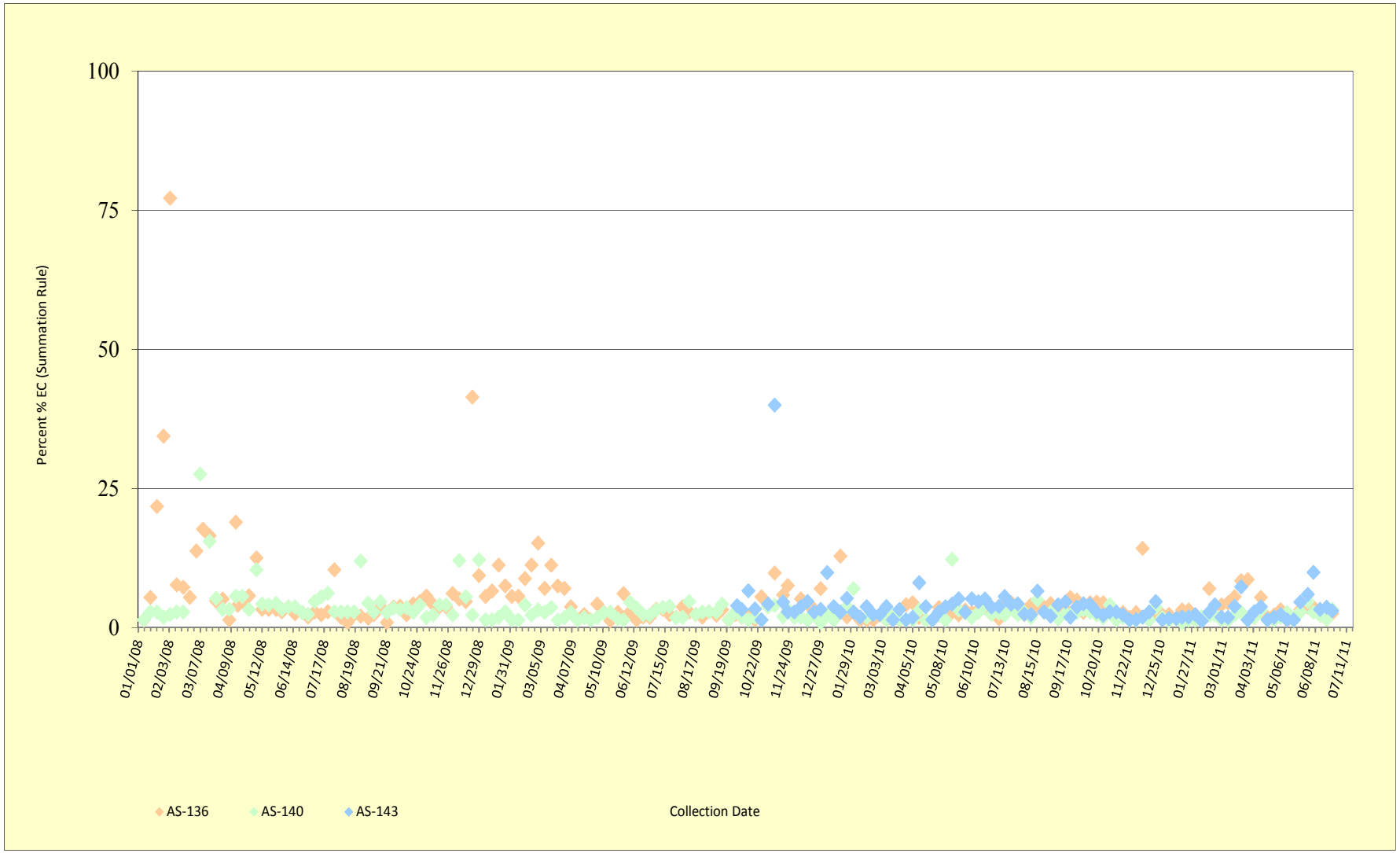
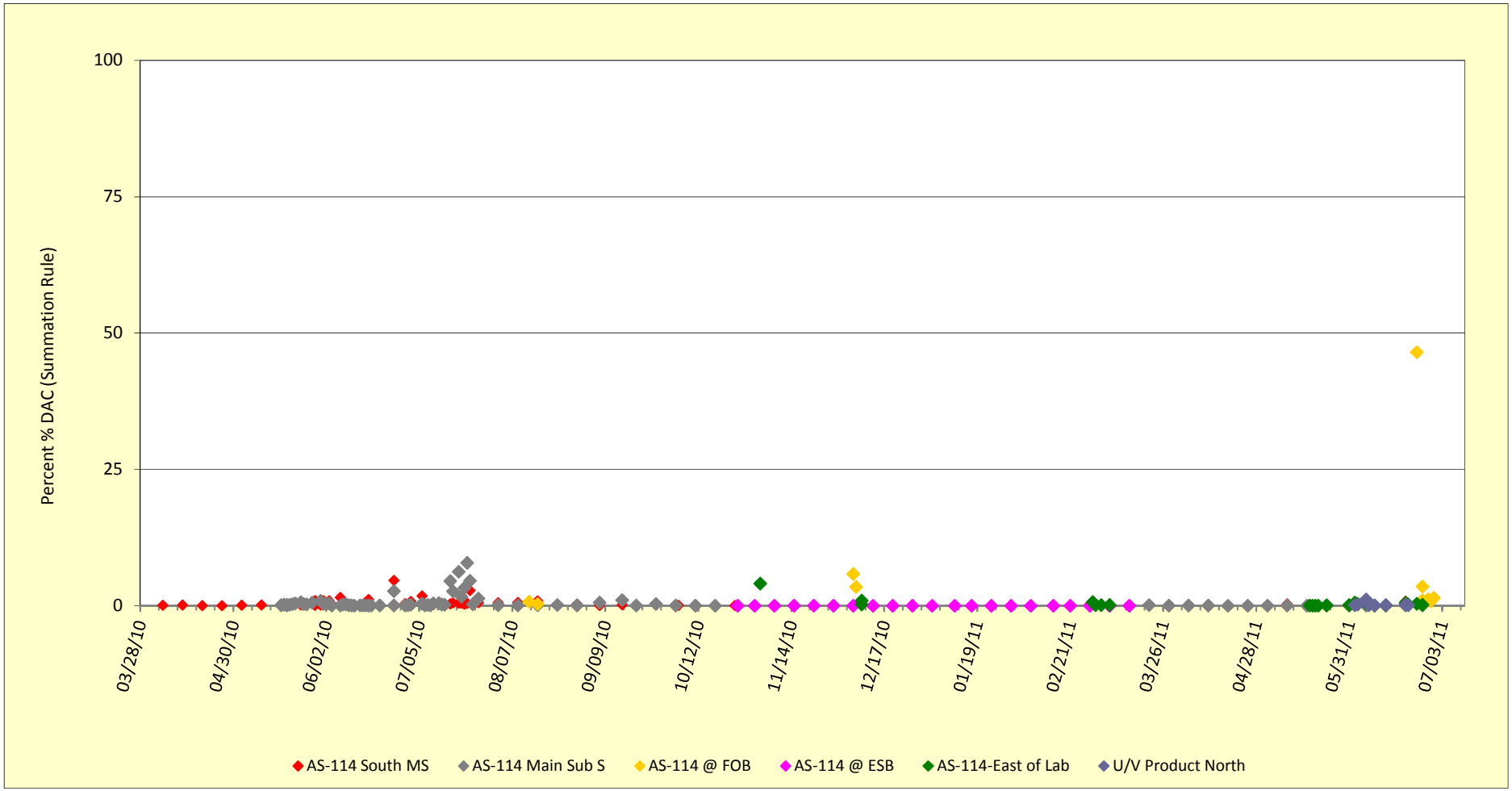


Figure EA - 16
Supplemental Environmental Air Samplers
(% DAC)
2011



Thermoluminescent Dosimeters (TLDs)

Thermoluminescent Dosimeters (TLDs) readings for the three (3) most recent semiannual periods are shown in Table TLD-1 and Figure TLD-1 respectively. All locations showed a mild uptrend over the three (3) semiannual monitoring periods. Table TLD-2 displays the quarterly results for 2010 and 2011 along with the result of a quality control badge co-located at the location shown in the same color. Results were somewhat lower for the first (1^{st}) half 2011. As expected, the 1979 data through 2011 data (Figures TLD-2 and TLD-3) demonstrates slightly elevated readings at boundary locations with readings in residential areas at background levels.

Table TLD-1
Environmental TLD
Semiannual Average Exposure Rate
(uR/hr)

Location	Jan. - Jun. 2010	Jul. - Dec. 2010	Jan. - Jun. 2011
AS-202 East Boundary	13.3	15.4	13.6
AS-203 South Boundary	13.5	15.8	14.1
AS-204 West Boundary	14.9	17.7	15.2
AS-206 North Boundary	14.6	16.2	11.6
AS-209 Mill Entrance Road	17.5	20.3	18.2
AS-210 Shadow Hills Estates	12.8	15.0	12.9
AS-212 Nearest Resident	9.7	10.9	10.3
Canon City #2	10.6	11.9	11.3
Lincoln Park #2	11.5	13.4	11.9
OroVerde #3	12.1	14.3	13.0

Figure TLD-1
Environmental TLD Data
Semiannual Average Exposure Rate

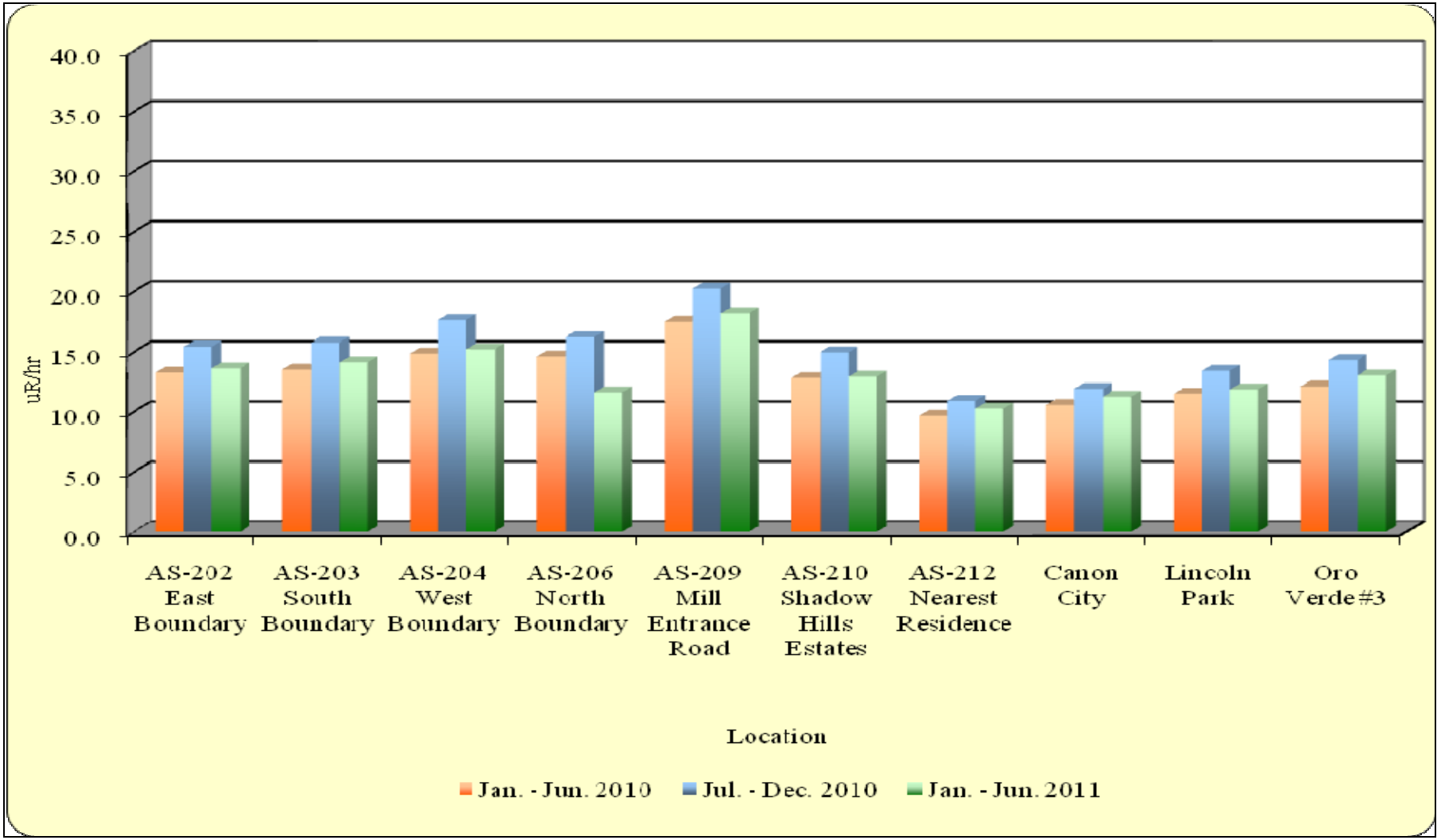


Table TLD-2
Environmental TLD
Annual Average Gamma Exposure Rate

	Location	1st	2nd	3rd	4th	AVG.
2011	AS-202 East Boundary	14	13.2			13.6
	AS-203 South Boundary	14.7	13.5			14.1
	AS-204 West Boundary	15.7	14.7			15.2
	AS-206 North Boundary	12.4	10.8			11.6
	AS-209 Mill Entrance Rd.	18.5	17.9			18.2
	AS-210 Shadow Hills Estate	N/A	12.9			12.9
	AS-212 Nearest Residence	10.7	9.8			10.3
	CC Canon City #2	12.2	10.3			11.3
	LP Lincoln Park #2	12.7	11.0			11.9
	OV OroVerde #3	13.5	12.5			13.0
	Secondary Impoundment	N/A	N/A			N/A
	Quality Control (QC)	11.4	13.0			

Figure TLD-2
Environmental TLD Data
Annual Average Gamma Exposure Rate
1979-2011

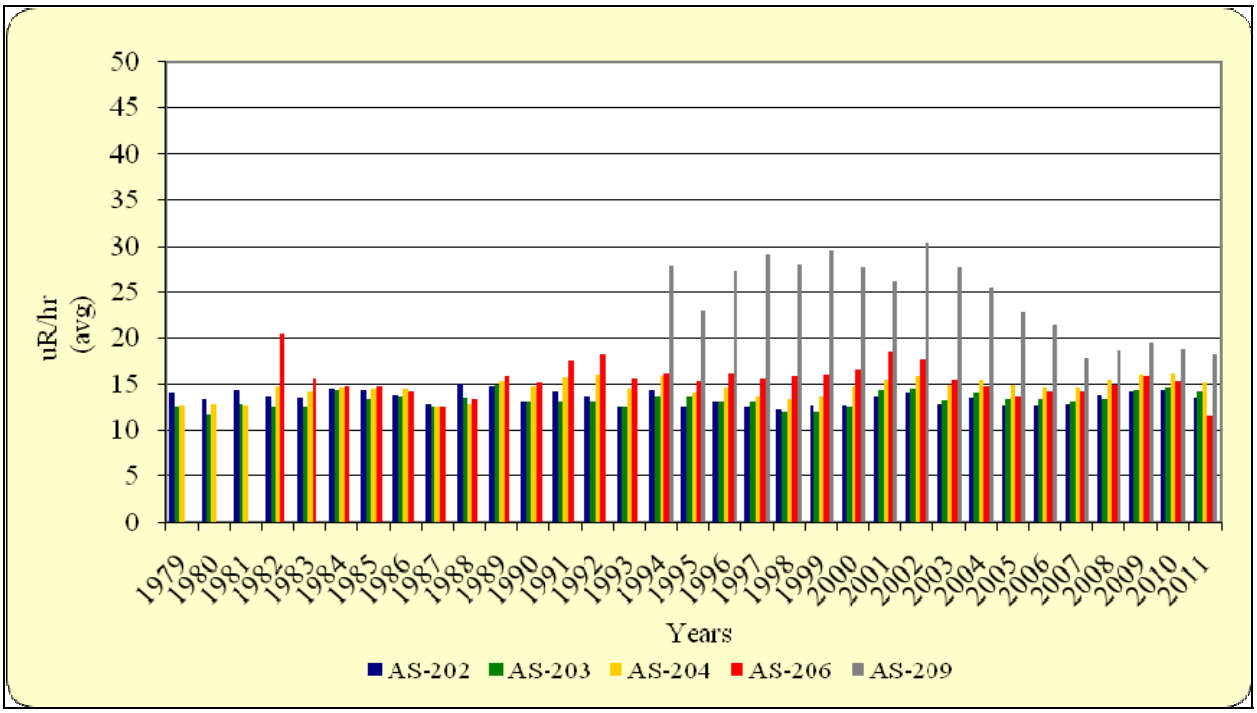
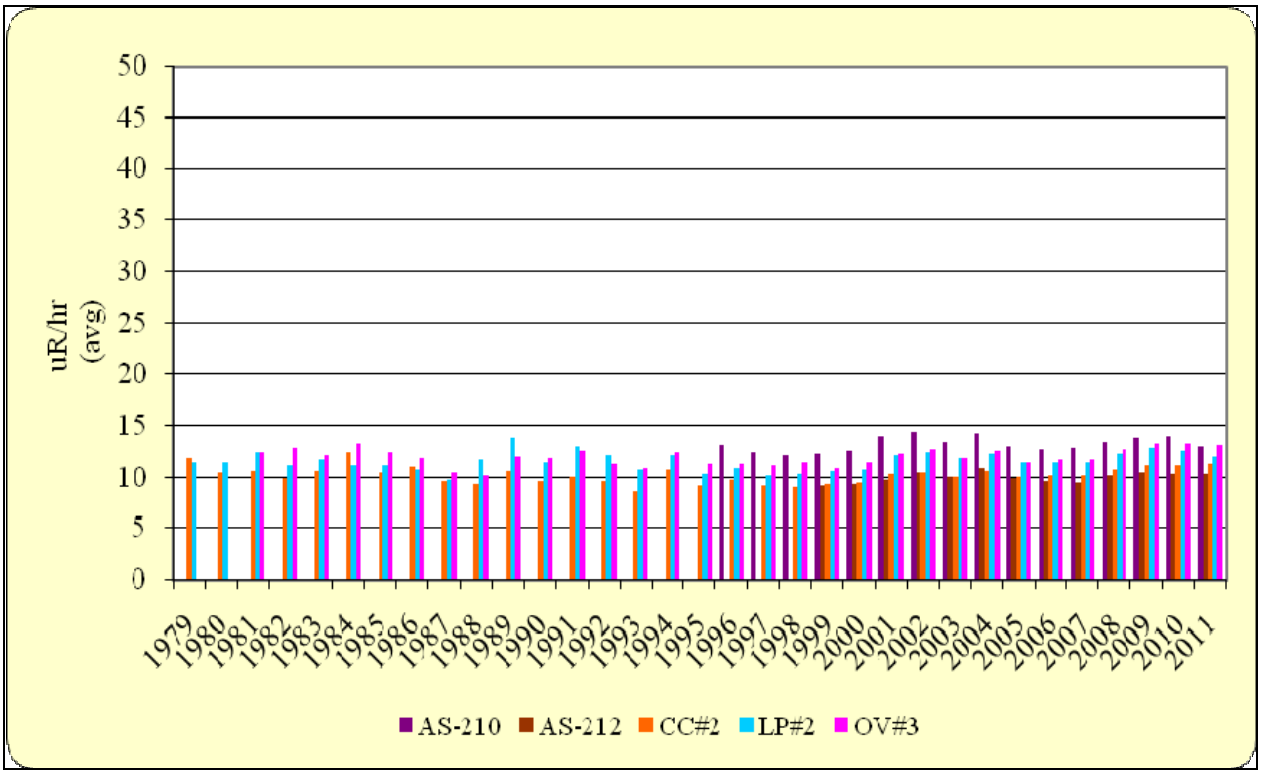


Figure TLD-3
Environmental TLD Data
Annual Average Gamma Exposure Rate
1979-2011



Radon

Radon concentrations for the three (3) most recent semiannual periods are shown in Table RN-1 and Figure RN-1 respectively. Table RN-2 displays the 2010 and 2011 quarterly results. Figure RN-2 displays the 2010 and 2011 annual average by location. As expected, 1979 through 2011 data (tables and figures RN-2 and RN-3) demonstrate slightly elevated readings at boundary locations with readings in residential areas at background levels. Comparison to the CDPHE required equilibrium factors and effluent concentration limits per the CDPHE letter of June 24, 2004 is shown in Table RN-3. Background mean is calculated for the three (3) most recent semiannual periods in 2010 and 2011 as specified in CDPHE letter of June 24, 2004. The Background Mean plus two (2) standard deviations of the Background Mean is added to the Alternate Effluent Limit and compared to the semiannual average results.

All locations showed compliance at less than the Effective Effluent Limit (EEL) for the January to June 2011 reporting period. First Half 2011 results are slightly higher than the last semiannual period yet within historical levels. Note that this is an annual limit. First (1^{st}) quarter 2010 data was particularly unusual in that two (2) community locations and one (1) boundary monitor were reported at less than the detection limit. Several other boundary monitors had very low results compared to historical values and to nearby supplemental monitors. Three (3) separate QA assessments were performed by the vendor and the results were not changed. However, for all locations in the second (2^{nd}) quarter 2010, the data are similar. No reason is known for this difference between quarterly data. The 2010 Quality Control data showed exact correspondence. 2011 Quality control data also show exact correspondence.

Due to concerns raised by CDPHE in early July 2009 when the Secondary Impoundment was allowed to dry in anticipation of starting the initial cover, five (5) additional radon monitors were deployed starting in August and co-located at AS-202, AS-203 and AS-204 as well as new monitors located between AS-202 and AS-203 as well as between AS-203 and AS-204. These results are reported in Table RN-3.

