February 26, 2010

Mr. Steve Tarlton, Program Manager
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 second (2^{nd}) half of 2009 pursuant to RH 18.7.2.

If you have any questions, please contact me.

Sincerely,

Jim Cain
Environmental Coordinator/
Radiation Safety Officer

JC: kju

Attachments

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Stack Emission Monitoring

Environmental Air Monitoring

COTTER CORPORATION
CANON CITY MILLING FACILITY
EFFLUENT REPORT
JULY TO DECEMBER 2009
February 26, 2010

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 second (2^{nd}) half of 2009, 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:
  - Roof repairs
  - Rotated Rod and Ball Mills
- Secondary Impoundment Constructability Project and Initial Cover:
  - Routine road upkeep and dust control for SI Project
  - Excavation of ore pad material, haulage to SI started
  - Soil haulage - PI and Front Gate Ore Pad, mixing and cover (Kessler)
- Repair of mobile equipment.
- Records Storage:
  - Physical upgrades to records storage building
  - Records sorting
- Maintenance of Primary Impoundment pH level at four (4) or above.
- Schwartzwalder Mine support including submission of semiannual report.
- Enhancement of the Primary Impoundment dust control system including adding to the sprinkler system and applying dust suppressant in some areas.
- Continued the Hazard Analysis and Reduction program that was initiated in June 2006 – Cleaning and "Bird proofing" of various buildings in response to CDPHE inspection report.
- Pre wood-stave tank removal activities:
  - Finished nuclear gauge removal and storage
- Primary Impoundment, Secondary Impoundment, New Pond 3, and Water Distribution Pond Hypalon repairs
- Extensive storm erosion damage cleanup, repair and construction of new diversion channels. Also repair of silt fences per RAP.
- PRTW sump work from rain runoff sediment.
- Bench scale test work and operator training for processing off-specification vanadium.
- Installed additional radon track etch monitors near Secondary Impoundment
- Randy Whicker joined us on 9/8/09 as an RSO and to do env/rad for Schwartzwalder Mine.

- Provided all day tour for Colorado State University HP and IH students, University of Colorado at Denver and National Jewish Hospital occupational medicine residents and Montrose County officials.
- Provided support to contractor for five (5) new wells drilled for Golf Course investigation.
- Moved OV-3 environmental air sampler at resident's request.
- Small cone crusher installed at SDU area for use with blackflake material.
- Passive roof vent fans installed on lab rad material storage sheds occupational radon.
- CCD building Hi-rate sump solution overflow to concrete ditch less than five hundred (<500) gallon.
- Graded evaporation cell berms to allow water truck access for dust control.
- Evaluation of YC Reddler conveyor and related equipment for possible removal.
- Installed two inch (2") line from PI sump to evap cell for deep dewatering.
- Moved V barrels and placed corroded ones into packaging bags.
- Sampled five (5) new wells for Golf Course investigation on a monthly basis.
- Produced an evaluation proposal for AS-210 soils/gamma levels.
- Submitted an evaluation of vegetation sampling variability per CDPHE request.
- Enhanced Gamma scan and counting capability.
- Submitted "Interim Cleanup of Entry Road Report" to CDPHE.
- Secured Rad Tech Office:
  - Potential asbestos exposure
  - Sealed ductwork (Environmental Eradicators)
  - Started decontamination of needed instruments/materials for removal from building.
- Pumped out Lab Septic Tank (Roto Rooter):
  - Seeded with bacteria
- Transferred solutions from USX cells, blanked off valves, repaired piping that had frozen and cracked.

Contractors

- Rock gravel deliveries for SI, also at golf course area SCS dam for road repairs. (Front Range Aggregates).
- Installed five (5) new wells in vicinity of Shadow Hills Golf Course (Drilling Engineers, Inc.).
- Underground utilities locate for CCD's and ore pad projects. (Utility Locates and Diversified Underground).
- Secured Rad Tech Office:
  - Sealed ductwork (Environmental Eradicators)
- Excavated four feet (4') from Front Gate Ore Pad (Kessler).
- Pumped out Lab Septic Tank (Roto Rooter).

TRACKING OF RADIOACTIVE MATERIALS

Ores and Materials received from July to December 2009

- Western Slope Ore (uranium-vanadium) – None

Ores and Materials processed from July to December 2009

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

Ore and Materials Inventory as of December 31, 2009

- 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.)
- Euxenite Ore – Approximately twenty (20) tons in 55-gallon drums are stored in the Old Moly SX Building (Barrel Storage).
- Approximately one thousand eight hundred (1,800) tons of GE Meeker formerly stored on ore stockpile was disposed in the Secondary Impoundment.

Finished Product Inventory as of June 30, 2009

- Calcium Molybdate Concentrate – Approximately forty-five (45) tons in 55-gallon drums were stored in the Moly SX Building (Barrel Storage).
- Vanadium Concentrate – Approximately ninety-nine thousand nine hundred seventy (99,970) pounds of V_2O_5 were stored in 55-gallon drums on the rail dock outside the Product Building.
- Yellowcake Concentrate – No uranium concentrate was stored in the Product Storage Building.

Material shipped off site from January to June 2009

- 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 a limited time in the second (2^{nd}) half of 2009. A sample was collected and the emissions estimate for both the first (1^{st}) and second (2^{nd}) half of 2009 is based on a sample collected in October 2009. Individual stack sampling reports for 2008 data are located in Table S1. Individual stack sampling reports for 2009 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 2009 versus 2008. For perspective, the uranium emission is less than one (<1) gram per year.

Mill Point Release
2nd Half 2008 and 2009
Table S-0

Mill Point Source Release Rates For Jul. - Dec. 2008				
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**	1.43E-06	9.86E-08	8.22E-09	2.82E-08
Calciner/Barreling Enclosure General Ventilation Baghouse	*	*	*	*
Uranium Oxide Venturi Scrubber	*	*	*	*
Decomposition/Fusion Furnace	*	*	*	*
Total Release Rates	1.43E-06	9.86E-08	8.22E-09	2.82E-08

Mill Point Source Release Rates For Jan. – Jun. 2009				
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	2.09E-07	1.44E-08	1.20E-09	4.12E-09
Calciner/Barreling Enclosure General Ventilation Baghouse	*	*	*	*
Uranium Oxide Venturi Scrubber	*	*	*	*
Decomposition/Fusion Furnace	*	*	*	*
Total Release Rates	2.09E-07	1.44E-08	1.20E-09	4.12E-09

Mill Point Source Release Rates For Jul. - Dec. 2009				
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**	4.03E-07	2.06E-08	5.25E-09	1.85E-08
Calciner/Barreling Enclosure General Ventilation Baghouse	*	*	*	*
Uranium Oxide Venturi Scrubber	*	*	*	*
Decomposition/Fusion Furnace	*	*	*	*
Total Release Rates	4.03E-07	2.06E-08	5.25E-09	1.85E-08

Laboratory Baghouse 2008
(AIRS#57)
Table S-1

2008	Sampled	Flow Rate	Est. Op	^{Nat}U	^{Nat}U	^{230}Th	^{230}Th	^{226}Ra	^{226}Ra	^{210}Pb	^{210}Pb	^{210}Po	^{210}Po	^{232}Th	^{232}Th
Month	Vol. (ml)	(ml/sec)	Hours	uCi/ml	uCi/sec	uCi/ml	uCi/sec	uCi/ml	uCi/sec	uCi/ml	uCi/sec	uCi/ml	uCi/sec	uCi/ml	uCi/sec
Jan.	1.39E+06	2.91E+06	0	7.33E-12	2.13E-05	7.94E-13	2.31E-06	3.61E-13	1.05E-06	3.83E-12	1.11E-05	4.33E-13	1.26E-06	5.05E-13	1.47E-06
Feb.	1.39E+06	2.91E+06	0	7.33E-12	2.13E-05	7.94E-13	2.31E-06	3.61E-13	1.05E-06	3.83E-12	1.11E-05	4.33E-13	1.26E-06	5.05E-13	1.47E-06
Mar.	1.39E+06	2.91E+06	0	7.33E-12	2.13E-05	7.94E-13	2.31E-06	3.61E-13	1.05E-06	3.83E-12	1.11E-05	4.33E-13	1.26E-06	5.05E-13	1.47E-06
Apr.	1.39E+06	2.91E+06	0	7.33E-12	2.13E-05	7.94E-13	2.31E-06	3.61E-13	1.05E-06	3.83E-12	1.11E-05	4.33E-13	1.26E-06	5.05E-13	1.47E-06
May	1.39E+06	2.91E+06	0	7.33E-12	2.13E-05	7.94E-13	2.31E-06	3.61E-13	1.05E-06	3.83E-12	1.11E-05	4.33E-13	1.26E-06	5.05E-13	1.47E-06
Jun.	1.39E+06	2.91E+06	0	7.33E-12	2.13E-05	7.94E-13	2.31E-06	3.61E-13	1.05E-06	3.83E-12	1.11E-05	4.33E-13	1.26E-06	5.05E-13	1.47E-06
Jul	1.42E+06	2.84E+06	5.2	7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
Aug	1.42E+06	2.84E+06	0	7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
Sep	1.42E+06	2.84E+06	0	7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
Oct	1.42E+06	2.84E+06	7.42	7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
Nov	1.42E+06	2.84E+06	6.5	7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
Dec	1.42E+06	2.84E+06	0.33	7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
	Op. Hours	Jan. - Jun.	0												
		Jul. - Dec.	19.45												
		Jan. - Dec.	19.45												
	Average Jan. - Jun.			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 Jan. - Jun.			7.33E-12	2.13E-05	7.94E-13	2.31E-06	3.61E-13	1.05E-06	3.83E-12	1.11E-05	4.33E-13	1.26E-06	5.05E-13	1.47E-06
	Average Jul. - Dec.			7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
	Maximum Jul. - Dec.			7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
	Average Jan. - Dec.			7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
	Maximum Jan. - Dec.			7.33E-12	2.13E-05	7.94E-13	2.31E-06	3.61E-13	1.05E-06	3.83E-12	1.11E-05	4.33E-13	1.26E-06	5.05E-13	1.47E-06
			Estimated Monthly Release Rate												
			2008		^{Nat}U		^{230}Th		^{226}Ra		^{232}Th				
			Month		mCi		mCi		mCi		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.		0.00E+00		0.00E+00		0.00E+00		0.00E+00				
			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		3.80E-04		2.62E-05		2.18E-06		7.49E-06				
			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		5.42E-04		3.74E-05		3.12E-06		1.07E-05				
			Nov		4.75E-04		3.28E-05		2.73E-06		9.36E-06				
			Dec		2.41E-05		1.66E-06		1.39E-07		4.75E-07				
		Total Jan. - Jun.			0.00E+00		0.00E+00		0.00E+00		0.00E+00				
		Total Jul. - Dec.			1.42E-03		9.80E-05		8.17E-06		2.80E-05				
		Total Jan. - Dec.			1.42E-03		9.80E-05		8.17E-06		2.80E-05				

NOTE: "<" are below detection limit and are taken as ½ that value (^{226}Ra/^{210}Po)

Laboratory Baghouse 2009
(AIRS#57)
Table S-2

2009	Sampled	Flow Rate	Est. Op	^{Nat}U	^{Nat}U	^{230}Th	^{230}Th	^{226}Ra	^{226}Ra	^{210}Pb	^{210}Pb	^{210}Po	^{210}Po	^{232}Th	^{232}Th
Month	Vol. (ml)	(ml/sec)	Hours	uCi/ml	uCi/sec	uCi/ml	uCi/sec	uCi/ml	uCi/sec	uCi/ml	uCi/sec	uCi/ml	uCi/sec	uCi/ml	uCi/sec
Jan.	1.42E+06	2.84E+06	0	7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
Feb.	1.42E+06	2.84E+06	0.47	7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
Mar.	1.42E+06	2.84E+06	0.92	7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
Apr.	1.42E+06	2.84E+06	0.13	7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
May	1.42E+06	2.84E+06	0	7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
Jun.	1.42E+06	2.84E+06	1.34	7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
Jul	1.59E+06	2.72E+06	0	2.47E-12	6.71E-06	1.26E-13	3.42E-07	3.21E-14	8.73E-08	2.86E-13	7.78E-07	7.61E-14	2.07E-07	1.13E-13	3.08E-07
Aug	1.59E+06	2.72E+06	0	2.47E-12	6.71E-06	1.26E-13	3.42E-07	3.21E-14	8.73E-08	2.86E-13	7.78E-07	7.61E-14	2.07E-07	1.13E-13	3.08E-07
Sep	1.59E+06	2.72E+06	0	2.47E-12	6.71E-06	1.26E-13	3.42E-07	3.21E-14	8.73E-08	2.86E-13	7.78E-07	7.61E-14	2.07E-07	1.13E-13	3.08E-07
Oct	1.59E+06	2.72E+06	15.67	2.47E-12	6.71E-06	1.26E-13	3.42E-07	3.21E-14	8.73E-08	2.86E-13	7.78E-07	7.61E-14	2.07E-07	1.13E-13	3.08E-07
Nov	1.59E+06	2.72E+06	0.6	2.47E-12	6.71E-06	1.26E-13	3.42E-07	3.21E-14	8.73E-08	2.86E-13	7.78E-07	7.61E-14	2.07E-07	1.13E-13	3.08E-07
Dec	1.59E+06	2.72E+06	0.42	2.47E-12	6.71E-06	1.26E-13	3.42E-07	3.21E-14	8.73E-08	2.86E-13	7.78E-07	7.61E-14	2.07E-07	1.13E-13	3.08E-07
	Op. Hours	Jan. - Jun.	2.86												
		Jul. - Dec.	16.69												
		Jan. - Dec.	19.55												
	Average Jan. - Jun.			7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
	Maximum Jan. - Jun.			7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
	Average Jul. - Dec.			2.47E-12	6.71E-06	1.26E-13	3.42E-07	3.21E-14	8.73E-08	2.86E-13	7.78E-07	7.61E-14	2.07E-07	1.13E-13	3.08E-07
	Maximum Jul. - Dec.			2.47E-12	6.71E-06	1.26E-13	3.42E-07	3.21E-14	8.73E-08	2.86E-13	7.78E-07	7.61E-14	2.07E-07	1.13E-13	3.08E-07
	Average Jan. - Dec.			3.15E-12	8.70E-06	1.80E-13	4.97E-07	3.34E-14	9.16E-08	3.37E-13	9.28E-07	8.14E-14	2.23E-07	1.17E-13	3.21E-07
	Maximum Jan. - Dec.			7.16E-12	2.03E-05	4.93E-13	1.40E-06	4.11E-14	1.17E-07	6.34E-13	1.80E-06	1.12E-13	3.19E-07	1.41E-13	4.00E-07
			Estimated Monthly Release Rate												
			2009		^{Nat}U		^{230}Th		^{226}Ra		^{232}Th				
			Month		mCi		mCi		mCi		mCi				
			Jan.		0.00E+00		0.00E+00		0.00E+00		0.00E+00				
			Feb.		3.44E-05		2.37E-06		1.97E-07		6.77E-07				
			Mar.		6.73E-05		4.64E-06		3.86E-07		1.32E-06				
			Apr.		9.50E-06		6.55E-07		5.46E-08		1.87E-07				
			May		0.00E+00		0.00E+00		0.00E+00		0.00E+00				
			Jun.		9.80E-05		6.75E-06		5.63E-07		1.93E-06				
			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		3.79E-04		1.93E-05		4.92E-06		1.74E-05				
			Nov		1.45E-05		7.39E-07		1.89E-07		6.65E-07				
			Dec		1.02E-05		5.17E-07		1.32E-07		4.65E-07				
		Total Jan. - Jun.			2.09E-04		1.44E-05		1.20E-06		4.12E-06				
		Total Jul. - Dec.			4.03E-04		2.06E-05		5.25E-06		1.85E-05				
		Total Jan. - Dec.			6.13E-04		3.50E-05		6.45E-06		2.26E-05				

NOTE: "<" are below detection limit and are taken as ½ that value ($^{226}Ra/^{210}Po/^{210}Pb$)

PUBLIC DOSE

Doses to an Individual Member of the Public (IMOP) from all pathways were estimated for 2008 by Tetra Tech, Inc. A report titled *ESTIMATES OF RADIATION DOSES TO MEMBERS OF THE PUBLIC FROM COTTER 2008 OPERATIONS* is Appendix D of the 2008 Annual Report. The results showed that the maximum potential dose (excluding radon) to a resident was one (**1)** 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 two (**2)** mrem/year and ten (**10)** mrem/year respectively versus the regulatory limit of twenty-five (**25)** mrem/year.

Including radon, the maximum potential dose was estimated at nine (**9)** mrem/year versus the regulatory limit of one hundred (**100)** mrem/year from mill sources. The 2009 public dose report will be submitted with the annual report in June 2010.

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 2009 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 2008 and 2009 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 2008 and 2009 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 lower concentration for ^{nat}U, ^{230}Th and ^{226}Ra with the following exceptions:

- AS-202 East Boundary had higher levels in the first (1st) quarter of 2009 probably due climatic conditions then returned to typical levels.
- AS-204 West Boundary has shown a slight uptrend for ^{nat}U.

- 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 higher for July to December 2009 versus January to June 2009.
- 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-204 West Boundary location had the highest percent of the effluent concentration (EC) limits in the second (2nd) half of 2009 for ^{nat}U at zero point seven percent (0.7 %) and ^{230}Th at one point nine percent (1.9%). All ^{226}Ra results are less than zero point one percent (0.1 %). **This means that all samplers monitored for the July to December 2009 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 2008 and EA-13 for 2009. 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 showed slightly elevated levels in the first (1st) quarter 2009 and is similar to the isotopic data. Historical spikes are typically seen in wintertime and control is good the rest of the year. The Secondary Impoundment interim cover project was initiated in August 2009 and continued through years end. An additional sampler AS-143 was co-located with AS-204 West Boundary sampler to monitor this activity. Both AS-136 and AS-143 showed a few slightly elevated readings. However, most were below ten percent (10%) of EC indicating good dust control.

The supplemental high volume air particulate sampler placed at AS-209 (designated as AS-140) showed typical results. Gross alpha activity is measured from filter papers used at the three (3) locations and are presented as a percentage of the Environmental Concentration (EC) limit. (Figure EA-14)

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 5,575 at the end of the second (2nd) half of 2009. 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.

Figure EA-1
Environmental Air and Vegetation Sampling Locations

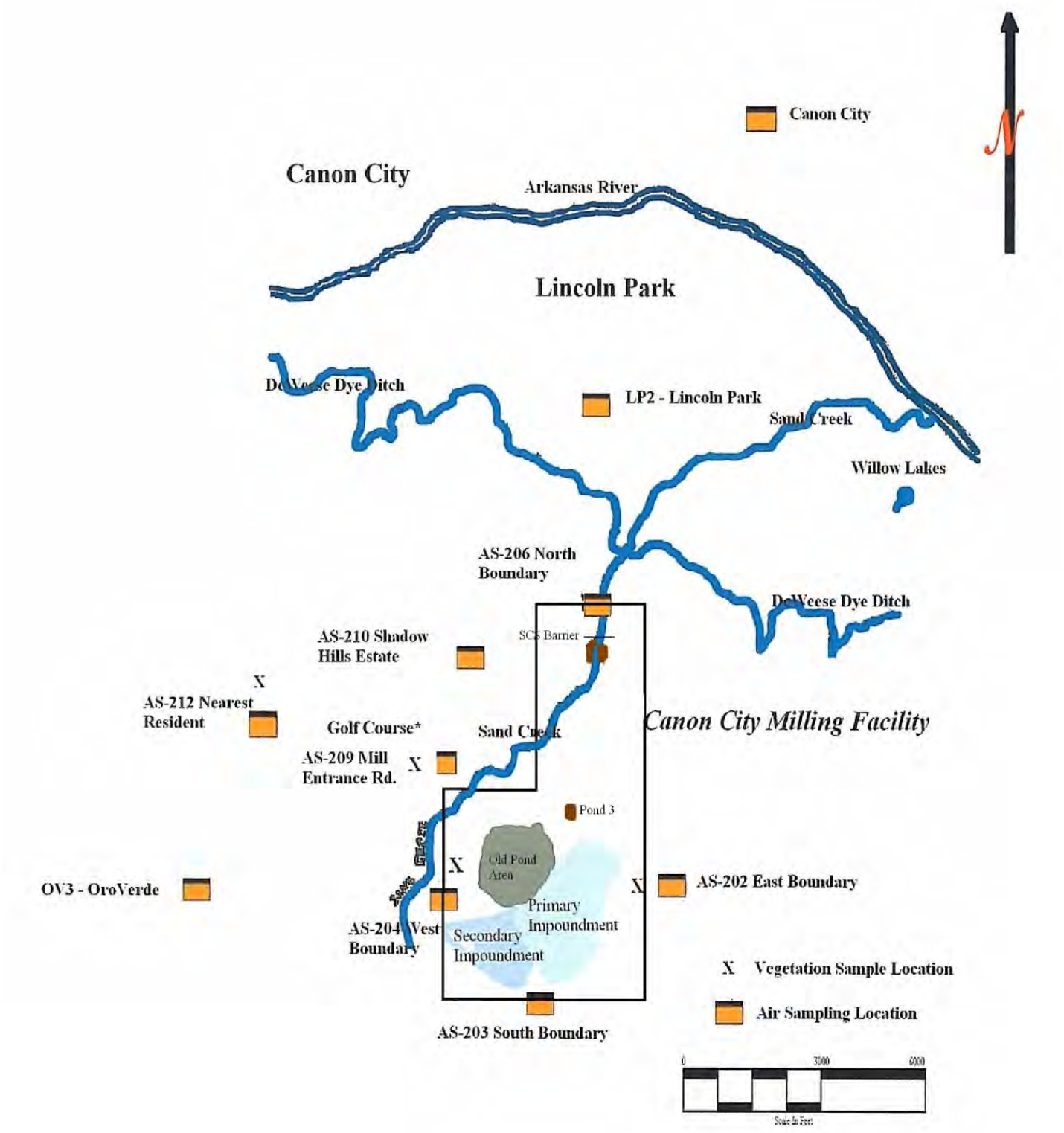


Table EA – 0
Environmental Air Monitoring
Average Concentration

Class Y ^{Nat}U (uCi/ml) EC=9E-14 (90E-15)			
Location	Jul. Dec. 2008	Jan. - Jun. 2009	Jul. - Dec. 2009
AS-202 East Boundary	3.44E-16	1.02E-15	4.49E-16
AS-203 South Boundary	1.04E-16	2.27E-16	2.98E-16
AS-204 West Boundary	2.49E-16	3.33E-16	5.87E-16
AS-206 North Boundary	1.20E-16	2.18E-16	2.10E-16
AS-209 Mill Entrance Road	2.90E-16	4.27E-16	4.43E-16
AS-210 Shadow Hills Estates	1.25E-16	2.19E-16	2.71E-16
AS-212 Nearest Resident	1.37E-16	2.71E-16	2.78E-16
Canon City #2	1.25E-16	2.64E-16	2.13E-16
Lincoln Park #2	1.23E-16	1.90E-16	2.51E-16
OroVerde #3	8.17E-17	2.12E-16	2.21E-16
QC Truck	4.73E-17	8.33E-17	1.71E-16

Class W ^{230}Th (uCi/ml)EC = 2E-14 (20E-15)			
Location	Jul. Dec. 2008	Jan. - Jun. 2009	Jul. - Dec. 2009
AS-202 East Boundary	1.05E-16	9.07E-16	2.41E-16
AS-203 South Boundary	7.84E-17	1.27E-16	1.04E-16
AS-204 West Boundary	5.53E-16	3.02E-16	3.74E-16
AS-206 North Boundary	7.34E-17	9.23E-17	4.61E-17
AS-209 Mill Entrance Road	6.51E-16	4.27E-16	3.11E-16
AS-210 Shadow Hills Estates	2.25E-16	2.07E-16	1.61E-16
AS-212 Nearest Resident	1.49E-16	1.48E-16	1.43E-16
Canon City #2	5.28E-17	5.55E-17	3.13E-17
Lincoln Park #2	5.17E-17	1.01E-16	3.58E-17
OroVerde #3	6.68E-17	7.28E-17	4.81E-17
QC Truck	2.03E-17	6.14E-17	1.60E-17

Class W ^{226}Ra (uCi/ml) EC = 9E-13 (900E-15)			
Location	Jul. Dec. 2008	Jan. - Jun. 2009	Jul. - Dec. 2009
AS-202 East Boundary	8.14E-17	3.71E-16	1.65E-16
AS-203 South Boundary	5.55E-17	1.01E-16	6.04E-17
AS-204 West Boundary	2.31E-16	1.07E-16	1.69E-16
AS-206 North Boundary	4.93E-17	6.23E-17	4.73E-17
AS-209 Mill Entrance Road	1.79E-16	8.05E-17	1.12E-16
AS-210 Shadow Hills Estates	6.42E-17	6.65E-17	6.59E-17
AS-212 Nearest Resident	5.23E-17	5.44E-17	5.25E-17
Canon City #2	3.69E-17	6.27E-17	7.00E-17
Lincoln Park #2	2.96E-17	7.28E-17	4.81E-17
OroVerde #3	2.73E-17	4.08E-17	2.56E-17
QC Truck	2.38E-17	1.74E-17	1.22E-17

Class D ^{210}Pb (uCi/ml) EC = 6E-13 (60E-14)			
Location	Jul. Dec. 2008	Jan. - Jun. 2009	Jul. - Dec. 2009
AS-202 East Boundary	9.81E-15	1.57E-14	2.02E-14
AS-203 South Boundary	9.51E-15	1.36E-14	1.77E-14
AS-204 West Boundary	1.16E-14	1.41E-14	2.20E-14
AS-206 North Boundary	1.19E-14	1.55E-14	2.17E-14
AS-209 Mill Entrance Road	1.04E-14	1.41E-14	2.15E-14
AS-210 Shadow Hills Estates	1.06E-14	1.34E-14	2.12E-14
AS-212 Nearest Resident	1.06E-14	1.51E-14	1.97E-14
Canon City #2	1.02E-14	1.50E-14	1.89E-14
Lincoln Park #2	9.95E-15	1.56E-14	1.96E-14
OroVerde #3	9.94E-15	1.43E-14	2.00E-14
QC Truck	1.51E-16	1.15E-16	1.79E-16

Class Y ^{232}Th (uCi/ml)EC=4E-15(400E-17)			
Location	Jul. Dec. 2008	Jan. - Jun. 2009	Jul. - Dec. 2009
AS-202 East Boundary	2.60E-18	2.47E-17	4.45E-18
AS-203 South Boundary	2.13E-18	1.86E-17	1.02E-17
AS-204 West Boundary	7.92E-18	2.56E-17	1.85E-17
AS-206 North Boundary	6.22E-18	2.73E-17	1.96E-17
AS-209 Mill Entrance Road	2.31E-18	2.79E-17	2.29E-17
AS-210 Shadow Hills Estates	1.49E-17	2.56E-17	2.28E-17
AS-212 Nearest Resident	7.47E-18	4.18E-17	1.53E-17
Canon City #2	2.41E-18	3.33E-17	1.98E-17
Lincoln Park #2	1.43E-17	3.33E-17	3.62E-17
OroVerde #3	2.30E-18	1.39E-17	1.11E-17
QC Truck	2.05E-18	7.93E-18	4.48E-18

Table EA-1
Environmental Air Monitoring
2008

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class Y ^{Nat}U (uCi/ml) EC = 9E-14 (900E-16)										
		% of EC		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	8.08E-16	0.9%	2.01E-16	0.2%	1.24E-16	0.1%	2.92E-16	0.3%	3.56E-16	0.4%
AS-203 South Boundary	2.10E-16	0.2%	1.40E-16	0.2%	8.51E-17	0.1%	1.70E-16	0.2%	1.51E-16	0.2%
AS-204 West Boundary	1.63E-16	0.2%	3.57E-16	0.4%	1.29E-16	0.1%	1.64E-16	0.2%	2.03E-16	0.2%
AS-206 North Boundary	1.96E-16	0.2%	8.53E-17	0.1%	9.35E-17	0.1%	1.82E-16	0.2%	1.39E-16	0.2%
AS-209 Mill Entrance Road	3.87E-16	0.4%	2.80E-16	0.3%	2.80E-16	0.3%	3.05E-16	0.3%	3.13E-16	0.3%
AS-210 Shadow Hills Estates	2.05E-16	0.2%	1.16E-16	0.1%	7.90E-17	0.1%	1.82E-16	0.2%	1.46E-16	0.2%
AS-212 Nearest Resident	1.87E-16	0.2%	9.12E-17	0.1%	7.30E-17	0.1%	1.82E-16	0.2%	1.33E-16	0.1%
Canon City #2	2.05E-16	0.2%	9.73E-17	0.1%	6.69E-17	0.1%	2.01E-16	0.2%	1.43E-16	0.2%
Lincoln Park #2	1.92E-16	0.2%	9.13E-17	0.1%	7.30E-17	0.1%	2.07E-16	0.2%	1.41E-16	0.2%
OroVerde #3	2.12E-16	0.2%	6.69E-17	0.1%	5.78E-17	0.1%	1.70E-16	0.2%	1.27E-16	0.1%
QC Truck	1.50E-16	0.2%	2.25E-17	0.0%	< 1.35E-17	0.0%	1.34E-16	0.1%	7.85E-17	0.1%

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class W ^{230}Th (uCi/ml) EC = 2E-14 (20E-15)										
		% of EC		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	1.23E-15	6.2%	4.04E-16	2.0%	3.05E-16	1.5%	7.06E-16	3.5%	6.62E-16	3.3%
AS-203 South Boundary	2.10E-16	1.1%	1.73E-16	0.9%	1.78E-16	0.9%	2.00E-16	1.0%	1.90E-16	1.0%
AS-204 West Boundary	2.81E-16	1.4%	4.36E-16	2.2%	4.71E-16	2.4%	5.41E-16	2.7%	4.32E-16	2.2%
AS-206 North Boundary	1.79E-16	0.9%	1.29E-16	0.6%	1.45E-16	0.7%	1.39E-16	0.7%	1.48E-16	0.7%
AS-209 Mill Entrance Road	8.20E-16	4.1%	1.63E-15	8.1%	1.35E-15	6.7%	4.09E-16	2.0%	1.05E-15	5.3%
AS-210 Shadow Hills Estates	2.78E-16	1.4%	3.58E-16	1.8%	3.14E-16	1.6%	1.58E-16	0.8%	2.77E-16	1.4%
AS-212 Nearest Resident	2.56E-16	1.3%	2.89E-16	1.4%	1.84E-16	0.9%	1.62E-16	0.8%	2.23E-16	1.1%
Canon City #2	1.69E-16	0.8%	1.98E-16	1.0%	8.89E-17	0.4%	1.72E-16	0.9%	1.57E-16	0.8%
Lincoln Park #2	2.20E-16	1.1%	1.32E-16	0.7%	1.50E-16	0.7%	1.71E-16	0.9%	1.68E-16	0.8%
OroVerde #3	1.15E-16	0.6%	1.93E-16	1.0%	1.51E-16	0.8%	1.51E-16	0.8%	1.53E-16	0.8%
QC Truck	1.55E-16	0.8%	1.17E-16	0.6%	1.03E-16	0.5%	1.22E-16	0.6%	1.24E-16	0.6%

Table EA-1
Environmental Air Monitoring
2008

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class W ^{226}Ra (uCi/ml) EC = 9E-13 (900E-15)										
		% of EC		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	1.99E-15	0.2%	3.42E-16	0.0%	1.93E-16	0.0%	9.44E-16	0.1%	8.67E-16	0.1%
AS-203 South Boundary	1.28E-16	0.0%	1.07E-16	0.0%	1.05E-16	0.0%	1.05E-16	0.0%	1.11E-16	0.0%
AS-204 West Boundary	1.32E-16	0.0%	2.00E-16	0.0%	1.76E-16	0.0%	3.20E-16	0.0%	2.07E-16	0.0%
AS-206 North Boundary	1.30E-16	0.0%	8.37E-17	0.0%	8.84E-17	0.0%	9.96E-17	0.0%	1.00E-16	0.0%
AS-209 Mill Entrance Road	2.61E-16	0.0%	2.15E-16	0.0%	2.68E-16	0.0%	1.78E-16	0.0%	2.31E-16	0.0%
AS-210 Shadow Hills Estates	1.61E-16	0.0%	1.22E-16	0.0%	7.45E-17	0.0%	1.08E-16	0.0%	1.16E-16	0.0%
AS-212 Nearest Resident	1.08E-16	0.0%	9.43E-17	0.0%	7.81E-17	0.0%	8.35E-17	0.0%	9.11E-17	0.0%
Canon City #2	1.29E-16	0.0%	8.45E-17	0.0%	6.56E-17	0.0%	1.07E-16	0.0%	9.66E-17	0.0%
Lincoln Park #2	1.52E-16	0.0%	9.80E-17	0.0%	9.61E-17	0.0%	8.98E-17	0.0%	1.09E-16	0.0%
OroVerde #3	1.56E-16	0.0%	8.63E-17	0.0%	1.02E-16	0.0%	9.79E-17	0.0%	1.11E-16	0.0%
QC Truck	9.60E-17	0.0%	7.55E-17	0.0%	5.03E-17	0.0%	8.21E-17	0.0%	7.60E-17	0.0%

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class D ^{210}Pb (uCi/ml) EC = 6E-13 (60E-14)										
		% of EC		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	2.49E-14	4.1%	1.50E-14	2.5%	1.85E-14	3.1%	1.69E-14	2.8%	1.88E-14	3.1%
AS-203 South Boundary	2.13E-14	3.6%	1.39E-14	2.3%	1.63E-14	2.7%	1.39E-14	2.3%	1.64E-14	2.7%
AS-204 West Boundary	1.85E-14	3.1%	1.57E-14	2.6%	1.92E-14	3.2%	1.81E-14	3.0%	1.79E-14	3.0%
AS-206 North Boundary	2.36E-14	3.9%	1.43E-14	2.4%	1.89E-14	3.1%	1.61E-14	2.7%	1.82E-14	3.0%
AS-209 Mill Entrance Road	1.78E-14	3.0%	1.32E-14	2.2%	1.62E-14	2.7%	1.45E-14	2.4%	1.54E-14	2.6%
AS-210 Shadow Hills Estates	1.76E-14	2.9%	1.48E-14	2.5%	1.50E-14	2.5%	1.56E-14	2.6%	1.58E-14	2.6%
AS-212 Nearest Resident	1.80E-14	3.0%	1.37E-14	2.3%	1.38E-14	2.3%	1.43E-14	2.4%	1.49E-14	2.5%
Canon City #2	1.83E-14	3.0%	1.53E-14	2.5%	1.48E-14	2.5%	1.60E-14	2.7%	1.61E-14	2.7%
Lincoln Park #2	2.19E-14	3.7%	1.37E-14	2.3%	1.47E-14	2.5%	1.59E-14	2.6%	1.66E-14	2.8%
OroVerde #3	2.19E-14	3.7%	1.51E-14	2.5%	1.63E-14	2.7%	1.55E-14	2.6%	1.72E-14	2.9%
QC Truck	2.31E-15	0.4%	1.65E-15	0.3%	1.88E-15	0.3%	1.32E-15	0.2%	1.79E-15	0.3%

