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River Corridor
Closure Contract

Groundwater, Leachate, and Lysimeter Monitoring and Sampling at the Environmental Restoration Disposal Facility, Calendar Year 2014

May 2015

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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EXECUTIVE SUMMARY

This document reports the findings of the groundwater, leachate, and lysimeter monitoring and sampling at the Environmental Restoration Disposal Facility (ERDF) for calendar year (CY) 2014. 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-00079) and to meet the requirements of the *Record of Decision for the Environmental Restoration Disposal Facility, Hanford Site, 200 Area, Benton County, Washington* (ERDF ROD) (EPA 1995).

The purpose of this annual monitoring report is to evaluate the conditions of and identify trends for groundwater beneath ERDF and report leachate results in fulfillment of the requirements specified in the ERDF ROD (EPA 1995) and the *Amended Record of Decision, Decision Summary and Responsiveness Summary for the Environmental Restoration Disposal Facility, Hanford Site – 200 Area, Benton County, Washington* (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 ERDF is situated downgradient of 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 the storage tanks are sampled semi-annually to (1) provide data to maintain leachate delisting status, (2) provide confirmation that Effluent Treatment Facility acceptance

criteria are continuing to be met, and (3) assess whether additional COCs should be added to the routine ERDF groundwater monitoring program.

ERDF has been expanded from its original 2 cells to currently 10 cells. Beginning with construction of Cells 5 and 6, gravity collection basin lysimeters (lysimeters) were included in response to the *Study of Vadose Zone Monitoring at the Hanford Site, Task 1, Use in New Cells at the Environmental Restoration Disposal Facility* (DOE/RL-2003-31). The lysimeter sections are below the lower soil operations layer. Lysimeter liquids are collected via a perforated pipe laid on top of a geomembrane below all engineered components of the cells. All subsequent cells have had basin lysimeters installed. The lysimeters are dewatered and sampled semi-annually.

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 semi-annually from four monitoring wells in the vicinity of 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). Wells 699-37-66 and 699-36-66B were constructed in 2007 and 2008 to replace two wells (699-36-67 and 699-37-68) removed due to ERDF expansion. 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.

The following summary is offered based on the CY 2014 analytical results; the statistical analysis of monitoring data; an evaluation of the groundwater, leachate, and lysimeter monitoring data; and a review of the water-level measurement data.

Groundwater

Nitrate, carbon tetrachloride, gross beta, gross alpha, 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 upgradient in the prevailing groundwater flow towards ERDF. The two groundwater wells (699-37-66 and 699-36-66B) have been placed within the existing groundwater contamination plume that has been slowly moving in the downgradient direction underneath ERDF. These wells were placed further downgradient than the original wells. This may extend the time period needed to allow contaminant peaks

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 seven 200 West Area source contaminant peaks appear to have passed the upgradient well between CY 2000 and CY 2005, establishing a slight downward trend in contamination levels there.

Groundwater activities from gross beta have varied from a long-term upward trend in the downgradient wells to all wells showing decline. All wells were below the upper tolerance levels for CY 2014 except for the March sampling of 699-35-66A, which was just above the upper tolerance level. Gross alpha activities are typically nondetect, but the September result from 699-36-66 did report a value above the tolerance limit. Groundwater activity from uranium and iodine-129 have remained stable with a general downward trend. Levels of technetium-99 in all wells remained essentially stable in CY 2014. Well 699-35-66A exceeded the upper tolerance level but was below previous maximums. This is a good indication that the groundwater contaminant plume from the 200 West Area is moving in an easterly direction. Groundwater activity from uranium, technetium-99, 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.

Nitrate and carbon tetrachloride concentrations have remained stable to slightly decreasing concentrations and all values were below the upper tolerance limits.

Additional radionuclides and chemical constituents are monitored in the routine analyses. In general, concentrations remain stable to slightly decreasing except for arsenic concentrations, which remain well below Hanford Site background reference values. Historical analysis has shown periodic spikes in the groundwater data; three of the four wells show elevated arsenic values but remained below the upper tolerance level. 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 remain above the upper tolerance interval. Well 699-36-70A chromium levels increased significantly in the fall 2013 sampling, just below the upper tolerance level. The spring chromium value slightly exceeded the upper tolerance limit but dropped significantly in fall 2014. All other wells are stable at a level below the upper tolerance interval. The source of the elevated levels

does not appear to be ERDF related and appears to be related to the groundwater contaminant plume from the 200 West Area or from corrosion of well components. Chromium levels and other corrosion products will continue to be monitored in future sampling.

The fluoride concentration in upgradient well 699-36-70A exceeded the upper tolerance limit for March 2014 sampling (remaining below the Hanford Site background) but returned to nominal levels for this well in September.

Total organic halide concentrations significantly spiked in downgradient wells during CY 2006 monitoring and were detected again in the downgradient wells in CY 2008 sampling. The two 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 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. Recent samples have been downward indicating, but some rebound was noted in fall 2014. The upgradient well 699-36-70A slightly exceeded the upper tolerance value Any future indication of consistent contamination will be evaluated to establish the source and composition of the compounds.

The pH of downgradient well 699-37-66 fell below the lower tolerance limit for the fall 2012 sampling; monitoring will continue.

Leachate

The composition of the leachate will reflect the contamination levels of the wastes being disposed. Leachate concentrations for nitrate, sulfate, chromium, uranium, tritium, technetium-99, and gross alpha/beta have rebounded from lows seen in the CY 2012 sampling but remain below delisting levels and below previously seen maximums. Total chromium values indicate the potential that hexavalent chromium concentrations may approach or exceed one-tenth of the delisting value. Analysis for hexavalent chromium has been included in the routine twice yearly analysis requests and will be reported in future years. No significant changes were noted for the remaining routine analytes.

The Biennial Waste Stream Evaluation and Confirmatory Leachate Sampling report has been included in this report. This evaluation occurs after receipt of the results from the biennial “long list” analysis currently performed during the September leachate sampling in even numbered years. In the confirmatory leachate sampling for all COCs, an evaluation of analytical data obtained from the ERDF leachate collection system is used to confirm that no constituents were present in the leachate at levels exceeding the established delisting values.

Based on this CY 2014 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.

Lysimeters

The source of the liquid within the lysimeters is from the vadose zone located beneath the ERDF cell liner and is made up of compaction moisture from the admix layer located immediately above the lysimeter, construction water, consolidation water, and/or condensation water. The absence of technetium-99 within the lysimeter liquid is a very good indicator that the leachate collection system located above the lysimeters is not leaking liquid into the lysimeters. This is based on technetium-99’s high solubility and ease of mobility through soils when soluble; there are no detectable levels of technetium-99 within the lysimeter liquid. Additional supporting evidence is the high sulfate concentration in the lysimeter liquid in comparison to the leachate, indicating there is no effective dilution of the lysimeter liquid.

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ACRONYMS

COC	contaminant of concern
CY	calendar year
DRAS	Delisting Risk Assessment Software
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
e-tape	electronic tape measure
ETF	Effluent Treatment Facility
RCRA	*Resource Conservation and Recovery Act of 1976*
ROD	Record of Decision

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-00079) 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-198) was revised and a new *Environmental Restoration Disposal Facility Leachate Sampling and Analysis Plan* (ERDF SAP) (WCH-173) was approved. The ERDF SAP was revised in CY 2014 and WCH-198 is undergoing revision for issuance in CY 2015. Any new requirements or changes in evaluation that were recommended by the revised ERDF SAP are included in this report and will be in future reports. Future reports will incorporate changes or revisions to the ERDF GPP. 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-198) 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 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 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
- Biennially evaluate waste streams disposed at ERDF as part of the delisted criteria for the leachate
- Describe and evaluate the conditions and identify trends of the ERDF lysimeter system as related to the vadose zone monitoring and changes in the volume of liquid in the lysimeters
- 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 CY 1996 through CY 2014. 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 2012 through CY 2014 are presented in Appendix C. Leachate data collected from CY 1996 through CY 2013 are contained in previous ERDF groundwater and leachate monitoring reports (BHI-01382, BHI-01641, BHI-01684, BHI-01738, BHI-01777, WCH-88, WCH-189, WCH-295, WCH-315, WCH-399, WCH-455, WCH-536, WCH-564, WCH-590). Lysimeter data collected from CY 1996 through CY 2014 are contained in previous ERDF lysimeter monitoring reports (WCH-42, WCH-335, WCH-400, WCH-454, WCH-536, WCH-564).

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 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*. The landfill was designed to meet the *Resource Conservation and Recovery Act of 1976* (RCRA) minimum technology requirements; however, 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.

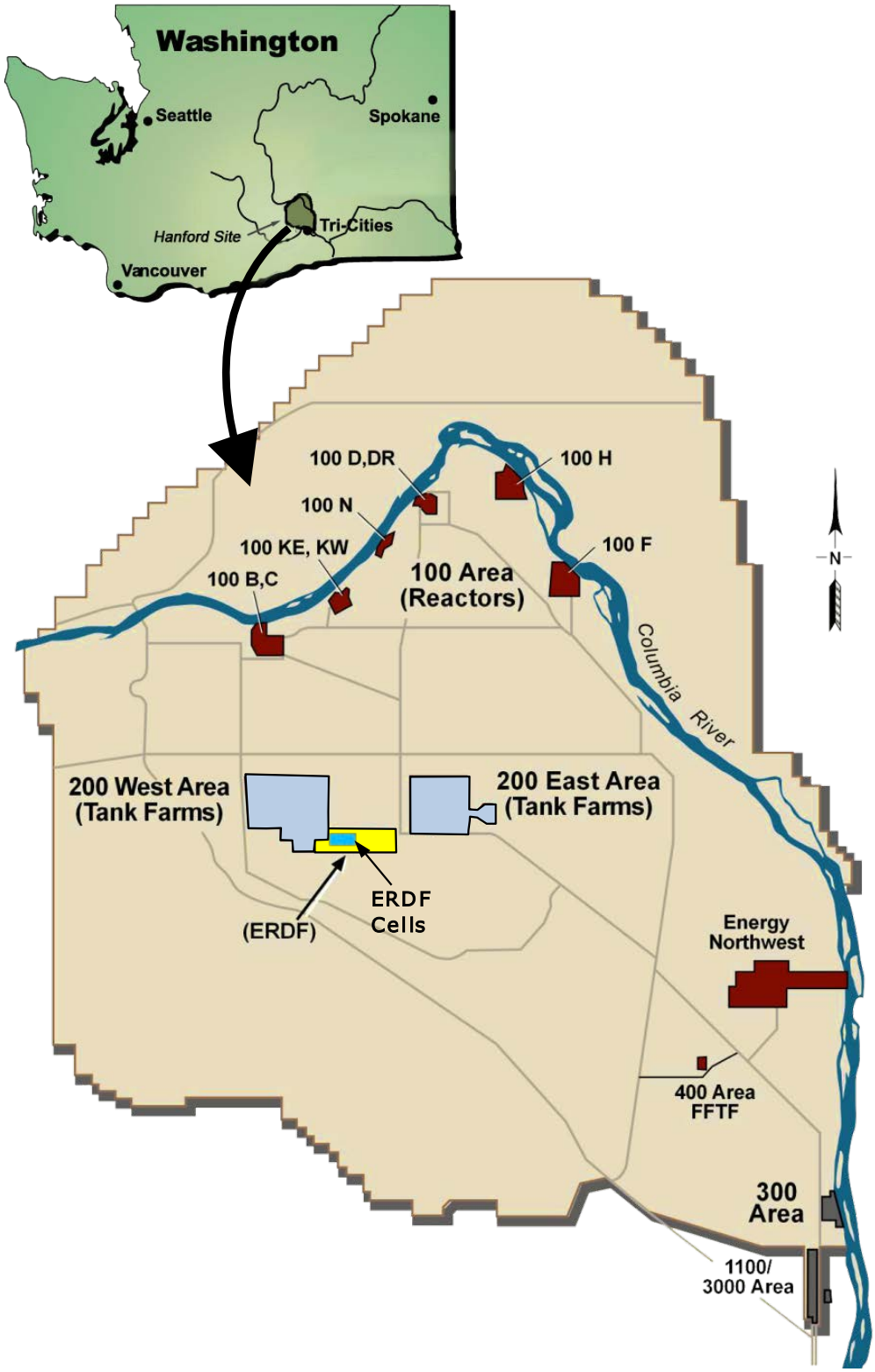
2.2 ENVIRONMENTAL RESTORATION DISPOSAL FACILITY

The approved design of the ERDF is a series of side-by-side cells that measures 21.3 m (70 ft) in depth, with a wall slope of 3:1 and with final dimensions of 433 m (1,420 ft) long by 219 m (720 ft) wide at the top of the cells. There are currently 10 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 0.305 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 (double the width) 9 and 10 was completed in early 2011. Figure 2-2 shows ERDF as it is currently constructed. Throughout CY 2014, approximately 1,409,000 metric tons (1,578,100 US tons) of 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). Activities are underway to transfer processing of ERDF leachate to the 200 West Area Pump and Treat Facility.

Figure 2-1. Location of the Environmental Restoration Disposal Facility.



