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River Corridor
Closure Contract

Groundwater and Leachate Monitoring and Sampling at ERDF, CY 2010

June 2011

For Public Release

Washington Closure Hanford

Prepared for the U.S. Department of Energy, Richland Operations Office
Office of Assistant Manager for River Corridor

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Author Names: R. L. Weiss
B. L. Lawrence

Approval: W. A. Borlaug, Waste Operations Project Engineer

W. A. Borlaug
Signature

6/8/2011
Date

B. L. Lawrence, Waste Operations Environmental Project Lead

Signature

6/7/2011
Date

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EXECUTIVE SUMMARY

This document reports the findings of the groundwater and leachate monitoring and sampling at the Environmental Restoration Disposal Facility (ERDF) for calendar year (CY) 2010. The ERDF is a Hanford Site low-level mixed waste disposal facility that was brought into service on July 1, 1996. Baseline sampling and analytical data obtained from monitoring wells and the ERDF leachate collection system were used to determine contaminants of concern (COCs) and background conditions for long-term monitoring as described in the *Groundwater Protection Plan for the Environmental Restoration Disposal Facility* (BHI 1996) and to meet the requirements of the ERDF Record of Decision (ROD) (EPA 1995).

The purpose of this annual monitoring report is to evaluate the conditions of and identify trends for groundwater beneath the ERDF and report leachate results in fulfillment of the requirements specified in the ERDF ROD[2] and the ERDF Amended ROD (EPA 1999). The overall objective of the groundwater monitoring program is to determine whether ERDF has impacted the groundwater. This objective is complicated by the fact that the ERDF is situated downgradient of the numerous groundwater contamination plumes originating from the 200 West Area.

Each of the ERDF cells is constructed with a double-liner system for the purpose of collecting liquids, or leachate, that may travel through the waste materials stored at the disposal site. These liquids are typically generated from natural precipitation and the application of dust control water that percolates downward through the disposed waste materials and collects on the surface of the lining material. The primary liners and the secondary liners each are designed to deliver leachate to sump areas. Sumps for the primary liners are independent from the sumps associated with the secondary liners. The primary and secondary sumps at each of the cells are routinely evacuated, and the leachate is stored in holding tanks prior to transfer to the Effluent Treatment Facility.
The leachate in these storage tanks is sampled semiannually to provide data for leachate delisting analyses and to assess whether additional COCs should be added to the routine ERDF groundwater monitoring program.

The ERDF groundwater monitoring program is part of the larger Hanford Site groundwater monitoring program, in which groundwater sampling is conducted across the entire Hanford Site. Groundwater samples are collected semiannually from four monitoring wells in the vicinity

of the ERDF. The monitoring well network consists of one upgradient well (699-36-70A) and three downgradient wells (699-37-66, 699-35-66A, and 699-36-66B). Groundwater monitoring wells in the ERDF well network have exhibited a gradual rate of decline in water levels since monitoring was initiated in September 1995. Water-level measurements collected during CY 2010 from wells 699-35-66A and 699-36-70A show a rate of decline that may be starting to stabilize.

Based on the CY 2010 analytical results, the statistical analysis of monitoring data, an evaluation of leachate monitoring data, and a review of the water-level measurement data, the following information is offered:

Nitrogen, carbon tetrachloride, gross beta, technetium-99, iodine-129, and uranium present in samples collected from the ERDF monitoring wells are due to the migration of contaminants from non-ERDF sources in the 200 West Area. The two new groundwater wells (699-37-66 and 699-36-66B) appear to have been placed within the existing groundwater contamination plume that has been slowly moving in the downgradient direction from ERDF. This may extend the time period needed to allow the contaminant peak from historical releases in the 200 West Area to pass the downgradient wells due to the increased travel time of the groundwater between monitoring locations. The contaminant peak appears to have passed the upgradient well around CY 2005, establishing a slight downward trend in contamination levels there.

Groundwater activity from gross beta indicates a long-term upward trend in the downgradient wells with the upgradient well showing some decline after peaking in 2000 and 2001 and has remained below the upper tolerance level following 2004. Groundwater activity from uranium has remained stable with a downward trend. Groundwater activity from gross alpha showed upward spikes from wells during the March sampling and downward spikes in wells during the September; however, the overall trend indicates that gross alpha has been stable. Although levels of technetium-99 are below the upper tolerance interval, the downgradient wells have shown a trend of increasing concentrations, while the upgradient well has shown a trend of decreasing concentrations. This is a good indication that the groundwater contaminant plume from the 200 West Area is moving in the easterly direction and beginning to impact the downgradient wells. Groundwater activity from uranium, gross alpha, and gross beta will continue to be monitored in future sampling to evaluate the data for adverse impacts from ERDF leachate to the groundwater at this location.

Arsenic concentrations remain well below Hanford Site background reference values. Historical analysis has shown similar periodic spikes in the groundwater data, while September 2009 samples show concentrations in the wells back within the general trend line. No Hanford Site-derived sources for arsenic have been identified for potential impact in the groundwater under ERDF. Pre-Hanford use of arsenic in agriculture may be the source of this contamination.

Chromium levels in the downgradient well 699-35-66A have historically been elevated, and after slightly increasing appear to have stabilized at a level greater than the upper tolerance interval. All other wells are stable at a level below the upper tolerance interval. The source of the elevated levels do not appear to be ERDF related and appear to be related to the groundwater contaminant plume from the 200 West Area.

Total organic halide concentrations significantly spiked in downgradient wells during CY 2006 monitoring and were detected again in the newly installed downgradient wells in CY 2008 sampling. The two new groundwater wells (699-37-66 and 699-36-66B) appear to have been placed within the existing groundwater contamination plume that has been slowly moving in the downgradient direction from ERDF. Analysis has shown periodic spikes in the groundwater data in the past. No correlations can be seen between total organic halide results and the volatile organic analyses (VOA) performed at the same time (VOA will report unexpected detections of chlorinated organics, the most likely contributor to total organic halide results). Total organic halide analysis is only an indicator analysis. Any future indication of consistent contamination will be evaluated to establish the source and composition of the compounds.

Trends in the leachate indicate decreasing gross alpha, gross beta, and uranium activity in samples collected over the past 3 years. Analysis of the radionuclide data indicates an apparent correlation of the increasing uranium levels and waste from specific field remediation sites disposed of at ERDF. Since 2005, ERDF has accepted 4.6 million tons of waste, much of which contained uranium, alpha, and beta activity. This volume of waste is expected to increase concentrations of the more soluble elements over time. Groundwater monitoring data for these constituents were examined to determine potential impacts to groundwater from ERDF operations.

Based on this CY 2010 data evaluation, there has been no correlation between leachate COC levels and groundwater COC levels that would indicate the leachate is impacting the groundwater under ERDF. Therefore, no additional analytes are recommended for the groundwater monitoring program or the routine leachate sampling. The current monitoring frequency appears to be appropriate for future monitoring needs.

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ACRONYMS

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
COC	contaminant of concern
CY	calendar year
ERDF	Environmental Restoration Disposal Facility
ERDF GPP	*Groundwater Protection Plan for the Environmental Restoration Disposal Facility*
ETF	Effluent Treatment Facility
RCRA	*Resource Conservation and Recovery Act of 1976*
ROD	Record of Decision
SAP	sampling and analysis plan

1.0 INTRODUCTION

The Environmental Restoration Disposal Facility (ERDF) is a Hanford Site low-level mixed waste disposal facility that was brought into service on July 1, 1996. Baseline sampling and analytical data obtained from monitoring wells and the ERDF leachate collection system were used to determine contaminants of concern (COCs) and background conditions for long-term monitoring as described in the *Groundwater Protection Plan for the Environmental Restoration Disposal Facility* (ERDF GPP) (BHI 1996) and to meet the requirements of the ERDF Record of Decision (ROD) (EPA 1995). Based on about 10 years of ERDF monitoring activities and statistical evaluations of the data, the ERDF GPP (WCH 2008b) was revised and a new *Environmental Restoration Disposal Facility Leachate Sampling and Analysis Plan* (SAP) (WCH 2008a) was approved. Any new requirements or changes in evaluation that were recommended by the new ERDF GPP and SAP are included in this report and will be in future reports. Ongoing groundwater and leachate monitoring are performed to meet the requirements of the ERDF ROD, and details of the monitoring program are described in the revised ERDF GPP (WCH 2008b) and the ERDF Amended ROD (EPA 1999).

1.1 PURPOSE AND OBJECTIVES

The purpose of this annual monitoring report is to evaluate the conditions of and identify trends for groundwater beneath the ERDF, and to report leachate results in fulfillment of the requirements specified in the ERDF ROD (EPA 1995) and the ERDF Amended ROD (EPA 1999). The objectives of this report are as follows:

- Review routine groundwater sampling data to statistically evaluate if there have been changes in COC concentrations over time that may be attributed to ERDF operations
- Assess conditions that may indicate the presence of encroaching groundwater contaminant plumes originating from upgradient sources in the 200 West Area
- Assess data from routine ERDF leachate sampling to determine if additional constituents should be added to the ERDF groundwater monitoring COCs list and to confirm that leachate concentrations do not exceed delisting levels specified in the ERDF Amended ROD (EPA 1999)
- Evaluate the groundwater levels in the ERDF monitoring wells to determine if the existing wells need to be modified or replaced
- Describe and evaluate the sample data, identify changes or trends in the data, and incorporate a summary of the results.

Appendix A shows analytical results for groundwater samples that were collected from the ERDF monitoring well network from calendar year (CY) 1996 through CY 2010. Appendix B graphically shows trends in the monitoring data resulting from routine groundwater sampling in the ERDF well network. The most recent 3 years of leachate analytical results for samples collected from CY 2008 through CY 2010 are presented in Appendix C. Leachate data collected from CY 1996 through CY 2008 are contained in previous ERDF groundwater and leachate monitoring reports (Faurote 2000; BHI 2002, 2003, 2004, 2005; WCH 2006, 2007, 2008a, 2009, 2010).

2.0 BACKGROUND

2.1 GENERAL DESCRIPTION

The ERDF site is located between the 200 East and 200 West Areas of the Hanford Site (Figure 2-1). This location was selected for the ERDF over other possible locations because of the depth to groundwater in this area, its location above pre-existing groundwater plumes, the relatively flat topography in this area, and the compatibility of this location with stakeholder recommendations.

The ERDF landfill is authorized under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA). The landfill was designed to meet the *Resource Conservation and Recovery Act of 1976* (RCRA) minimum technology requirements; however, the ERDF is not permitted as a RCRA facility. Wastes disposed at ERDF contain elevated levels of radionuclides and hazardous constituents originating from the 100, 200, and 300 Area waste sites.

2.2 ENVIRONMENTAL RESTORATION DISPOSAL FACILITY

ERDF was designed as a series of side-by-side cells that measure 21.3 m (70 ft) in depth, 152.4 by 152.4 m (500 ft) wide at the base, with a wall slope of 3:1 to measure over 304 m (1,000 ft) wide at the surface. There are currently ten waste cells associated with the ERDF site. Initially, cells 1 and 2 were constructed and the placement of waste in these cells has since been completed. An interim cover has been constructed over these cells consisting of a plastic membrane and 30.5 m (1 ft) of soil. Cells 3 and 4 were constructed in 2000 and the placement of waste in these cells has been completed. Construction of cells 5 and 6 was completed during 2004 and cells 7 and 8 started receiving waste during the first half of CY 2009. Construction of super cells 9 and 10 was completed in early 2011. Figure 2-2 shows the ERDF as it is currently constructed. Throughout CY 2010, approximately 1,625,050 metric tons of remediation wastes were disposed at the facility.

2.2.1 Leachate System

Each of the ERDF cells was constructed with a double-liner system for the purpose of collecting liquids, or leachate, that may travel through the waste materials stored at the disposal site. These liquids are typically generated from natural precipitation and the application of dust control water that percolates downward through the disposed waste materials and collects on the surface of the lining material. The primary (upper) and secondary (lower) liners each are designed to deliver leachate to sump areas. Sumps for the upper liners are independent from the sumps associated with the lower liners. The upper and lower sumps at each of the cells are routinely evacuated, and the leachate is stored in holding tanks prior to transfer to the Effluent Treatment Facility (ETF).

Figure 1. Location of the Environmental Restoration Disposal Facility.

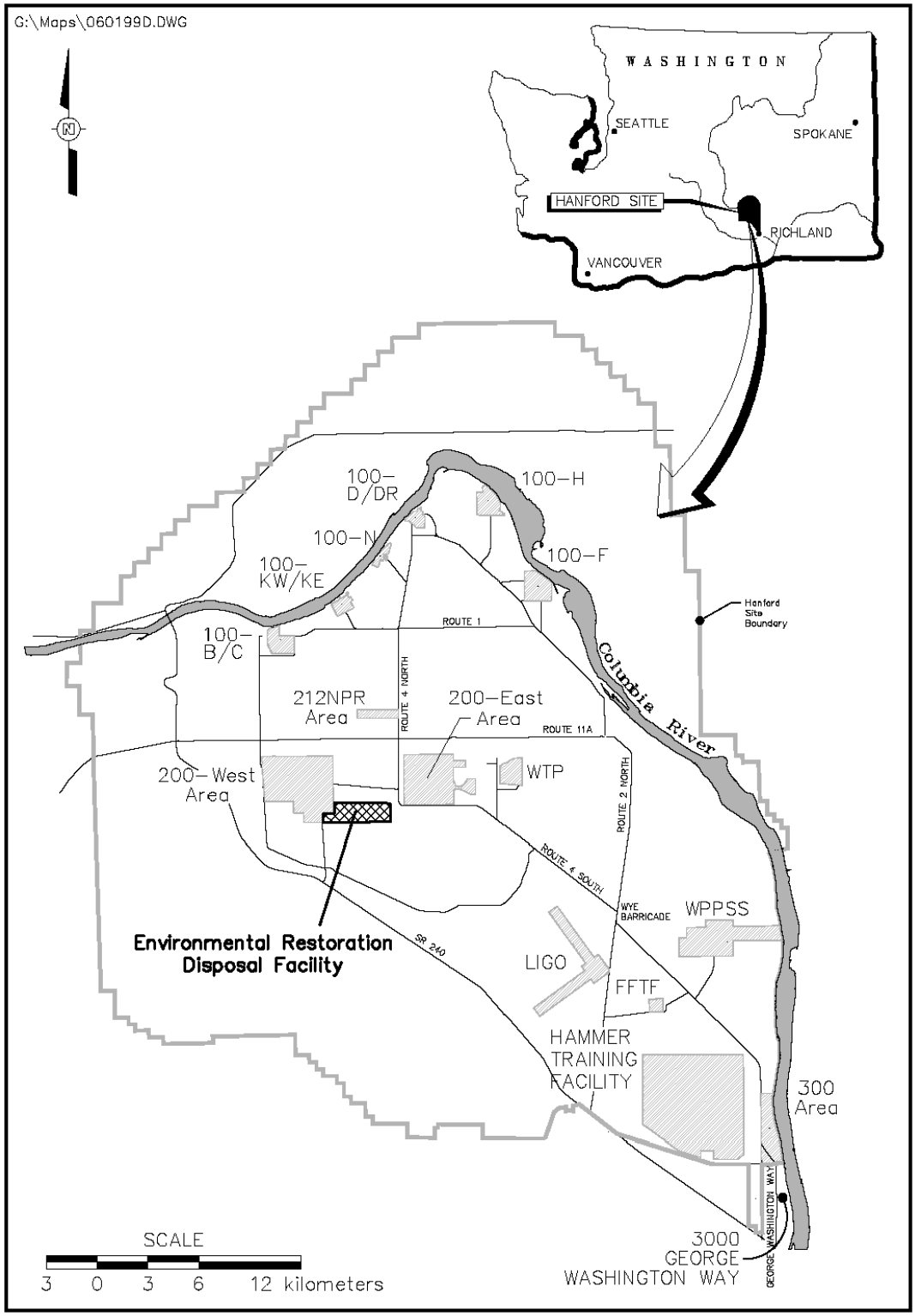
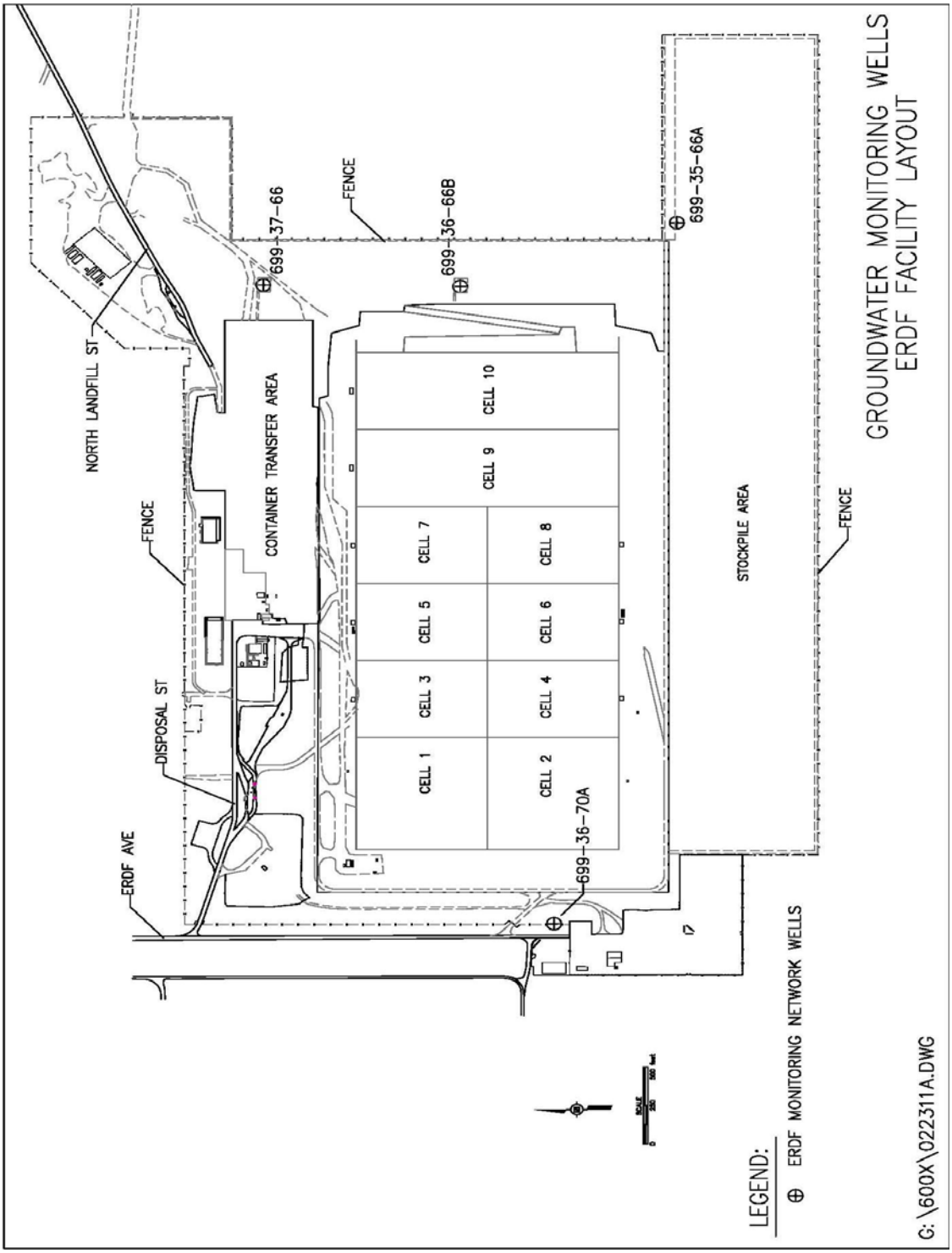


Figure 2. ERDF Monitoring Well Location Map.



3.0 GROUNDWATER AND LEACHATE MONITORING

The groundwater and leachate monitoring program is described in the ERDF GPP (WCH 2008b). This section provides an overview of these monitoring requirements.

3.1 GROUNDWATER SAMPLING

Groundwater samples are collected semiannually from four monitoring wells in the vicinity of the ERDF. This monitoring well network is scheduled for routine sampling during the first and third quarters of each year. The monitoring well network consists of one upgradient well (699-36-70A) and three downgradient wells (699-37-66, 699-35-66A, and 699-36-66B). During CY 2010, groundwater sampling was completed at all of the ERDF monitoring wells in April and November. Well locations are shown in Figure 2-2.

The COCs for routine monitoring were determined based on the results of preoperational baseline sampling, conducted in March 1996, and known contaminant plumes beneath the ERDF. Additional COCs may be added to the groundwater monitoring program if analytical results from leachate sampling indicate it is warranted. To date, no additional COCs have been identified for addition to the groundwater lists based on leachate analysis results. Table 3-1 lists the analytes for the groundwater monitoring program.

Routine groundwater sampling has been conducted since ERDF operations commenced. Sampling at the ERDF groundwater wells was not completed during March 2000 due to a Hanford Site moratorium on groundwater sampling. Well 699-37-68 was not sampled during September 2000 because of problems with a dedicated monitoring well pump (BHI 2004). Groundwater wells 699-37-68 and 699-36-67 were decommissioned in 2007 due to construction of ERDF waste cells 7 and 8. Groundwater monitoring wells 699-37-66 and 699-36-66B were installed as replacement downgradient wells.

Table 3-1. List of Groundwater Analytes by Analytical Method. (2 Pages)

Analyte	Method[a]	Practical Quantitation Limit	Accuracy[b] (%)	Precision[b] (%)
Arsenic	6010A	10 μg/L	±25	±25
Barium	6010A	20 μg/L	±25	±25
Chromium	6010A	70 μg/L	±25	±25
Lead	6010A	40 μg/L	±25	±25
Selenium	6010A	750 μg/L	±25	±25
Tin	6010A	30 μg/L	±25	±25
Vanadium	6010A	80 μg/L	±25	±25
Zinc	6010A	20 μg/L	±25	±25
Carbon tetrachloride	8260B	5 μg/L	±25	±25
Alkalinity	310.1[c]	10,000 μg/L	±20	±25

Table 3-1. List of Groundwater Analytes by Analytical Method. (2 Pages)

Analyte	Method[a]	Practical Quantitation Limit	Accuracy[b] (%)	Precision[b] (%)
Chloride	300[d]	10,000 μg/L	±20	±25
Fluoride	300[d]	100 μg/L	±20	±25
Nitrogen (in nitrite/nitrate)	353.1	0.05 μg/L	±20	±25
Sulfate	300[d]	2,000 μg/L	±20	±25
Total dissolved solids	160.1[c]	10,000 μg/L	±20	NA
Total organic halides	9020	5 μg/L	±20	NA
Carbon-14	[e]	200 pCi/L	±20	±25
Iodine-129	[e]	5 pCi/L	±20	±25
Technetium-99	[e]	10 pCi/L	±20	±25
Radium	903.1[f]	1 pCi/L	±20	±25
Total uranium	[e]	0.1 μg/L	±20	±25
Gross alpha	900.0[f]	3 pCi/L	±20	±25
Gross beta	900.0[f]	4 pCi/L	±20	±25
pH	[g]	NA	NA	NA
Specific conductance	[g]	25 μS/cm	±20	NA
Turbidity	180.1[c]	0.05 NTU	±0.05 NTU	NA

[a] Method number indicated is from *Test Method for Evaluating Solid Wastes: Physical Chemical Methods* (SW-846) (EPA 1986), unless otherwise specified.
[b] Accuracy is expressed as percent recovery; precision is expressed as a percent relative difference.
[c] Method specified is from *Methods for Chemical Analysis of Water and Wastes* (Kopp and McKee 1983).
[d] Method specified is from *Determination of Inorganic Anions in Aqueous and Solids Samples by Ion Chromatography* (Lindahl 1984), and is a modification of EPA Method 300.0 (EPA 1993).
[e] Industry standard method, laboratory-specific, based on acceptance by Washington Closure Hanford.
[f] Method specified is from *Prescribed Procedures for Measurement of Radioactivity in Drinking Water* (EPA 1989).
[g] Parameter will be measured in the field.

NA = not available, or not applicable
NTU = nephelometric turbidity units

3.1.1 General Approach to Evaluating Results

Groundwater samples collected from the ERDF monitoring well network were analyzed in accordance with the requirements of the U.S. Environmental Protection Agency SW-846 (EPA 1986), industry standard, or laboratory-specific test methods (Table 3-1). Laboratory results for these samples were entered into the Hanford Environmental Information System, a Hanford Site database that contains environmental analytical data. Groundwater monitoring data contained in the Hanford Environmental Information System were evaluated to identify the analytical results needed for inclusion in this report. The following data selection and evaluation criteria were applied:

- Quality assurance/quality control data were evaluated for the purpose of identifying potential collection or analytical problems. However, unless a problem with the data was identified during this review, the results or discussion regarding the quality assurance/quality control data were not included in this report.

- All data qualifiers were recorded.

- If the relative percent difference between values reported for main and duplicate samples was greater than 20%, the samples were flagged in the data spreadsheet and the data evaluated to determine their applicability.

- Data acceptance based on a less than 20% relative difference criterion was relaxed for analytical results reported at or near the method detection limit (e.g., typically within five times the detection limit). This allows for an expected increased analytical error when values are close to the detection limit.

- Only analytical results for metals from filtered groundwater samples were used for metals evaluation.

3.1.2 Statistical Approach to Evaluating Results

The statistical analysis of ERDF groundwater monitoring data is based on the ERDF GPP (WCH 2008b) and *Hanford Site Groundwater Monitoring: Setting, Sources and Methods* (PNNL 2000). The ERDF GPP requires that background water quality be established from four consecutive groundwater sampling events using one of two methods. The groundwater quality background conditions can be determined using either facility-wide data or historical data from each well in the monitoring network. The first approach (facility-wide) results in a single background value for the site for each constituent to which subsequent groundwater quality data are compared; this is referred to as an interwell comparison (PNNL 2000).

The second approach (historical) results in background water quality data for each well to which the subsequent groundwater quality data are compared; this approach is referred to as an intrawell comparison (PNNL 2000).

The interwell approach has been selected and used for the ERDF groundwater monitoring program. This method will allow for the consideration of impacts from non-ERDF sources.

For each analyte of interest identified in the ERDF GPP, data from four pre-operational sampling events at each of the four ERDF monitoring wells were grouped together into data sets. The average concentration, activity, or other appropriate measure for each analyte was determined, and the tolerance interval for each analyte was calculated. Data from the subsequent semiannual monitoring events are compared to background levels and tolerance intervals. Those constituents observed to have levels outside of the tolerance interval are evaluated to determine whether the deviation may be related to an ERDF or non-ERDF source(s).

Where analytical results report a nondetect, the detection limit value is used in this assessment. If a current measurement exceeds a tolerance interval based on the reported detection limit, it is not considered to be a confirmed exceedance and is discussed qualitatively.

3.1.3 Determination of Tolerance Intervals

The tolerance interval represents a concentration range that contains a specified proportion of the population with a specified probability (PNNL 2000). Both the upper and lower bounds of the interval (two-sided) were calculated. The parametric tolerance interval was determined using the following equation:

$$TI = X_b + k * S_b \text{ (two-sided)}$$

where:

k = normal tolerance factor, which depends on the number of background samples (n), coverage (P%), and the confidence level (Y)
X_b = mean of background concentrations
S_b = sample standard deviation
TI = tolerance interval.

Coverage of 95% and a confidence level of 95% were used to determine the parametric tolerance interval. Application of this equation assumes that a normal (or lognormal) distribution is a reasonable approximation of the background concentrations.

3.2 GROUNDWATER LEVELS

Water-level measurements were collected from each of the four monitoring wells during the semiannual groundwater sampling events to determine groundwater accessibility during future monitoring events. Water-level measurements were taken during each routine groundwater monitoring event immediately prior to purging the well for sample collection.

During the September 2005 monitoring event, the exact water level in monitoring well 699-36-67 could not be determined because the electronic tape measure (e-tape) did not appear to reach the top of the water in the well. The e-tape apparently did not sound indicating that water had been reached and appeared to be dry when removed from the well. Based on the length of the e-tape used, the water level in this well was more than 3.5 m (11.5 ft) lower than anticipated. Sampling at this well took place as planned, and the well produced a sufficient amount of water for sample collection. This measurement was treated as an anomaly and not used to evaluate water levels and future accessibility. Prior to the decommissioning of well 699-36-67 in 2007, subsequent samples have returned to expected levels.

Based on a water table map (Figure 3-1), groundwater in the vicinity of the ERDF generally moves from the west across the site to the east-northeast at approximately 91 m (298.5 ft) below the surface. The hydraulic gradient is about 0.001 m/m on the west end of ERDF and averages 0.003 m/m across the entire width of ERDF with the east end being considerably greater. The average hydraulic gradient for the operable unit (200 West) that included the ERDF is 0.002 m/m. The groundwater table in and near the 200 West Area has been steadily declining since discharges to the 200 West Area pond and trench systems were discontinued during the mid-1980s.

Figure 3. Water-Level Contour Map.