Table EA-1
Environmental Air Monitoring
2008

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class Y ^{232}Th (uCi/ml) EC = 4E-15 (400E-17)										
		% of EC		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	4.18E-17	0.7%	5.40E-17	0.9%	2.38E-17	0.4%	4.31E-17	0.7%	4.07E-17	0.7%
AS-203 South Boundary	4.01E-17	0.7%	3.59E-17	0.6%	2.16E-17	0.4%	4.13E-17	0.7%	3.47E-17	0.6%
AS-204 West Boundary	4.81E-17	0.8%	4.36E-17	0.7%	4.37E-17	0.7%	4.85E-17	0.8%	4.60E-17	0.8%
AS-206 North Boundary	3.70E-17	0.6%	4.05E-17	0.7%	3.50E-17	0.6%	5.29E-17	0.9%	4.14E-17	0.7%
AS-209 Mill Entrance Road	3.35E-17	0.6%	4.04E-17	0.7%	4.04E-17	0.7%	5.04E-17	0.8%	4.12E-17	0.7%
AS-210 Shadow Hills Estates	3.03E-17	0.5%	4.67E-17	0.8%	3.05E-17	0.5%	5.21E-17	0.9%	3.99E-17	0.7%
AS-212 Nearest Resident	4.24E-17	0.7%	2.96E-17	0.5%	2.69E-17	0.4%	4.13E-17	0.7%	3.51E-17	0.6%
Canon City #2	5.26E-17	0.9%	4.67E-17	0.8%	2.07E-17	0.3%	5.93E-17	1.0%	4.48E-17	0.7%
Lincoln Park #2	4.85E-17	0.8%	5.66E-17	0.9%	5.30E-17	0.9%	5.93E-17	1.0%	5.43E-17	0.9%
OroVerde #3	4.35E-17	0.7%	3.77E-17	0.6%	3.32E-17	0.6%	4.22E-17	0.7%	3.92E-17	0.7%
QC Truck	3.43E-17	0.6%	1.89E-17	0.3%	2.70E-17	0.4%	2.80E-17	0.5%	2.70E-17	0.5%

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
2009

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class Y ^{Nat}U (uCi/ml) EC = 9E-14 (90E-15)										
		% of EC		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	1.60E-15	1.8%	4.32E-16	0.5%	4.11E-16	0.5%	4.87E-16	0.5%	7.32E-16	0.8%
AS-203 South Boundary	2.47E-16	0.3%	2.07E-16	0.2%	3.82E-16	0.4%	2.13E-16	0.2%	2.62E-16	0.3%
AS-204 West Boundary	2.92E-16	0.3%	3.73E-16	0.4%	5.65E-16	0.6%	6.09E-16	0.7%	4.60E-16	0.5%
AS-206 North Boundary	2.30E-16	0.3%	2.06E-16	0.2%	2.75E-16	0.3%	1.45E-16	0.2%	2.14E-16	0.2%
AS-209 Mill Entrance Road	4.33E-16	0.5%	4.21E-16	0.5%	5.88E-16	0.7%	2.98E-16	0.3%	4.35E-16	0.5%
AS-210 Shadow Hills Estates	2.24E-16	0.2%	2.15E-16	0.2%	3.91E-16	0.4%	1.52E-16	0.2%	2.45E-16	0.3%
AS-212 Nearest Resident	3.23E-16	0.4%	2.18E-16	0.2%	3.91E-16	0.4%	1.64E-16	0.2%	2.74E-16	0.3%
Canon City #2	2.96E-16	0.3%	2.32E-16	0.3%	2.91E-16	0.3%	1.34E-16	0.1%	2.38E-16	0.3%
Lincoln Park #2	1.86E-16	0.2%	1.94E-16	0.2%	3.31E-16	0.4%	1.70E-16	0.2%	2.20E-16	0.2%
OroVerde #3	2.59E-16	0.3%	1.65E-16	0.2%	3.26E-16	0.4%	1.15E-16	0.1%	2.16E-16	0.2%
QC Truck	7.56E-17	0.1%	9.10E-17	0.1%	< 2.62E-16	0.3%	7.90E-17	0.1%	9.42E-17	0.1%

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class W ^{230}Th (uCi/ml) EC = 2E-14 (20E-15)										
		% of EC		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	1.54E-15	7.7%	2.78E-16	1.4%	1.29E-16	0.6%	3.54E-16	1.8%	5.74E-16	2.9%
AS-203 South Boundary	1.68E-16	0.8%	8.63E-17	0.4%	6.91E-17	0.3%	1.39E-16	0.7%	1.16E-16	0.6%
AS-204 West Boundary	2.72E-16	1.4%	3.33E-16	1.7%	4.10E-16	2.0%	3.39E-16	1.7%	3.38E-16	1.7%
AS-206 North Boundary	8.25E-17	0.4%	1.02E-16	0.5%	5.58E-17	0.3%	3.65E-17	0.2%	6.92E-17	0.3%
AS-209 Mill Entrance Road	3.66E-16	1.8%	4.89E-16	2.4%	3.53E-16	1.8%	2.69E-16	1.3%	3.69E-16	1.8%
AS-210 Shadow Hills Estates	1.55E-16	0.8%	2.60E-16	1.3%	2.43E-16	1.2%	7.90E-17	0.4%	1.84E-16	0.9%
AS-212 Nearest Resident	1.69E-16	0.8%	1.28E-16	0.6%	1.91E-16	1.0%	9.44E-17	0.5%	1.45E-16	0.7%
Canon City #2	1.85E-17	0.1%	9.25E-17	0.5%	4.64E-17	0.2%	1.62E-17	0.1%	4.34E-17	0.2%
Lincoln Park #2	5.57E-17	0.3%	1.46E-16	0.7%	6.66E-17	0.3%	4.87E-18	0.0%	6.84E-17	0.3%
OroVerde #3	2.97E-17	0.1%	1.16E-16	0.6%	5.40E-17	0.3%	4.22E-17	0.2%	6.04E-17	0.3%
QC Truck	5.75E-18	0.0%	1.17E-16	0.6%	1.85E-17	0.1%	1.35E-17	0.1%	3.87E-17	0.2%

Table EA-2
Environmental Air Monitoring
2009

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class W ^{226}Ra (uCi/ml) EC = 9E-13 (900E-15)										
		% of EC		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	6.97E-16	0.1%	4.59E-17	0.0%	1.15E-16	0.0%	2.16E-16	0.0%	2.68E-16	0.0%
AS-203 South Boundary	9.34E-17	0.0%	1.09E-16	0.0%	6.24E-17	0.0%	5.85E-17	0.0%	8.08E-17	0.0%
AS-204 West Boundary	9.80E-17	0.0%	1.15E-16	0.0%	1.78E-16	0.0%	1.61E-16	0.0%	1.38E-16	0.0%
AS-206 North Boundary	7.08E-17	0.0%	5.39E-17	0.0%	7.77E-17	0.0%	1.69E-17	0.0%	5.48E-17	0.0%
AS-209 Mill Entrance Road	1.05E-16	0.0%	5.57E-17	0.0%	1.41E-16	0.0%	8.35E-17	0.0%	9.63E-17	0.0%
AS-210 Shadow Hills Estates	8.45E-17	0.0%	4.85E-17	0.0%	8.96E-17	0.0%	4.22E-17	0.0%	6.62E-17	0.0%
AS-212 Nearest Resident	5.30E-17	0.0%	5.57E-17	0.0%	7.98E-17	0.0%	2.52E-17	0.0%	5.34E-17	0.0%
Canon City #2	7.69E-17	0.0%	4.85E-17	0.0%	1.13E-16	0.0%	2.70E-17	0.0%	6.63E-17	0.0%
Lincoln Park #2	1.20E-16	0.0%	2.52E-17	0.0%	5.40E-17	0.0%	4.23E-17	0.0%	6.05E-17	0.0%
OroVerde #3	6.92E-17	0.0%	1.23E-17	0.0%	4.56E-17	0.0%	5.66E-18	0.0%	3.32E-17	0.0%
QC Truck	2.43E-17	0.0%	1.05E-17	0.0%	6.44E-18	0.0%	1.79E-17	0.0%	1.48E-17	0.0%

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class D ^{210}Pb (uCi/ml) EC = 6E-13 (60E-14)										
		% of EC		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	1.76E-14	2.9%	1.38E-14	2.3%	2.17E-14	3.6%	1.86E-14	3.1%	1.79E-14	3.0%
AS-203 South Boundary	1.52E-14	2.5%	1.20E-14	2.0%	1.92E-14	3.2%	1.62E-14	2.7%	1.56E-14	2.6%
AS-204 West Boundary	1.47E-14	2.5%	1.35E-14	2.2%	2.12E-14	3.5%	2.27E-14	3.8%	1.81E-14	3.0%
AS-206 North Boundary	1.87E-14	3.1%	1.23E-14	2.1%	2.08E-14	3.5%	2.27E-14	3.8%	1.86E-14	3.1%
AS-209 Mill Entrance Road	1.54E-14	2.6%	1.23E-14	2.1%	2.20E-14	3.7%	2.11E-14	3.5%	1.77E-14	2.9%
AS-210 Shadow Hills Estates	1.49E-14	2.5%	1.28E-14	2.1%	2.11E-14	3.5%	2.12E-14	3.5%	1.75E-14	2.9%
AS-212 Nearest Resident	1.79E-14	3.0%	1.20E-14	2.0%	2.10E-14	3.5%	1.83E-14	3.1%	1.73E-14	2.9%
Canon City #2	1.73E-14	2.9%	1.22E-14	2.0%	1.79E-14	3.0%	1.99E-14	3.3%	1.68E-14	2.8%
Lincoln Park #2	1.91E-14	3.2%	1.26E-14	2.1%	1.90E-14	3.2%	2.02E-14	3.4%	1.77E-14	3.0%
OroVerde #3	1.64E-14	2.7%	1.21E-14	2.0%	2.03E-14	3.4%	1.97E-14	3.3%	1.71E-14	2.9%
QC Truck	1.23E-16	0.0%	1.23E-14	2.1%	1.15E-16	0.0%	< 2.44E-16	0.0%	3.17E-15	0.5%

Table EA-2
Environmental Air Monitoring
2009

Location	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Average	
Class Y ^{232}Th (uCi/ml) EC = 4E-15 (400E-17)										
		% of EC		*% of EC*		*% of EC*		*% of EC*		*% of EC*
AS-202 East Boundary	3.60E-17	0.6%	1.35E-17	0.2%	4.08E-18	0.1%	4.82E-18	0.1%	1.46E-17	0.2%
AS-203 South Boundary	2.60E-17	0.4%	1.12E-17	0.2%	1.52E-17	0.3%	5.26E-18	0.1%	1.44E-17	0.2%
AS-204 West Boundary	2.43E-17	0.4%	2.70E-17	0.4%	3.04E-17	0.5%	6.60E-18	0.1%	2.20E-17	0.4%
AS-206 North Boundary	3.14E-17	0.5%	2.32E-17	0.4%	1.44E-17	0.2%	2.49E-17	0.4%	2.35E-17	0.4%
AS-209 Mill Entrance Road	3.24E-17	0.5%	2.34E-17	0.4%	2.35E-17	0.4%	2.24E-17	0.4%	2.54E-17	0.4%
AS-210 Shadow Hills Estates	3.42E-17	0.6%	1.71E-17	0.3%	5.17E-18	0.1%	4.04E-17	0.7%	2.42E-17	0.4%
AS-212 Nearest Resident	4.67E-17	0.8%	3.68E-17	0.6%	5.38E-18	0.1%	2.52E-17	0.4%	2.85E-17	0.5%
Canon City #2	3.60E-17	0.6%	3.05E-17	0.5%	1.26E-17	0.2%	2.70E-17	0.4%	2.66E-17	0.4%
Lincoln Park #2	4.77E-17	0.8%	1.89E-17	0.3%	3.46E-17	0.6%	3.78E-17	0.6%	3.47E-17	0.6%
OroVerde #3	1.53E-17	0.3%	1.24E-17	0.2%	5.19E-18	0.1%	1.71E-17	0.3%	1.25E-17	0.2%
QC Truck	4.90E-18	0.1%	1.10E-17	0.2%	5.01E-18	0.1%	3.95E-18	0.1%	6.20E-18	0.1%

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)