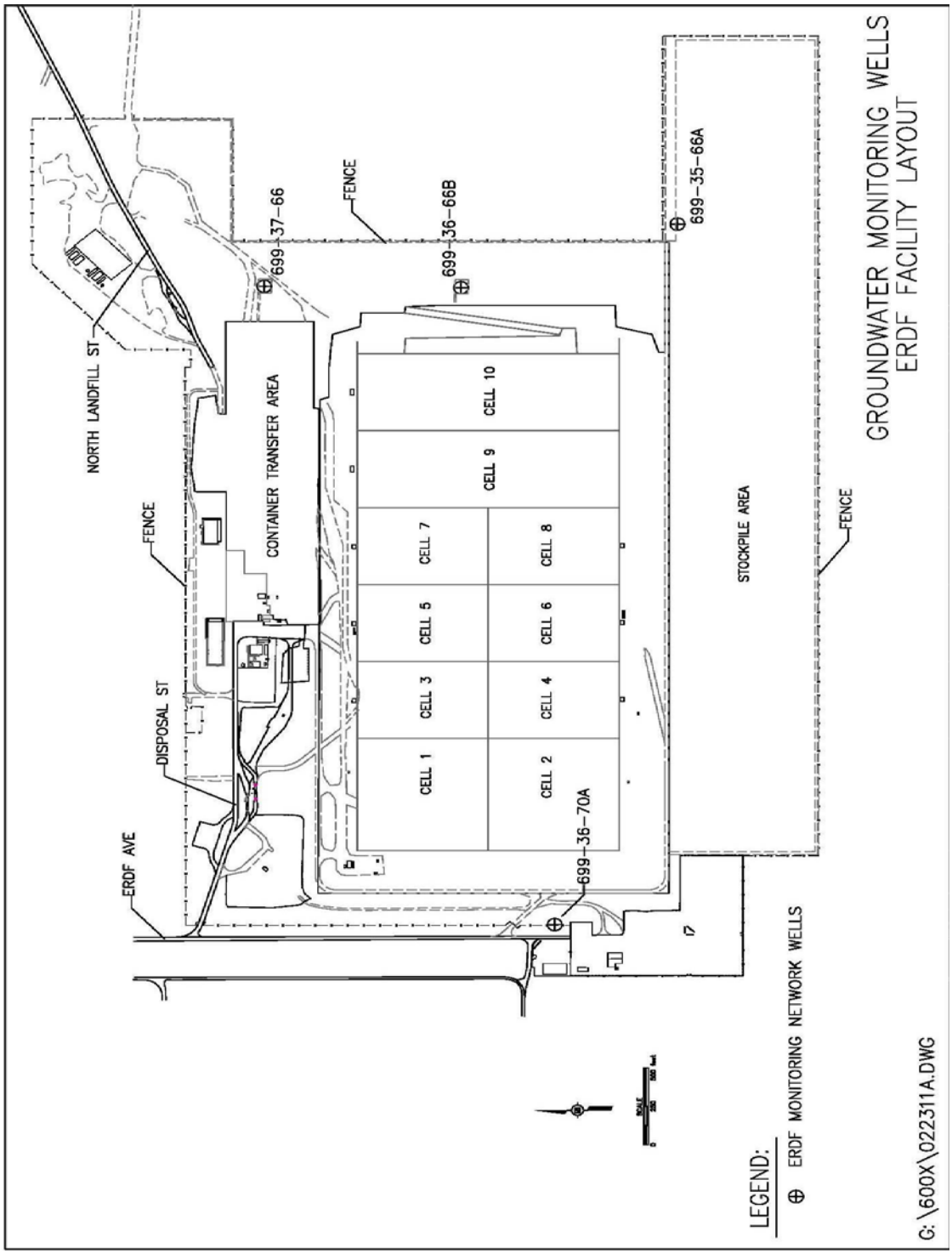


Figure 2-2. The ERDF Monitoring Well Location Map.

2.2.2 Lysimeter System

Gravity collection lysimeters (basin lysimeters) were constructed in response to the *Study of Vadose Zone Monitoring at the Hanford Site, Task 1, Use in New Cells at the Environmental Restoration Disposal Facility* (DOE/RL-2003-31). This study was performed by Fluor Hanford for the U.S. Department of Energy, Richland Operations Office. The purpose of the study was to report on the status of vadose zone monitoring and to recommend measures that could be taken at the Hanford Site to further develop the technology of vadose zone monitoring. Lysimeters were installed beginning with the construction of cells 5 and 6 and continued with all subsequent cell construction.

The lysimeter design selected from the study for installation under the ERDF cells was a basin lysimeter. These are constructed by excavating a sloping recession within the cell sub-grade beneath the composite liner system and installing an approximate 380.9-m^2 (4,100-ft^2) liner into the area. A 15-cm (6-in.)-diameter perforated pipe section is laid atop the lysimeter liner and connected to a high-density polyethylene piping that is installed to the upper edge of the cell area.

This type of lysimeter is not configured to detect small increases in liquid accumulation. A thick-walled, 15-cm (6-in.)-diameter pipe is laid flat on the bottom of a collection area of approximately 50.7 m^2 (546 ft^2) and increasing to 380.9 m^2 (4,100 ft^2) at the top of the lysimeter. The lysimeter has an approximate capacity to contain 181,699 L (48,000 gal) within the available pore space of the gravel.

The vadose zone monitoring activities described herein are expected to continue until after the final landfill cap is installed and the annual quantity of leachate collected in the secondary leachate collection and removal system is shown to be insignificant (i.e., less than the amount needed to activate the removal pumps).

3.0 GROUNDWATER AND LEACHATE MONITORING

The groundwater and leachate monitoring program is described in the ERDF GPP (WCH-198). This section provides an overview of these monitoring requirements.

3.1 GROUNDWATER SAMPLING

Groundwater samples are collected semi-annually from four monitoring wells in the vicinity of 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 2014 groundwater sampling was completed at all of the ERDF monitoring wells in March and September. 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 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.

Table 3-1. Analytes, Acceptance Criteria, and Target Maximum PQL for Groundwater Samples. (2 Pages)

Method	Target PQL	QC Element and Acceptance Criteria
General Chemical Parameters		
Alkalinity – SM2320[a]	10 mg/L	Field Duplicate - ± 20% RPD[e] Field Blanks[f] - <2X PQL Method Blank - <PQL Laboratory Control Sample - 80-120% Recovery Lab Duplicate - ± 20% RPD[e] Matrix Spike - 80-120% Recovery
Total Organic Halides – SW9020[b]	5 µg/L	
Total Dissolved Solids – SM2540C[a]	10 mg/L	
Anions by IC – SW9056[b] or 300.0[c]		
Chloride	10 mg/L	
Fluoride	0.1 mg/L	
Sulfate	2 mg/L	
N in Nitrate/Nitrite – 253.2[d]	0.1 mg/L	
Metals		
Metals ICP-SW6010[b] or ICP/MS-SW6020[b]		Field Duplicate - ± 20% RPD[e] Field Blanks[f] - <2X PQL Method Blank - <PQL Laboratory Control Sample - 80-120% Recovery Matrix Spike - 80-120% Recovery Matrix Spike Duplicate - ± 20% RPD[e]
Arsenic	10 µg/L	
Barium	20 µg/L	
Chromium	70 µg/L	
Lead	40 µg/L	
Selenium	750 µg/L	
Tin	30 µg/L	
Vanadium	80 µg/L	
Zinc	20 µg/L	

Table 3-1. Analytes, Acceptance Criteria, and Target Maximum PQL for Groundwater Samples. (2 Pages)

Method	Target PQL	QC Element and Acceptance Criteria
Volatile Organic Compounds		
Volatiles by GC/MS – SW8260[b]		Field Duplicate - ± 25% RPD[e] Field Blanks[f] - <2X PQL Method Blank - <PQL Laboratory Control Sample – Statistically derived[g] Matrix Spike - Statistically derived[g] Matrix Spike Duplicate - Statistically derived[g] Surrogates - Statistically derived[g]
Carbon Tetrachloride	5 µg/L	
Radionuclides		
Carbon-14 - LSC[h]	200 pCi/L	Field Duplicate - ± 25% RPD[e] Field Blanks[f] - <2X MDA Method Blank - <2X MDA Laboratory Control Sample - 80-120% Recovery Lab Duplicate - ± 25% RPD[e] Matrix Spike - 80-120% Recovery
Iodine-129 - LEPS[h]	5 pCi/L	
Technetium-99 – LSC/GPC[h]	10 pCi/L	
Total Radium Alpha – AEA/GEA[h]	1 pCi/L	
Gross Alpha - GPC[h]	3 pCi/L	
Gross Beta - GPC[h]	4 pCi/L	
Total Uranium - KPA[h]	0.1 mg/L	
Field Parameters		
pH	0.1 pH unit	As per manufacturer's instructions.
Specific Conductance	25 µS/cm	
Turbidity	0.5 NTU	
Temperature	±1 °C	

[a] Standard Methods for the Examination of Water and Wastewater (APHA/AWWA/WEF 2012).
[b] EPA SW-846, as revised.
[c] EPA Method 300.0 (*Method 300.0 Determination of Inorganic Anions by Ion Chromatography* [EPA 1993]).
[d] *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-79-020, March 1979 and revised March 1983. For N in Nitrate/Nitrite, specific method may change with laboratory.
[e] RPD. Applies only in cases where one or both results are greater than 5X the detection limit.
[f] Field blanks typically consist of equipment blanks, full trip blanks. Organic analysis may include a field transfer blank.
[g] Determined by the laboratory based on historical data. Control limits are reported with the data.
[h] Laboratory developed procedures.

AEA = alpha energy analysis
GC/MS = gas chromatography/mass spectrometry
GEA = gamma energy analysis
GPC = gas proportional counting
KPA = kinetic phosphorescence analysis
IC = ion chromatography
ICP = inductively coupled plasma
ICPMS = inductively coupled plasma mass spectrometry
LEPS = low-energy photon spectrometry
LSC = liquid scintillation counting
MDA = minimum detectable activity
MS = mass spectrometry
NTU = nephelometric turbidity units
PQL = practical quantitation limit
QC = quality control
RPD = relative percent difference

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-01738). 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.

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 (EPA) SW-846, 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 discussions 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-198) and *Hanford Site Groundwater Monitoring: Setting, Sources, and Methods* (PNNL-13080). 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-13080).

The second approach (historical) results in background water quality data for each well group to which the subsequent groundwater quality data are compared; this approach is referred to as an intrawell comparison (PNNL-13080).

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 semi-annual 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 nondetection (i.e., 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-13080). Both the upper and lower bounds of the interval (two-sided) were initially 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.

In the original statistical approach, two-sided tolerance limits were calculated for all constituents. Two-sided tolerance limits are appropriate if exceeding either the upper or the lower limit is indicative of changes (or contamination) in groundwater quality. An example of a constituent exhibiting these characteristics is pH, which can be significantly higher (more basic) or lower (more acidic) than the baseline concentration. For other constituents, a one-sided or upper tolerance limit is desired.

A revised statistical approach for groundwater monitoring at the ERDF was developed for WCH-198. The approach of using tolerance levels was maintained; however, with the exception of pH, the tolerance limits representing a one-sided tolerance interval was chosen. The general approach was to determine an upper tolerance limit for each analyte. The assumption that the pre-operational baseline data can be pooled into a single data set for each analyte was maintained. The revised tolerance limits have been used since 2007.

3.2 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-198). 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 2014 data are summarized in Table 3-2.

Table 3-2. Summary of Tolerance Interval Comparisons and Trends. (3 Pages)

Analyte	Upper Tolerance Interval [a]	Well(s) Exceeding Upper Tolerance Interval in CY 2014 [b]				Comments
		70A	66A	66B	66	
Arsenic	4.2 μg/L	No	No	No	No	Arsenic concentrations in wells 70A, 66, and 66B had detectable levels that did not exceed the tolerance level for the CY 2014 samples. All arsenic detections are very close to analytical detection limits (i.e., higher analytical uncertainty). It should also be noted that all reported arsenic detects (except for one apparent anomalous result in 2005) have remained below the Hanford Site background levels listed in the ERDF GPP (WCH-198) 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 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	Yes	Yes	No	No	Chromium levels in 66A are elevated relative to the tolerance limit, but have not changed significantly from previous years. Well 70A has shown an significant increase in the last 2 calendar years, exceeding the tolerance limit in the March sample. Levels dropped in the September sampling. The other wells were all below the upper tolerance level.
Lead	5 μg/L	No	No	No	No	All wells exhibited lead concentrations below the tolerance interval, returning to nondetected levels.
Selenium	5.6 μg/L	No	No	No	No	All wells exhibited concentrations of selenium below the tolerance interval.
Tin	10 μg/L	No	No	No	No	Tin concentrations for the wells had nondetectable levels.
Uranium	3.4 μg/L	No	No	No	No	All wells exhibited stable uranium concentrations below the tolerance interval.
Vanadium	40 μg/L	No	No	No	No	All wells exhibited vanadium concentrations below the tolerance interval.
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.
Chloride	26 mg/L	No	No	No	No	All wells exhibited chloride concentrations below the tolerance interval and.