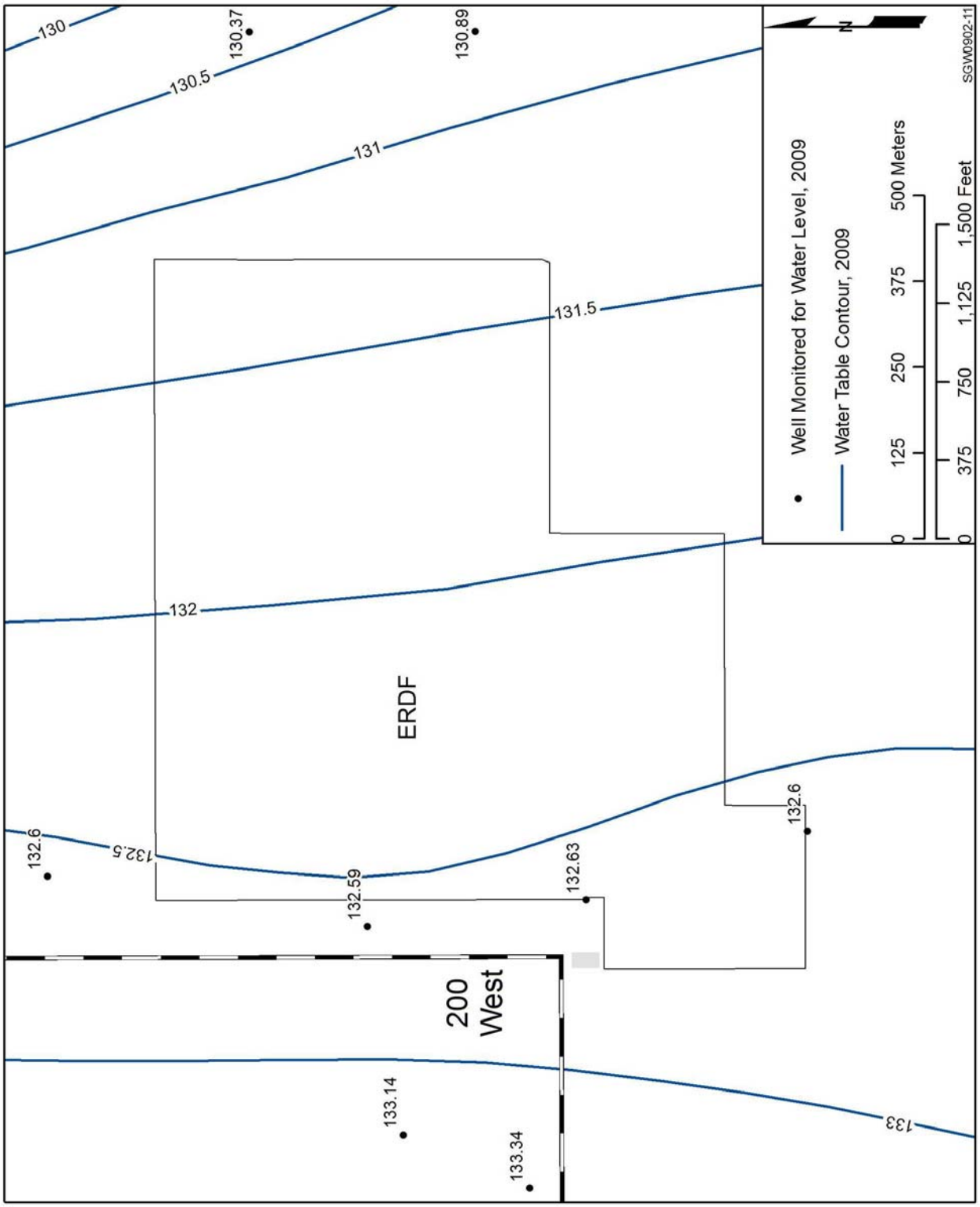
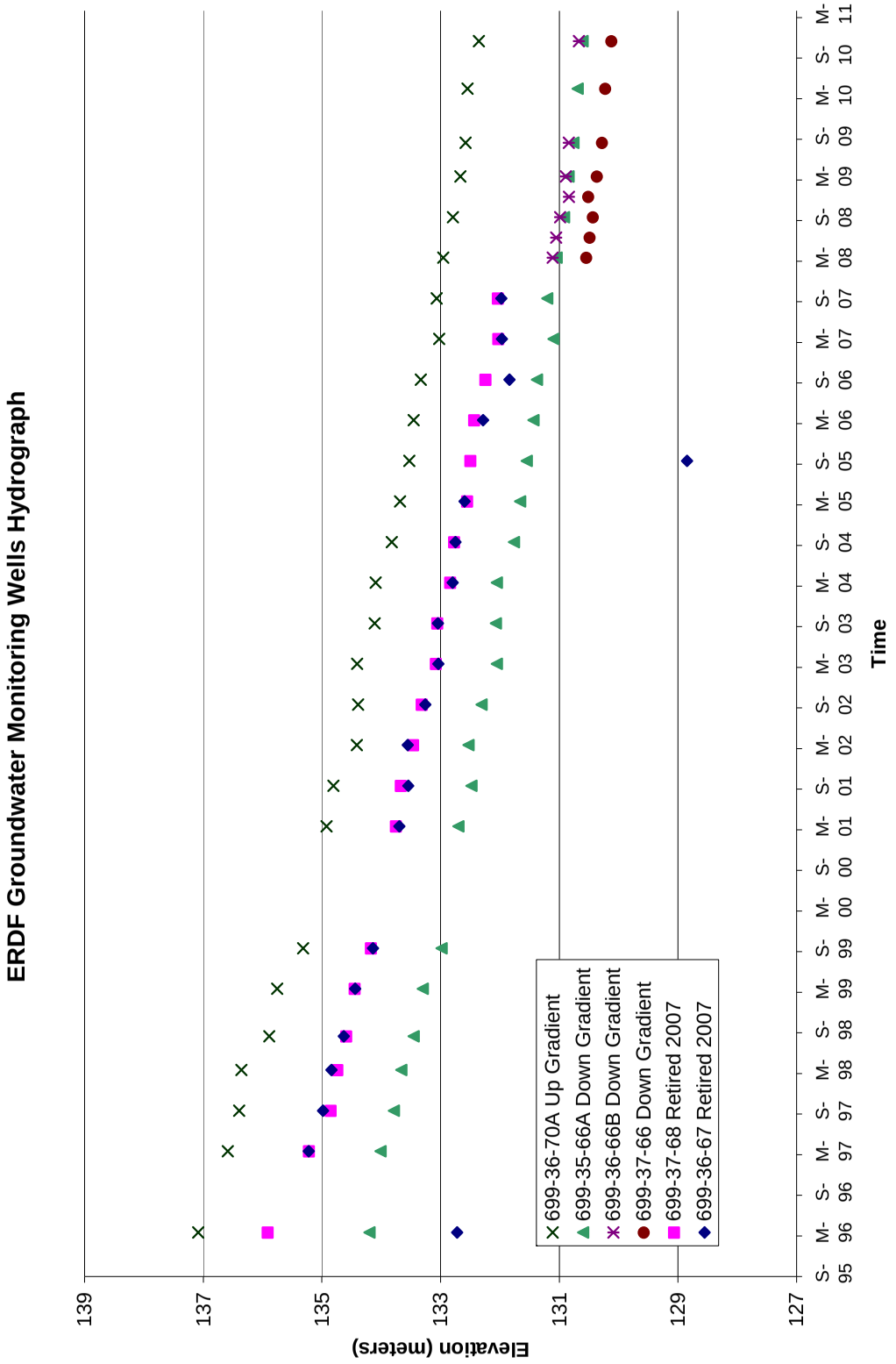


Figure 4. Hydrograph from ERDF Groundwater Monitoring Wells.



The current hydrograph for the ERDF monitoring wells presented in Figure 3-2 indicates an annual decline of less than 0.4 m/yr (1.31 ft/yr), which is consistent with the regional hydrologic changes reported for the area (Swanson et al. 1999, Hartman et al. 2005).

3.3 LEACHATE SAMPLING

The leachate is sampled semi-annually to provide data for leachate delisting analyses and to assess whether additional COCs should be added to the routine ERDF groundwater monitoring program. Separate leachate sampling may also be performed to verify that waste acceptance criteria for the ETF are met prior to the transfer of leachate to that facility. The evaluation and reporting of the ETF sampling data are outside the scope of this report.

Initial leachate sampling was performed quarterly through the end of CY 2000 for an extensive list of analytes as defined by the ERDF Amended ROD (EPA 1999). This “long list” of analytes is shown in Table C-2 in Appendix C. At the end of the initial baseline sampling, the analyte list was revised (short list), and leachate sampling was reduced to a semiannual basis. The short list of analytes is identified in Table C-1 of Appendix C. Once every 2 years (biennial), sampling of the long list of analytes is performed on the leachate as identified in the ERDF Amended ROD (EPA 1999).

The ERDF project continued routine sampling and analysis of landfill leachate during CY 2010. Composite leachate samples for the short and long list of analytes were collected during 2010. Historically, a composite sample of leachate media was collected in duplicate from the sumps (cells 1 through 6) associated with the upper landfill liners. Subsequent to that sampling, the decision had been made to take composite samples from the leachate storage tanks. This was done for the 2010 sampling events. For the 2010 sampling events, an additional set of duplicate samples were taken from the leachate storage tanks. Data for the current year and from the two prior years of leachate sampling (i.e., CYs 2008 to 2010) are used to identify trends that may indicate if additional laboratory analysis for groundwater samples is warranted.

4.0 ANALYTICAL RESULTS AND FIELD DATA

Analytical results for groundwater and leachate samples collected during CY 2010 are discussed in the following subsections. Also discussed are the data resulting from CY 2010 groundwater-level measurements.

4.1 SUMMARY OF GROUNDWATER ANALYSES

The groundwater results were used to measure analytical and statistical variability. The statistical basis for comparison of the groundwater analysis results is presented in Section 3.1.2 of this report. Analytical results reported for groundwater samples, collected from the ERDF monitoring well network are presented in Appendix A. The analyte trend plots summarizing groundwater monitoring results are included in Appendix B and have been revised to reflect the new tolerance limits for CY 2007 data onward (WCH 2008b). The tolerance limits show an overlap in the graphical presentations in Appendix B to better show changes. The original tolerance intervals apply to pre-2007 sampling; the new tolerance limits apply only to CY 2007 and later sampling.

Groundwater monitoring results and apparent trends based on CY 2010 data are summarized in Table 4-1.

Table 4-1. Summary of Tolerance Interval Comparisons and Trends. (3 Pages)

Analyte	Upper Tolerance Interval[a]	Well(s) Exceeding Upper Tolerance Interval in CY 2010[b]				Comments
		70A	66A	66B	66	
Arsenic	4.2 μg/L	No	No	No	No	Arsenic concentrations in all wells 66 and 66B had non-detectable levels that exceeded the tolerance level for the April 2010 sample event. The April 2010 samples showed a significant decline for well 66A. However, arsenic concentrations in well 66 remained above the tolerance limit for September 2010. All arsenic detections are very close to analytical detection limits (i.e., higher analytical uncertainty). It should also be noted that the reported arsenic detects for CY 2010 remained below the Hanford Site background levels listed in the ERDF GPP (WCH 2008b) for arsenic (11.8 μg/L).
Barium	122.3 μg/L	No	No	No	No	All wells exhibited concentrations below the tolerance interval and stable with regards to previous years for the established wells. Well 66 showed the highest recordable levels of all the wells, but remains below the tolerance level.
Chromium	13.4 μg/L	No	Yes	No	No	Chromium levels in 66A are elevated relative to the tolerance limit, but have not changed significantly from previous years. The other wells were all below the upper tolerance level.
Lead	5 μg/L	No	No	No	No	Lead concentrations for CY 2010 sampling were not detected. Levels have been consistent with previous analyses and appear stable.

Table 4-1. Summary of Tolerance Interval Comparisons and Trends. (3 Pages)

Analyte	Upper Tolerance Interval[a]	Well(s) Exceeding Upper Tolerance Interval in CY 2010[b]				Comments
		70A	66A	66B	66	
Selenium	5.6 μg/L	No	No	No	Yes	Selenium values in well 66 exhibited a spike above the tolerance interval in April 2010. The remaining wells exhibited stable Selenium concentrations below the tolerance interval.
Tin	10 μg/L	No	No	No	No	Tin levels in CY 2010 sampling were not detected.
Uranium	3.4 μg/L	No	No	No	No	All wells exhibited stable uranium concentrations below the tolerance interval.
Vanadium	40 μg/L	Yes	Yes	No	Yes	Vanadium values in wells 66, 66A, and 70A exhibited a spike above the tolerance interval in April 2010 and a decline below the tolerance interval for the November 2010 sampling event.
Zinc	26.5 μg/L	No	No	No	No	All wells exhibited stable zinc concentrations below the tolerance interval.
Alkalinity	152.9 mg/L	No	No	No	No	All wells exhibited alkalinity concentrations below the tolerance interval and stable with regards to previous years.
Chloride	26 mg/L	No	No	No	No	All wells exhibited chloride concentrations below the tolerance interval and stable with regards to previous years.
Fluoride	0.45 mg/L	No	No	No	No	All wells exhibited fluoride concentrations below the tolerance interval and stable with regards to previous years.
Sulfate	37.8 mg/L	No	No	No	No	All wells exhibited sulfate concentrations below the tolerance interval. Wells 66, 66A, and 66B appear stable with regards to previous years.
Gross Alpha	2.98 pCi/L	No	No	No	No	The wells were below the tolerance interval. No apparent trending in the data was seen.
Gross Beta	31.5 pCi/L	No	Yes	Yes	Yes	Gross beta activity was above tolerance limits in all downgradient wells (66, 66A, and 66B). The downgradient wells appear to be upward trending and continue to exceed the tolerance interval. The maximum values in upgradient well 70A remained below the tolerance level.
Carbon-14	58.1 pCi/L	No	No	No	No	Carbon-14 levels in CY 2010 sampling were not detected.
Iodine-129	21.1 pCi/L	No	No	No	No	All wells exhibited iodine-129 concentrations below the tolerance level and stable.
Technetium-99	93.8 pCi/L	No	Yes	No	No	Downgradient well 66A appears to be upward trending and exceeded the tolerance interval in the 2010 samples. The two new downgradient wells (66 & 66B) have elevated levels but remained below the tolerance limit. A determination on trending could not be reached due to lack of historical data. This is expected as the plume that appears to have peaked in the upgradient well is now continuing to pass beneath the site.
Radium	0.695 pCi/L	No	No	No	No	Radium was not detected in any of the wells during the 2010 monitoring events; all detection limits were below the tolerance interval and all of the wells appear to be stable relative to previous years.
Carbon Tetrachloride	11 μg/L	No	No	No	No	All wells exhibited carbon tetrachloride concentrations below the tolerance interval with no significant trends identified.

Table 4-1. Summary of Tolerance Interval Comparisons and Trends. (3 Pages)

Analyte	Upper Tolerance Interval[a]	Well(s) Exceeding Upper Tolerance Interval in CY 2010[b]				Comments
		70A	66A	66B	66	
Nitrogen in Nitrite and Nitrate	51.1 mg/L	No	No	No	No	All wells exhibited concentrations below the tolerance interval and appear stable with regards to previous years with an indication of down trending. The new downgradient well 66 displayed elevated levels but remained below the tolerance limit, and a determination on trending could not be reached due to lack of historical data.
Total Organic Halides	5 μg/L	No	No	Yes	No	All wells exhibited concentrations below the tolerance interval and appear stable with regards to previous years. The sample data was well within the historic range.
Total Dissolved Solids	570 mg/L	No	No	No	No	All wells exhibited concentrations below the tolerance interval and appear stable with regards to previous years. The new downgradient well 66 displayed elevated levels, but remained below the tolerance limit, and a determination on trending could not be reached due to lack of historical data.
Turbidity	49.8 NTU	No	No	No	No	All wells exhibited concentrations below the tolerance interval and appear stable with regards to previous years.
pH	8.01 units/ 7.48 units[c]	No	No	No	No	All wells exhibited pH concentrations below the upper tolerance interval.
Specific Conductance	774 μS/m	No	No	No	No	All wells exhibited concentrations below the tolerance interval and appear stable with regards to previous years.

[a] New upper tolerance levels have been set for 2007 onward in the revised ERDF GPP (WCH 2008b).

[b] Well identification:

70A = upgradient monitoring well 699-36-70A
66 = downgradient monitoring well 699-37-66
66A = downgradient monitoring well 699-35-66A
66B = downgradient monitoring well 699-36-66B

[c] pH tolerance interval includes upper and lower limits.

CY = calendar year
ERDF GPP = *Groundwater Protection Plan for the Environmental Restoration Disposal Facility*
NTU = nephelometric turbidity units

Numerous contaminant plumes that originated from past activities in the 200 West Area are near or beneath the ERDF site. Chemical processing activities of uranium and plutonium in the 200 West Area are known to have introduced contaminants in the groundwater upgradient from ERDF. Plumes originating from 200 West Area sources detected in ERDF monitoring wells include nitrogen (nitrate plus nitrite), carbon tetrachloride, gross alpha, gross beta, technetium-99, iodine-129, and uranium. Detailed descriptions of the sources for these constituents are contained in the ERDF GPP (WCH 2008b). Due to the elevated readings of COCs, the newly established monitoring wells appear to indicate the contaminate plumes are migrating eastward. The apparent trends in groundwater concentrations of these constituents are as follows:

- **Nitrogen**. Concentrations for nitrogen (nitrate plus nitrite) have remained stable and continue to show a long-term downward trend for well 699-36-70A. Well 699-37-66 exhibits elevated but stable readings; no long-term trending data is available.

- **Carbon Tetrachloride**. Carbon tetrachloride concentrations have remained fairly consistent at levels below the upper tolerance interval within the ERDF monitoring wells.

- **Gross Alpha Activity**. Gross alpha activity concentrations have been slightly variable, but generally within the calculated tolerance intervals, since monitoring at the ERDF well network was initiated.

- **Gross Beta Activity**. Activity for gross beta generally increased over the course of the ERDF monitoring activities for all wells through CY 2003. Recent sampling results suggest that gross beta activity in the upgradient well (699-36-70A) has entered a downward trend. Downgradient well 699-35-66A is showing a continuing long-term upward trend. Downgradient wells 699-37-66 and 699-36-66B show gross beta activity above the tolerance limit. A determination on trending for wells 699-37-66 and 699-36-66B is not possible due to the limited historical data available; however, the values are similar to the retired down gradient wells.

- **Technetium-99**. Technetium-99 activity concentrations in the ERDF monitoring wells have remained stable and generally been within tolerance intervals over the course of ERDF monitoring activities. Recent sampling results suggest activity in well 699-36-70A may be entering a downward trend, and well 699-35-66A shows an upward trend over the long term. Technetium-99 activity concentrations in well 699-35-66A exceeded the interval tolerance during the CY 2010 sample events. Down-gradient wells 699-37-66 and 699-36-66B show elevated levels of technetium-99 below the tolerance limit and similar to past results from the retired down gradient wells, but a determination on trending is not possible due to the limited historical data available. This is expected as the plume which appears to have peaked in the up-gradient well is now continuing to pass beneath the site.

- **Iodine-129**. Iodine-129 activity has remained stable in all monitoring wells over the course of ERDF monitoring activities; no wells have exceeded the upper tolerance interval.

- **Uranium**. Uranium activity in groundwater has generally been stable in the ERDF monitoring wells with a slight long-term downward trend.

4.2 SUMMARY OF WATER LEVEL MEASUREMENTS

Groundwater monitoring wells in the ERDF well network have exhibited a gradual rate of decline in water levels since monitoring was initiated in September 1995. Water-level measurements collected during CY 2010 from wells 699-35-66A and 699-36-70A show a rate of decline that may be starting to stabilize. The newly installed well 699-37-66 appears to be fairly stable with little to no water level change between the April and November measurements. Well 699-36-66B exhibited a gradual rate of decline during CY 2010 monitoring.

Based on the measured water levels in the four ERDF monitoring wells, it was determined that the height of the water column in the ERDF upgradient monitoring well 699-36-70A is 4.1 m (13 ft). The downgradient monitoring wells had water column levels of 3.4 m (11 ft) at well 699-35-66A, 9.5 m (31 ft) at well 699-37-66, and 9.6 m (31 ft) at well 699-36-66B. At the

current average rate of decline, the monitoring wells would be available for use as they are currently constructed for approximately 15 to 22 years.

4.3 SUMMARY OF LEACHATE ANALYSIS

Data associated with leachate sampling conducted from CY 2008 through CY 2010 are presented in Appendix C, Table C-1. Only analytical results that were reported as significant detects (>1 ppb), or as nondetected values, but which are on the routine short list and long list or groundwater monitoring COCs lists, are included in this report.

The composite leachate samples contained detectable concentrations of common metals, anions, and mobile radionuclides. Evaluation of the reported constituents for the expanded analyte list found no impact to the delisting criteria. Based on the CY 2010 leachate sampling results, the constituents that were generally decreasing in activity include gross alpha and gross beta. The following is an update of those constituents, for which there were detectable concentrations, and their activities in evaluation of the CY 2010 sampling results:

- **Chromium**. Chromium concentrations began declining during CY 2007 and have stabilized in recent years. The chromium concentration averaged 29 µg/L in December 2006, but the 2010 average was approximately 20 µg/L.

- **Nickel**. Nickel, which is on the long list of analytes and monitored once every 2 years, appears to be decreasing in concentration.

- **Potassium**. Potassium concentrations have declined from a maximum of about 26,000 µg/L to ~22,000 µg/L through CY 2010.

- **Specific Conductance**. Specific conductance remained steady during CY 2010.

- **Bromide**. Bromide concentration had been detected in recent years, was not detected in leachate samples in CY 2010.

- **Nitrate**. Nitrate concentrations remained steady through March 2010, averaging ~392 mg/L. A significant decline to about 277 mg/L was seen in the September 2010 samples.

- **Total Dissolved Solids**. Total dissolved solids had been increasing throughout 2006, but remained steady during CY 2010, averaging ~1,925,000 µg/L.

- **Gross Alpha**. Gross alpha activity concentrations have historically increased, reaching a new maximum concentration of 3,380 pCi/L in December 2008, but have declined in recent sampling. A significant decline to 1,230 pCi/L was seen in the September 2010 samples.

- **Gross Beta**. Gross beta activity concentrations have been increasing reaching a new maximum concentration of 1,500 pCi/L in December 2008 but have declined in recent sampling. The gross beta concentrations for the September sampling were 648 pCi/L.

- **Uranium**. Uranium concentrations have been steady over the previous 3 years and reached a new maximum concentration of 3,060 µg/L in March 2010, but declined significantly in September 2010 to 1,480 µg/L.

- **Technetium-99**. Technetium-99 concentrations have slightly decreased through CY 2010 monitoring to 579 pCi/L.

- **Tritium**. Tritium concentrations remained steady through March 2010, with a significant decline seen in the September 2010 samples.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the CY 2010 analytical results, the statistical analysis of monitoring data, an evaluation of leachate monitoring data, and a review of the water-level measurement data, the following conclusions and recommendations are presented:

Nitrogen, carbon tetrachloride, gross beta, technetium-99, iodine-129, and uranium present in samples collected from the ERDF monitoring wells are due to the migration of contaminants from non-ERDF sources in the 200 West Area. There has been no correlation between leachate COC levels and groundwater COC levels to indicate the leachate collection system is impacting the groundwater under ERDF. The two new groundwater wells (699-37-66 and 699-36-66B) appear to have been placed within the existing groundwater contamination plume that has been slowly moving in the downgradient direction from ERDF. This may extend the time period needed to allow the contaminant peak from historical releases in the 200 West Area to pass the down-gradient wells due to the increased travel time of the groundwater between monitoring locations. The contaminant peak appears to have passed the upgradient well around 2005, establishing a slight downtrend in the upgradient well.

Groundwater activity from gross beta indicates a long-term upward trend in the downgradient wells with the upgradient well showing some decline after peaking in 2000 and 2001, and has remained below the upper tolerance level after 2004. Groundwater activity from uranium has remained stable with a downward trend. Groundwater activity from gross alpha showed upward spikes during the CY 2010 monitoring from wells 699-37-66 and 699-36-70A, and downward spikes in wells 699-35-66A and 699-36-66B; however, the overall trend indicates that gross alpha has been stable. Although levels of technetium-99 are below the upper tolerance interval, the downgradient wells have shown a trend of increasing concentrations, while the upgradient well has shown a trend of decreasing concentrations. This is a good indication that the groundwater contaminant plume from the 200 West Area is moving in the easterly direction and beginning to impact the downgradient wells. Groundwater activity from uranium, gross alpha, and gross beta will continue to be monitored in future events to evaluate the data for adverse impacts from ERDF leachate to the groundwater at this location. At this time there is no evidence of any adverse impacts to the groundwater from ERDF.

Arsenic concentrations remain well below Hanford Site background reference values. Historical analysis has shown similar periodic spikes in the groundwater data, while September 2010 samples show concentrations in the wells back within the general trend line. No Hanford Site-derived sources for arsenic have been identified for potential impact in the groundwater under ERDF. Pre-Hanford use of arsenic in agriculture may be the source of this contamination.

Chromium levels in the downgradient well 699-35-66A have historically been elevated and, after slightly increasing, appear to have stabilized at a level greater than the upper tolerance interval. All other wells are stable at a level below the upper tolerance interval. The source of the elevated levels do not appear to be ERDF related and appear to be related to the groundwater contaminant plume from the 200 West Area.

Total organic halide concentrations significantly spiked in downgradient wells during CY 2006 monitoring and were detected again in the newly installed downgradient wells in CY 2008 sampling. The two new groundwater wells (699-37-66 and 699-36-66B) appear to have been placed within the existing groundwater contamination plume that has been slowly moving in the down-gradient direction from ERDF. Analysis has shown periodic spikes in the groundwater

data in the past. No correlations can be seen between total organic halide results and the volatile organic analyses performed at the same time (volatile organic analyses will report unexpected detections of chlorinated organics – the most likely contributor to total organic halide results). Total organic halide analysis is only an indicator analysis. Any future indication of consistent contamination will be evaluated to establish the source and composition of the compounds.

Trends in leachate indicate a decrease in the activity of gross alpha, gross beta, and uranium for samples collected over the past 3 years. Analysis of the radionuclide data indicates an apparent correlation of the increasing uranium levels and waste from specific field remediation sites disposed of at ERDF. Since 2005 ERDF has accepted close to 4.6 million tons of waste, much of which contained uranium, gross alpha, and gross beta activity. This volume of waste is expected to increase concentrations of the more soluble elements over time. Groundwater monitoring data for these constituents were examined to determine potential impacts to groundwater from ERDF operations.

Based on this CY 2010 evaluation, no additional analytes are recommended for the groundwater monitoring program, and no additional analysis is necessary for the routine leachate sampling. The current monitoring frequency appears to be appropriate for future monitoring needs.

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APPENDIX A

GROUNDWATER SAMPLING RESULTS, 1996-2010

Table A-1. Arsenic.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	3 B		1.1 B		3 B		1.7 B	1.7 B					4.4	
Sep-96	2.6 B	3.8 B	0.98 B		2.1 B		0.67 B						4.4	
Mar-97	2.8 B	2.7 B	2 B		2.5 B		1.4 B						4.4	
Sep-97	3.5 B	2.8 B	1.9 B		3.3 B		1.6 U						4.4	
Mar-98	2.1 B		1.6 B	1.1 B	2.6 B		0.6 U						4.4	
Aug-98	2.8 B		1 U		1.2 B		1.4 B	1 U					4.4	
Mar-99	3.3 U		3.3 U	3.3 U	3.3 U		3.3 U						4.4	
Sep-99	3.3 U	3.3 U	3.3 U		3.3 U		3.3 U						4.4	
Mar-00													4.4	
Sep-00	2.6		2.4 U		3.2	3.8							4.4	
Mar-01	3		2.3 U		5.2		4.5	3.2					4.4	
Sep-01	5.6		22.8	10 U	52.1 U		52.1 U						4.4	
Mar-02	4.4	3 U	4.6		4.3		3 U						4.4	
Sep-02	4.4		4.5 U	3.3	3.8		3.3 U						4.4	
Mar-03	3.5 U		4.4		3.5 U		3.5 U						4.4	
Sep-03	4.2 U	4.2 U	4.2 U		4.2 U		4.2 U						4.4	
Mar-04	3.4 U		3.40 U		3.4 U		3.4 U	3.4 U					4.4	
Sep-04	3.6 U		3.7	3.6 U	3.6 U		3.6 U						4.4	
Mar-05	34 U	34 U	34 U		34 U		34 U						4.4	
Sep-05	4.7 U		23.6 U		23.6 U		27.5	23.6 U					4.4	
Mar-06													4.4	
Sep-06	5.3		3.7 U	3.7 U	4.7		3.7 U						4.4	4.2
Mar-07	4.6		4.1		4.3	5	4.1 U						4.4	4.2
Sep-07	5.6		4.1 U	4.1 U	4.1 U		4.1 U							4.2
Mar-08	5 U				5 U	5			5 U		5 U			4.2
Jun-08									5 U		5 U			4.2
Sep-08	3.8				5.5				3.5		2.9	3.6		4.2
Dec-08									10 U		10 U	10 U		4.2
Mar-09	10 U				10 U				10 U		10 U	10 U		4.2
Sep-09	4.54 B	3.1 B			3.2 B				2.14 B		2.23 B			4.2
Apr-10	2.6 B				2.8 B				10 U	10 U	10 U			4.2
Nov-10	2.71 B				2.97 B				10 U	2.4 B	2 B			4.2

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results
U = Result is non-detected.