Figure EA - 2A
Environmental Air
Average Annual ^{Nat}U Concentration
1979-2009

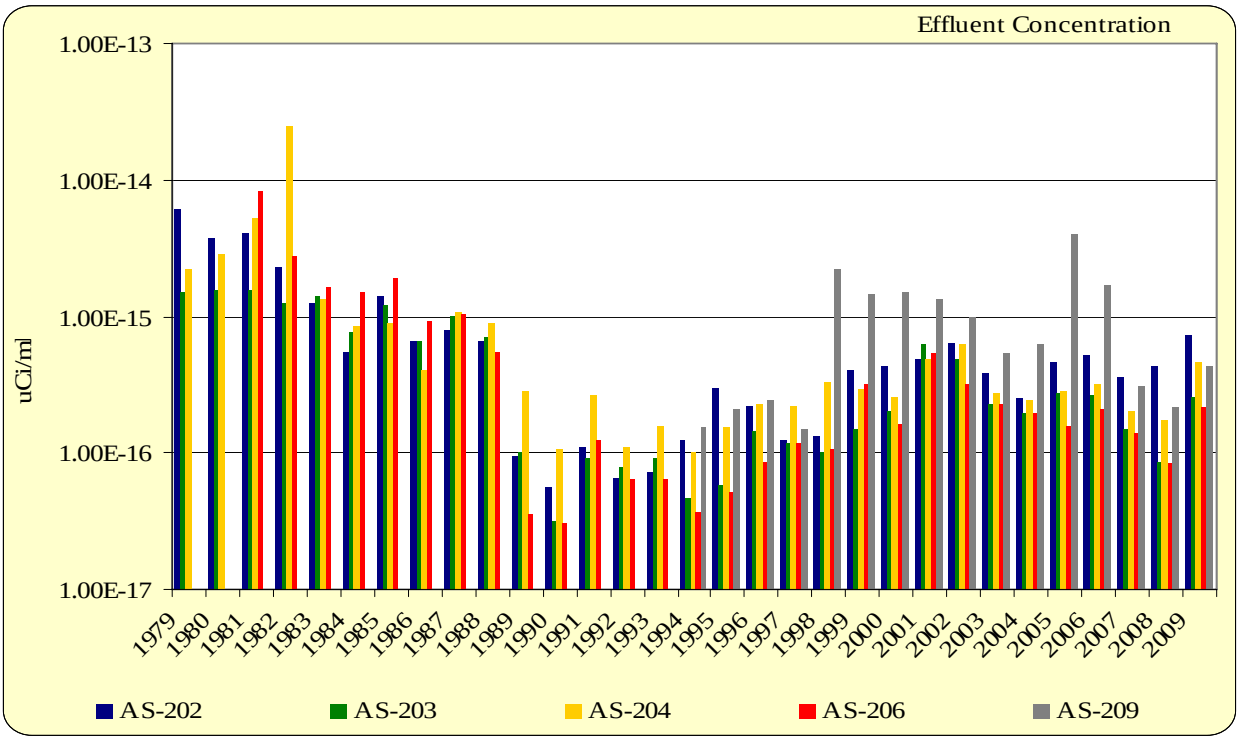


Figure EA - 2B
Environmental Air
Average Annual ^{Nat}U Concentration
1979-2009

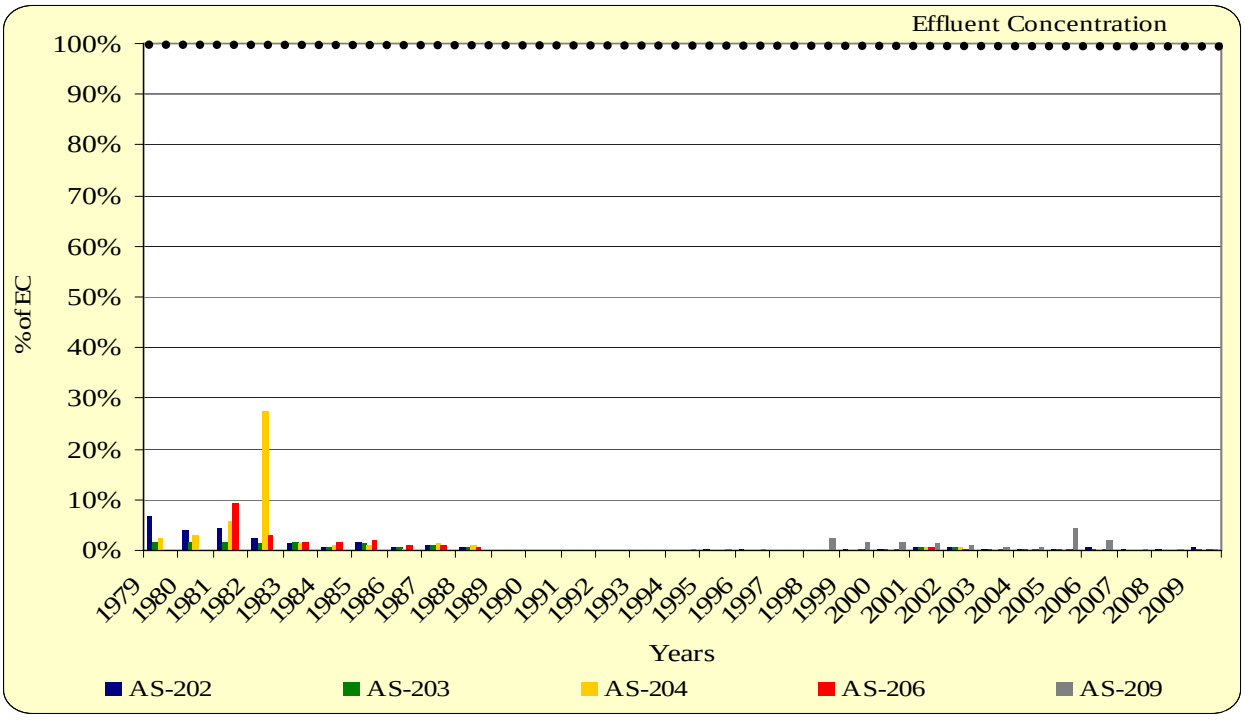


Figure EA - 3A
Environmental Air
Average Annual ^{Nat}U Concentration
1979-2009

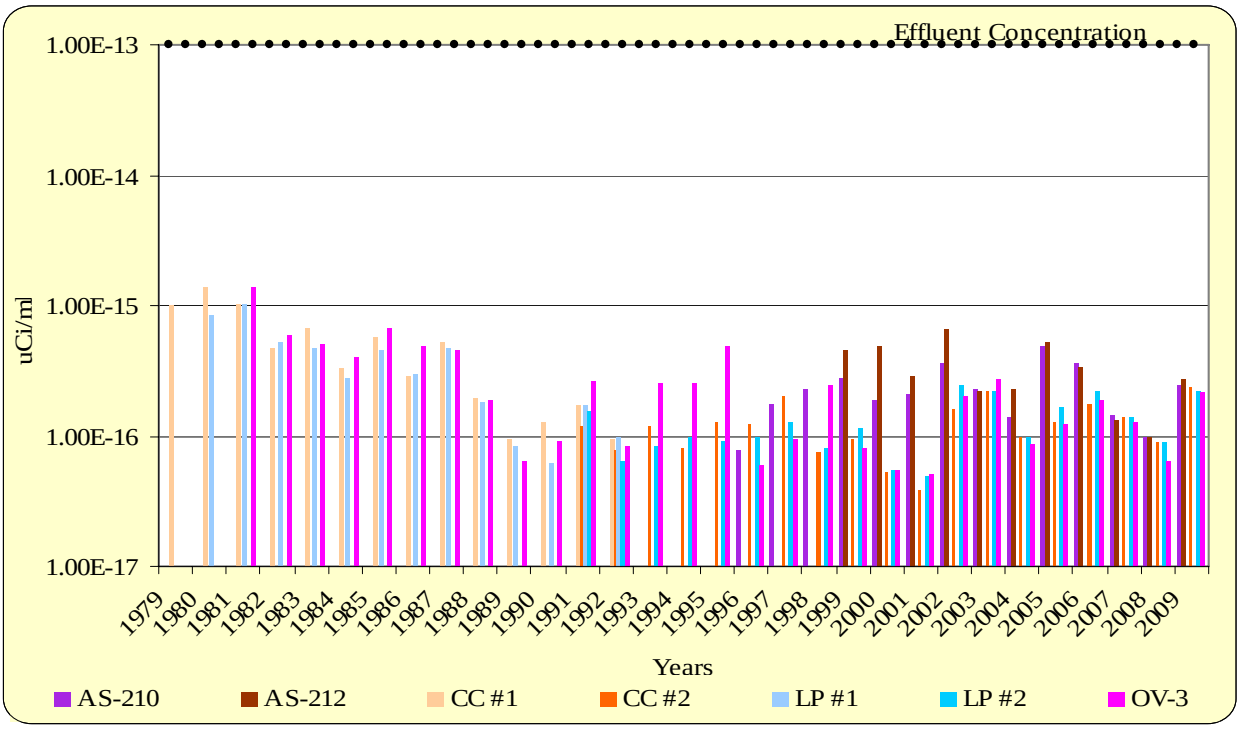


Figure EA - 3B
Environmental Air
Average Annual ^{Nat}U Concentration
1979-2009

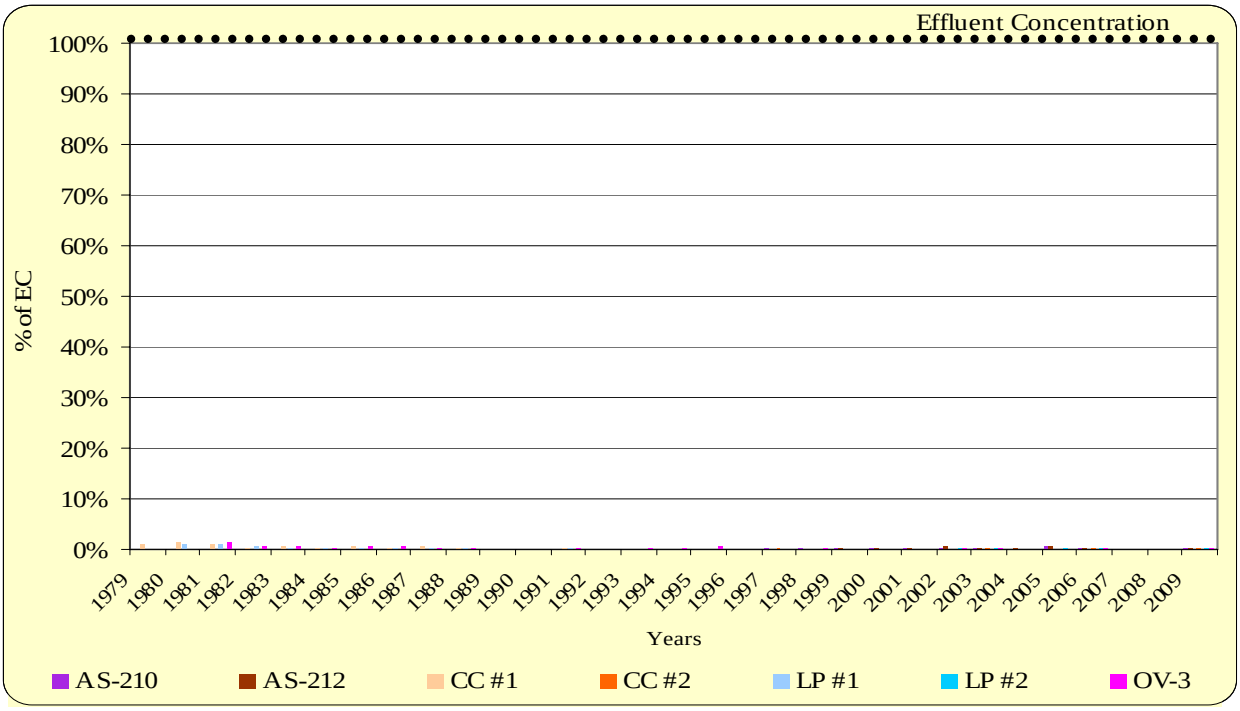


Figure EA - 4A
Environmental Air
Average Annual ^{230}Th Concentration
1979-2009

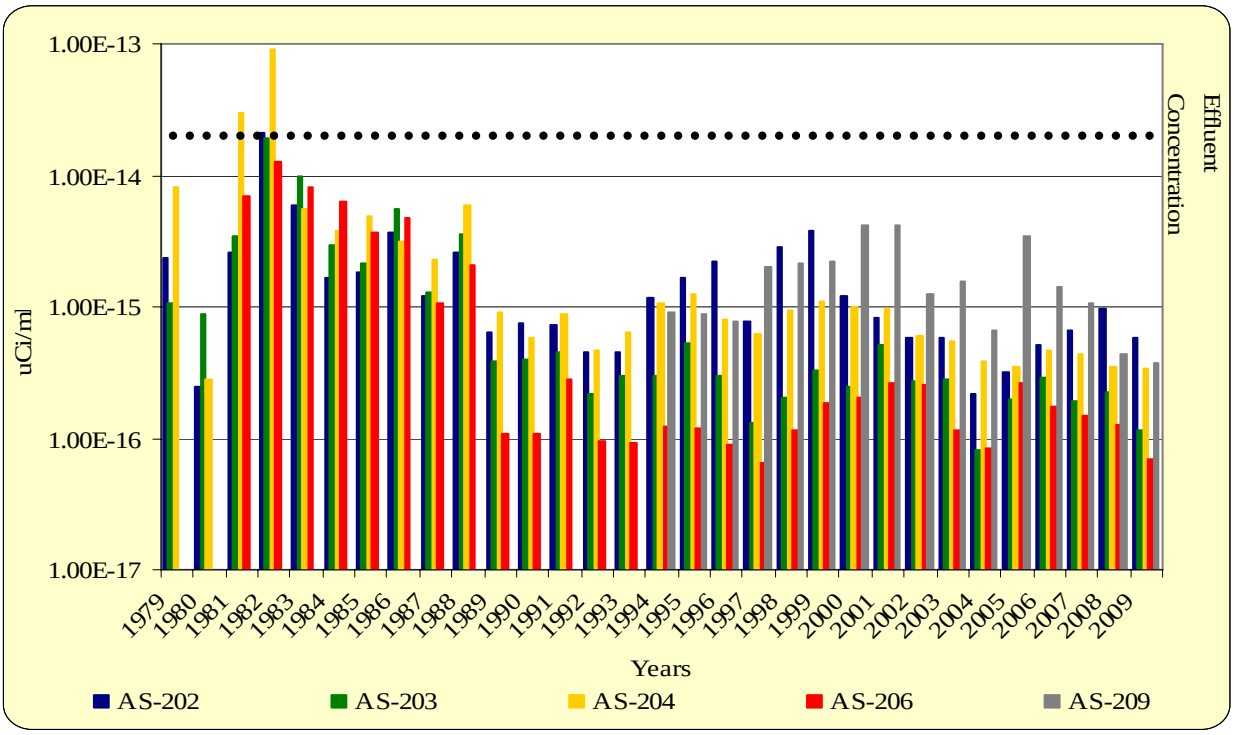


Figure EA - 4B
Environmental Air
Average Annual ^{230}Th Concentration
1979-2009

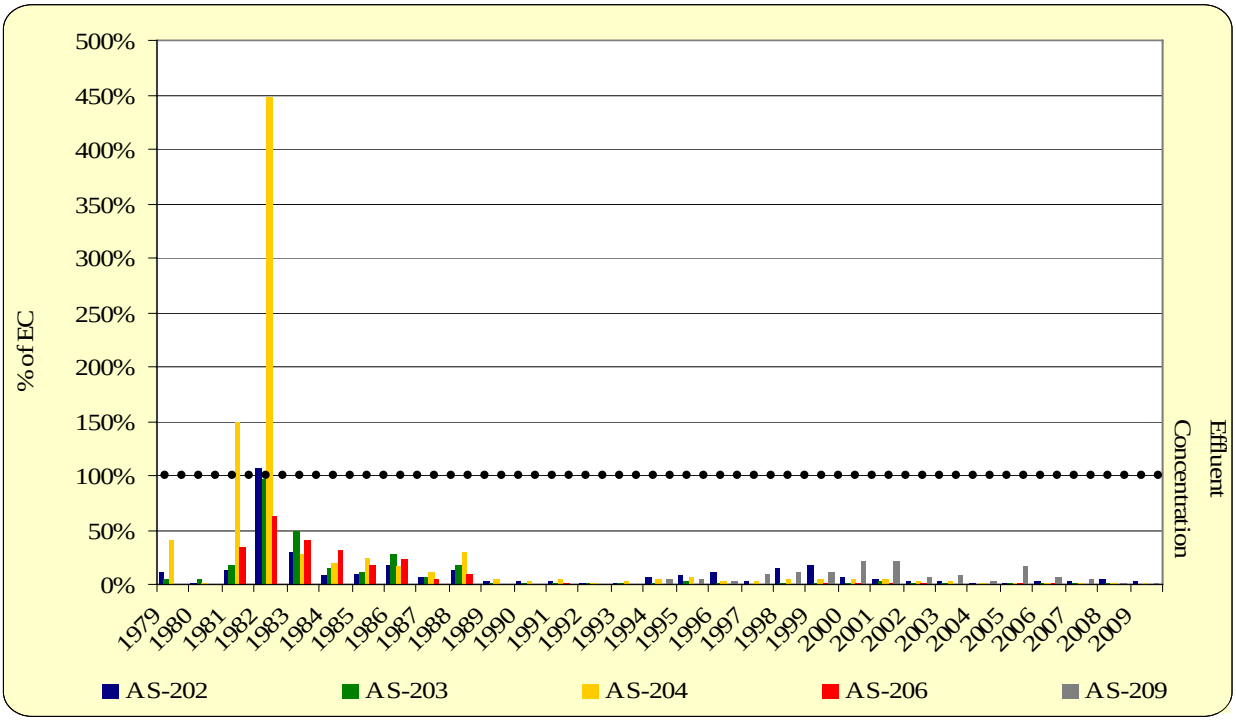


Figure EA - 5A
Environmental Air
Average Annual ^{230}Th Concentration
1979-2009

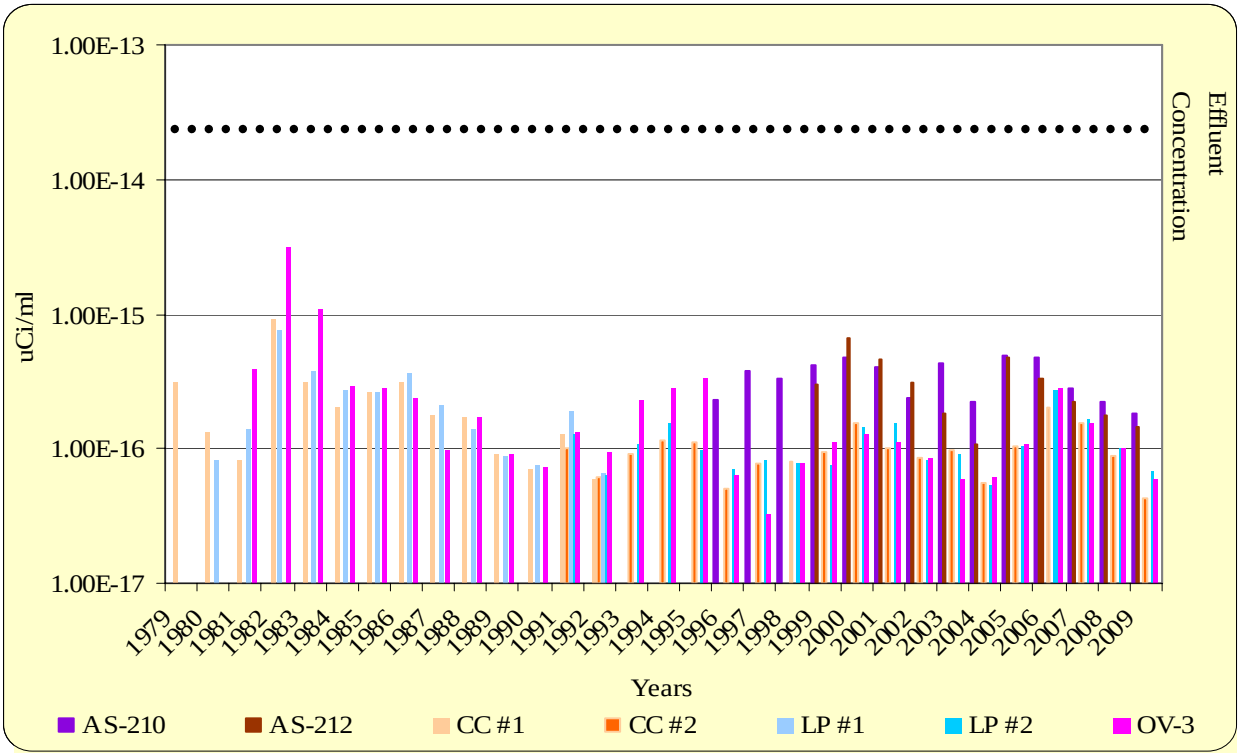


Figure EA - 5B
Environmental Air
Average Annual ^{230}Th Concentration
1979-2009

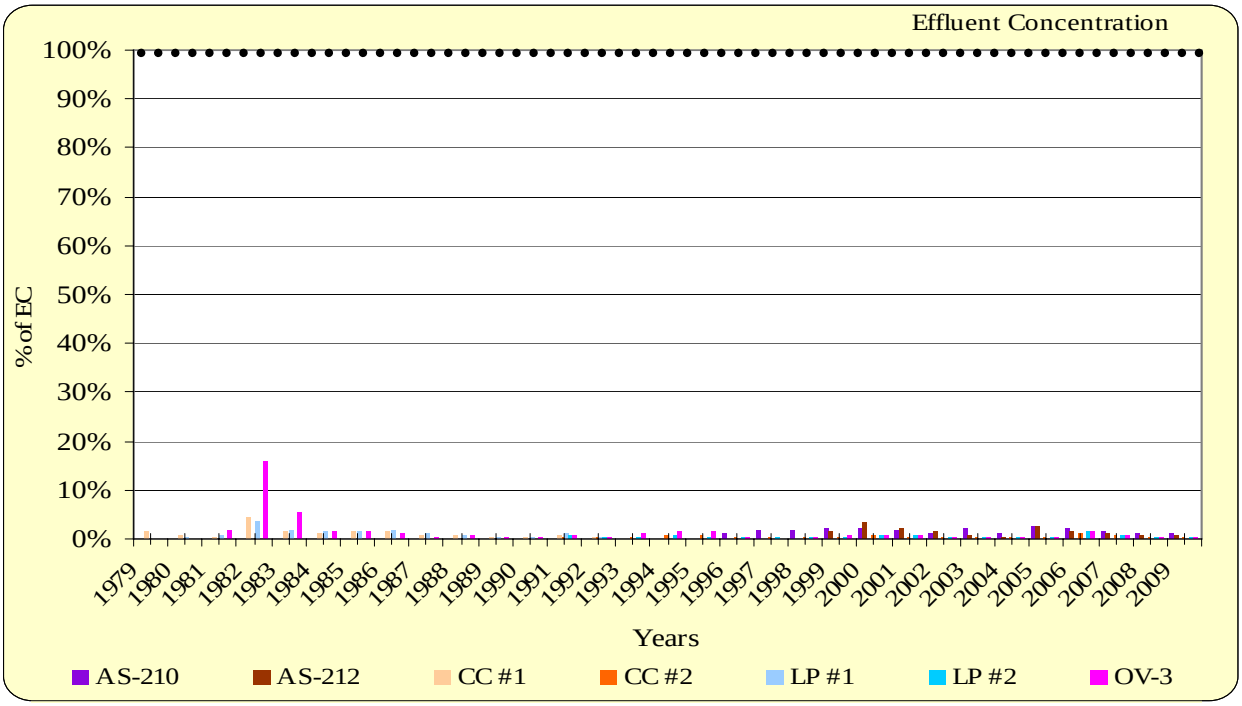


Figure EA-6A
Environmental Air
Average Annual ^{226}Ra Concentration
1979-2009

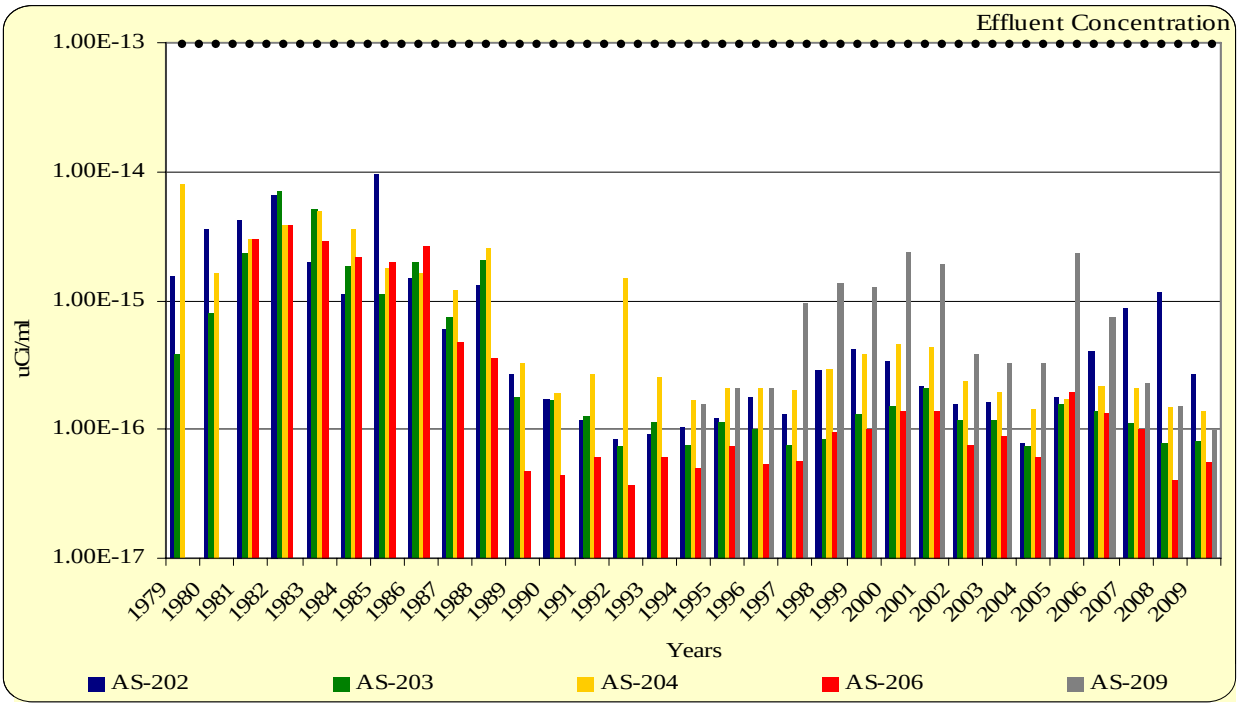


Figure EA-6B
Environmental Air
Average Annual ^{226}Ra Concentration
1979-2009

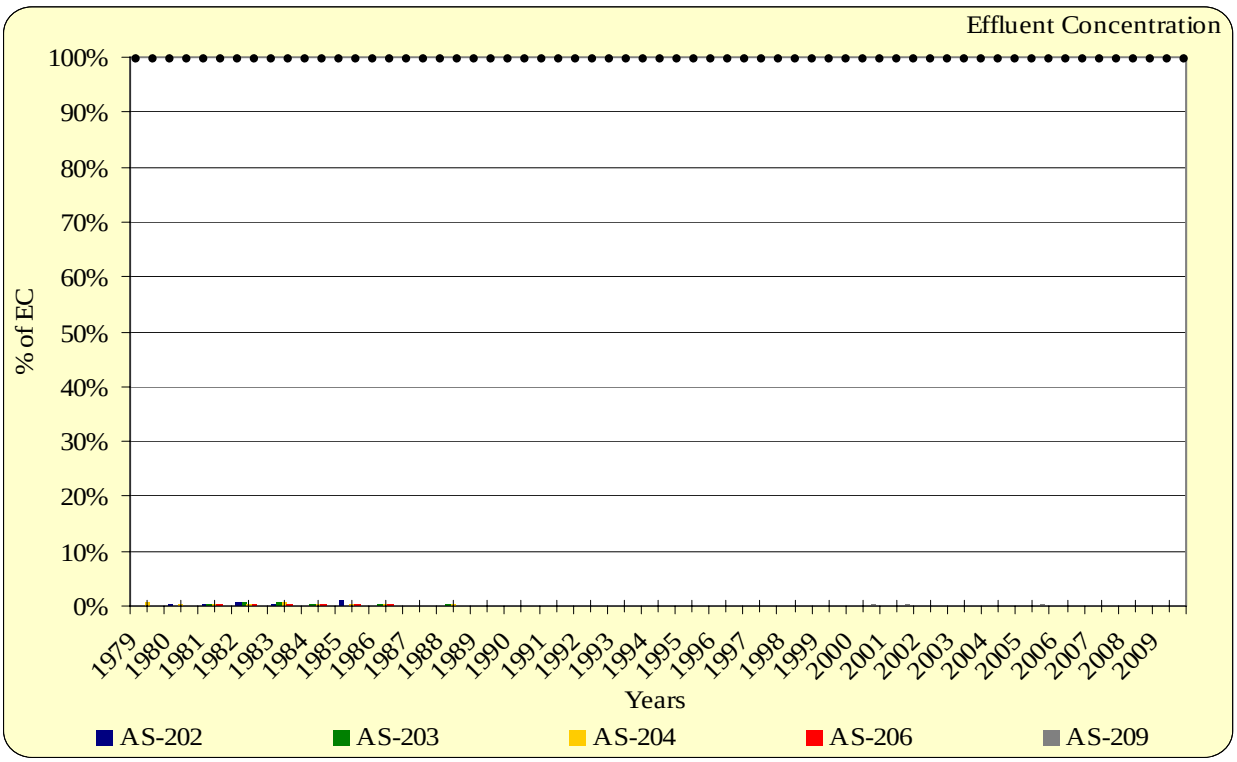


Figure EA-7A
Environmental Air
Average Annual ^{226}Ra Concentration
1979-2009

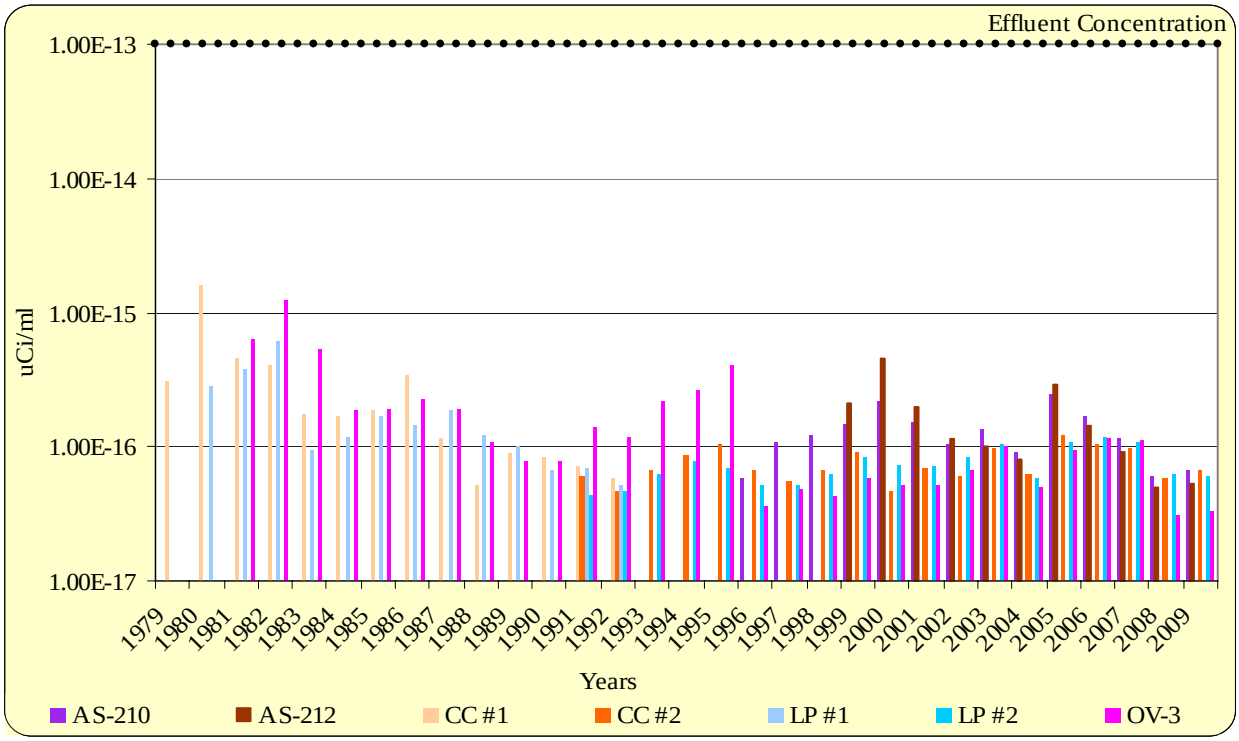


Figure EA-7B
Environmental Air
Average Annual ^{226}Ra Concentration
1979-2009

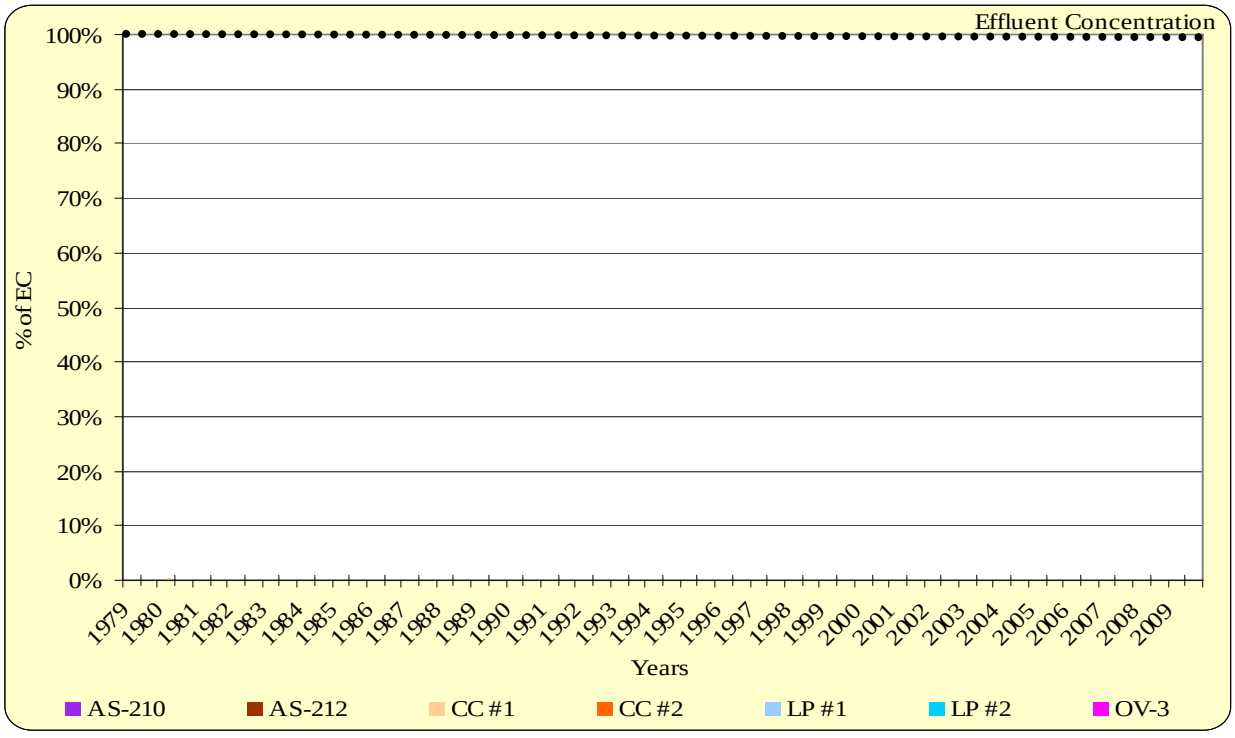


Figure EA-8A
Environmental Air
Average Annual ^{210}Pb Concentration
1979-2009

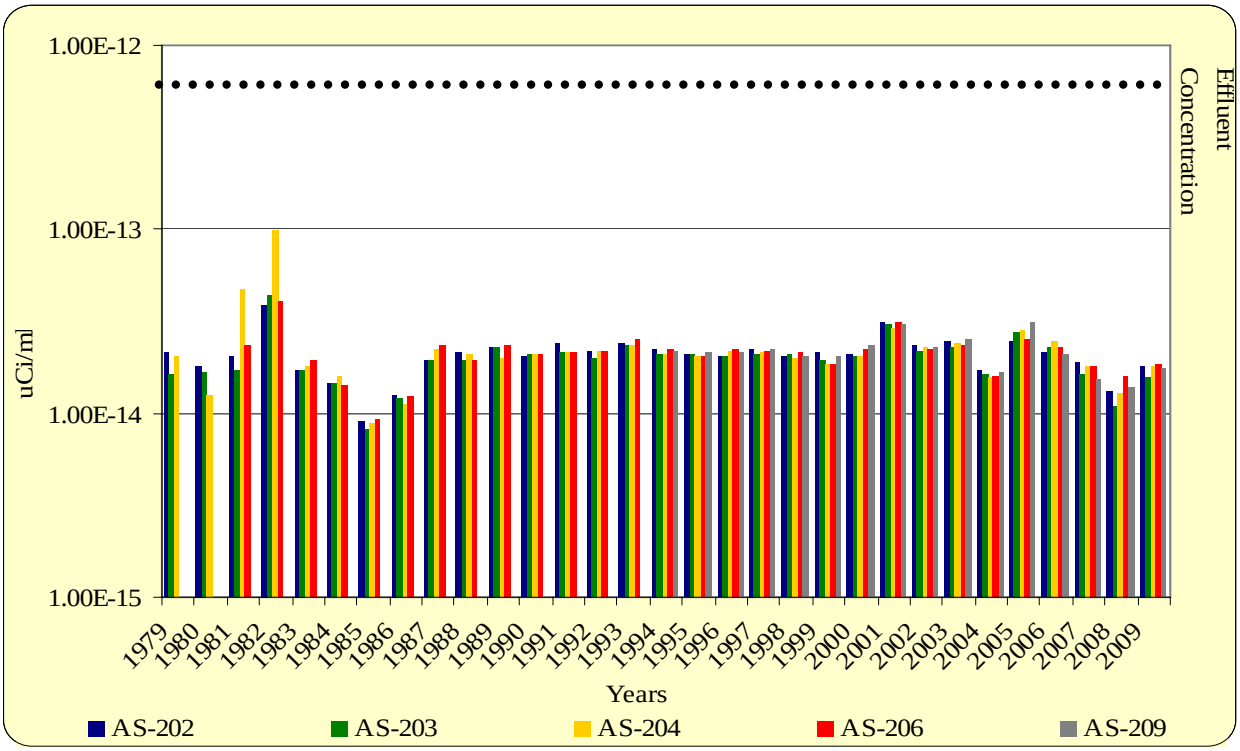


Figure EA-8B
Environmental Air
Average Annual ^{210}Pb Concentration
1979-2009

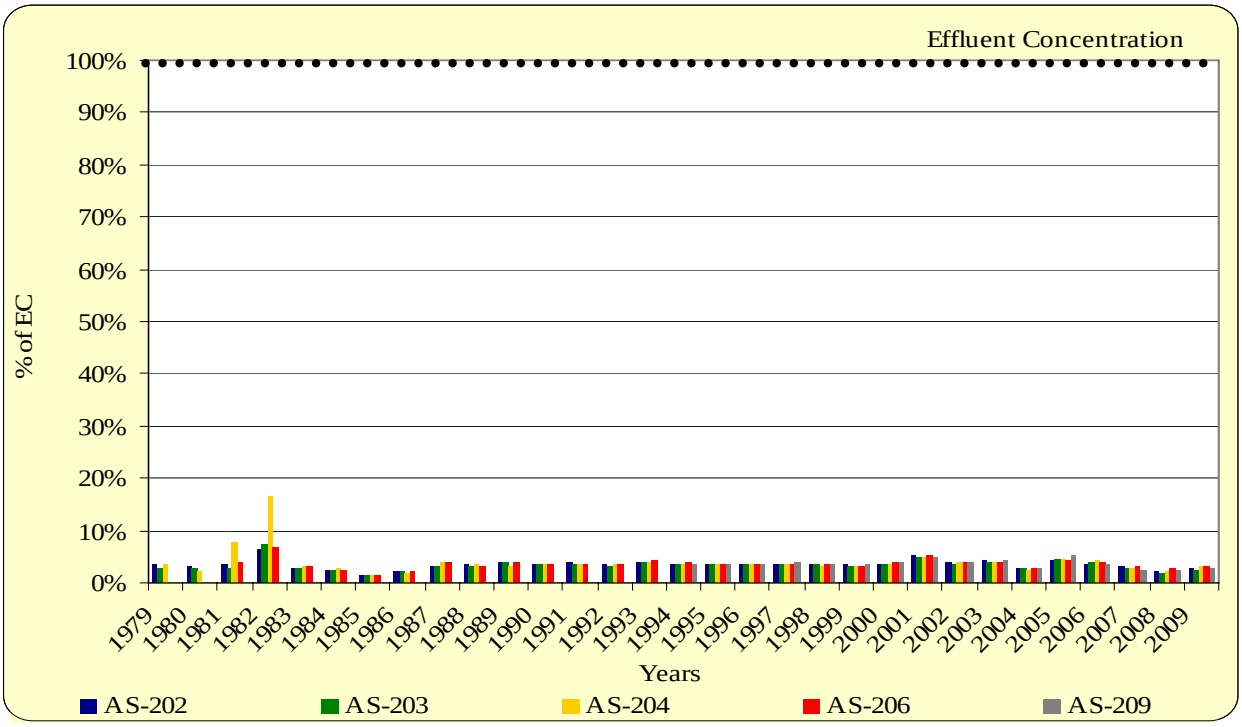


Figure EA-9A
Environmental Air
Average Annual ^{210}Pb Concentration
1979-2009

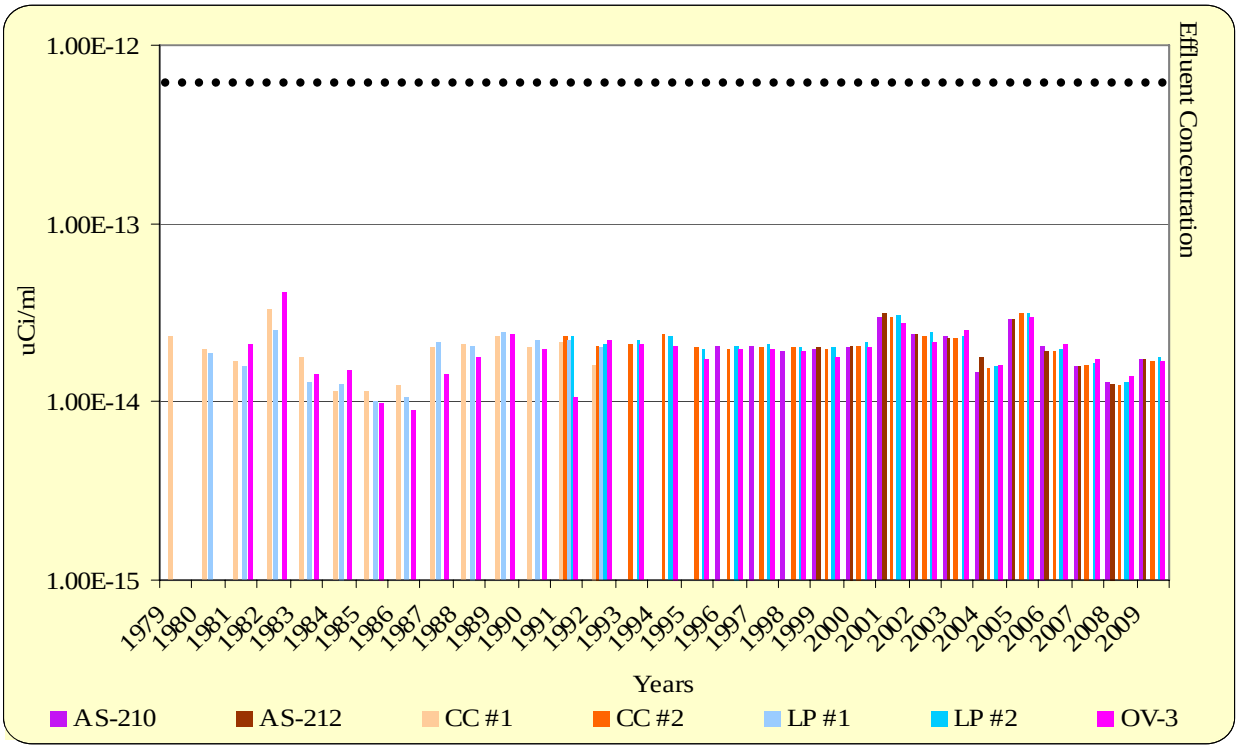


Figure EA-9B
Environmental Air
Average Annual ^{210}Pb Concentration
1979-2009

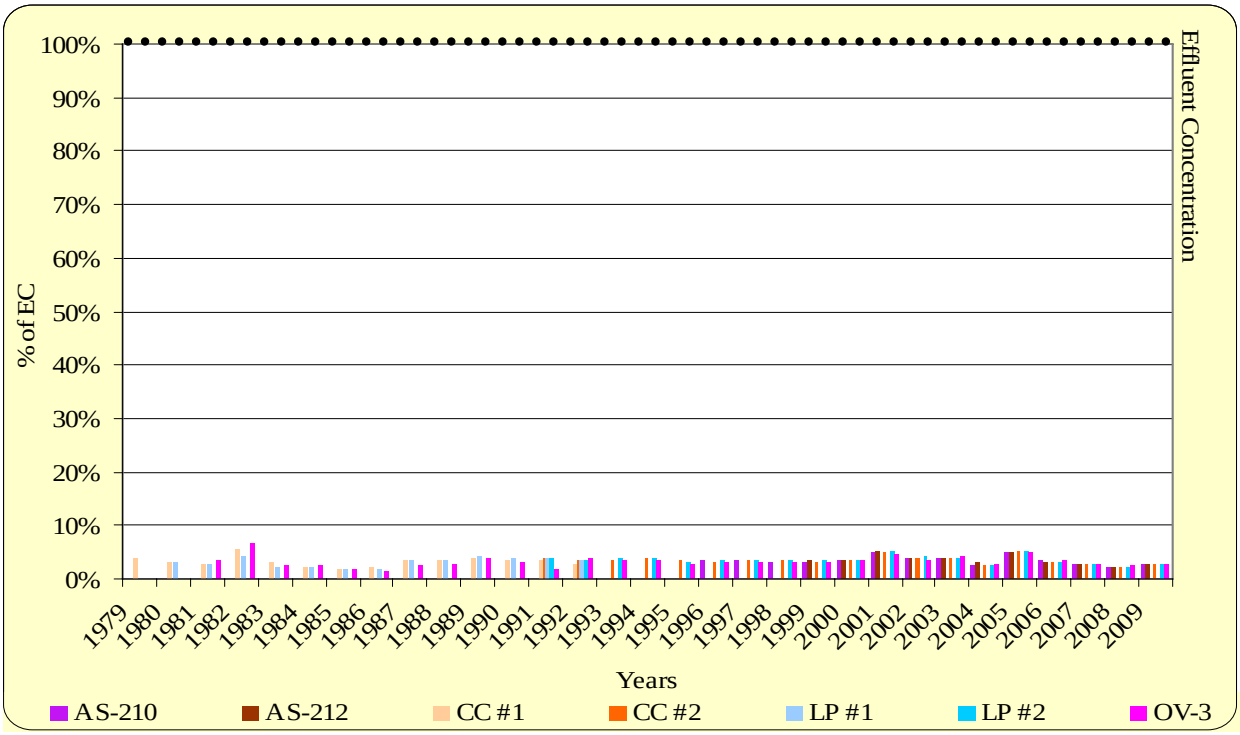


Figure EA-10A
Environmental Air
Average Annual ^{232}Th Concentration
1979-2009

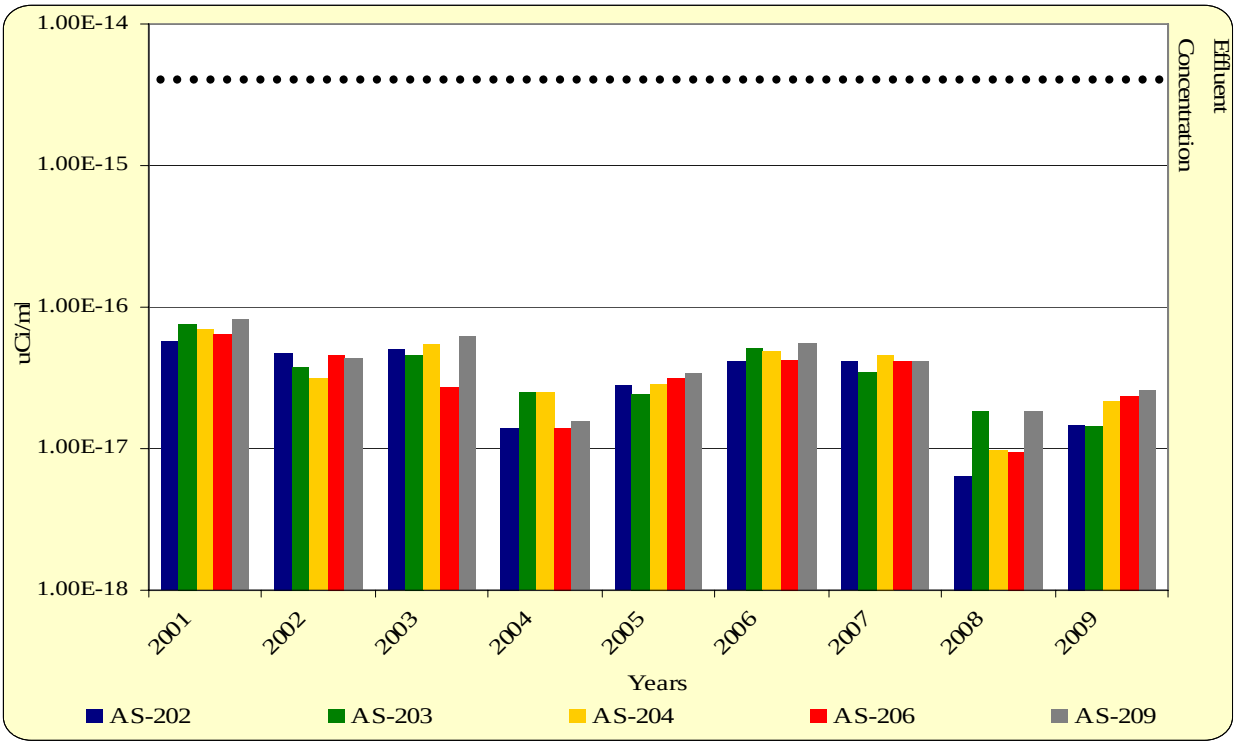


Figure EA-10B
Environmental Air
Average Annual ^{232}Th Concentration
1979-2009

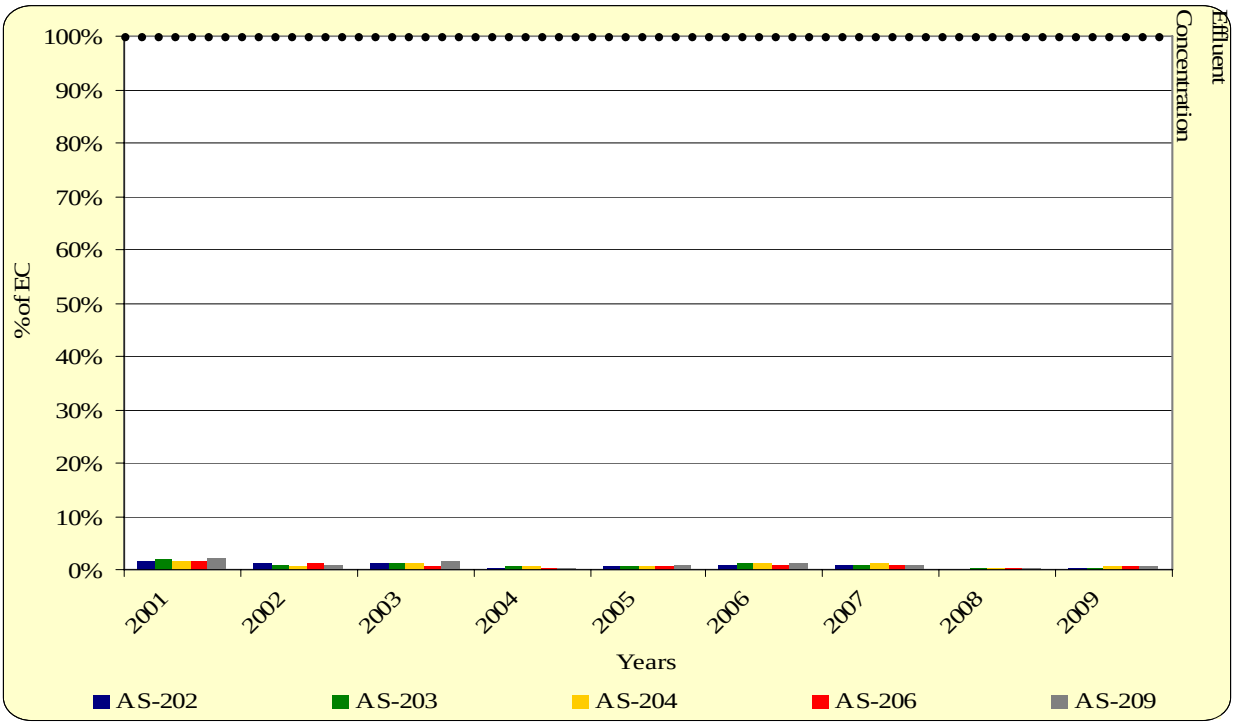


Figure EA - 11A
Environmental Air
Average Annual ^{232}Th Concentration
1979-2009

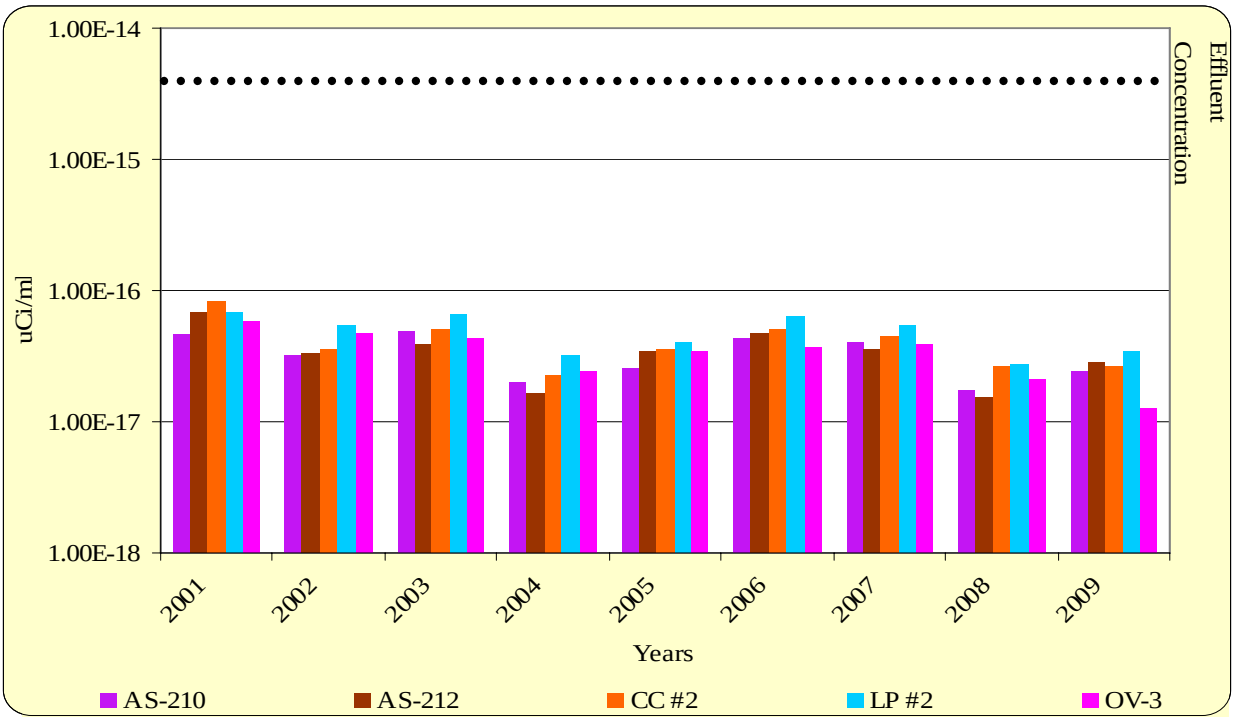


Figure EA - 11B
Environmental Air
Average Annual ^{232}Th Concentration
1979-2009