Table RN-1
Semiannual Average ^{222}Rn Concentration
(pCi/m^3)

Location	Jan. - Jun. 2010	Jul. - Dec. 2010	Jan. - Jun. 2011
AS-202 East Boundary	1250	700	850
AS-203 South Boundary	485	850	750
AS-204 West Boundary	500	1100	650
AS-206 North Boundary	1000	700	900
AS-209 Mill Entrance Road	450	1000	1250
AS-210 Shadow Hills Estates	335	650	950
AS-212 Nearest Resident	300	450	1050
Canon City #2	385	550	1050
Lincoln Park #2	400	700	1200
OroVerde #3	335	450	1000
Secondary Impoundment	1150	1350	1550

Figure RN-1
Environmental Air
Semiannual Average ^{222}Rn Concentration

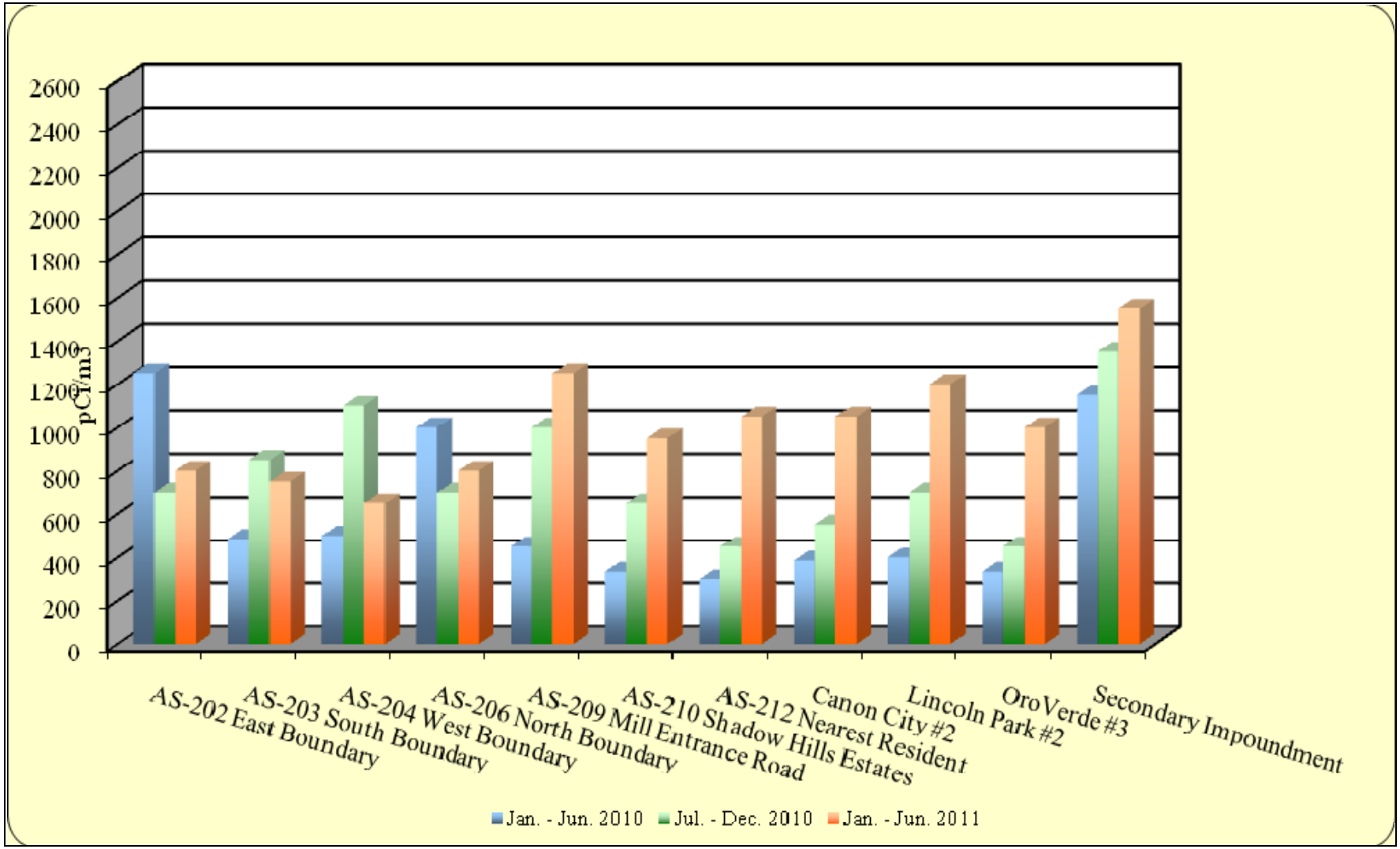


Table RN-2
Annual Average ^{222}Rn Concentration
(pCi/m^3)

	Location	1ST	2ND	3RD	4TH	AVG
2011	AS-202 East Boundary	1300	400			850
	AS-203 South Boundary	1000	500			750
	AS-204 West Boundary	900	**400**			650
	AS-206 North Boundary	**1400**	400			900
	AS-209 Mill Entrance Road	1500	1000			1250
	AS-210 Shadow Hills Estates	900	1000			950
	AS-212 Nearest Resident	1000	1100			1050
	Canon City #2	1100	1000			1050
	Lincoln Park #2	1200	1200			1200
	OroVerde #3	1000	1000			1000
	Secondary Impoundment	1700	1400			1550
	QC	**1400**	**400**			

Note: Orange denotes QC location for the quarter

Table RN-3
Average ^{222}Rn Concentration Special Locations
(pCi/m^3)

	Location	1ST	2ND	3RD	4TH	AVG
2011	AS-202 East Boundary	800	500			650
	AS-203 South Boundary	800	500			650
	AS-204 West Boundary	900	600			750
	Fence South (N3823.453 W 105 14.097)	600	700			650
	Fence South (N38 23.428 W 105 13.932)	1000	800			900

Figure RN-2
Environmental Air
Average Annual ^{222}Rn Concentration

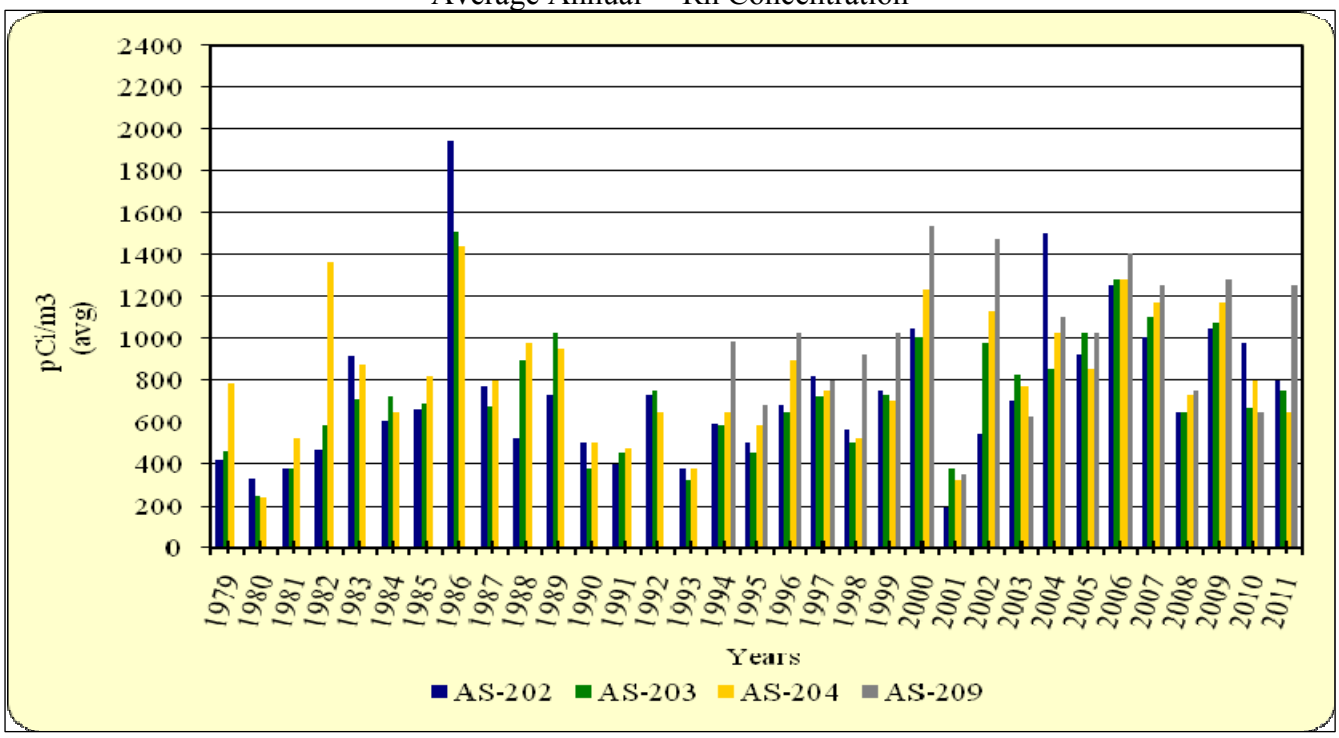


Figure RN-3
Environmental Air
Average Annual ^{222}Rn Concentration

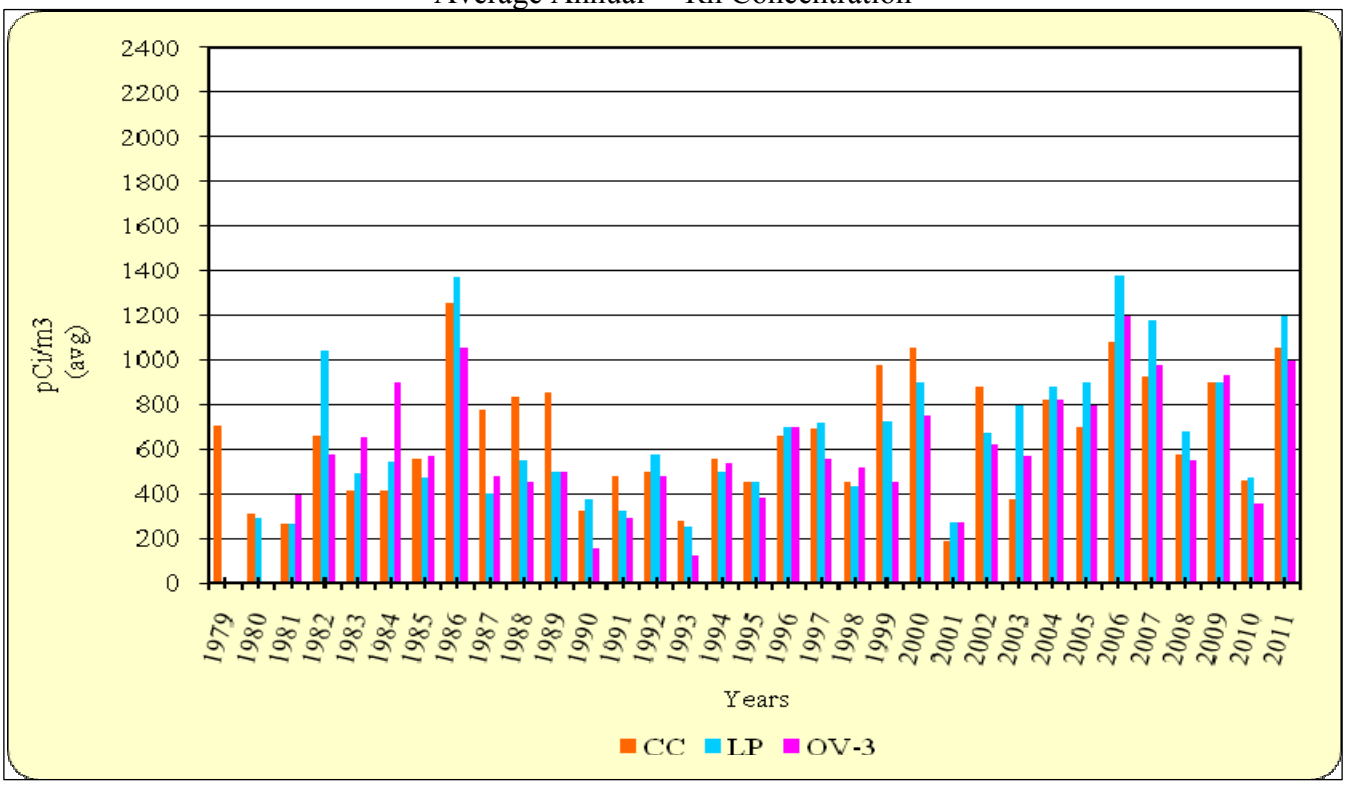


Figure RN-4
Environmental Air
Average Annual ^{222}Rn Concentration

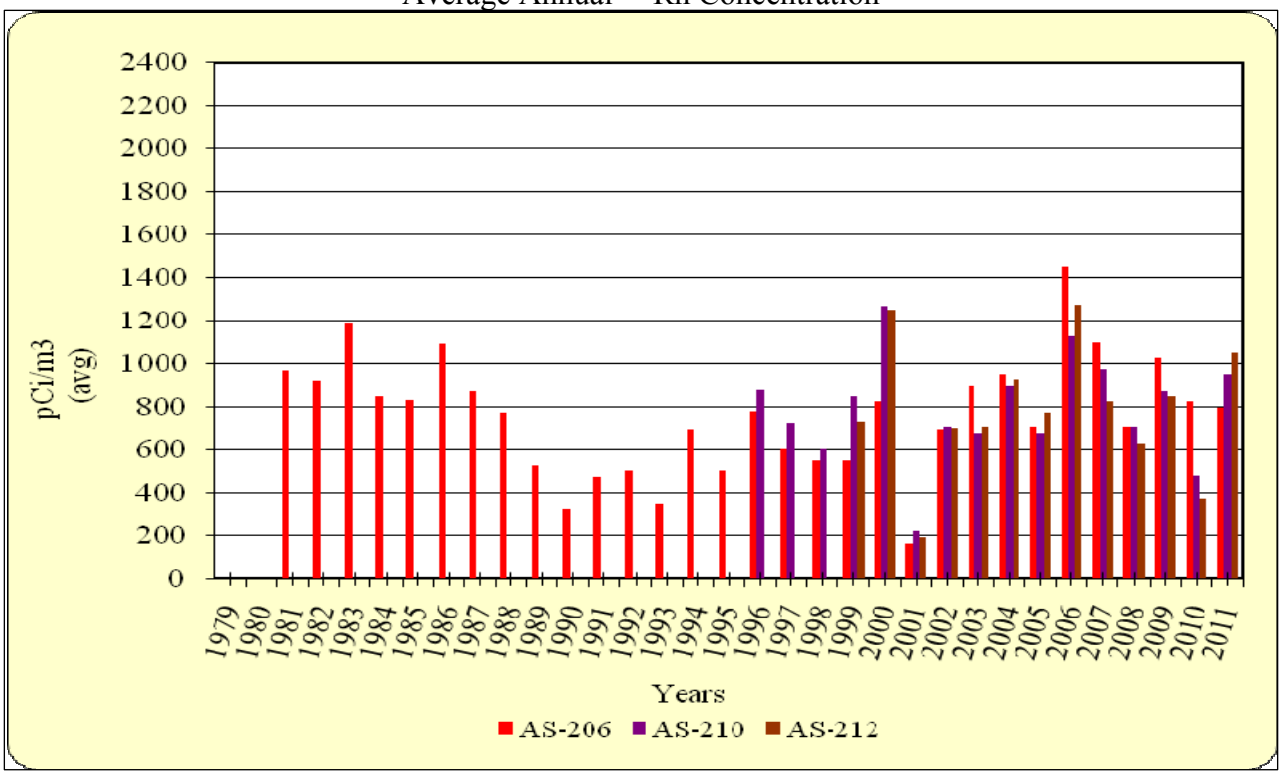


Table RN-4 Alternate Effluent Limit Comparison for ^{222}Rn

Background Concentrations (pCi/m^3)

Year	CC	LP	OV3	Background (BKG) MEAN	Standard Deviation of MEAN	BKG + 2 Standard Deviations of MEAN
2011 1st half						
Q1	1100	1200	1000			
Q2	1050	1200	1000			
Q3	N/A	N/A	N/A			
Q4	N/A	N/A	N/A	1092	27	1145
2010 2nd half						
Q1	N/A	N/A	N/A			
Q2	N/A	N/A	N/A			
Q3	600	600	400			
Q4	500	800	500	567	39	646
20101st half						
Q1	70	100	70			
Q2	700	700	600			
Q3	N/A	N/A	N/A			
Q4	N/A	N/A	N/A	373	94	560

Year	Sampler Location	Assumed Equilibrium Fraction (pCi/m^3)	Alternate Effluent Limit (pCi/m^3)	Effective Effluent Limit = Alternate Effluent Limit + BKG + 2 Standard Deviations of MEAN (pCi/m^3)	Average Radon (including BKG) (pCi/m^3)	> Effluent Limit?
2011 1st half	AS 202	0.2	500	1645	850	no
	AS 203	0.2	500	1645	750	no
	AS 204	0.2	500	1645	650	no
	AS 206	0.4	250	1395	900	no
	AS 209	0.2	500	1645	1250	no
	AS 210	0.4	250	1395	950	no
	AS 212	0.4	250	1395	1050	no
2010 2nd half	AS 202	0.2	500	1146	700	no
	AS 203	0.2	500	1146	850	no
	AS 204	0.2	500	1146	1100	no
	AS 206	0.4	250	896	700	no
	AS 209	0.2	500	1146	1000	no
	AS 210	0.4	250	896	650	no
	AS 212	0.4	250	896	450	no
2010 1st half	AS 202	0.2	500	1060	1250	yes
	AS 203	0.2	500	1060	485	no
	AS 204	0.2	500	1060	500	no
	AS 206	0.4	250	810	1000	yes
	AS 209	0.2	500	1060	450	no
	AS 210	0.4	250	810	335	no
	AS 212	0.4	250	810	300	no

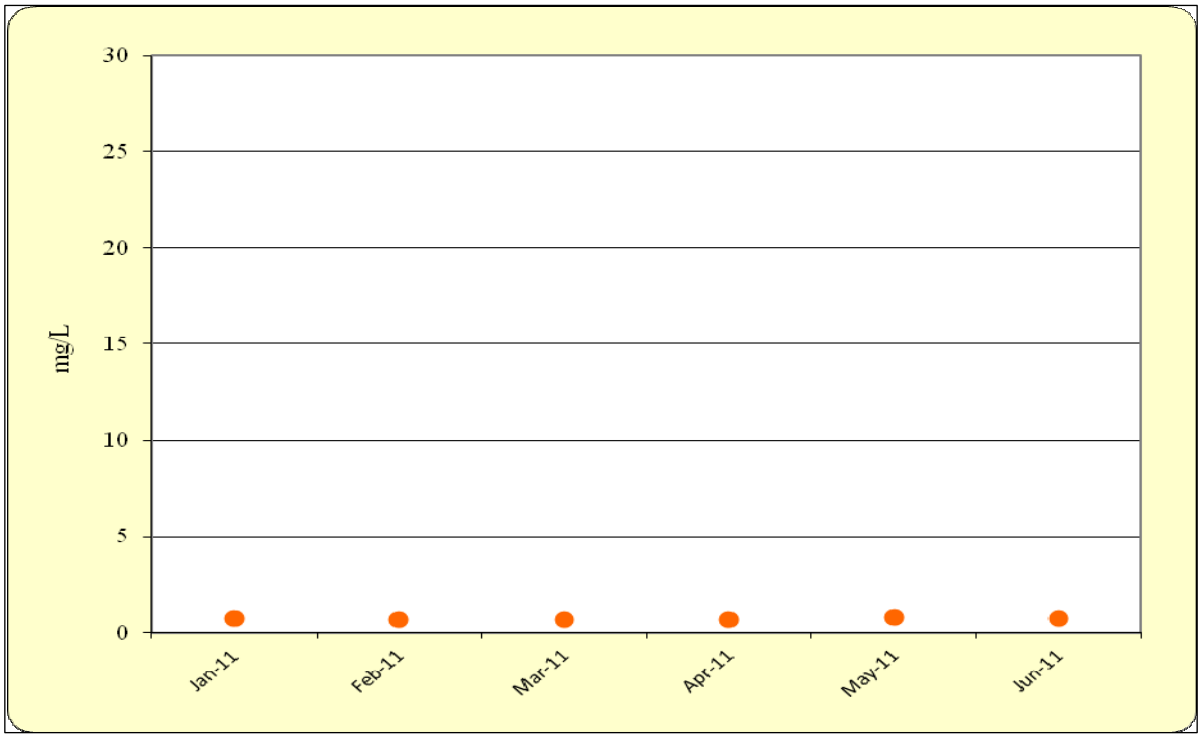
Radon Flux Measurements

Cotter submitted a letter to CDPHE on June 30, 2010, indicating that the Primary and Secondary Impoundments would be closed as soon as reasonably achievable. Subsequently Cotter notified EPA that Radon Flux measurements for the Primary Impoundment would no longer be done.

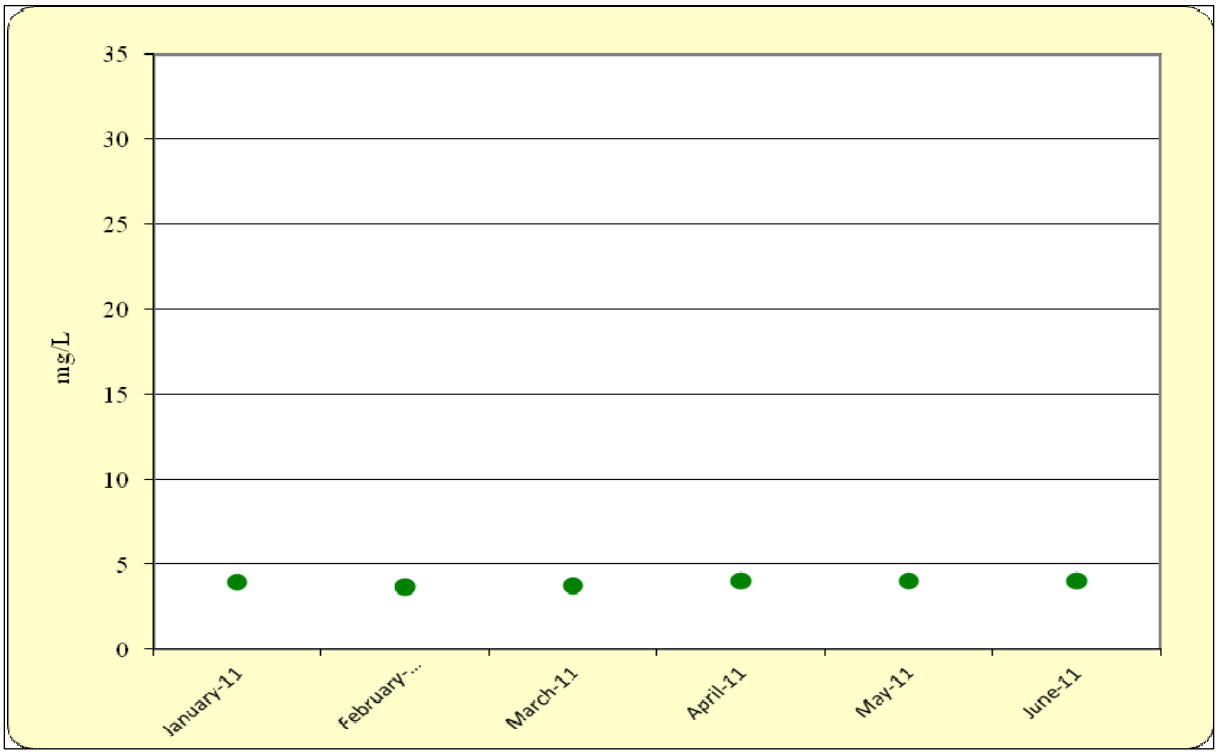
DAM TO DITCH AREA (DDA)

A field investigation was conducted in 2010 to evaluate elevated uranium and molybdenum levels in groundwater between the Soil Conservation Service (SCS) Dam and the Deweese Dye Ditch, referred to as the Dam to Ditch Area, located near the northern edge of the Cotter property. The field investigation was conducted to further characterize environmental conditions in the Dam to Ditch Area in order to enhance the site conceptual hydrogeologic model. Results of the study will be used to optimize design of corrective actions (if needed). Thirteen soil borings were drilled and four monitor wells were installed as part of the investigation. The monitor wells were sampled for water quality and measured for water levels during the fourth quarter of 2010. One of the wells (049) was dry. In addition, geologic materials were collected from the borings for use in a column leach study to characterize the mobility of uranium and molybdenum from these same subsurface materials. These studies indicated that U and Mo are leachable however they are at very low levels and likely show that the vadose zone does not contain materials that need leached. Further evaluation of this area is ongoing. (Figures DDA1-1A, DDA1-1B)

DDA1-1A
Location 051 Uranium



DDA1-1B
Location 051 Molybdenum



PERMEABLE REACTIVE TREATMENT WALL (PRTW)

The solidified, impermeable, upgradient face of the PRTW continues to prevent the flow of groundwater off-site. Groundwater is collected and pumped to the primary impoundment, consistent with the past six (6) years.