Table A-2. Barium Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	46 B		81.9 B		92.1 B		92 B	90.6 B					123.3	
Sep-96	42.9 B	0.0402 B	66.7 B		80.8 B		77.9 B						123.3	
Mar-97	46.3 B	47 B	87.6 B		93.4 B		102 B						123.3	
Jun-97					83.6								123.3	
Sep-97	42.2 B	40.9 B	64.6 B		80 B	76.6	69.6 B						123.3	
Mar-98	43.7		66.8	66.6	78.4	82.4	79						123.3	
Aug-98	39.8 B		58.2 B		74.1 B		71.1 B	69 B					123.3	
Mar-99	40.5		59	58.4	76.1	72.8	73.2						123.3	
Sep-99	40.3 B	40.2 B	54.1 B		75.6 B		69.8 B						123.3	
Jan-00					77.8 B								123.3	
Mar-00													123.3	
Sep-00	38.9		51.5		73.8	74.3							123.3	
Dec-00					77.3 B								123.3	
Mar-01	38		50		71.4		68.1	69.9					123.3	
Sep-01	40.5		200 U	200 U	71.2		64.9						123.3	
Dec-01					74.6 B								123.3	
Mar-02	38.3	38.5	56.2		66.9		68.7						123.3	
Sep-02	39.8		58.1	0.31	69.4		67.9						123.3	
Mar-03	37.8		49.6		70		64.3						123.3	
Sep-03	39.8	41.4	58.3		71.5		65						123.3	
Mar-04	38.9		56.1		56.5		66.6	66.5					123.3	
Sep-04	39.9 C		56.3 C	57.2 C	60.9 C		68.7 C						123.3	
Mar-05	39.3	39.5	56.4		60.4		61.6						123.3	
Sep-05	37.1 C		48.4		54.5		65.4	63.8					123.3	
Mar-06	35.4	38.1	55.2		58.1		64.5						123.3	
Sep-06	39.2 C		53	52.1	55.9 C		60.5						123.3	122.3
Mar-07	40		57.7		61.3	46.1	67.7						123.3	122.3
Sep-07	39 C		55.4	54.9	53.8 C		66.4							122.3
Mar-08	39 C				49.4 C	50.6 C			80 C		64.8 C			122.3
Jun-08									77.4		59.8			122.3
Sep-08	39.7 C				51 C				77.9 C		59.8 C	59.9 C		122.3
Dec-08									76.8		59.5	59.2		122.3
Mar-09	37				46				75.1		55.8	56.4		122.3
Sep-09	37.6	37.8			43.6				71.6		55.2			122.3
Mar-10	41				45.8				77.8	76.9	57.2			122.3
Nov-10	39.2				44				72.2	75.4	58			122.3

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-3. Chromium Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	13.4		4.4 U		5.9 B		7.7 B	5.1 B					16.5	
Sep-96	12.1	0.0205	4.4 U		4.4 U		4.4 U						16.5	
Mar-97	12.2	12	2.7 U		3.9 B		4.5 B						16.5	
Jun-97					7.9 B								16.5	
Sep-97	13.4	13.3	3.3 B		3.5 U	3.6 B	3.5 U						16.5	
Mar-98	16.6		3.3 B	3.6 B	6.8 B	5.4 B	4.1 B						16.5	
Aug-98	13.5		4.2 U		4.2 U		4.2 U	4.2 U					16.5	
Mar-99	13.9		2.3	2.2	6.1 B	2.2	3.1						16.5	
Sep-99	14.8	14.8	2.5 B		4.4 B		3.1 B						16.5	
Jan-00					4.4 B								16.5	
Mar-00													16.5	
Sep-00	16.3		1.6		4.6	4.9							16.5	
Dec-00					5.7 U								16.5	
Mar-01	14.8		2.4		4.1		4.5	3.8					16.5	
Sep-01	21.1		10 U	10 U	7.4		5.4						16.5	
Dec-01					1.5 B								16.5	
Mar-02	16.3	16.2	5.2		6		11.3						16.5	
Sep-02	16.2		5.6	1.2	5.5		8.7						16.5	
Mar-03	16.3		2.5		3.8		9.9						16.5	
Sep-03	16.2 C	17.2C	3.6		4.9		12 C						16.5	
Mar-04	16.6		4.1		4		4.4	3.8					16.5	
Sep-04	15.6		5.5	5.3	3.8		11.6						16.5	
Mar-05	15.9	17.1	9.7 U		9.7 U		9.7 U						16.5	
Sep-05	14.4		3.6 UC		3.6 UC		3.6 UC	5.4 UC					16.5	
Mar-06	14.6	15.8	6.4 U		6.4 U		6.4 U						16.5	
Sep-06	16.3		2.5	2.6	4.8		3.4						16.5	13.4
Mar-07	17.5		3.1		4.9	3.4	4.3						16.5	13.4
Sep-07	17		2.7	3.3	3.4		5							13.4
Mar-08	17.2				4.2	4.7			2.8		4.1			13.4
Jun-08									2.2		3.2			13.4
Sep-08	17.1				4.5				2.5		3.4	3.6		13.4
Dec-08									2.93		3.98	3.93		13.4
Mar-09	16				5.21				1.99 B		3.2	3.27		13.4
Sep-09	16.4	16			3.78				2.74		3.32			13.4
Mar-10	16.9				4.5				2.46	3.12	3.69			13.4
Nov-10	16.5				3.67				2.48	2.51	3.46			13.4

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-4. Lead Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	1 UJ		1 UJ		1 UJ		1 UJ	1 UJ					70.4	
Sep-96	42.1 U	0.002 U	42.1 U		42.1 U		42.1 U						70.4	
Mar-97	26 U	26 U	26 U		34.8 B		26 U						70.4	
Sep-97	1.1 U	1.1 U	1.1 U		1.1 U		47.1 U						70.4	
Mar-98	1.1 U		1.1 U	1.1 U	1.1 U		2.4 B						70.4	
Aug-98	30.2 U		30.2 U		30.2 U		30.2 U	30.2 U					70.4	
Mar-99	1.8 U		1.8 U	1.8 U	1.8 U		2.5						70.4	
Sep-99	2.1 U	4	49.2		6.7		2.4 B						70.4	
Mar-00													70.4	
Sep-00	2.1 U		2.1 U		2.1 U	2.1 U							70.4	
Mar-01	2.6 U		2.6 U		2.6 U		2.6 U	2.6 U					70.4	
Sep-01	3.7		6.8	3 U	22.7 U		22.7 U						70.4	
Mar-02	2.2 U	2.8	2.2 U		2.2 U		4.2						70.4	
Sep-02	2.4 U		2.4 U	2.4 U	2.4 U		2.4 U						70.4	
Mar-03	2.6 U		2.3 U		2.6 U		2.6 U						70.4	
Sep-03	1.9 U	1.9U	1.9 U		1.9 U		1.9 U						70.4	
Mar-04	2 U		2 U		2 U		2 U	2					70.4	
Sep-04	1.9 U		1.9 U	1.9 U	1.9 U		1.9 U						70.4	
Mar-05	24.7 U	24.7 U	24.7 U		24.7 U		24.7 U						70.4	
Sep-05	2.9 U		31.9 U		31.9 U		31.9 U	31.9 U					70.4	
Mar-06													70.4	
Sep-06	3.3 UC		1.2 U	1.2 U	1.2 U		1.2 U						70.4	5
Mar-07	2.8 U		2.8 U		2.8 U	2.8 U	2.8 U						70.4	5
Sep-07	3.3 U		3.3 U	3.3 U	3.3 U		3.3 U							5
Mar-08	3 U				3 U	3 U			3 U		3 U			5
Jun-08									3 U		3 U			5
Sep-08	1.5 U				1.5 U				1.5 U		1.5 U	1.5 U		5
Dec-08									5 U		5 U	5 U		5
Mar-09	5 U				5 U				5 U		5 U	5 U		5
Sep-09	5 U	5 U			5 U				5 U		5 U			5
April-10	5 U				5 U				5 U	5 U	5 U			5
Nov-10	5 U				5 U				5 U	5 U	5 U			5

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-5. Selenium Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	2.1 B		2.6 B		3.5 B		3.4 B	3.6B					5.6	
Sep-96	3.1 B	0.003 U	3.8 B		4.1 B		4.8 B						5.6	
Mar-97	2.6 BN	2.3 BN	3.5 BN		3.1 BN		3.9 BN						5.6	
Sep-97	3.2 B	2.9 B	3.6 B		4.8 B		4.6 B						5.6	
Mar-98	3.2 B		3.6 B	3.6 B	4.4 B		4.2 B						5.6	
Aug-98	3.2 B		4.5 B		5.8		5.8	5.5					5.6	
Mar-99	5.2		3.6 U	4.5	7.6		4.2						5.6	
Sep-99	3.7 U	5.2	3.7 U		7.3		4.6 B						5.6	
Mar-00													5.6	
Sep-00	3.4		3.5		4	5.5							5.6	
Mar-01	2.6 U		3.1		3.4		2.6	2.6 U					5.6	
Sep-01	5.9		5 U	19.8	62.1 U		62.1 U						5.6	
Mar-02	7.7	7.9	3.6 U		7.8		7.7						5.6	
Sep-02	4.1 U		4.1 U	4.1 U	7.4		4.1 U						5.6	
Mar-03	3.6 U		5.7		4.4 U		3.8 U						5.6	
Sep-03	3.8	4.4	3.6		6.9		5.7						5.6	
Mar-04	4.2		5.6		7.4		3.4 U	3.4 U					5.6	
Sep-04	3.9 U		3.9 U	3.9 U	3.9 U		3.9 U						5.6	
Mar-05	48.5 U	48.5 U	48.5 U		48.5 U		48.5 U						5.6	
Sep-05	6.2 C		44 U		44 U		44 U	44.0 U					5.6	
Mar-06													5.6	
Sep-06	4.4		3.3	5.2	3.7		3						5.6	5.6
Mar-07	5.9		5.1		9.7		5.9						5.6	5.6
Sep-07	4.8		4.3 U	4.3 U	4.3 U		4.3 U							5.6
Mar-08	6 U				7.8	9.3			6.5		6 U			5.6
Jun-08									6 U		6 U			5.6
Sep-08	4.3				3.4 C				4.7		6	5.1		5.6
Dec-08									10 U		10 U	10 U		5.6
Mar-09	6.98 B				6.65 B				5.56 B		6.07 B	6.78 B		5.6
Sep-09	3.23 B	5.53 B			4.61 B				4.64 B		3.66 B			5.6
April-10	5.24 B				4.28 B				5.7 B	6.6 B	4.8 B			5.6
Nov-10	10 U				10 U				10 U	10 U	10 U			5.6

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-6. Tin Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	35.3 U		35.3 U		35.3 U		40.1 B	35.3 U					55.6	
Sep-96	33.5 U	0.033 U	33.5 U		33.5 U		33.5 U						55.6	
Mar-97	24.7 U	24.7 U	24.7 U		29 B		24.7 U						55.6	
Sep-97	5.6 U	5.6 U	5.6 U		5.6 U		33.2 U						55.6	
Mar-98	4.9 U		4.9 U	4.9 U	4.9 U		4.9 U						55.6	
Aug-98	28 U		28 U		28 U		28 U	28 U					55.6	
Mar-99	2.7 U		2.7 U	2.7 U	2.7 U		2.7 U						55.6	
Sep-99	2.1 U	2.1 U	2.1 U		2.1 U		2.1 U						55.6	
Mar-00													55.6	
Sep-00													55.6	
Mar-01	3.5 U		3.5 U		3.5 U		3.5 U	3.5 U					55.6	
Sep-01	2.4 U		100 U	100 U	13.9 U		13.9 U						55.6	
Mar-02	3.3 U	3.3 U	3.3 U		3.3 U		3.3 U						55.6	
Sep-02	4.7 U		4.7 U	4.7 U	4.7 U		4.7 U						55.6	
Mar-03	3.6 U		5.8 U		3.6 U		3.6 U						55.6	
Sep-03	5.6 U	5.6 U	5.6 U		5.6 U		5.6 U						55.6	
Mar-04	3.6 U		3.6 U		3.6 U		3.6 U	3.6 U					55.6	
Sep-04	4 U		4 U	4 U	4 U		4 U						55.6	
Mar-05													55.6	
Sep-05	5.1 U												55.6	
Mar-06													55.6	
Sep-06	3.5 U		3.5 U	4.6	3.5 U		3.5 U						55.6	10
Mar-07	4.4		3.4 U		3.4 U	4.1	3.8						55.6	10
Sep-07	6.3 U		6.3 U	6.3 U	6.3 U		6.3 U							10
Mar-08	6 U				6 U	6.5			8.1		6 U			10
Jun-08									6 U		6 U			10
Sep-08	3 U				3 U				3 U		3 U	3 U		10
Dec-08									100 U		100 U	100 U		10
Mar-09	100 U				100 U				100 U		100 U	100 U		10
Sep-09	100 U	100 U			100 U				100 U		100 U			10
April-10	100 U				100 U				100 U	100 U	100 U			10
Nov-10	1 U				1 U				1 U	1 U	1 U			10

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-7. Uranium Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Sep-95					2.98 U								3.4	
Mar-96	2.64		2.24		2.94		2.74	2.77					3.4	
Sep-96	2.4		2.26		2.42		2.21						3.4	
Mar-97	2.7		2.69		3.16		2.87						3.4	
Sep-97	2.76	2.55	2.43		3.01		2.38						3.4	
Mar-98	2.33		2.49	2.44	2.99		2.32						3.4	
Aug-98	2.59		2.48		3.34		2.34	2.36					3.4	
Mar-99	2.6		2.8	3	3.4		2.7						3.4	
Sep-99	2.65	2.53	2.63		3.41		2.58						3.4	
Mar-00													3.4	
Sep-00	3.27		3.19		3.17	3.62							3.4	
Mar-01	2.31		2.36		3.12		2.83	2.79					3.4	
Sep-01	2.42		2.25	2.28	3.06		2.65						3.4	
Mar-02	2.44	2.52	2.46		3.22		2.84						3.4	
Sep-02	2.25		2.27	2.14	2.99		2.58						3.4	
Mar-03	2.33		4.22		3.27		2.79						3.4	
Sep-03	2.19	2.22	2.49		2.97		2.58						3.4	
Mar-04	2.24		2.12		2.94		2.8	3.07					3.4	
Sep-04	2.35 B		2.15 B	2.38 B	2.95 B		2.59 B						3.4	
Mar-05	2.26	2.3	2.14		2.86		2.85						3.4	
Sep-05	2		1.63		2.34		2.09	2.2					3.4	
Mar-06	2.35	2.3	2.14		2.94		2.68						3.4	
Sep-06	2.12		1.94	1.95	2.53		2.72						3.4	3.4
Mar-07	1.91		2.57		2.6	2.16	2.53						3.4	3.4
Sep-07	2.55		1.84	1.93	2.59		2.47							3.4
Mar-08	2.12				2.32	2.53			1.64		2.5			3.4
Jun-08									1.63		2.51			3.4
Sep-08	2.45				2.49				1.96		2.48	2.53		3.4
Dec-08									1.65		2.48	2.61		3.4
Mar-09	2.13				2.4				1.61		2.46	2.38		3.4
Sep-09	2.29	2.35			2.43				1.67		2.56			3.4
April-10	2.07				2.34				1.56	1.6	2.48			3.4
Nov-10	2.02				2.34				1.59	1.61	2.34			3.4

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-8. Vanadium Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	26.8 J		12.6 J		23.6 J		14.4 J	15.1 J					41	
Sep-96	33.4 B	0.0258 B	25.1 B		32.9 B		24.3 B						41	
Mar-97	33.2 B	30.3 B	26 B		28.9 B		25.3 B						41	
Jun-97					36.2								41	
Sep-97	27.8 B	27.2 B	18.8 B		25.7 B	28.8	24.9 B						41	
Mar-98	29		18.6	18.3	26.8	28.4	23						41	
Aug-98	39.5 B		30.1 B		39.5 B		36 B	33.9 B					41	
Mar-99	28.3		13.9	15	25.2	30	23.6						41	
Sep-99	28.7 B	28.6 B	17.5 B		26.4 B		23.5 B						41	
Jan-00					25.7 B								41	
Mar-00													41	
Sep-00	27.5		15.5		27.2	27.3							41	
Dec-00					27.1 B								41	
Mar-01	27.1		16.5		25.8		25	25.3					41	
Sep-01	28.5		50 U	50 U	26.2		22.8						41	
Dec-01					26.2 B								41	
Mar-02	26.6	27.4	23.4		25.6		23.4						41	
Sep-02	28.6		26.7	1.1	28.8		24.3						41	
Mar-03	28.5		22.1		26.8		23.8						41	
Sep-03	25.9	26.9	24.4		26.2		16.2						41	
Mar-04	26.8		24.9		24.6		24.2	24.7					41	
Sep-04	27 C		25.4 C	25.2	26.1		24.8 C						41	
Mar-05	25.8	27.4	25.1		25.9		23.3						41	
Sep-05	25.4		21.5		24.9		27.4	23.4					41	
Mar-06	25.3	27.1	24.9		26.4		22.9						41	
Sep-06	28.8 C		23.7 C	23.2 C	28.6 C		22.7 C						41	40
Mar-07	27.6		25.1		27.6	21.1	25						41	40
Sep-07	28.5		23.8	23.6	29.1		25.9							40
Mar-08	27.7				28.8	29			23.2		22.1			40
Jun-08									24.3		24.4			40
Sep-08	28.9				30.2				22.6		24.5	23.9		40
Dec-08									27.3		25.9	28.6		40
Mar-09	31.2				32.8				30		29.4	28.4		40
Sep-09	31.2	30.6			30				24.5		29			40
April-10	41.8				41.7				40.5	41	39.1			40
Nov-10	36.9				38.6				35.7	37.7	36.9			40

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-9. Zinc Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	13.7 U		146		8.5 U		368	155					757	
Sep-96	15.4 B	0.003 U	260		23.1		665						757	
Mar-97	26.5	26.7	382		55.4		507						757	
Jun-97					12								757	
Sep-97	8.1 B	5.7	339		10.3	5.1 U	394						757	
Mar-98	5.8 B		318	321	6.1 B	2.2 U	386						757	
Aug-98	10.3 B		241		4.7 B		663	629					757	
Mar-99	2.6		164	144	10.6	0.8 U	347						757	
Sep-99	2.9 B	3.5 B	215		0.8 U		350						757	
Jan-00					10.4 B								757	
Mar-00													757	
Sep-00	7.4		357		2.8	4.2							757	
Dec-00					7.1 U								757	
Mar-01	4.4		262		0.94		17.4	17.5					757	
Sep-01	5.8		310	325	17.1		24.6						757	
Dec-01					1.3 U								757	
Mar-02	3.1	2.6	280		0.4 U		33.4						757	
Sep-02	7.1		329	0.54	2.3		33.6						757	
Mar-03	13.4 C		180		15 C		34.4 C						757	
Sep-03	23.7 C	2.6 C	296		3.1		8.9 C						757	
Mar-04	7.8 C		317 C		5.1 C		12.9 C	9.9 C					757	
Sep-04	6.9		288	286 C	7.3 C		12.8						757	
Mar-05	29.6 UC	5.6 UC	316 C		3.8 UC		15.4 UC						757	
Sep-05	14.5 UC		266 C		8.5 UC		9.1 UC	8.6 UC					757	
Mar-06	9 UC	15.9 UC	286 C		17 UC		12.4 UC						757	
Sep-06	8.7 UC		259 C	260 C	10.3 UC		6.6 UC						757	26.5
Mar-07	5.8 UCJ		341		7 UCJ	6.1 UCJ	11.7 UCJ						757	25.5
Sep-07	11.8 UC		378	375	3.8 UC		10.3 UC							26.5
Mar-08	6 U				6 U	6 U			6 U		19			26.5
Jun-08									6 U		6 U			26.5
Sep-08	4.7				3 U				3 U		6.9	5.9		26.5
Dec-08									10 U		10 U	10 U		26.5
Mar-09	10 U				10 U				10 U		8.16 B	4.83 B		26.5
Sep-09	10 U	10 U			10 U				10 U		10 U			26.5
April-10	10 U				10 U				10 U		10 U			26.5
Nov-10	10 U				10 U				12.6	10 U	10 U			26.5

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-10. Alkalinity Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	138		121		113		124	125					151.8	
Sep-96	143		125		117		129						151.8	
Mar-97	147		129		113		121						151.8	
Jun-97					114								151.8	
Sep-97	138	142	125		119		125						151.8	
Dec-97					121								151.8	
Mar-98	140		122	123	120		127						151.8	
Jun-98					122								151.8	
Aug-98	143		124		124		131	131					151.8	
Dec-98					127								151.8	
Mar-99	143		124	124	123		129						151.8	
Jun-99					118								151.8	
Sep-99	140	139	123		122		130						151.8	
Jan-00					135								151.8	
Mar-00													151.8	
Jun-00					137								151.8	
Sep-00	160		137		119	123							151.8	
Mar-01	137		145		120		152	144					151.8	
Jun-01					130								151.8	
Sep-01	132		126	128	124		130						151.8	
Mar-02	138	135	124		126		132						151.8	
Sep-02	135		130	128	131		146						151.8	
Mar-03	128		120		111		113						151.8	
Sep-03	130	129	128		114		123						151.8	
Mar-04	147		132		140		136	141					151.8	
Sep-04	137		121	130	126		121						151.8	
Mar-05	142	138	128		128		130						151.8	
Sep-05	138		132		126		126	130					151.8	
Mar-06	139	139	128		124		128						151.8	
Sep-06	137		125	117	120		123						151.8	152.9
Mar-07	138 J		126 J		126 J	126 J	124 J						151.8	152.9
Sep-07	129 J		117 J	120 J	118 J		120 J							152.9
Mar-08	123				111	100			117		129			152.9
Jun-08									121		131			152.9
Sep-08	133				121				125		137	135		152.9
Mar-09	143				121				127		141	137		152.9
Sep-09	137	139			126				135		141			152.9
April-10	138				119				125	140	136			152.9
Nov-10	139				127				134	132	143			152.9

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-11. Chloride Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	21.1		24.2		24.2		20.2	20.6					25.9	
Sep-96	19		22.9		21.7		20.1						25.9	
Mar-97	19.2		23.7				20.08						25.9	
Jun-97					22 D								25.9	
Sep-97	20.5	19.9	22.9		22.4		21						25.9	
Dec-97					20.6 D								25.9	
Mar-98	16.1 CD		21.4 D	21.4 D	20.9 CD		19.6 CD						25.9	
Jun-98					21								25.9	
Aug-98	18.3		23.7		21.4		20.7	21					25.9	
Dec-98					20.5 D								25.9	
Mar-99	19.5		24.9	24.4	20.2 CD	23.3	21.7						25.9	
Jun-99					21.2 CD								25.9	
Sep-99	18.9	19.9	26.3		23.2		28.1						25.9	
Jan-00					20.4 D								25.9	
Mar-00													25.9	
Jun-00					20.5 CD								25.9	
Sep-00	18.4		25.7		21.4	22.4							25.9	
Dec-00					21.9 D								25.9	
Mar-01	18.6		25.7		17.2		22.3	27.6					25.9	
Jun-01					16.8 D								25.9	
Sep-01	19		23.4	24.4	20.5		23.3						25.9	
Dec-01					18.6 D								25.9	
Mar-02	16.6	16.8	22.6		19.3		25.2						25.9	
Sep-02	18		25.6	24.5	20.7		26.6						25.9	
Mar-03	18.3		22.5		22.8		28.2						25.9	
Sep-03	15.7 D	15.6 D	22.6 D		23 D		23.8 D						25.9	
Mar-04	15 D		21.9 D		16.5 D		23.8 D	24.3 D					25.9	
Sep-04	15.7		22.3	23.1	17.4		24.1						25.9	
Mar-05	20.7	20.1	27.7		22.5		19						25.9	
Sep-05	13.4 D		23 D		17.1 D		24.8 D	24.5 D					25.9	
Mar-06	13.2 D	13.9 D	23.5 D		16.7 D		20.6 D						25.9	
Sep-06	15.2		21.2 D	21 D	17.5		24.5 D						25.9	26
Mar-07	16.4 D		24.3 D		19.1 D	18.9 D	27.2 D						25.9	26
Sep-07	15.8 D		21.3 D	21.9 D	16.2 D		23.9 D							26
Mar-08	17 D				18.3 D	18 D			18.1 D		22.2 D			26
Jun-08									15.4 D		18.8 D			26
Sep-08	14.4 D				15.2 D						19.6 D	19.8 D		26
Mar-09	12 D				13 D				16 D		18.6 D	18.7		26
Sep-09	14.3 D	13.8 D			15.4				16.8 D		20.8			26
April-10	11.9 D				12.3 D				15.7 D	15.9 D	18.9 D			26
Nov-10	16.1 D				17.7 D				17.1 D	17.1 D	20.6 D			26

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-12. Fluoride Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	0.34		0.4		0.42		0.36	0.36					0.5	
Sep-96	0.34		0.37		0.41		0.33						0.5	
Mar-97	0.34		0.36				0.3						0.5	
Jun-97					0.406								0.5	
Sep-97	0.39	0.334	0.348		0.415		0.331						0.5	
Dec-97					0.378								0.5	
Mar-98	0.304		0.363	0.364	0.371		0.33						0.5	
Jun-98					0.383								0.5	
Aug-98	0.342		0.355		0.362		0.343	0.34					0.5	
Dec-98					0.399								0.5	
Mar-99	0.5 U		0.5 U	0.5 U	0.335	0.5 U	0.5 U						0.5	
Jun-99					0.373								0.5	
Sep-99	0.5 U	0.5 U	0.5 U		0.5 U		0.5 U						0.5	
Jan-00					0.41								0.5	
Mar-00													0.5	
Jun-00					0.39								0.5	
Sep-00	0.5 U		0.5 U		0.5 U	0.5 U							0.5	
Dec-00					0.36 C								0.5	
Mar-01	0.5 U		2.5 U		0.5 U		2.5 U	2.5U					0.5	
Jun-01					0.35								0.5	
Sep-01	1 U		1 U	1 U	0.5 U		0.5 U						0.5	
Dec-01					0.36								0.5	
Mar-02	0.25 U	0.25 U	0.26		0.28		0.25 U						0.5	
Sep-02	0.25 U		0.25 U	0.25 U	0.25 U		0.357						0.5	
Mar-03	0.25 U		0.34		0.3		0.34						0.5	
Sep-03	0.3	0.31	0.28		0.3		0.25 U						0.5	
Mar-04	0.3		0.32		0.37		0.286	0.327					0.5	
Sep-04	0.28		0.34	0.29	0.3		0.26						0.5	
Mar-05	0.25	.25 U	0.27		0.28		0.29						0.5	
Sep-05	0.268		0.316		0.343		0.289	0.284					0.5	
Mar-06	0.27	0.3	0.29		0.31		0.26						0.5	
Sep-06	0.3		0.35	0.37	0.28		0.26						0.5	0.45
Mar-07	0.29		0.25		0.27	0.27	0.25 U						0.5	0.45
Sep-07	0.28		0.3	0.35	0.42		0.33							0.45
Mar-08	0.25 U				0.3	0.3			0.25 U		0.25 U			0.45
Jun-08									0.26		0.29			0.45
Sep-08	0.27				0.35				1.2 UD		0.5 UD	.5 UD		0.45
Mar-09	0.25				0.3				0.28		0.29	.25 D		0.45
Sep-09	0.4	0.43			0.31				0.34		0.37			0.45
April-10	0.23				0.3				.019 B	0.23 B	0.24 B			0.45
Nov-10	0.27				0.32				0.24 B	0.21 B	0.22 B			0.45