Table 3-2. Summary of Tolerance Interval Comparisons and Trends. (3 Pages)

Analyte	Upper Tolerance Interval [a]	Well(s) Exceeding Upper Tolerance Interval in CY 2014 [b]				Comments
		70A	66A	66B	66	
Fluoride	0.45 mg/L	Yes	No	No	No	All wells except 70A exhibited stable fluoride concentrations below the tolerance interval. The March value for well 70A slightly exceeded the tolerance limit but returned to historical levels in the September sample.
Sulfate	37.8 mg/L	No	No	No	No	All wells exhibited sulfate concentrations below the tolerance interval and stable.
Gross alpha	2.98 pCi/L	No	No	No	Yes	All wells except 66 exhibited gross alpha nondetections below the tolerance interval and. Well 66 exceeded the tolerance interval for the September sample. No apparent trending in the data was seen.
Gross beta	31.5 pCi/L	No	Yes	No	No	Gross beta activity was below tolerance limits in all the wells except well 66A. Well 66A slightly exceeded the tolerance interval for the September sample, but values are well below previous. Wells 66, 66B, and 70A have shown general downward trends over the last 3 calendar years.
Carbon-14	58.1 pCi/L	No	No	No	No	All wells exhibited nondetected carbon-14 concentrations below the tolerance interval.
Iodine-129	21.1 pCi/L	No	No	No	No	All wells exhibited iodine-129 concentrations below the tolerance level.
Technetium-99	93.8 pCi/L	No	Yes	No	No	All wells were lower in CY 2014 than recent maximums with only well 66A above the tolerance limit. There is an indication of downward trending for all wells.
Radium	0.695 pCi/L	No	No	No	No	All wells exhibited nondetected radium concentrations below the tolerance interval.
Carbon tetrachloride	11 μg/L	No	No	No	No	All wells exhibited carbon tetrachloride concentrations below the tolerance interval with no significant trends identified.
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 an indication of downward trending.
Total organic halides	5 μg/L	Yes	No	No	No	Well 70A slightly exceeded the tolerance limit for the September 2014 sampling, while the other wells were below the tolerance limit.
Total dissolved solids	570 mg/L	No	No	No	No	All wells exhibited concentrations below the tolerance interval and appear stable. The 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. Well 70A displayed elevated levels but remains below the tolerance level.
pH	8.01 units/ 7.48 units [c]	No	No	No	No Yes	The wells exhibited pH concentrations below the upper tolerance interval. Well 66 exceeded the lower tolerance limit for the September sample.

Table 3-2. Summary of Tolerance Interval Comparisons and Trends. (3 Pages)

Analyte	Upper Tolerance Interval [a]	Well(s) Exceeding Upper Tolerance Interval in CY 2014 [b]				Comments
		70A	66A	66B	66	
Specific conductance	774 μS/m	No	No	No	No	All wells exhibited concentrations below the tolerance interval and appear stable.

[a] New upper tolerance levels have been set for 2007 onward in the revised ERDF GPP (WCH-198).
[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-198). Due to the elevated readings of COCs, the 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. Wells 699-37-66, 699-36-66B, and 699-35-66A exhibit elevated but stable readings.

- **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**. Groundwater activity from gross beta has varied from a long-term upward trend in the downgradient wells with all wells showing decline.

- **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. Historical sampling results suggest activity in well 699-36-70A with a downward trend, and well 699-35-66A historically showed an upward trend. Levels of technetium-99 in all wells remained stable in CY 2014. Only the fall analysis for well 699-35-66A exceeded the upper tolerance level. This is a good indication that the groundwater contaminant plume from the 200 West Area is moving in an easterly direction.

- **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.

Additional radionuclides and chemical constituents are monitored in the routine analyses. In general, concentrations remain stable to slightly decreasing except for the following:

- **Arsenic.** Arsenic concentrations remain well below Hanford Site background reference values. Historical analysis has shown periodic spikes in the groundwater data, three of the four wells show elevated arsenic values but remained below the upper tolerance level. 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**. Chromium levels in the downgradient well 699-35-66A have historically been elevated and remains above the upper tolerance interval. Well 699-36-70A chromium levels increased significantly in the fall 2013 sampling, just below the upper tolerance level. The spring chromium value slightly exceeded the upper tolerance limit but dropped significantly in fall 2014. All other wells are stable at a level below the upper tolerance interval. The source of the elevated levels does not appear to be ERDF related and appears to be related to the groundwater contaminant plume from the 200 West Area or from corrosion of well components. Chromium levels and other corrosion products will continue to be monitored in future sampling.

- **Fluoride.** The fluoride concentration in upgradient well 699-36-70A exceeded the upper tolerance limit for March 2014 sampling (remaining below the Hanford Site background) but returned to nominal levels for this well in September.

- **Total Organic Halide**. Total organic halide concentrations significantly spiked in downgradient wells during CY 2006 monitoring and were detected again in the downgradient wells in CY 2008 sampling. The two 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 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. Recent samples have been downward indicating, but some rebound was noted in fall 2014. The upgradient well 699-36-70A slightly exceeded the upper tolerance value Any future indication of consistent contamination will be evaluated to establish the source and composition of the compounds.

- **pH**. The pH of downgradient well 699-37-66 fell below the lower tolerance limit for fall 2012 sampling. Monitoring will continue.

3.3 GROUNDWATER LEVELS

Water-level measurements were collected from each of the four monitoring wells during the semi-annual 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.

NOTE: 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-level contour map (Figure 3-1), groundwater in the vicinity of 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/meter on the west end of ERDF and averages 0.003 m/meter 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 ERDF is 0.002 m/meter. 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.

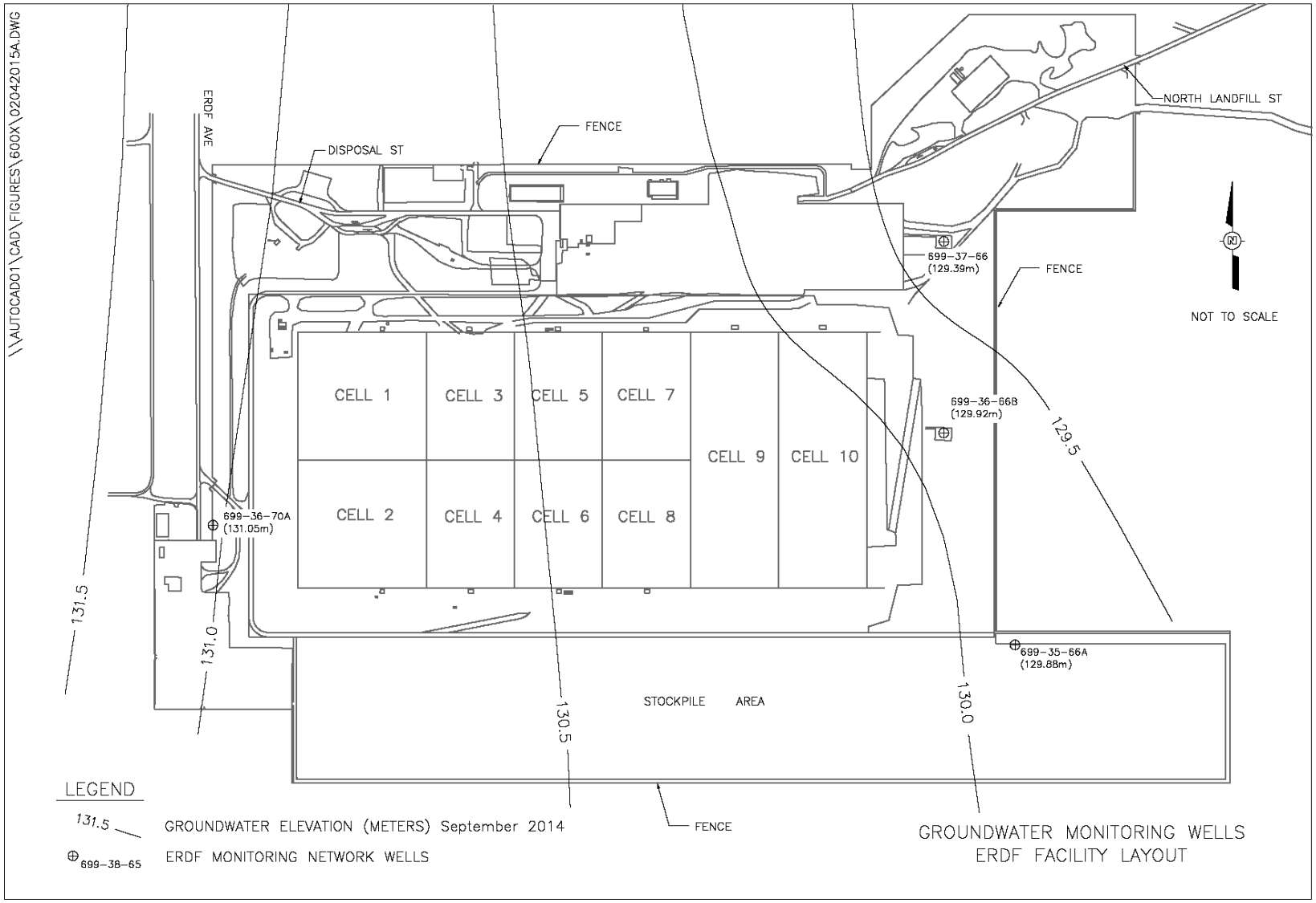
The current hydrograph for the ERDF monitoring wells presented in Figure 3-2 indicates an annual decline of less than 0.4 m/yr (1.31 ft/yr), which is consistent with the regional hydrologic changes reported for the area (BHI-01311, PNNL-15070-SUM).

3.4 SUMMARY OF GROUNDWATER MONITORING WELL 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. Overall trends will continue to be monitored with future sampling.

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 2.8 m (9 ft). The downgradient monitoring wells had water column levels of 2.7 m (9 ft) at well 699-35-66A, 8.7 m (28 ft) at well 699-37-66, and 8.9 m (29 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 14 to 21 years.

Figure 3-1. Water-Level Contour Map.



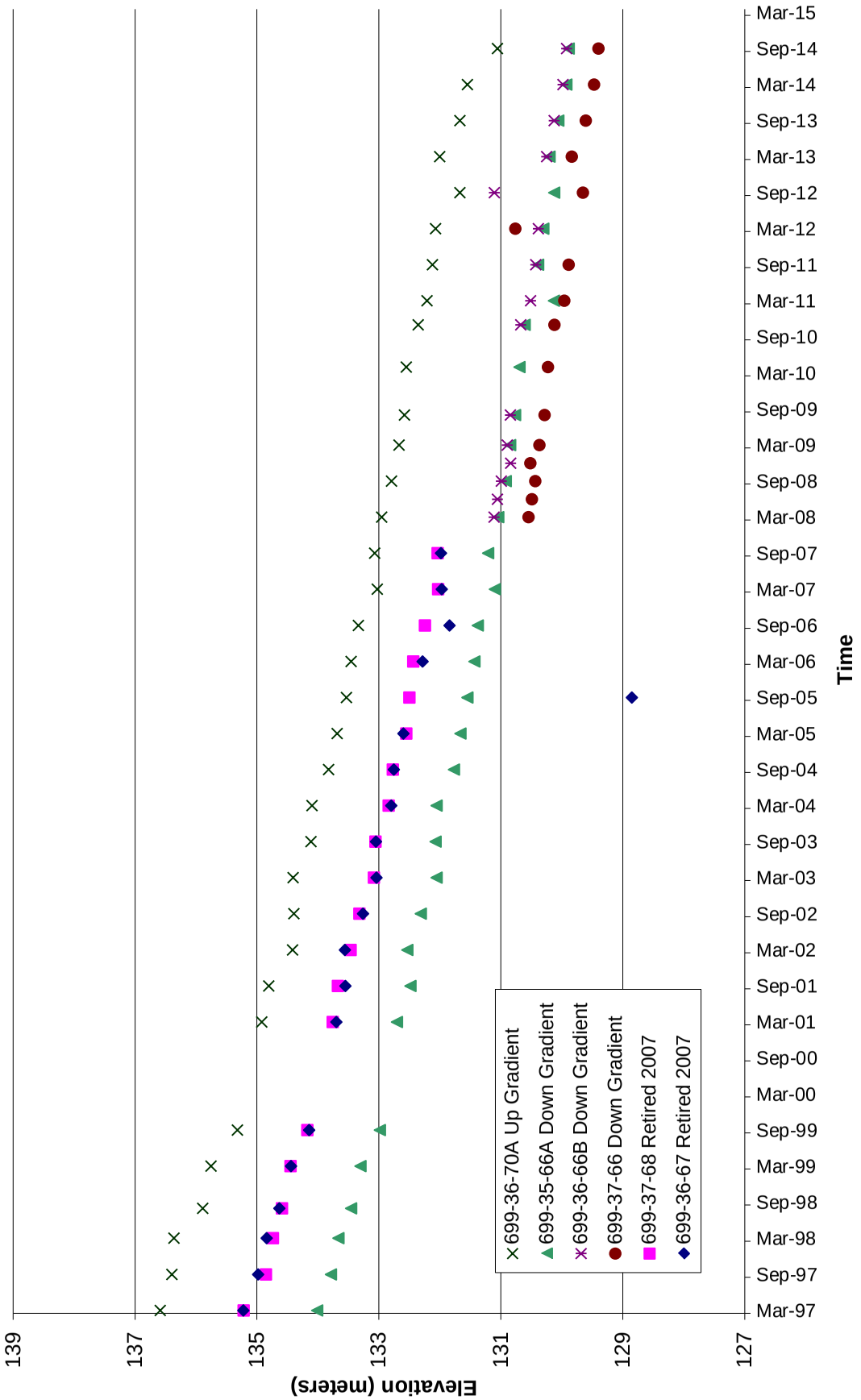


Figure 3-2. Hydrograph from the ERDF Groundwater Monitoring Wells.

3.5 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. Although separate leachate sampling may also be performed to verify that waste acceptance criteria for the ETF continue to be met, ETF is currently relying on the semi-annual sampling results to monitor acceptance. The evaluation and reporting of any ETF-specific 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 Appendix C. At the end of the initial baseline sampling, the analyte list was revised (short list) and leachate sampling was reduced to a semi-annual basis. The short list of analytes is identified in 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 leachate sampling program is described in the ERDF SAP (WCH-173). The representative samples are collected to support routine and confirmatory sampling programs. The representative samples are collected from varying levels within the leachate storage unit.