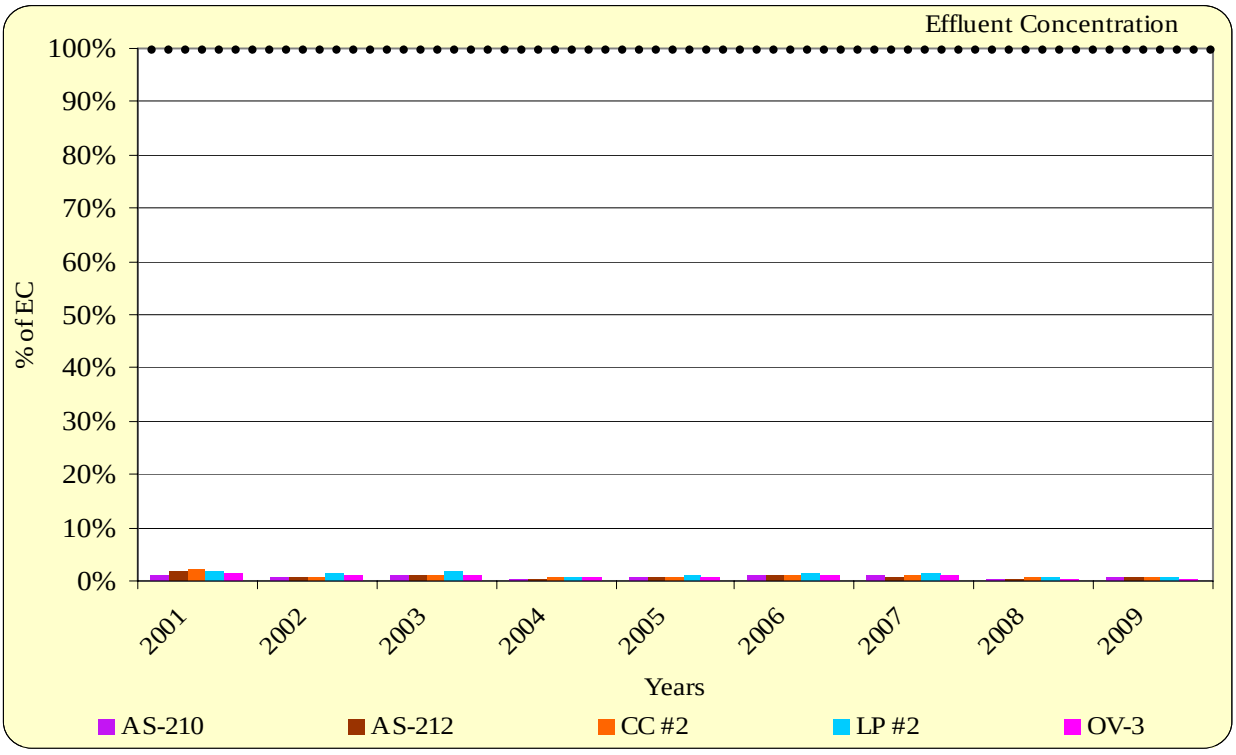
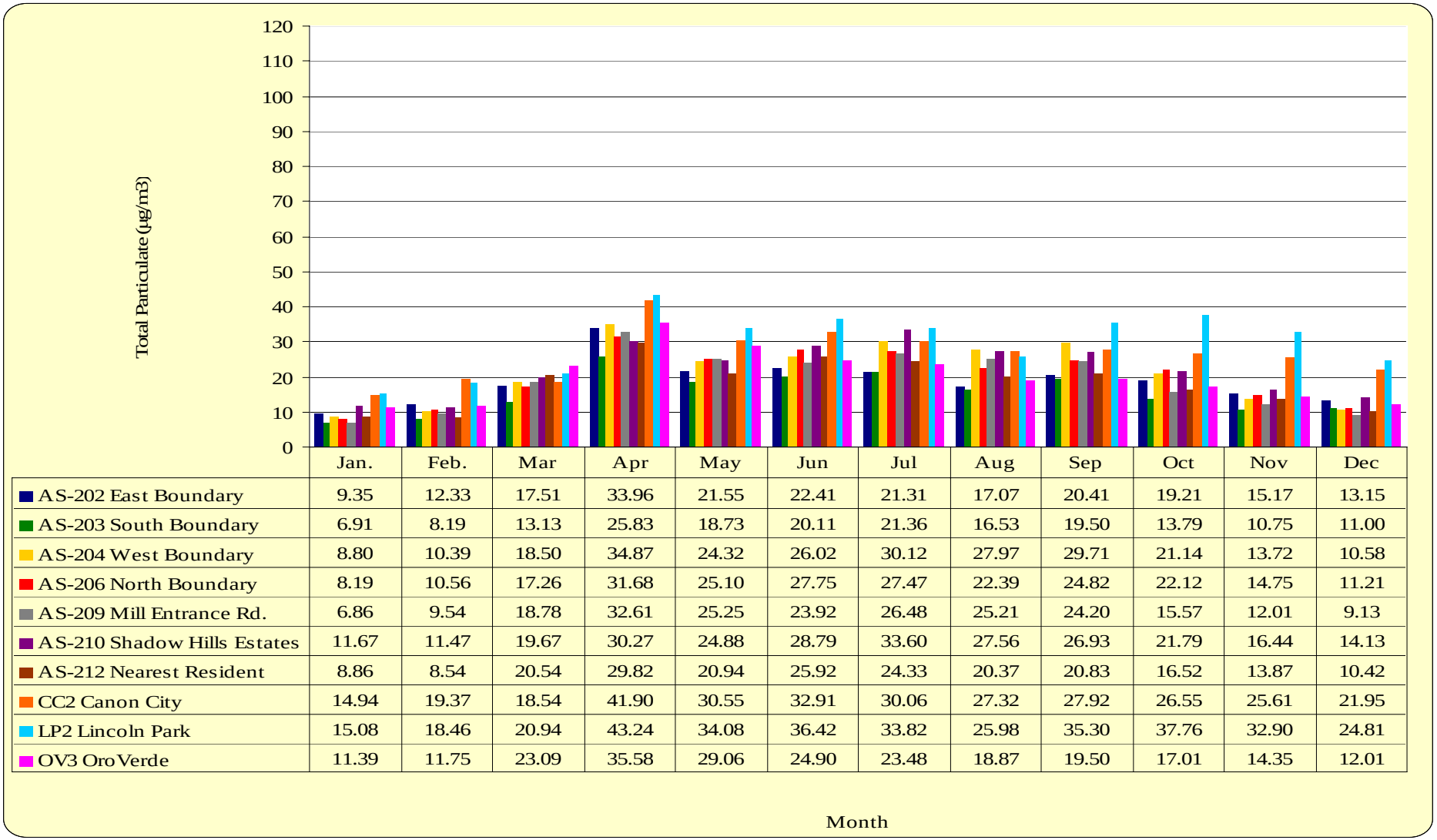


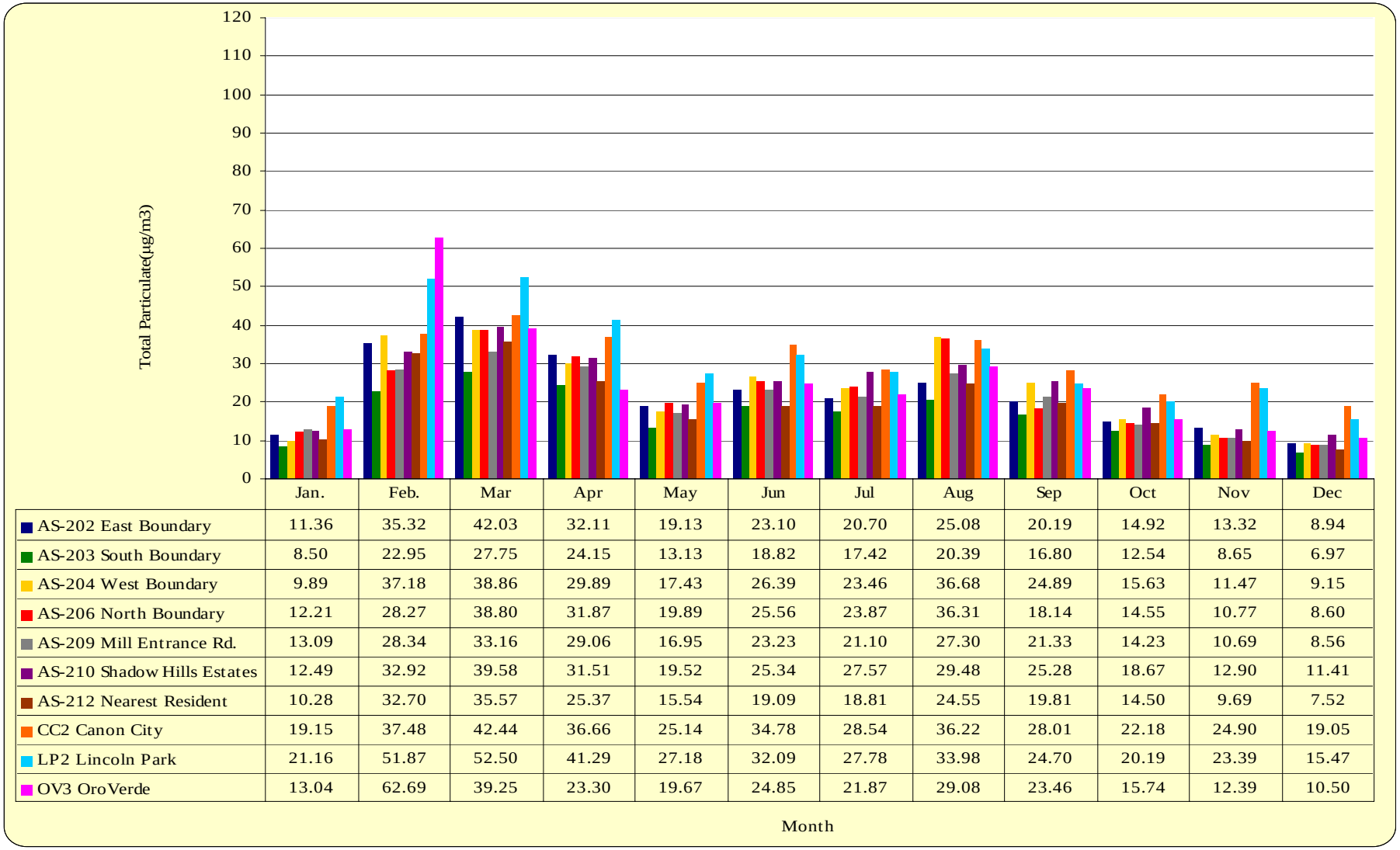
Figure EA-12
Environmental Air
Monthly Average Total Particulate
January through December 2008



	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AS-202 East Boundary	9.35	12.33	17.51	33.96	21.55	22.41	21.31	17.07	20.41	19.21	15.17	13.15
AS-203 South Boundary	6.91	8.19	13.13	25.83	18.73	20.11	21.36	16.53	19.50	13.79	10.75	11.00
AS-204 West Boundary	8.80	10.39	18.50	34.87	24.32	26.02	30.12	27.97	29.71	21.14	13.72	10.58
AS-206 North Boundary	8.19	10.56	17.26	31.68	25.10	27.75	27.47	22.39	24.82	22.12	14.75	11.21
AS-209 Mill Entrance Rd.	6.86	9.54	18.78	32.61	25.25	23.92	26.48	25.21	24.20	15.57	12.01	9.13
AS-210 Shadow Hills Estates	11.67	11.47	19.67	30.27	24.88	28.79	33.60	27.56	26.93	21.79	16.44	14.13
AS-212 Nearest Resident	8.86	8.54	20.54	29.82	20.94	25.92	24.33	20.37	20.83	16.52	13.87	10.42
CC2 Canon City	14.94	19.37	18.54	41.90	30.55	32.91	30.06	27.32	27.92	26.55	25.61	21.95
LP2 Lincoln Park	15.08	18.46	20.94	43.24	34.08	36.42	33.82	25.98	35.30	37.76	32.90	24.81
OV3 OroVerde	11.39	11.75	23.09	35.58	29.06	24.90	23.48	18.87	19.50	17.01	14.35	12.01

Note: 1) 01/11/08 - AS-206 and AS-209: VOID

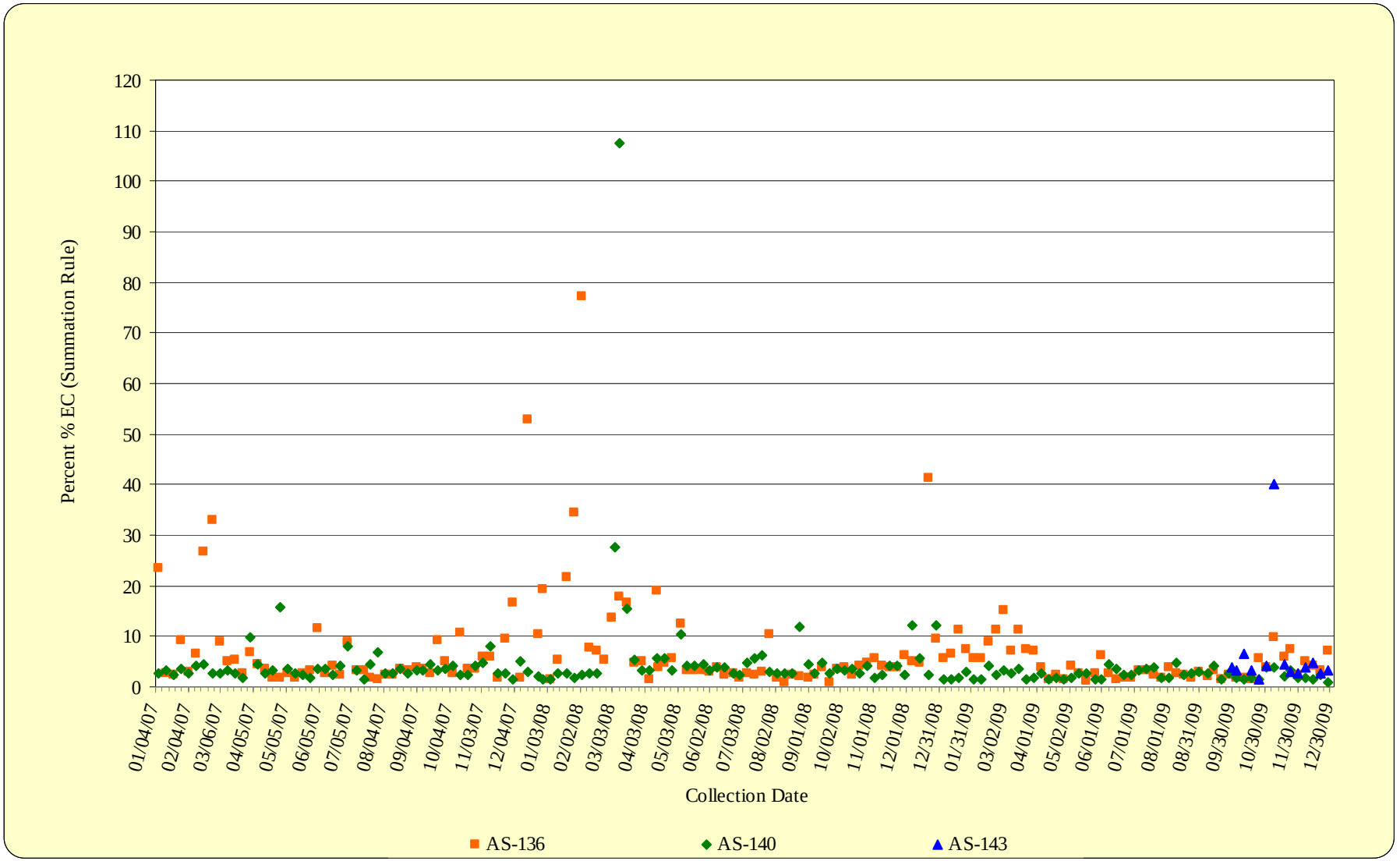
Figure EA-13
Environmental Air
Monthly Average Total Particulate
January through December 2009



	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AS-202 East Boundary	11.36	35.32	42.03	32.11	19.13	23.10	20.70	25.08	20.19	14.92	13.32	8.94
AS-203 South Boundary	8.50	22.95	27.75	24.15	13.13	18.82	17.42	20.39	16.80	12.54	8.65	6.97
AS-204 West Boundary	9.89	37.18	38.86	29.89	17.43	26.39	23.46	36.68	24.89	15.63	11.47	9.15
AS-206 North Boundary	12.21	28.27	38.80	31.87	19.89	25.56	23.87	36.31	18.14	14.55	10.77	8.60
AS-209 Mill Entrance Rd.	13.09	28.34	33.16	29.06	16.95	23.23	21.10	27.30	21.33	14.23	10.69	8.56
AS-210 Shadow Hills Estates	12.49	32.92	39.58	31.51	19.52	25.34	27.57	29.48	25.28	18.67	12.90	11.41
AS-212 Nearest Resident	10.28	32.70	35.57	25.37	15.54	19.09	18.81	24.55	19.81	14.50	9.69	7.52
CC2 Canon City	19.15	37.48	42.44	36.66	25.14	34.78	28.54	36.22	28.01	22.18	24.90	19.05
LP2 Lincoln Park	21.16	51.87	52.50	41.29	27.18	32.09	27.78	33.98	24.70	20.19	23.39	15.47
OV3 OroVerde	13.04	62.69	39.25	23.30	19.67	24.85	21.87	29.08	23.46	15.74	12.39	10.50

NOTES:
OV3 - same filter used 04/03/09 - 04/17/09; Week of 04/09/09 includes extra day due to holiday

Figure EA - 14
Supplemental Environmental Air Samplers
2007 - 2009



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 2008 and 2009 along with the result of a quality control badge co-located at the location shown in the same color. As expected, the 1979 data through 2009 data (Figures TLD-2 and TLD-3) demonstrates slightly elevated readings at boundary locations with readings in residential areas at background levels. Note that AS-209 has shown a reduction in response to the entry road cleanup.

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

Location	Jul. - Dec. 2008	Jan. - Jul. 2009	Jul. - Dec. 2009
AS-202 East Boundary	13.5	14.1	14.4
AS-203 South Boundary	12.5	14.0	14.6
AS-204 West Boundary	15.3	15.6	16.7
AS-206 North Boundary	14.7	15.8	16.1
AS-209 Mill Entrance Road	18.2	19.5	19.6
AS-210 Shadow Hills Estates	13.0	13.5	14.0
AS-212 Nearest Resident	10.1	10.4	10.5
Canon City #2	10.5	11.0	11.3
Lincoln Park #2	12.0	12.7	12.8
OroVerde #3	12.3	12.6	13.8

Figure TLD-1
Environmental TLD Data
Semiannual Average Exposure Rate

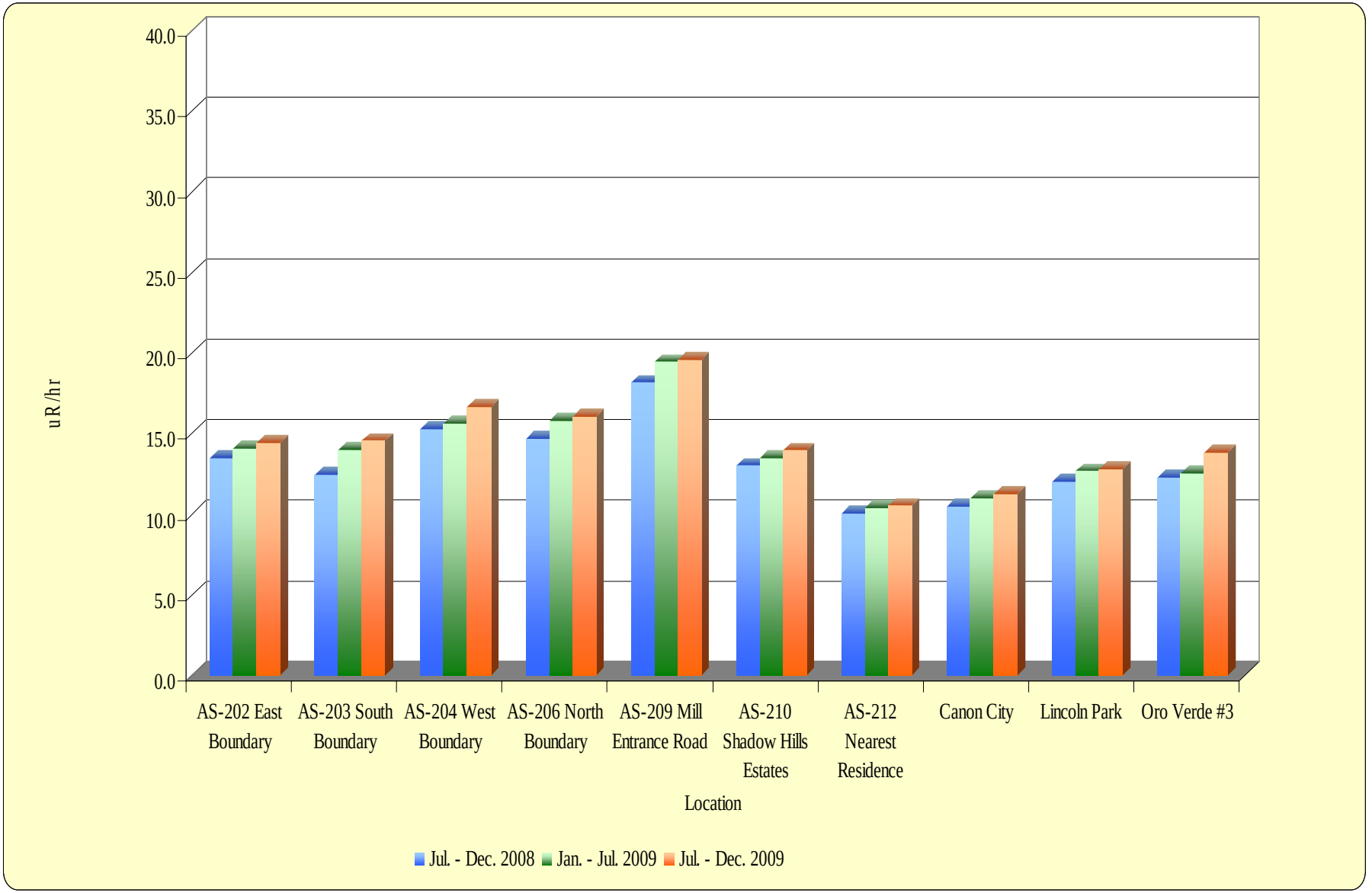


Table TLD-2
Environmental TLD
Annual Average Gamma Exposure Rate

	Location	1st	2nd	3rd	4th	AVG.
2009	AS-202 East Boundary	13.5	14.6	14.7	14.1	14.2
	AS-203 South Boundary	13.2	14.8	15.2	13.9	14.3
	AS-204 West Boundary	14.9	16.3	17.3	16	16.1
	AS-206 North Boundary	14.9	16.7	17.4	14.7	15.9
	AS-209 Mill Entrance Rd.	18.3	20.6	21.1	18	19.5
	AS-210 Shadow Hills Estate	13.0	13.9	14.7	13.2	13.7
	AS-212 Nearest Residence	10.4	10.4	10.4	10.6	10.5
	CC Canon City #2	10.4	11.6	11.7	10.8	11.1
	LP Lincoln Park #2	11.5	13.8	13.0	12.6	12.7
	OV OroVerde #3	12	13.1	14.1	13.5	13.2
	Secondary Impoundment	N/A	N/A	N/A	N/A	N/A
	Quality Control (QC)	9.6	12.6	12.0	13.5	

Figure TLD-2
Environmental TLD Data
Annual Average Gamma Exposure Rate
1979-2009

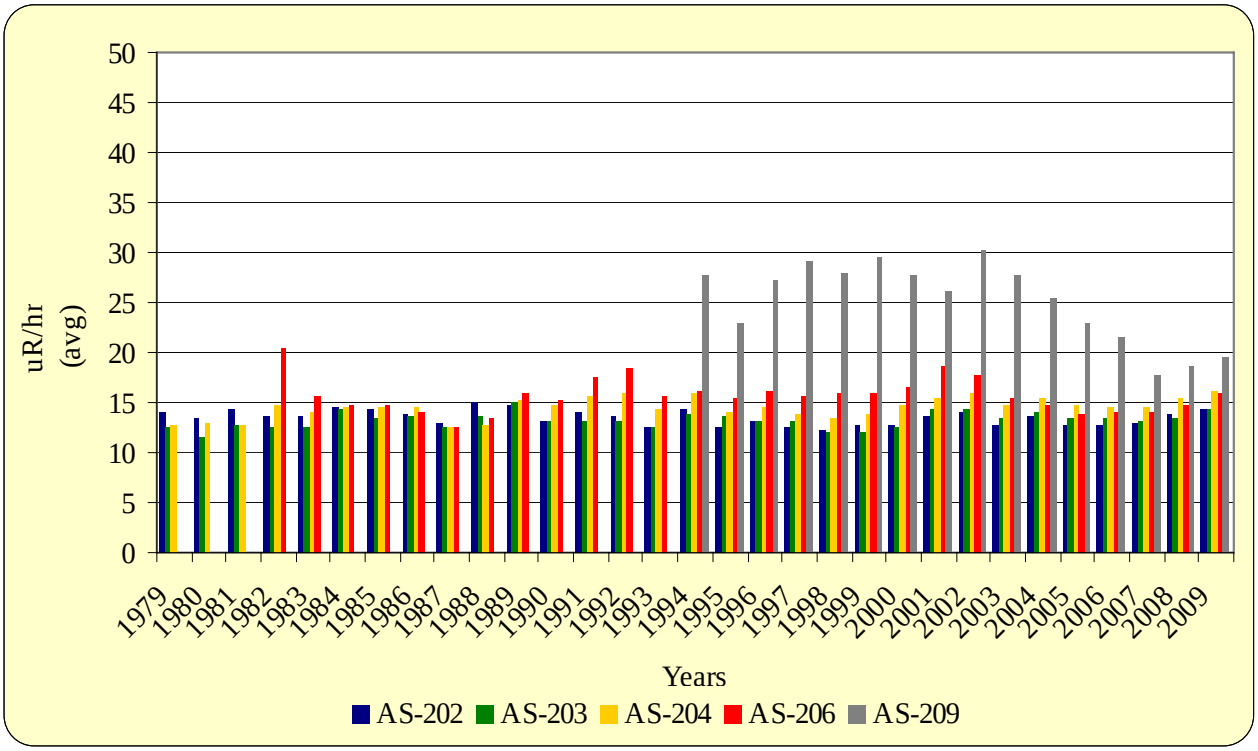
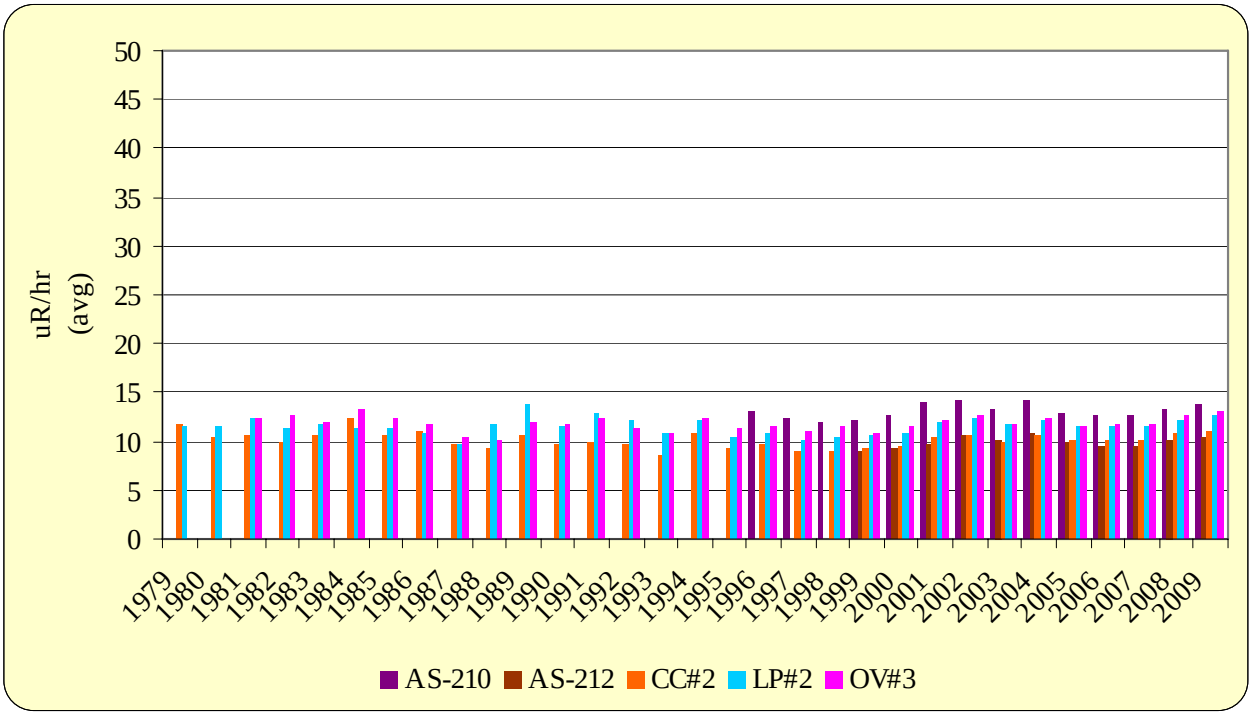


Figure TLD-3
Environmental TLD Data
Annual Average Gamma Exposure Rate
1979-2009



Radon

Radon concentrations for the three (3) most recent semiannual periods are show in Table RN-1 and Figure RN-1 respectively. Table RN-2 displays the 2008 and 2009 quarterly results. Figure RN-2 displays the 2008 and 2009 annual average by location. As expected, 1979 through 2009 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 2008 and 2009 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 July to December 2009 reporting period. Note that this is an annual limit. First (1^{st}) quarter data was particularly skewed high for boundary locations as compared to nearby and offsite locations. However, for all locations in the second (2^{nd}) quarter and third (3^{rd}) quarter the data shown are similar. Fourth (4^{th}) quarter data shows a reversal to lower boundary readings versus nearby and background locations. No reason is known for this difference between quarterly data. However, the Quality Control data show differences of at least twenty-five percent (25%). When this uncertainty is taken into account, all readings are in a very narrow band.

Due to concerns raised by CDPHE in early July 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. Measurements for the third (3^{rd}) quarter were generally similar, while fourth (4^{th}) quarter results were more varied. The semiannual averages for these newly deployed monitors when compared to the existing monitors are all within the QC variability noted above.