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-13. Sulfate Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	24.2		29.9		30.7		28.9	28.7					37.8	
Sep-96	25.2		32.2		33.2		30.3						37.8	
Mar-97	27		31.5				30.5						37.8	
Jun-97					33.8 D								37.8	
Sep-97	26.6	26.1	32.6		34.9		31.4						37.8	
Dec-97					34.5 D								37.8	
Mar-98	22.7 D		31.6 D	31.4 D	34.8 D		31.2 D						37.8	
Jun-98					35								37.8	
Aug-98	26		30.7		35.4		31.8	31.5					37.8	
Dec-98					36.8 D								37.8	
Mar-99	26.8		32.4	32	37.3	35.2 D	30.8						37.8	
Jun-99					33.2 D								37.8	
Sep-99	25.9	25.8	32.5		34.6		31.3						37.8	
Jan-00					34.5 D								37.8	
Mar-00													37.8	
Jun-00					34.2 D								37.8	
Sep-00	30.5		31.7		37.6	35.9							37.8	
Dec-00					36.8 D								37.8	
Mar-01	26.9		36		31.6		37.8	39.5					37.8	
Jun-01					36.9 D								37.8	
Sep-01	27.8		30.3	30.8	34.5		31						37.8	
Dec-01					33.1 D								37.8	
Mar-02	25.6	25.6	29.2		33.8		30.5						37.8	
Sep-02	26.2		30.2	29.2	32.7		31.1						37.8	
Mar-03	26		30		34.7		31						37.8	
Sep-03	26.6 D	26.7 D	31.3 D		34.3 D		31.5 D						37.8	
Mar-04	26.7 D		31 D		32.2 D		31.5 D	32.4 D					37.8	
Sep-04	29.2		33.7	36	37.4		34.5						37.8	
Mar-05	27.7	27.3	32.7		33		24						37.8	
Sep-05	24 D		32.8 D		32.3 D		31.5 D	31.1 D					37.8	
Mar-06	27.3 D	27.4 D	30.9 D		30.5 D		30.9 D						37.8	
Sep-06	26.6		30.2 D	29.4 D	29.9		29.8 D						37.8	37.8
Mar-07	27.1 D		30.7 D		32.1 D	31.8 D	31.7 D						37.8	37.8
Sep-07	26.6 D		31.2 D	30.1 D	29 D		30.5 D							37.8
Mar-08	28 D				30.7 D	31.1			27.1 D		29.9 D			37.8
Jun-08									27.4 D		30.9 D			37.8
Sep-08	26.7 D				28.4 D				26		28.3 D	29.3 D		37.8
Mar-09	23.9 D				26.3 D				25 D		27.3 D	28.3 D		37.8
Sep-09	29.2 D	28 D			30.4 D				28.2 D		31.1 D			37.8
April-10	23.4 D				24.6 D				25.7 D	22.5 D	27.2 D			37.8
Nov-10	26.7				27.7				26.5	26.6	29.8			37.8

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-14. Gross Alpha Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	1.45 J		2.12 J		2.28 J		2.43 J	1.73 J					3.3	
Sep-96	1.69 J		0.109 U		1.57 J		1.15 U						3.3	
Mar-97	1.69 J	0.199 U	1.31 U		1.26 J		0.837 U						3.3	
Jun-97					1.68 J								3.3	
Sep-97	0.39 U	1.66 J	0.791 U		1.2 J		2.5 J						3.3	
Dec-97					2.36 J								3.3	
Mar-98	1.32 J		0.659 U	1.4J	2.17 J		0.683 U						3.3	
Jun-98					2.17 U								3.3	
Aug-98	0.431 U		2.3 J		2.89 J		2.45 J	3.37					3.3	
Dec-98					1.87 J								3.3	
Mar-99	2.7 J		3	1.3U	1.68 U	1.3 U	1.5 U						3.3	
Jun-99					2.75 J								3.3	
Sep-99	2.64 J	0.565 U	0.535 U		1.31 U	0.928 U	1.55 U						3.3	
Jan-00					3.75								3.3	
Mar-00													3.3	
Jun-00					3.29								3.3	
Sep-00	0.34 U		0.5 U		0.266 U	1.28 U							3.3	
Dec-00					2.06 U								3.3	
Mar-01	0.303 U		1.01 U		2.33 J		0.812 U	1.43 U					3.3	
Sep-01	-0.386 U		0.976 U	0.751 U	1.12 U		0.374 U						3.3	
Mar-02	0.884 U	0.227 U	0.522 U		0.363 U		0.016 U						3.3	
Sep-02	0.348 U		0.38 U	0.91 U	0.289 U		-0.377 U						3.3	
Mar-03	0.748 U		6.01		0.865 U		1.68						3.3	
Sep-03	1.44	0.882 U	1.11 U		1.16 U		1.64						3.3	
Mar-04	2.26		1.73 U		1.83 U		1.52	2.13					3.3	
Sep-04	1.21		-0.435 U	-0.173 U	0.487 U		0.531 U						3.3	
Mar-05	1.53	0.817 U	1.33		0.913 U		1.68						3.3	
Sep-05	0.862 U		1.06 U		0.646 U		1.16 U	1.78					3.3	
Mar-06	-0.264 U	1.16 U	-0.146 U		1.12 U		0.117 U						3.3	
Sep-06	-0.059 U		1.34 U	3.05	1.86		-0.156 U						3.3	2.98
Mar-07	0.083 U		-0.0265 U		-0.442 U	-.857 U	-0.864 U						3.3	2.98
Sep-07	-0.352 U		4.71	1.05 U	3.62		-0.194 U							2.98
Mar-08	0.897 U				1.06 U	0.656 U			0.119 U		-0.095 U			2.98
Jun-08									2.1		0.673 U			2.98
Sep-08	-0.474 U				2.76				1.41 U		0.125 U	-.134 U		2.98
Dec-08									0.066 U		-0.187 U	.841 U		2.98
Mar-09	1.56 U				0.767 U				-0.179 U		3.92	.583 U		2.98
Dec-09	1.38 U	1.26 U			1.9 U				0.576 U		1.54 U			2.98
April-10	2.41 U				1.99				1.38 U	2.67	1.8 U			2.98
Nov-10	0.97 U				1.22U				0.946 U	.926 U	0.767 U			2.98

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-15. Gross Beta Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	10.9		22.4		20.4		16	15.5					31.7	
Sep-96	13.2		26.9		25.7		17.6						31.7	
Mar-97	11.2	10.5	21.6		23.2		13.5						31.7	
Jun-97					16.3								31.7	
Sep-97	10.2	12.7	20.7		21		15.9						31.7	
Dec-97					21.4								31.7	
Mar-98	10.5		26.4	25.4	20.2		14.5						31.7	
Jun-98					44.7								31.7	
Aug-98	17.1		27.4		25.1		19.1	13.4					31.7	
Dec-98					21.3								31.7	
Mar-99	25		17	67	25.1	56	27						31.7	
Jun-99					25.8								31.7	
Sep-99	25.1	25.8	57.2		38	50.2	27.1						31.7	
Jan-00					21.7								31.7	
Mar-00													31.7	
Jun-00					21.6								31.7	
Sep-00	27.6		49.2		49.9	47.4							31.7	
Dec-00					23.4								31.7	
Mar-01	26.2		59.4		47.8		31.9	35.5					31.7	
Sep-01	29.8		41.2	39.6	41.2		29.8						31.7	
Mar-02	28	28.5	39.1		42.7		30.8						31.7	
Sep-02	23.3		28.3	26.3	28.7		21.4						31.7	
Mar-03	38.8		47		44.3		36.8						31.7	
Sep-03	38.1	38.1	35.6		44		41.5						31.7	
Mar-04	25.8		28.1		29.8		36.2	41.3					31.7	
Sep-04	39.1		34.1	34.3	33.8		38.3						31.7	
Mar-05	41.4	38.4	32.9		33.2		36.9						31.7	
Sep-05	44.6		35.8		27.8		41.6	41.2					31.7	
Mar-06	45.4	44.6	30		30		45.4						31.7	
Sep-06	45.5		27.6	33.2	29		40.5						31.7	31.5
Mar-07	52.1		35.3		27.8	24	39.6						31.7	31.5
Sep-07	52.5		34.6	38.2	26.4		46.2						31.7	31.5
Mar-08	45.7				20	23.6			38.7		33.4			31.5
Jun-08									31.9		39.2			31.5
Sep-08	42.1				22.8				44.8		38.1	60.3		31.5
Dec-08									39.9		33.7 J	41.8 J		31.5
Mar-09	46.8				24.9				37.8		42.4	39.6		31.5
Sep-09	46.4	50.7			19.9				37		38.9			31.5
April-10	54.4				21.3				34.9	41.8	38.6			31.5
Nov-10	53.7				21.4				36.5	34.7	34.6			31.5

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-16. Carbon-14 Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	22.3 J		6.76 J		4.26 J		4.72 J	2.48 U					26.8	
Sep-96													26.8	
Mar-97	21.6 J	22.2 J	11.1 J		3.94 U		3.81 U						26.8	
Sep-97	16.7 J	10.7 J	3.27 U		1.6 U		5.43 U						26.8	
Mar-98	19.4 J		4.5 U	7.16 U	3.69 U		-1.49 U						26.8	
Aug-98	18.5 J		8.63 J		2.07 U		6.46 U	6.4 U					26.8	
Mar-99	25 U		9.9 U	12 U	-6.1 U		-6.5 U						26.8	
Sep-99	14.1 U	7.43 U	-2.74 U		-9.54 U		-5.94 U						26.8	
Mar-00													26.8	
Sep-00	35.2 U		13.7 U		3.75 U	4.81 U							26.8	
Mar-01	9.56 U		43.4 U		-28.1 U		47.2 U	57 J					26.8	
Sep-01	32.5 U		6.73 U	22.5 U	-15.1 U		-1.16 U						26.8	
Mar-02	14 U	21.4 U	11.6 U		21.7 U		13.2 U						26.8	
Sep-02	5.02 U		17 U	32.6 U	-1.55 U		8.45 U						26.8	
Mar-03	-6.69 U		-0.225 U		25.2 U		1.78 U						26.8	
Sep-03	0.446 U	3.32 U	5.74 U		-10.3 U		-4.5 U						26.8	
Mar-04	33.9 U		16.4 U		10.2 U		9.75 U	-12.4 U					26.8	
Sep-04	8.8 U		0 U	6.99 U	1.22 U		2.45 U						26.8	
Mar-05	11.8 U	42.2 U	38.6 U		17.8 U		28.9 U						26.8	
Sep-05	19.9 U		8.17 U		-2.4 U		-2.37 U	-10.7 U					26.8	
Mar-06	34.2 U	16.1 U	1.44 U		-22.6 U		6.04 U						26.8	
Sep-06	15.8 U		1.42 U	-5.16 U	13.6 U		-4.74 U						26.8	58.1
Mar-07	20.8 U		29.4 U		21.2 U	7.41 U	16.1 U						26.8	58.1
Sep-07	22.4 U		26.8 U	26.4 U	-0.045 U		44.9 U							58.1
Mar-08	30.6 U				23.5 U	-3.8 U			0.956 U		18.1 U			58.1
Jun-08									-20.6 U		-4.28 U			58.1
Sep-08	27.6 U				-20.8 U				-8.35 U		-12.9 U	-4.33 U		58.1
Dec-08									19.6 U		34.6 UJ	49.2 UJ		58.1
Mar-09	-18.3 U				-0.458 U				-13.9 U		-13.9 U	17.5 U		58.1
Sep-09	35 U	14.3 U			7.52 U				-8.42 U		11.5 U			58.1
April-10	41.9 U				33.5 U				8.23 U	6.81 U	18.3 U			58.1
Nov-10	10.3 U				0.452 U				-31.7 U	-7.42 U	30.6 U			58.1

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-17. Iodine-129 Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Jan-95					38.8 J								21.5	
Jun-95					19.9								21.5	
Jan-96			3.06 U				1.04 U						21.5	
Mar-96	9.4		9.42		18.7		6.01	3.69 U					21.5	
Sep-96	7.54		11.9		13.7		2.22 U						21.5	
Mar-97	10.1	11	7.81		11.8		2.82 J						21.5	
Jun-97					12.3								21.5	
Sep-97	9.52	11.3	9.73		16.2		3.03 J						21.5	
Mar-98	8.07	4.54 U	13.2	9.83 U	15.2	15.2	1.62 U	1.62 U					21.5	
Aug-98	9.6		12.2		15.2		2.57	2.78					21.5	
Mar-99	6.1		7.9	1.2 U	14.4	3.8 U	2.9 U						21.5	
Sep-99	5.68	6.96	9.24		6.54 U		1.87 U						21.5	
Jan-00					12.9								21.5	
Mar-00													21.5	
Sep-00	0.307 U		11		13.9	13.1							21.5	
Dec-00					13.3								21.5	
Mar-01	4.63 U		13.8		16.7		6.72	2.74 U					21.5	
Jun-01					7.37								21.5	
Sep-01	3.1 U		12.3	-5.52 U	13.8		4.59 J						21.5	
Dec-01					9.14								21.5	
Mar-02	4.09	3.79	9.71	10.7	13.9		2.2	2.16 U					21.5	
Sep-02	4.66 J		8.34	12	14.3		2.3 U						21.5	
Mar-03	4.97		12.1		14.2		3.43						21.5	
Sep-03	2.91 U	-9.28 U	7.88 U		13.4		-1.82 U						21.5	
Mar-04	4.86		11.8		11		2.44 U	1.64 U					21.5	
Sep-04	4.99		13.6	13.3	6.53		2.52 U						21.5	
Mar-05	5.25 U	3.66 U	15.5		10.6		-1.61 U						21.5	
Sep-05	5.30		14.6		12.5		2.42 U	2.45 U					21.5	
Mar-06	2.87 U	1.91 U	13.5		7.66		0.379 U						21.5	
Sep-06	3.02 U		12.7	15.4	10.1		3.58 U						21.5	21.1
Mar-07	5.18		14.3		14.3	11.5	3.51						21.5	21.1
Sep-07	5.59		17	16	11.3		2.63 U						21.5	21.1
Mar-08	6.32				12.6	11.6			1.58 U		7.66			21.1
Jun-08									0.236 U		7.94			21.1
Sep-08	3.29				11.2				0.953 U		7.44	7.8		21.1
Dec-08									0.784 U		5.59	7.69		21.1
Mar-09	4.6				11.2				1.1 U		7.28	4.82		21.1
Sep-09	6.15	4.7 U			11.6				2.83		8.26			21.1
April-10	2.99 U				10				1.05 U	-0.853 U	5.52			21.1
Nov-10	4.82				10.6				.0651 U	0.767 U	5.3			21.1

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-18. Technetium-99 Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Sep-95					60.2								94.9	
Mar-96	25.5		65		64.2		31	32					94.9	
Sep-96	20.3		53.5		52.3		32.1						94.9	
Mar-97	20	21.6	77.5		59.9		30						94.9	
Jun-97					64								94.9	
Sep-97	18.9	17.3	66.8		57		34.8						94.9	
Dec-97					64.2								94.9	
Mar-98	23.2		68.6	75.4	78.2		23.5						94.9	
Jun-98					73.6								94.9	
Aug-98	29.4		74.9		77.4		36.5	16.5					94.9	
Dec-98					72								94.9	
Mar-99	0 U		86	83	70.5	0 U	36						94.9	
Jun-99					0.0737 J								94.9	
Sep-99	40.4	34.3	85.2		90.1		44.6						94.9	
Jan-00					126								94.9	
Mar-01													94.9	
Jun-00					85.7								94.9	
Sep-00	35.6		80.1		85.6	76.5							94.9	
Dec-00					60.9								94.9	
Mar-01	45.5		75.9		92		40.2	42.3					94.9	
Jun-01					61.3								94.9	
Sep-01	47.6		56.5	63.7	72.3		46.9						94.9	
Dec-01					66.3								94.9	
Mar-02	51.4	61.3	71.8		76.1		46.3						94.9	
Sep-02	52.8		59.7	51.6	67.1		58.8						94.9	
Mar-03	61.3		62.1		66.3		56.5						94.9	
Sep-03	57.7	59.5	54.5		58.3		58.7						94.9	
Mar-04	59.4		54.7		56.4		66.7	68.1					94.9	
Sep-04	67.2		60.6	63.5	56.5		66.3						94.9	
Mar-05	68.6	78.4	66.2		57.2		65.5						94.9	
Sep-05	73.1		57		50.9		71.8	73					94.9	
Mar-06	74.3	80	59.2		46		60.4						94.9	
Sep-06	75.2		47.1	48.3	40.7		64.5						94.9	93.8
Mar-07	73.3		51.5		40.6	39	67.7						94.9	93.8
Sep-07	84.3		46.7	51.5	37		72.8							93.8
Mar-08	76.9				39	33.2			63.4		67.7			93.8
Jun-08									63.8		65.4			93.8
Sep-08	74.8				33.7				61.3		64.5	66.6		93.8
Dec-08									64.8		64.1	62.3		93.8
Mar-09	94.7				38.6				77.8		74	71.8		93.8
Sep-09	95.4	99.5			38				69.1		70.6			93.8
April-10	102				38				73.7	78.6	70.6			93.8
Nov-10	100				35.8				73.5	68.5	70.8			93.8

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-19. Radium Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	0.141 U		0.207 U		0.521 U		0.276 U	0.235 J					0.5	
Sep-96	0.0497 U		0.135 J		0.0482 U		0.0248 U						0.5	
Mar-97	0.0235 U		0.065 J		0.0577 U		0.07 U						0.5	
Sep-97	0.0723 U	0.0358U	0.0353 U		0.123 U		0.0748 U						0.5	
Mar-98	0.078 U		0.21 J	0.103 U	0.148 U		0.114 U						0.5	
Aug-98	0.0391 U		0.0864 U		0.14 U		0.135 U	0.0544 U					0.5	
Mar-99	0.001 U		0.088 U	0 U	0.087 U		0.017 U						0.5	
Sep-99	0.025 U	.088 U	0.083 U		0.195 U		-0.068 U						0.5	
Mar-00													0.5	
Sep-00	0.827 U		1.99 J		-0.261 U	0.182 U							0.5	
Mar-01	0.144 U		0.431 U		-0.037 U		0.033 U	0.931 U					0.5	
Sep-01	-0.387 U		-0.537 U	0.506 U	0.675 U		0.18 U						0.5	
Mar-02	0.94 J	0.599 U	0.063 U		0.383 U		0.258 U						0.5	
Sep-02	-0.147 U		0.332 U	-0.143 U	0.147 U		-0.271 U						0.5	
Mar-03	0.345 U		0.474 U		-0.392 U		0.637 U						0.5	
Sep-03	-0.063 U	-.009 U	0.092 U		0.039 U		0.039 U						0.5	
Mar-04	0.232 U		0.611 U		0.57 U		0.265 U	0.411 U					0.5	
Sep-04	-0.022 U		-0.05 U	-0.128 U	-0.083 U		-0.051 U						0.5	
Mar-05	0.144 U	-.045 U	0.089 U		0.037 U		-0.058 U						0.5	
Sep-05	0.168 U		0.085 U		0.059 U		0.036 U	0.04 U					0.5	
Mar-06	-0.294 U	-0.042 U	0.045 U		-0.199 U		-0.194 U						0.5	
Sep-06	-0.215 U		-0.117 U	0.073 U	-0.327 U		0.06 U						0.5	0.695
Mar-07	-0.136 UJ		-0.395 UJ		-0.301 U	-.21 UJ	-0.327 UJ						0.5	0.695
Sep-07	-0.229 U		-0.008 U	.067 U	-0.121 U		-0.399 U							0.695
Mar-08	-0.019 U				-0.052 U	0.096 U			0.102 U		0.046 U			0.695
Jun-08									0.077 U		0.174 U			0.695
Sep-08	0.023 U				0.027 U				0.1 U		-0.033 U	.424 U		0.695
Dec-08									0.088 U		-0.069 U	.024 U		0.695
Mar-09	-0.14 U				-0.104 U				-0.281 U		-0.1 U	.021 U		0.695
Sep-09	0.078 U				0.053 U				0.036 U		0.271 U			0.695
April-10	0.148 U				-0.005 U				0.089 U	0.048 U	0.015 U			0.695
Nov-10	0.056 U				0.006 U				0.013 U	0.004 U	0.144 U			0.695

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-20. Carbon Tetrachloride Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	5 U		2 J		4 J		5 U	5 U					10.6	
Sep-96	4 J	5 U	7		7		5 J						10.6	
Mar-97	4 J	3 J	6		7		4 J						10.6	
Jun-97					7								10.6	
Sep-97	5 U	5 U	4 J		11		5 U						10.6	
Mar-98													10.6	
Jun-98					10 U								10.6	
Aug-98	2 J		6		5		3 J	3 J					10.6	
Mar-99	1 J		4 J	4 J	7		3 J						10.6	
Sep-99	5 U	1 J	4 J		5		3 J						10.6	
Mar-00													10.6	
Jun-00					7.1								10.6	
Sep-00	1 J		5		9	9							10.6	
Mar-01	1 J		6		7		5.26	5					10.6	
Sep-01	5 U		4 J	4 J	7		5 J						10.6	
Mar-02	1 J	1 J	5		9		5						10.6	
Sep-02	1.011 J		5.018	5.243	8		5.854						10.6	
Mar-03	5 U		4 J		6		5 J						10.6	
Sep-03	5 U	5 U	4 J		6		5						10.6	
Mar-04	1 J		6		8		7.416						10.6	
Sep-04	1 J		5	6	8		7	7.223					10.6	
Mar-05	1 J	1 J	6	6	7		8						10.6	
Sep-05	5 U		6		7		8	8					10.6	
Mar-06	1 J	1 J	4 J		5 J		10						10.6	
Sep-06	5 U		5 J	5 J	6		6						10.6	11
Mar-07	1 J		5 J		4 J	5 J	7 J						10.6	11
Sep-07	5 U		6	6	5		8							11
Mar-08	5 U				5 J	4 J			5 U		2 J			11
Jun-08									5 U		2 J			11
Sep-08	5 U				4 J				5 U		2 J	2 J		11
Dec-08									1.14 J		2.33 J	2.32 J		11
Mar-09	5 U				4.05 J				5 U		1.52 J	1.6 J		11
Sep-09	5 U	5 U			4.35 J				5 U		1.85 J			11
April-10	5 U				3.02 J				5 U	5 U	1.63 J			11
Nov-10	5 U				4.61 J				1 J	5 U	2.01 J			11

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Result.
U = Result is non-detected.

Table A-21. Nitrogen Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Sep-95					36.6								51.5	
Mar-96	4.58		20.2		31.9		35.6	36.5					51.5	
Sep-96	4.19		20.6		26.1		33.7						51.5	
Mar-97	0.419	40	22.6		21.3		34.1						51.5	
Sep-97	4.13	4.19	18.9		24.6		35.4						51.5	
Mar-98	4.62 D		20.4 D	20.1 D	25.3 D		34.3 D						51.5	
Aug-98	4.14		24		26.3		35.2	34.5					51.5	
Mar-99	4.53		20.8	20.6	24.6		31.8						51.5	
Sep-99	4.6	4.5	20		23.7		33						51.5	
Mar-00													51.5	
Sep-00	4.7		19.1		24.6	23.2							51.5	
Mar-01	5.5		19.9		24.7		31.3	32.2					51.5	
Sep-01	4.6		17.3	17.6	23		29.3						51.5	
Mar-02	4.6	4.5	16.3		18.9		27.9						51.5	
Sep-02	4.48		15.8	15.8	19		26.6						51.5	
Mar-03	4.8		17		21.4		29.7						51.5	
Sep-03	5.1 D	5.1 D	15.9 D		19.3 D		29.2 D						51.5	
Mar-04	4.8 D		14.4 D		16.8 D		32.4 D	26 D					51.5	
Sep-04	4.9		15.3	15.8	16.8		26.8						51.5	
Mar-05	5.1	5.1	14.3		15.6		25.8						51.5	
Sep-05	7.72 D		12.5 D		14.4 D		24.6 D	24 D					51.5	
Mar-06	4.6 D	4.6 D	12.9 D		13.8 D		23.7 D						51.5	
Sep-06	5.3		13.4 D	13.2 D	13.3		22.8 D						51.5	51.1
Mar-07	4.8 D		13 D		13.8 D	14 D	28.9 D						51.5	51.1
Sep-07	4.4 D		12.7 D	12.7 D	10.7 D		22.7 D							51.1
Mar-08	3.1 D				6.2 D	6.1 D			39.8 D		9.4 D			51.1
Jun-08									36.2 D		13.4 D			51.1
Sep-08	3.4				6.6 D				38.3 D		9.4 D	9.7 D		51.1
Mar-09	4.6 D				8.3 D				35.1 D		13.3 D	12.6 D		51.1
Sep-09	4.44 D	4.36 D			7.52 D				33.8 D		12.4 D			51.1
April-10	5.28 D				7.72 D				35.1 D	91.2	12.4 D			51.1
Nov-10	4.73 D				6.6 D				32.1 D	33.8 D	6.8 D			51.1

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-22. Total Organic Halides Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	6.6 J		10.5 J		5.6 J		6.6 J	5					9.5	
Sep-96	5 U		5 U		5 U		5 U						9.5	
Mar-97	5 U		5 U		2.9		5 U						9.5	
Jun-97					11.7								9.5	
Sep-97	6.05	4.62 U	7.05		4.62 U		5 U						9.5	
Mar-98	4.62 U		4.62 U	4.62 U	4.62 U		4.62 U						9.5	
Aug-98	5.9		5.85		6.7		5 U	5 U					9.5	
Mar-99	24 U		12 U	24 U	34.5		14.3						9.5	
Sep-99	128	12 U	206		12 U		12 U						9.5	
Jan-00					14								9.5	
Mar-00													9.5	
Jun-00					4.4 B								9.5	
Sep-00	206		271		180	181							9.5	
Dec-00					10.6								9.5	
Mar-01	17.1 U		20 U		20 U		20 U	20 U					9.5	
Sep-01	6.5 U		8.7 U	7.4 U	6.5 U		6.6 U						9.5	
Dec-01					13.2								9.5	
Mar-02	5.2 U	6.1	9.3		9.5		5.2 U						9.5	
Sep-02	10.5		5.6	5.2 U	8.5		60.6						9.5	
Mar-03	5.2 U		6.3		5.3		5.2 U						9.5	
Sep-03	5.2 U	5.2 U	6.2		6.8		6.3						9.5	
Mar-04	6.7		5.7		9.8		5.2 U	6.4					9.5	
Sep-04	5.2 U		5.2 U	5.2 U	6.7		5.2 U						9.5	
Mar-05	5 U	6.3	8.1		12.8		11.4						9.5	
Sep-05	5 U		8.83		12.2		7.46	5.51					9.5	
Mar-06	5.2 UC	15.9 C	5.2 UC		9.2 C		10.6 D						9.5	
Sep-06	16.9		5 U	5 U	6.1		38.9						9.5	5
Mar-07	5.2 U		5.2 U		5.2 U	5.2 UJ	7.2						9.5	5
Sep-07	5.2 U		5.2 U	5.2 U	5.2 U		5.2 U							5
Mar-08	5.2 U				5.2 U	5.2			9.8		7.1			5
Jun-08	5.5								5.2 U		5.2 U			5
Sep-08					5 U	5.2 U					5.2 U	5.9		5
Mar-09	5 U				5 U				5 U		5 U	5 U		5
Sep-09	2.77 B	5.38			4.96 B				5.23		14.5			5
April-10	5 U				5 U				1.89 B	3.8 B	0.72 B			5
Nov-10	40 U				40 U				40 U	26.4 B	40 U			5

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-23. Total Dissolved Solids Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	254		340		384		401	420					573.6	
Sep-96	236		367		411		457						573.6	
Mar-97	283	279	404		390		514						573.6	
Jun-97					398								573.6	
Sep-97	277	278	377		401		463						573.6	
Dec-97					379								573.6	
Mar-98	322		320	309	327		456						573.6	
Jun-98					472								573.6	
Aug-98	296		406		422		491	507					573.6	
Dec-98					344								573.6	
Mar-99	280		380	400	390	406	440						573.6	
Jun-99					407								573.6	
Sep-99	270	280	370		410		470						573.6	
Jan-00					355								573.6	
Mar-00													573.6	
Jun-00					434								573.6	
Sep-00	270		340		550	520							573.6	
Mar-01	278		407		400		349	436					573.6	
Sep-01	305		384	391	420		535						573.6	
Mar-02	265	258	333		358		430						573.6	
Sep-02	276		326	328	344		446						573.6	
Mar-03	260		337		349		407						573.6	
Sep-03	269	271	361		381		5U						573.6	
Mar-04	262		323		326		438	442					573.6	
Sep-04	262		331	330	355		392						573.6	
Mar-05	205	253	278		339		386						573.6	
Sep-05	292		387		403		460	500					573.6	
Mar-06	274	269	314		302		391						573.6	
Sep-06	270		464	409	311		521						573.6	570
Mar-07	271 J		312 J		310 J	314 J	388 J						573.6	570
Sep-07	259 J		309 J	363 J	304 J		498 J							570
Mar-08	274				295	341			438		344			570
Jun-08									508		222			570
Sep-08	268				285				477		337	345		570
Mar-09	263				291				439		326	301		570
Sep-09	262	286			290				520		344			570
April-10	270				285				485	481	336			570
Nov-10	257				258				442	430	323			570

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-24. Turbidity Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	0.34 J		0.3 J		0.26 J		3.21 J	1.48 J					50	
Sep-96													50	
Mar-97	0.71		8.91		0.84		60.6						50	
Jun-97					1.78								50	
Sep-97	1.9		14.4		1.33		4.56						50	
Dec-97					1.38								50	
Mar-98	1.65		23.4		3.52		4.85						50	
Jun-98					3.99								50	
Aug-98	1.29		90.5				2.95						50	
Dec-98					2.62								50	
Mar-99			52.6		4.54								50	
Jun-99					3.25								50	
Sep-99	2.29		87.2		2.68								50	
Jan-00					4.12								50	
Mar-00													50	
Jun-00					1.63								50	
Sep-00	2.3		142		2.6								50	
Dec-00					2.41								50	
Mar-01	1.71		38.2		1.06		16.7						50	
Jun-01					1.71								50	
Sep-01	1.54		3.35		1.17		6.62						50	
Dec-01					4.12								50	
Mar-02	1.85		11.1		5		7.4						50	
Sep-02	2.2		5.6		4.7		6.7						50	
Mar-03	1.86		962		1.29		15						50	
Sep-03	2.41		41.6		2.68		49.7						50	
Mar-04	2.01		16.3		2.49		15						50	
Sep-04	2.93		16.9		4.65		4.19						50	
Mar-05	2.78		7.53		2.13		4.16						50	
Sep-05	0.73		4.61		3.88		3.94						50	
Mar-06	1.93		7.21		1.39		4.07						50	
Sep-06	1.12		4.02		4.41		4.6						50	49.8
Mar-07	1.65		4.99		1.94		7.02						50	49.8
Sep-07	1.17		4.57		3.94		13.5							49.8
Mar-08	2.77				4.74				0.87		3.56			49.8
Jun-08									3.95		2.61			49.8
Sep-08	2.83				1.31				1.93		1.24			49.8
Dec-08									1.65		2.23			49.8
Mar-09	3.49				2.52				0.8		0.57			49.8
Sep-09	1.85				0.97				3.01		1.12			49.8
April-10	3.27				2.43				0.77		2.1			49.8
Nov-10	2.69				1.32				4.03		0.73			49.8

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-25. pH Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Jan-96			7.71				7.68						8	
Mar-96	7.66				7.8								8	
Sep-96					7.7								8	
Mar-97	7.82		7.68		7.67		7.64						8	
Jun-97					7.75								8	
Sep-97	7.86		7.86		7.76		7.74						8	
Dec-97					7.81								8	
Mar-98	7.86		7.8		7.64		7.71						8	
Jun-98					7.72								8	
Aug-98	7.95		8.31		7.95		7.77						8	
Dec-98					7.8								8	
Mar-99			7.72		7.71								8	
Jun-99					7.61								8	
Sep-99	7.95		7.69		7.82								8	
Jan-00					7.77								8	
Jun-00					7.71								8	
Sep-00	7.9		7.7		7.8								8	
Dec-00					7.75								8	
Mar-01	8.56		7.7		7.84		7.74						8	
Jun-01					7.68								8	
Sep-01	7.77		7.7		7.7		7.78						8	
Dec-01					7.74								8	
Mar-02	7.89		7.83		7.73		7.8						8	
Sep-02	7.9		7.8		7.7		7.8						8	
Mar-03	7.9		7.79		7.71		7.76						8	
Sep-03	7.85		7.76		7.63		7.67						8	
Mar-04	7.89		7.77		7.63		7.78						8	
Sep-04	7.76		7.78		7.68		7.76						8	
Mar-05	7.86		7.74		7.64		7.83						8	
Sep-05	7.84		7.74		7.59		7.81						8	
Mar-06	7.9		7.74		7.69		7.86						8	
Sep-06	7.81		7.78		7.72		7.8						8	8.01
Mar-07	7.86		7.78		7.77		8.08						8	8.01
Sep-07	8.07		7.79		7.8		7.9							8.01
Mar-08	7.77				7.62				7.51		7.55			8.01
Jun-08									7.5		7.56			8.01
Sep-08	7.35				7.56				7.47		7.52			8.01
Dec-08									7.67		7.75			8.01
Mar-09	7.91				7.77				7.67		7.75			8.01
Sep-09	7.95				7.8				7.6		7.73			8.01
April-10	7.99				7.84				7.7		7.82			8.01
Nov-10	7.97				7.8				7.5		7.71			8.01

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

Table A-26. Specific Conductance Data.