The ERDF project continued routine sampling and analysis of landfill leachate during CY 2014. Composite leachate samples for the short and long list of analytes were collected during CY 2014. Data for the current year and from the 2 prior years of leachate sampling (i.e., CYs 2012 to 2014) are used to identify trends that may indicate if additional laboratory analysis for groundwater samples is warranted.

NOTE: The second leachate sampling for CY 2013 was delayed until February 2014 due to operation issues.

3.6 SUMMARY OF LEACHATE ANALYSIS

Data associated with leachate sampling conducted from CY 2012 through CY 2014 are presented in Appendix C. Only analytical results that were reported as significant detects (>1 parts per billion), or as nondetected values, but which are on the routine short and long list or groundwater monitoring COCs lists, are included in this report. Leachate sampling trends are presented in Appendix D.

The composite leachate samples contained detectable concentrations of common metals, anions, and mobile radionuclides. Many of the metal results showed concentration spikes during the CY 2011 sampling events relative to the previous years; subsequent results have remained consistent with sample data previous to the spike and none of the results approached delisting levels. The nitrate results for March 2011 showed a similar spike but remained below previous maximum values. The other anions showed no significant fluctuations over the 2011 to 2012 time frames. The suspended solid results also spiked in March 2011 and have returned to low levels. There were no exceedances of a delisting level during the year.

Evaluation of the reported constituents for the expanded analyte list found no impact to the delisting criteria.

The following is an update of those constituents of primary interest for which there were detectable concentrations and their activities in evaluation of the CY 2014 sampling results:

- **Chromium**. Chromium concentrations began declining during CY 2007 and stabilized immediately after the March 2011 spike but have increased in recent years. The chromium concentration averaged 29 µg/L in December 2006 but the CY 2014 average was approximately 60 µg/L. Hexavalent chromium concentrations were determined as part of the 2-year long list. The values reported (approximately 57 µg/L) are close to one-tenth of the delisting level (620 µg/L). Due to the overall upward trending seen for total chromium, analysis for hexavalent chromium has been included in the routine analysis lists. Both total and hexavalent chromium levels will be monitored.

- **Nickel**. Nickel is on the long list of analytes and monitored once every 2 years. No significant changes were noted from the fall 2014 analysis.

- **Potassium**. Potassium concentrations have declined from a maximum of about 26,000 µg/L to ~20,100 µg/L through CY 2014.

- **Specific conductance**. Specific conductance remained steady during CY 2014.

- **Anions**. Nitrate concentrations rebounded from the historic low seen in the September 2012 samples but remain well below previous maximums, averaging ~284 mg/L. The other primary anions (chloride and sulfate) have similarly rebounded from the September 2012 lows. They are showing a general upward trend but remain below historical maximums.

- **Total dissolved solids**. Total dissolved solids had been increasing through 2006 with CY 2014 averaging ~1,947,500 µg/L.

- **Gross alpha**. Gross alpha activity concentrations historically increased through December 2008, reaching a maximum concentration of 3,380 pCi/L, but have declined in recent sampling. Recent levels have been stable at approximately 600 pCi/L.

- **Gross beta**. Gross beta activity concentrations historically increased through December 2008, reaching a maximum concentration of 1,500 pCi/L, but have declined in recent sampling. Recent levels have been stable at approximately 400 pCi/L.

- **Uranium**. Uranium concentrations historically increased through December 2008 and reached a new maximum concentration of 3,060 µg/L in March 2010 but have declined rapidly. The uranium concentrations have rebounded from the low seen in the September 2012 samples but remain well below previous maximums averaging 1,200 µg/L in the latest samples.

- **Technetium-99**. Technetium-99 concentrations have decreased since March 2010 and have been stable at approximately 355 pCi/L.

- **Tritium**. Tritium concentrations remained above 100,000 pCi/L from the beginning of analysis in December 2008 through CY 2010 and then declined to approximately half of the maximum values. An increase was seen in the CY 2014 samples from 85,000 pCi/L to 93,000 pCi/L.

4.0 LYSIMETER MONITORING AND SAMPLING

4.1 PURPOSE AND OBJECTIVES

The purpose of this section is to evaluate the conditions and identify trends to develop Hanford Site-specific data on the performance of the lysimeter systems related to the vadose zone monitoring and potential future use of the lysimeter systems. The objectives of this section are as follows:

- Assess data from routine ERDF lysimeter sampling to determine if COC concentrations over time may be attributed to ERDF operations
- Describe and evaluate the sample data, identify changes or trends in the data, and incorporate a summary of the results
- Evaluate the data to determine if the routine analyte list of indicator parameters is adequate
- Document and describe the changes in the volume of liquid in the lysimeter.

4.2 LYSIMETER MONITORING AND SAMPLING

The lysimeter monitoring program is described in the *Environmental Restoration Disposal Facility Lysimeter Monitoring and Sampling Plan* (WCH-291). This section provides an overview of these monitoring and sample results.

4.2.1 Camera Inspection and Dewatering

The lysimeters were structurally intact without any obstructions within the visual portion of the pipe. The lysimeters had some silt sediment within the water layer that clouded out the camera when disturbed. Prior to the visual disturbance associated with the silt, the liquid associated with the lysimeters appeared transparent with minimal suspended particles. The liquid surfaces had no apparent sheen and only had a very minor amount of unidentifiable floating particles.

The lysimeter dewatering activity with each cell is presented in Table 4-1.

4.3 LYSIMETER SAMPLING

Analytical results are evaluated to document vadose zone conditions, characterized to ensure proper management of liquids, and monitored for any trends in the data.

The vadose zone monitoring activities are expected to continue until after the final landfill cap is installed and the annual quantity of leachate collected in the secondary leachate collection and removal system is shown to be insignificant (i.e., less than the amount needed to activate the removal pumps).

Table 4-1. Lysimeter Dewatering Activity.

Year	Cell 5 Lysimeter (gal)	Cell 6 Lysimeter (gal)	Cell 7 Lysimeter (gal)	Cell 8 Lysimeter (gal)	Cell 9 Lysimeter (gal)	Cell 10 Lysimeter (gal)
CY 2005	NA	2,302				
CY 2006	3,541	273				
CY 2007	NA	NA				
CY 2008	2,770	NA				
CY 2009	1,851	3,000	800	650		
CY 2010	400	360	400	Insufficient volume to pump [a]		
CY 2011	Insufficient volume to pump [a]	Insufficient volume to pump [a]	Insufficient volume to pump [a]	Insufficient volume to pump [a]	1,600	6,000
CY 2012	1,700	1,500	4,800	2,300	4,400	2,800
CY 2013	750	550	1,200	1,250	2,400	1,850
CY 2014	750	400	1,525	1,200	1,400	1,400
Total	11,762	8,385	8,725	5,400	9,800	12,050

[a] Malfunction of the dewatering pump system may have falsely indicated insufficient pumpable volumes in the lysimeter. An upgraded dewatering pump was utilized in CY 2012.

CY = calendar year

NA = not available or not applicable

Lysimeters in cells 5 and 6 were initially sampled in August 2005 in accordance with *Gravity Collection Lysimeter Monitoring Plan ERDF Cells 5 and 6* (BHI-01777). Initial lysimeter samples for cells 5 and 6 were analyzed for chloride, gross alpha, technetium-99, and gross beta. In CY 2009, the *Environmental Restoration Disposal Facility Lysimeter Monitoring and Sampling Plan* (WCH-291) was developed. It was determined that the COCs for the initial sampling of the lysimeters should be consistent with the COCs for the routine leachate sampling at ERDF as described in the ERDF SAP (WCH-173). The routine leachate list is identified in Appendix C. Cells 7 and 8 lysimeters were initially sampled in CY 2009. Cells 9 and 10 lysimeters were initially sampled in CY 2011.

The purpose of the initial characterization was to establish a baseline and determine if the routine analyte list of indicator parameters was adequate. No changes to the routine lysimeter analysis lists were identified from the initial characterization results.

All subsequent sampling of lysimeter liquids after the initial sampling were analyzed for the routine lysimeter list defined in the *Environmental Restoration Disposal Facility Lysimeter Monitoring and Sampling Plan* (WCH-291).

4.3.1 General Approach to Evaluating Results

Table 4-2 shows the list of routine lysimeter analytes by analytical method. Lysimeter samples were analyzed in accordance with the requirements of the EPA SW-846, industry standard, or laboratory-specific test methods as presented in Table 4-2. The following data selection and evaluation criteria were applied when reviewing the data:

- 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 of or a 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 percent 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.

Table 4-2. List of Routine Lysimeter Analytes by Analytical Method. (2 Pages)

Analyte	Method [a]	Practical Quantitation Limit	Accuracy [b] (%)	Precision [b] (%)
Calcium	6010	1,000 μg/L	80-120	±20
Magnesium	6010	750 μg/L	80-120	±20
Potassium	6010	4,000 μg/L	80-120	±20
Sodium	6010	500 μg/L	80-120	±20
Chloride	300.0 [c]	200 μg/L	80-120	±20
Nitrate	300.0 [c]	250 μg/L	80-120	±20
Sulfate	300.0 [c]	500 μg/L	80-120±20	±20±25
Total dissolved solids	2540C [d]	10,000 μg/L	80-120	±20
Total suspended solids	2540D [d]	8,000 μg/L	80-120	±20
Total organic carbon	5310B [d]	1,000 μg/L	80-120	±20
Technetium-99	[e]	15 pCi/L	80-120	±20
Total uranium	[e]	1 μg/L	80-120	±20
Gross alpha	900.0 [f]	3 pCi/L	80-120	±20
Gross beta	900.0 [f]	5 pCi/L	80-120	±20
pH	[g]	0.5 pH unit	NA	NA

Table 4-2. List of Routine Lysimeter Analytes by Analytical Method. (2 Pages)

Analyte	Method [a]	Practical Quantitation Limit	Accuracy [b] (%)	Precision [b] (%)
Specific conductance	9050	1 μS/cm	NA	NA

[a] Method number indicated is from *Test Method for Evaluating Solid Wastes: Physical Chemical Methods* (EPA SW-846), unless otherwise specified. The laboratory uses the most recent published version of these methods.
[b] Accuracy is expressed as percent recovery; precision is expressed as a percent relative difference.
[c] EPA Method 300.0 (*Method 300.0 Determination of Inorganic Anions by Ion Chromatography* [EPA 1993]).
[d] *Standard Methods for the Examination of Water and Wastewater*(APHA/AWWA/WEF 2012),.
[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-600/4-80-032).
[g] Parameter will be measured in the field.
EPA= U.S. Environmental Protection Agency
NA = not available or not applicable.

4.4 SUMMARY OF LYSIMETER ANALYTICAL RESULTS

Data associated with the cell lysimeters sampling conducted during CY 2014 are presented in Appendix E.

A summary of the analytical results from the CY 2014 sampling events are discussed below.

4.5 SUMMARY OF LYSIMETER ANALYSIS

Lysimeter samples contained detectable concentrations of common metals, anions, and radionuclides. No analytical anomalies were noted for the analysis. The following is a brief description of those constituents for which concentrations/activities contained inconsistencies when compared with the other lysimeters. These inconsistencies are typically large differences in concentrations cell-to-cell.

- **Sulfate.** Soluble salts, such as sulfate, were the primary constituents present within the lysimeter liquid and can be directly correlated to the levels of the primary constituents found within the admix material used to construct the cells. Most of the cells showed initial upward trending of sulfate concentrations, but concentrations have remained relatively constant in recent years.

- **Total dissolved solids.** Total dissolved solids show an upward trend for all lysimeters except for cells 5 and 6, which have become much more stable in recent years.

- **Total suspended solids.** Total suspended solid values are typically low; however, cells 7 and 9 have shown occasional spikes relative to the other cells.

- **Uranium.** Uranium levels within cells 5 through 8 lysimeters had low detectable levels. Cells 9 and 10 had very low levels present.

- **Gross alpha.** Gross alpha activity concentrations have been mostly constant except for spikes seen in cells 7 and 9 when total suspended solids are high.

- **Gross beta.** Gross beta activity appears to be within a consistent range within the lysimeters except for spikes seen in cells 7 and 9 when total suspended solids are high.

- **pH.** The cells appear to have stable pH levels.

4.6 EVALUATION OF CY 2014 LYSIMETER RESULTS

There has been no indication of contamination of the lysimeters by leachate generated during ERDF operations. The absence of technetium-99 within the lysimeter liquid is a very good indicator that the leachate collection system located above the lysimeters is not leaking liquid into the lysimeters. This is based on technetium-99's high solubility and ease of mobility through soils when soluble. There are no detectable levels of technetium-99 within the lysimeter liquid. Additional supporting evidence is the high sulfate concentration in the lysimeter liquid in comparison to the leachate, indicating there is no effective dilution of the lysimeter liquid.

No consistent changes or trends have been noted in the analytical data from each cell over time.

The routine lysimeter analyte list appears to continue to be adequate at this time.

Based on the data, response to dewatering activities cannot be analyzed adequately at this time. Further inspections and dewatering of lysimeters is planned as a routine activity during CY 2015.