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

Location	Jul. - Dec. 2008	Jan.. - Jul. 2009	Jul. - Dec. 2009
AS-202 East Boundary	800	1250	850
AS-203 South Boundary	950	1250	900
AS-204 West Boundary	950	1350	1000
AS-206 North Boundary	900	1250	800
AS-209 Mill Entrance Road	1200	1450	1100
AS-210 Shadow Hills Estates	950	750	1000
AS-212 Nearest Resident	900	800	900
Canon City #2	900	850	950
Lincoln Park #2	1050	850	1050
OroVerde #3	1000	900	950
Secondary Impoundment	1450	1550	1250

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

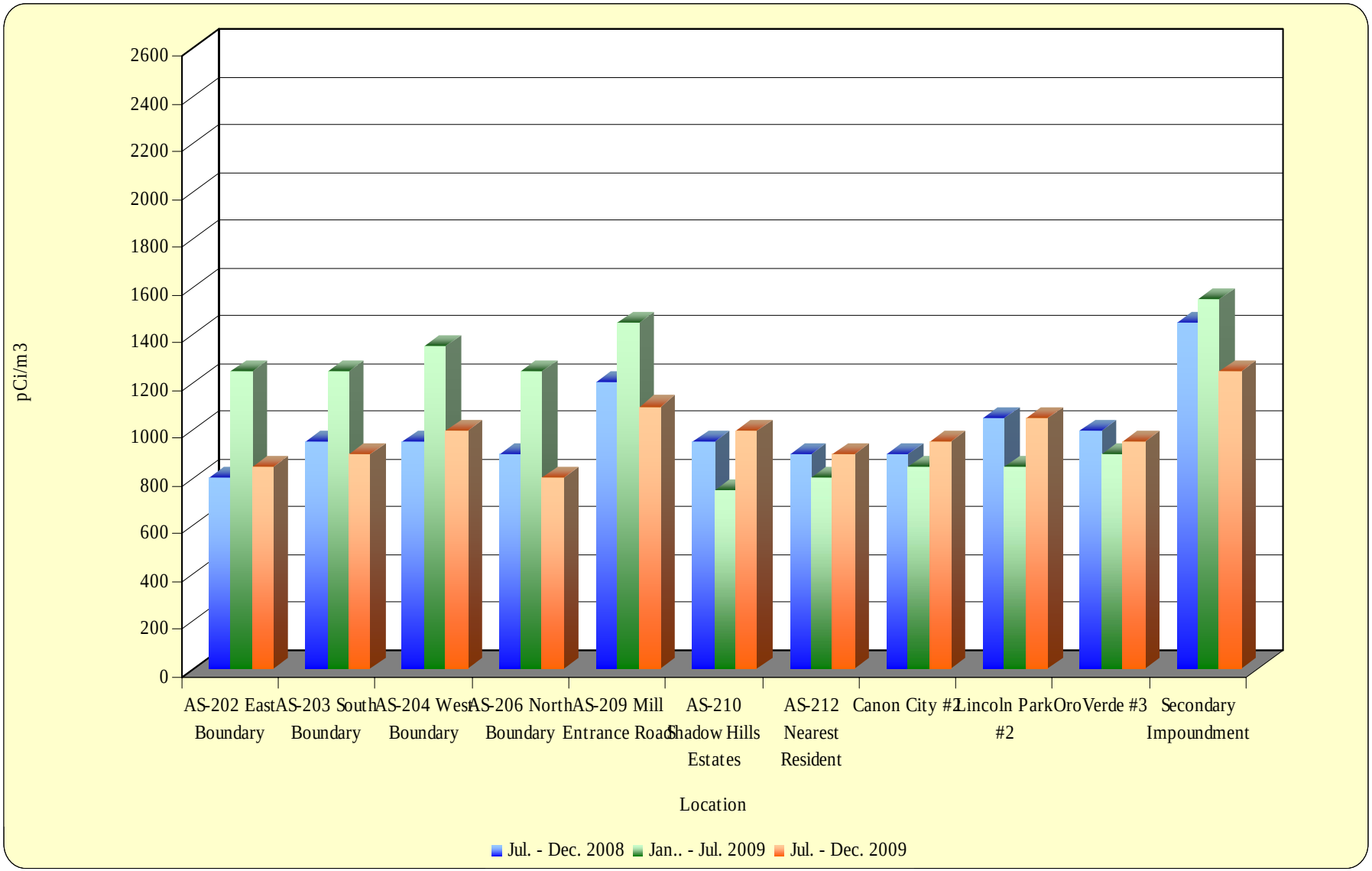


Table RN-2
Annual Average ^{222}Rn Concentration
(pCi/m^3)

	Location	1ST	2ND	3RD	4TH	AVG
2009	AS-202 East Boundary	1500	1000	1100	600	1050
	AS-203 South Boundary	1500	1000	1100	700	1075
	AS-204 West Boundary	1600	1100	1200	800	1175
	AS-206 North Boundary	1600	900	800	800	1025
	AS-209 Mill Entrance Road	1800	1100	1100	1100	1275
	AS-210 Shadow Hills Estates	600	900	1200	800	875
	AS-212 Nearest Resident	600	1000	800	1000	850
	Canon City #2	700	1000	1000	900	900
	Lincoln Park #2	600	1100	1000	1100	900
	OroVerde #3	700	1100	1000	900	933
	Secondary Impoundment	1700	1400	1400	1100	1400
	QC	500	1200	1100	600	

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
2009	AS-202 East Boundary	N/A	N/A	1100	1300	1200
	AS-203 South Boundary	N/A	N/A	1000	1300	1150
	AS-204 West Boundary	N/A	N/A	900	1200	1050
	Fence South (N3823.543 W 105 14.092)	N/A	N/A	900	1200	1050
	Fence South (N38 23.428 W 105 13.932)	N/A	N/A	1000	1300	1150

Note: 3rd Quarter radon canisters set August 5th – October 5th

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

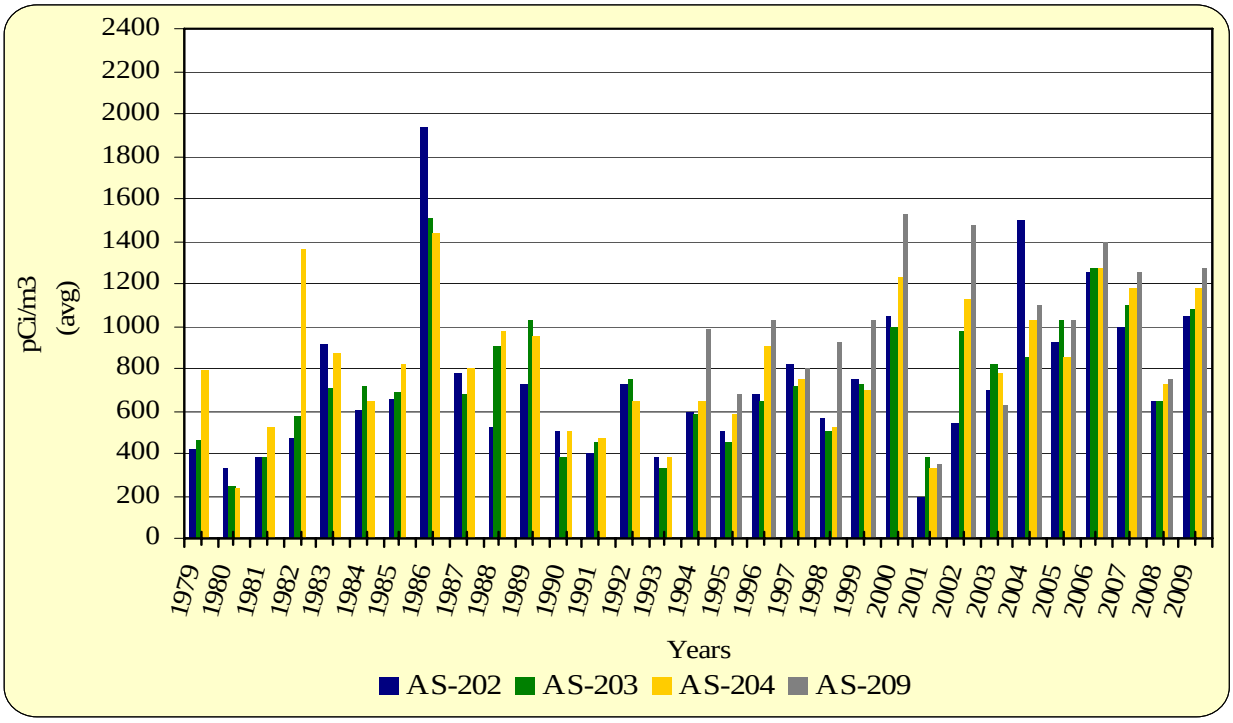


Figure RN-3
Environmental Air
Average Annual ^{222}Rn Concentration

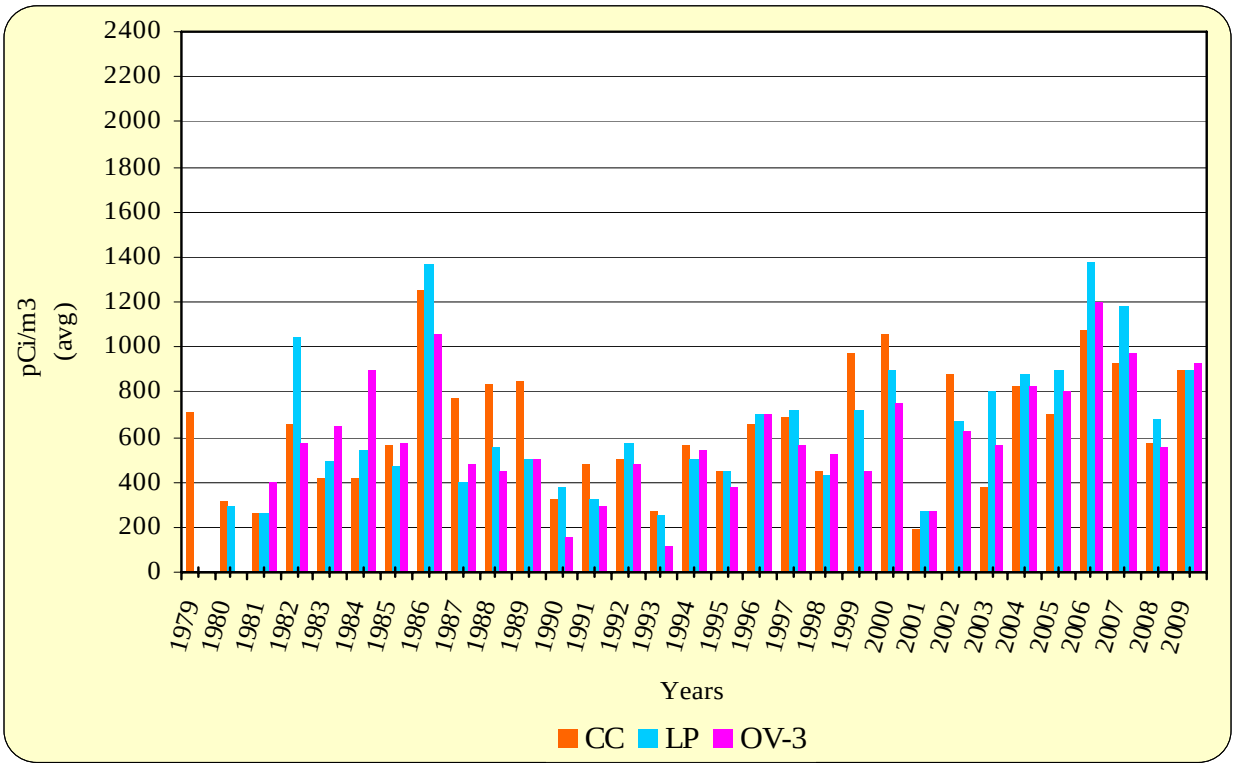


Figure RN-4
Environmental Air
Average Annual ^{222}Rn Concentration

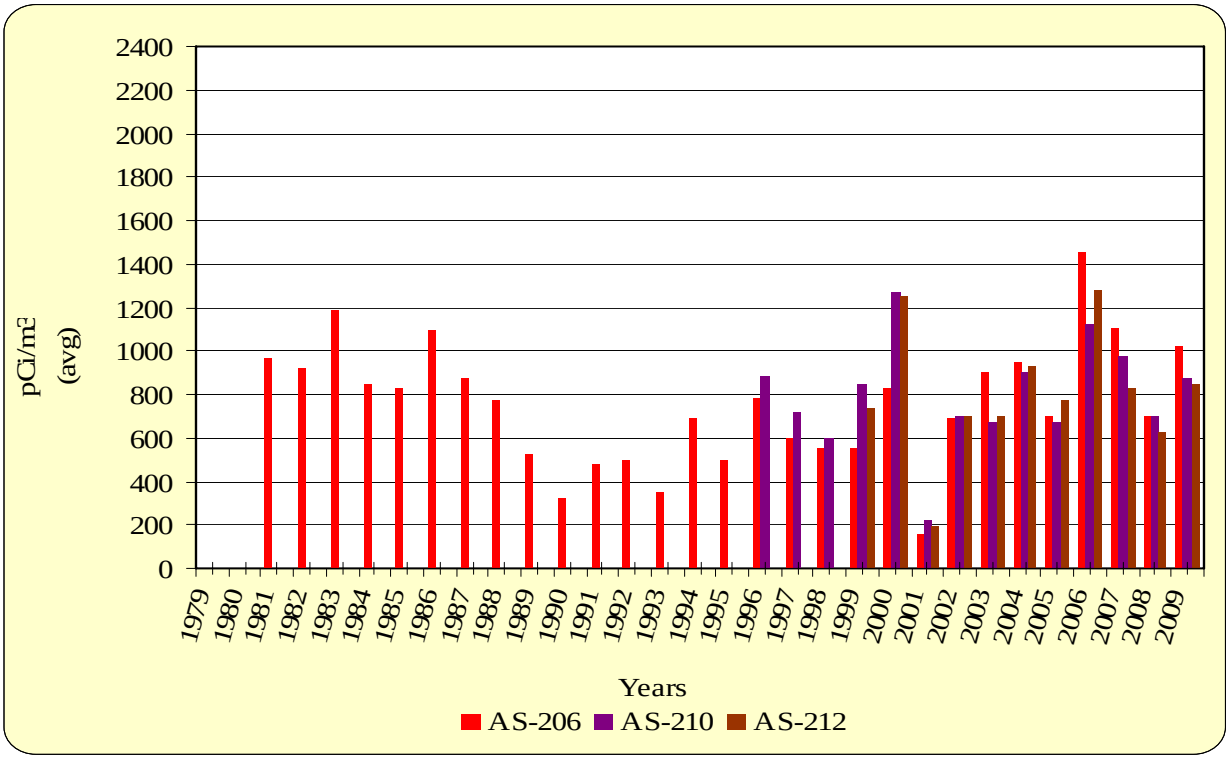


Table RN-4
Alternate Effluent Limit Comparison for ^{222}Rn

Background Concentrations (pCi/m^3)

	CC	LP	OV3	Background (BKG) MEAN	Standard Deviation of MEAN	BKG + 2 Standard Deviations of MEAN
2009 2nd half						
Q1	N/A	N/A	N/A			
Q2	N/A	N/A	N/A			
Q3	1000	1000	1000			
Q4	900	1100	900	983	22	1027
2009 1st half						
Q1	700	600	700			
Q2	1000	1100	1100			
Q3	N/A	N/A	N/A			
Q4	N/A	N/A	N/A	867	65	997
2008 2nd half						
Q1	N/A	N/A	N/A			
Q2	N/A	N/A	N/A			
Q3	900	1100	900			
Q4	900	1000	1100	983	28	1040

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?
2009 2nd half	AS 202	0.2	500	1527	850	no
	AS 203	0.2	500	1527	900	no
	AS 204	0.2	500	1527	1175	no
	AS 206	0.4	250	1277	800	no
	AS 209	0.2	500	1527	1100	no
	AS 210	0.4	250	1277	800	no
	AS 212	0.4	250	1277	1000	no
2009 1st half	AS 202	0.2	500	1497	1250	no
	AS 203	0.2	500	1497	1250	no
	AS 204	0.2	500	1497	1350	no
	AS 206	0.4	250	1247	1250	yes
	AS 209	0.2	500	1497	1450	no
	AS 210	0.4	250	1247	750	no
	AS 212	0.4	250	1247	800	no
2008 2nd half	AS 202	0.2	500	1540	800	no
	AS 203	0.2	500	1540	900	no
	AS 204	0.2	500	1540	1100	no
	AS 206	0.4	250	1290	1000	no
	AS 209	0.2	500	1540	1100	no
	AS 210	0.4	250	1290	900	no
	AS 212	0.4	250	1290	900	no

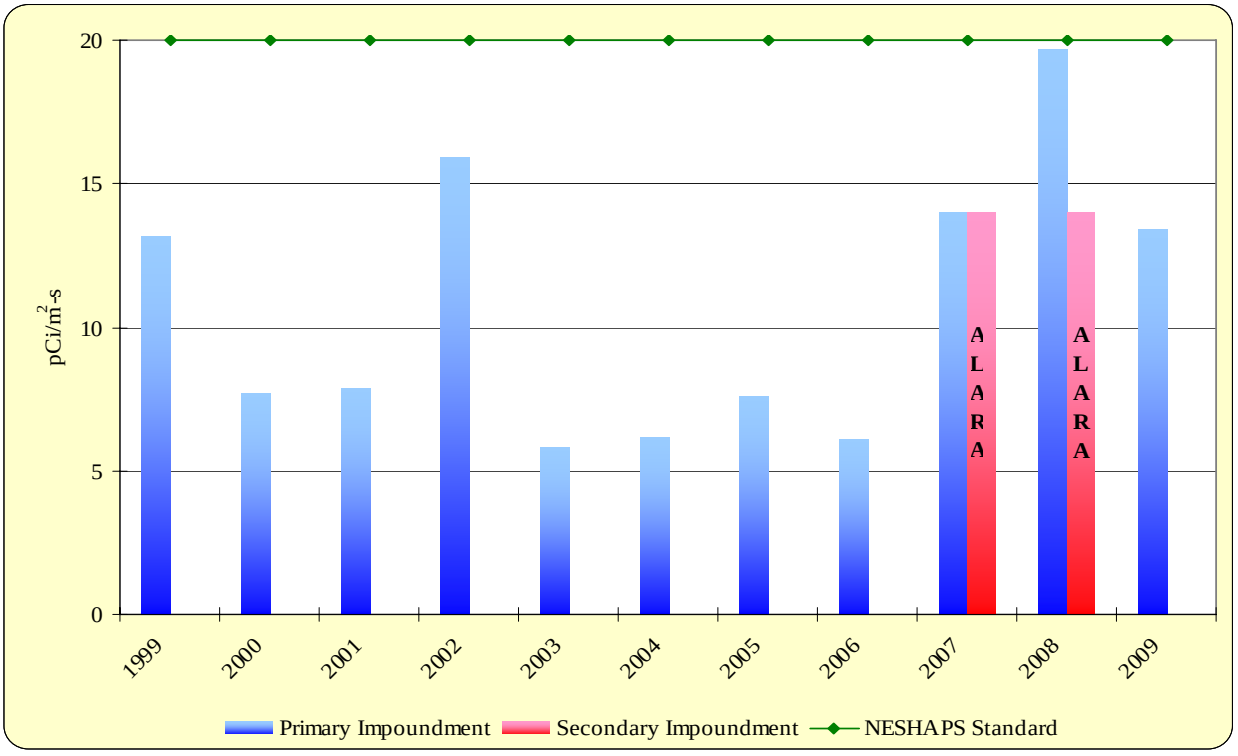
Radon Flux Measurements

Radon Flux measurements for the Primary Impoundment were conducted in June 2009 with the resulting flux of thirteen point four **(13.4) pCi/m^2-s** compared to the 2008 flux of nineteen point seven **(19.7) pCi/m^2-s** versus the National Emission Standard for Hazardous Air Pollutants (NESHAPS) standard of twenty **(20) pCi/m^2-s**. The 2009 report will be filed with the Environmental Protection Agency (EPA).

When the 2008 Primary Impoundment preliminary results were received, Cotter initiated a program to cover the most highly elevated areas as an ALARA function. Approximately eight thousand eight hundred (8,800) cubic yards of soil cover averaging four (4) feet in depth was placed on approximately one (1) acre in the northwest corner of the exposed tailings beach encompassing tailings beach locations TB 69-72. This was completed in the latter part of 2008 and early 2009. The combination of these remedial activities and slightly more water covered area (about 3 acres) resulted in the reduced average radon flux.

For the Secondary Impoundment, the June 2008 sampling was conducted as an ALARA function and not for compliance with NESHAPS. The resulting measurements indicated a reading of fourteen **(14) pCi/m^2-s** This result is the same (fourteen **(14) pCi/m^2-s)**) as the readings which were taken in October 2007 after remedial ALARA actions were taken to reduce the flux of twenty-three point four **(23.4) pCi/m^2-s** as measured in July 2007. The Secondary Impoundment was not sampled in 2009.

Table RF-1
Mean Radon Flux
Primary and Secondary Impoundments
1999-2009



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 three (3) years.

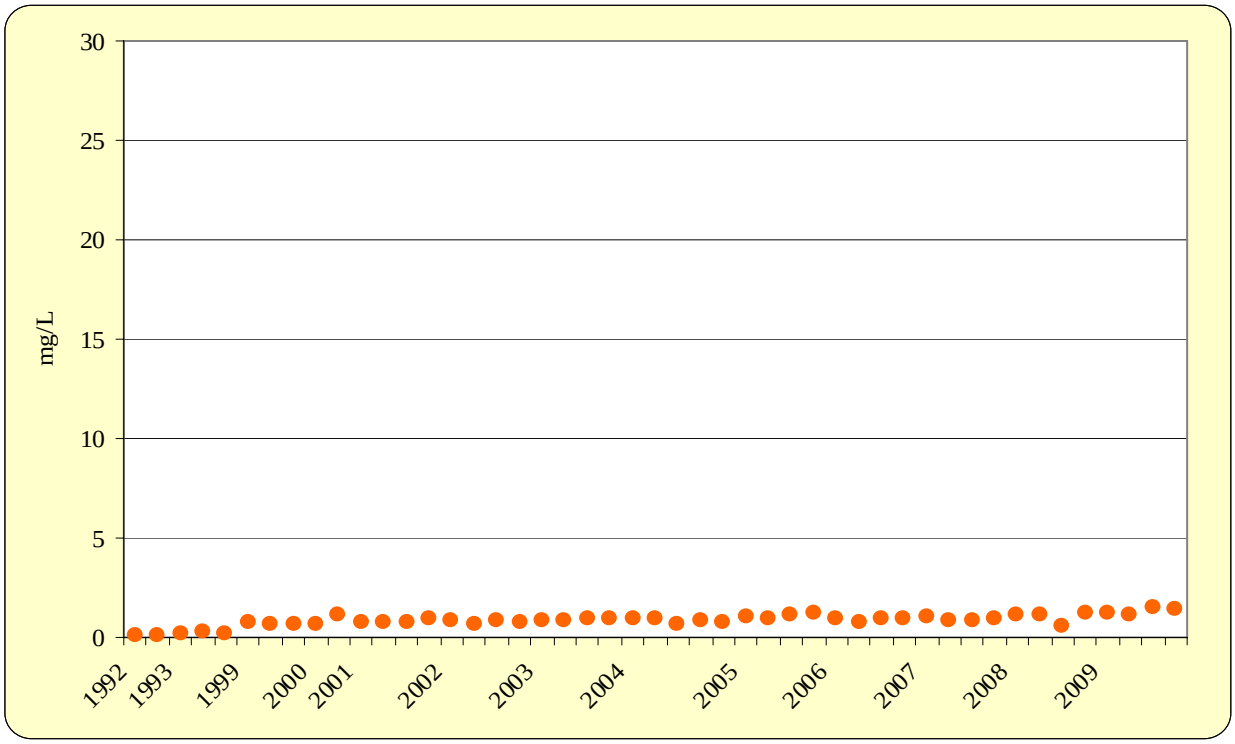
Recognizing the importance of groundwater flow to effective groundwater remediation in Lincoln Park, it was concluded that restoring the PRTW may benefit groundwater conditions downgradient. Recall that the PRTW did effectively remove target contaminants U and Mo from the groundwater for almost three (3) years.

After identifying the critical precipitating ions, further study of iron (Fe), calcium (Ca), sulfate (SO4), and carbonate (CO3)/bicarbonate (HCO3) geochemistry revealed the potential to influence precipitation rates thus extending the life of the PRTW. Increasing pH promotes precipitation of iron oxy-hydroxides and carbonate precipitates such as siderite and aragonite. Maintaining a near neutral pH and steady groundwater flow may retard precipitation formation inside the PRTW.

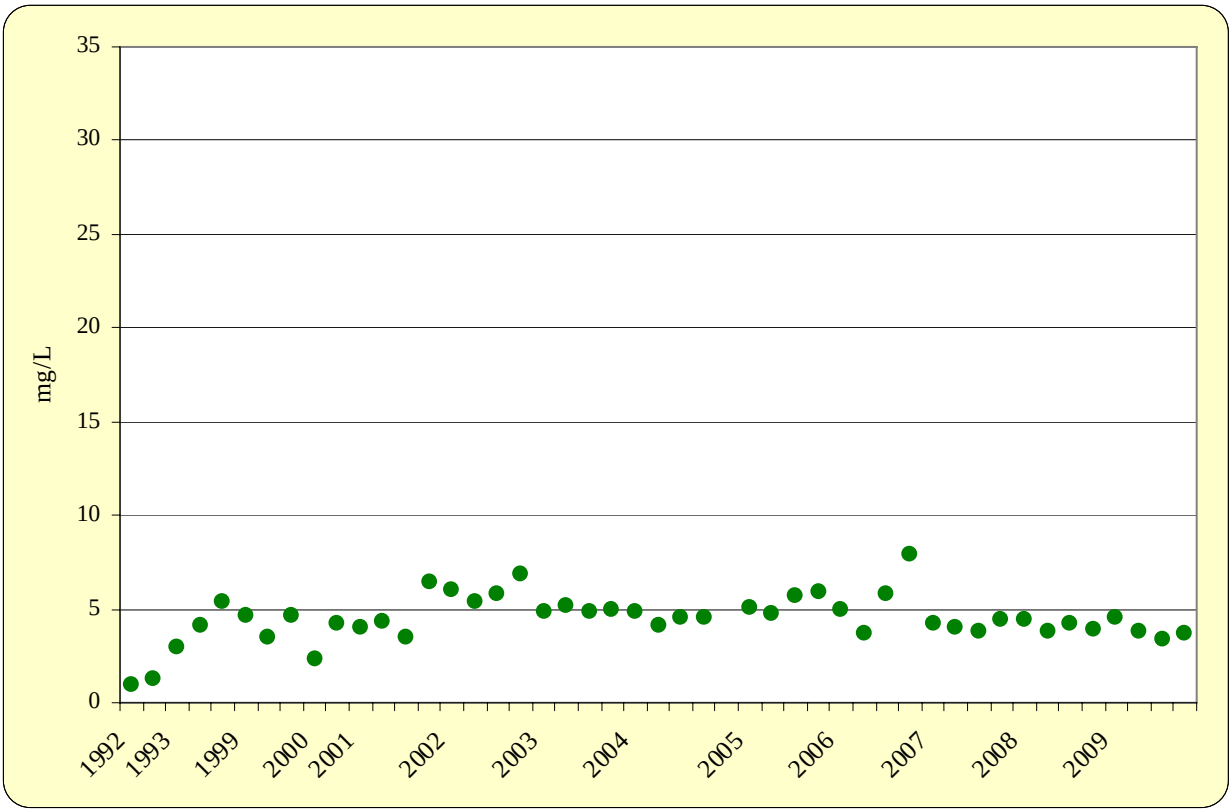
Laboratory batch tests were performed in December 2009. Buffering the pH of the groundwater between seven point zero (7.0) and eight point one (8.1) did significantly increase the concentration of ionic iron in the groundwater. Another series of batch tests is anticipated in 2010 that will study the impact of the buffer on the uranium remediation ability of the PRTW and study the performance of two more buffers.

Wells 814, 815, 329-330 in the near vicinity of the PRTW continued to be monitored in the second (2^{nd}) half of 2009. (Figures PRTW 1A and B through PRTW 5A and B)

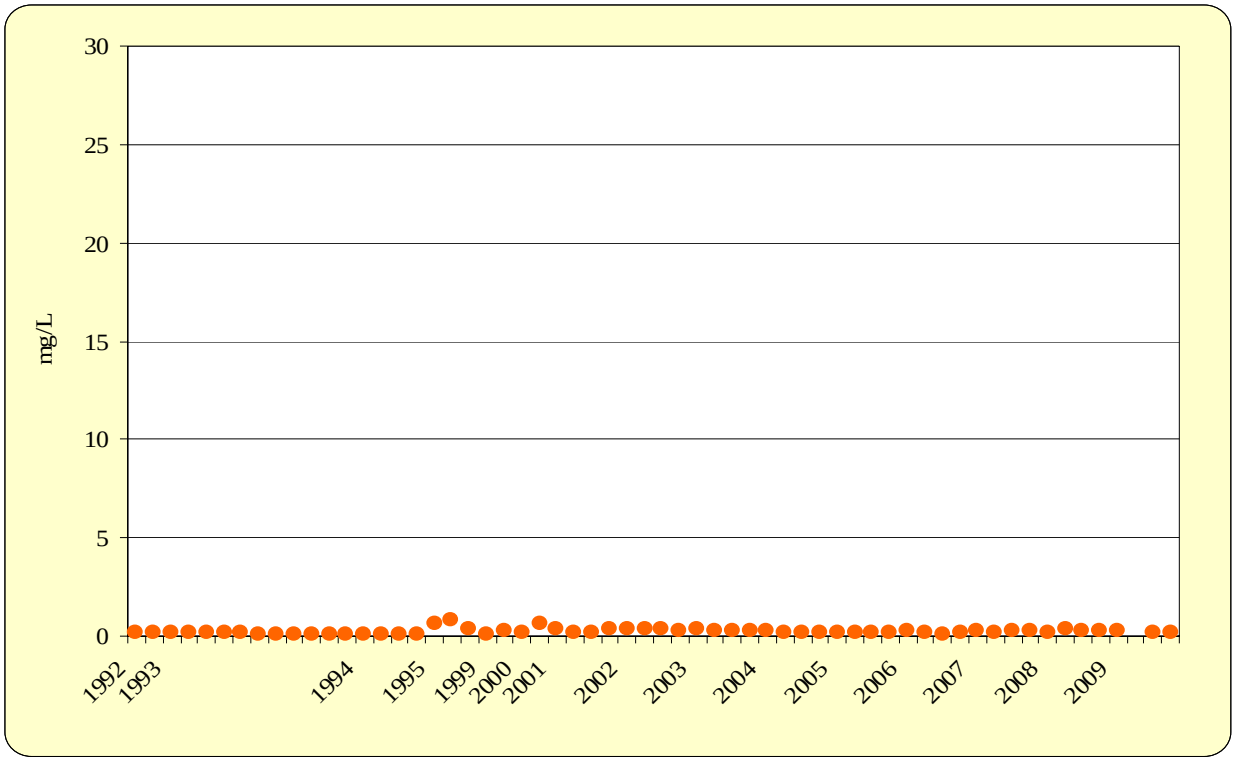
PRTW – 1A
Location 814 Uranium
1992-2009



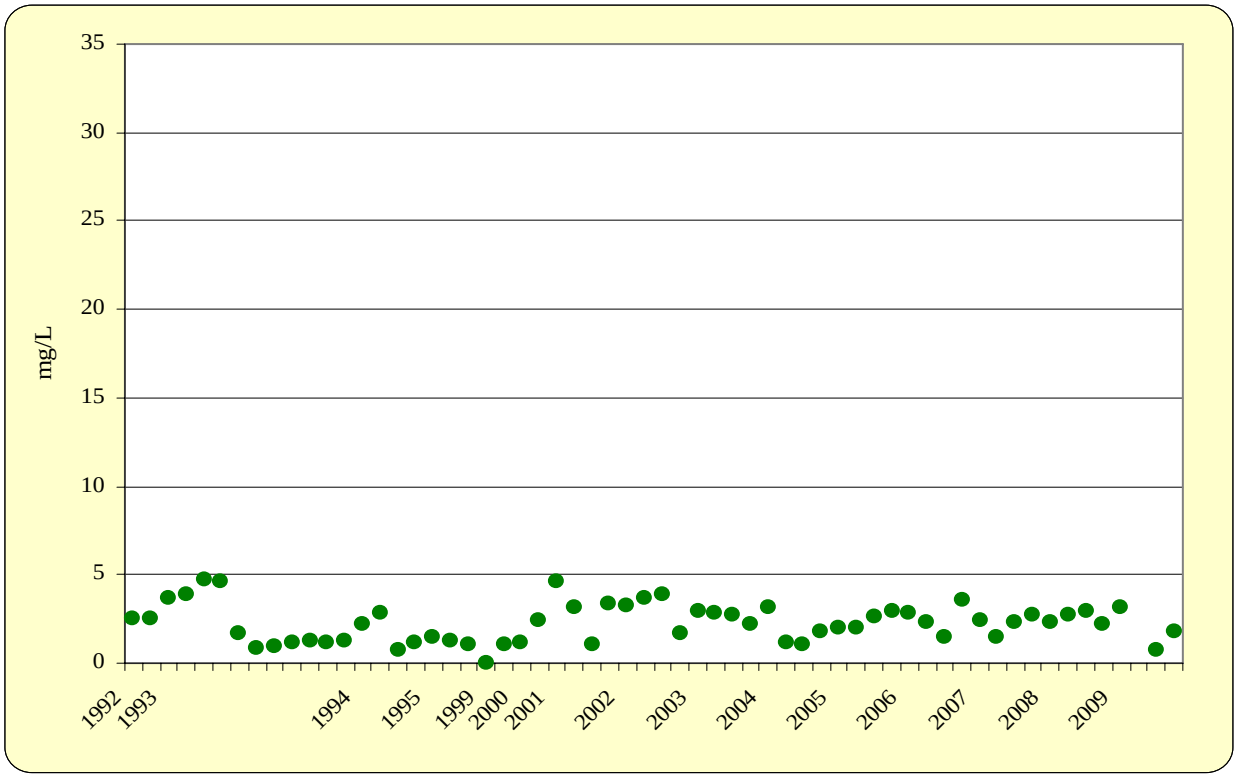
PRTW – 1B
Location 814 Molybdenum
1992-2009



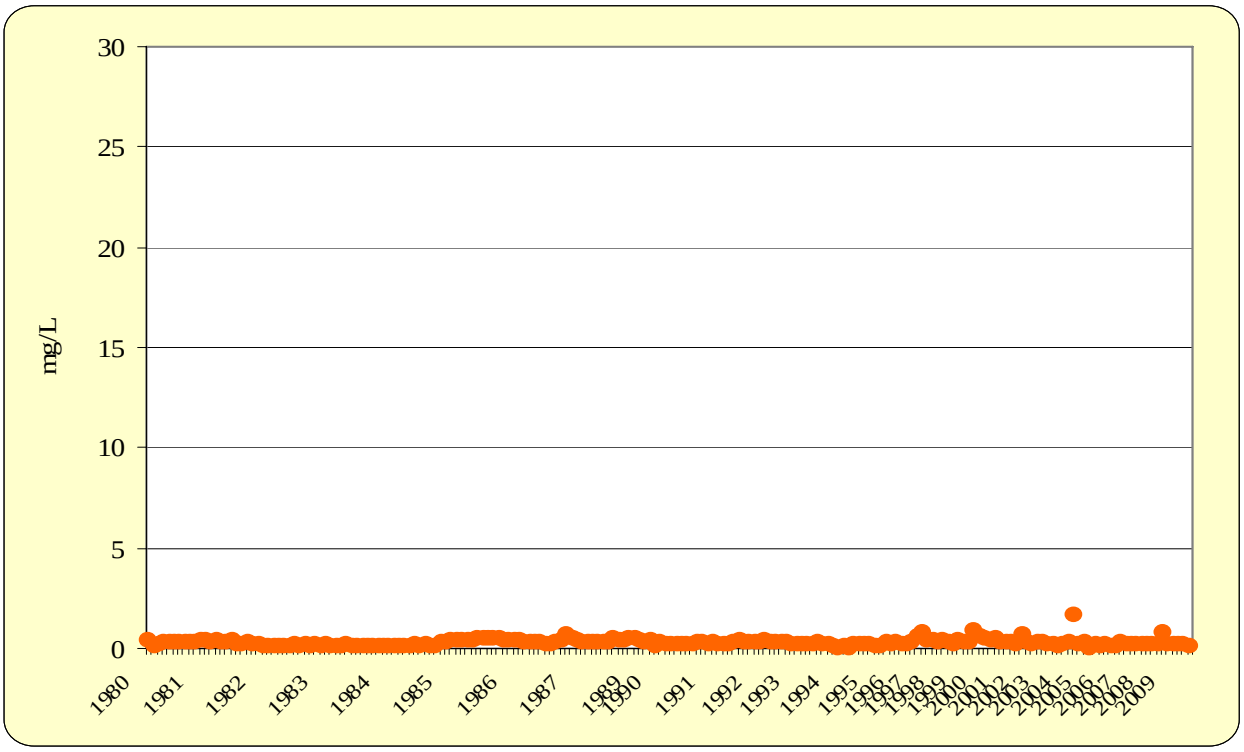
PRTW – 2A
Location 815 Uranium
1992-2009