Sample Date	699-35-66A (Down Gradient)	DUP	699-36-67 (Retired 2007)	DUP	699-36-70A (Up Gradient)	DUP	699-37-68 (Retired 2007)	DUP	699-37-66 (Down Gradient)	DUP	699-36-66B (Down Gradient)	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Jan-96			461				547						743	
Mar-96	402				618								743	
Sep-96					595								743	
Mar-97	428		545		562		630						743	
Jun-97					591								743	
Sep-97	423		540		575		614						743	
Dec-97					483								743	
Mar-98	441		534		565		671						743	
Jun-98					505								743	
Aug-98	405		510		546		270						743	
Dec-98					558	571 C							743	
Mar-99			577		585	552 C							743	
Jun-99					556 C	571 C							743	
Sep-99	413		541		578								743	
Jan-00					533 C	584							743	
Mar-00													743	
Jun-00					576								743	
Sep-00	412		537		565								743	
Dec-00					537 C	563							743	
Mar-01	416		533		555		618						743	
Jun-01					547								743	
Sep-01	423		522		540		601						743	
Dec-01					460	530							743	
Mar-02	473		518		522		605						743	
Sep-02	412		517		537		605						743	
Mar-03	409		505		535		594						743	
Sep-03	395		502		500		425						743	
Mar-04	409		500		487		604						743	
Sep-04	406		486		483		588						743	
Mar-05	405		487		470		596						743	
Sep-05	402		471		469		562						743	
Mar-06	402		482		465		573						743	
Sep-06	407		475		454		553						743	774
Mar-07	408		482		455		567						743	774
Sep-07	400		491		441		574							774
Mar-08	408				429				667		515			774
Jun-08									676		507			774
Sep-08	397				400				648		500			774
Dec-08									666		504			774
Mar-09	402				421				636		504			774
Sep-09	378				411				617		472			774
April-10	394				396				634		490			774
Nov-10	401				402				656		498			774

B = Estimated Results.
C = Detected in both the sample and QC blank, and sample concentration was </= 5x the blank concentration.
D = Reported from dilution.
J = Estimated Results.
U = Result is non-detected.

APPENDIX B

GROUNDWATER SAMPLING TRENDS, 1996-2010

Figure B-1. Arsenic (Filtered).

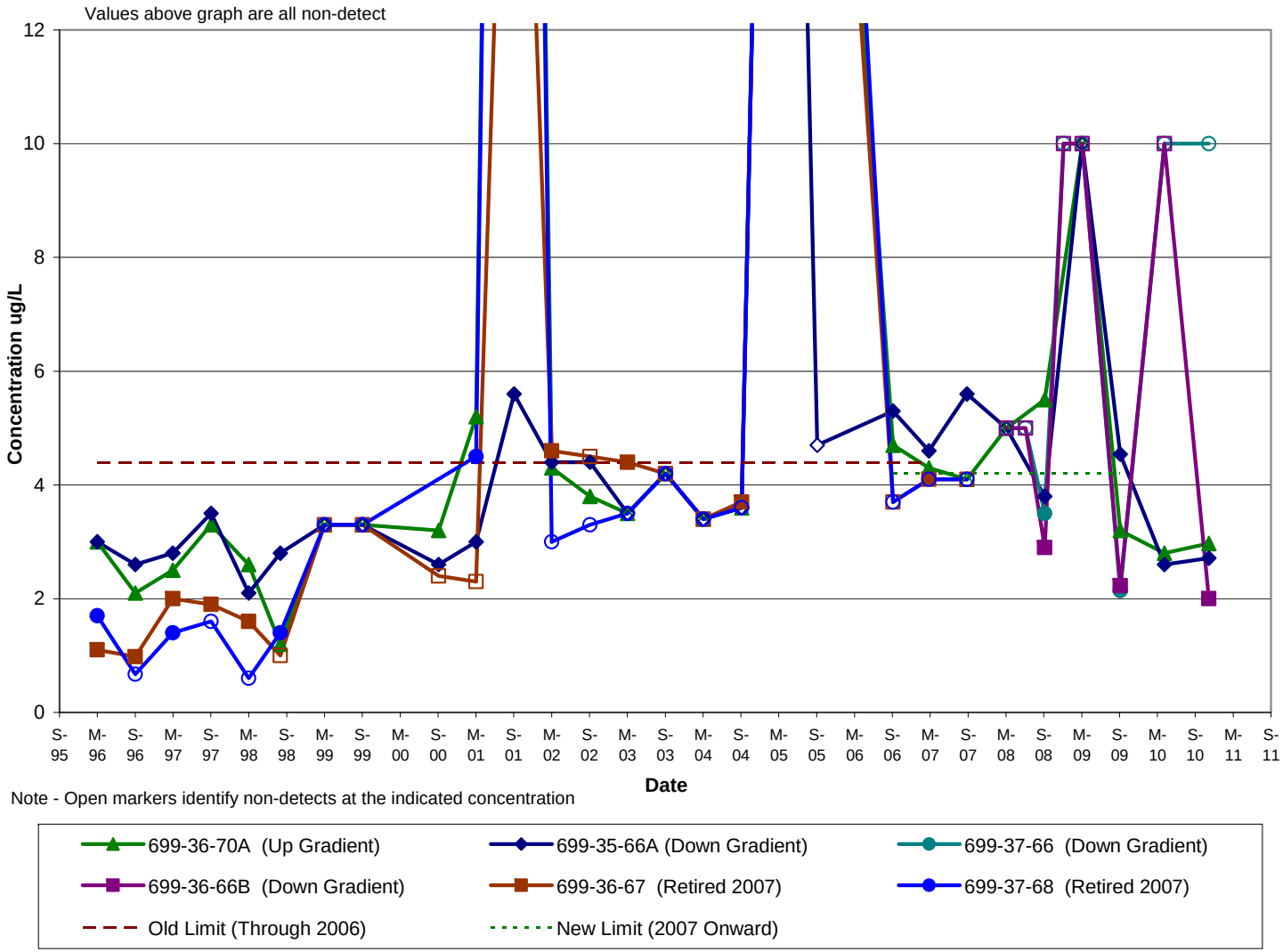


Figure B-2. Barium (Filtered).

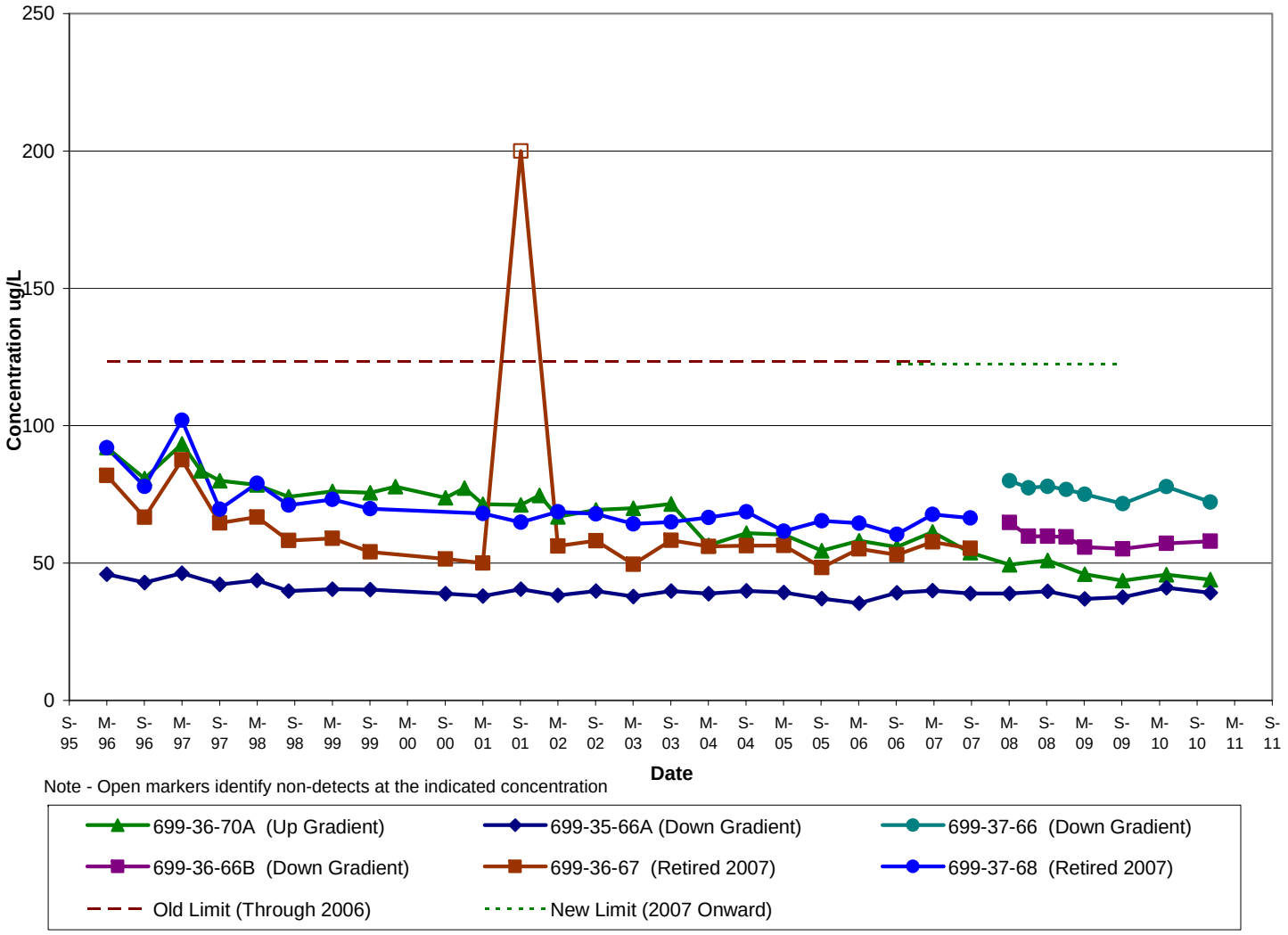


Figure B-3. Chromium (Filtered).

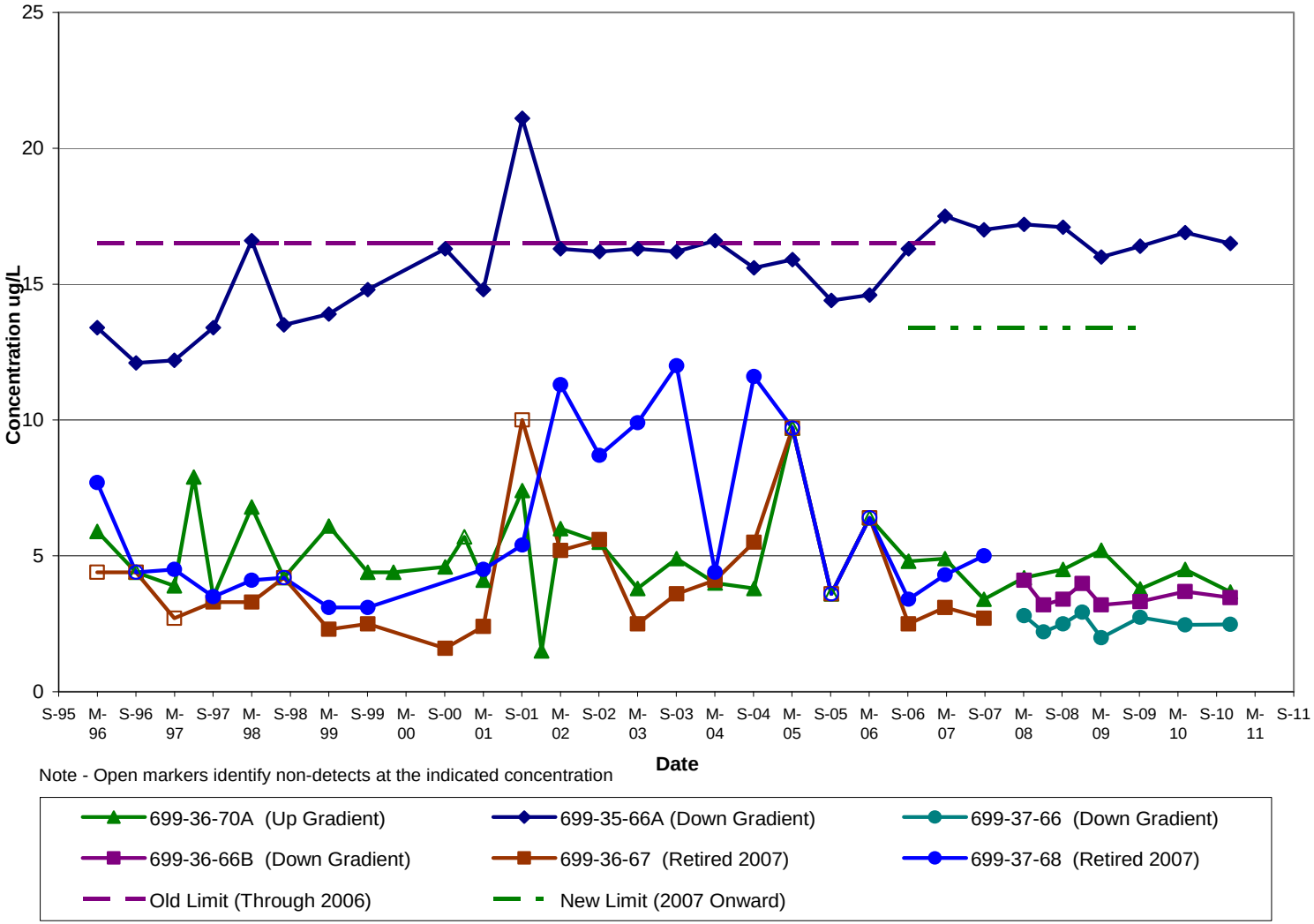


Figure B-4. Lead (Filtered).

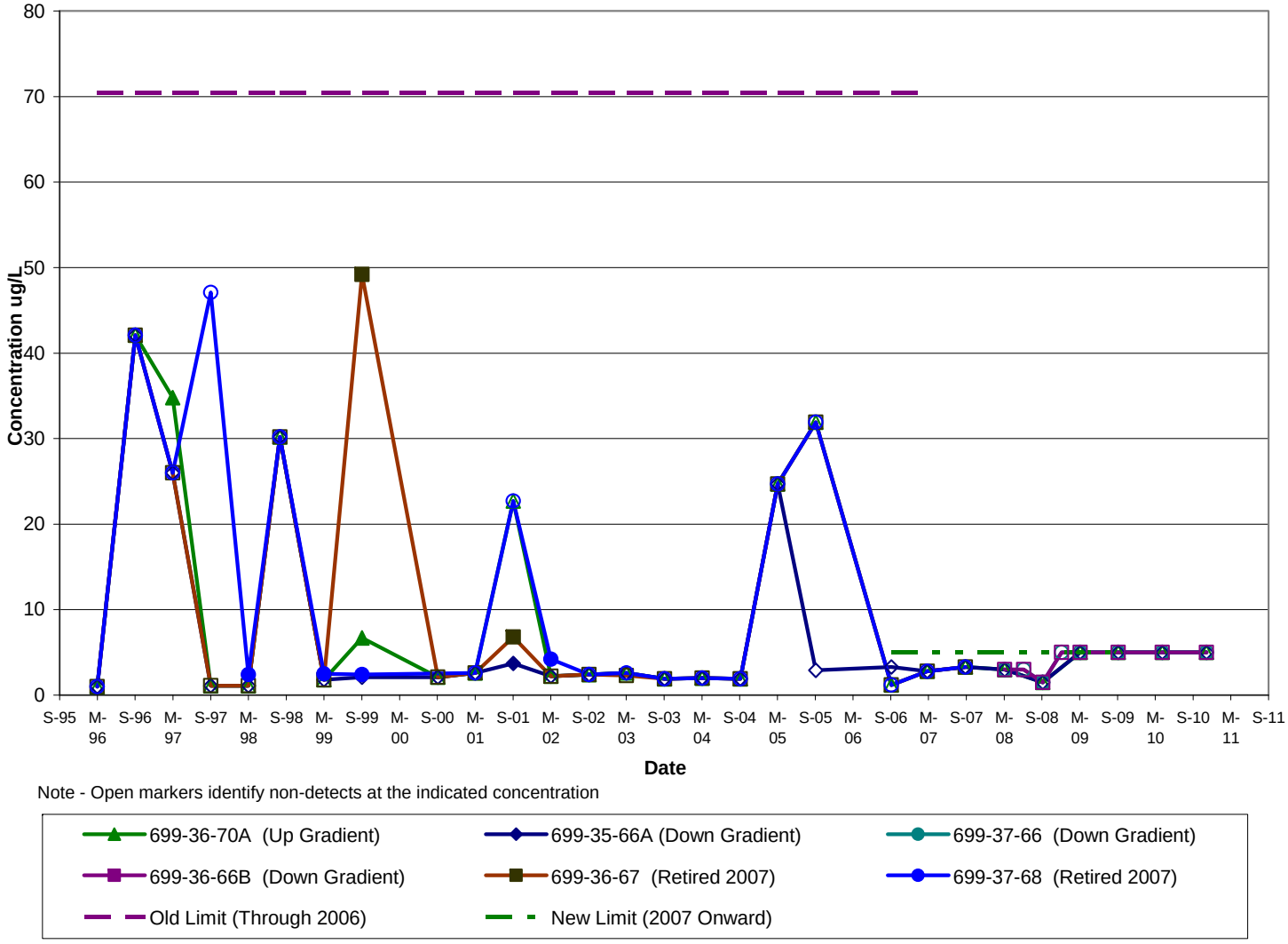


Figure B-5. Selenium (Filtered).

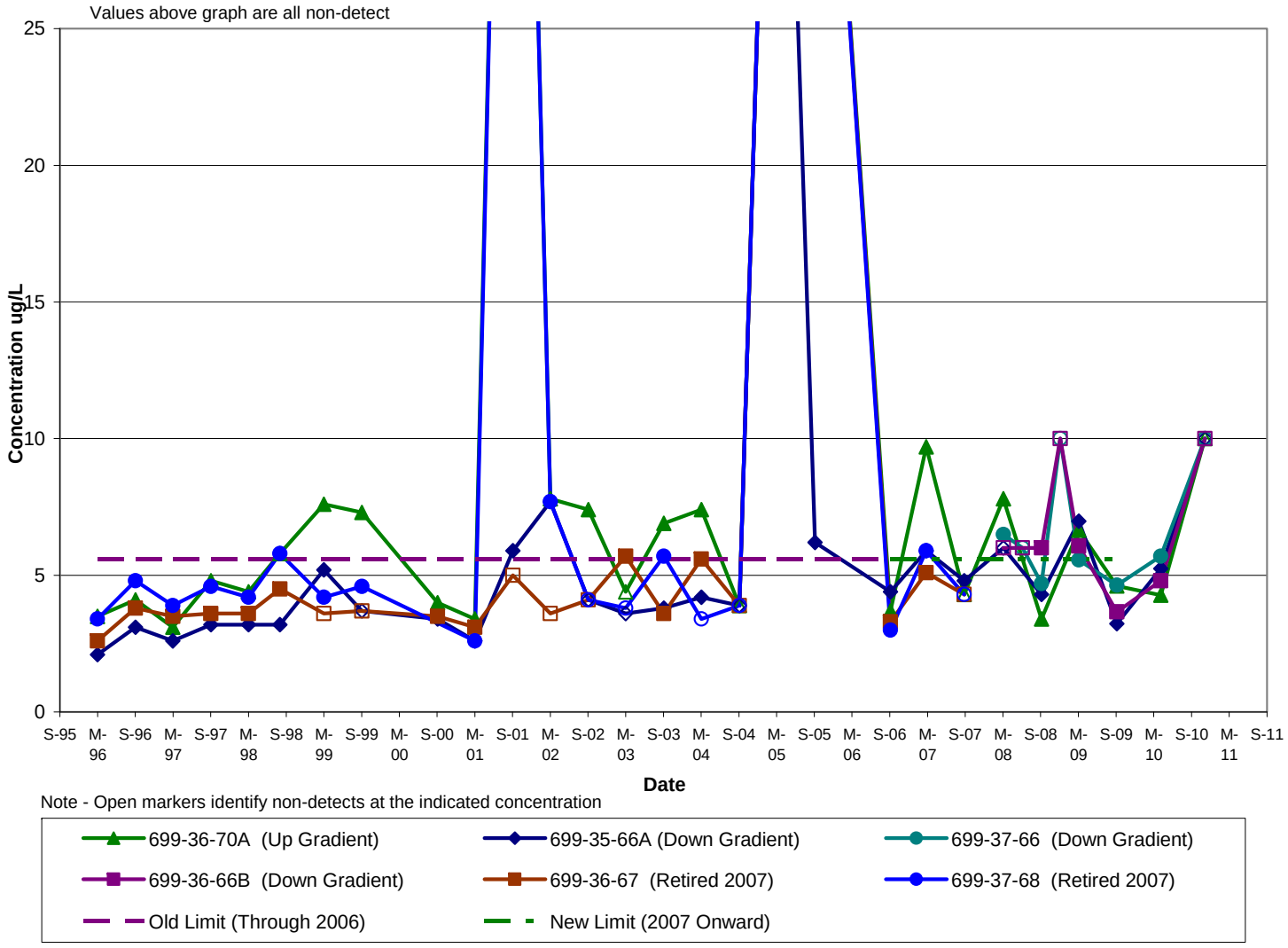


Figure B-6. Uranium.

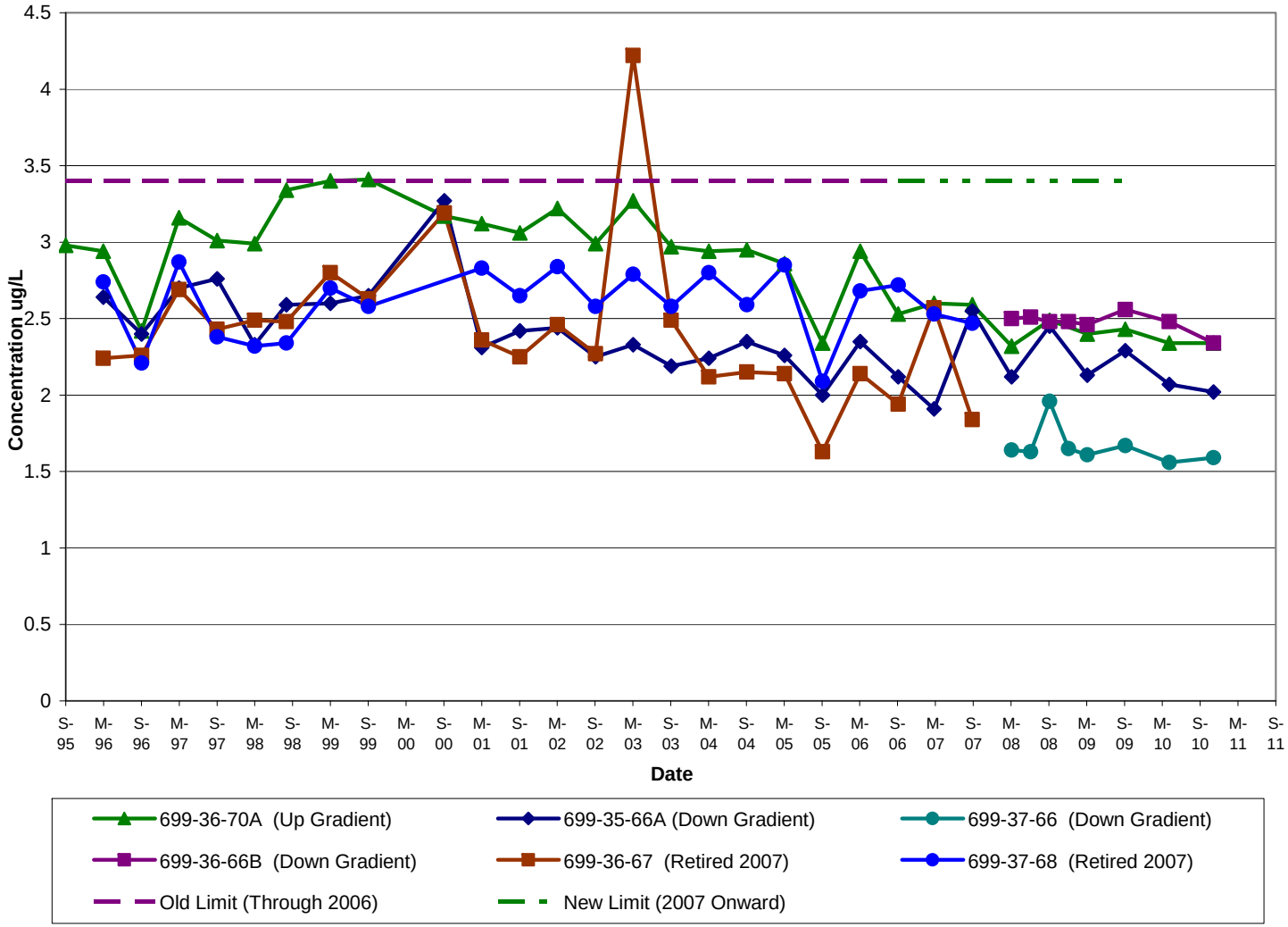


Figure B-7. Tin (Filtered).