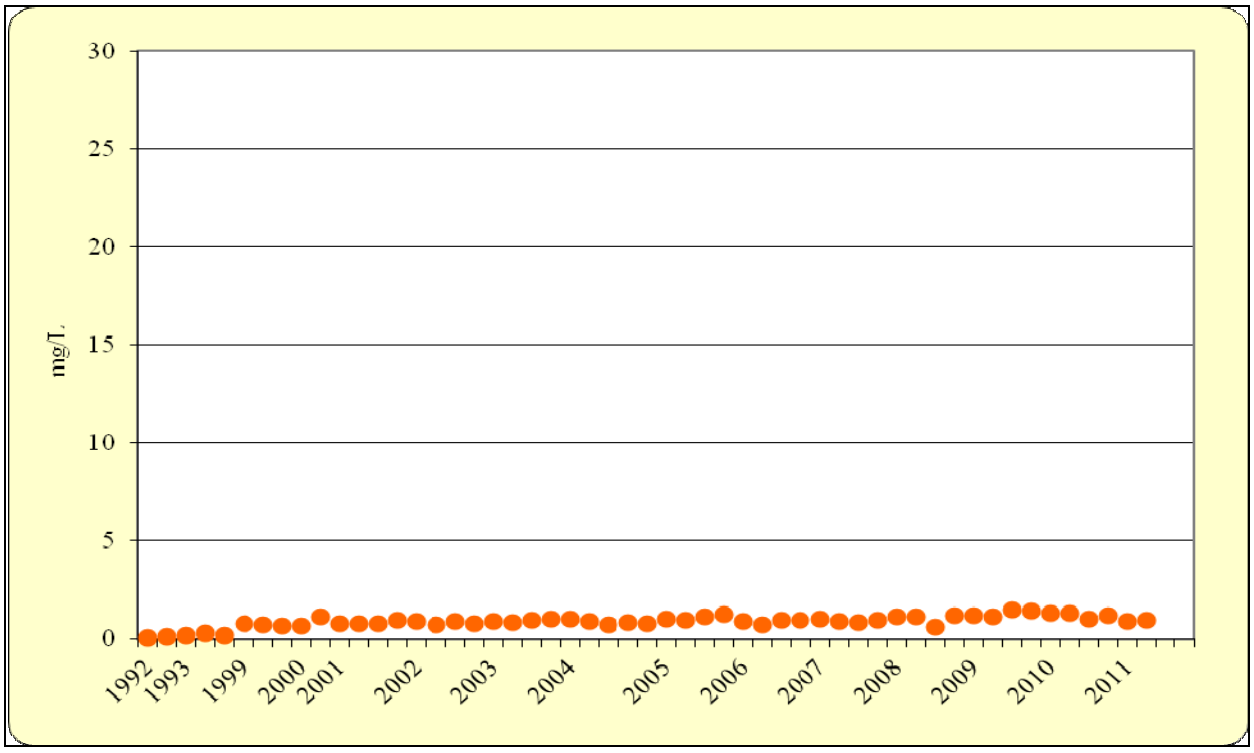
Literature research and laboratory experimentation on both the structure of the PRTW and the zero valent iron (ZVI), the reactive material, are ongoing. ZVI is effective in removing U from contaminated water via oxidation-reduction chemistry not just at the mill but at numerous locations across the United States. Other groundwater constituents also precipitate under the same conditions, reducing the porosity of the PRTW. Ferrous sulfide is especially troublesome where sulfate concentration is high in groundwater because the molecule initially forms as an amorphous paste that coats ZVI grains, fills barrier pores and clogs the barrier. Ferrous sulfide along with other carbonate and hydroxide precipitates reduces groundwater flow in most of the ZVI *in situ* barriers across the country.

As ZVI oxidizes to ferrous and ferric ions, the pH of the groundwater rises above neutral conditions. In high pH groundwater conditions, carbonate and hydroxide precipitates readily form. The concentration of chemically available ZVI, however, reduces with increasing pH. Laboratory experiments confirmed that maintaining near neutral pH increased oxidation-reduction chemistry of ZVI, thus improving the overall efficiency of the PRTW.

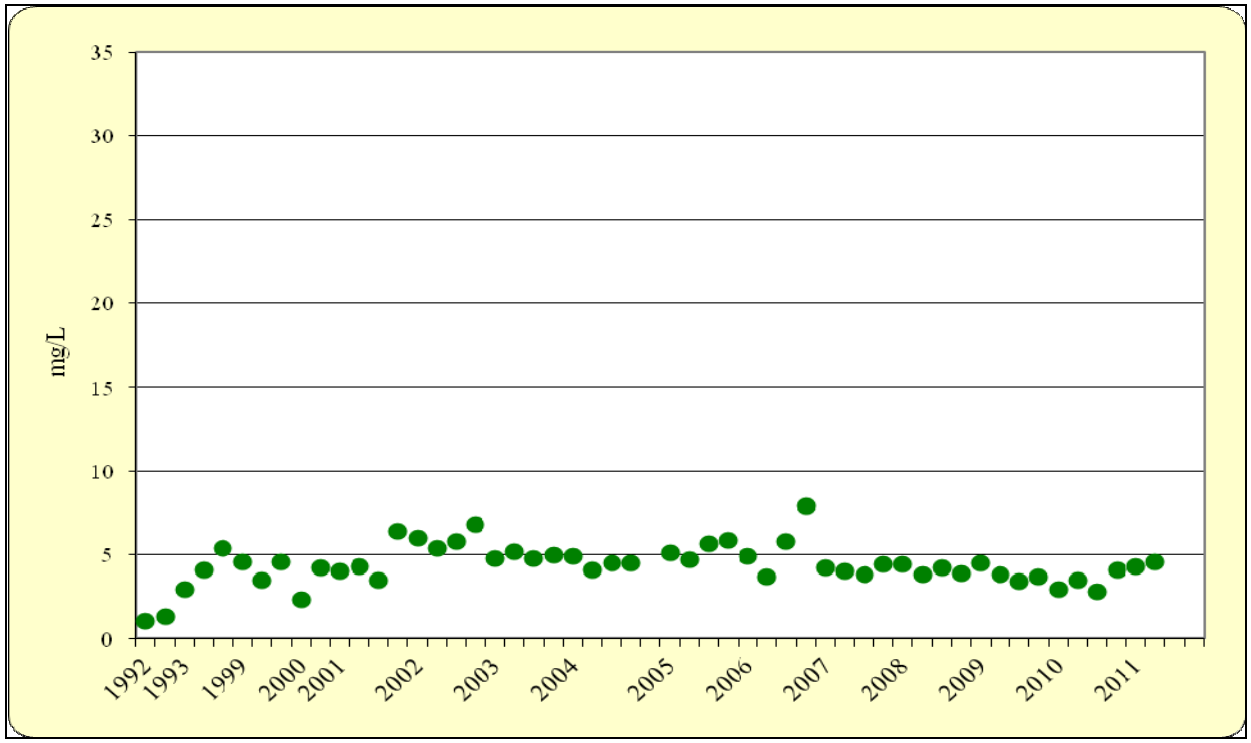
Whereas extensive research exists describing the effective remediation of U in groundwater by ZVI, limited information is available about Mo, the second contamination of concern in the groundwater plume. During the fall of 2011, another series of laboratory experiments will be performed to determine the chemical mechanism by which Mo is removed from the groundwater at the PRTW. Because Mo's oxidation state changes easily, incubation, filtration and drying will occur under anoxic conditions using a nitrogen bath. Incubation suspension pH will be maintained at neutral pH with dilute HCl. Cooperating with Dr. Robert Zielinski and Bill Betterman of the US Geological Survey in Denver, Colorado, solids will be analyzed using x-ray diffraction providing both qualitatively and quantitatively data.

Since the PRTW lies within the area of the previously mentioned Dam to Ditch area, the results from those investigations and the above mentioned work will be used to decide the future of the PRTW.

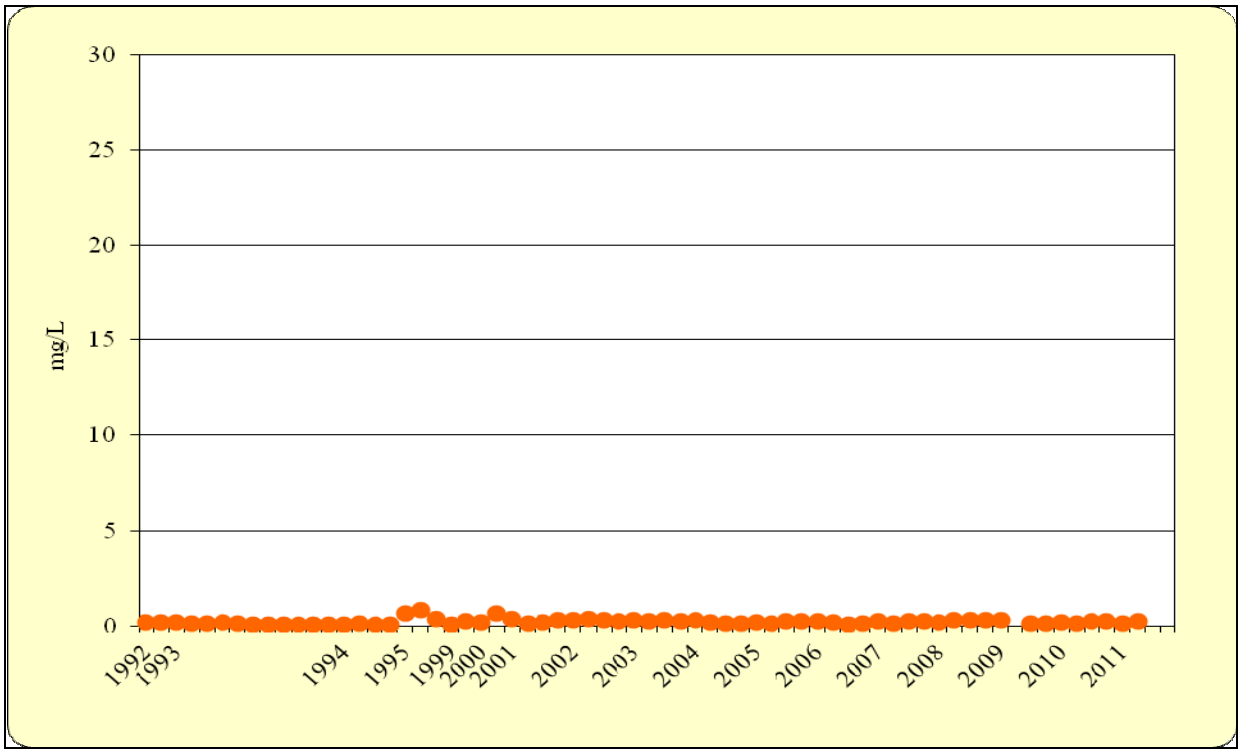
PRTW – 1A
Location 814 Uranium
1992-2011



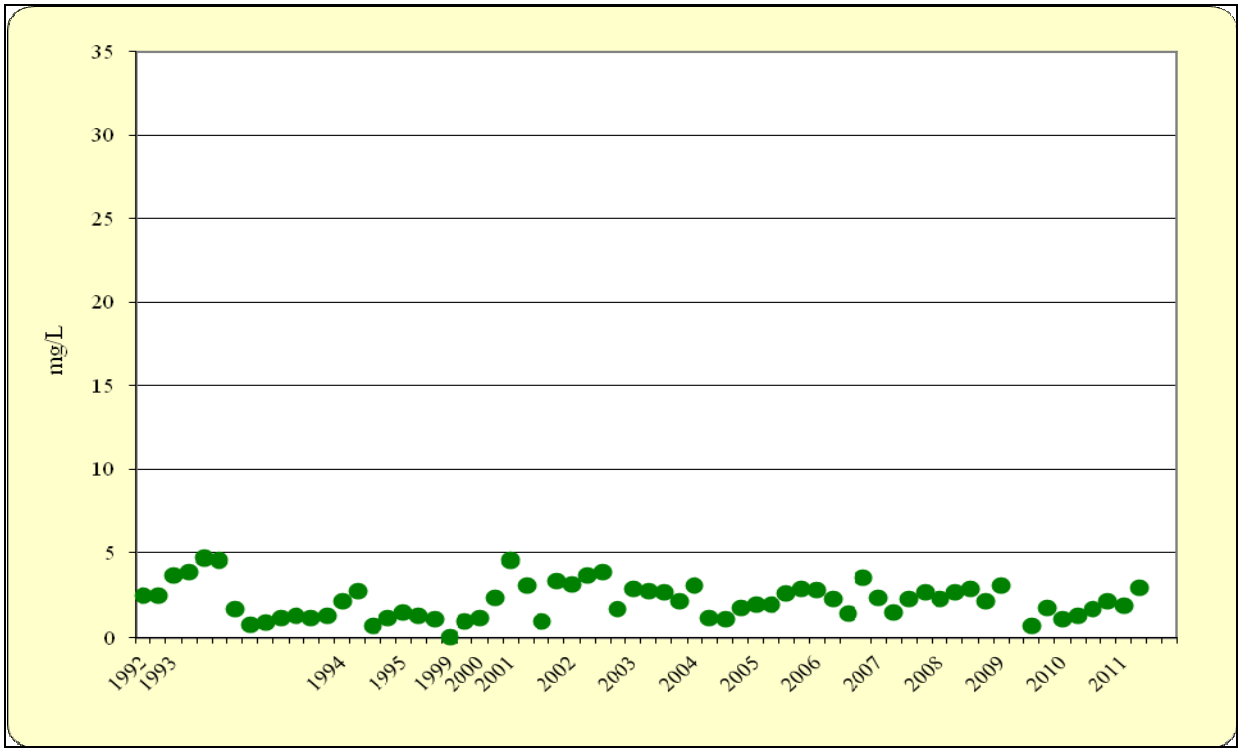
PRTW – 1B
Location 814 Molybdenum
1992-2011



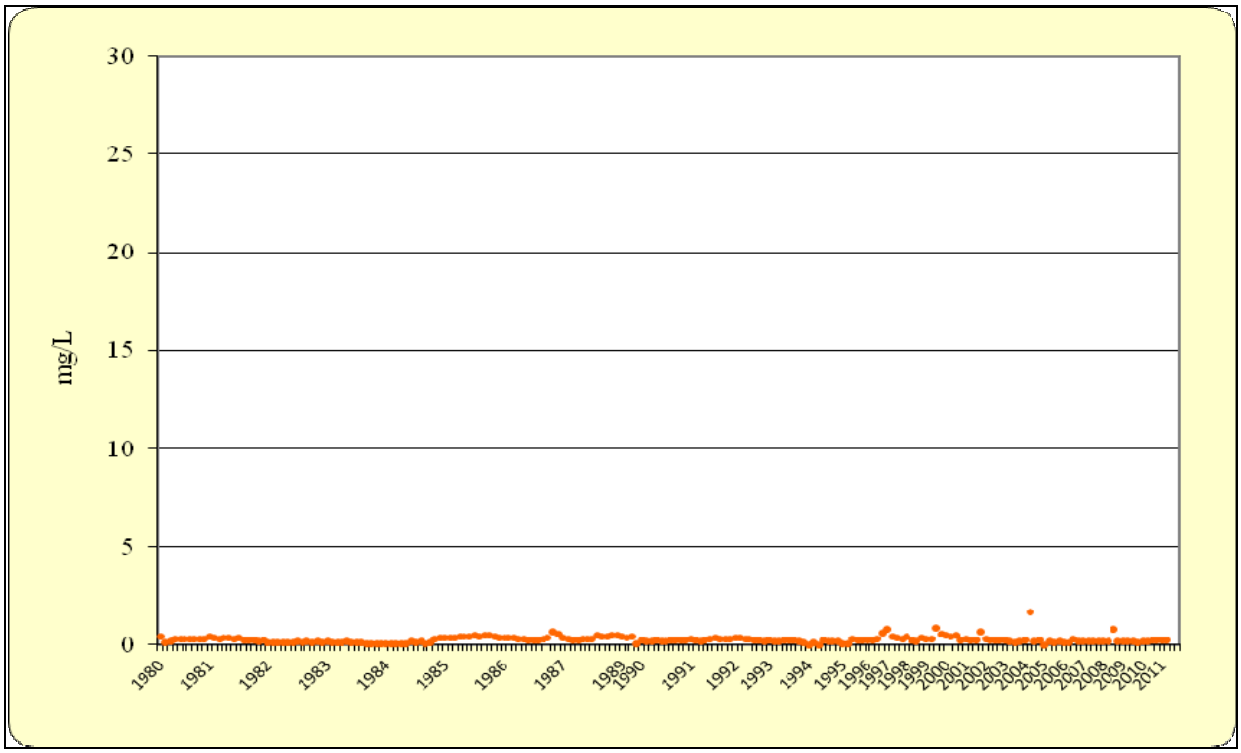
PRTW – 2A
Location 815 Uranium
1992-2011



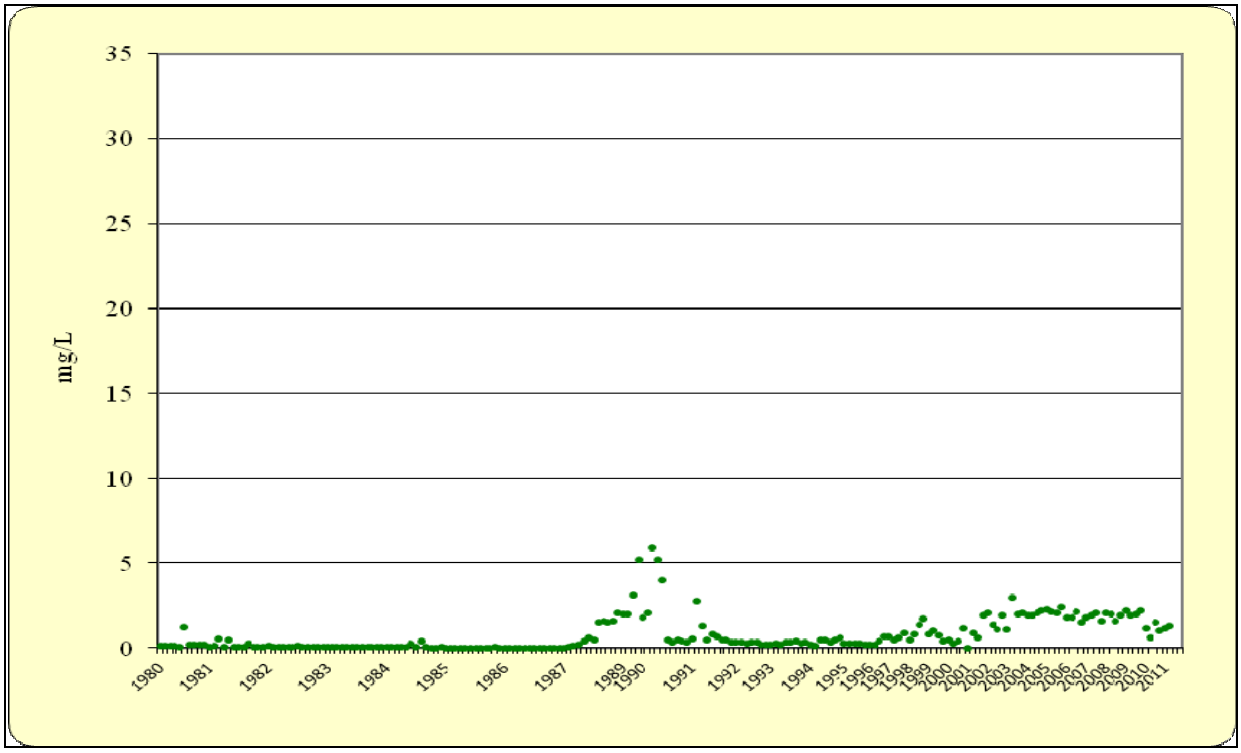
PRTW – 2B
Location 815 Molybdenum
1992-2011