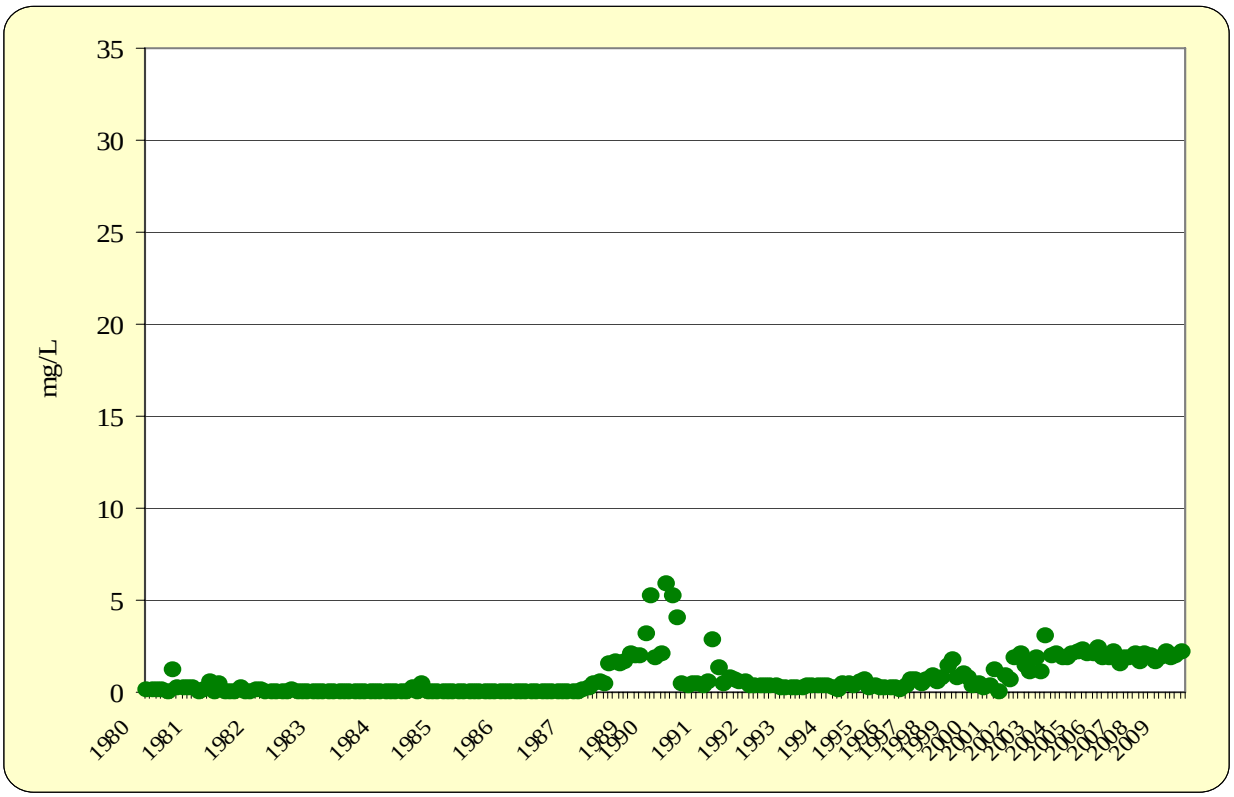
PRTW – 2B
Location 815 Molybdenum
1992-2009



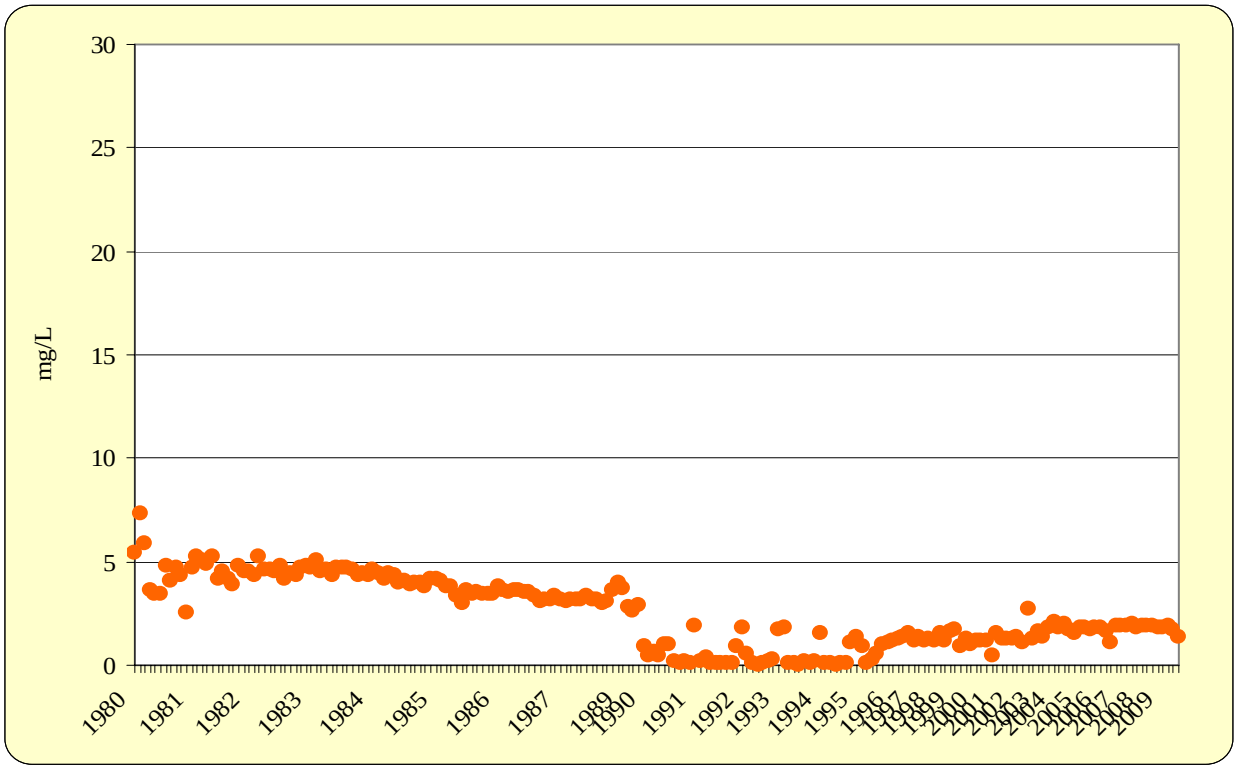
PRTW – 3A
Location 329 Uranium
1980-2009



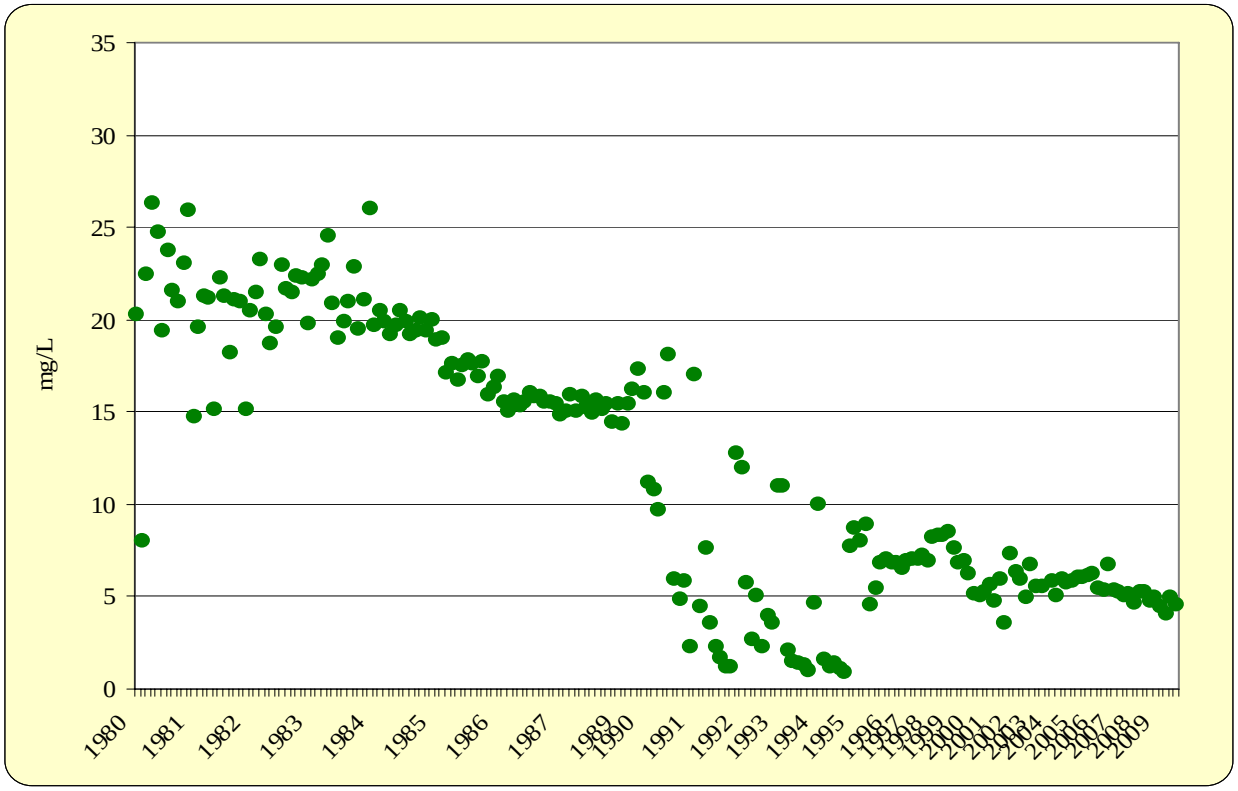
PRTW – 3B
Location 329 Molybdenum
1980-2009



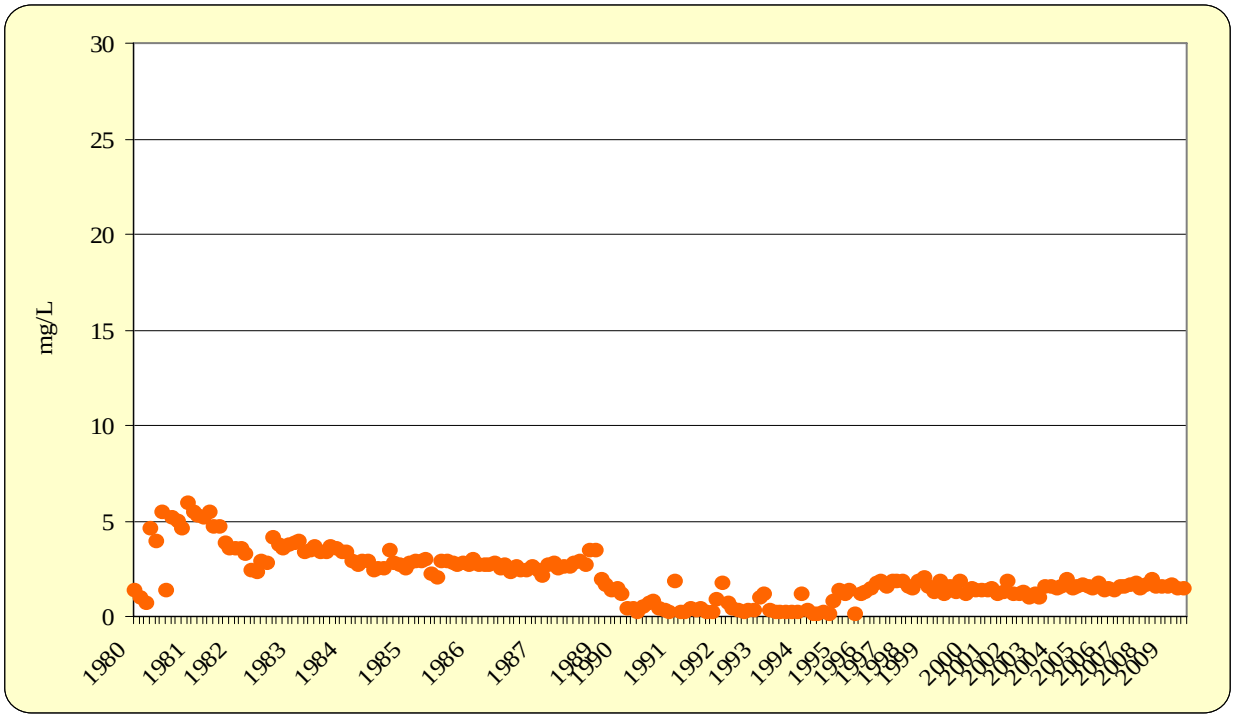
PRTW – 4A
Location 330 Uranium
1980-2009



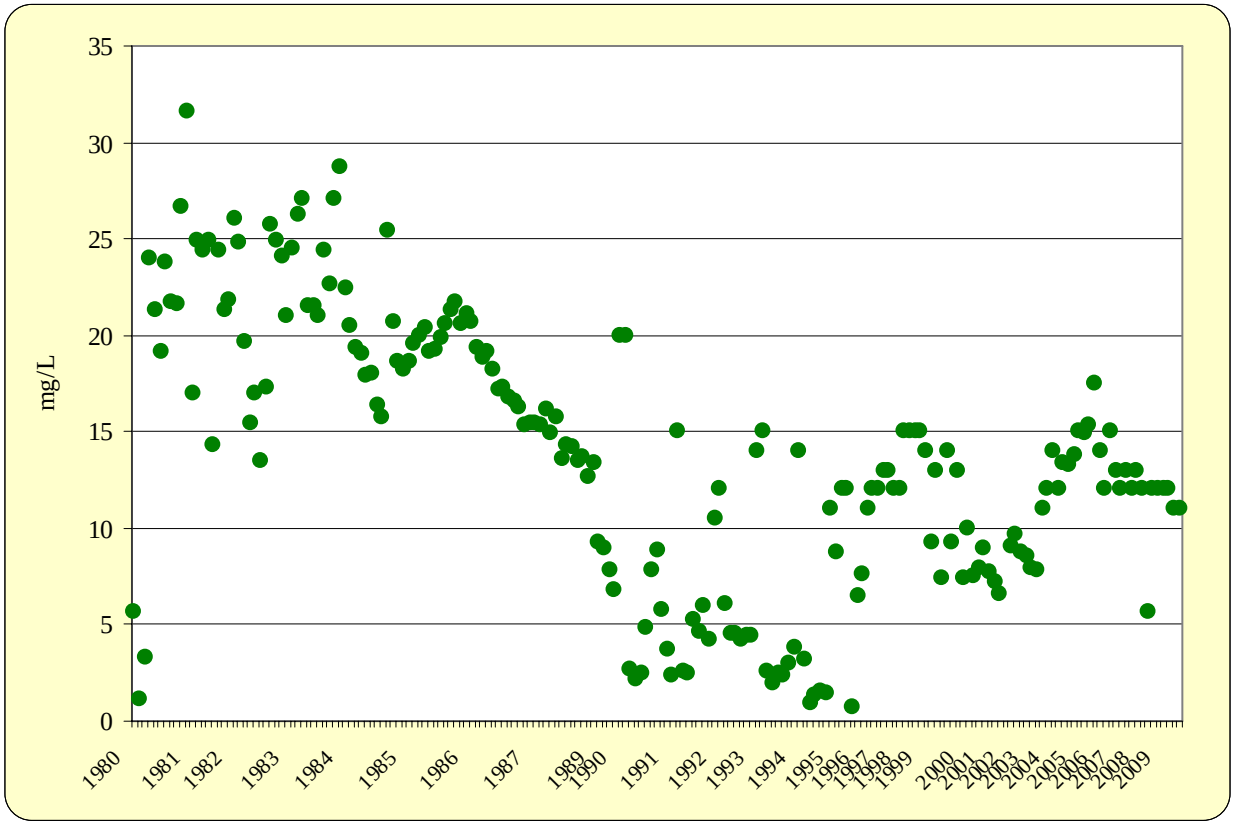
PRTW – 4B
Location 330 Molybdenum
1980-2009



PRTW – 5A
Location 331 Uranium
1980-2009



PRTW – 5B
Location 331 Molybdenum
1980-2009



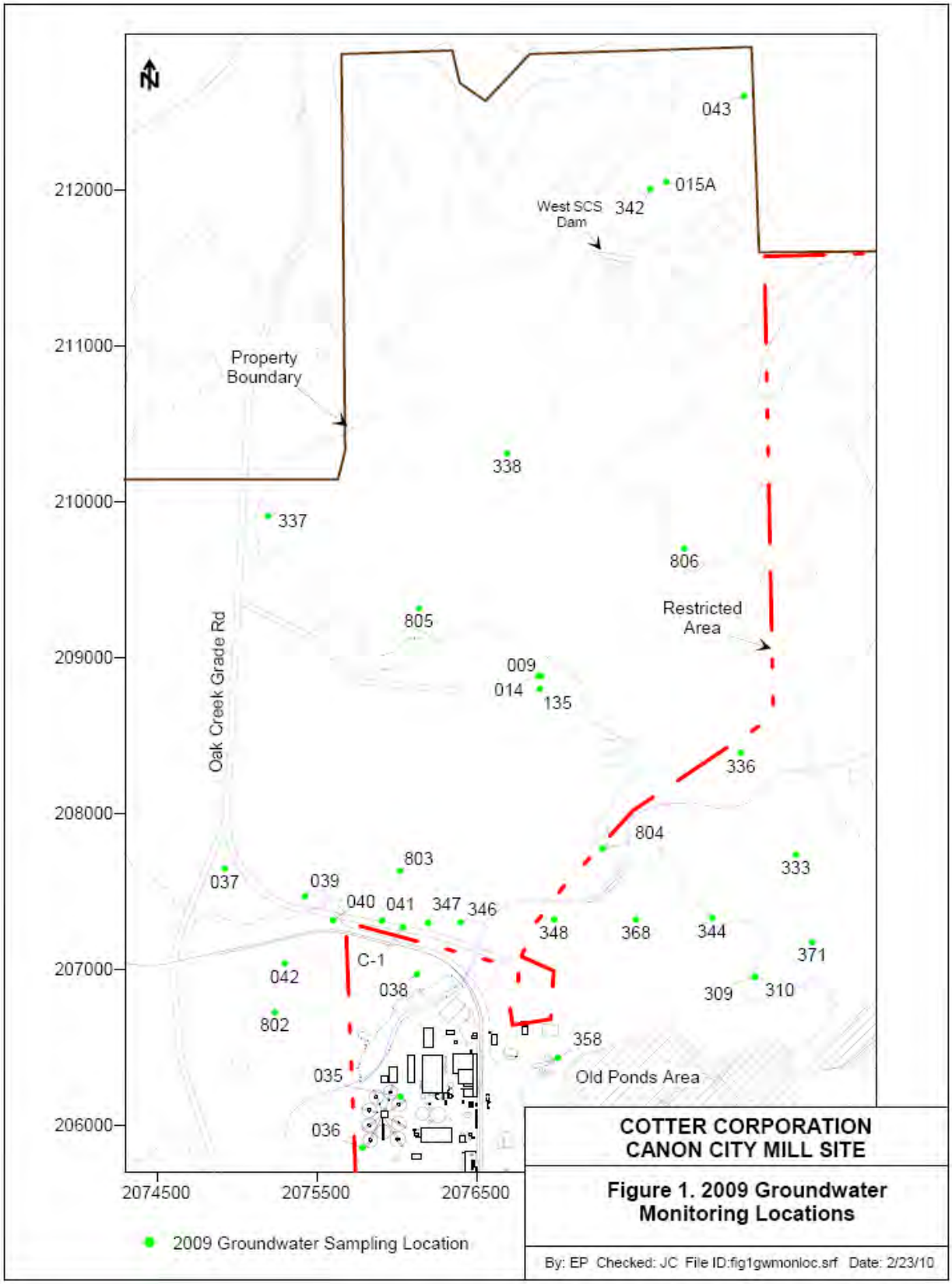
GOLF COURSE (GC)

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.

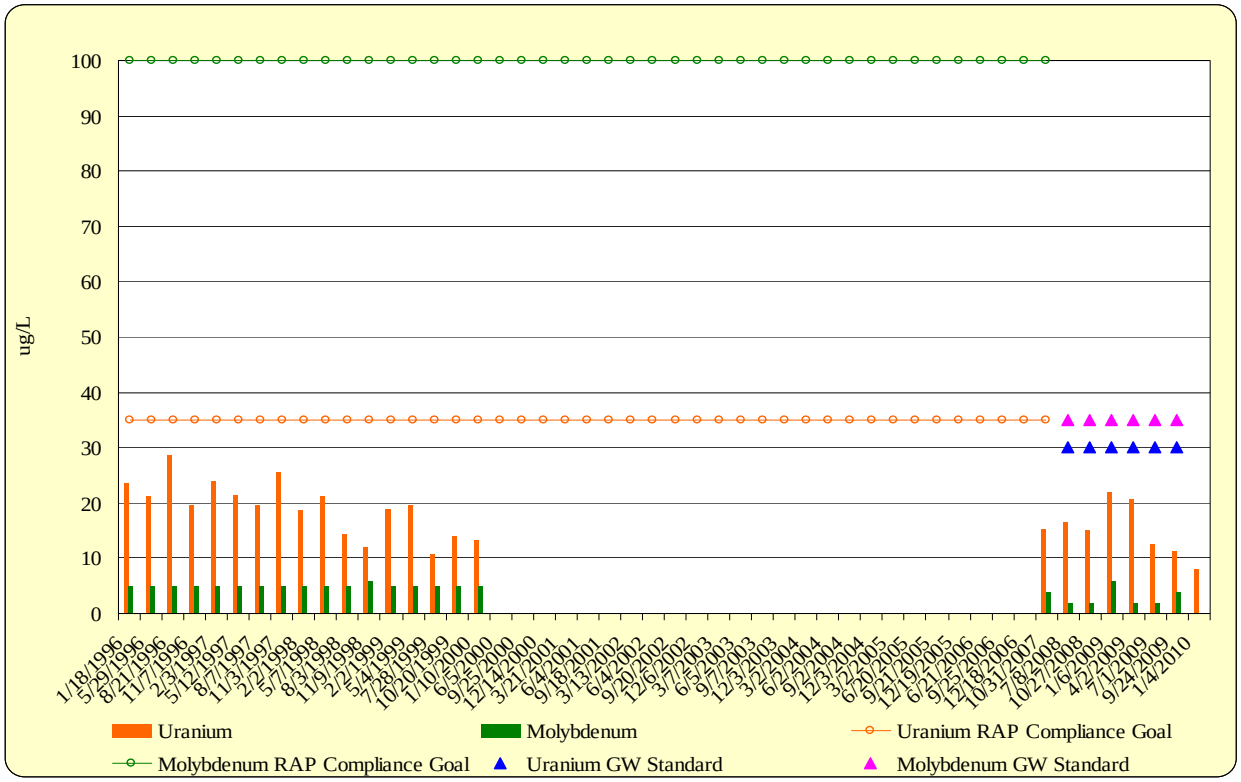
A significant amount of investigation including historical aerial, geologic, geochemical, and trend analysis have been performed to characterize the source and pathways to guide the corrective action. Various field investigations have been performed including additional monitoring well installation in 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.

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 these waters may be natural.

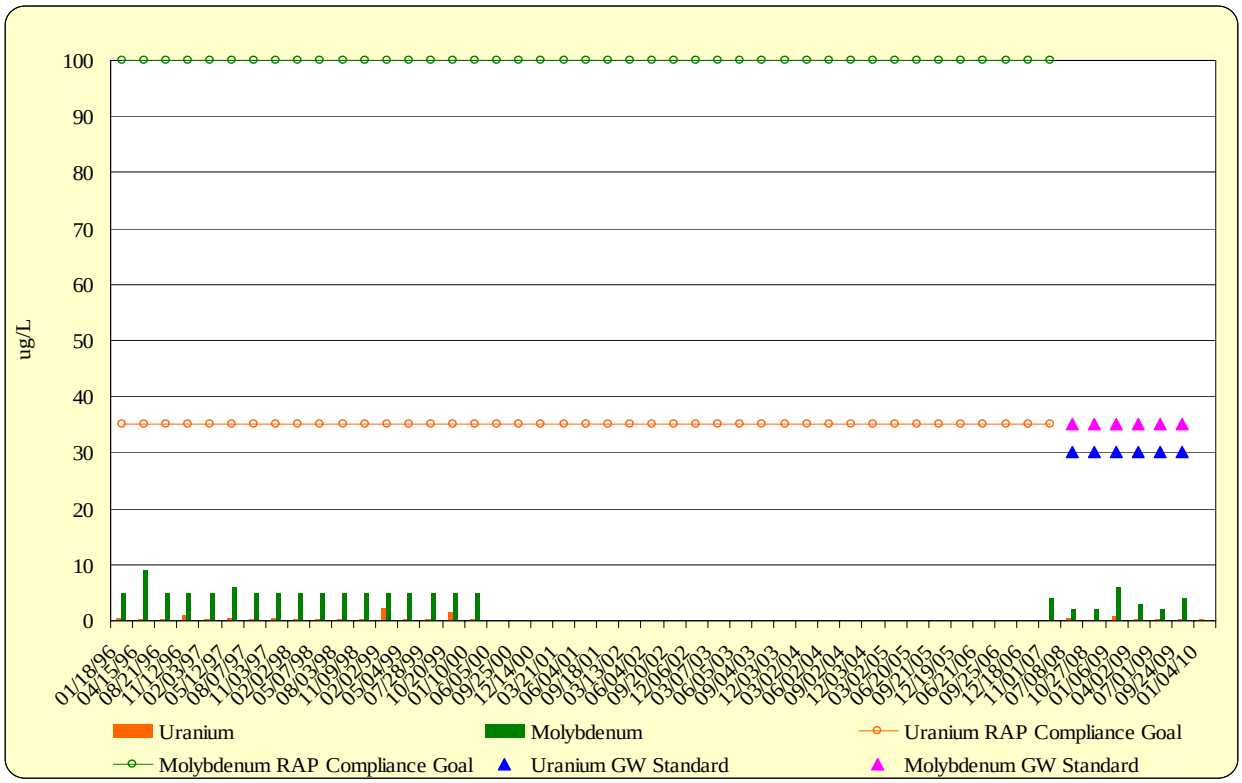
Figure GC – 0
Groundwater Monitoring Locations



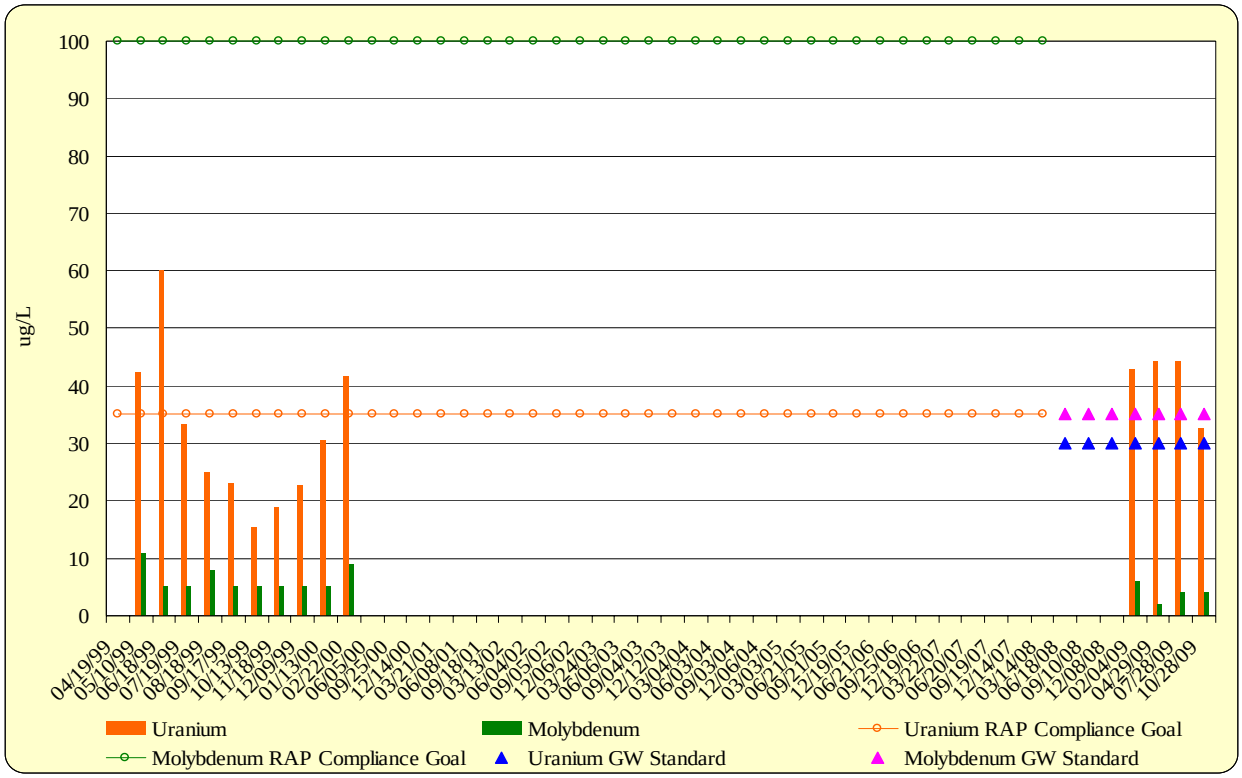
GC-1
Location 009
Uranium and Molybdenum



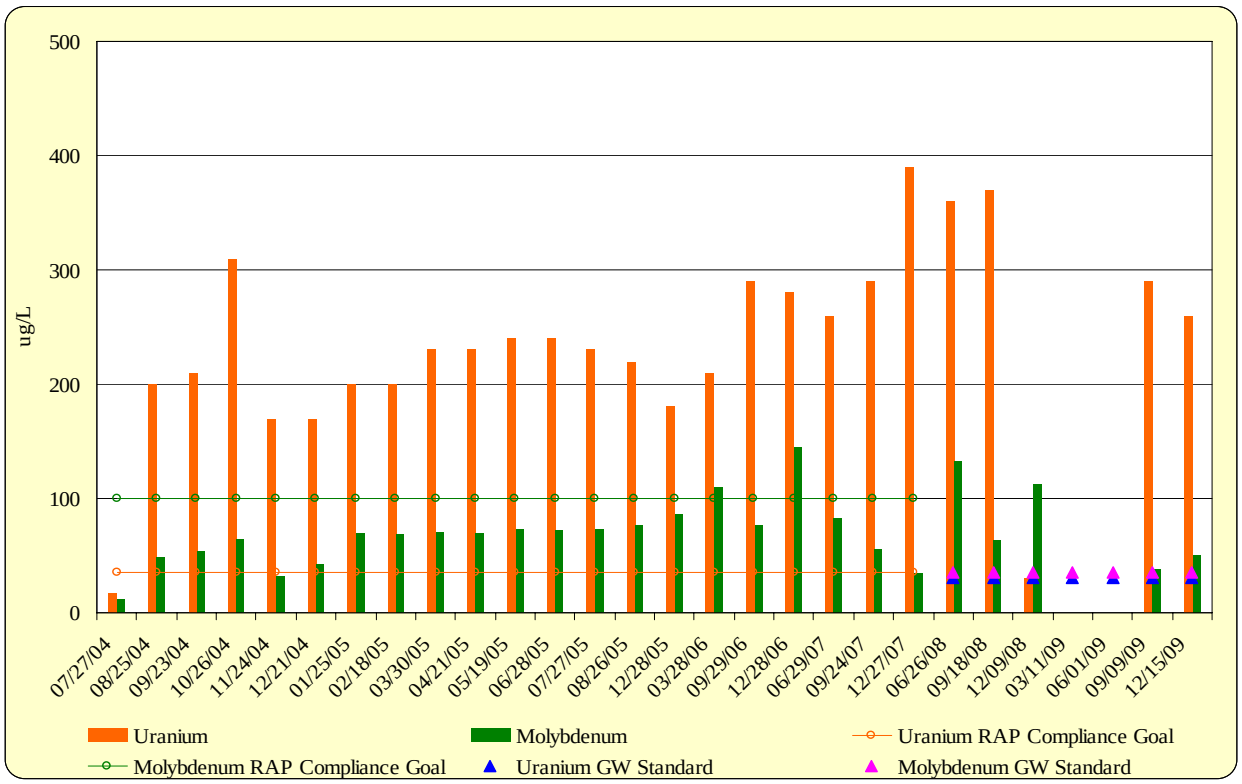
GC-2
Location 014
Uranium and Molybdenum



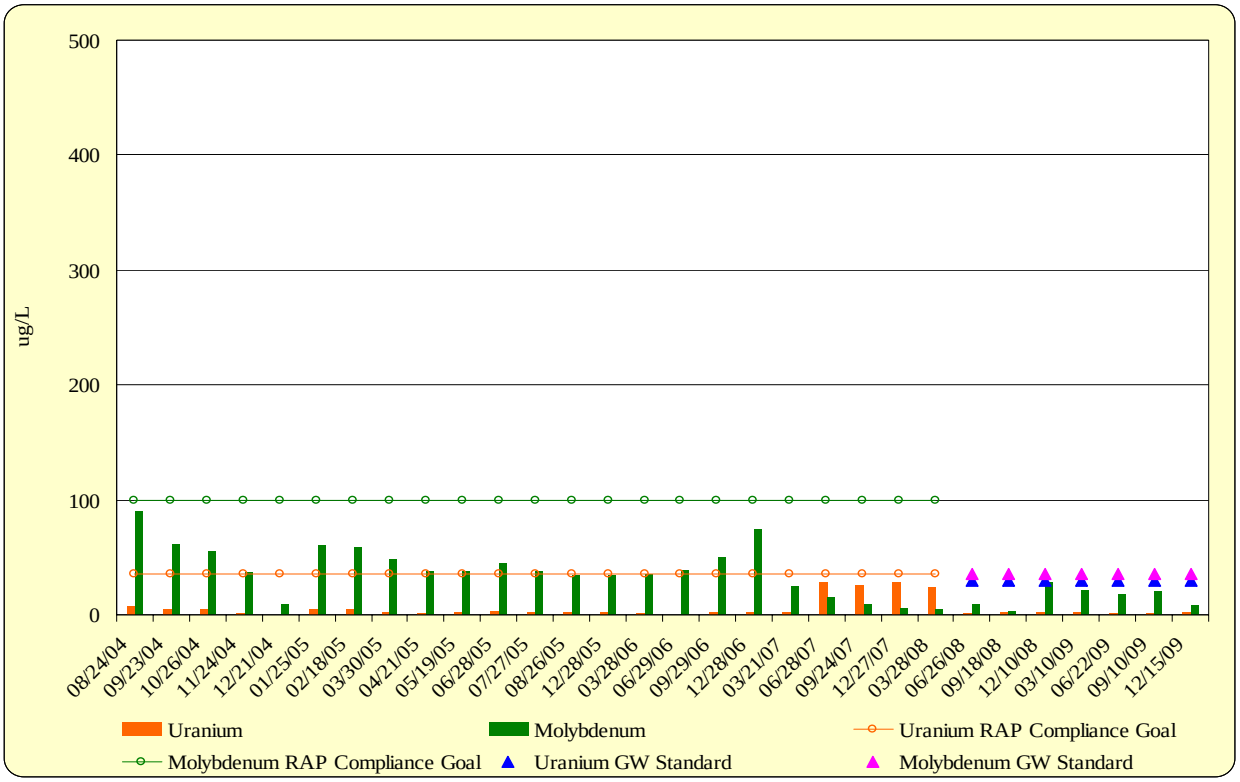
GC-3
Location 015A
Uranium and Molybdenum