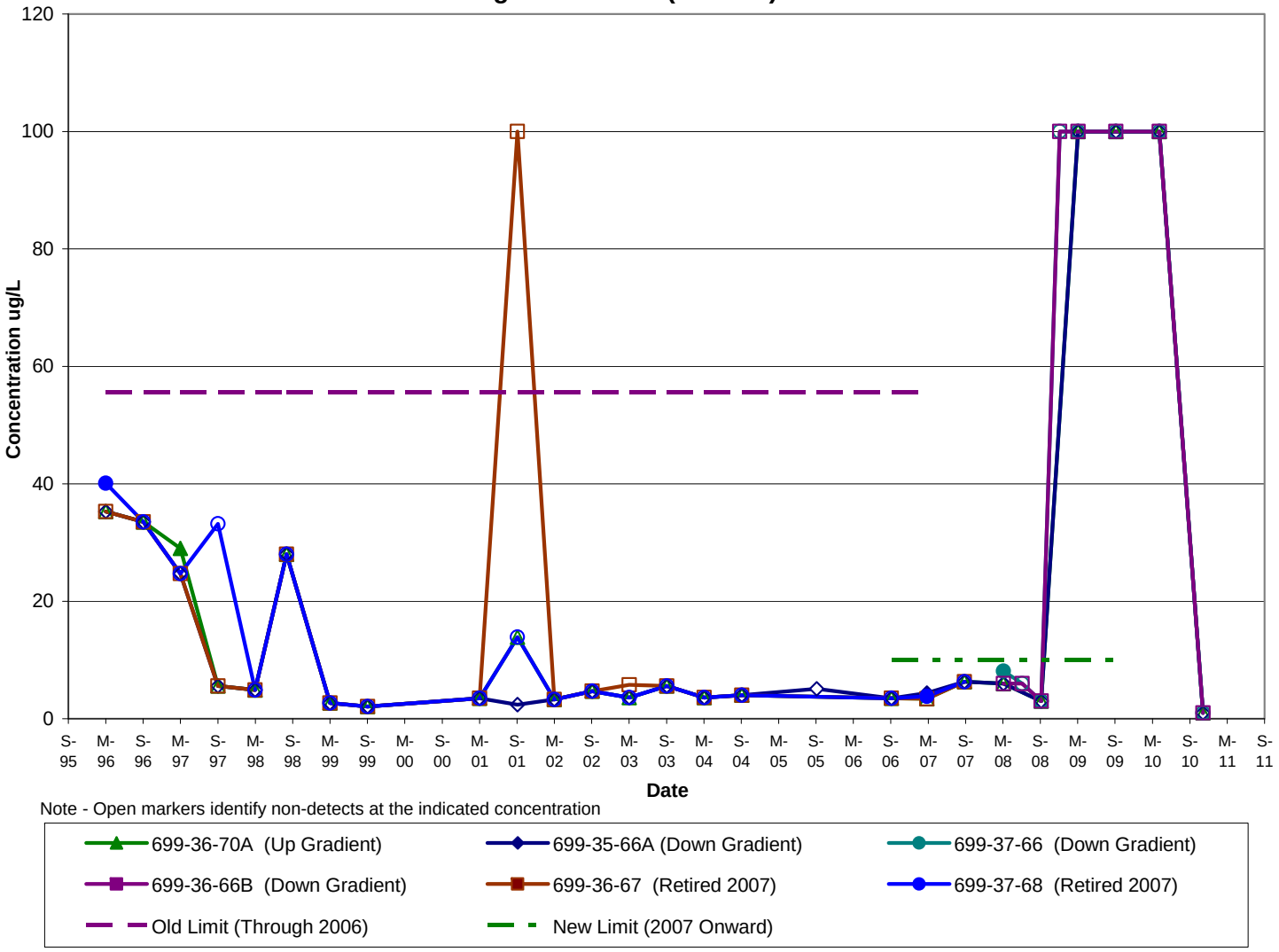


Figure B-8. Vanadium (Filtered).

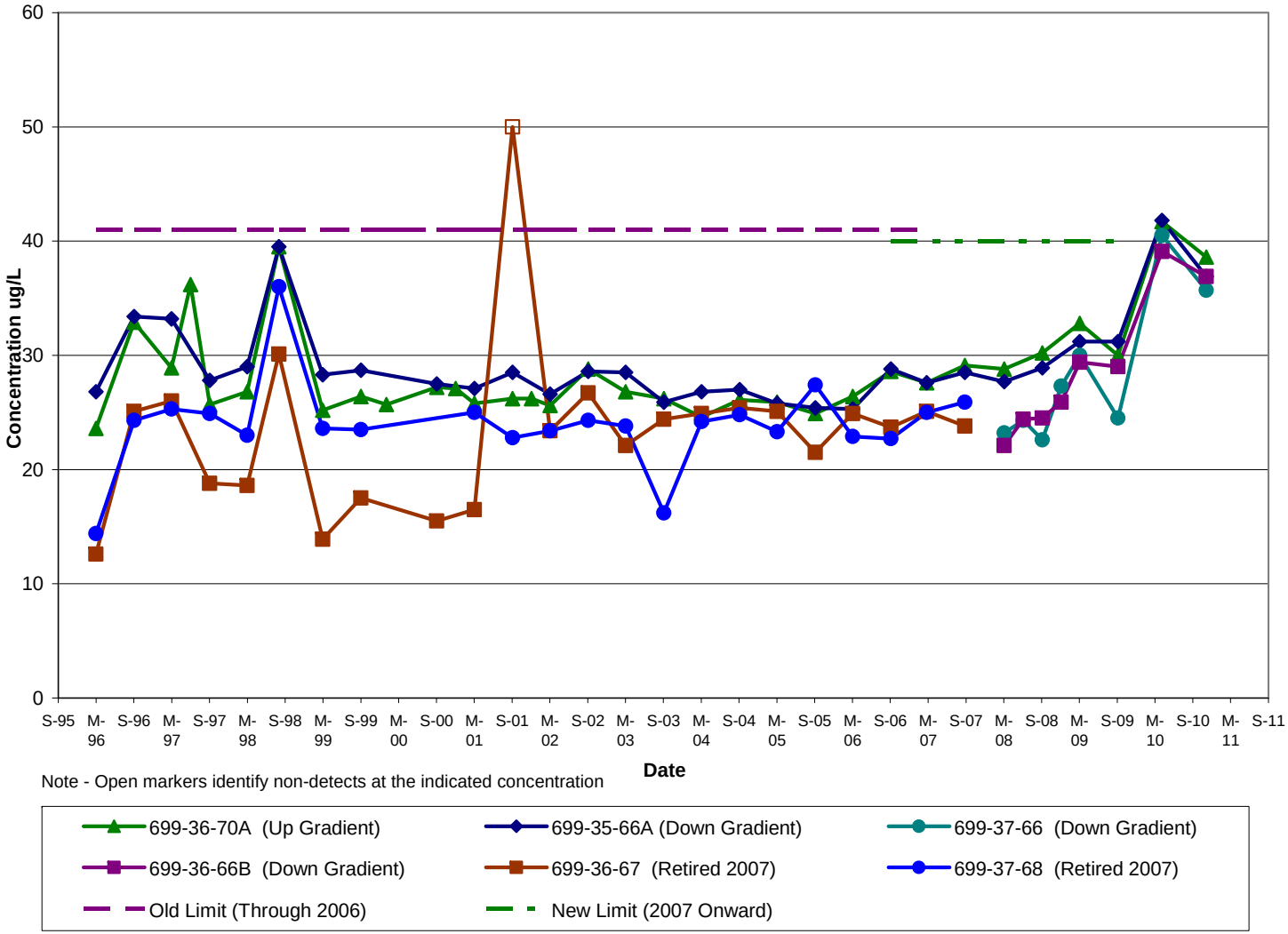


Figure B-9. Zinc (Filtered).

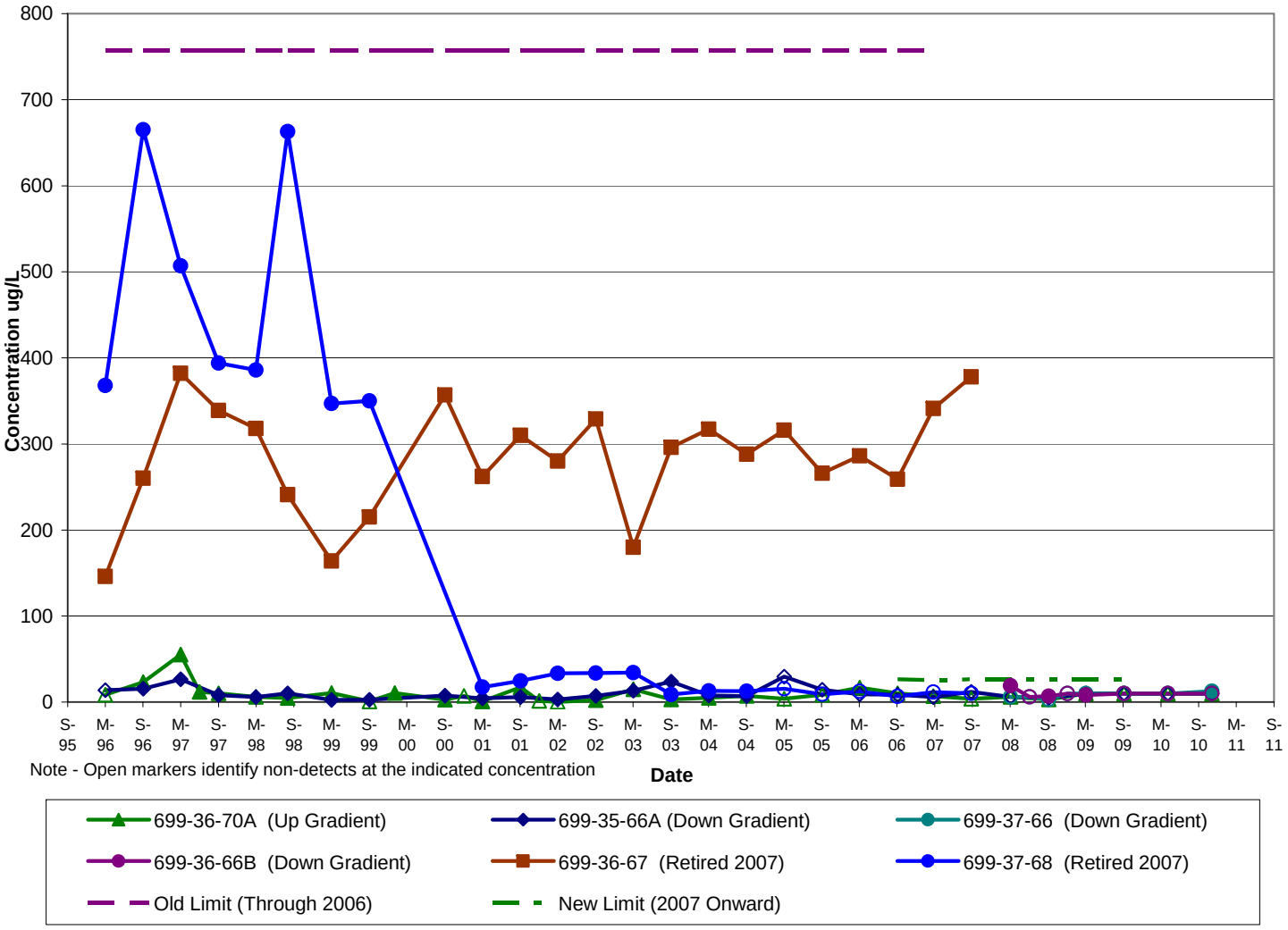


Figure B-10. Alkalinity.

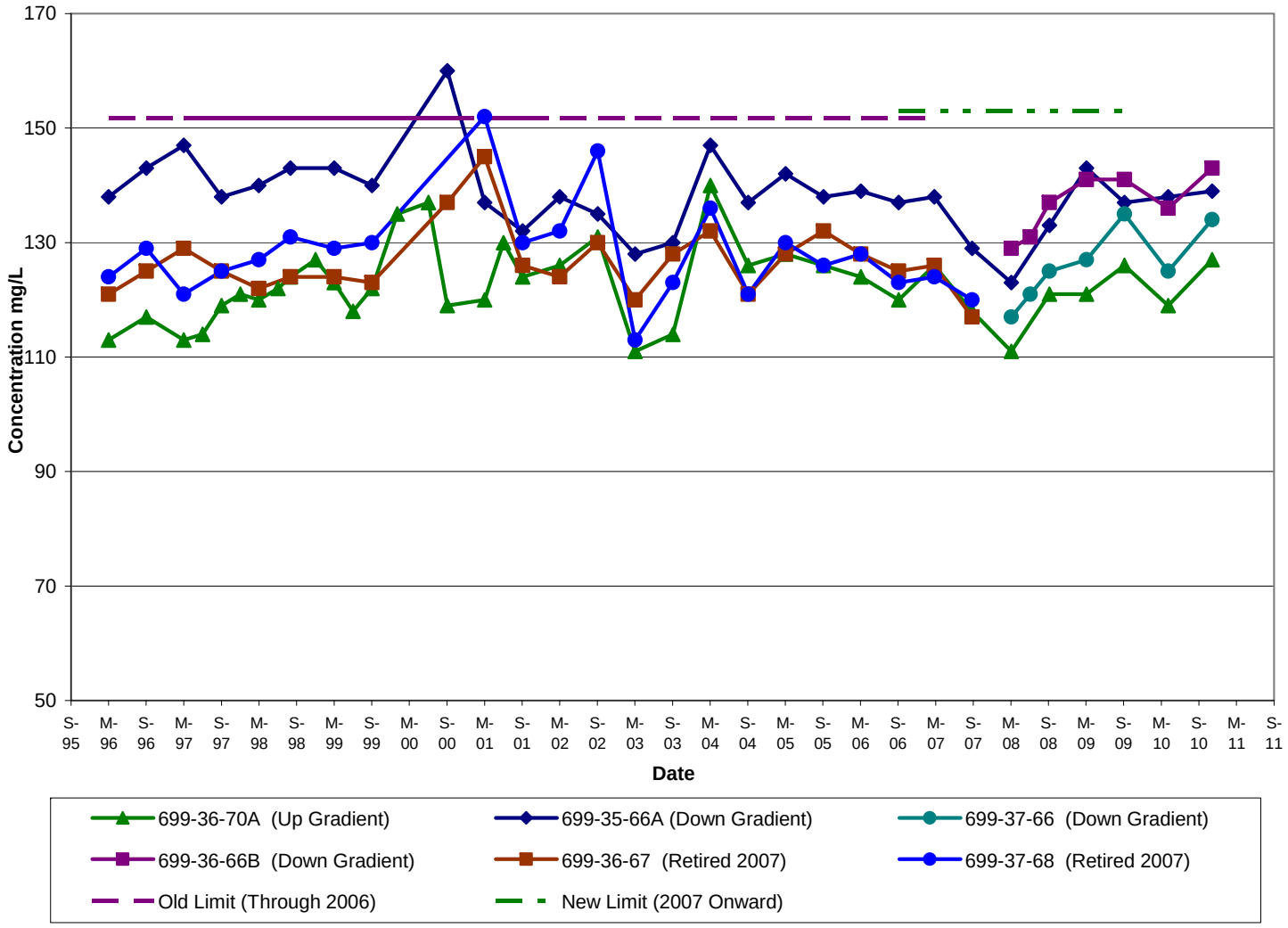


Figure B-11. Fluoride.

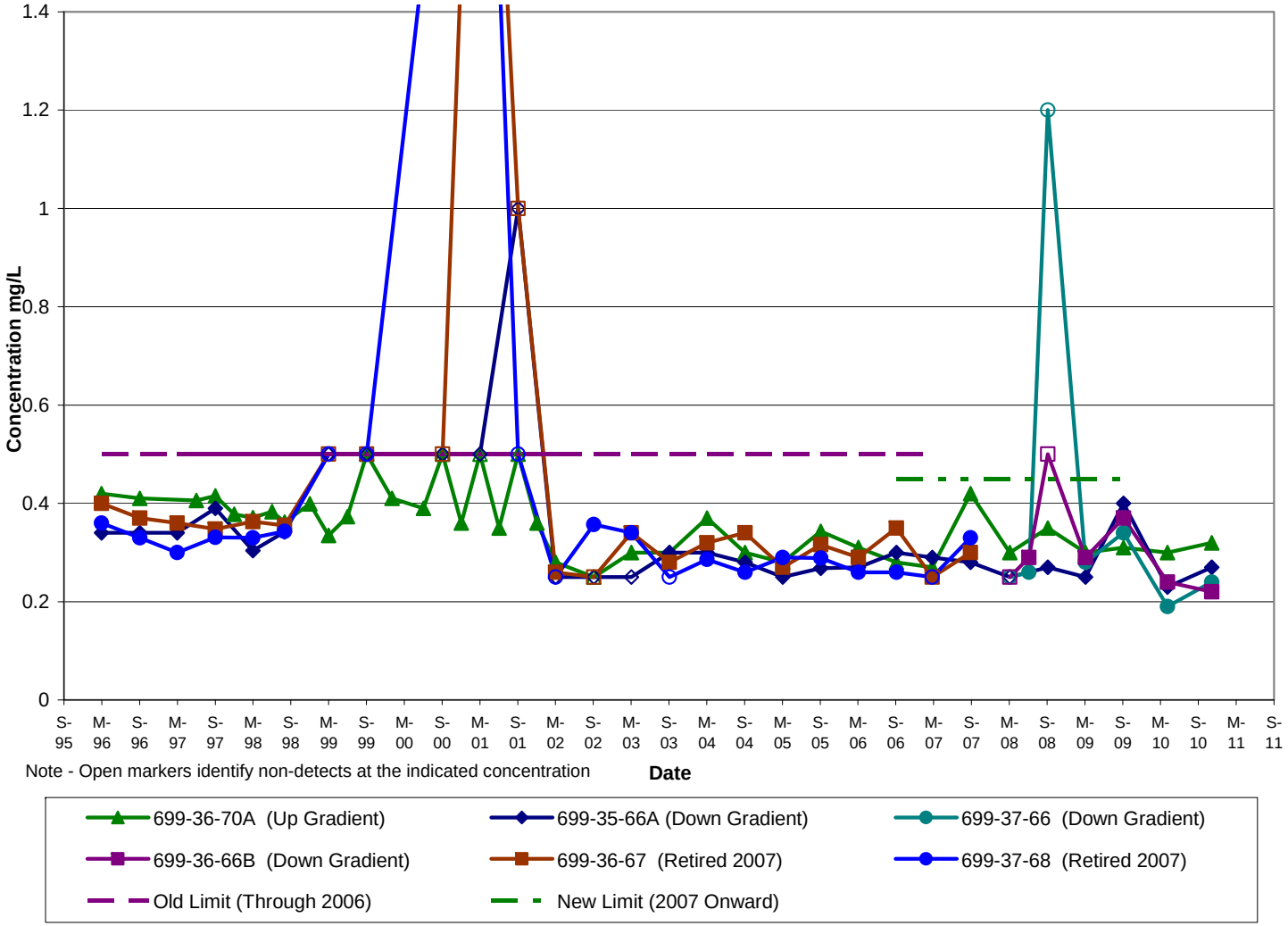


Figure B-12. Chloride.

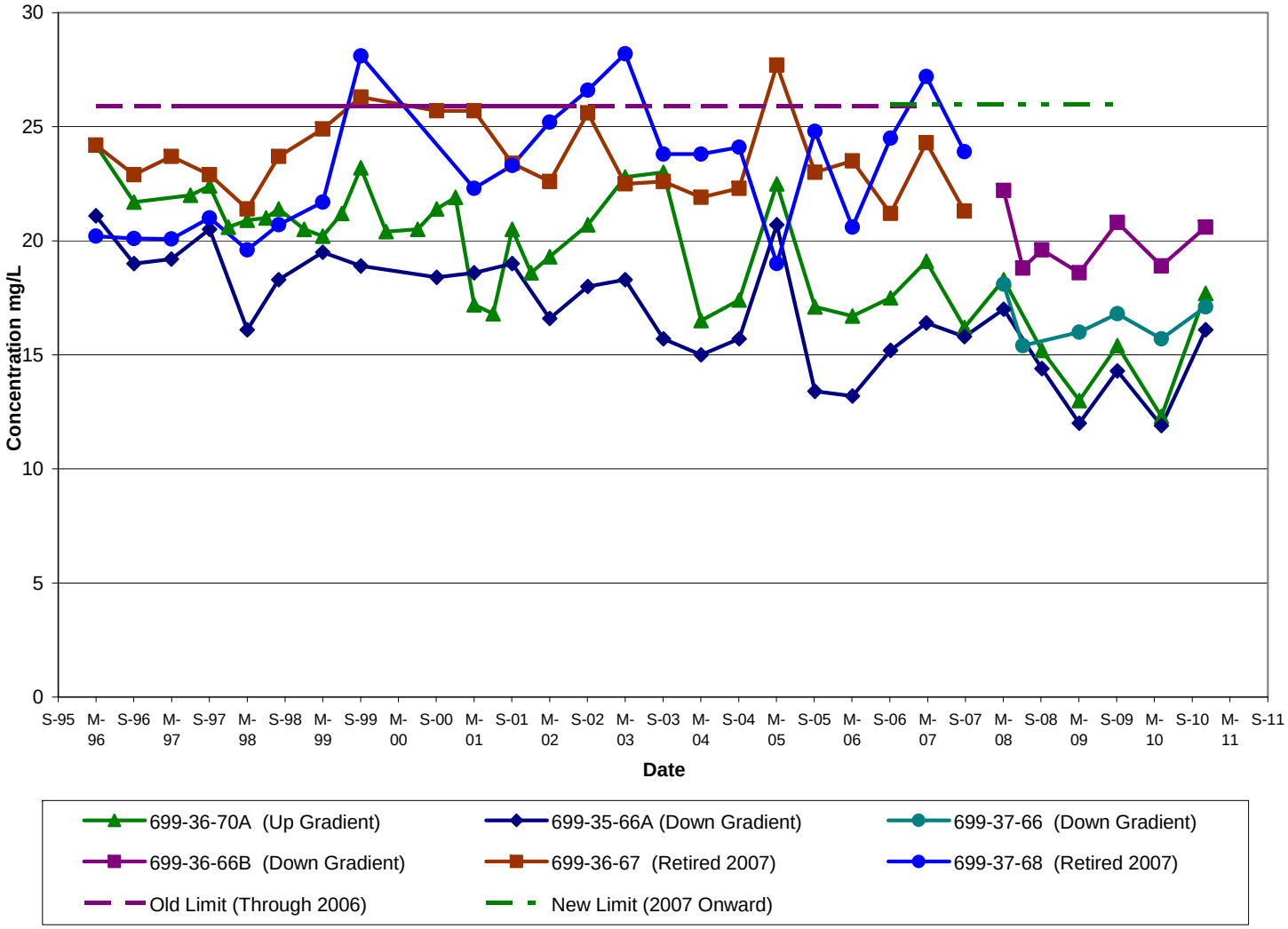


Figure B-13. Sulfate.

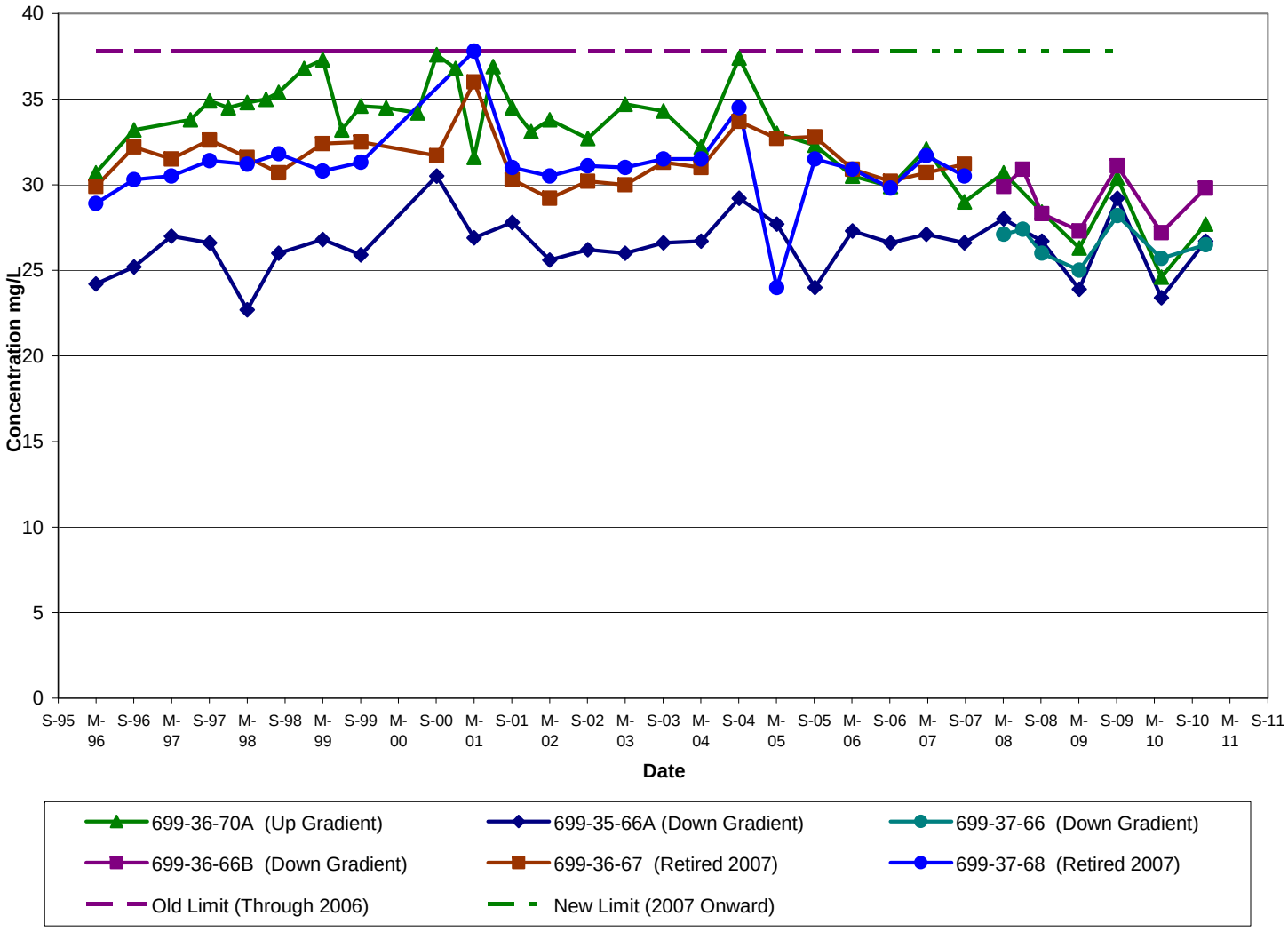


Figure B-14. Gross Alpha.

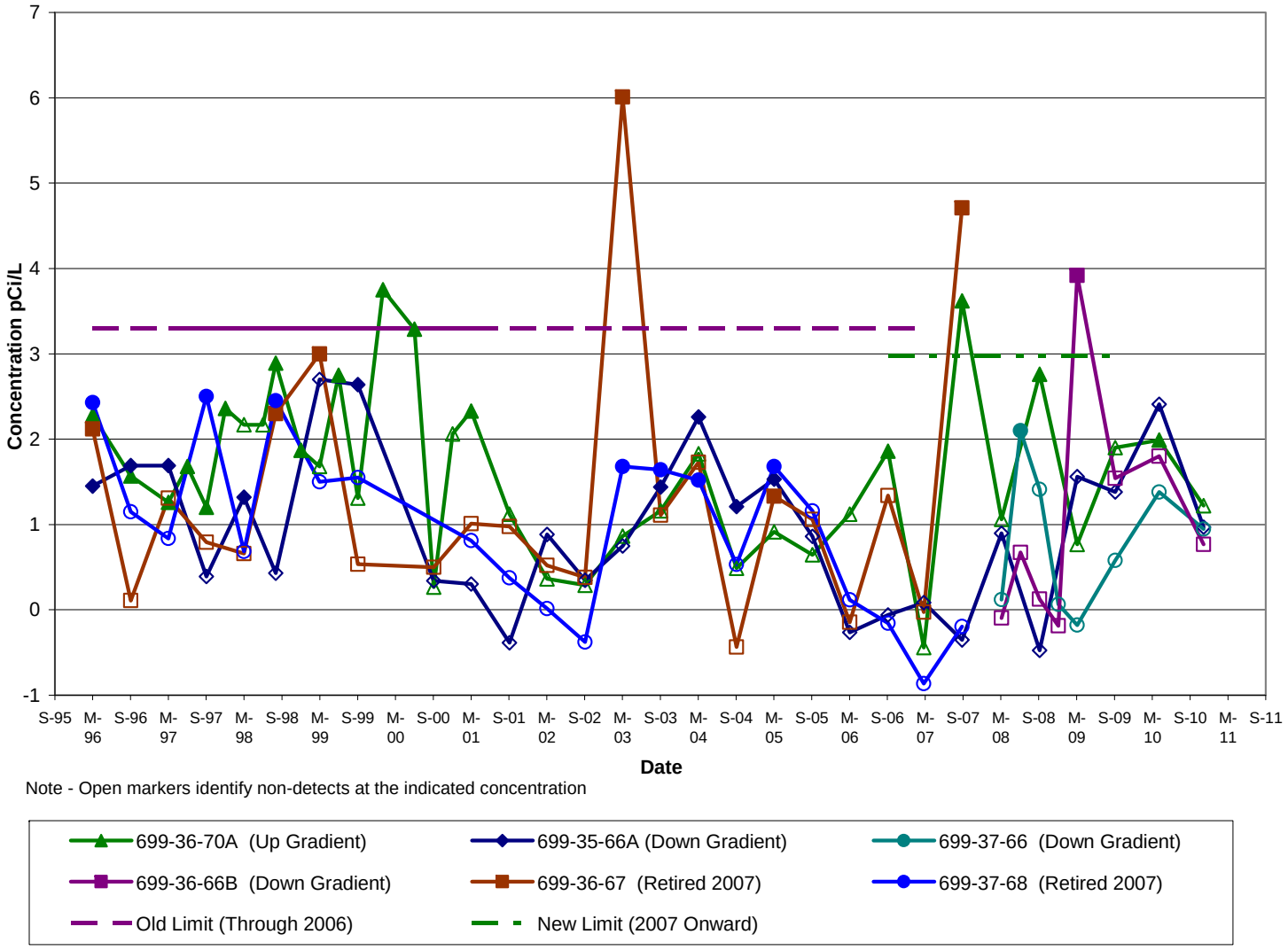


Figure B-15. Gross Beta.