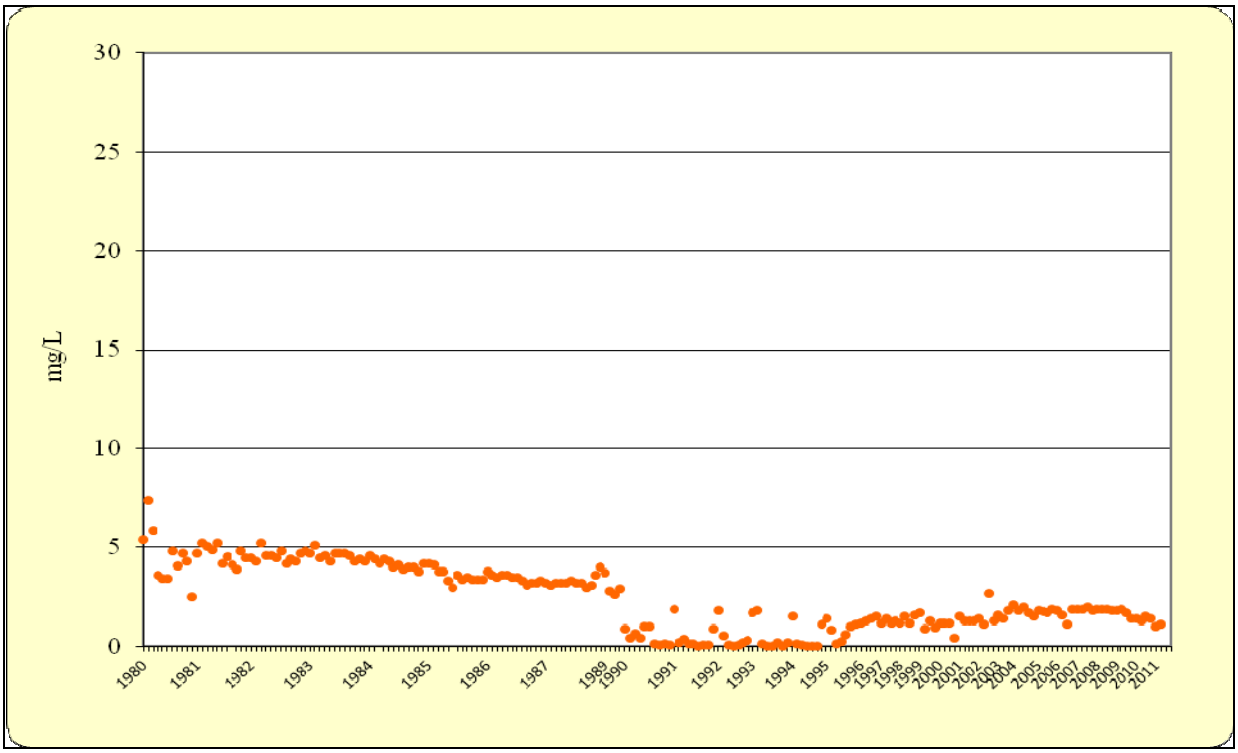
PRTW – 3A
Location 329 Uranium
1980-2011



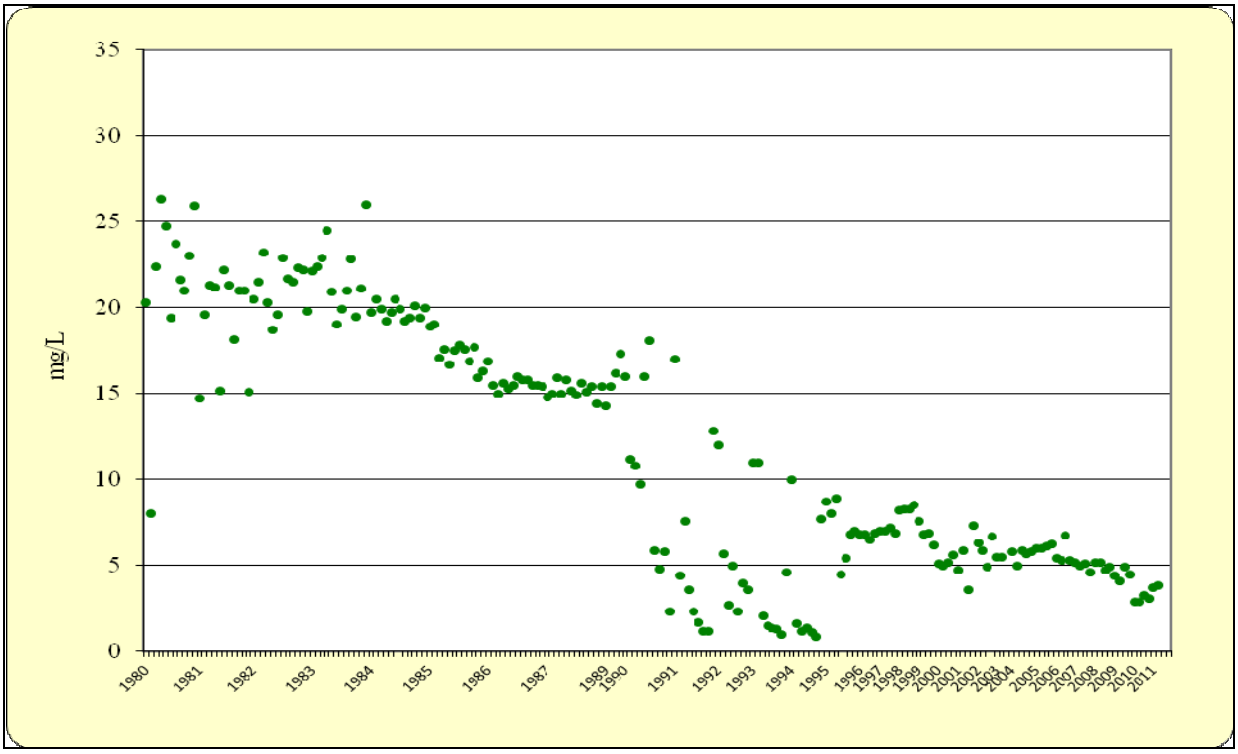
PRTW – 3B
Location 329 Molybdenum
1980-2011



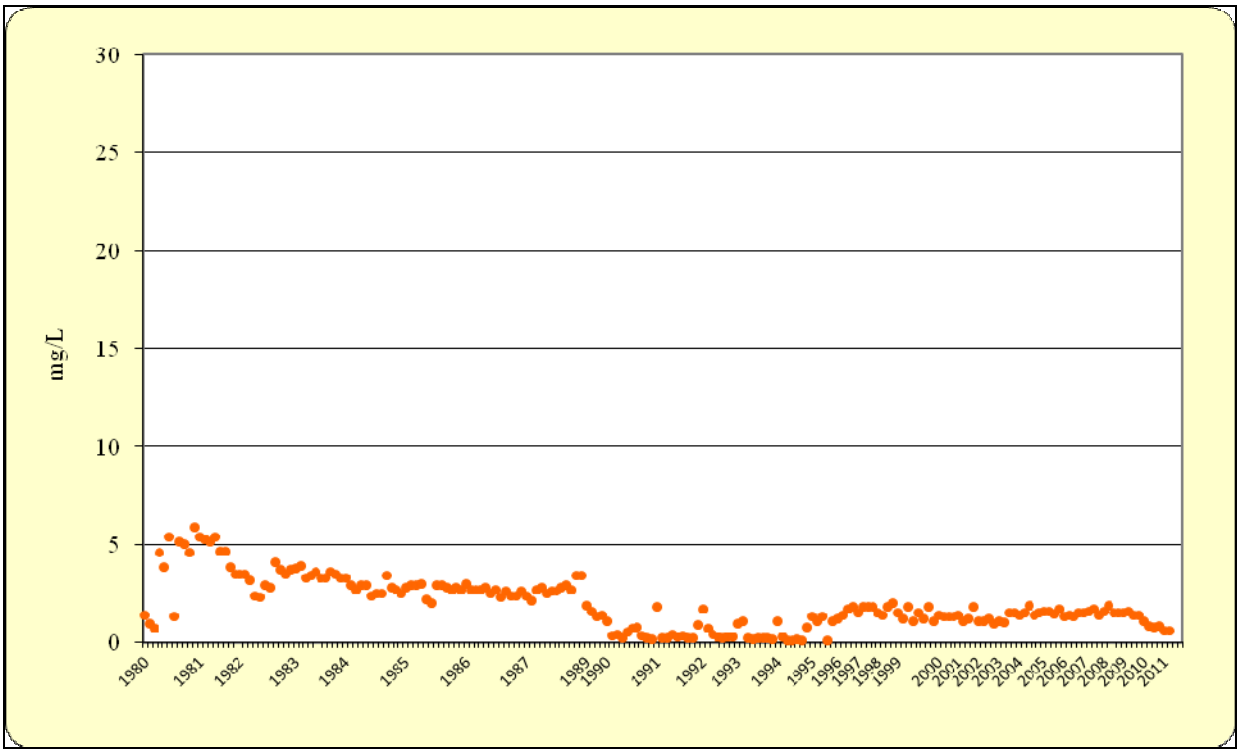
PRTW – 4A
Location 330 Uranium
1980-2011



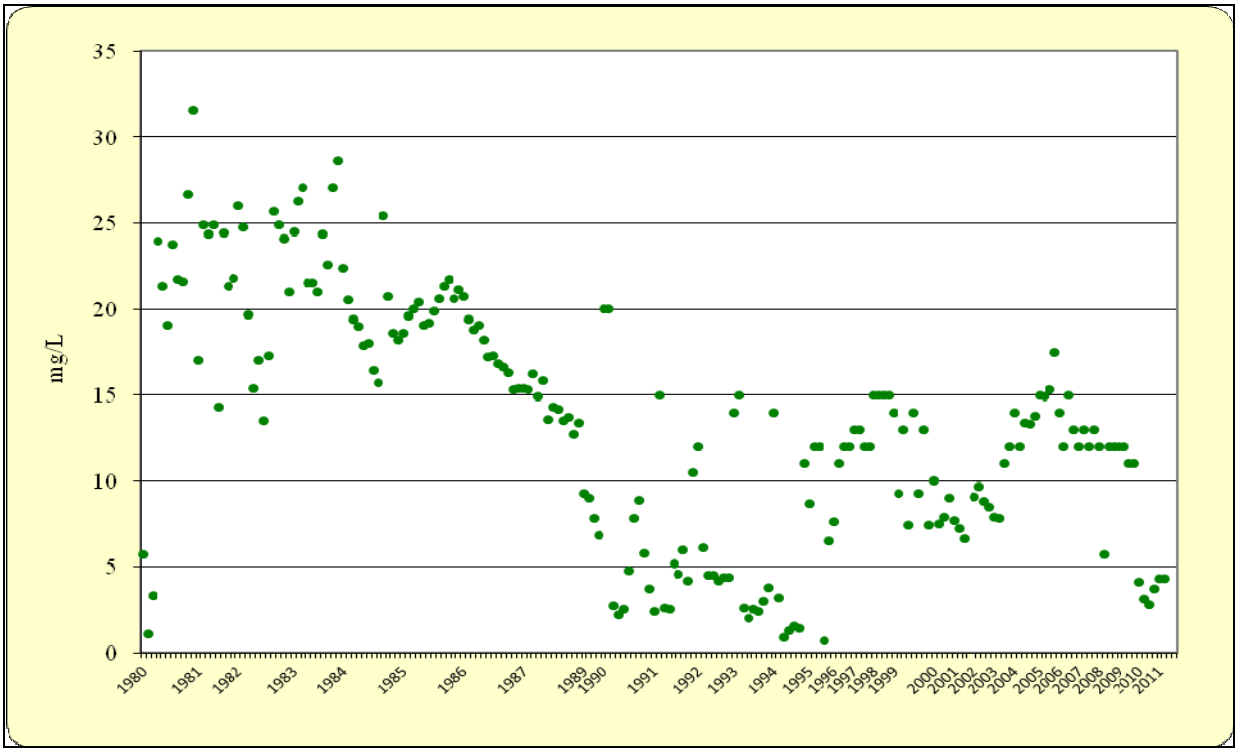
PRTW – 4B
Location 330 Molybdenum
1980-2011



PRTW – 5A
Location 331 Uranium
1980-2011



PRTW – 5B
Location 331 Molybdenum
1980-2011



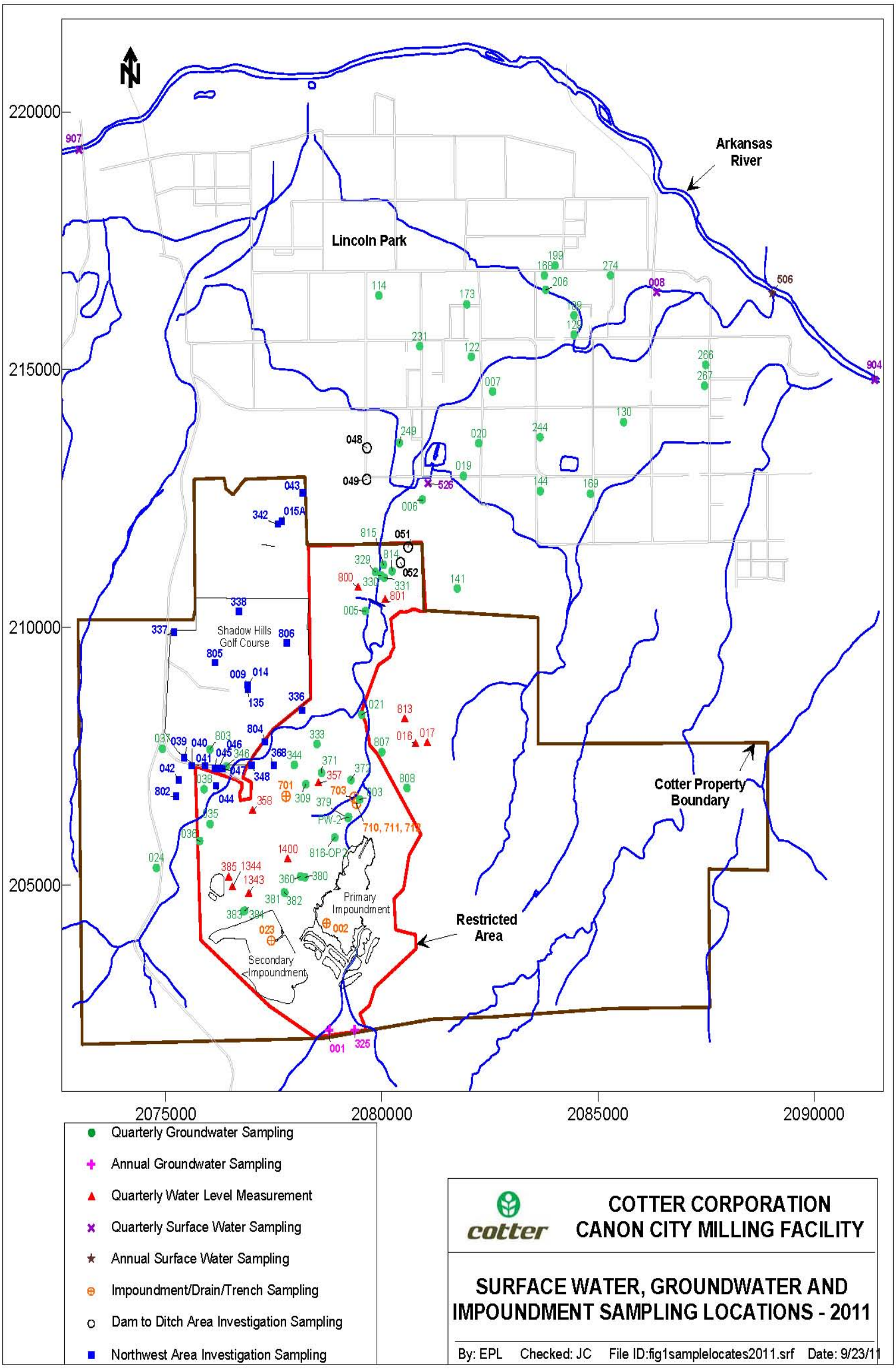
GOLF COURSE (GC)

As a result of the Environmental Protection Agency's five (5) year review, completed in September 2007, Cotter was asked to re-evaluate the potential for a groundwater plume near the Shadow Hills Golf Course. The monitoring program was expanded to collect samples from locations along the boundary of Cotter and Shadow Hills Golf Course as well as locations on the golf course. In addition, two (2) new monitoring wells were added on Cotter property, one (1) at the northwest entrance and one (1) near a historical ore pad west of Sand Creek. These locations are designated 037 and 038 respectively. Monitoring data indicates that uranium is present in wells on the golf course at levels above the groundwater standards that went into effect May 31, 2008.

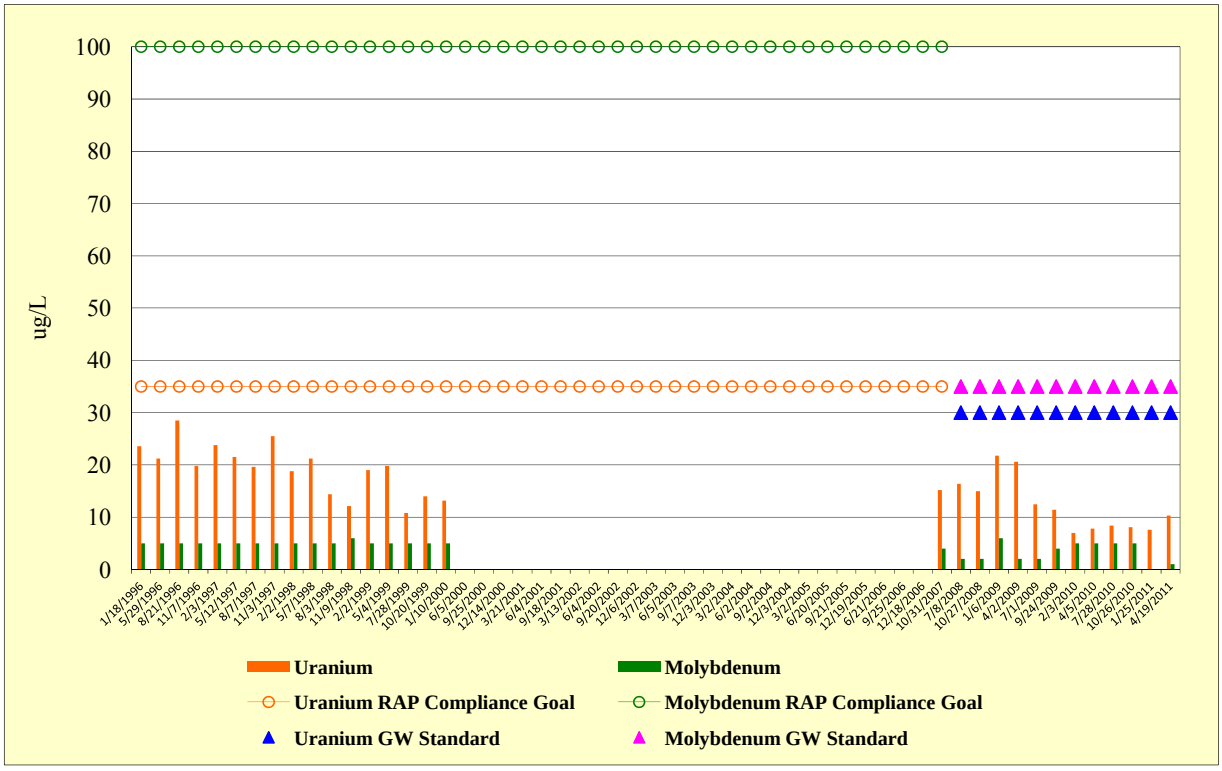
A significant amount of investigation including historical, aerial, geologic, geochemical, and trend analysis has been performed to characterize the source and pathways to guide the corrective action. Various field investigations have been performed including additional monitoring well installation in September for three (3) wells (039, 040 and 041) along the northern boundary of the Cotter restricted area. Well 042 was placed north of well 802 and approximately halfway between well 802 and 039. This investigation did not define a migration pathway for uranium. Well 043 was placed at the northeast corner of Cotter property north of the golf course to act as a sentinel well in the expanded monitoring network. Wells 044 to 047 were constructed in January 2010. Well 044 is south of the railroad berm and Wells 045-047 are east of 039-041. Well 044 showed results consistent with the legacy plume. Wells 045-047 showed uranium concentrations below the groundwater standard. A summary report of the Golf Course Investigation was provided in May 2010. Further investigation of the 043 area was included in the June 2010 Dam to Ditch Area Investigation Plan. As noted in the PRTW section the field investigation indicated that "Water quality data from two offsite wells (one dry) indicates the northwest uranium plume identified at Well 043 does not extend an appreciable distance beyond the Cotter property boundary." Two new wells (048 and 049) were installed in late 2010 as part of the DDA investigation. These wells on the southwestern edge of Lincoln Park were also located to assess the extent, if any, of the uranium plume on the golf course to Lincoln Park. Well 049 turned out to be dry while well 048 showed slightly elevated molybdenum but low uranium indicating no link between 043 and the Lincoln Park area.