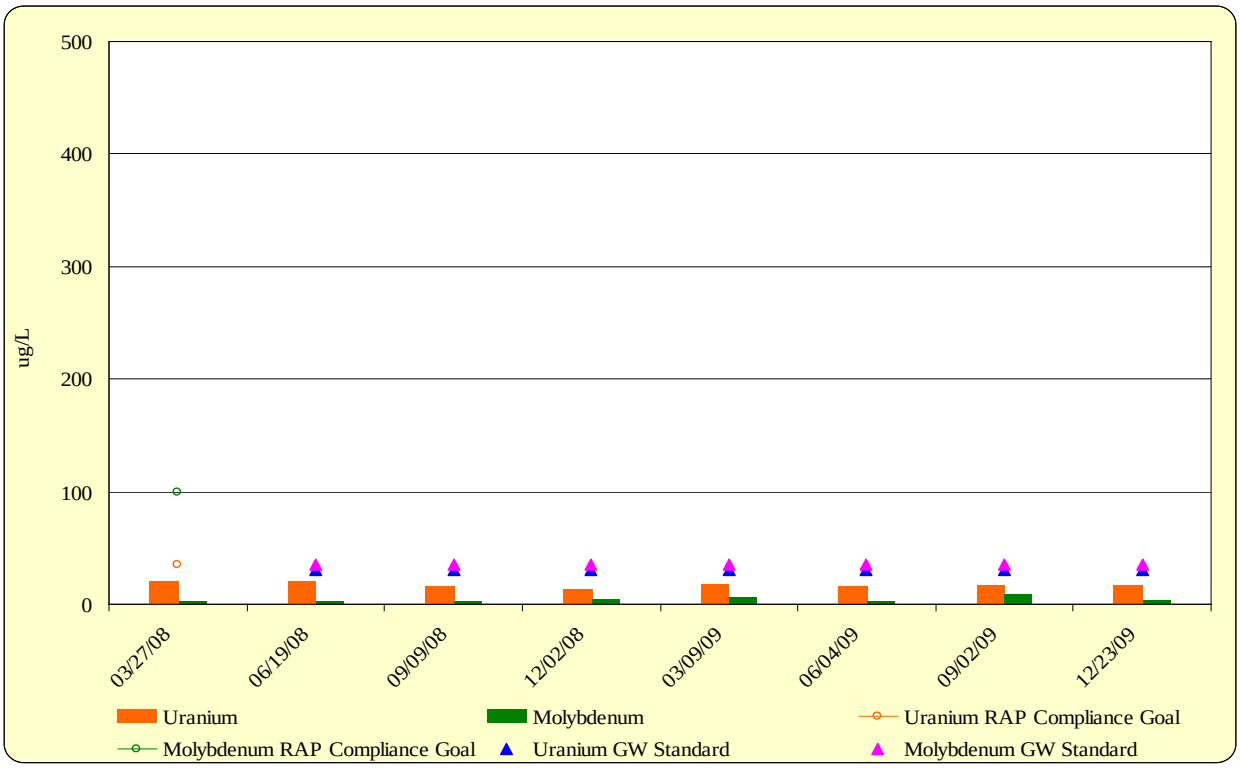
GC-4
Location 035
Uranium and Molybdenum



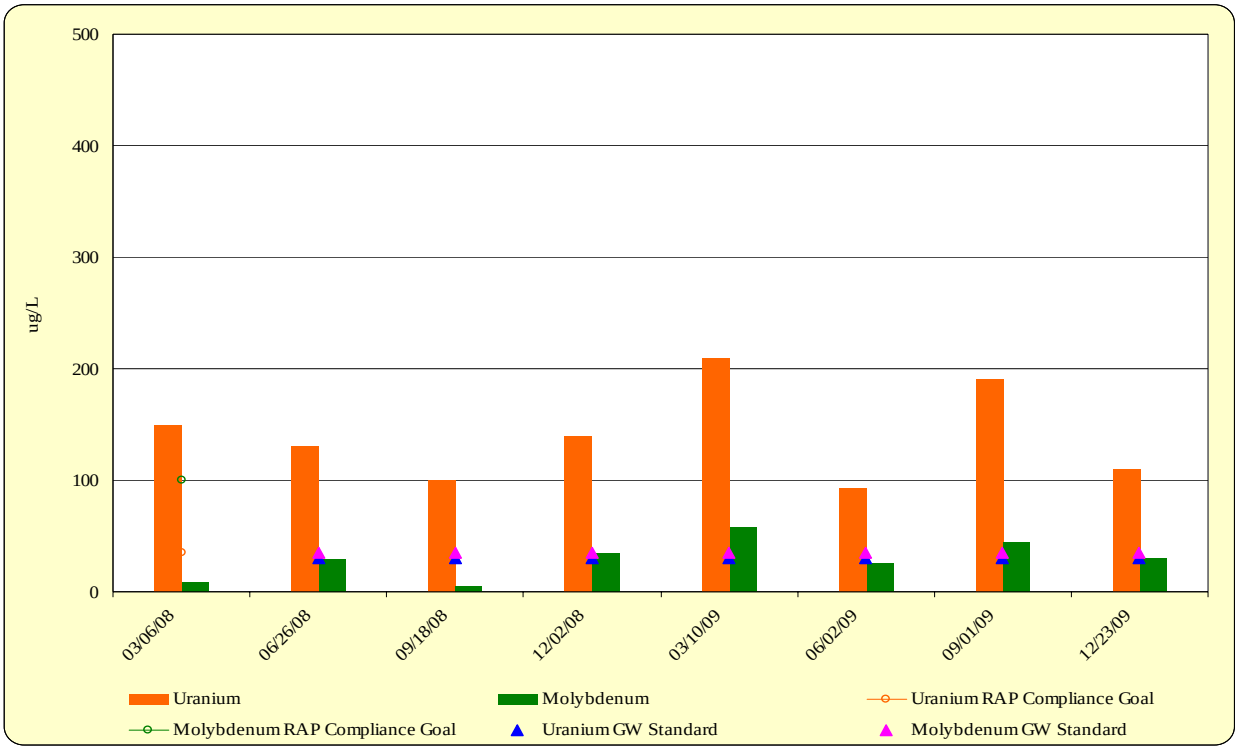
GC-5
Location 036
Uranium and Molybdenum



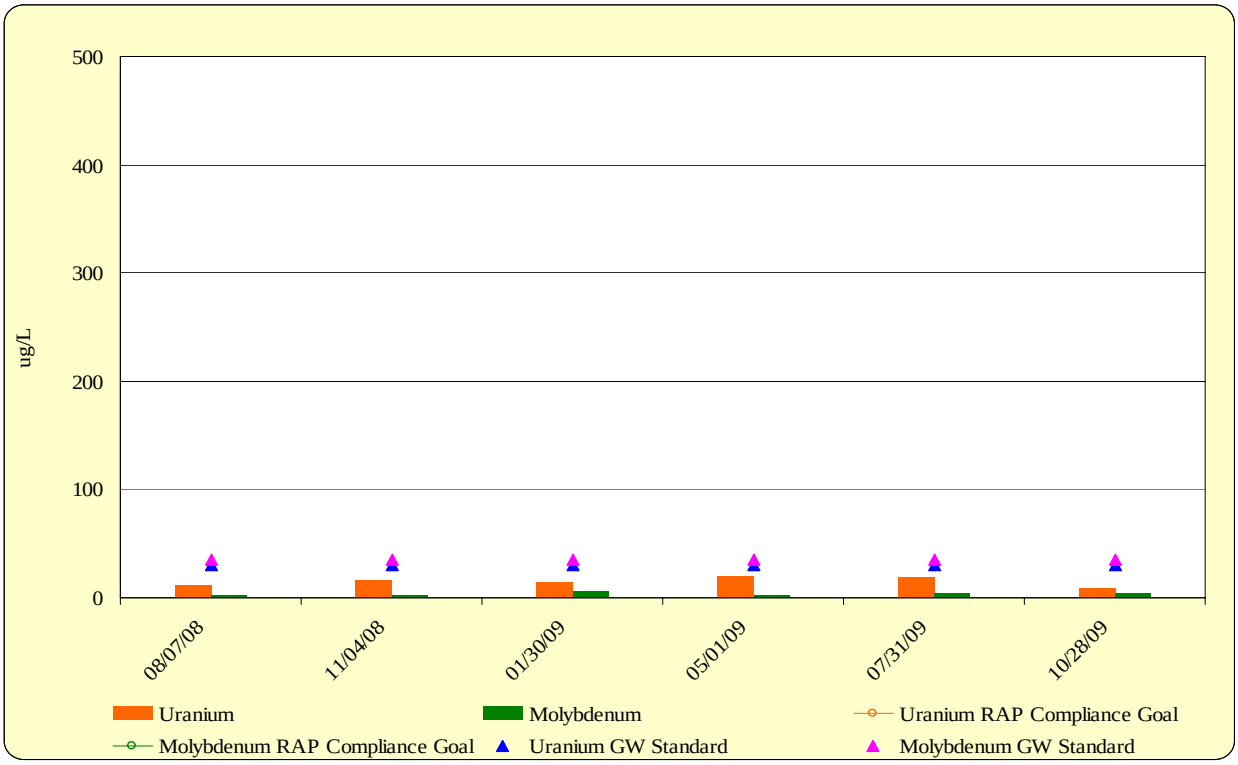
GC-6
Location 037
Uranium and Molybdenum



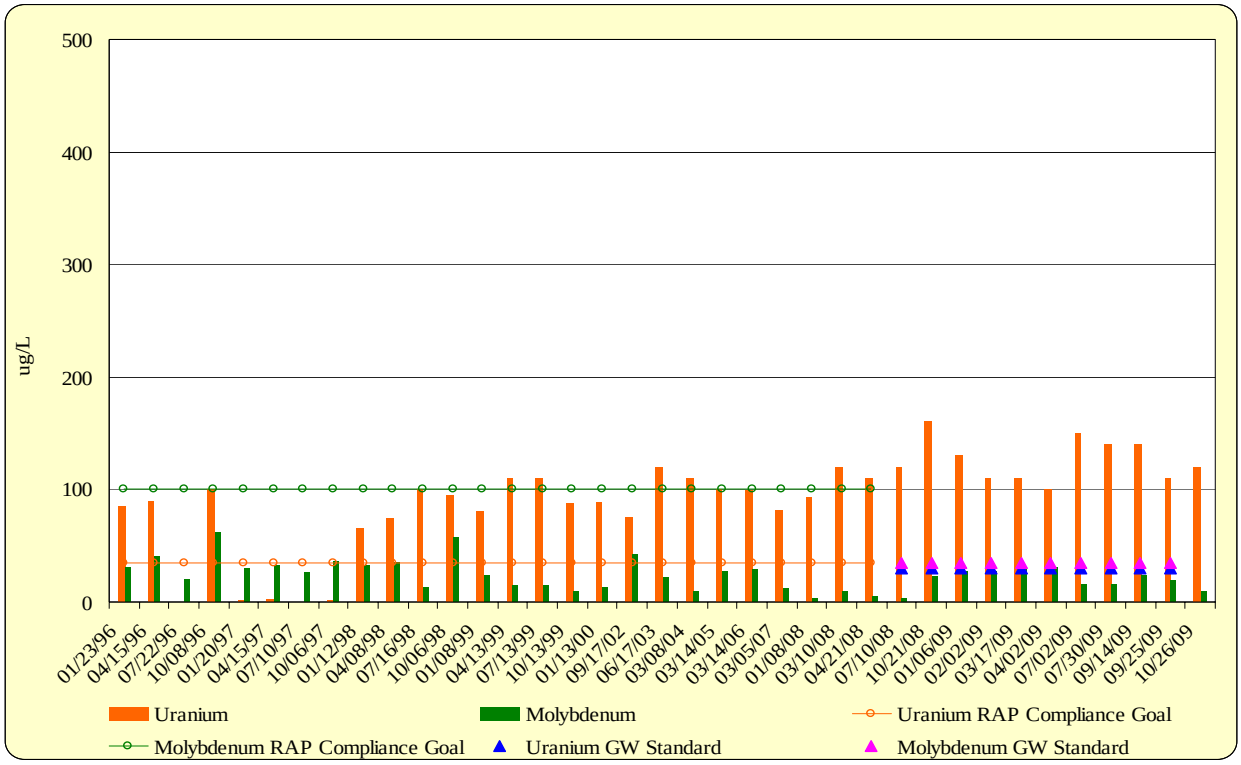
GC-7
Location 038
Uranium and Molybdenum



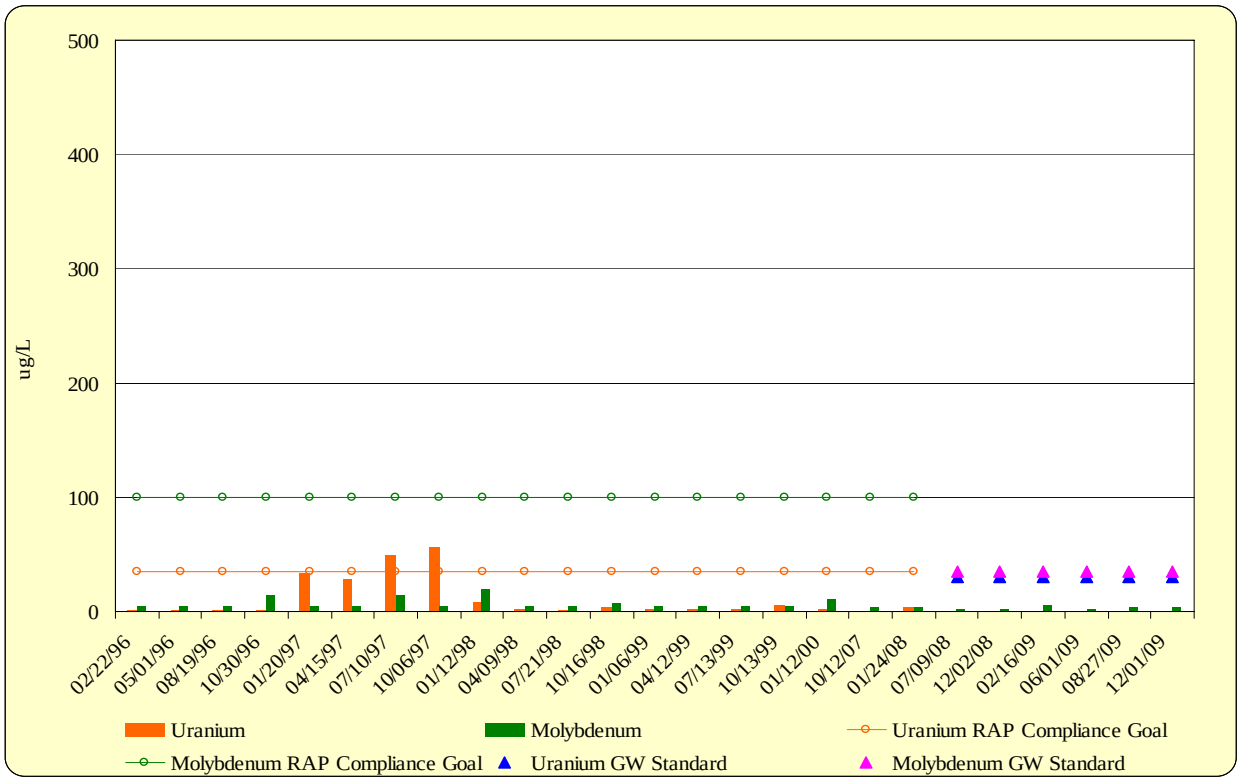
GC-8
Location 135
Uranium and Molybdenum



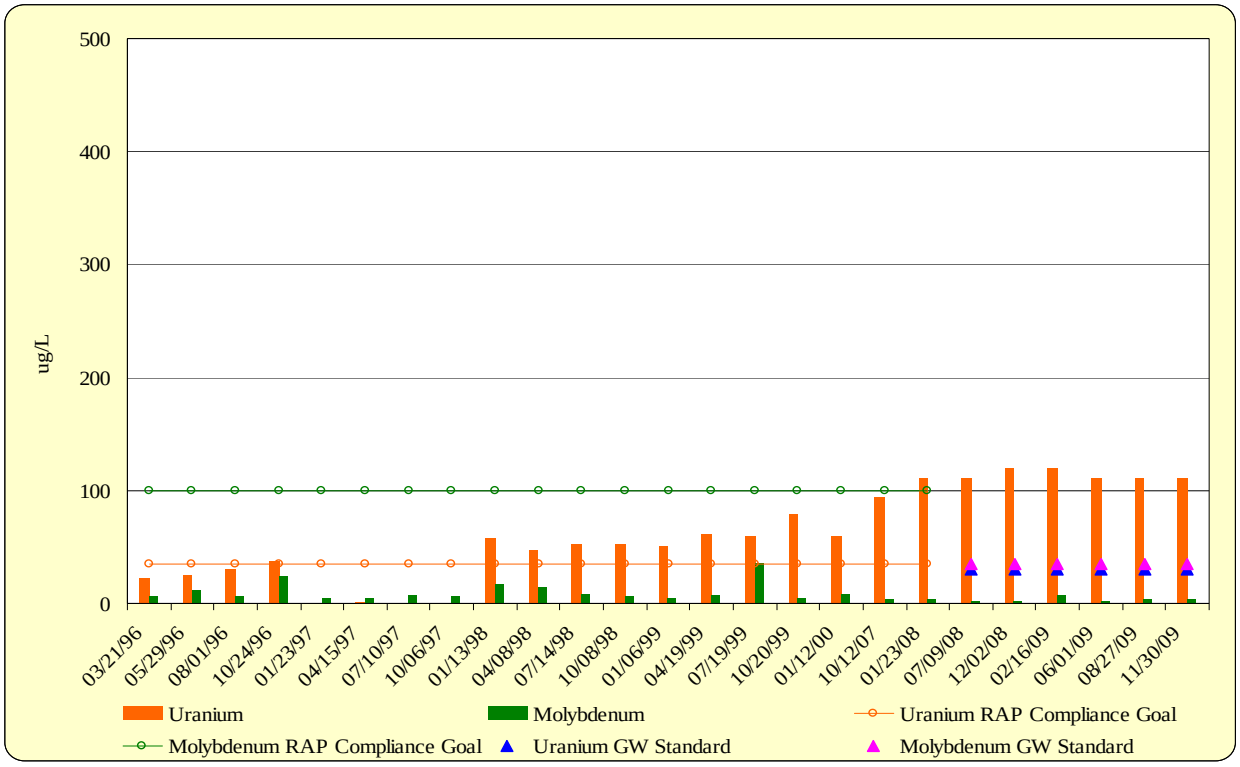
GC-9
Location 336
Uranium and Molybdenum



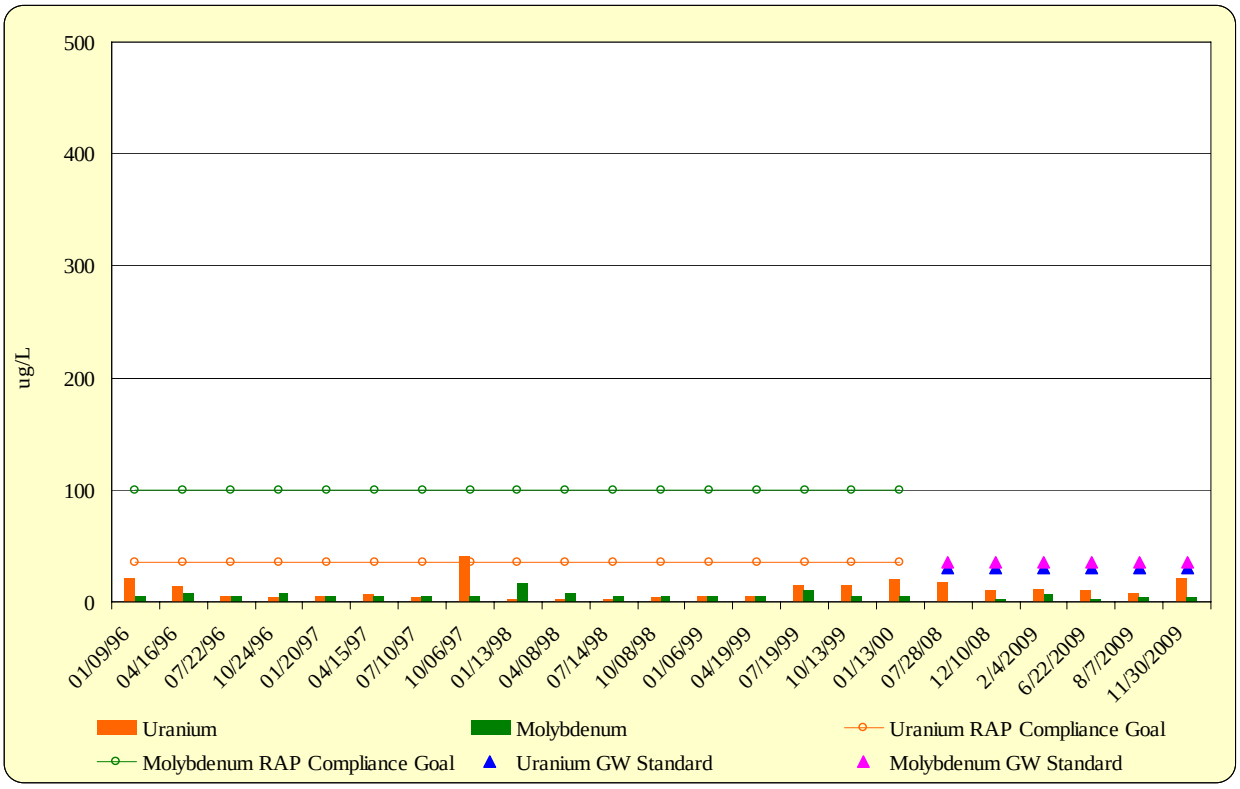
GC-10
Location 337
Uranium and Molybdenum



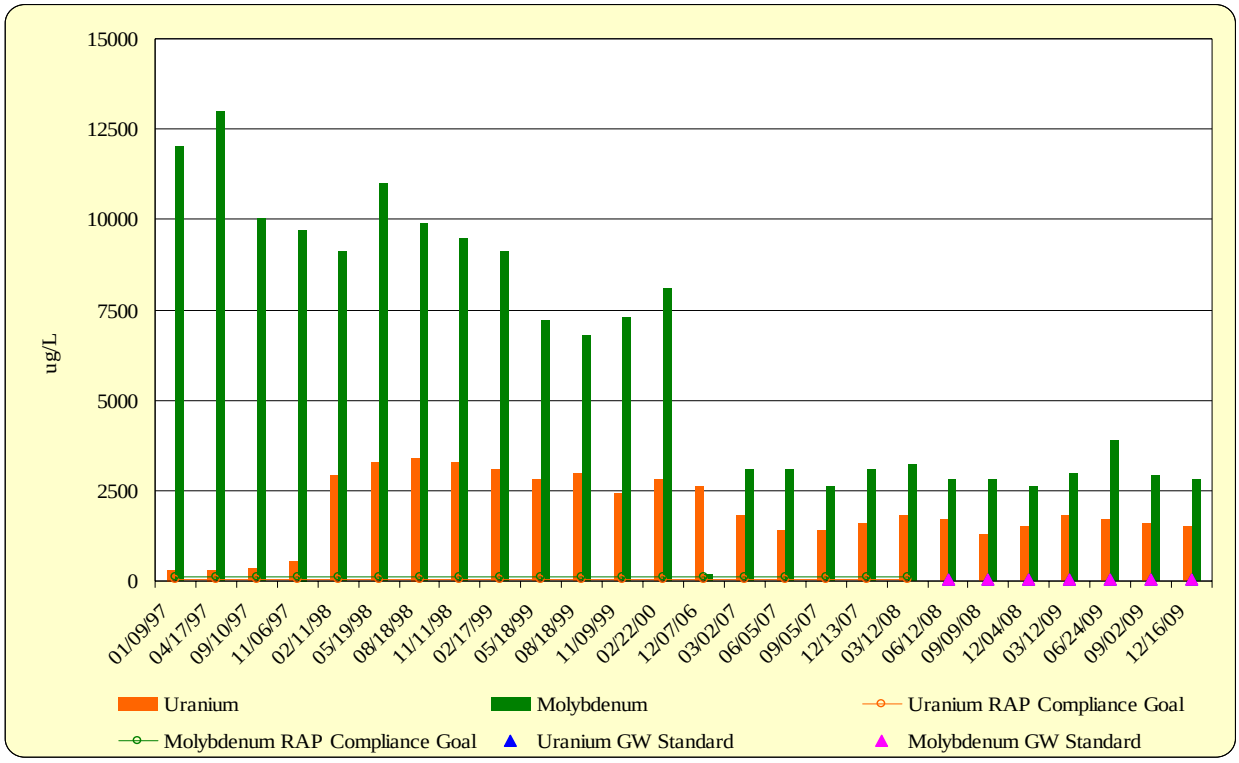
GC-11
Location 338
Uranium and Molybdenum



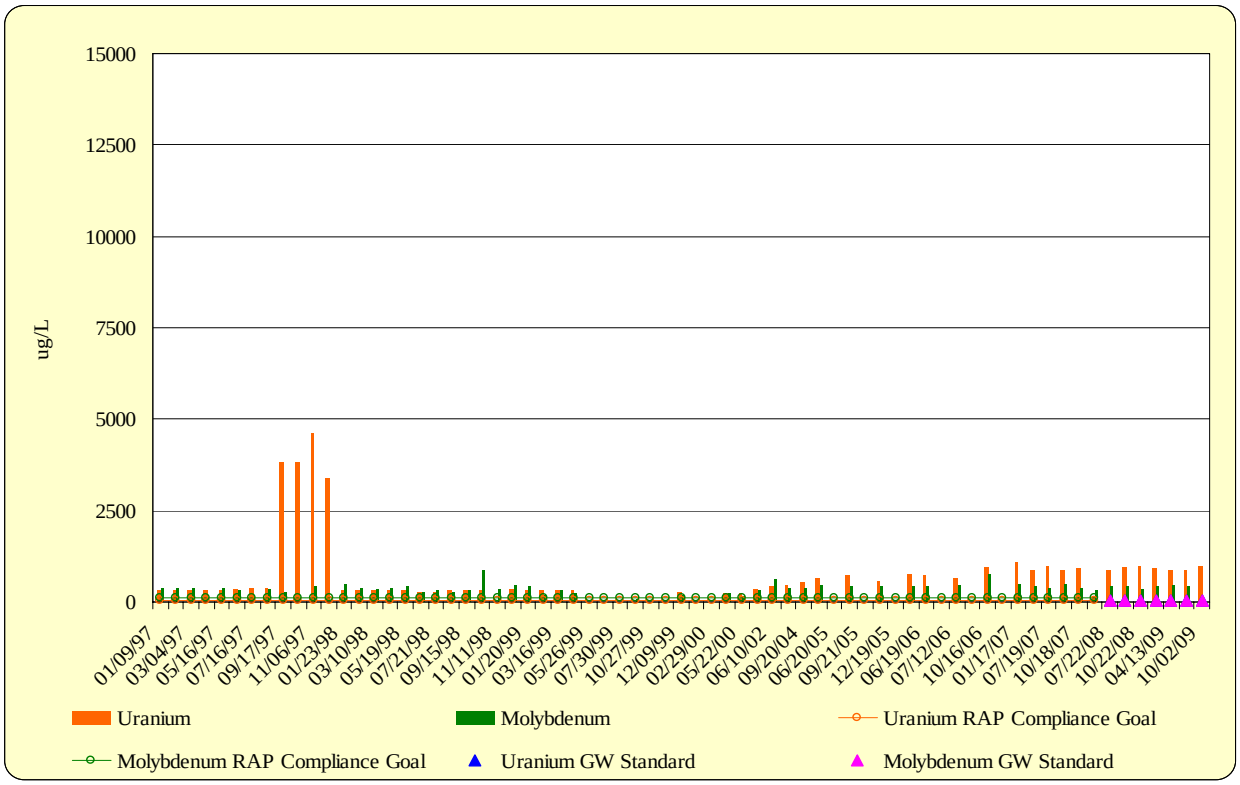
GC-12
Location 342
Uranium and Molybdenum



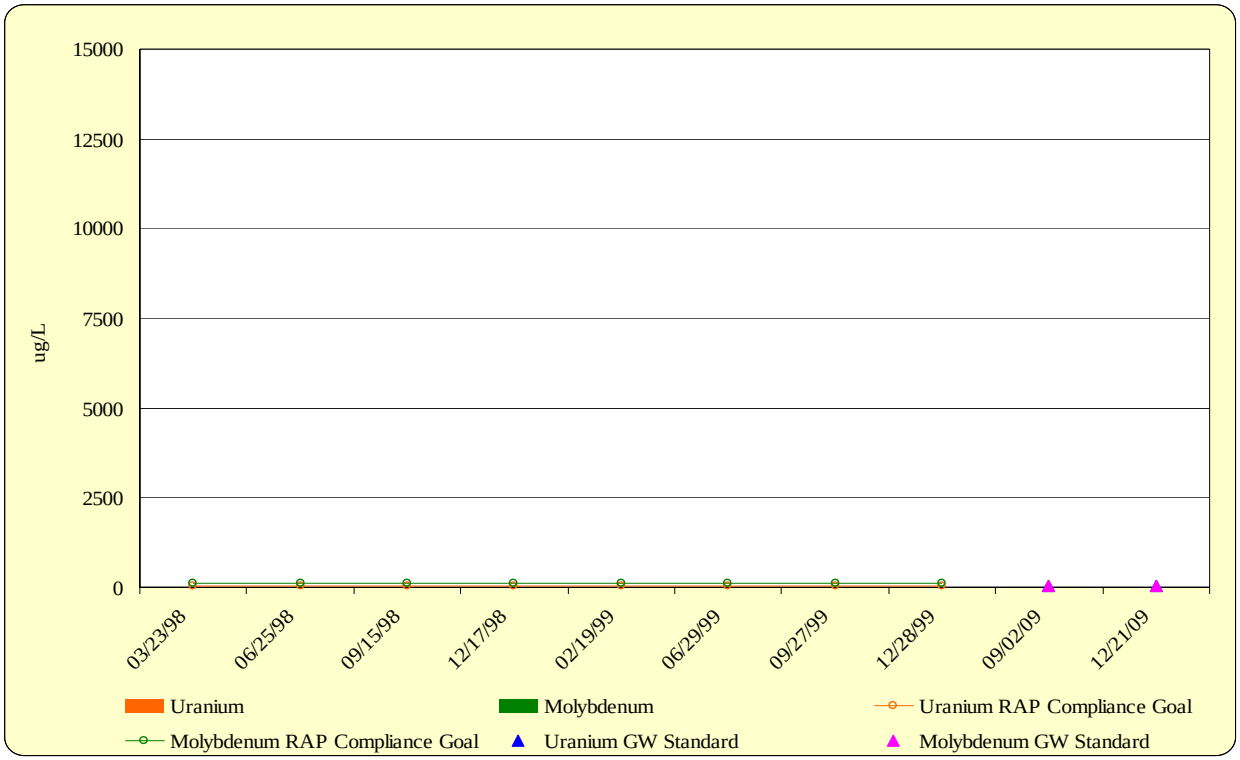
GC-13
Location 344
Uranium and Molybdenum



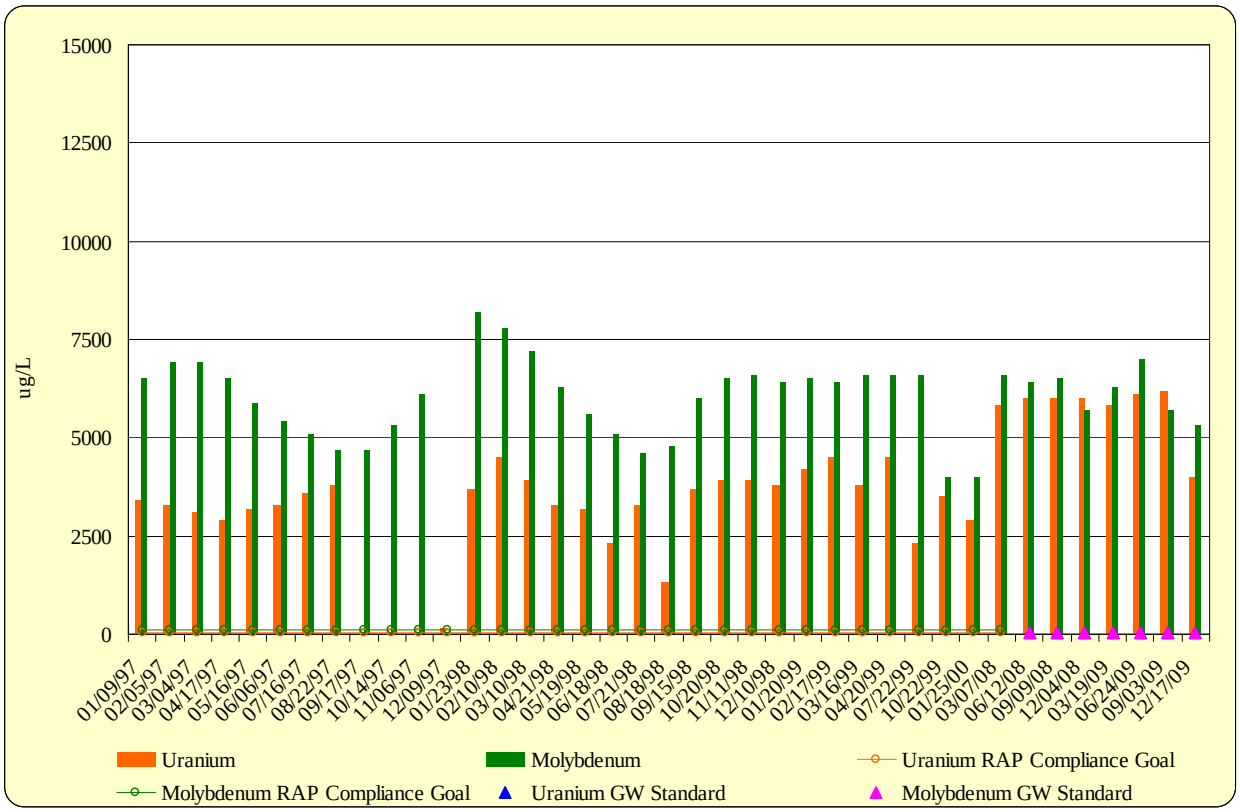
GC-14
Location 346
Uranium and Molybdenum