5.0 ERDF BIENNIAL WASTE STREAM EVALUATION AND CONFIRMATORY LEACHATE SAMPLING RESULTS (NOVEMBER 2012 – OCTOBER 2014)

The ERDF delisting 1999 ROD Amendment states that ERDF waste profiles are to be evaluated on a biennial basis for the presence of compounds on the EPA delisting docket that were not part of the initial COCs list. The ROD also requires that any new compounds be evaluated against the initial COC list to determine if they should be included in future leachate sampling, and if they are identified on existing EPA docket lists. It should be noted that the EPA delisting docket list (as referenced in the ERDF ROD) has been replaced by delisting values derived from the Delisting Risk Assessment Software (DRAS) program, a Microsoft Windows-based software tool developed by the EPA to estimate the potential releases of waste constituents and to predict the risk associated with those releases. The results from the 2012 to 2014 analysis are being reported in this annual report, as described below.

A review was performed on chemicals defined in waste profiles disposed of in ERDF from July 2012 through July 2014. A total of 230 new materials were identified as potentially added to ERDF. Review of the identifiable chemicals against the DRAS 3R1 program found four compounds with delisting values not included in the ERDF analytical list:

- Epichlorohydrin (CAS 106-89-8): 5,591,000 µg/L
- Bis(2-chloroethoxy)methane (CAS 111-91-1): 423 µg/L
- Chloroprene (CAS 126-99-8): 0.0534 µg/L
- Tris(dibromopropyl)phosphate (CAS 126-72-7): 0.97 µg/L.

Bis(2-chloroethoxy)methane and chloroprene have been routinely reported in previous biennial sampling. Tris(dibromopropyl)phosphate was added as a reportable analyte. Analysis for epichlorohydrin is not routine for the available analytical methods. The delisting value established for epichlorohydrin (5,591 ppm) is orders of magnitude greater than the estimated concentration of the waste source (9.99 ppm) and is unlikely to be present in detectable quantities in the ERDF leachate. This compound was included for specific assessment of tentatively identified compounds during the 2014 ERDF confirmatory analysis, along with 12 additional organics previously identified having assignable delisting values but for which no routine analytical method is available.

In the confirmatory leachate sampling for all COCs, an evaluation of analytical data obtained from the ERDF leachate collection system is used to confirm that no constituents were present in the leachate at levels exceeding the established delisting values. Typically, this evaluation occurs after receipt of the results from the biennial “long list” analysis currently performed during the September leachate sampling in even numbered years.

All data have been received and evaluation shows that no detected result exceeded any delisting value over the last 2 years of analysis.

Between November 2012 and October 2014, only one analyte (nitrate) was consistently detected at a value greater than one-tenth of the delisting value. Nitrate remained below one-third of its delisting value for every sample. The October 2012 nitrate values were the lowest in over 10 years. One sample in the fall 2014 long list reported a detection for 1,2-diphenylhydrazine just above detection and just above one-tenth of the compounds

associated delisting value (2.4 µg/L). Analysis for this compound will be included with the next two rounds of routine analysis. If the compound is reported as nondetected it will be deleted from subsequent routine analysis suites.

Indications have been noted of a potential upward trend in total and hexavalent chromium in the leachate. Hexavalent chromium concentrations in the most recent sampling are approaching one-tenth of the delisting value. Analysis for hexavalent chromium has been added to the routine list to better monitor this trend.

The concentrations of contaminants in the ERDF leachate have not changed significantly in recent years and there are no indications for potential to exceed delisting levels for any constituent.

The ERDF SAP (WCH-173) also requires that advances in commercially available technology will be monitored periodically for revisions to practical quantification limits and implementation of alternate methods with lower practical quantification limits. No improved quantification limit requirements were identified in this review.

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APPENDIX A

GROUNDWATER SAMPLING RESULTS, 1996-2014

Table A-1. Arsenic. (2 Pages)

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

Table A-1. Arsenic. (2 Pages)

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)
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
Mar-11	3.15 B				2.85 B	3.58B			3.54B		3.45B			4.2
Sep-11	10 U				4.03 B	3.96B			10 U		10 U			4.2
Mar-12	2.87 B				3.63 B				4 U	4U	2.43 B			4.2
Sept-12	3.32 B				2.91 B	3.28B			2.09B		2.38 B			4.2
Mar-13	2.7 B				2.5 B	2U			2 U		2.2B			4.2
Sept-13	2 U				2.4 B				2 U	2U	2 U			4.2
Mar-14	1.7 U				1.7 U				2.12 B	1.7 U	1.7 U			4.2
Sept-14	1.7 U				3.77	2.88			3.44 B		3.75 B			4.2

B = Results detected at a value less than the required PQL, but greater than or equal to the detection limit.
DUP = Field duplicate sample
U = Result is nondetected

Table A-2. Barium Data. (2 Pages)

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

Table A-2. Barium Data. (2 Pages)

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-10	41				45.8				77.8	76.9	57.2			122.3
Nov-10	39.2				44				72.2	75.4	58			122.3
Mar-11	38.4				43.1	44.6			74.6		57			122.3
Sep-11	38.9				43.5	44			72.1		58.6			122.3
Mar-12	38				44.3				76.1	74.3	57.2			122.3
Sep-12	38.8				44.6	45			75.7		58			122.3
Mar-13	40.8 B				45.2 B	44.9 B			77.2		60.4			122.3
Sep-13	40.6 B				46.6 B				78.4	75.7	60			122.3
Mar-14	36.5				42.7				68.2	68.1	52			122.3
Sept-14	34				47	45.5			76.8		58.5			122.3

B = Results detected at a value less than the required PQL, but greater than or equal to the detection limit
C = Detected in both the sample and the analytical batch preparation blank, and sample concentration was </= 5x the blank concentration
DUP = Field duplicate sample
U = Result is nondetected

Table A-3. Chromium Data. (2 Pages)

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	17.2 C	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

Table A-3. Chromium Data. (2 Pages)

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-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
Mar-11	16.1				3.56	3.79			2.47		3.08			13.4
Sep-11	16.2				3.73	3.63			2.32		3.37			13.4
Mar-12	16.1				3.31				2.51	2.28	3.38			13.4
Sep-12	17.2				4.25	3.99			2.51		3.51			13.4
Mar-13	20.2				4.6 B	4.9 B			3.1 U		3.9 B			13.4
Sep-13	20.3				13				3.9 B	5.5 B	5.3 B			13.4
Mar-14	16				13.8				3.14 B	20.1 B	2.43 B			13.4
Sept-14	16.2				9.41	10.5			2 U		2 U			13.4

B = Results detected at a value less than the required PQL, but greater than or equal to the detection limit
C = Detected in both the sample and the analytical batch preparation blank, and sample concentration was </= 5x the blank concentration
DUP = Field duplicate sample
U = Result is nondetected

Table A-4. Lead Data. (2 Pages)

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 U		1 U		1 U		1 U	1 U					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	1.9 U	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

Table A-4. Lead Data. (2 Pages)

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)
Nov-10	5 U				5 U				5 U	5 U	5 U			5
Mar-11	7.15				7.64	7.5			7.23		7.74			5
Sep-11	5 U				5 U	5 U			5U		5 U			5
Mar-12	5 U				5 U				5U	5 U	5 U			5
Sep-12	5 U				5 U	5 U			5U		5 U			5
Mar-13	4.3 B				4.2 B	4 B			4.2B		4.1 B			5
Sep-13	12				6 B				12.1	11.3	11.1			5
Mar-14	0.5 U				0.5 U				0.5 U	0.5 U	0.5 U			5
Sept-14	0.5 U				0.5 U	0.5 U			0.5 U		0.5 U			5

B = Results detected at a value less than the required PQL, but greater than or equal to the detection limit
C = Detected in both the sample and the analytical batch preparation blank, and sample concentration was </= 5x the blank concentration
DUP = Field duplicate sample
U = Result is nondetected

Table A-5. Selenium Data. (2 Pages)

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	3.6 B					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 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

Table A-5. Selenium Data. (2 Pages)

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)
Nov-10	10 U				10 U				10 U	10 U	10 U			5.6
Mar-11	10 U				10 U	10 U			10 U		10 U			5.6
Sep-11	10 U				3.48 B	10 U			4.05 B		10 U			5.6
Mar-12	5 U				4.45 B				6.78	5.36	4.94 B			5.6
Sep-12	4.77 B				4.16 B	4.16 B			4.96 B		4.55 B			5.6
Mar-13	6.9 B				4.6 B	4.6 B			4.2 B		4.3 B			5.6
Sep-13	6.3 B				2.7 U				5.9 B	6.5 B	5.1 B			5.6
Mar-14	4.84 BC				2.89 B				4.33 BC	4.38 BC	3.31 BC			5.6
Sept-14	3.43 B				2.62 B	2.72 B			4.06 B		2.89 B			5.6

B = Results detected at a value less than the required PQL, but greater than or equal to the detection limit
C = Detected in both the sample and the analytical batch preparation blank, and sample concentration was </= 5x the blank concentration
DUP = Field duplicate sample
N = Spike sample recovery is outside control limits
U = Result is nondetected

Table A-6. Tin Data. (2 Pages)

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

Table A-6. Tin Data. (2 Pages)

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)
Nov-10	1 U				1 U				1 U	1 U	1 U			10
Mar-11	1 U				1 U	1 U			1 U		1 U			10
Sep-11	1 U				1 U	1 U			1 U		1 U			10
Mar-12	1 U				1 U				1 U	19.5	1 U			10
Sep-12	1 U				1 U	1 U			1 U		1 U			10
Mar-13	13.5 U				13.5 U	13.5 U			13.5 U		13.5 U			10
Sep-13	13.5 U				13.5 U				13.5 U		13.5 U			10
Mar-14	1 U				1 U				1 U	1 U	1 U			10
Sept-14	1 U				1 U	1 U			1 U		1 U			10

B = Results detected at a value less than the required PQL, but greater than or equal to the detection limit
DUP = Field duplicate sample
U = Result is nondetected

Table A-7. Uranium Data. (2 Pages)

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

Table A-7. Uranium Data. (2 Pages)

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)
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
Mar-11	2.17				1.96	1.94			1.81		2.5			3.4
Sep-11	2.19				2.27	3.82			1.65		2.25			3.4
Mar-12	2.22				2.33				1.67	1.69	2.45			3.4
Sep-12	2.1				2.32	2.29			1.68		2.44			3.4
Mar-13	2.36				2.37	2.25			1.59		2.43			3.4
Sep-13	1.93				2.04				1.51	1.5	2.1			3.4
Mar-14	2.11				2.28				1.7	1.66	2.35			3.4
Sept-14	2.18				2.32	2.36			1.68		2.4			3.4

B = Results detected at a value less than the required PQL, but greater than or equal to the detection limit
DUP = Field duplicate sample

Table A-8. Vanadium Data. (2 Pages)

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		12.6		23.6		14.4 J	15.1					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

Table A-8. Vanadium Data. (2 Pages)

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-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
Mar-11	36				37.6	37.3			36.3		36.4			40
Sep-11	34.8				37.6	37.4			33.2		35.2			40
Mar-12	31.6				39.1				37.2	36.7	35			40
Sep-12	35.6				39.4	38.8			34.2		35.5			40
Mar-13	32.2 B				33 B	35.2 B			26 B		27.6 B			40
Sep-13	27.3 B				32.4 B				21.4 B	20.4 B	25.9 B			40
Mar-14	26.8				30				22.9	23.6	26.2			40
Sept-14	27.3				30.4	30.9			23.6		26.2			40

B = Results detected at a value less than the required PQL, but greater than or equal to the detection limit
C = Detected in both the sample and the analytical batch preparation blank, and sample concentration was </= 5x the blank concentration
DUP = Field duplicate sample
U = Result is nondetected

Table A-9. Zinc Data. (2 Pages)

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 UC	6.1 UC	11.7 UC						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

Table A-9. Zinc Data. (2 Pages)

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-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
Mar-11	10 U				10 U	10 U			10 U		10 U			26.5
Sep-11	10 U				10 U	10 U			10 U		10 U			26.5
Mar-12	10 U				10 U				10 U	10 U	10 U			26.5
Sep-12	10 U				10 U	10 U			10 U		10 U			26.5
Mar-13	6.5 B				7.8 B	9.4 B			8.3 B		7.2 B			26.5
Sep-13	7.7 BC				5.2 U				5.2 U	5.2 U	5.2 U			26.5
Mar-14	3.5 U				3.5 U				3.5 U	3.5 U	3.5 U			26.5
Sept-14	3.5 U				3.5 U	3.5 U			3.63 B		3.5 U			26.5

B = Results detected at a value less than the required PQL, but greater than or equal to the detection limit
C = Detected in both the sample and the analytical batch preparation blank, and sample concentration was </= 5x the blank concentration
DUP = Field duplicate sample
U = Result is nondetected

Table A-10. Alkalinity Data. (2 Pages)

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		126		126	126	124						151.8	152.9
Sep-07	129		117	120	118		120							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

Table A-10. Alkalinity Data. (2 Pages)

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)
Nov-10	139				127				134	132	143			152.9
Mar-11	138				122	124			136		146			152.9
Sep-11	139				125	124			135		146			152.9
Mar-12	143				127				132	132	143			152.9
Sep-12	143				139	127			134		145			152.9
Mar-13	135				124	122			132		140			152.9
Sep-13	125				121				138	130	135			152.9
Mar-14	139				118				128	127	118			152.9
Sept-14	128				113	118			124		130			152.9

DUP = Field duplicate sample

Table A-11. Chloride Data. (2 Pages)

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

Table A-11. Chloride Data. (2 Pages)