In addition the activity ratio (AR) for natural uranium was determined for wells on and in the vicinity of the golf course. The activity ratio (AR) for natural waters tend to have a ratio greater than one (>1) while waters impacted by processing typically have ARs of one (1). Wells on the golf course and nearby the west limb of Sand Creek have ARs of approximately one point five (1.5) while wells in the Old Pond Area vicinity have ARs near one (1). This suggests that the uranium in Golf Course waters may be natural. (Figures GC-1 through GC-31)

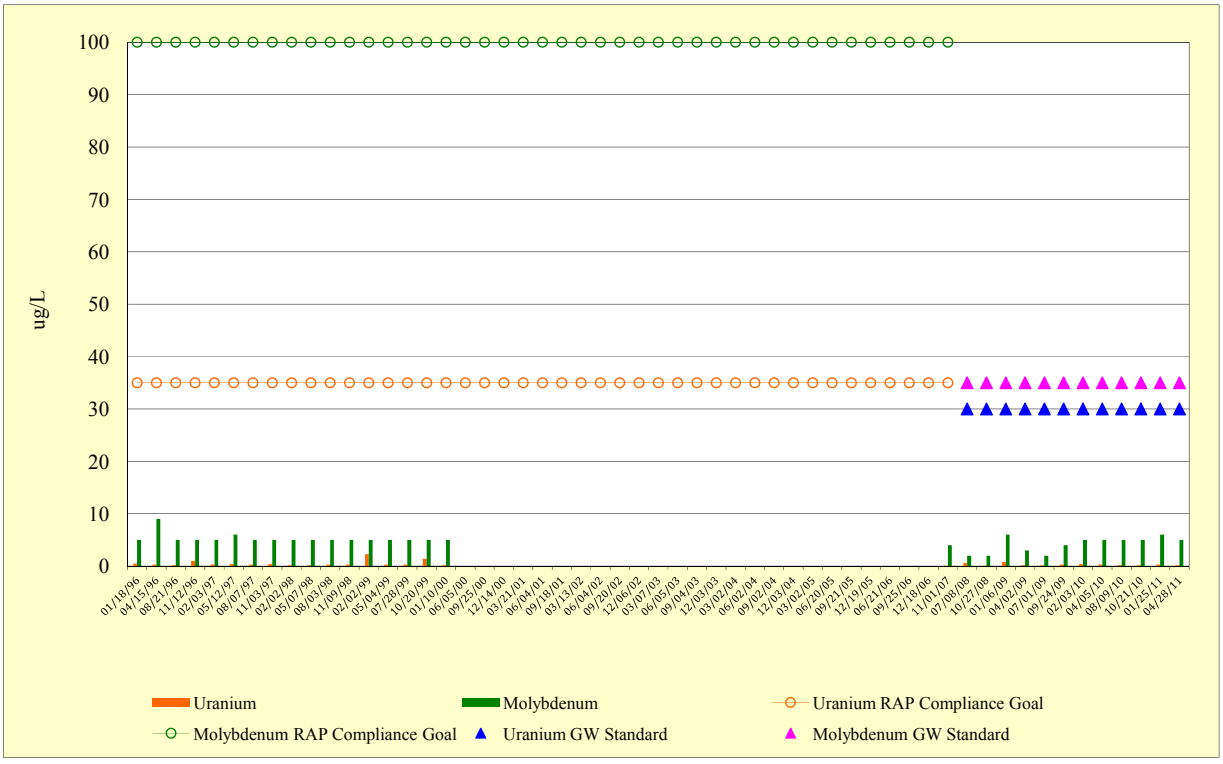
Figure GC – 0
Surface Water, Groundwater,
And Impoundment Sampling Locations
2011



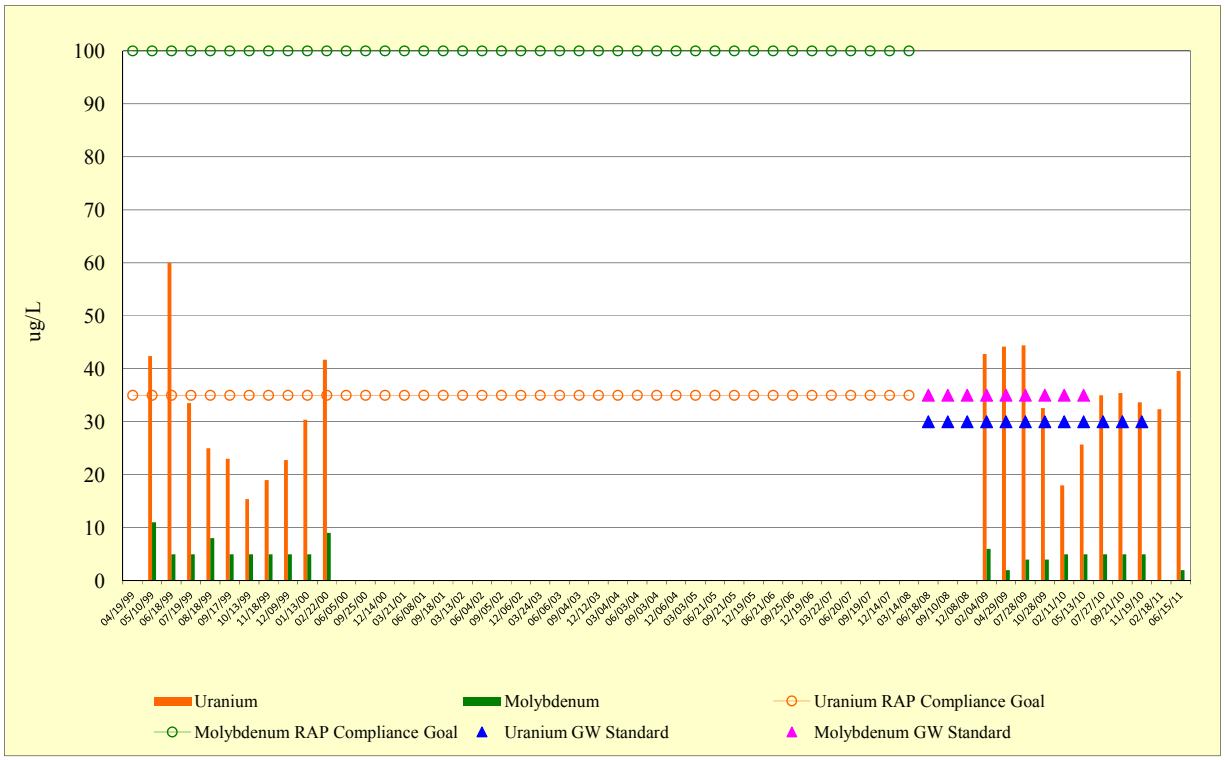
GC-1
Location 009
Uranium and Molybdenum



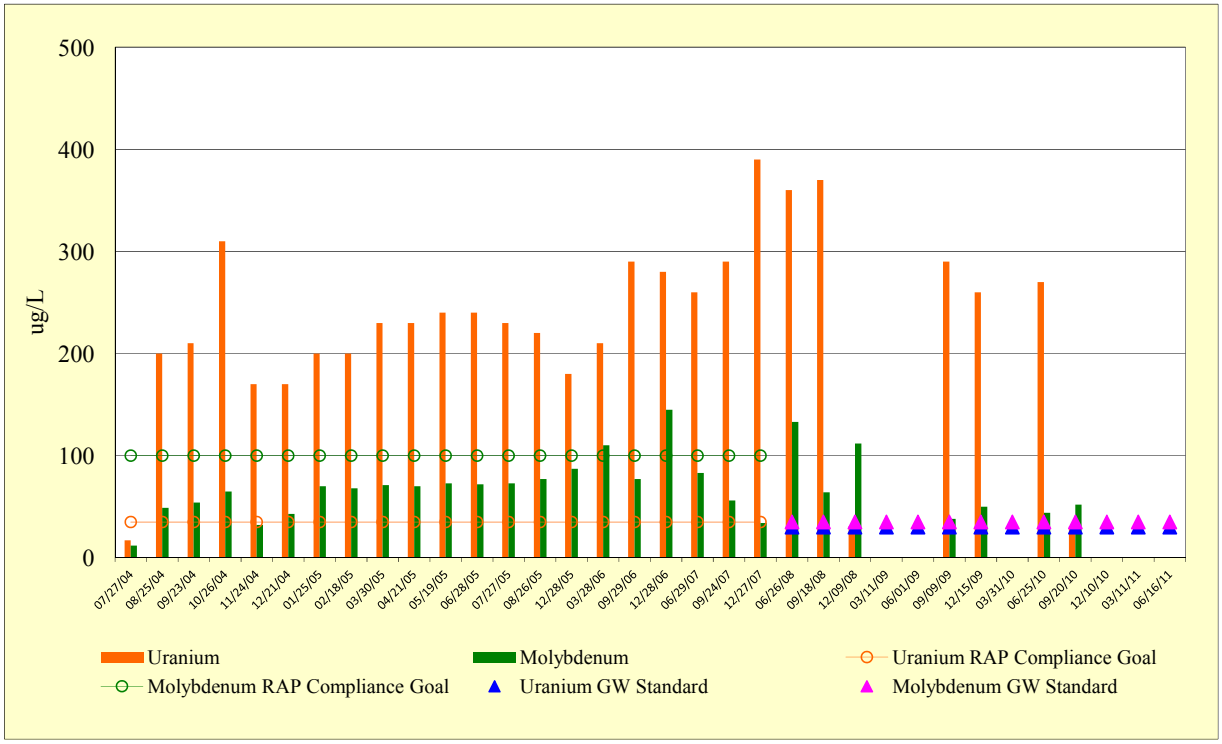
GC-2
Location 014
Uranium and Molybdenum



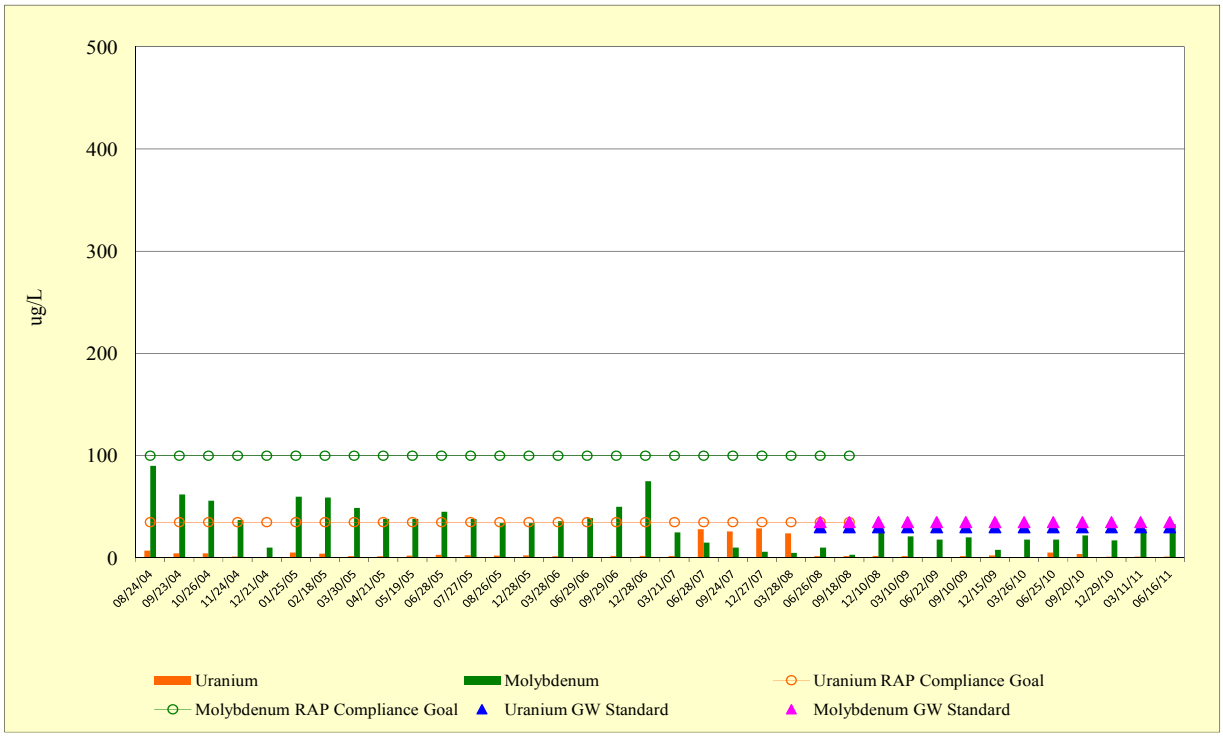
GC-3
Location 015A
Uranium and Molybdenum



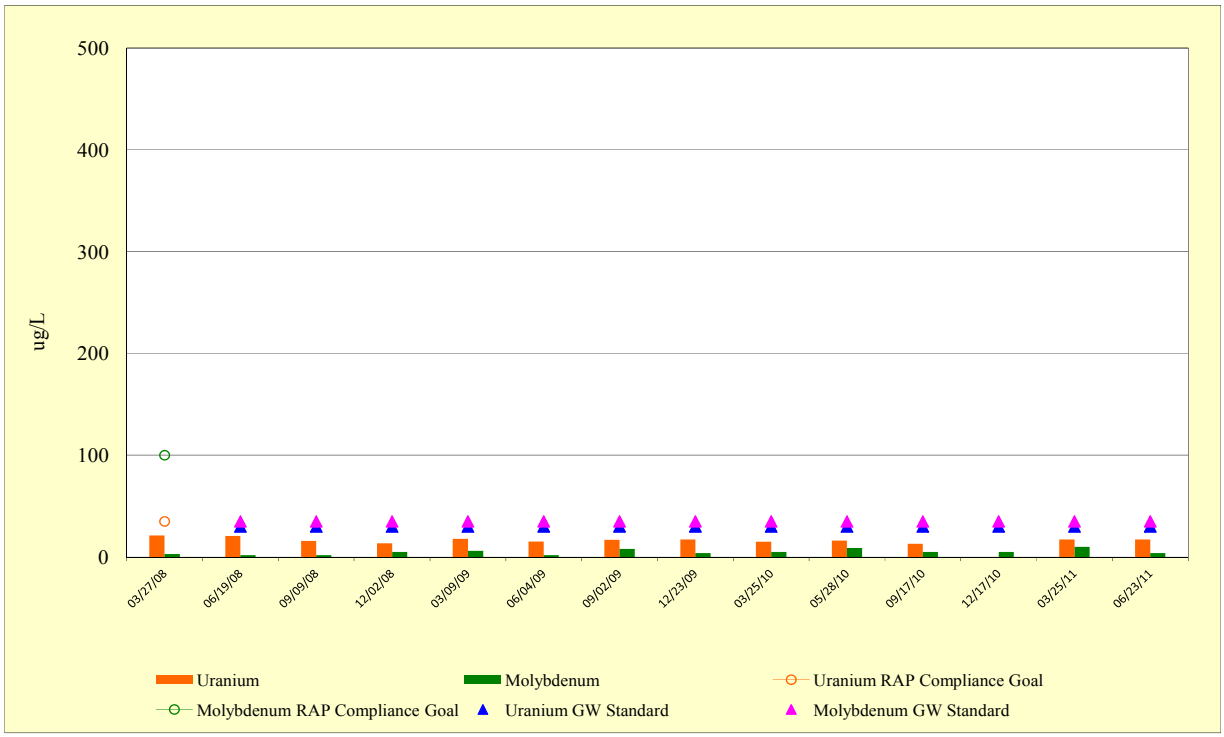
GC-4
Location 035
Uranium and Molybdenum



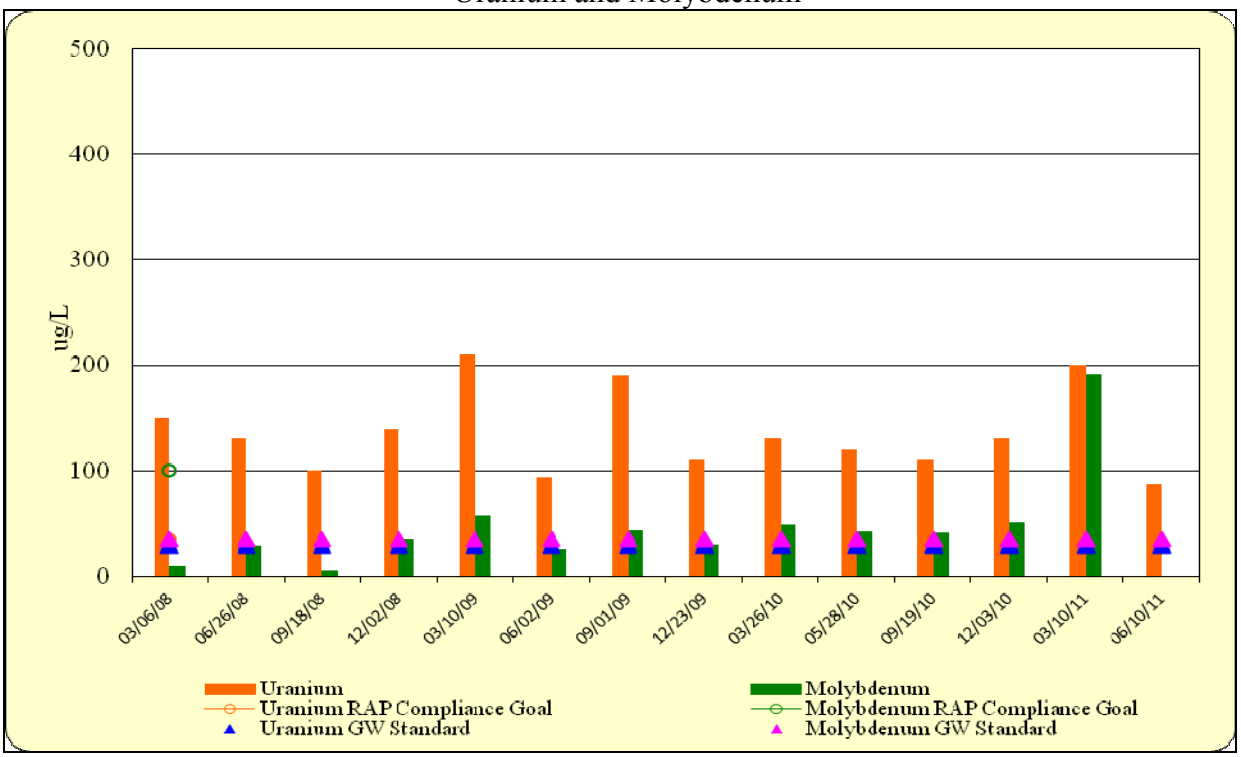
GC-5
Location 036
Uranium and Molybdenum



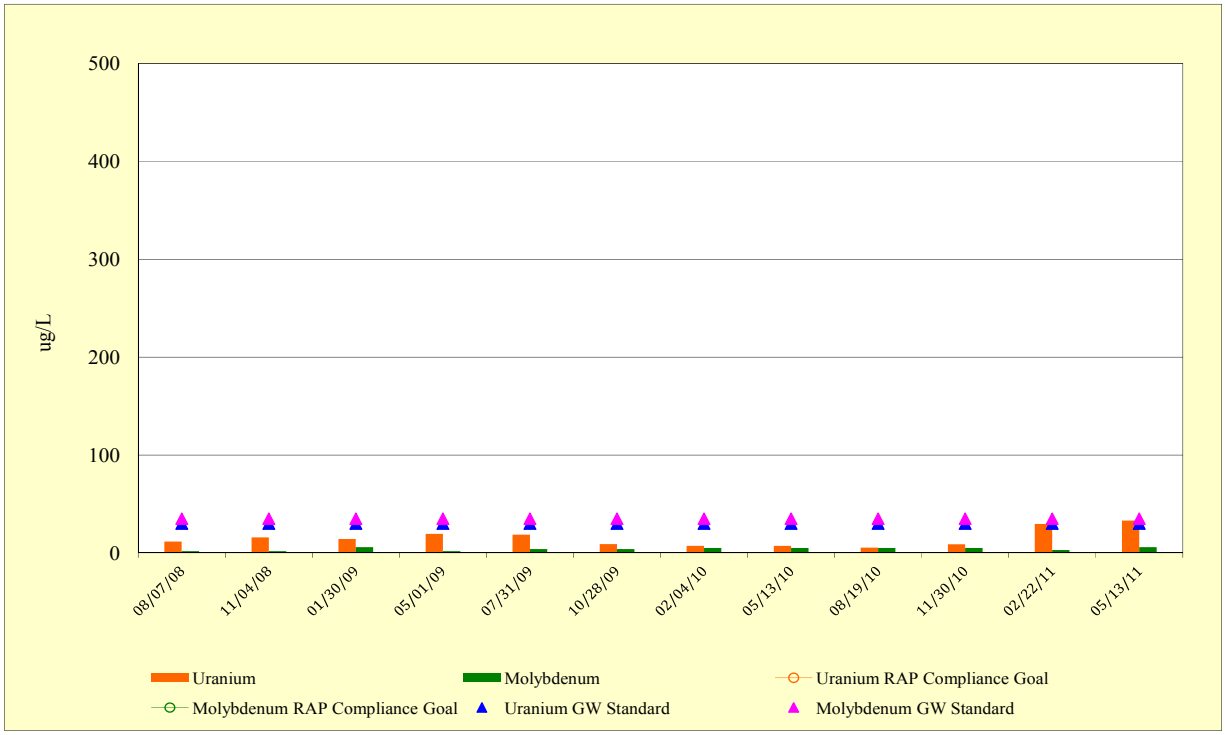
GC-6
Location 037
Uranium and Molybdenum



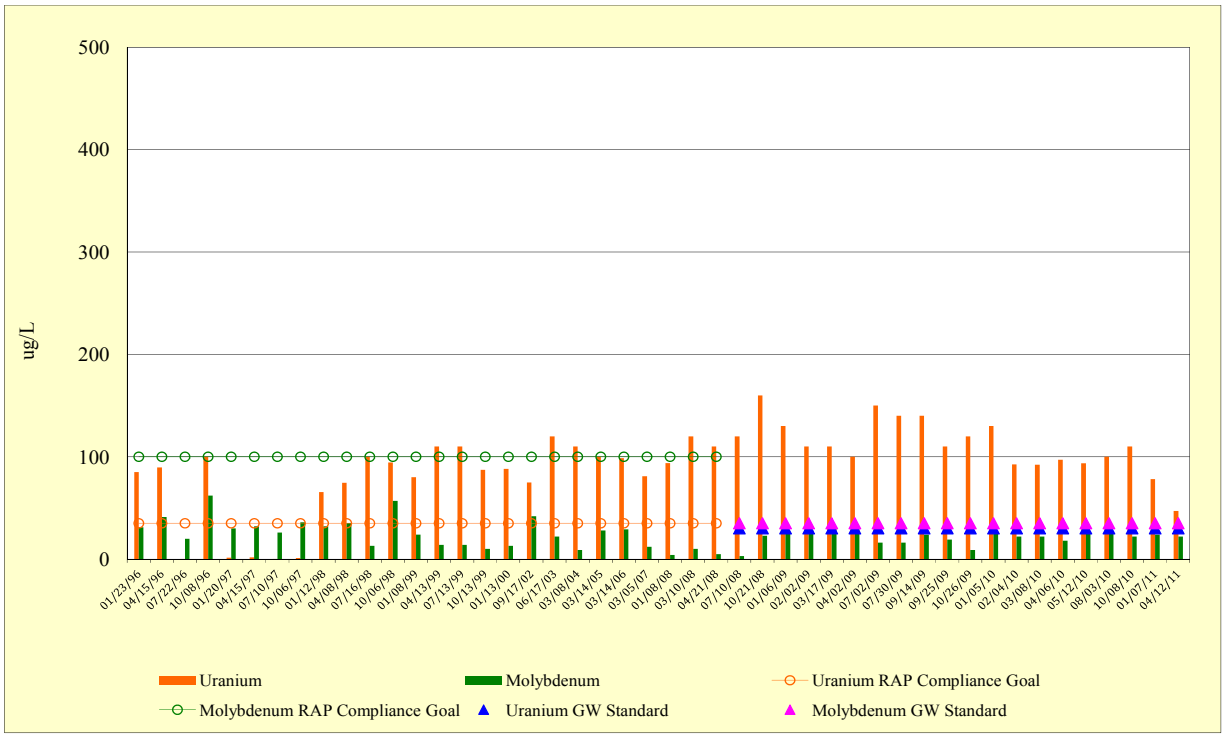
GC-7
Location 038
Uranium and Molybdenum