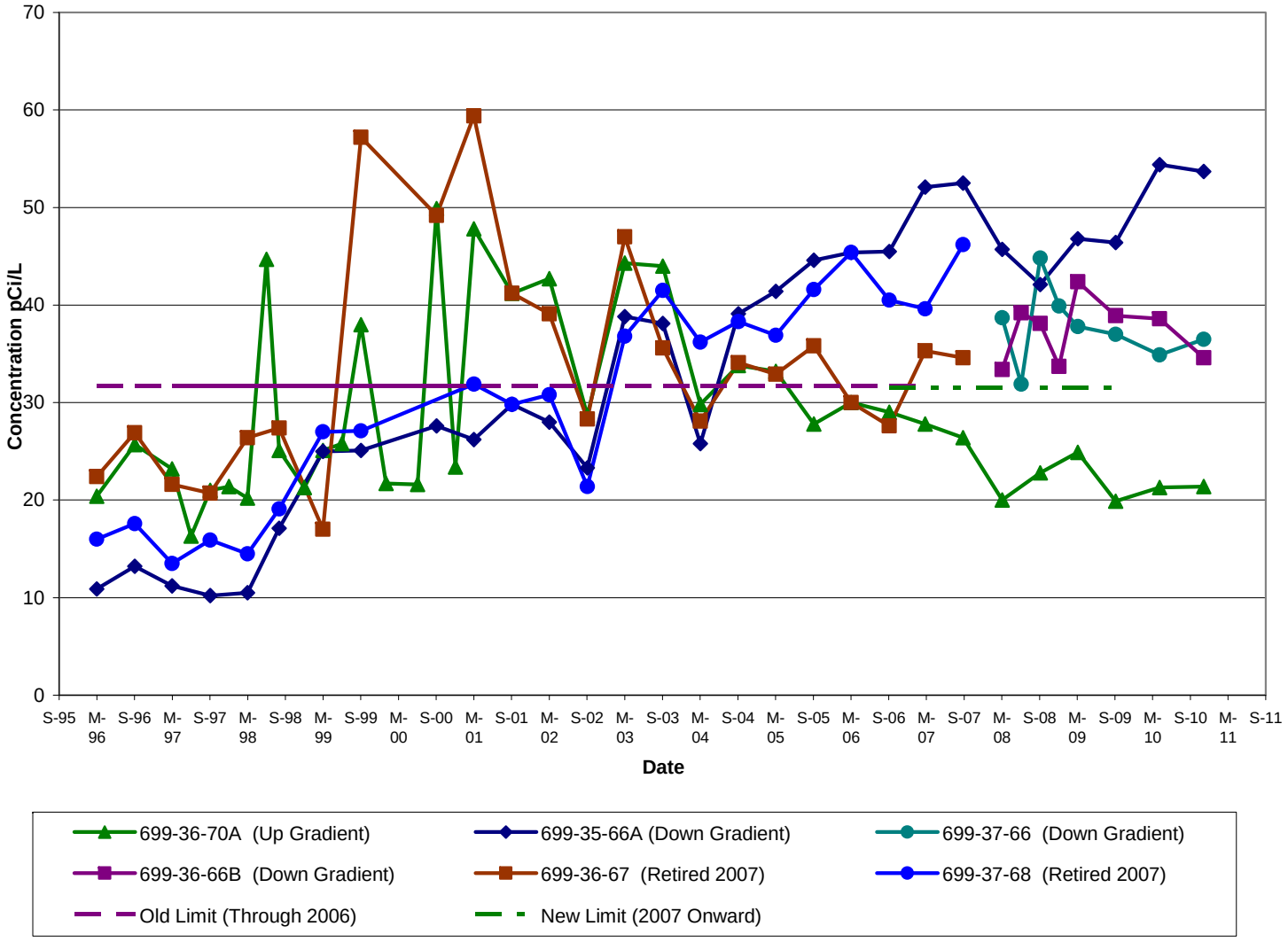


Figure B-16. Carbon-14.

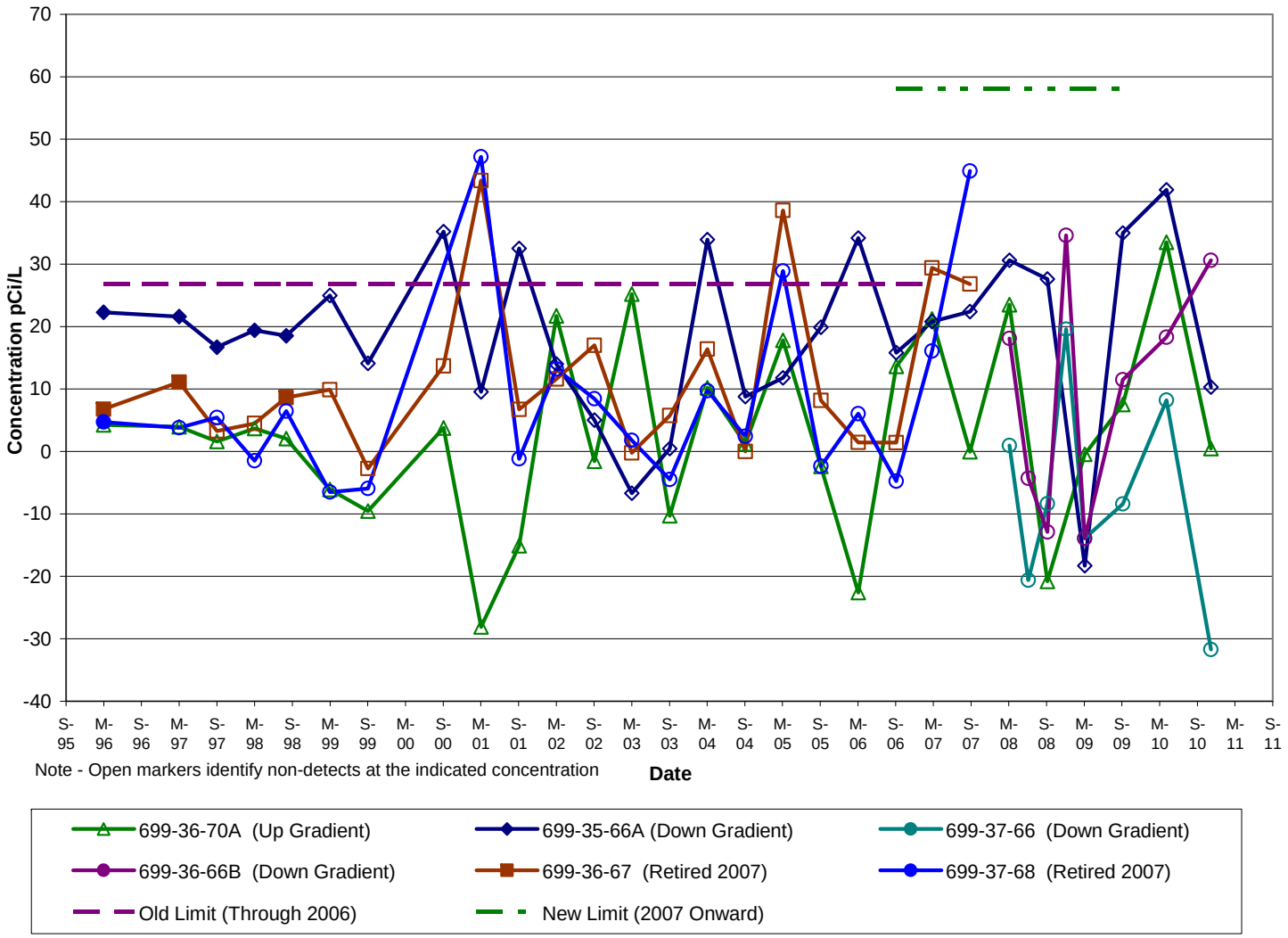


Figure B-17. Iodine-129.

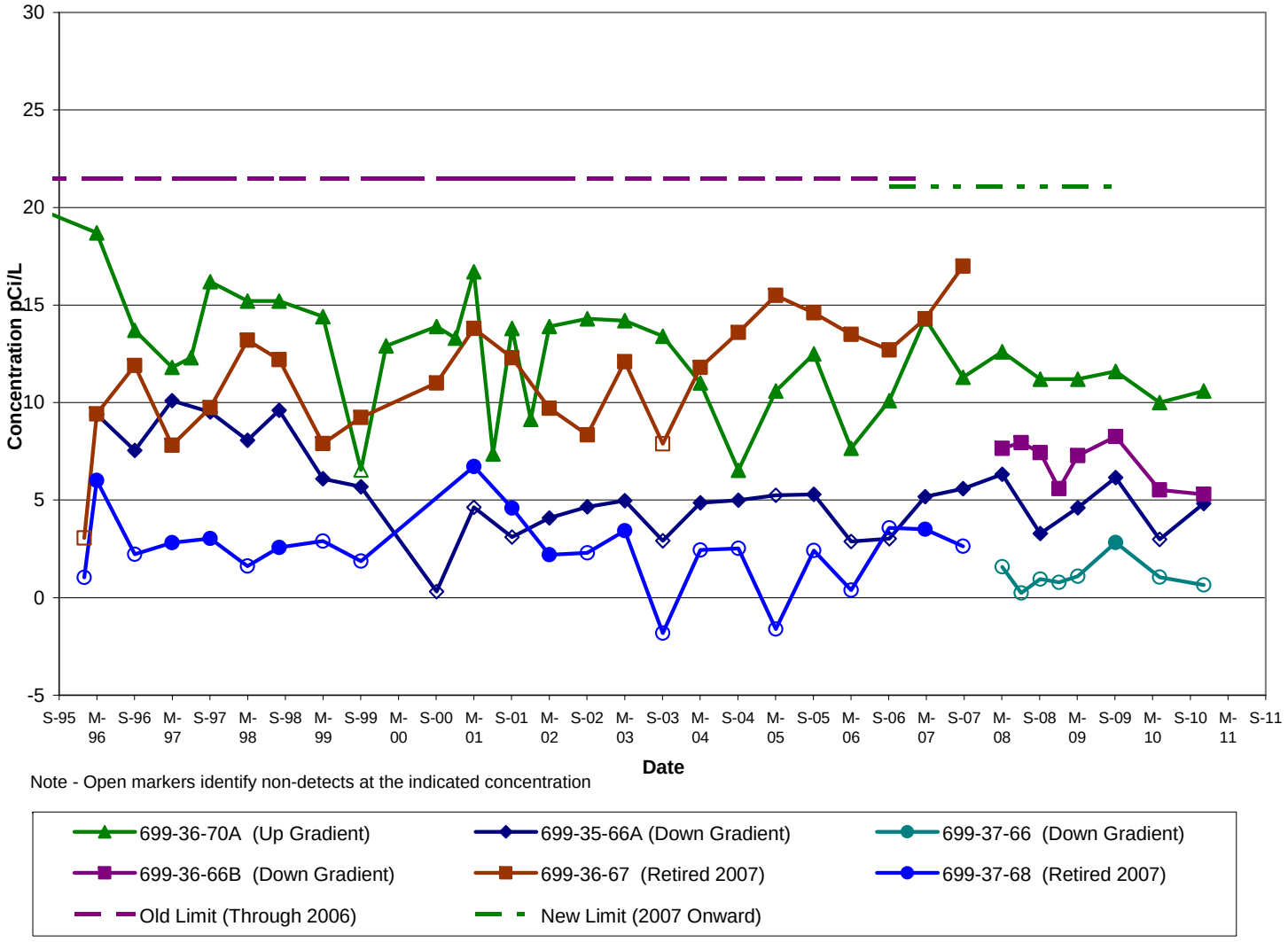


Figure B-18. Technetium-99.

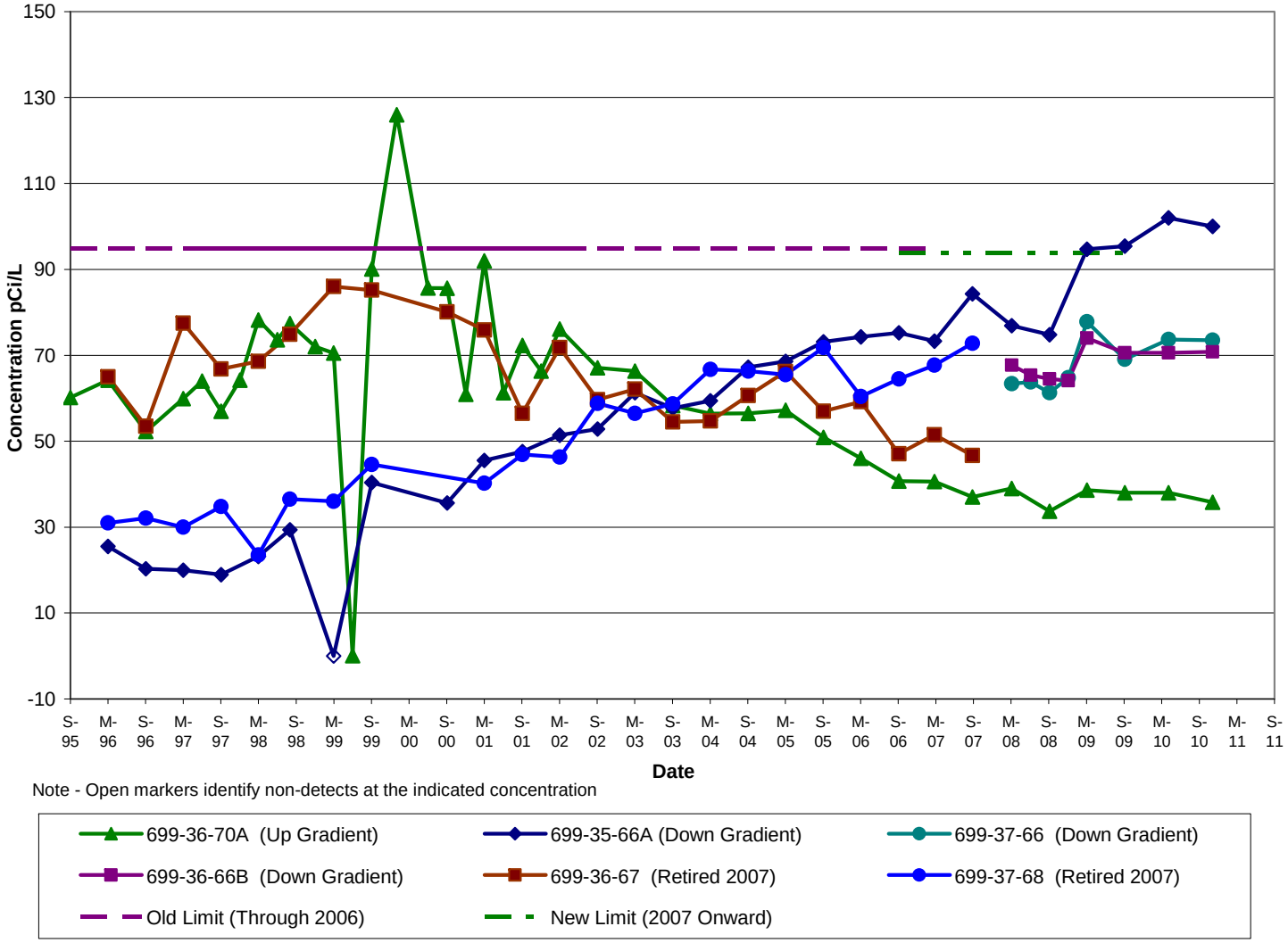


Figure B-19. Radium.

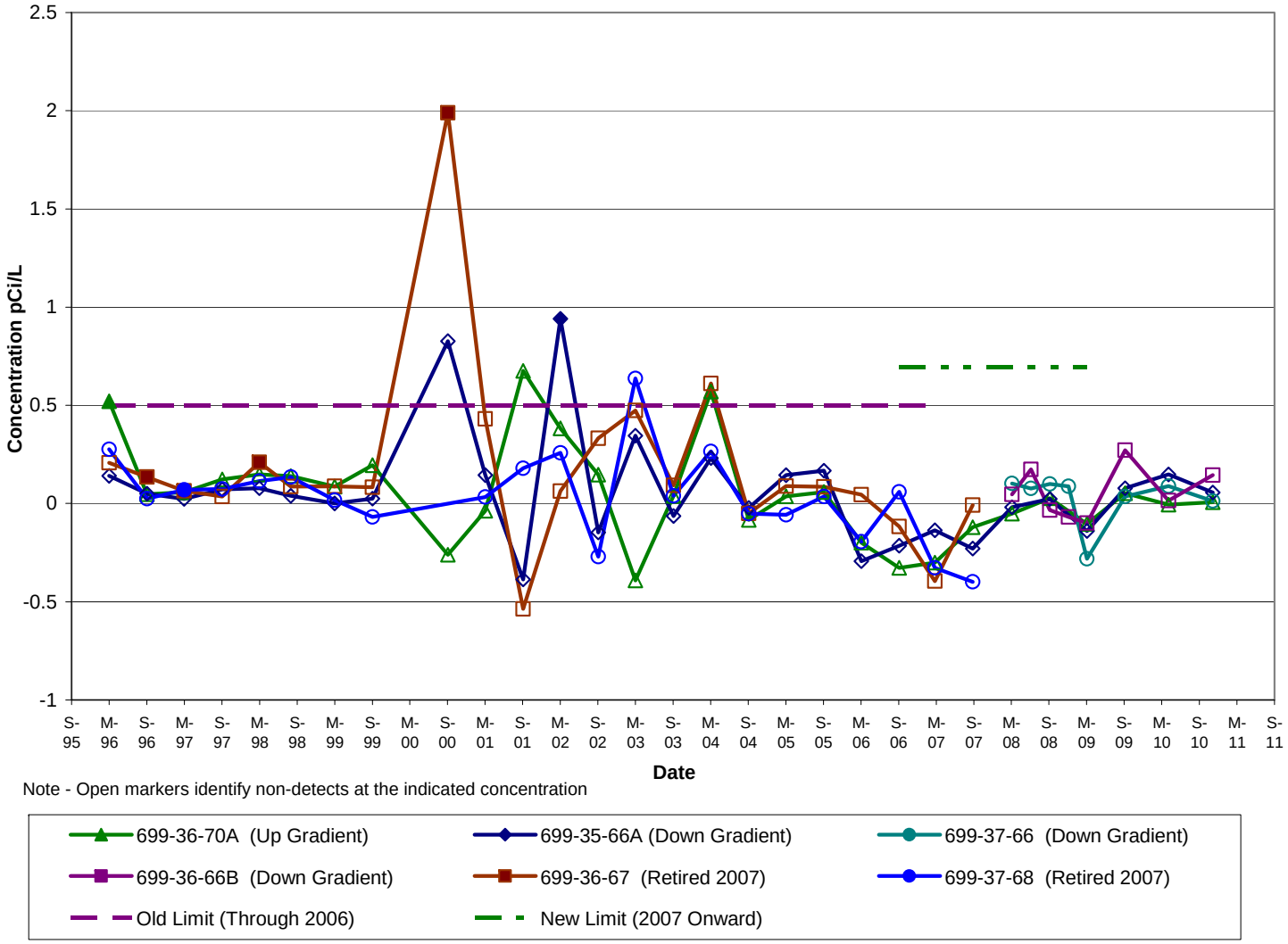


Figure B-20. Carbon Tetrachloride.

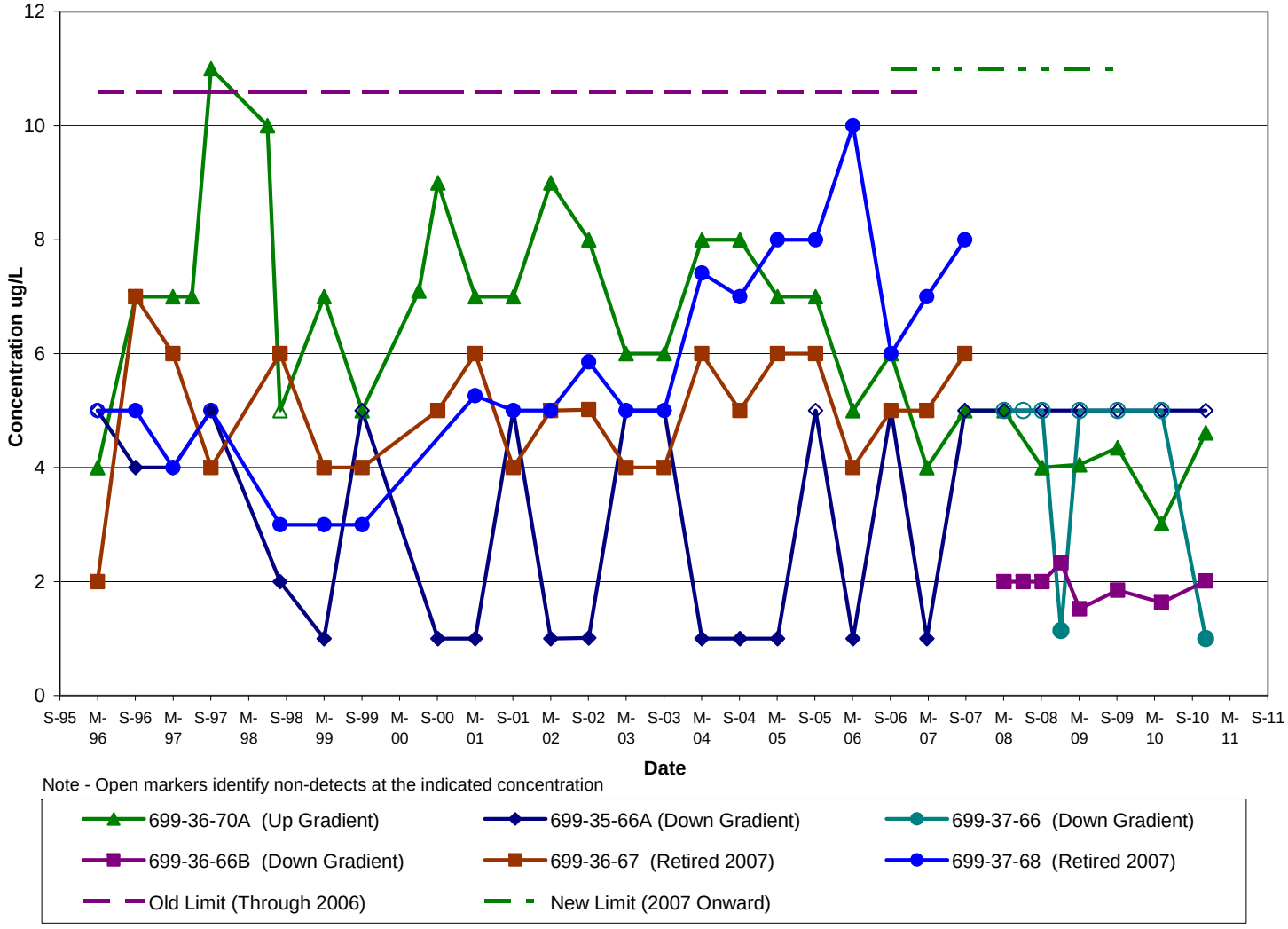


Figure B-21. Nitrogen in Nitrite and Nitrate.

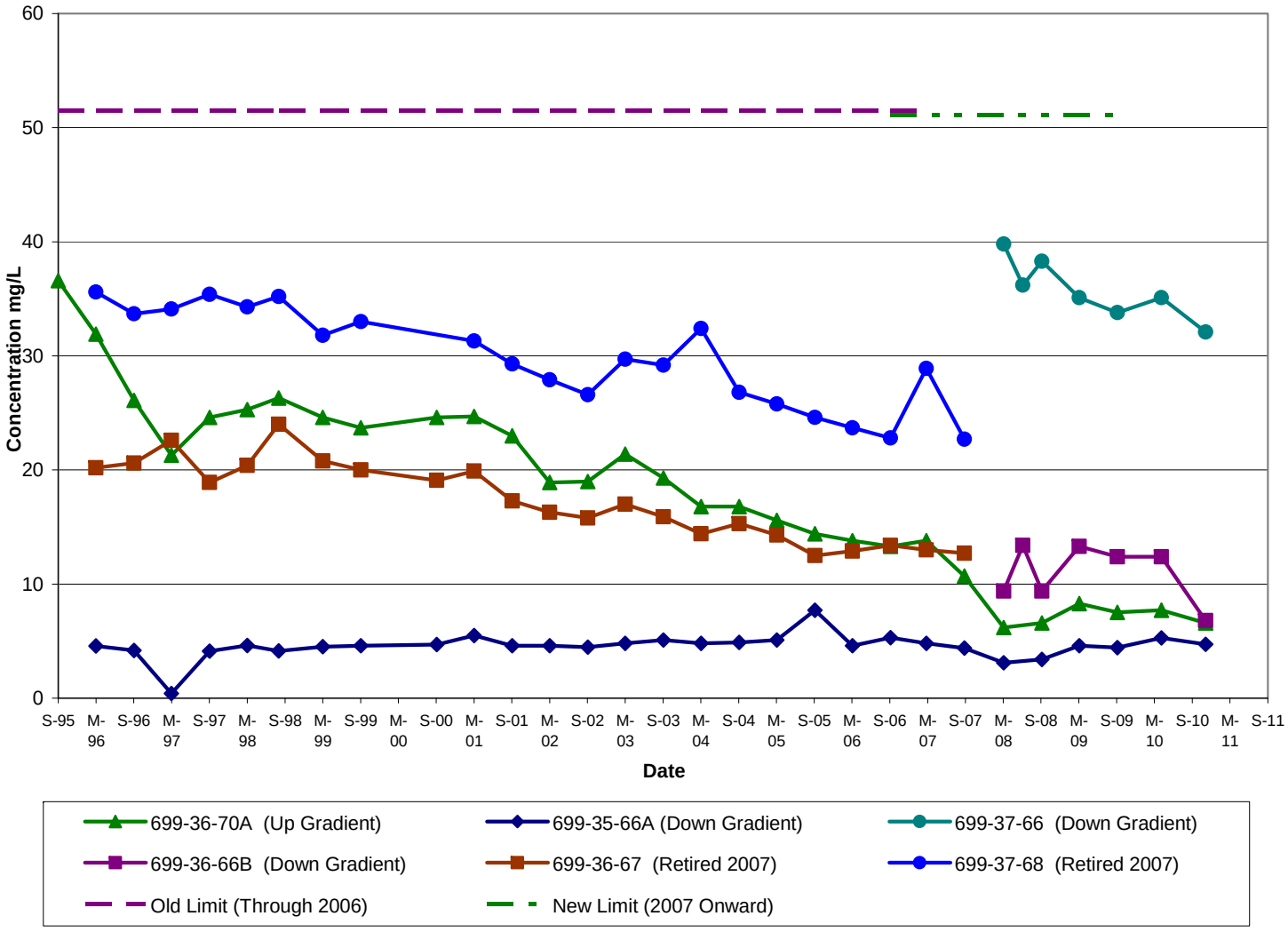


Figure B-22. Total Organic Halides.