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-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
Mar-11	14.5 D				15.2 D	16.4 D			15 D		19.2 D			26
Sep-11	13.5 D				13.4 D	13.4 D			16.2 D		19.4 D			26
Mar-12	14.4 D				13.8 D				16.9 D	16.7 D	20.6 D			26
Sep-12	12.8 D				13.6 D	13.4 D			16.7 D		20.6 D			26
Mar-13	13 D				13.7 D	14 D			17.6 D		21.2 D			26
Sep-13	13.3 D				13.6 D				18.1 D	18.1 D	21.6			26
Mar-14	13.4 D				13.7 D				17.2 D	17.3 D	21.2 D			26
Sept-14	12.8 D				13.5 D	13.4 D			15.8 D		19.3 D			26

C = Detected in both the sample and the analytical batch preparation blank, and sample concentration was </= 5x the blank concentration
D = Reported from dilution
DUP = Field duplicate sample

Table A-12. Fluoride Data. (2 Pages)

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	0.25 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	0.5 UD		0.45

Table A-12. Fluoride Data. (2 Pages)

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-09	0.25				0.3				0.28		0.29	0.25 D		0.45
Sep-09	0.4	0.43			0.31				0.34		0.37			0.45
April-10	0.23				0.3				0.019 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
Mar-11	0.32 B				0.28 B	0.29 B			0.29 B		0.31 B			0.45
Sep-11	0.33 B				0.54	0.38 B			0.26 B		0.32 B			0.45
Mar-12	0.46 B				0.54				0.42 B	0.41 B	0.46 B			0.45
Sep-12	0.32 B				0.35 B	0.35 B			0.32 B		0.32 B			0.45
Mar-13	0.33				0.39	0.38			0.28		0.3			0.45
Sep-13	0.31				0.37				0.25	0.26	0.28			0.45
Mar-14	0.317 B				0.477 B				0.285 B	0.282 B	0.297 B			0.45
Sept-14	0.299 D				0.356 B	0.338 B			0.268 D		0.284 D			0.45

B = Estimated results
D = Reported from dilution
DUP = Field duplicate sample
U = Result is nondetected

Table A-13. Sulfate Data. (2 Pages)

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

Table A-13. Sulfate Data. (2 Pages)

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-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
Mar-11	26.9 D				29.2 D	30.1 D			26.5 D		28.6 D			37.8
Sep-11	36.8 D				29.7 D	26.2 D			26.3 D		28.7 D			37.8
Mar-12	27.4 D				27 D				27.6 D	27.3 D	29.8 D			37.8
Sep-12	27.1 D				27.2 D	26.9			27.7 D		29.9 D			37.8
Mar-13	26.3 D				25 D	25.9 D			26.2 D		29 D			37.8
Sep-13	26.2 D				24.7 D				26.9 D	26.8 D	28.4 D			37.8
Mar-14	27.6 D				26.3 D				27.6 D	27.2 D	29.6 D			37.8
Sept-14	26.7 D				26 D	26 D			24.5 D		26.9 D			37.8

D = Reported from dilution
DUP = Field duplicate sample

Table A-14. Gross Alpha Data. (2 Pages)

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	1.4 J	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	1.3 U	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	-0.857 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	-0.134 U		2.98

Table A-14. Gross Alpha Data. (2 Pages)

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)
Dec-08									0.066 U		-0.187 U	0.841 U		2.98
Mar-09	1.56 U				0.767 U				-0.179 U		3.92	0.583 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				1.22 U				0.946 U	0.926 U	0.767 U			2.98
Mar-11	1.42 U				1.49 U	2.06			1.56 U		0.74 U			2.98
Sep-11	2.05 U				2.05 U	1.98 U			2.04 U		-0.311 U			2.98
Mar-12	1.7 U				0.464 U				2.08 U	0.866	2.62			2.98
Sep-12	3.96				1.74 U	1.47 U			2.7 U		1.82 U			2.98
Mar-13	1.56 U				1.38 U	0.487 U			1.38		2.87			2.98
Sep-13	0.945 U				1.6 U				1.23 U	2.21	0.799 U			2.98
Mar-14	0.835 U				1.86 U				0.168 U	0.108 U	1.4 U			2.98
Sept-14	0.428 U				0.0901 U	1.44			3.84		2.36 U			2.98

DUP = Field duplicate sample
J = Estimated results
U = Result is nondetected

Table A-15. Gross Beta Data. (2 Pages)

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	41.8		31.5

Table A-15. Gross Beta Data. (2 Pages)

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-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
Mar-11	54.2				22.5	19.4			34.2		31.8			31.5
Sep-11	54.8				18.1	19.2			32.6		36.8			31.5
Mar-12	54.3				18.1				32.5	34.2	32.9			31.5
Sep-12	60.1				16.7	17			29.9		32.4			31.5
Mar-13	30.1				10.3	10.2			18.7		21.8			31.5
Sep-13	27.8				10.4				18.5	16.3	17.8			31.5
Mar-14	32				12.1				16.6	18.1	14.2			31.5
Sept-14	29.9				9.83	8.72			18.5		17.2			31.5

DUP = Field duplicate sample

Table A-16. Carbon-14 Data. (2 Pages)

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

Table A-16. Carbon-14 Data. (2 Pages)

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)
Nov-10	10.3 U				0.452 U				-31.7 U	-7.42 U	30.6 U			58.1
Mar-11	35.8 U				-2.96 U	1.26 U			3.96 U		4.31 U			58.1
Sep-11	25.7 U				12.4 U	16.7 U			-0.939 U		29.8 U			58.1
Mar-12	15.5 U				6.32 U				15.2 U	21.6 U	6.85 U			58.1
Sep-12	28 U				27 U	20.1 U			14.1 U		43.8 U			58.1
Mar-13	16.8 U				17.2 U	20.6			10.7 U		27			58.1
Sep-13	10.8 U				-3.61 U				-6.43 U	3.26 U	10.4 U			58.1
Mar-14	16 U				5.56 U				8.4 U	3.05 U	14.8 U			58.1
Sept-14	15.4 U				15.4 U	8.68			-0.403 U		15.6 U			58.1

DUP = Field duplicate sample
J = Estimated results
U = Result is nondetected

Table A-17. Iodine-129 Data. (2 Pages)

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

Table A-17. Iodine-129 Data. (2 Pages)

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)
April-10	2.99 U				10				1.05 U	-0.853 U	5.52			21.1
Nov-10	4.82				10.6				0.0651 U	0.767 U	5.3			21.1
Mar-11	3.21 U				4.23	1.92 U			1.44 U		5.52			21.1
Sep-11	2.31 U				8.68	7.81			1.12 U		4.79			21.1
Mar-12	4.77				13.3				1.22	1.46	6.31			21.1
Sep-12	3.82				10.9	11.8			1.32		6.02			21.1
Mar-13	3.2				6.15	6.94			1.46		4.83			21.1
Sep-13	1.81				5.92				1.58	1.44	7.52			21.1
Mar-14	2.34				2.22				1.26		3.05			21.1
Sept-14	4.07				11	8.11			1.26		5.29			21.1

DUP = Field duplicate sample
J = Estimated results
U = Result is nondetected

Table A-18. Technetium-99 Data. (2 Pages)

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

Table A-18. Technetium-99 Data. (2 Pages)

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-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
Mar-11	113				35.1	6.84			73.3		74.4			93.8
Sep-11	124				32.1	33.7			76.6		68.6			93.8
Mar-12	114				32.2				66.1	32.5	61.8			93.8
Sep-12	128				29.1	34.6			66.8		67.7			93.8
Mar-13	91				24.8	27.5			54.7		48.8			93.8
Sep-13	103				28.7				54.4	56	48.2			93.8
Mar-14	101				27.4				54.3	54.2	38.7			93.8
Sept-14	115				27.4	21.3			54.6		56.6			93.8

DUP = Field duplicate sample
J = Estimated results
U = Result is nondetected

Table A-19. Radium Data. (2 Pages)

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	0.088 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	-0.009 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	-0.045 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	-0.21 UJ	-0.327 UJ						0.5	0.695
Sep-07	-0.229 U		-0.008 U	0.067 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	0.424 U		0.695
Dec-08									0.088 U		-0.069 U	0.024 U		0.695
Mar-09	-0.14 U				-0.104 U				-0.281 U		-0.1 U	0.021 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

Table A-19. Radium Data. (2 Pages)

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-11	-0.032 U				0.163 U	0.045 U			0.104 U		0.098 U			0.695
Sep-11	0.028 U				0.057 U	0.021 U			0.072 U		0.1 U			0.695
Mar-12	-0.038 U				0.054 U				0.049 U	0.188 U	0.026 U			0.695
Sep-12	0.23 U				0.177 U	0.295 U			0.25 U		0.121 U			0.695
Mar-13	0.048 U				0.021 U	-0.331 U			0.039 U		0 U			0.695
Sep-13	0.0296 U				0.0762				0.0759 U	0.0636 U	-0.0703 U			0.695
Mar-14	0.28 U				0.353 U				0.0426 U	-0.0768 U	0.185 U			0.695
Sept-14	0.0327 U				-0.0135 U	0.122 U			0.177 U		0.265 U			0.695

DUP = Field duplicate sample
J = Estimated results
U = Result is nondetected

Table A-20. Carbon Tetrachloride Data. (2 Pages)

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
Mar-11	5 U				3.22 J	3.33 J			5 U		1.96 J			11

Table A-20. Carbon Tetrachloride Data. (2 Pages)

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-11	5 U				3.08 J	2.94 J			1.07J		3.22 J			11
Mar-12	5 U				3.7 J				5 U	5 U	1.69 J			11
Sep-12	5 U				4.51 J	4.34 J			1.21 J		2.02 J			11
Mar-13	0.95 J				4.2	4.4			1.4		2.6			11
Sep-13	0.97 J				3.7				1.6	1.6	2.1			11
Mar-14	1 U				3.7 J				1 U	1 U	2 J			11
Sept-14	1.02 J				3.3	3.2			1.65 J		2.63 J			11

DUP = Field duplicate sample
J = Results detected at a value less than the required PQL, but greater than or equal to the detection limit.
U = Result is nondetected

Table A-21. Nitrogen Data. (2 Pages)

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
Mar-11	5.27 D				7.3 D	7.28 D			37.8 D		13.8 D			51.1
Sep-11	5.68 D				7.31 D	7.31 D			35.8 D		7.3 D			51.1

Table A-21. Nitrogen Data. (2 Pages)

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-12	5.27 D				6.95 D				34.1 D	33 D	11.4 D			51.1
Sep-12	5.2 D				6.74 D	6.92 D			34.1 D		11.9 D			51.1
Mar-13	5.7 D				7.01 D	6.7 D			34.8 D		12.5 D			51.1
Sep-13	6.3 D				7.15 D				39.8 D	39.6 D	14.1 D			51.1
Mar-14	5.92 D				6.56 D				31.6 D	36.2 D	12.2 D			51.1
Sept-14	5.25 D				6.32 D	6.49 D			30 D		11.7 D			51.1

D = Reported from dilution
DUP = Field duplicate sample

Table A-22. Total Organic Halides Data. (2 Pages)

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		10.5		5.6		6.6	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

Table A-22. Total Organic Halides Data. (2 Pages)

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)
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
Mar-11	40 U				40 U	40 U			40 U		40 U			5
Sep-11	20 U				10 U	10 U			10 U		20 U			5
Mar-12	10 U				10 U				10 U	10 U	10 U			5
Sep-12	20 U				20 U	20 U			20 U		20 U			5
Mar-13	6.8 M				11.9 M	10.3 M			6.6 M		7.6 M			5
Sep-13	1.8 U				5.7				3.7 B	1.8 U	3.9 B			5
Mar-14	3.33 U				3.52 B				3.33 U	3.33 U	3.33 U			5
Sept-14	4.06 B				5.62	5.34			3.33 U		3.33 U			5

B = Estimated results
C = Detected in both the sample and the analytical batch preparation blank, and sample concentration was </= 5x the blank concentration
D = Reported from dilution
DUP = Field duplicate sample
M = Analytical batch preparation duplicate precision criteria not met.
U = Result is nondetected

Table A-23. Total Dissolved Solids Data. (2 Pages)

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		312		310	314	388						573.6	570
Sep-07	259		309	363	304		498							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

Table A-23. Total Dissolved Solids Data. (2 Pages)

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)
April-10	270				285				485	481	336			570
Nov-10	257				258				442	430	323			570
Mar-11	260				305	295			414		301			570
Sept-11	240				267	272			396		289			570
Mar-12	282				291				458	478	346			570
Sep-12	269				295	295			476		441			570
Mar-13	266				270	270			446		266			570
Sep-13	301				266				514	518	357			570
Mar-14	246				266	244			413	407	303			570
Sept-14	253				239				409		303			570

DUP = Field duplicate sample

Table A-24. Turbidity Data. (2 Pages)

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		0.3		0.26		3.21	1.48					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

Table A-24. Turbidity Data. (2 Pages)

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-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
Mar-11	4.12				1.71				2.3		1.26			49.8
Sept-11	3.11				1.38				0.62		0.32			49.8
Mar-12	3.49				2				2.51		0.93			49.8
Sep-12	4.49				1.55				2.35		0.59			49.8
Mar-13	4.36				2.15				0.33		1.12			49.8
Sep-13	4.28				4.33				0.86		0.42			49.8
Mar-14	3.64				16.8				2		1.18			49.8
Sept-14	2.72				16.5				1.3		0.66			49.8

DUP = Field duplicate sample

Table A-25. pH Data. (2 Pages)

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

Table A-25. pH Data. (2 Pages)