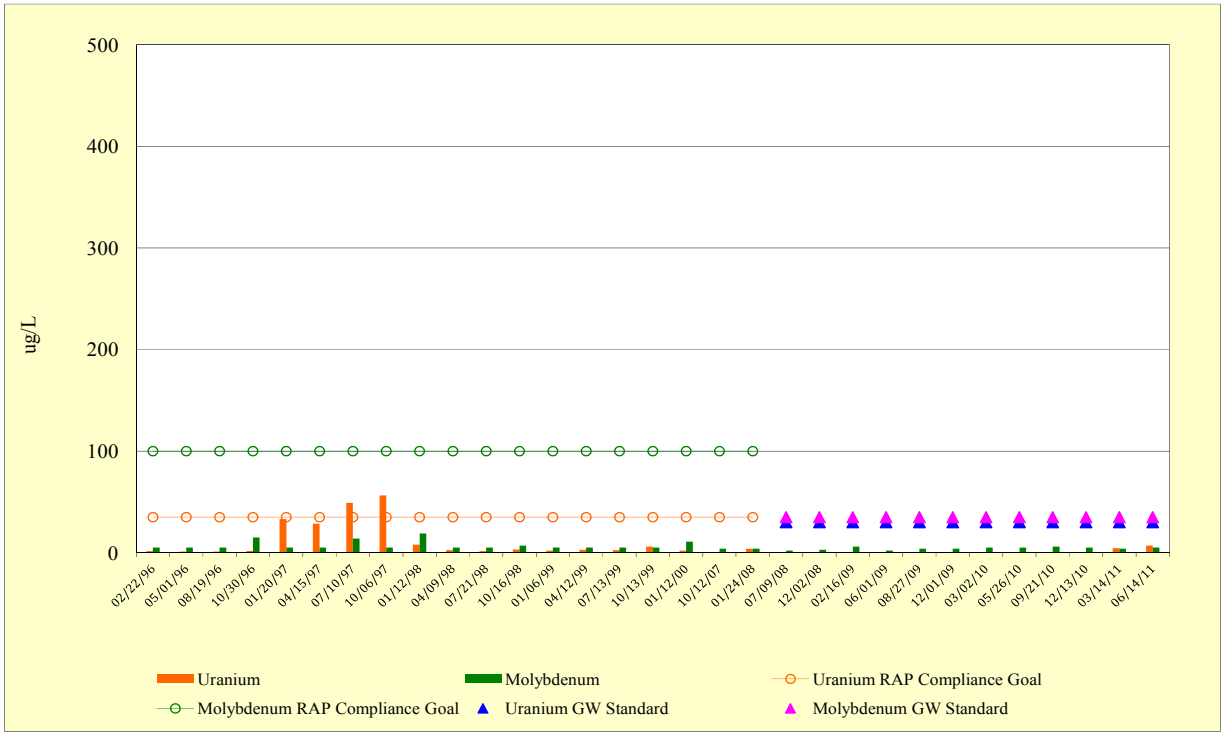
GC-8
Location 135
Uranium and Molybdenum



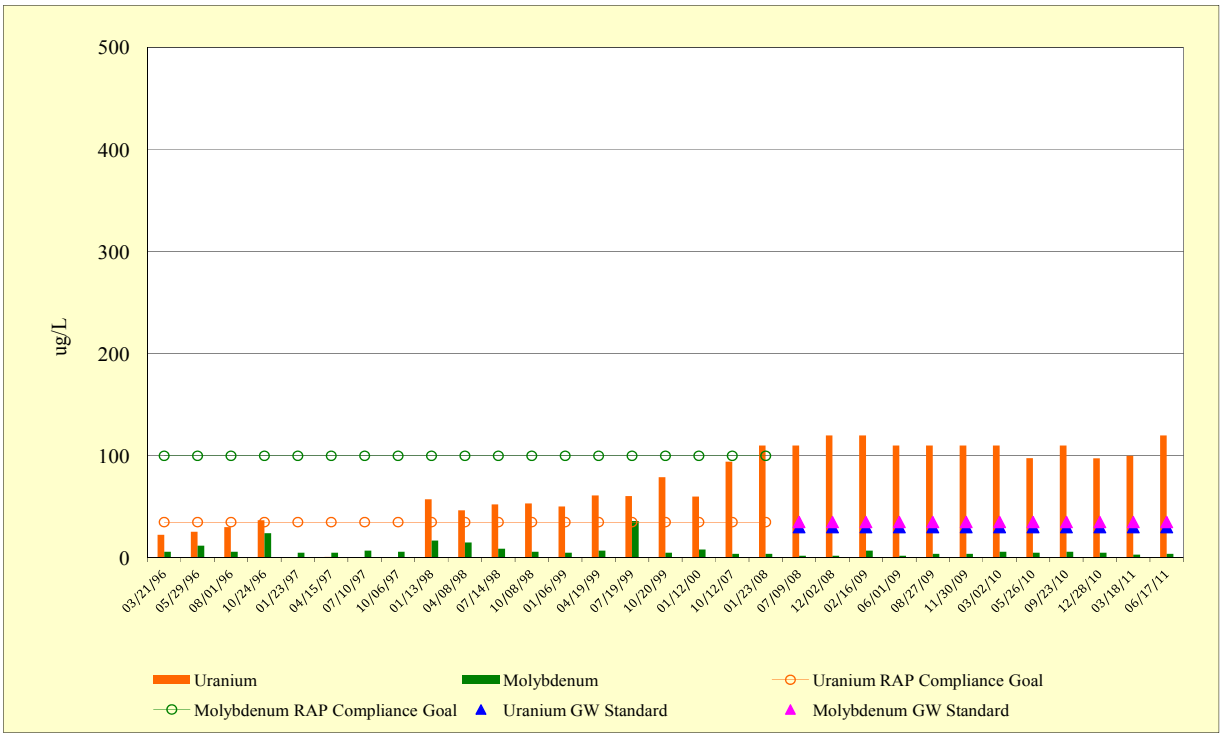
GC-9
Location 336
Uranium and Molybdenum



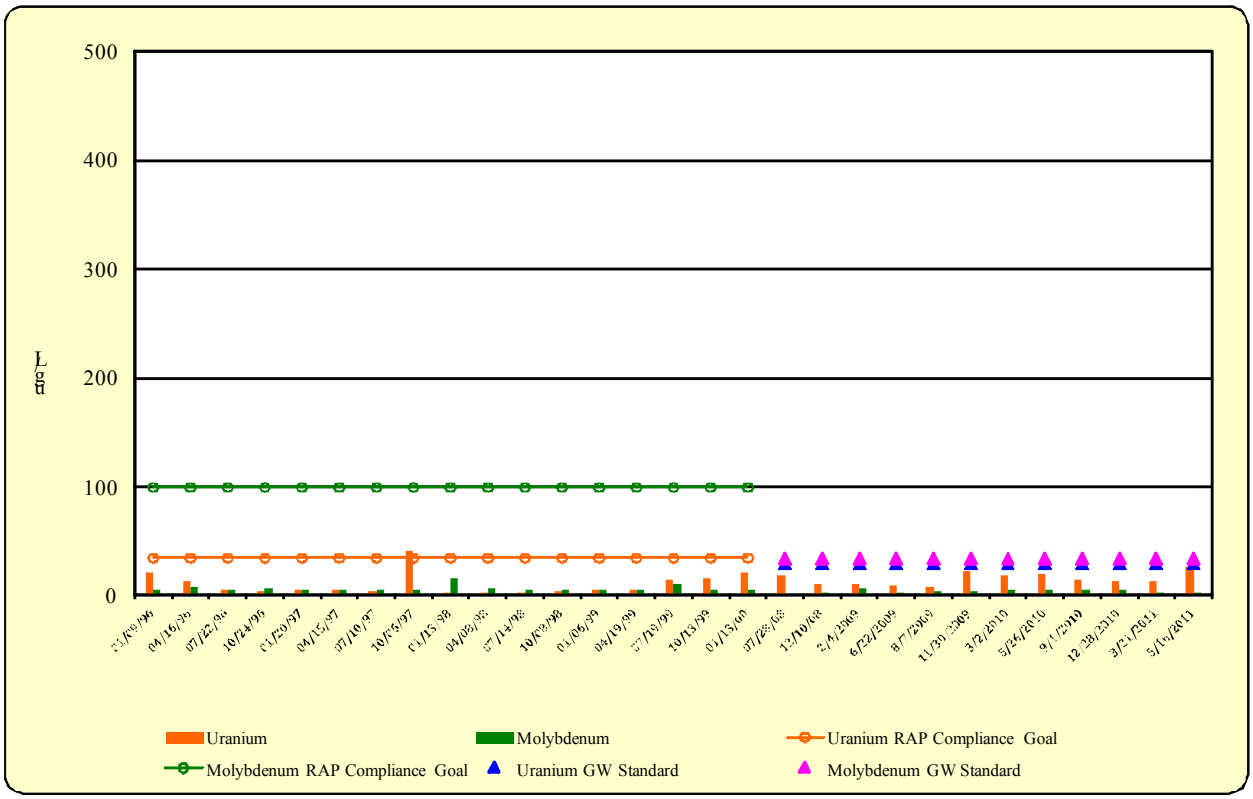
GC-10
Location 337
Uranium and Molybdenum



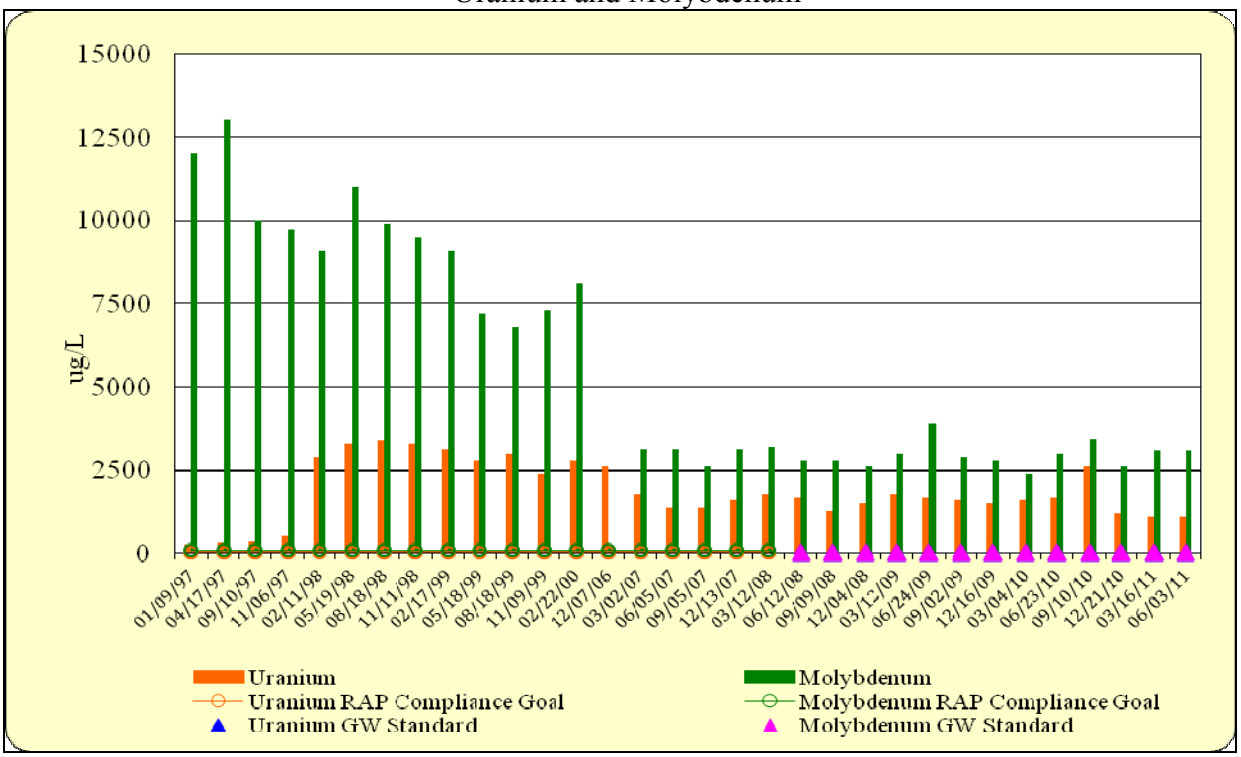
GC-11
Location 338
Uranium and Molybdenum



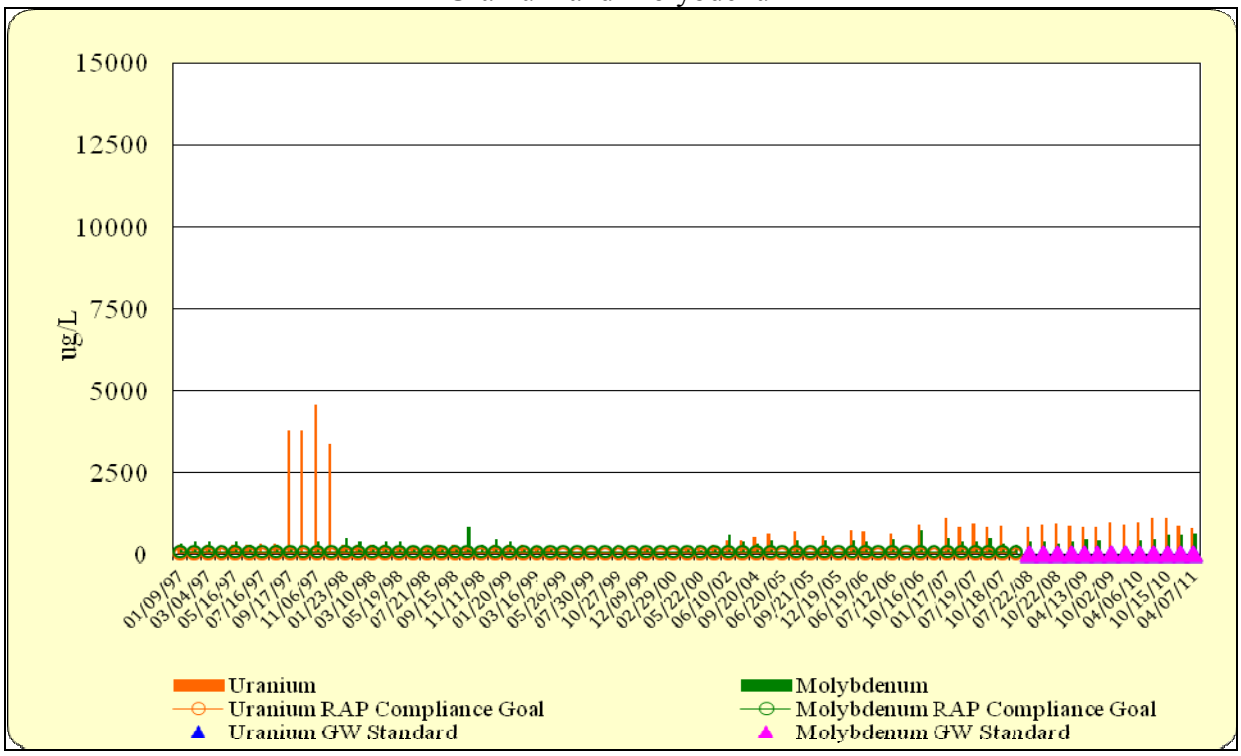
GC-12
Location 342
Uranium and Molybdenum



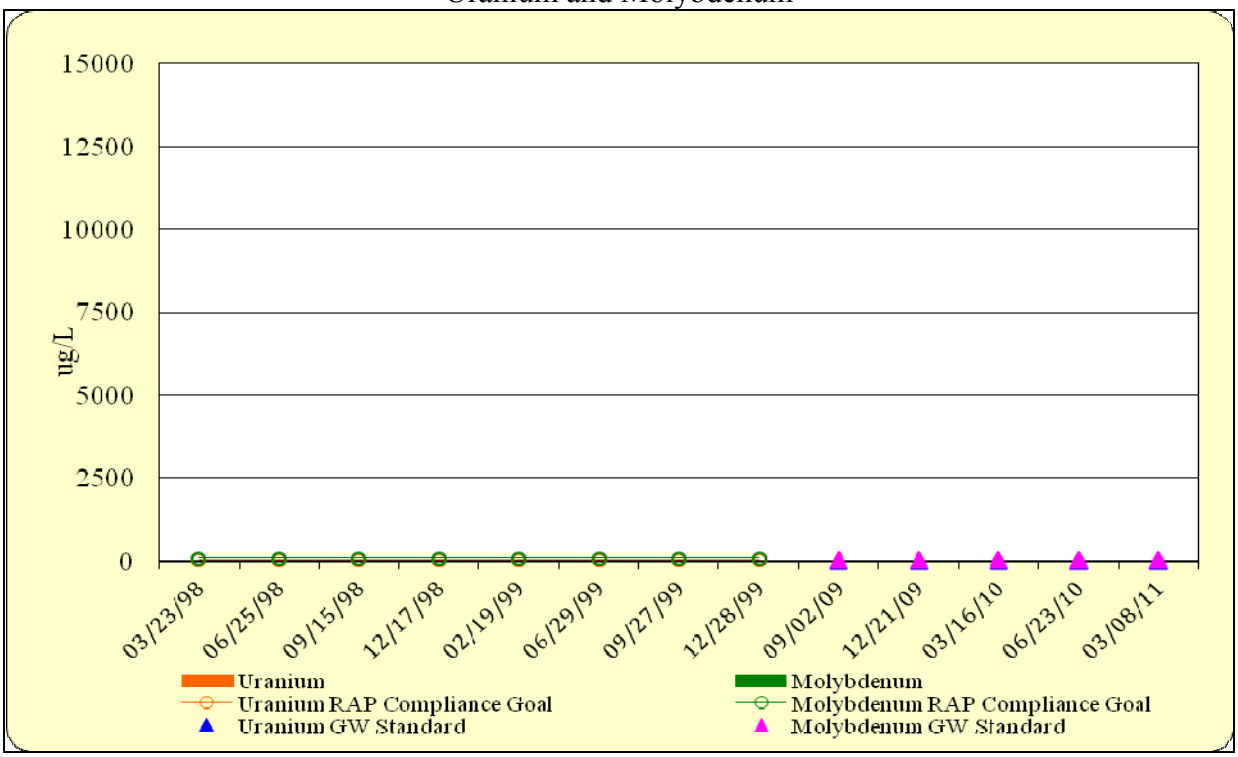
GC-13
Location 344
Uranium and Molybdenum



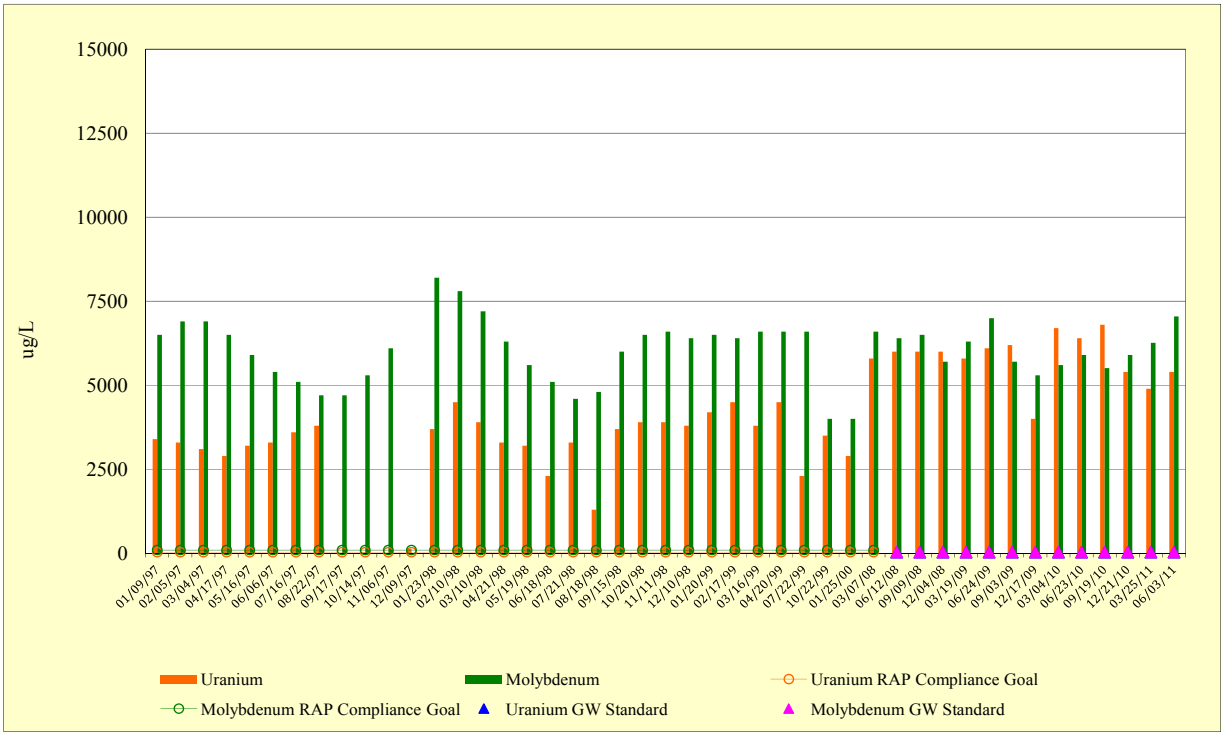
GC-14
Location 346
Uranium and Molybdenum



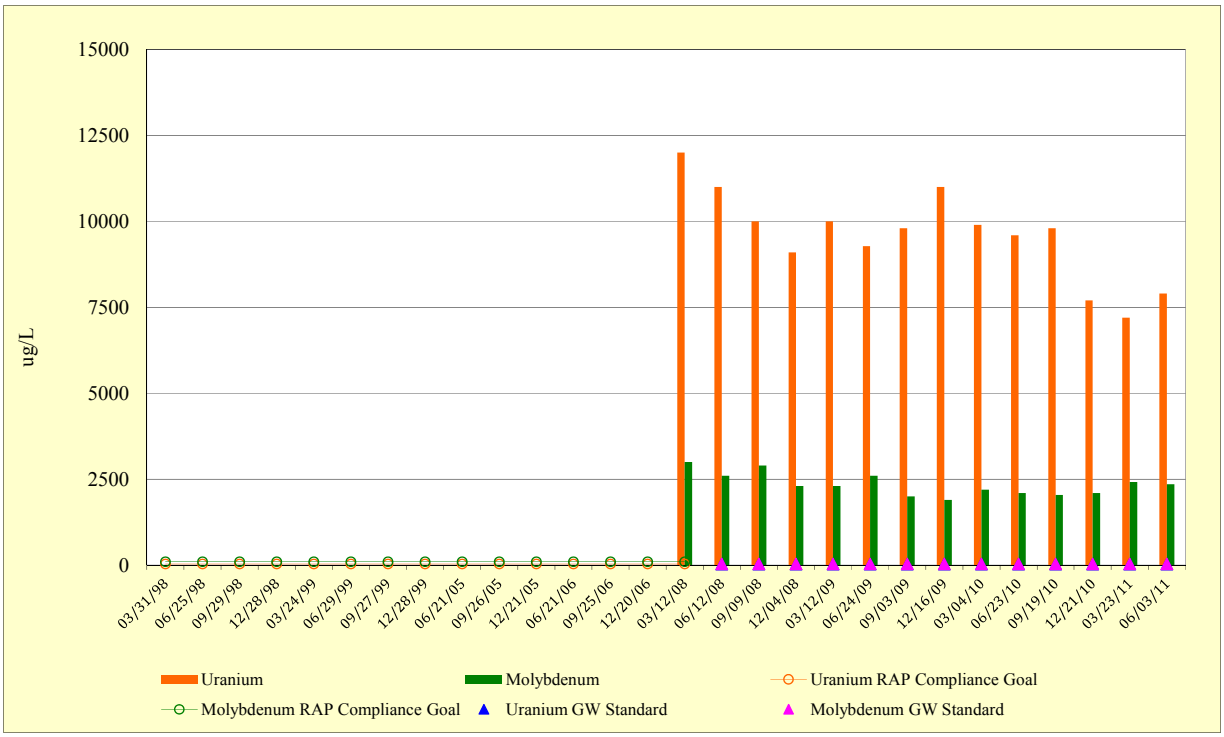
GC-15
Location 347
Uranium and Molybdenum