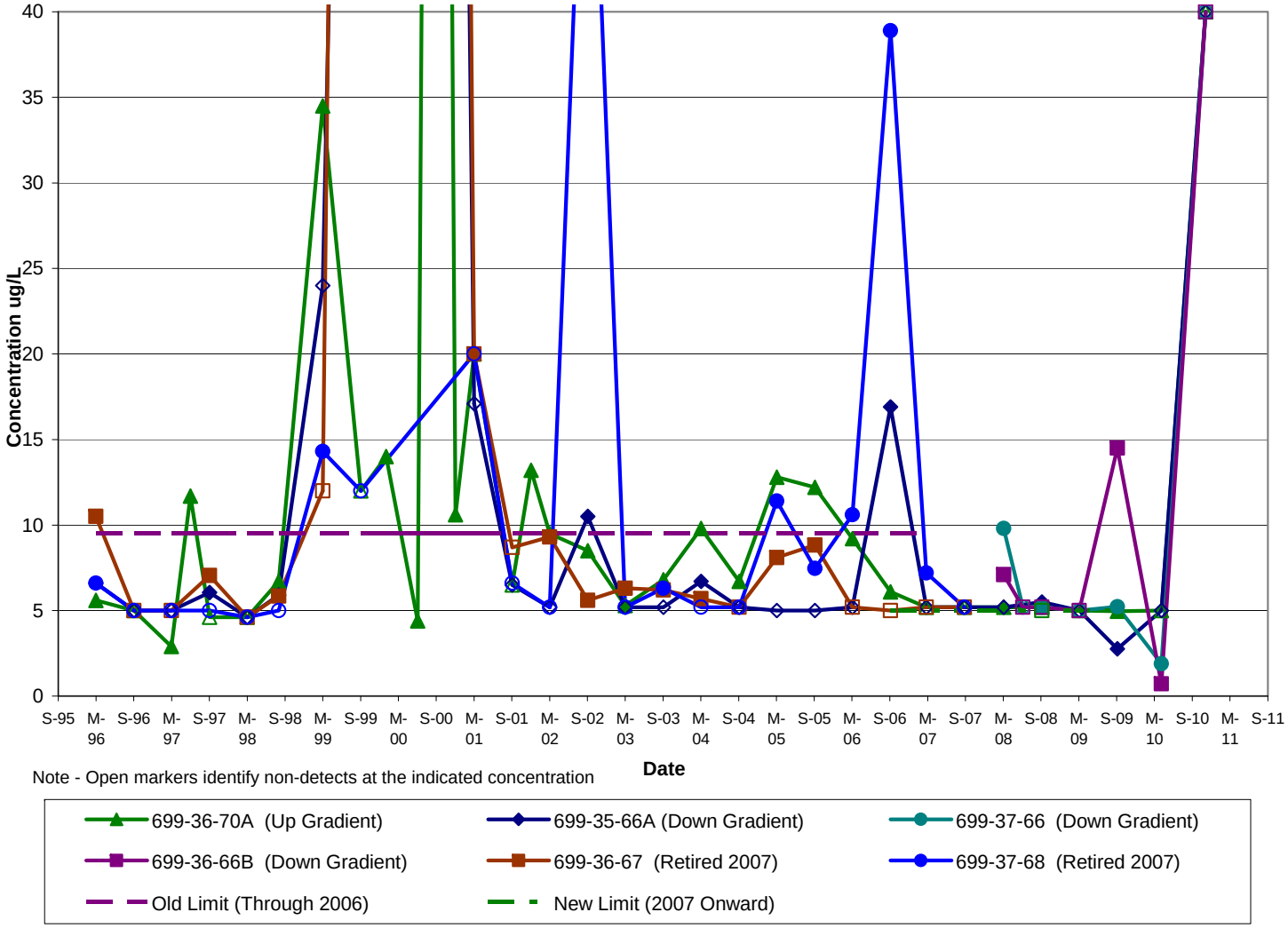


Figure B-23. Total Dissolved Solids.

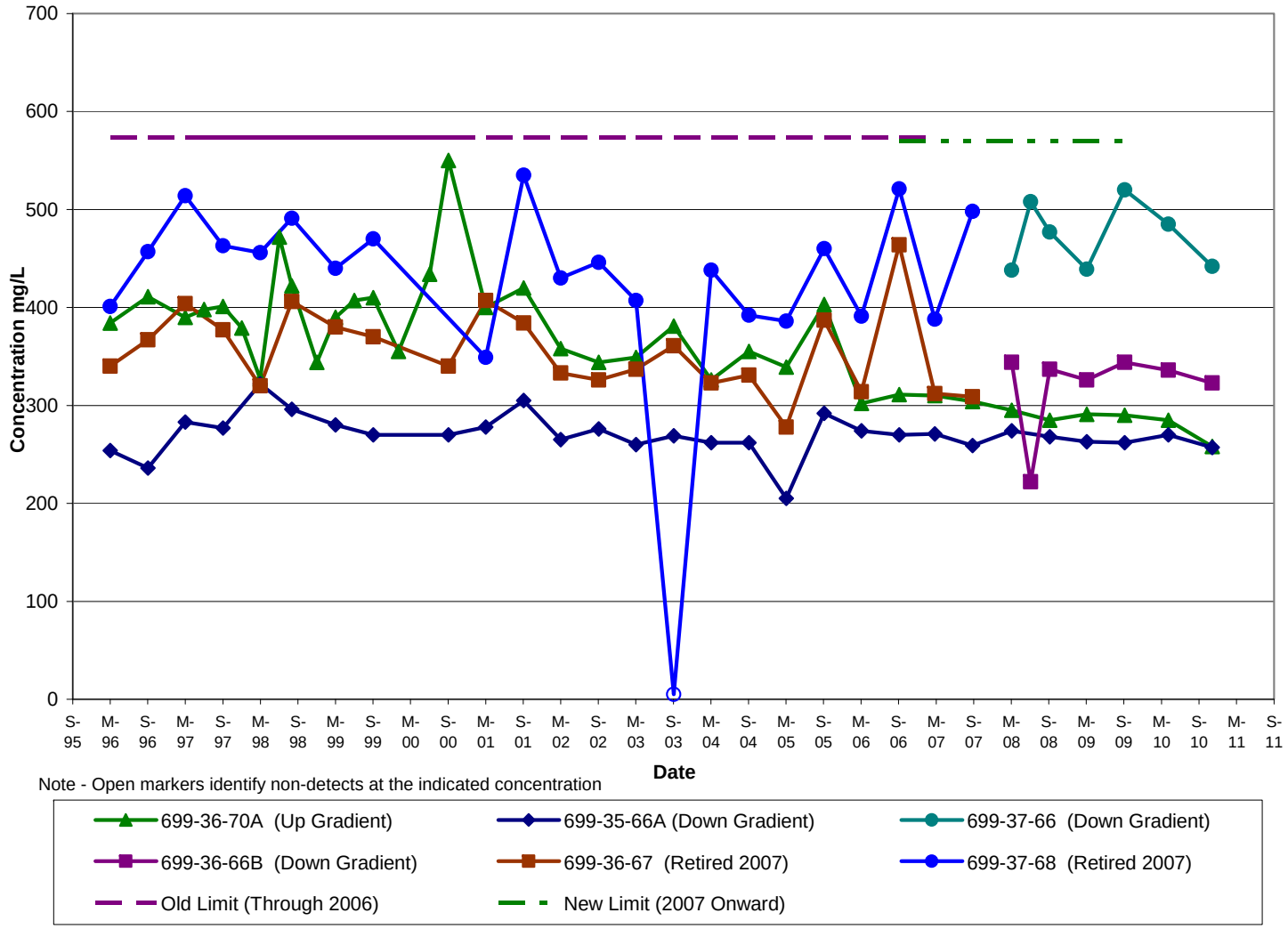


Figure B-24. Turbidity.

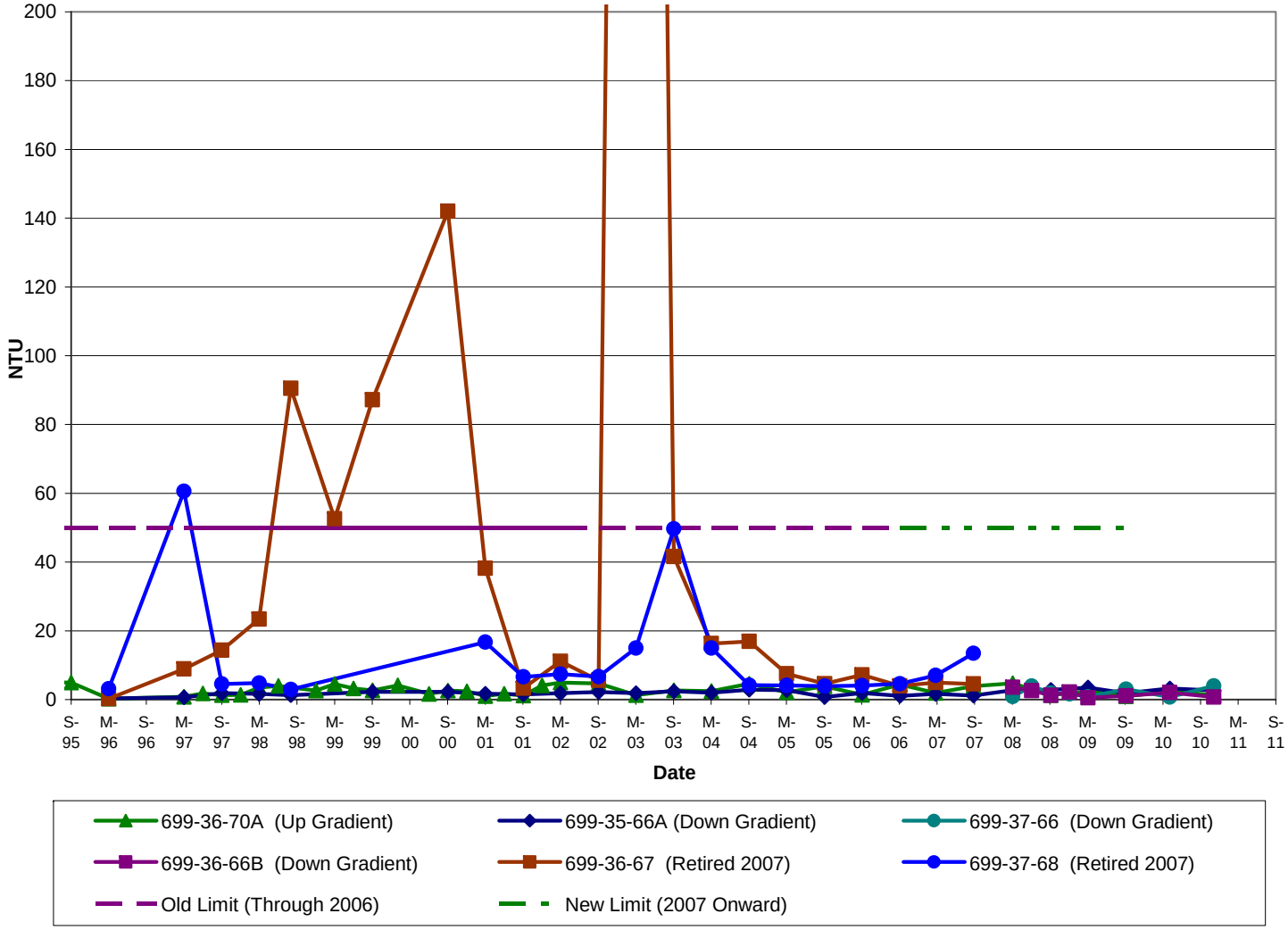


Figure B-25. pH.

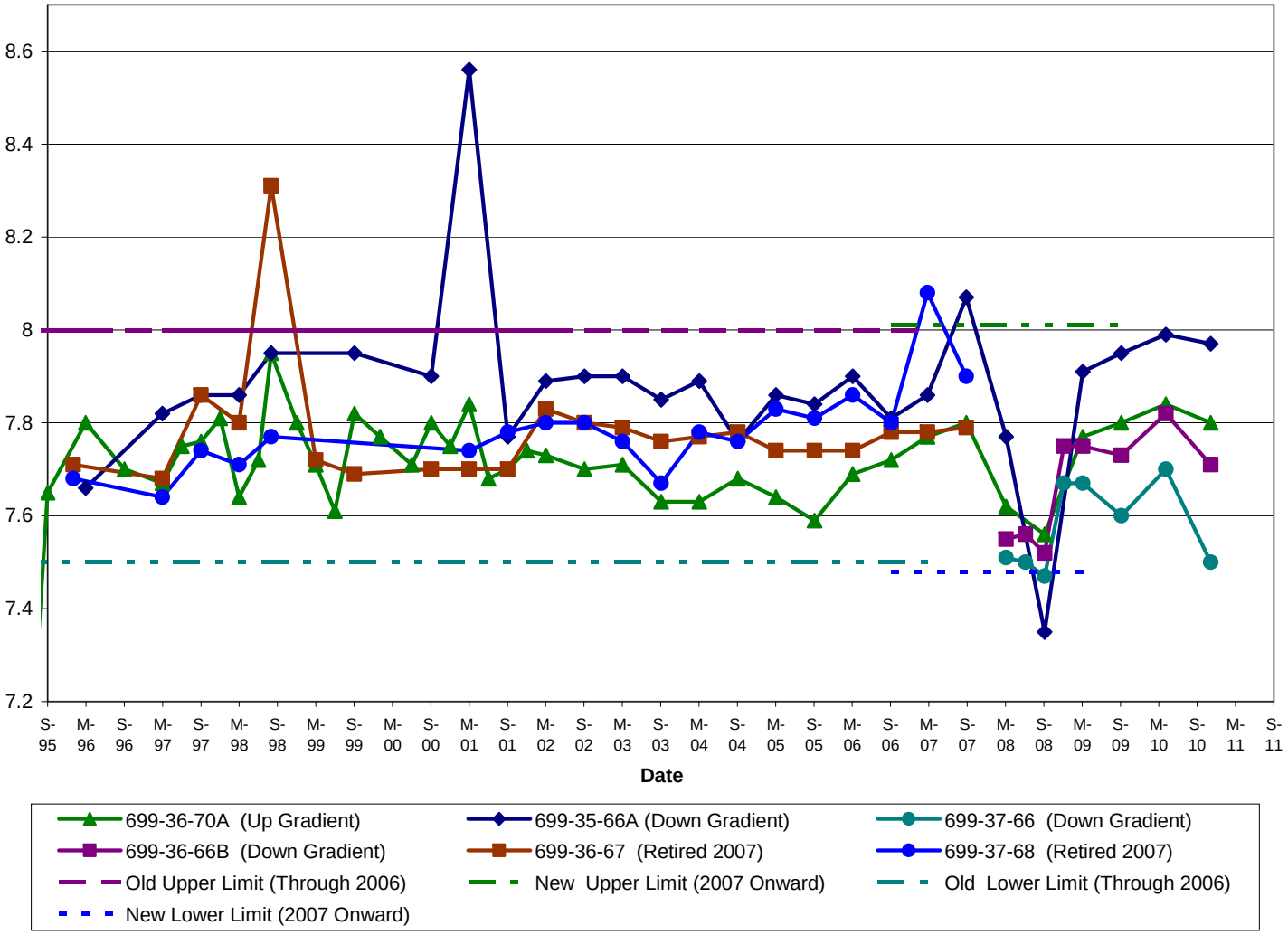
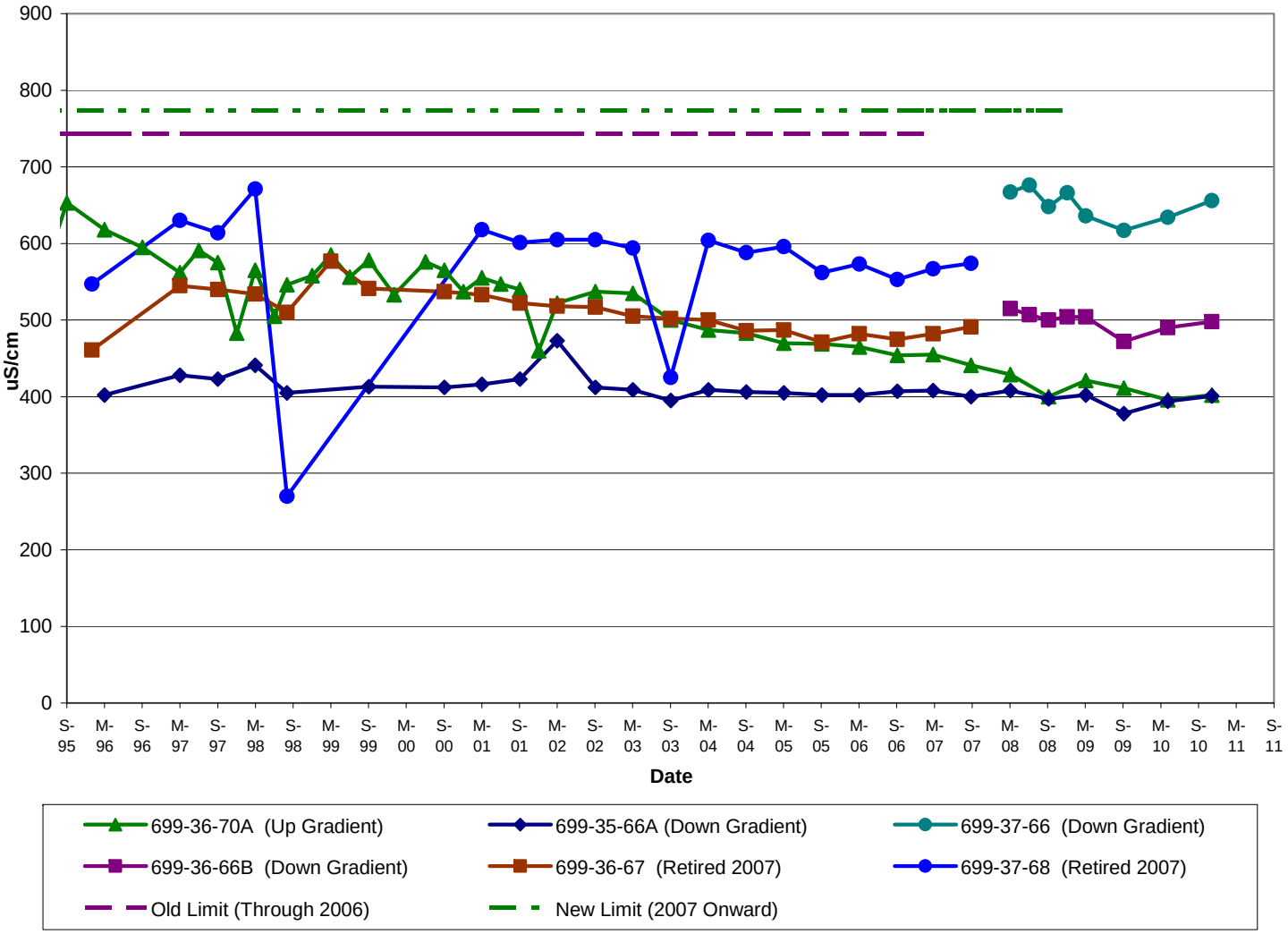


Figure B-26. Specific Conductance.



APPENDIX C

LEACHATE SAMPLING RESULTS SUMMARY, 2008-2010

Table C-1. Summary of Leachate Sampling Results, 2008-2010.

Constituent	Jun-08	Jun-08	Dec-08	Dec-08	Jun-09	Jun-09	Dec-09	Dec-09	Mar-10	Mar-10	Sep-10	Sep-10	Units
Aluminum	NR	NR	12.5U	12.5U	60.6	67.1	NR	NR	NR	NR	36.6B	36.4B	µg/L
Antimony	NR	NR	1.5U	1.5U	6U	6U	NR	NR	NR	NR	6U	6U	µg/L
Arsenic	5U	5U	7.9	7.7	6.63B	7.25B	6.62B	6.76B	6.73B	6.37B	5.33B	7B	µg/L
Barium	77.1	77.8	78.2	78.1	75.6	76.1	77.4	75.2	73.1	64.4	94.9	95.8	µg/L
Beryllium									1U	1U	2U	2U	
Calcium	180000	182000	213000	212000	184000	183000	198000	193000	189000	164000	224000	223000	µg/L
Chromium	16	14.6	21.5	21.1	11.7	11.2	25.2	24.9	19.8	17.7	20.7	20.7	µg/L
Copper	NR	NR	2.5U	2.5U	10U	10U	NR	NR	NR	NR	4.45B	3.85B	µg/L
Iron	NR	NR	12.5U	12.6	50U	50U	NR	NR	NR	NR	25.2B	15.5U	µg/L
Lead	3U	3U	1.2U	1.2U	5U	5U	4.35B	5.03B	10U	2.27B	5U	5U	µg/L
Magnesium	NR	NR	89700	89400	80600	79400	NR	NR	NR	NR	87200	88400	µg/L
Nickel	NR	NR	16.1	15.8	12.7B	12.3B	NR	NR	NR	NR	11.7B	11.8B	µg/L
Potassium	26100	26300	26100	26000	23500	23700	20600	20100	19400	16800	22000	22100	µg/L
Selenium	6U	6U	3.2	2.7	10U	10U	10U	10U	4.97B	4.91B	4.69B	3.94B	µg/L
Silcon	18800	19100	21100	21100	19500	21400	19200	19500	18500	17400	22400	22600	µg/L
Sodium	318000	325000	309000	311000	287000	285000	232000	228000	226000	196000	270000	270000	µg/L
Tin	6U	6U	0.9	0.8	100U	100U	5B	5U	5U	1.16B	100U	100U	µg/L
Thallium	6.8	6U	1.2U	1.2U	5U	5U	5B	5U	5U	5U	5U	5U	µg/L
Vanadium	20.7	20.8	25.7	25.6	36.6	35.8	23.9	22.1	41.8	38.7	40.5	40.2	µg/L
Zinc	6U	6U	2.5U	2.5U	10U	10U	20U	20U	20U	20U	10U	12.2	µg/L
Carbon tetrachloride	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	µg/L
Trichloroethene									5U	5U	5U	5U	
Methyl alcohol	NR	NR	500U	500U	NR	NR	NR	NR	NR	NR	5U	5U	µg/L
Trichlorofluoromethane	NR	NR	5U	5U	NR	NR	NR	NR	NR	NR	1.36J	1.15J	µg/L
pH	7.58	7.56	7.4	7.6	7.51	7.42	7.38	7.42	7.3	7.37	7.41	7.52	pH
Specific Conductance	3040	3060	NR	NR	3480	2790	2730	2700	2531	2610	2820	2820	µmS/cm
Bromide	2500UD	2500UD	2500UD	2500UD	2500UD	1090DB	2500U	2500U	2500U	2500U	500U	500U	µg/L
Chloride	264000D	261000D	266000D	266000D	268000D	252000D	222000D	203000D	228000D	226000D	323000	322000	µg/L
Fluoride	250U	1500	2500UD	2500UD	2500UD	2500UD	2500U	2500U	2500U	2500U	500U	500U	µg/L
Nitrate	381000D	376000D	388000D	394000D	358000D	346000D	364000D	338000D	395000D	389000D	276000	278000	µg/L
Nitrite	2500UD	2500UD	2500UD	2500UD	2500UD	2500UD	2500UD	5000UD	2500U	2500U	500U	500U	µg/L
Sulfate	589000D	571000D	564000D	565000D	575000D	558000D	490000D	475000D	488000D	483000D	563000	563000	µg/L
Total Organic Carbon	NR	NR	7800	7900	NR	NR	NR	NR	NR	NR	10200	9560	µg/L
Oil & Grease	NR	NR	1000U	1100U	NR	NR	NR	NR	NR	NR	10500U	10400U	µg/L
Total Dissolved Solids	2000000	1980000	2200000	2150000	2220000	2140000	1820000	1880000	1780000	1820000	2030000	2070000	µg/L
Total Suspended Solids	7000	6000	5000U	5000U	9000	8000	5000U	5000U	5000U	5000U	10000U	5000	µg/L
Alkalinity					216000	216000	234000	232000	214000	216000	274000	267000	µg/L
Gross Alpha	2470	2610	3380	3360	1740	1800	1700	1830	1690	1590	1290	1230	pCi/L
Gross Beta	1000	996	1500	1460	925	905	862	828	650	657	648	652	pCi/L
Carbon-14	50.8	31.5U	40.2U	68.7	48.9U	41U	39.4U	62.8	81.8	48	32.8U	47.9	pCi/L
Technetium-99	719	775	746	828	798	751	773	976	739	892	579	580	pCi/L
Uranium (Total)	2400	2370	2820	2660	2200	2190	2210	2500	2420	3060	1480	1800	µg/L
Iodine-129	0.084U	0.611U	-2.34U	-3.84U	-.293U	-.455U	-.751U	-.204U	1.85U	-2.1U	.751U	.608U	pCi/L
Total Radium Alpha Emissions	0.036U	0.157U	-0.041U	0.183U	0.1U	0.132U	0.095U	0.174U	.06U	.132U	.008U	0.017U	pCi/L
Tritium			116000	117000	98000	100000	120000	123000	122000	125000	97300	97000	pCi/L

B = Organics: Method blanks contamination, Inorganics: Value is an estimate.
C = Analyte detected in associated laboratory batch blank.
D = Result reported from secondary dilution.
J = Value is an estimate.
NR = Not requested for this analysis round. Constituents that are not requested are not required for the short list required for routine semi-annual sampling.
U = Result is nondetected.

Table C-2. Leachate Long List Analytes. (2 Pages)

Constituent	Constituent	Constituent	Constituent
(1-Methylethyl) benzene	7,12-Dimethylbenz[a]anthracene	Dibenz[a,h]anthracene	O,O,O-Triethyl phosphorothioate
1,1,1-Trichloroethane	Acenaphthene	Dibromochloromethane	o-Cresol
1,1,2,2-Tetrachloroethane	Acetic acid ethyl ester (Ethyl acetate)	Dibromomethane	Oil & Grease
1,1,2,2-Tetrachloroethene	Acetic acid vinyl ester (Vinyl acetate)	Dichlorodifluoromethane	PCB-1016
1,1,2-Trichloroethane	Acetonitrile	Dichloromethane (Methylene Chloride)	PCB-1221
1,1,2-Trichloroethylene	Acetophenone	Dichloropropanol	PCB-1232
1,1-Dichloroethane	Acrolein	Dieldrin	PCB-1242
1,1-Dichloroethene	Acrylonitrile	Diethyl phthalate	PCB-1248
1,2,2-Trichlorotrifluoroethane	Aldrin	Dimethyl phthalate	PCB-1254
1,2,4-Trichlorobenzene	alpha-BHC	Di-n-butylphthalate	PCB-1260
1,2-cis-Dichloroethene	alpha-Naphthylamine	Di-n-octylphthalate	p-Cresol
1,2-Dichlorobenzene	Aluminum	Endrin	Pentachlorobenzene
1,2-Dichloroethane	Americium-241	Ethyl benzene	Pentachlorophenol
1,2-Dichloropropane	Ammonia	Ethyl ether	pH
1,2-Diphenylhydrazine	Aniline	Ethyl methanesulfonate	Phenol
1,2-trans-Dichloroethene	Anthracene	Ethylene dibromide	Phosphate
1,3-Butadiene	Antimony	Europium-152	Potassium
1,3-Dichlorobenzene	Arsenic	Europium-154	Potassium-40
1,3-Dinitrobenzene	Barium	Europium-155	p-Phenylenediamine
1,4-Dichlorobenzene	Bendiocarb	Fluoranthene	Pyrene
1,4-Dinitrobenzene	Benzene	Fluorene	Pyridine
1,4-Dioxane	Benzo(a)anthracene	Fluoride	Radium-226
1-Acetyl-2-thiourea	Benzo(a)pyrene	Formaldehyde	Radium-228
1-Chloroethene (Vinyl Chloride)	Benzo(b)fluoranthene	Formic Acid	Selenium
2,4,5-Trichlorophenol	Benzo(k)fluoranthene	Gamma-BHC (lindane)	Silcon
2,4,6-Trichlorophenol	Benzyl alcohol	Gross alpha	Silver
2,4-D	Beryllium	Gross beta	Sodium
2,4-Dichlorophenol	beta-BHC	Heptachlor	Specific Conductance
2,4-Dimethylphenol	Bis(2-Chloroethoxy)methane	Heptachlor Epoxide	Styrene
2,4-Dinitrophenol	Bis(2-chloroethyl) ether	Hexachlorobutadiene	Sulfate
2,5-Diamintoluene	Bis(2-Chloroisopropyl) ether	hexachlorocyclopentadiene	Sulfide

Table C-2. Leachate Long List Analytes. (2 Pages)

Constituent	Constituent	Constituent	Constituent
2,6-dinitrotoluene	Bis(2-ethylhexyl) phthalate	Hexachloroethane	Technetium-99
2-Butanone (MEK)	Bromide	Hexachlorophene	Tetrahydrofuran
2-Butenaldehyde (Crotonaldehyde)	Bromodichloromethane	Hexavalent chromium	Thallium
2-Chloroethyl vinyl ether	Bromomethane	Indeno(1,2,3-cd)pyrene	Thorium-228
2-Chloronaphthalene	Butylbenzylphthalate	Iodine-129	Thorium-232
2-Chlorophenol	Cadmium	Isophorone	Tin
2-Cyclohexyl-4,6-dinitrophenol	Calcium	Lead	Toluene
2-Methyl-2-propenenitrile (Methacrylonitrile)	Carbon disulfide	Magnesium	Total Dissolved Solids
2-Methylpropyl alcohol (Isobutyl alcohol)	Carbon tetrachloride	Manganese	Total Organic Carbon
2-Naphthylamine	Carbon-14	m-Cresol	Total radium alpha emissions
2-nitroaniline	Cesium-137	Mercury	Total Suspended Solids
2-Propanone (Acetone)	Chloride	Methyl alcohol	Toxaphene
2-Propen-1-ol (Allyl alcohol)	Chlorobenzene	N,N-Diphenylamine	trans-1,3-Dichloropropene
2-secbutyl-4,6-dinitrophenol	Chloroethane	Naphthalene	Tribromomethane (Bromoform)
3,3-dichlorobenzidine	Chloroform	n-Butyl alcohol	Trichlorofluoromethane
3-Chloropropene (Allyl chloride)	Chloromethane	Nickel	Trichloromethanetiol
4,4-DDD	Chromium	Nitrate	Uranium (Total)
4,4-DDE	Chrysene	Nitrite	Uranium-235
4,4-DDT	cis-1,3-Dichloropropene	Nitrobenzene	Uranium-238
4-Bromophenylphenyl ether	Cobalt	N-Nitroso-di-n-propylamine	Vanadium
4-Chloro-3-methylphenol	Cobalt-60	N-Nitrosodiphenylamine	Xylene
4-Methyl-2-pentanone (MIBK)	Copper	N-Nitrosomorpholine	Zinc
4-Nitrophenol	Cyanide	N-Nitroso-N,N-dimethylamine	

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