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)
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
Mar-11	8.09				7.77				7.72		7.89			8.01
Sept-11	7.95				7.79				7.76		7.9			8.01
Mar-12	7.9				7.81				7.66		7.72			8.01
Sep-12	7.9				7.68				7.65		7.79			8.01
Mar-13	7.87				7.97				7.8		7.74			8.01
Sep-13	7.9				7.82				7.69		7.82			8.01
Mar-14	7.67				7.87				7.58		7.73			8.01
Sept-14	7.64				7.82				7.41		7.61			8.01

DUP = Field duplicate sample

Table A-26. Specific Conductance Data. (2 Pages)

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

Table A-26. Specific Conductance Data. (2 Pages)

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)
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
Mar-11	404				414				648		500			774
Sept-11	409				400				627		479			774
Mar-12	422				392				641		492			774
Sep-12	401				394				638		491			774
Mar-13	400				383				630		489			774
Sep-13	402				389				640		481			774
Mar-14	390				368				614		476			774
Sept-14	392				401				624		485			774

C = Detected in both the sample and the analytical batch preparation blank, and sample concentration was </= 5x the blank concentration
DUP = Field duplicate sample

APPENDIX B

GROUNDWATER SAMPLING TRENDS, 1996-2014

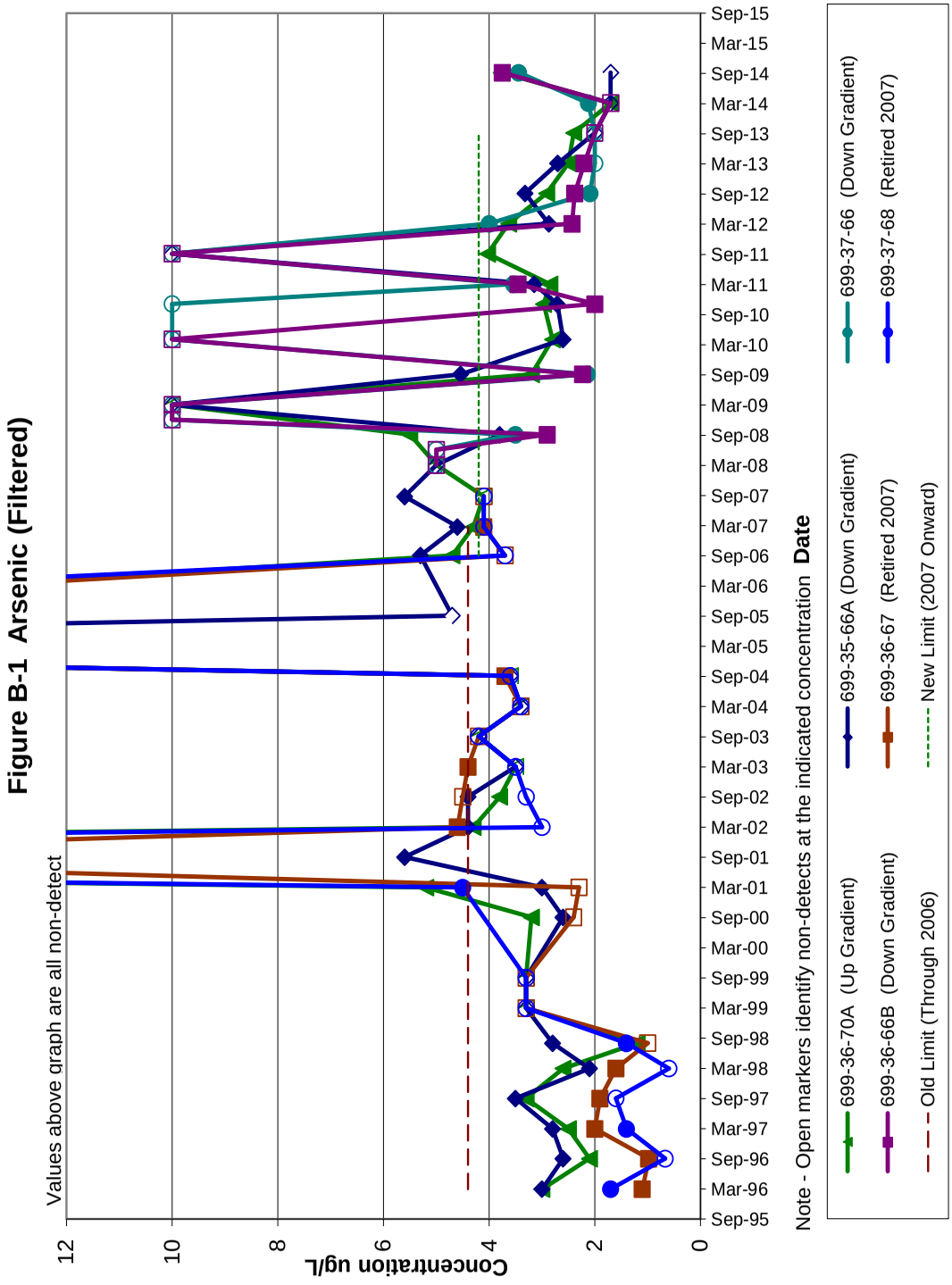


Figure B-1 Arsenic (Filtered)
Values above graph are all non-detect
Concentration ug/L
0
2
4
6
8
10
12
Sep-95
Mar-96
Sep-96
Mar-97
Sep-97
Mar-98
Sep-98
Mar-99
Sep-99
Mar-00
Sep-00
Mar-01
Sep-01
Mar-02
Sep-02
Mar-03
Sep-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Mar-09
Sep-09
Mar-10
Sep-10
Mar-11
Sep-11
Mar-12
Sep-12
Mar-13
Sep-13
Mar-14
Sep-14
Mar-15
Sep-15
Note - Open markers identify non-detects at the indicated concentration Date
699-37-66 (Down Gradient)
699-37-68 (Retired 2007)
699-35-66A (Down Gradient)
699-36-67 (Retired 2007)
New Limit (2007 Onward)
699-36-70A (Up Gradient)
699-36-66B (Down Gradient)
Old Limit (Through 2006)

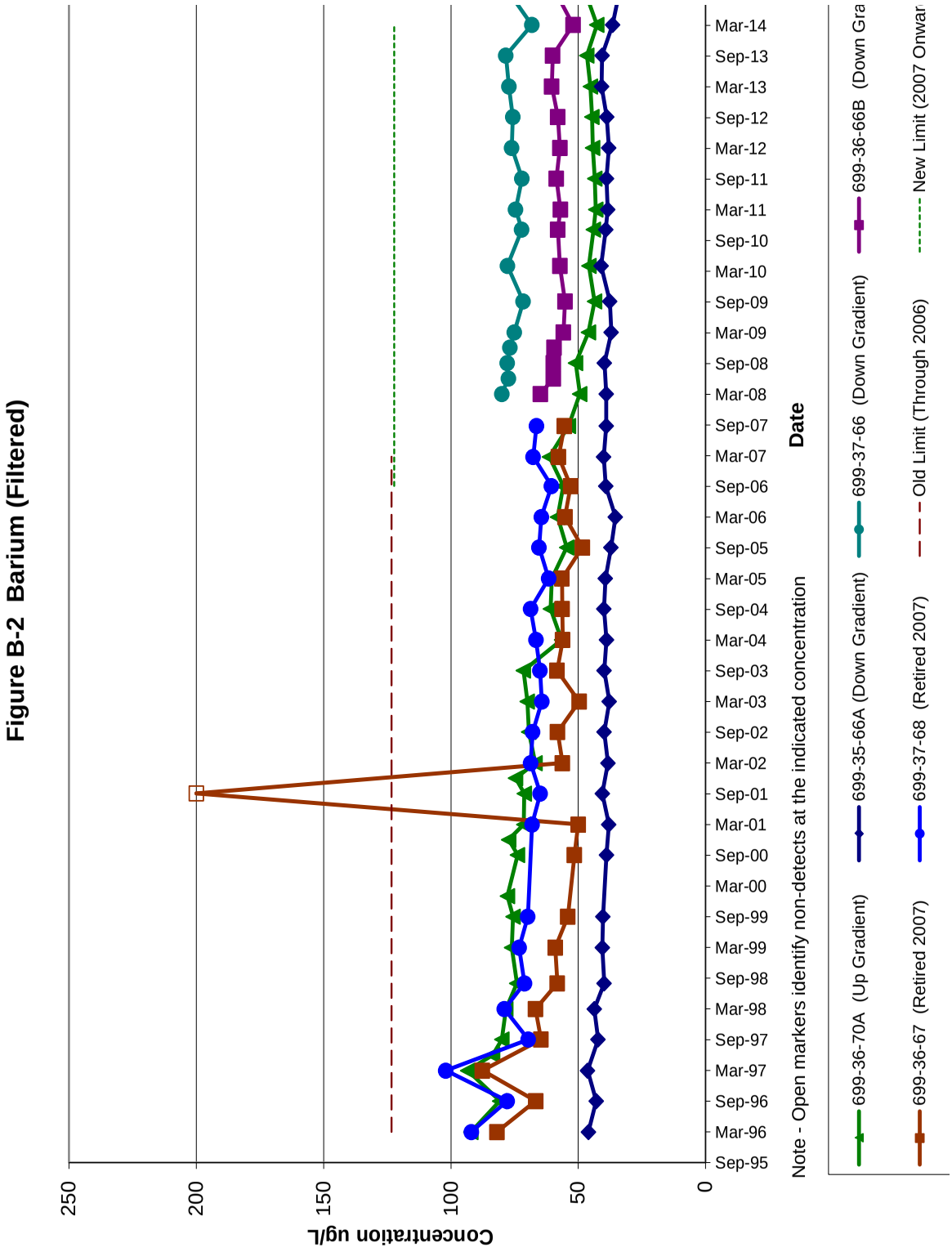


Figure B-2 Barium (Filtered)
Concentration ug/L
250
200
150
100
50
0
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Date
Note - Open markers identify non-detects at the indicated concentration
699-36-70A (Up Gradient)
699-35-66A (Down Gradient)
699-37-66 (Down Gradient)
699-36-66B (Down Gra
699-36-67 (Retired 2007)
699-37-68 (Retired 2007)
Old Limit (Through 2006)
New Limit (2007 Onwar

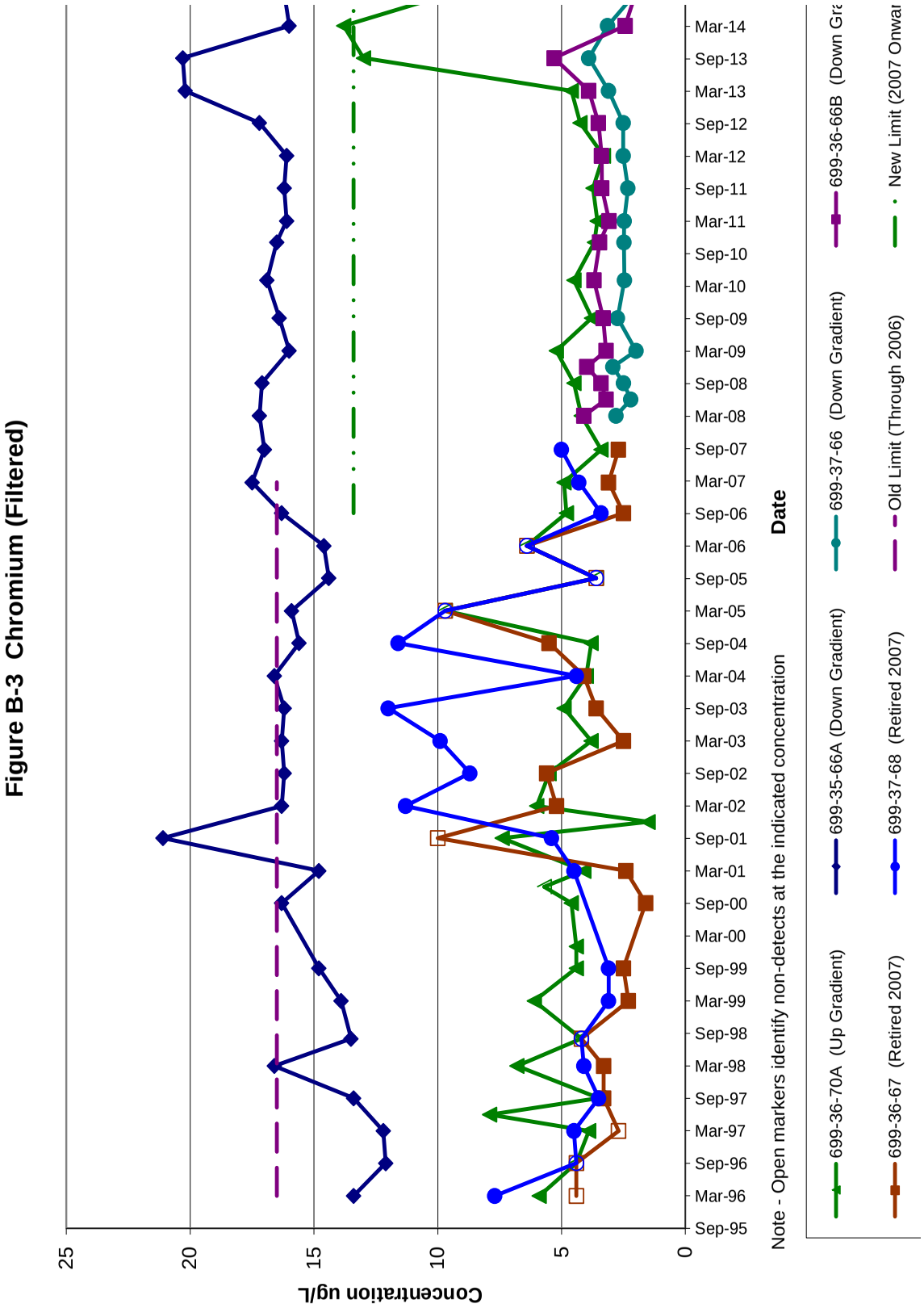


Figure B-3 Chromium (Filtered)
Concentration ug/L
25
20
15
10
5
0
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Date
Note - Open markers identify non-detects at the indicated concentration
699-36-70A (Up Gradient)
699-35-66A (Down Gradient)
699-37-66 (Down Gradient)
699-36-66B (Down Gra
699-36-67 (Retired 2007)
699-37-68 (Retired 2007)
Old Limit (Through 2006)
New Limit (2007 Onwar