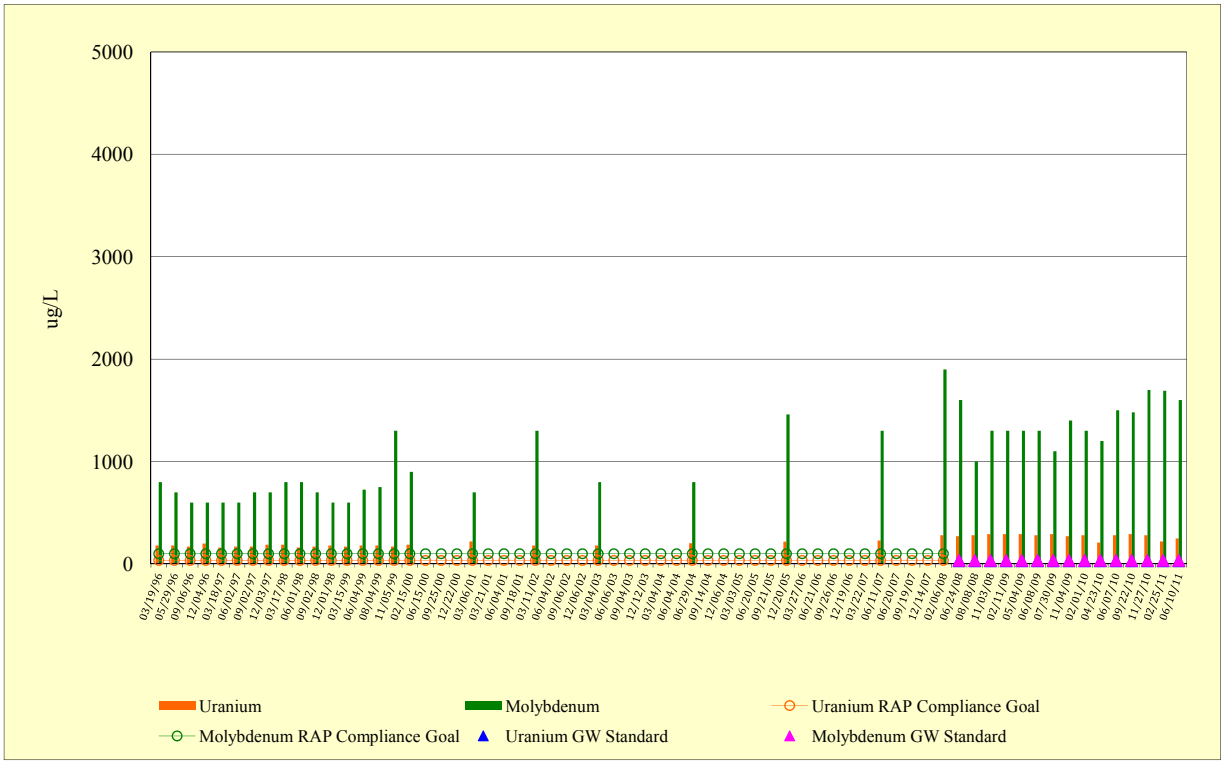
GC-16
Location 348
Uranium and Molybdenum



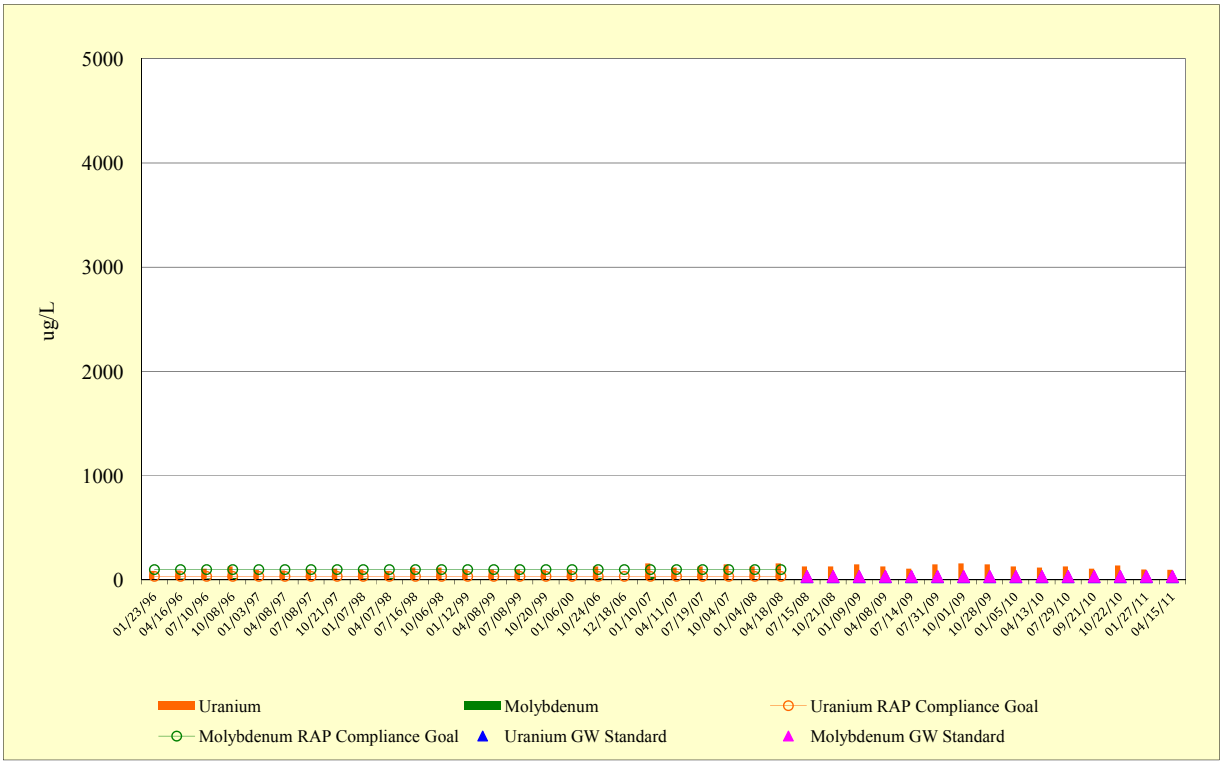
GC-17
Location 368
Uranium and Molybdenum



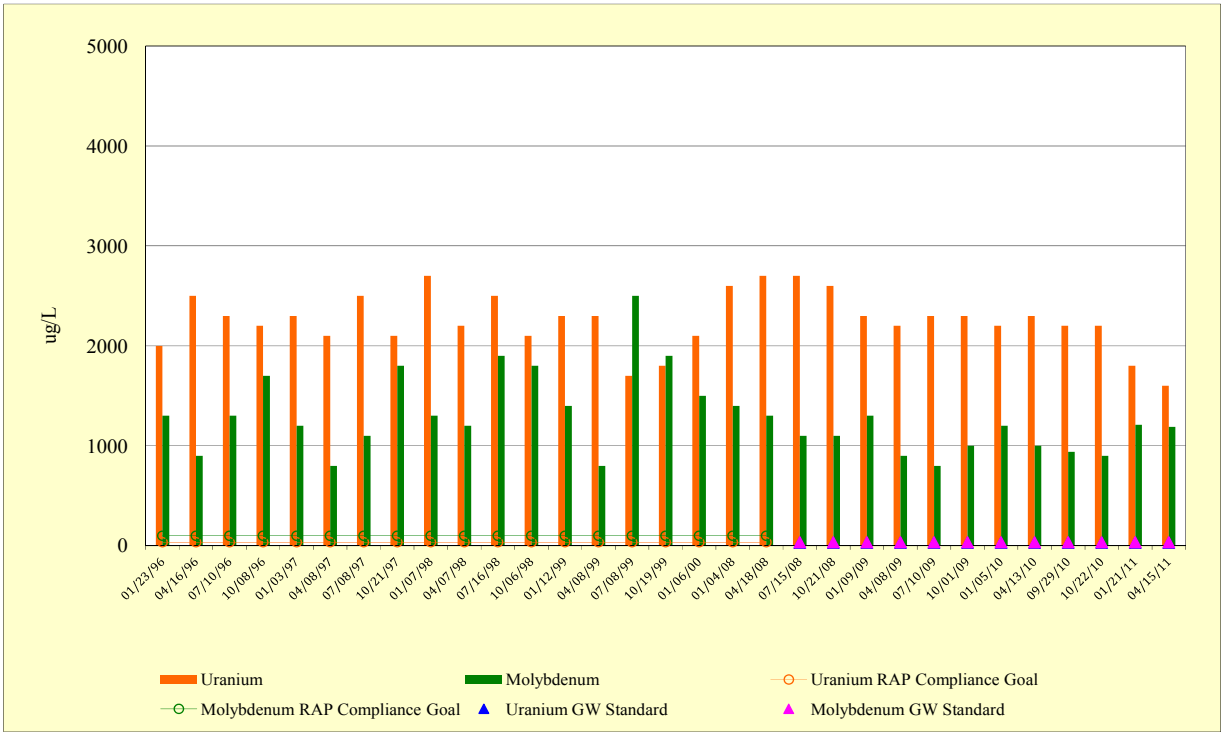
GC-18
Location 802
Uranium and Molybdenum



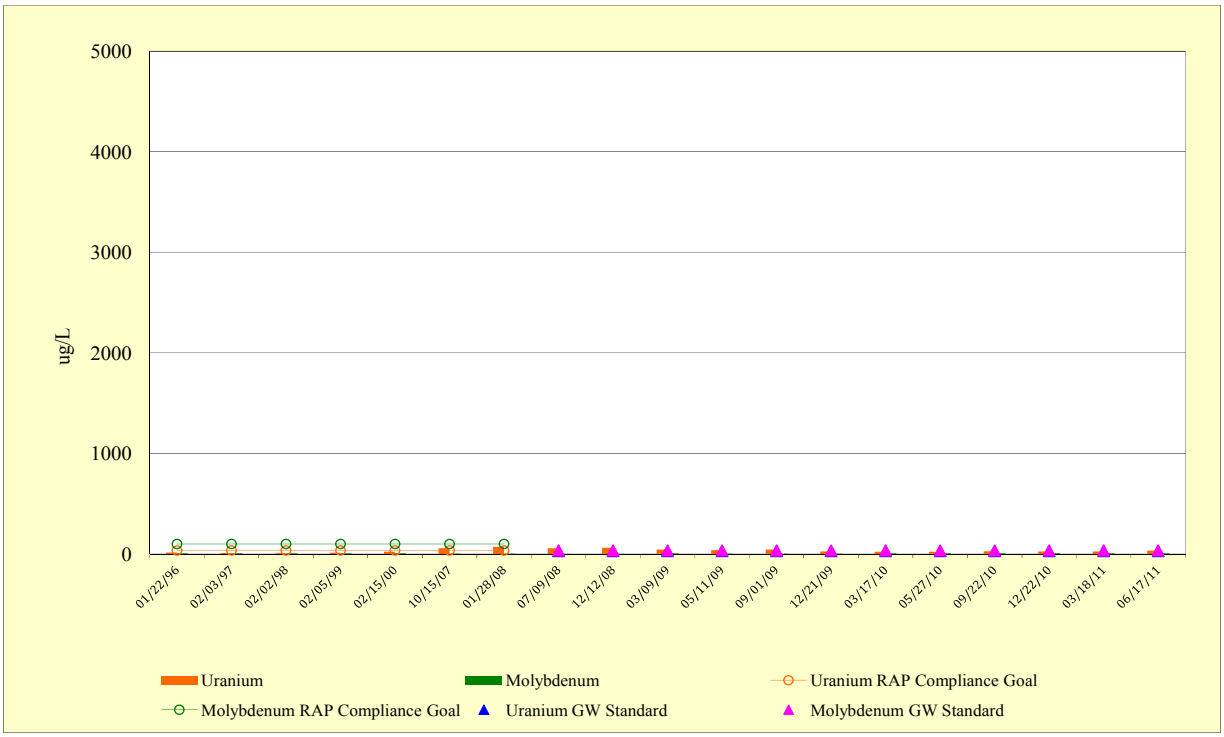
GC-19
Location 803
Uranium and Molybdenum



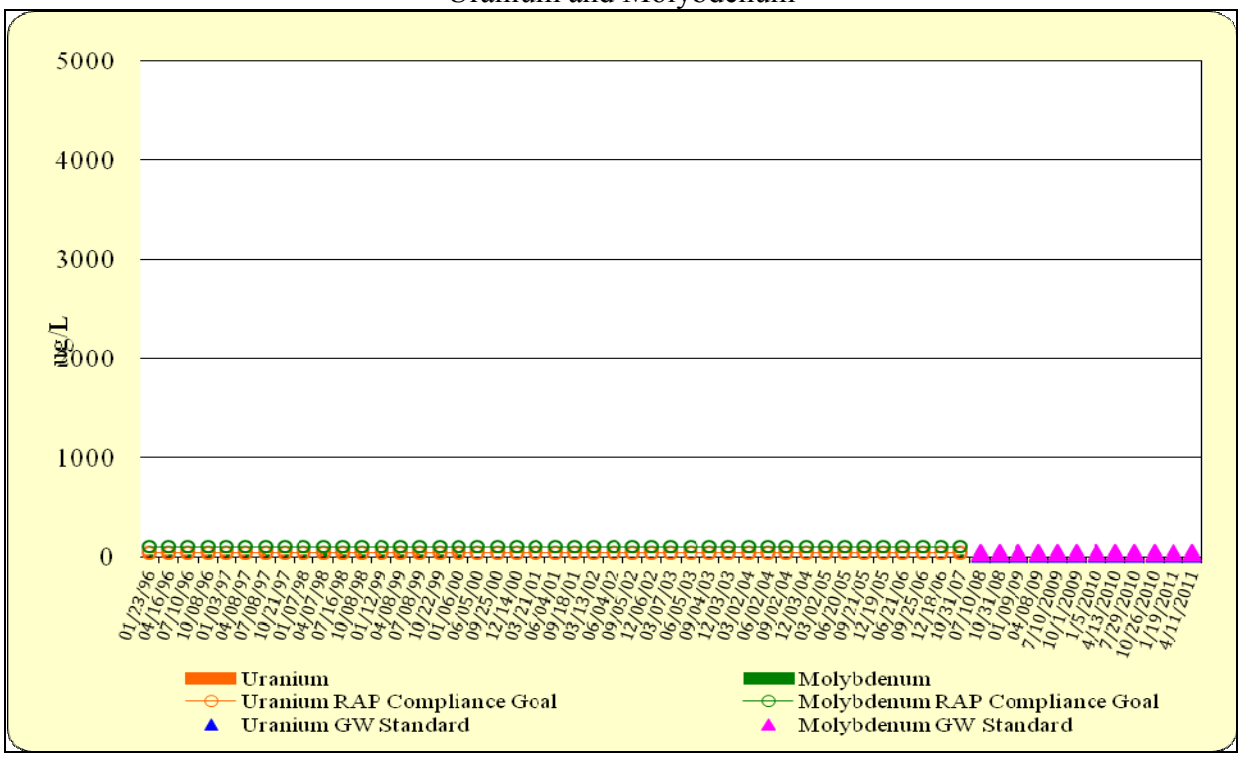
GC-20
Location 804
Uranium and Molybdenum



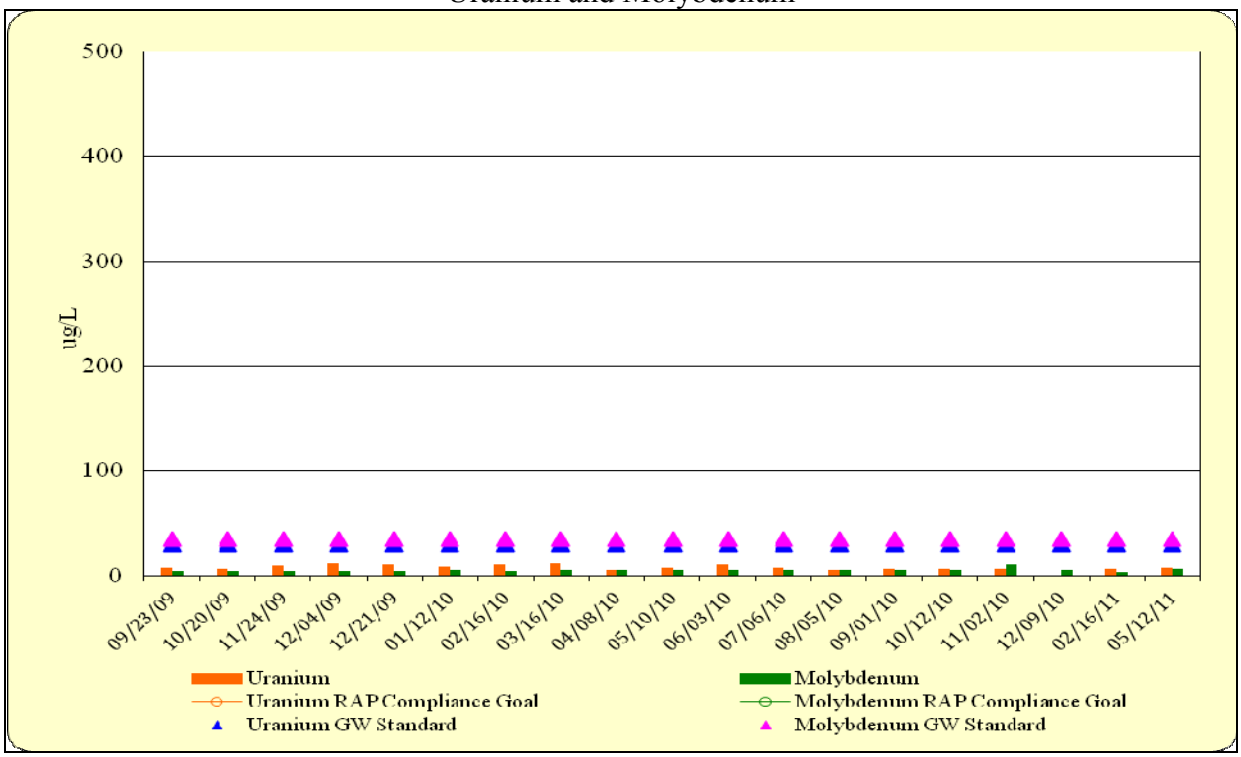
GC-21
Location 805
Uranium and Molybdenum



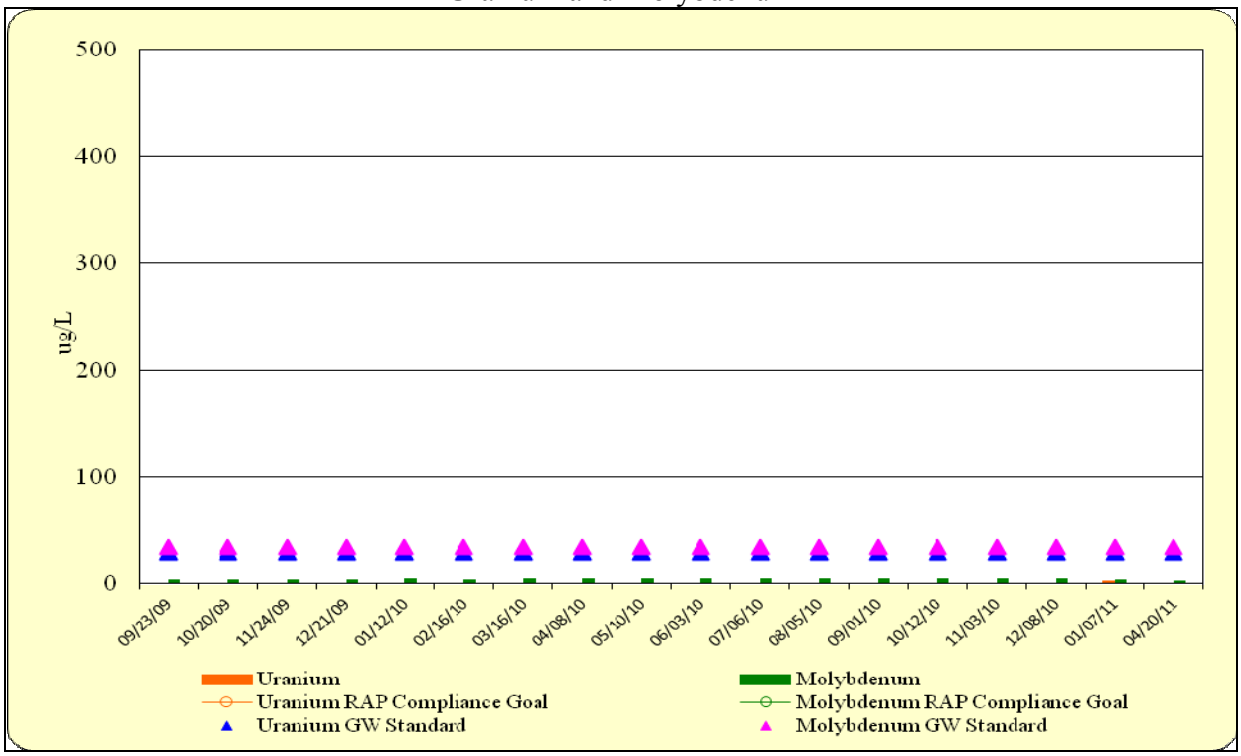
GC-22
Location 806
Uranium and Molybdenum