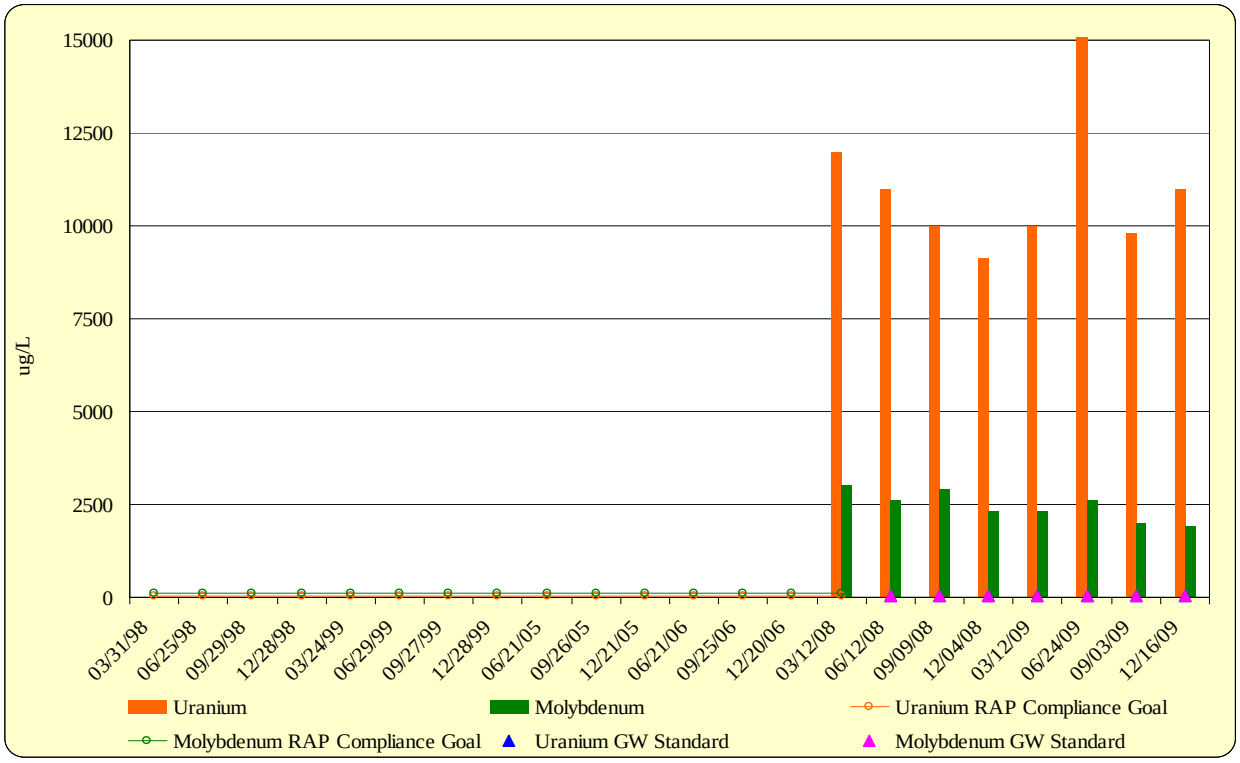
GC-15
Location 347
Uranium and Molybdenum



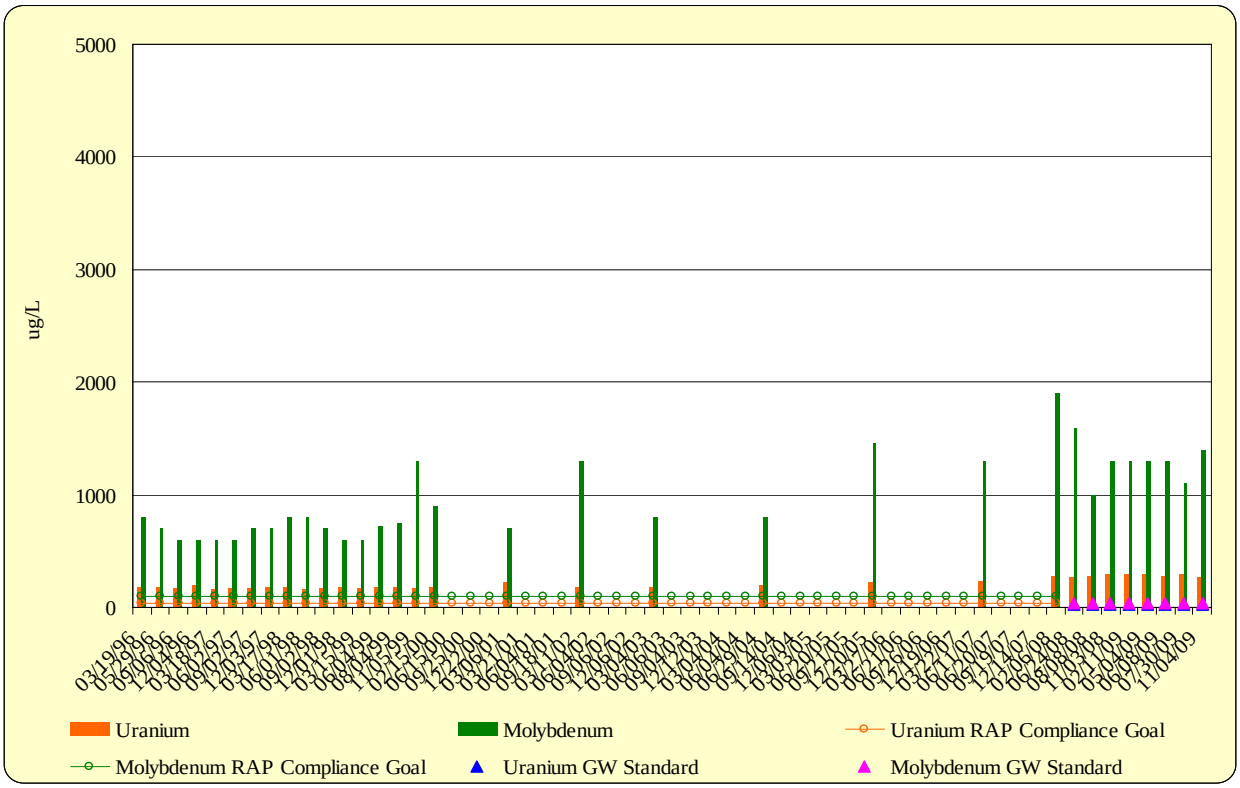
GC-16
Location 348
Uranium and Molybdenum



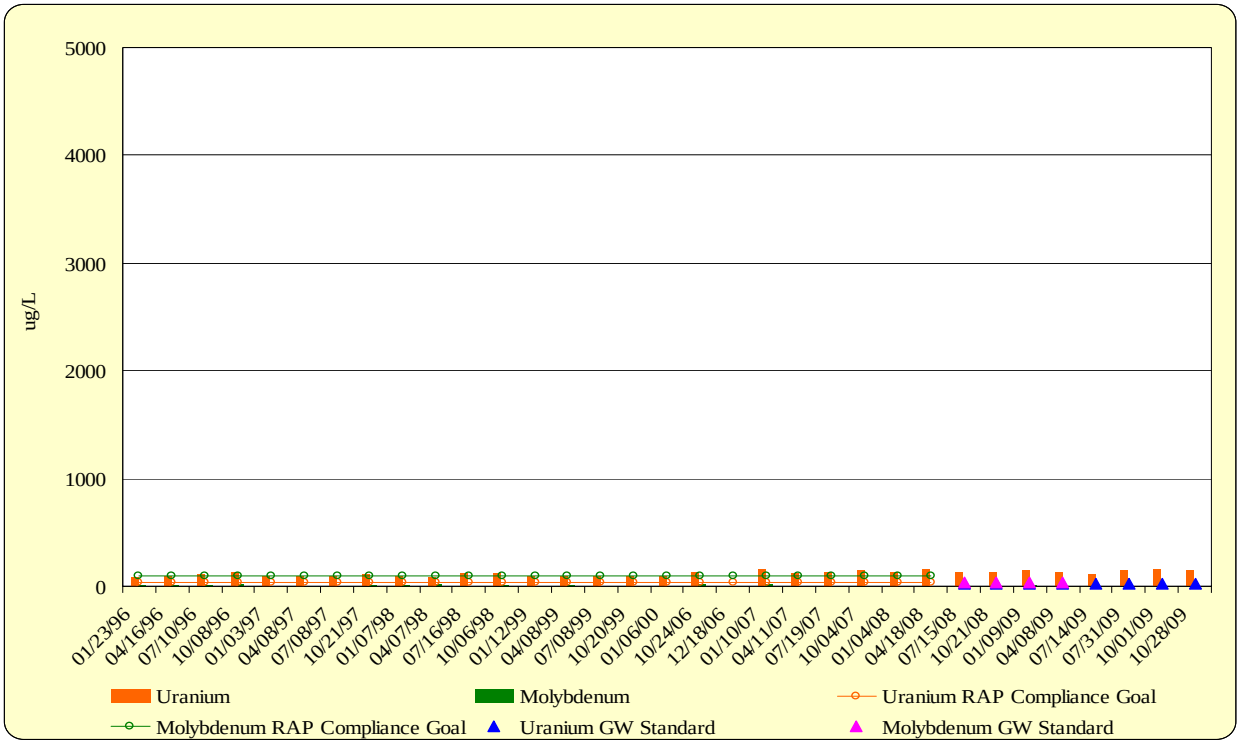
GC-17
Location 368
Uranium and Molybdenum



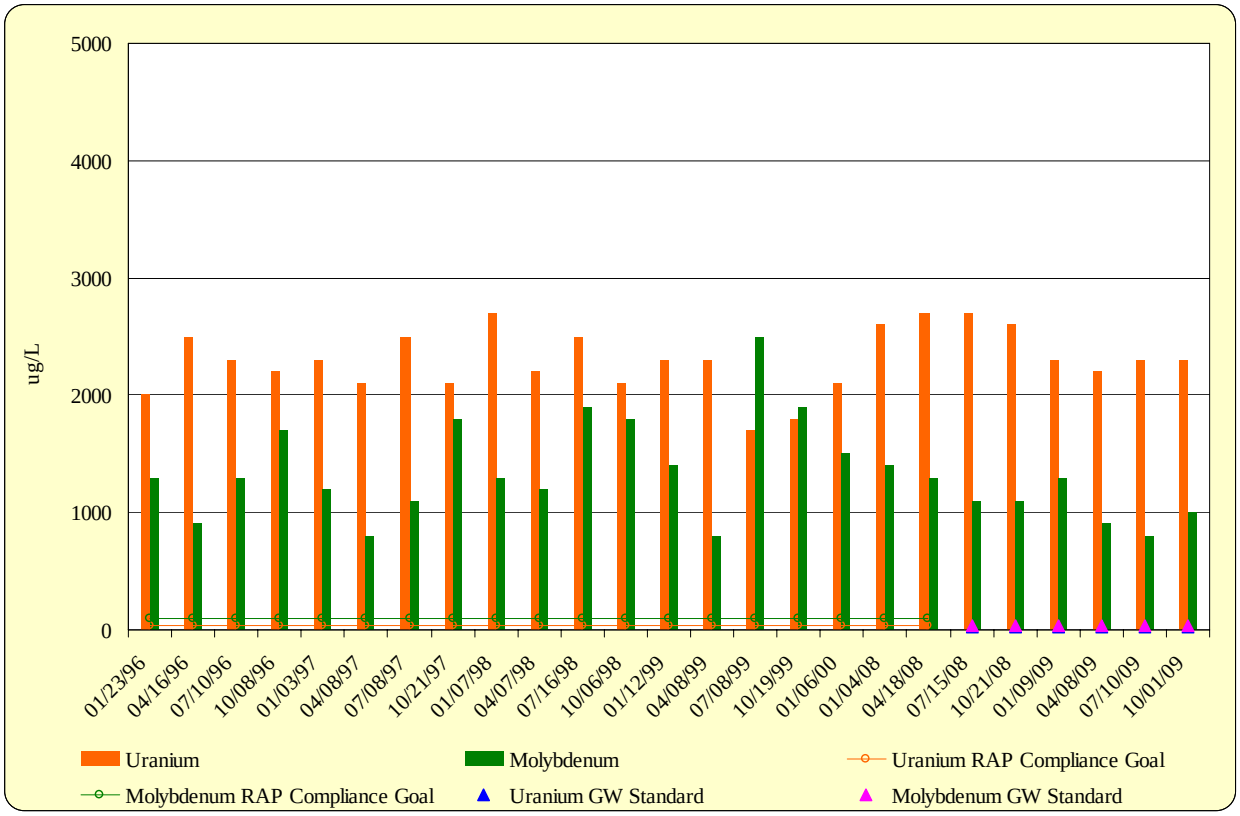
GC-18
Location 802
Uranium and Molybdenum



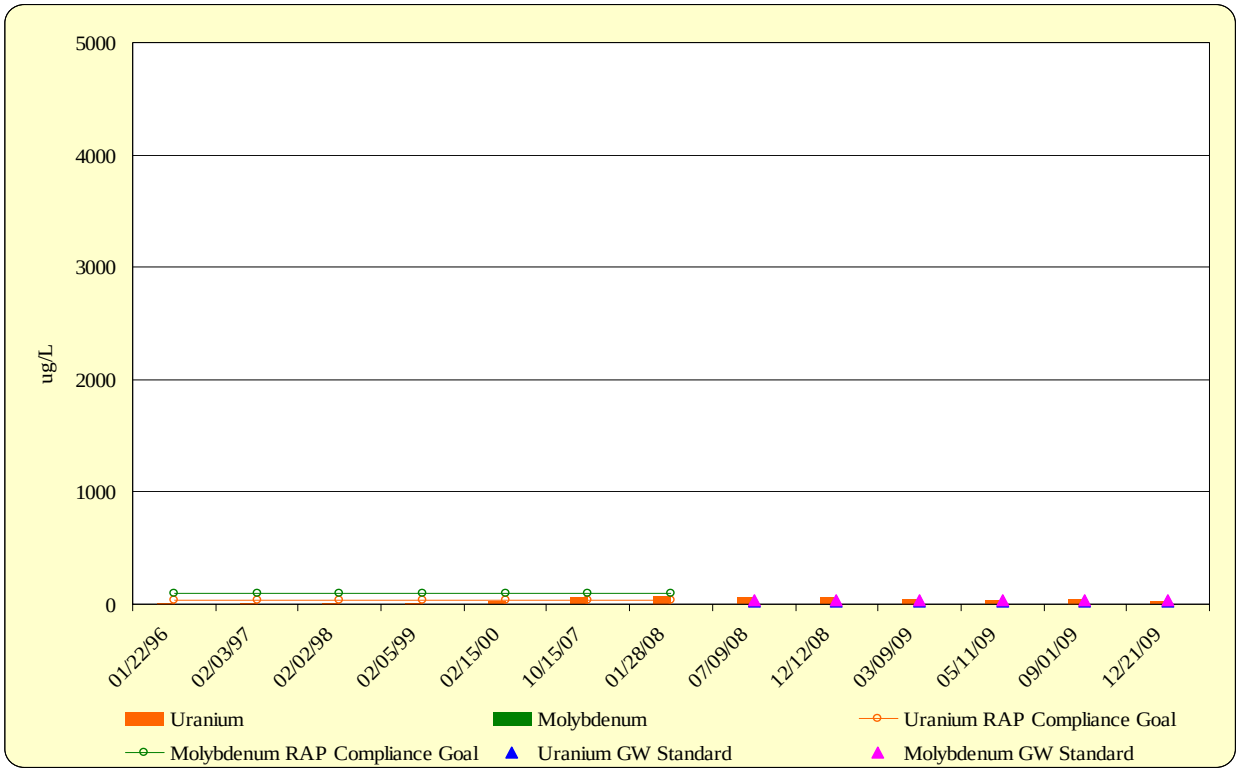
GC-19
Location 803
Uranium and Molybdenum



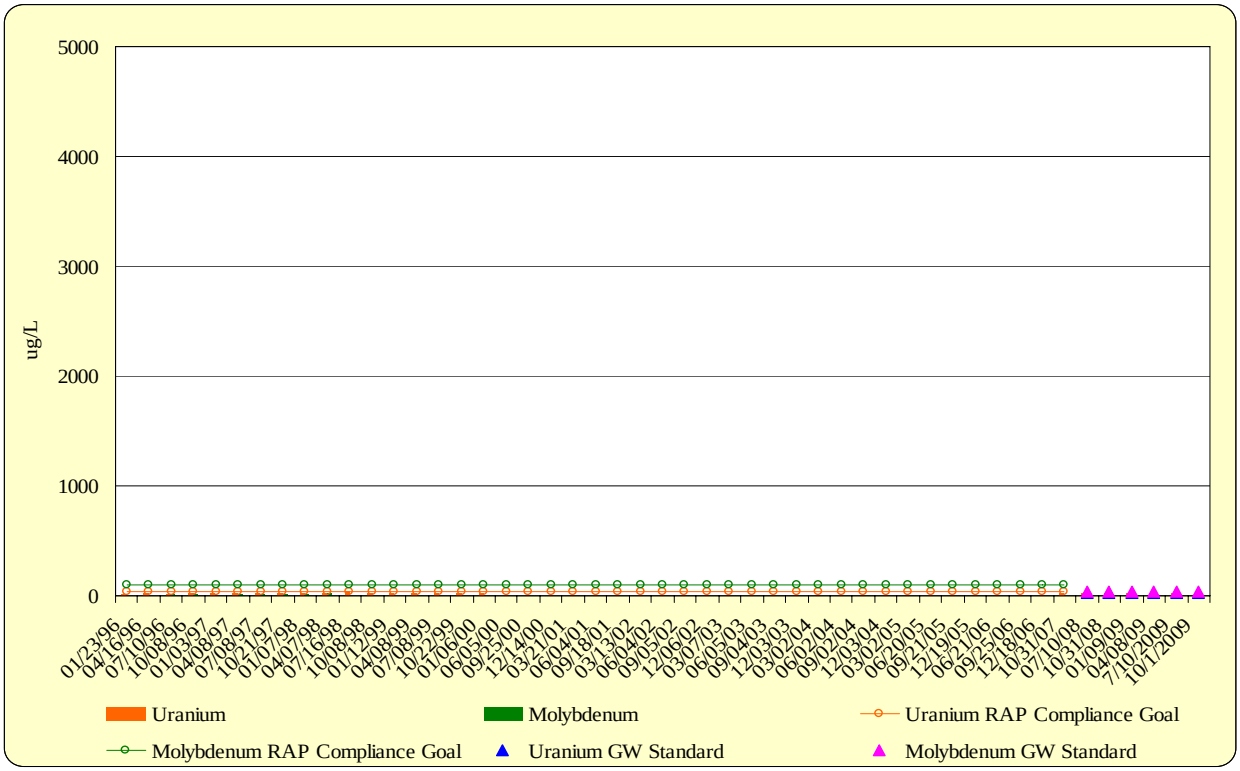
GC-20
Location 804
Uranium and Molybdenum



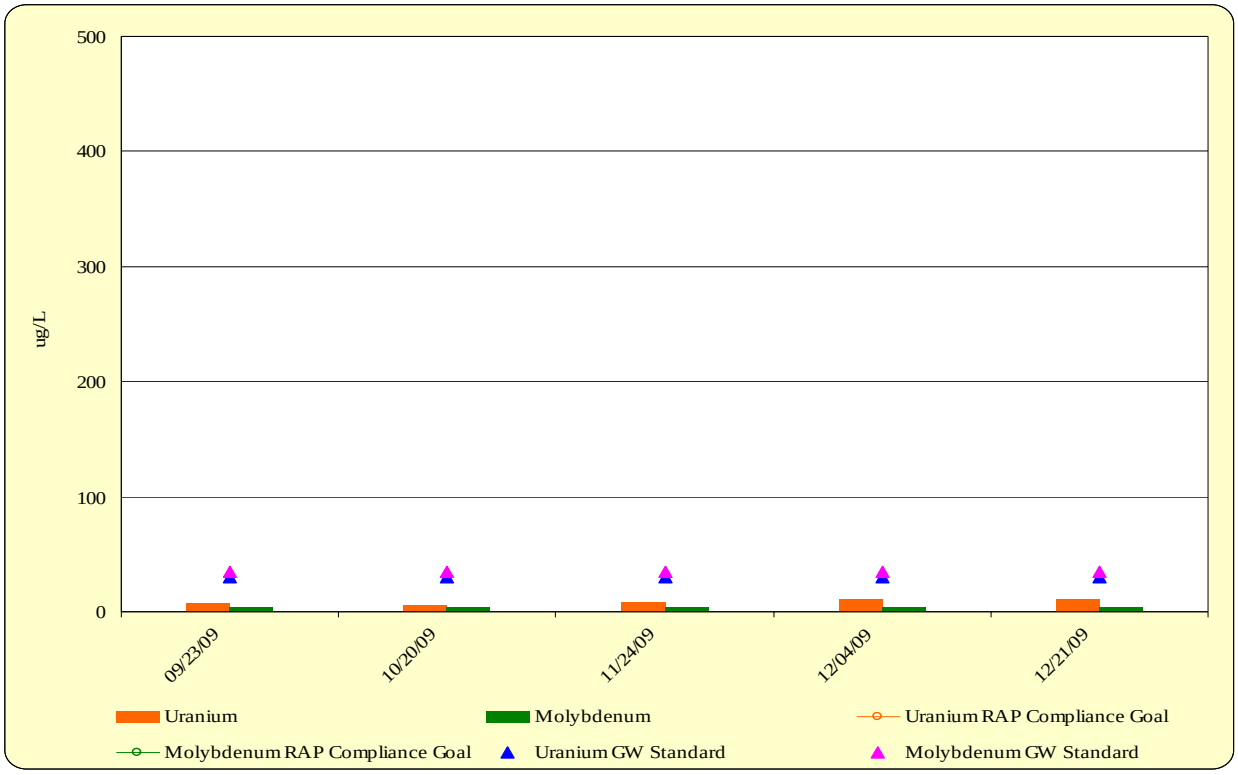
GC-21
Location 805
Uranium and Molybdenum



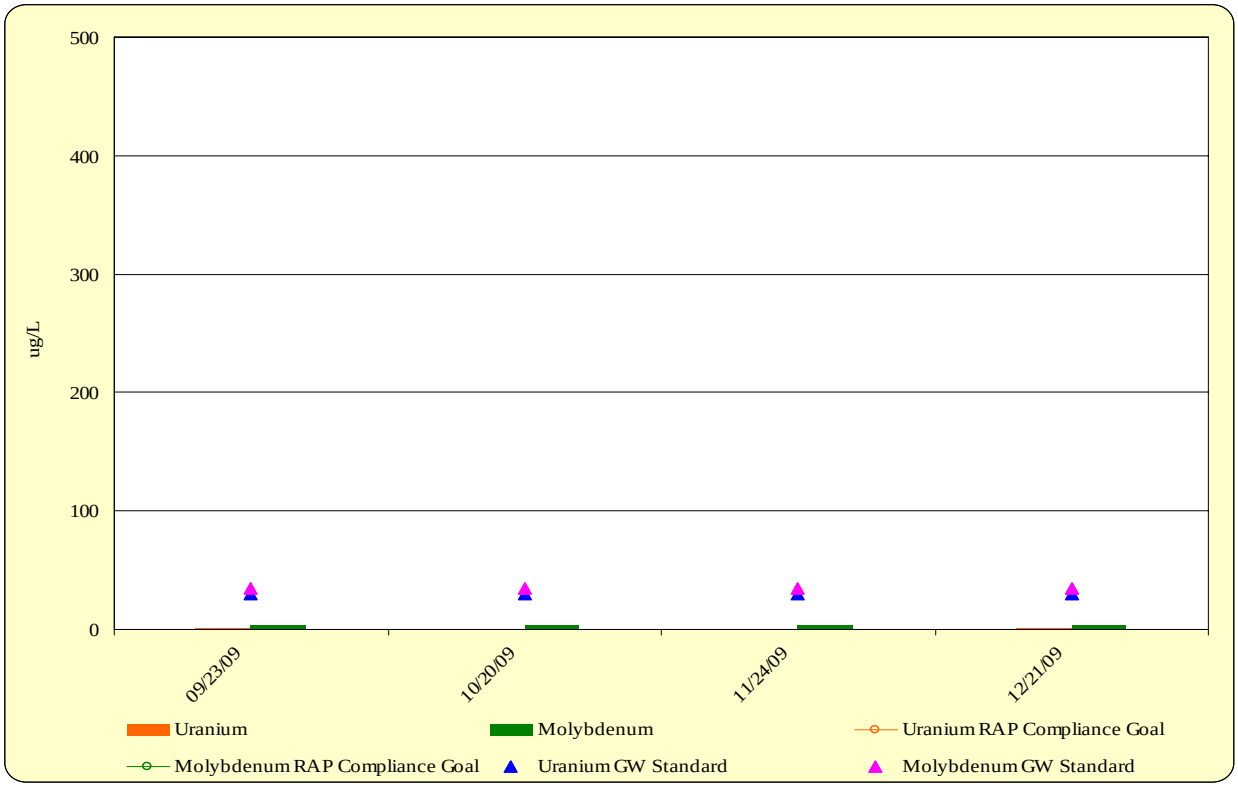
GC-22
Location 806
Uranium and Molybdenum



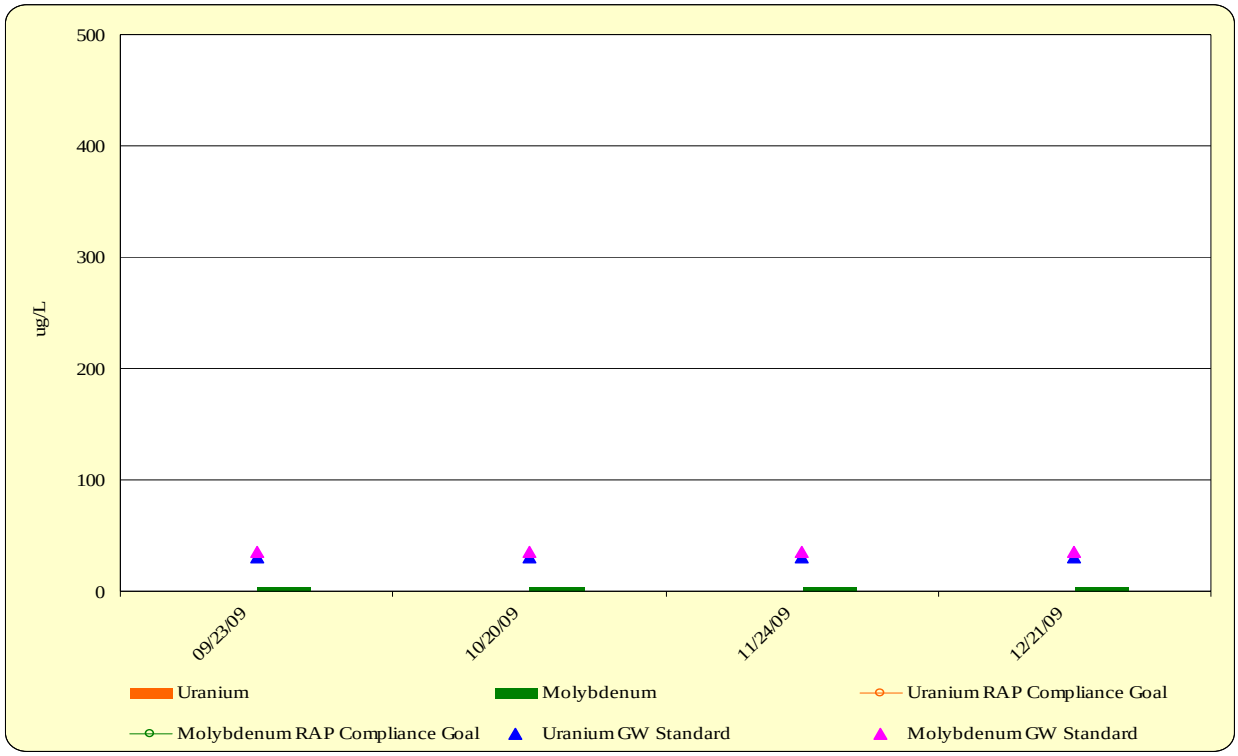
GC-23
Location 039
Uranium and Molybdenum



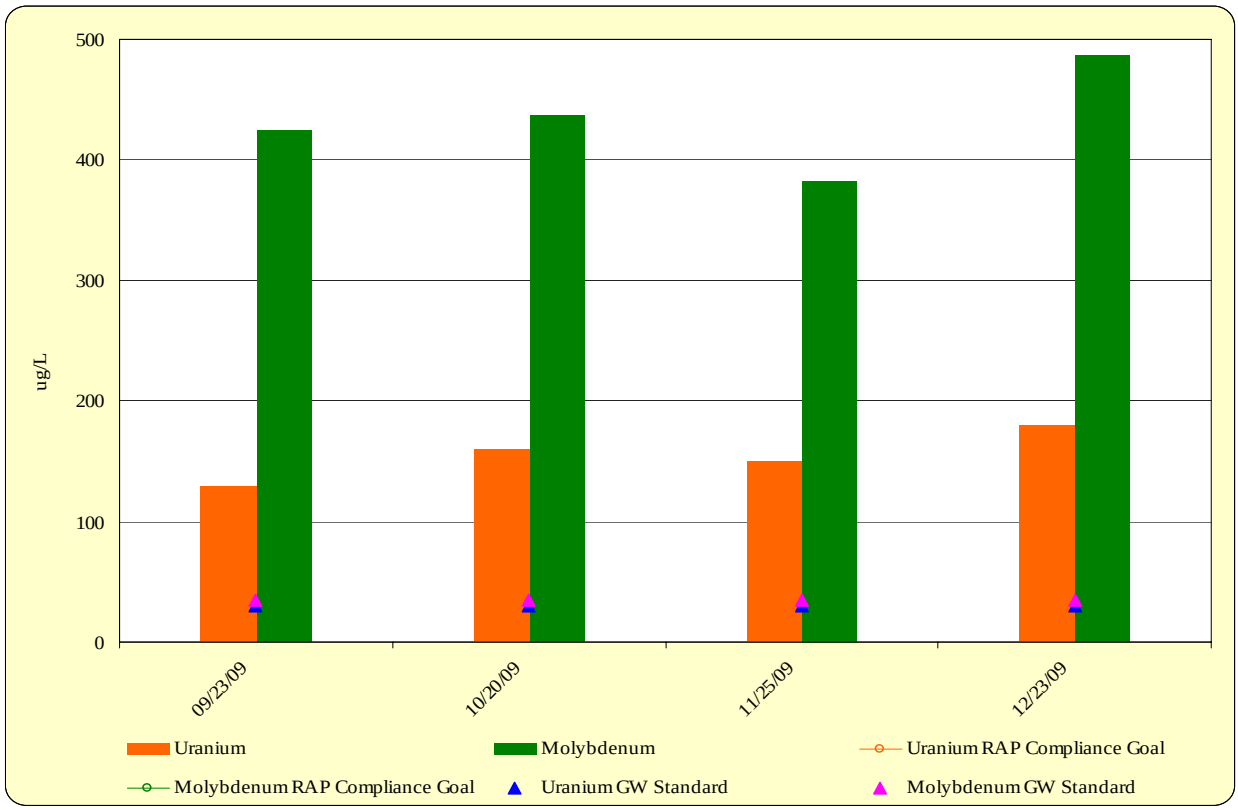
GC-24
Location 040
Uranium and Molybdenum



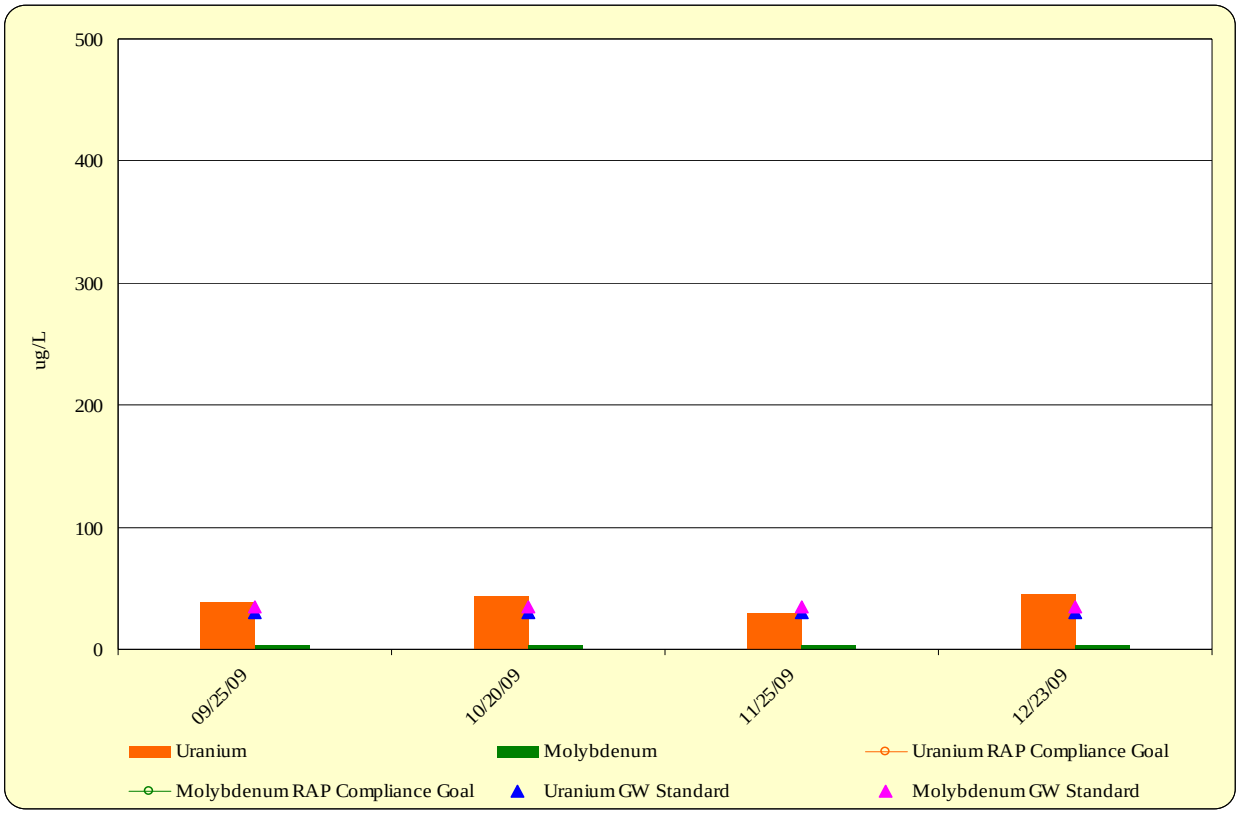
GC-25
Location 041
Uranium and Molybdenum



GC-26
Location 042
Uranium and Molybdenum



GC-27
Location 043
Uranium and Molybdenum



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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*.