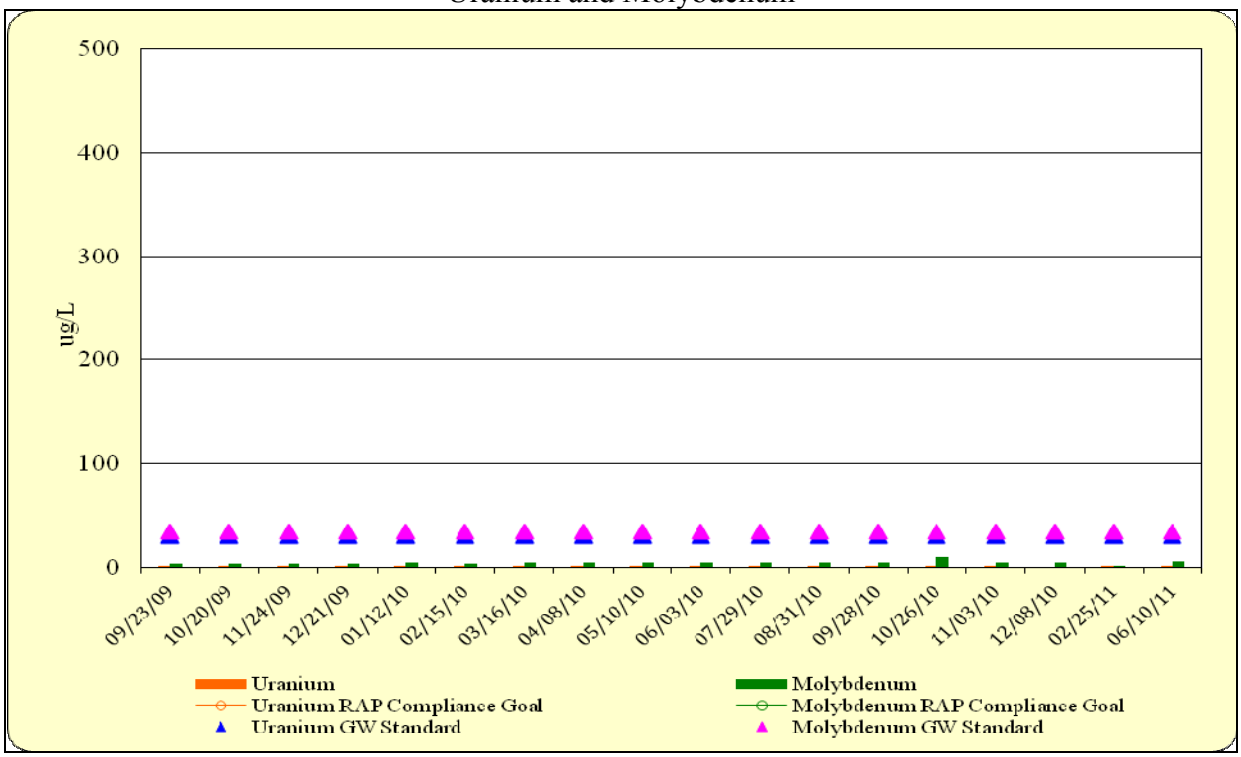
GC-23
Location 039
Uranium and Molybdenum



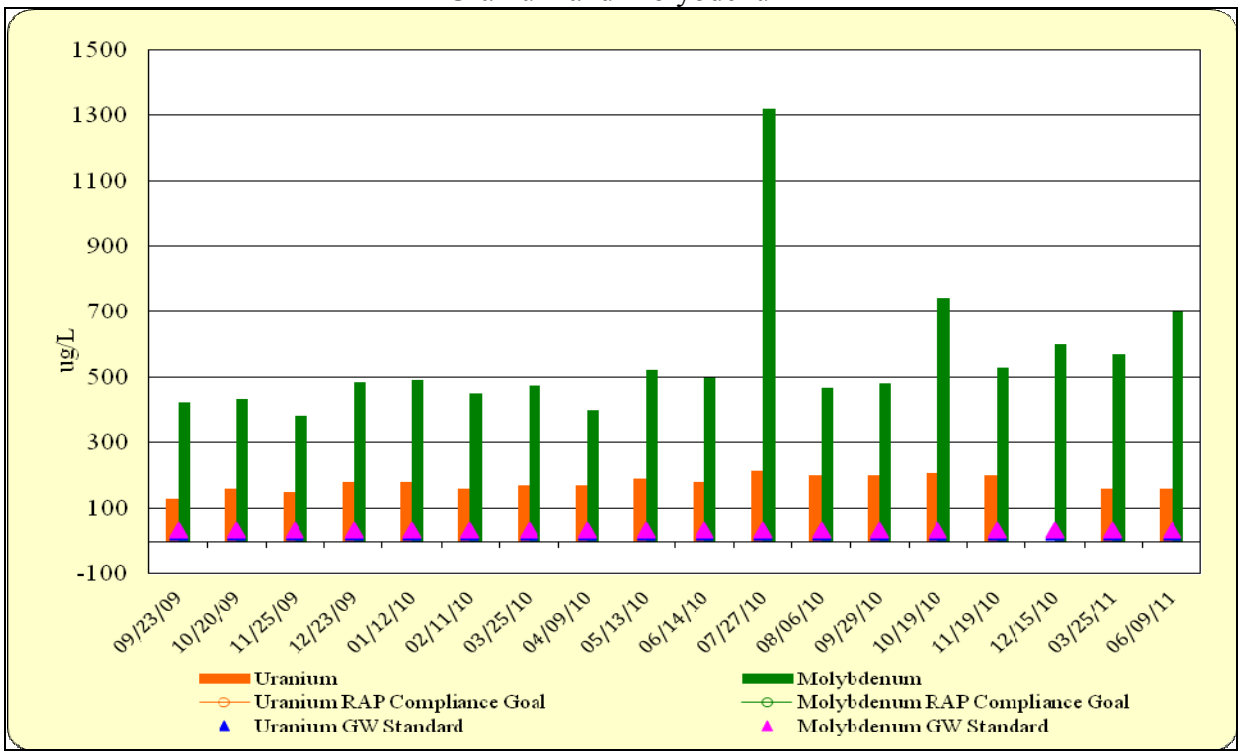
GC-24
Location 040
Uranium and Molybdenum



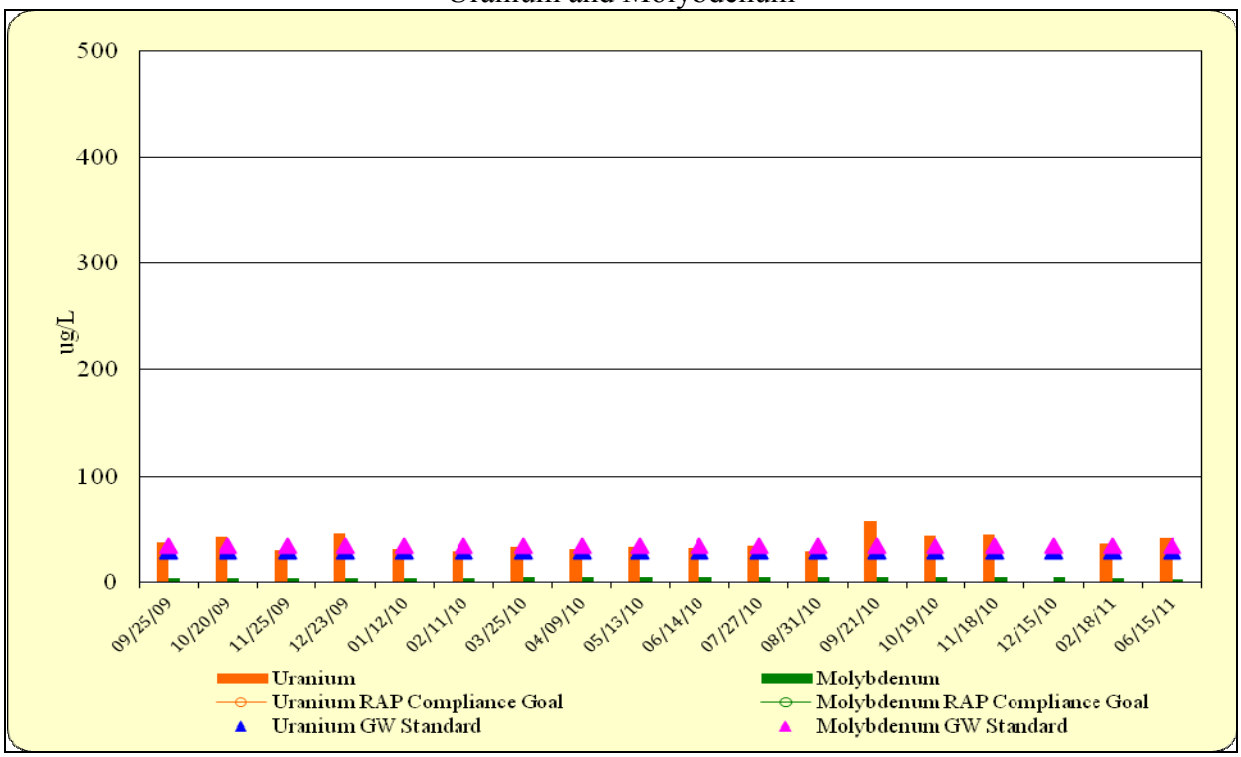
GC-25
Location 041
Uranium and Molybdenum



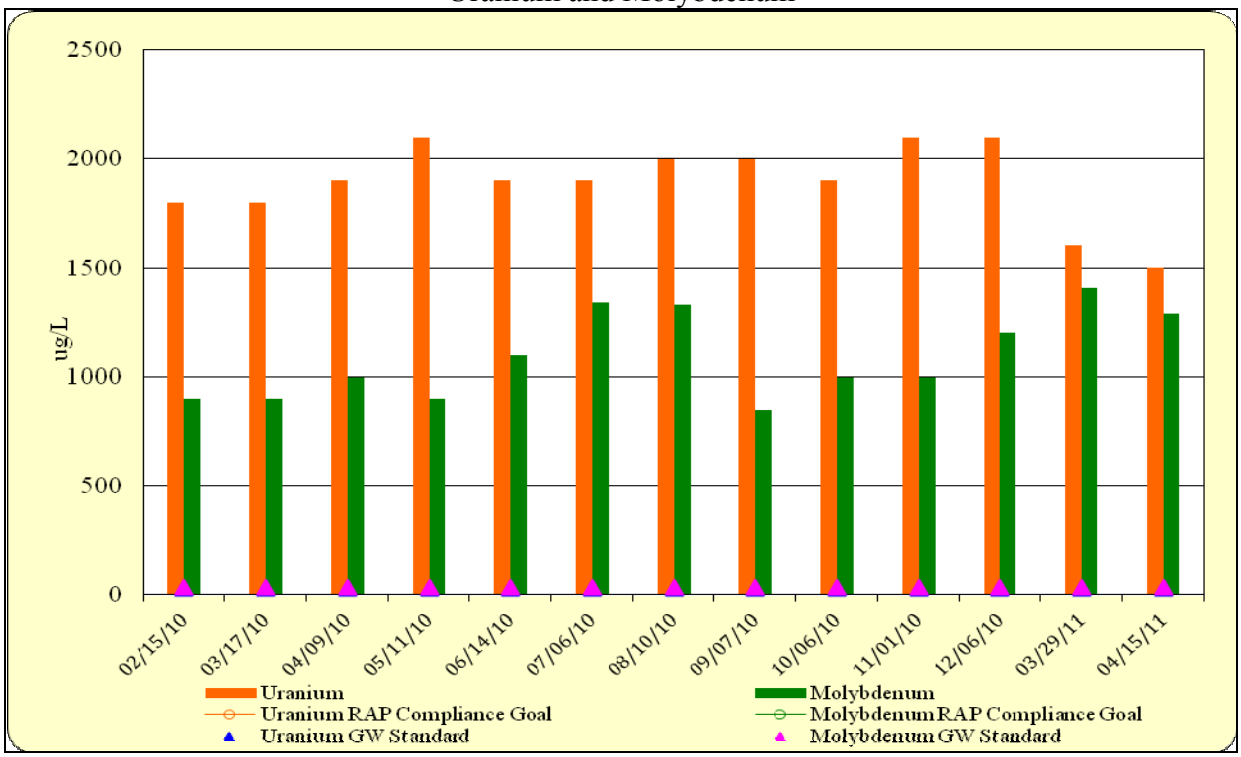
GC-26
Location 042
Uranium and Molybdenum



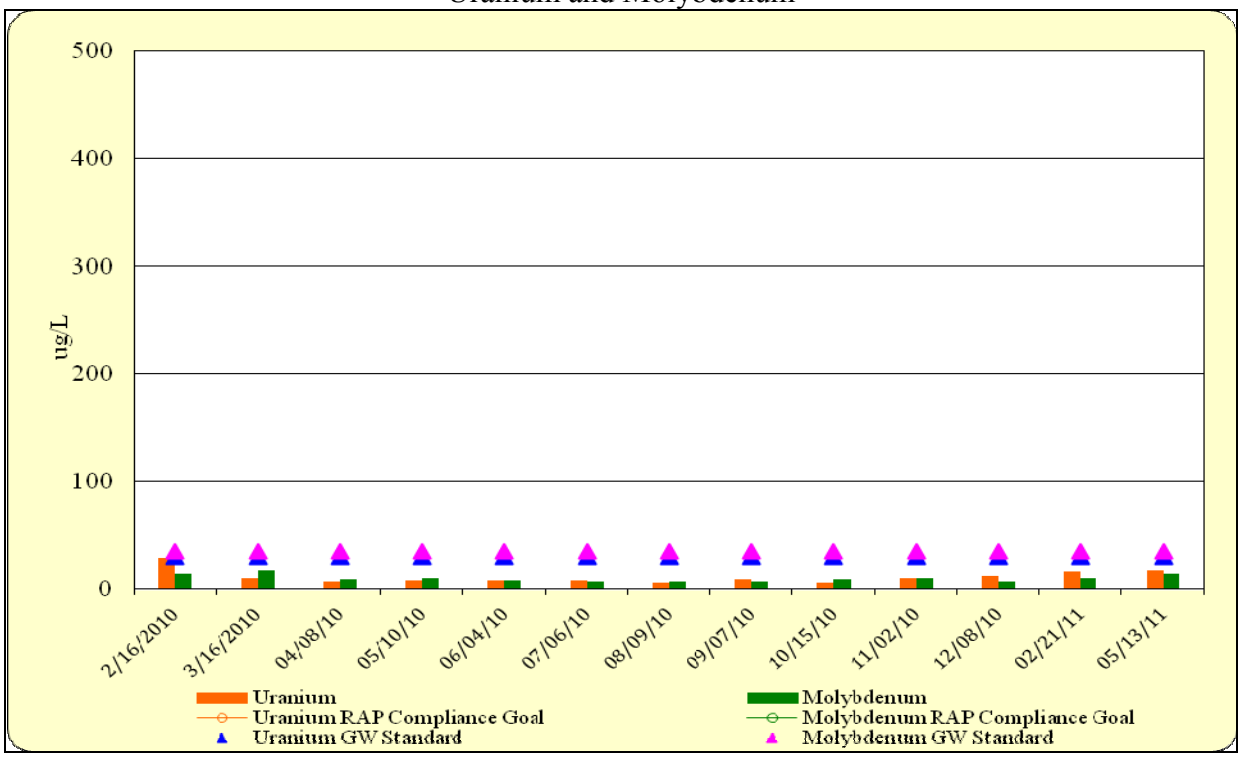
GC-27
Location 043
Uranium and Molybdenum



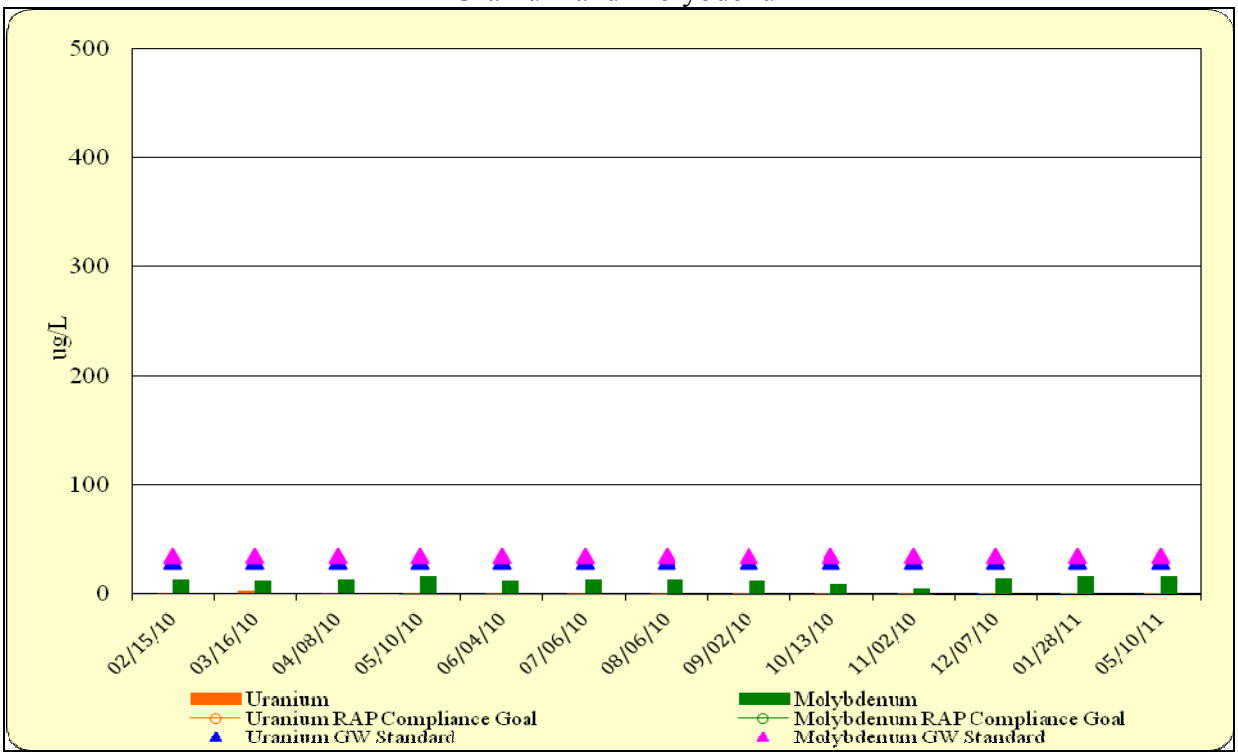
GC-28
Location 044
Uranium and Molybdenum



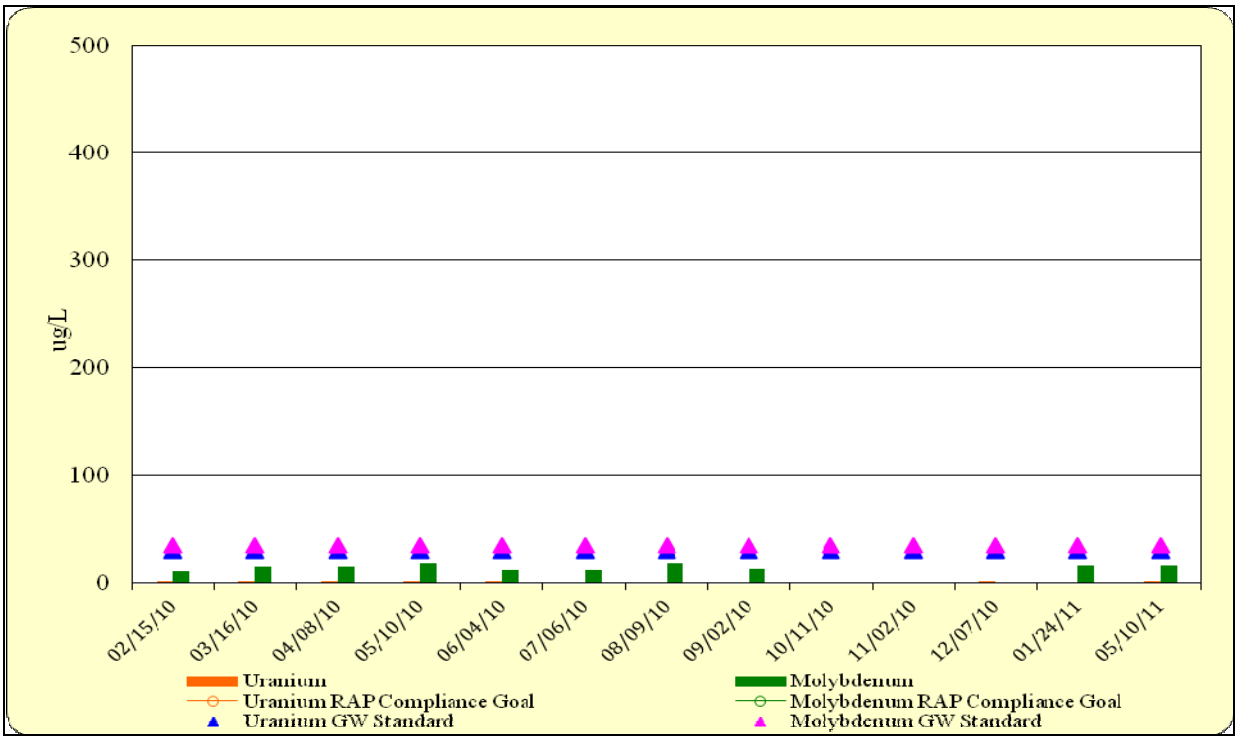
GC-29
Location 045
Uranium and Molybdenum



GC-30
Location 046
Uranium and Molybdenum



GC-31
Location 047
Uranium and Molybdenum



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SEMIANNUAL EFFLUENT REPORT
Appendix A
Solubility Classification for Environmental Air Samples

The solubility classifications used for comparison of Environmental Air Samples are taken from the Rules and Regulations pertaining to Radiation Control of the Colorado Department of Public Health and Environment, Part 4, Appendix B, Table 2 Effluent Concentrations.

For ^{nat}U, we use Class Y as recommended in *Nuclear Regulatory Guide 4.14 Section 4 Page 4-14.5*.

For ^{232}Th, we use Class Y since the uranium-zirconium ore is refractory and natural thorium would be considered an oxide.

For ^{230}Th, we use Class W for conservatism since alkaline tailings have been reported in Department of Energy sponsored research to be approximately thirty percent (30%) Class W and seventy percent (70%) Class Y.

For ^{226}Ra, use Class W since all forms are considered Class W.

For ^{210}Pb, we use Class D since all forms are considered Class D.

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Appendix B
Lower Limit of Detection Usage for Environmental Air Samples

Calculation of average radionuclide concentrations of quarterly composites of Environmental Air Samples is performed by using one-half (½) the (Lower Limit of Detection) LLD concentration.

This was done according to protocol established by the *Environmental Protection Agency Quality Assurance Procedures*.