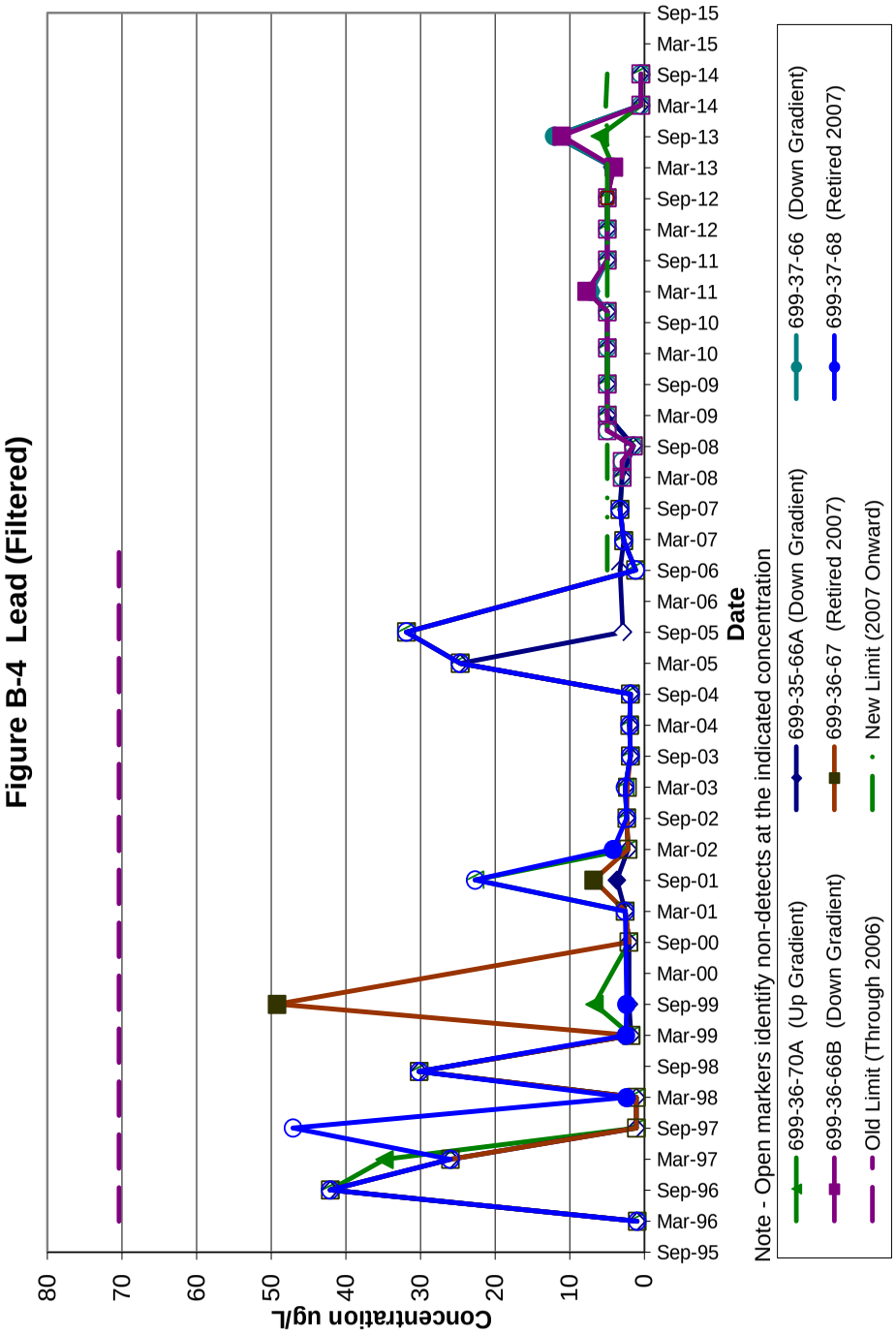


Figure B-4 Lead (Filtered)
Concentration ug/L
0
10
20
30
40
50
60
70
80
Date
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Note - Open markers identify non-detects at the indicated concentration
699-36-70A (Up Gradient)
699-35-66A (Down Gradient)
699-37-66 (Down Gradient)
699-36-66B (Down Gradient)
699-36-67 (Retired 2007)
699-37-68 (Retired 2007)
Old Limit (Through 2006)
New Limit (2007 Onward)

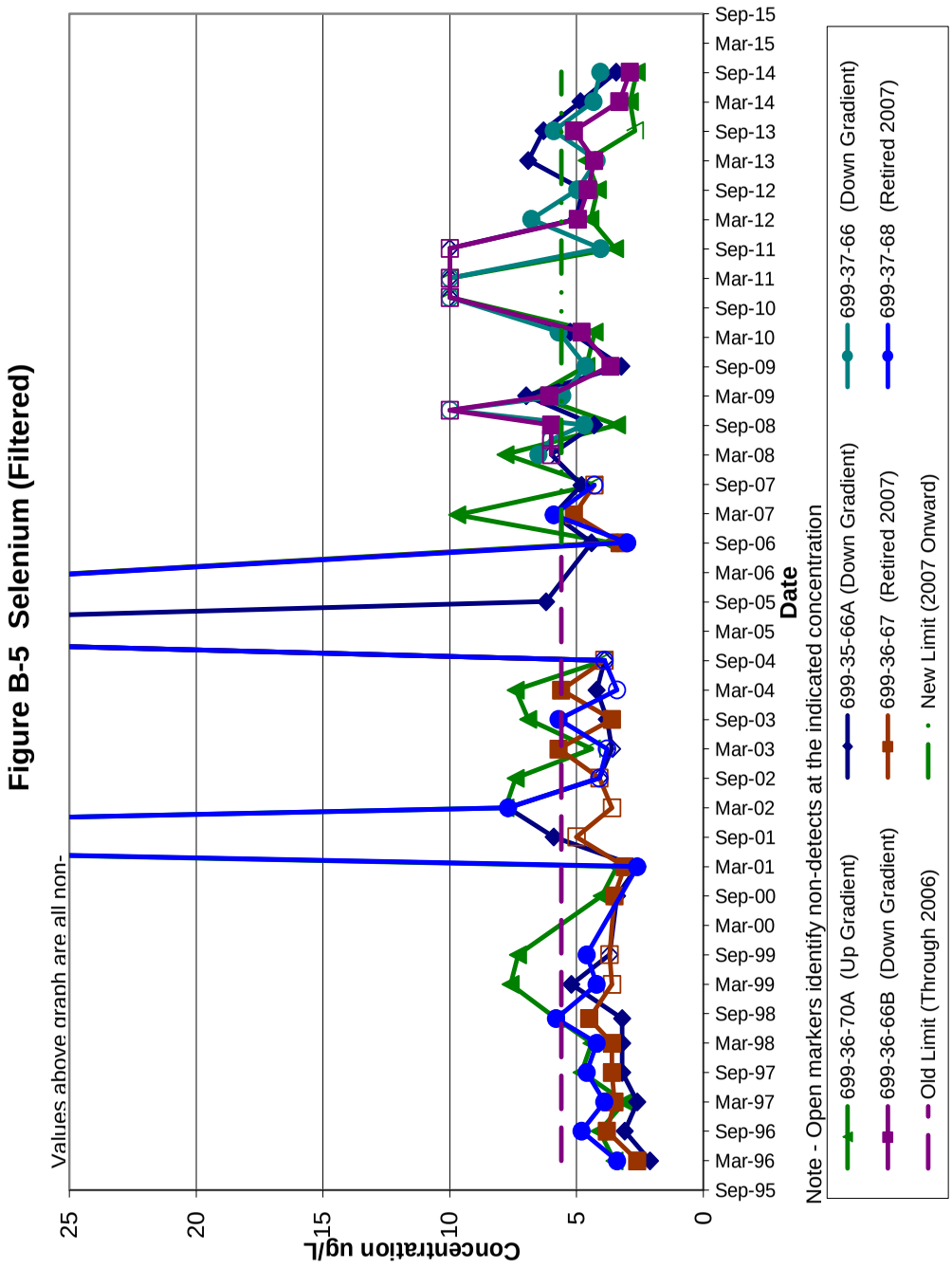


Figure B-5 Selenium (Filtered)
Values above graph are all non-
Concentration ug/L
0
5
10
15
20
25
Date
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Note - Open markers identify non-detects at the indicated concentration
699-36-70A (Up Gradient)
699-35-66A (Down Gradient)
699-37-66 (Down Gradient)
699-36-66B (Down Gradient)
699-36-67 (Retired 2007)
699-37-68 (Retired 2007)
Old Limit (Through 2006)
New Limit (2007 Onward)

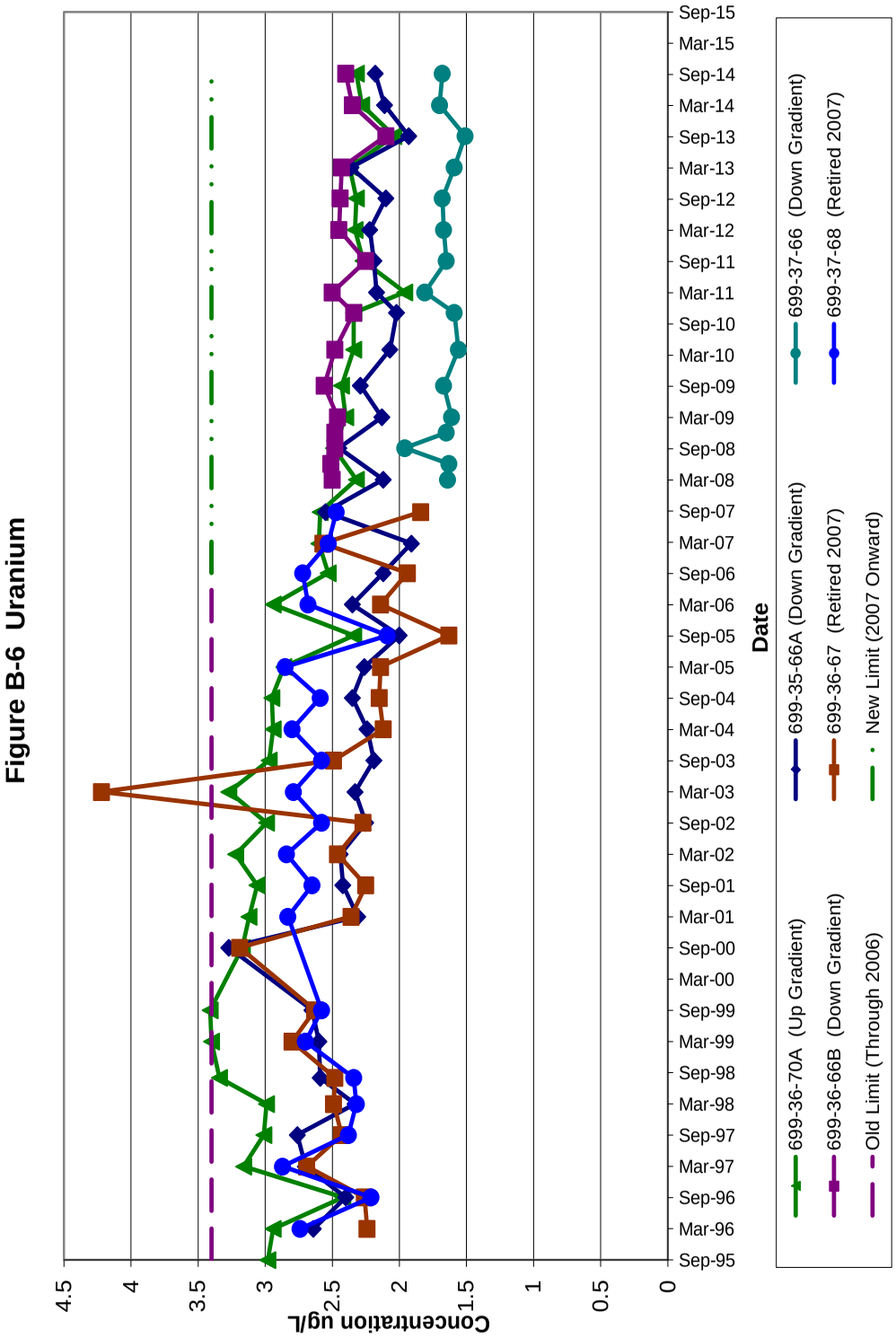


Figure B-6 Uranium
Concentration ug/L
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Date
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
699-36-70A (Up Gradient)
699-35-66A (Down Gradient)
699-37-66 (Down Gradient)
699-36-66B (Down Gradient)
699-36-67 (Retired 2007)
699-37-68 (Retired 2007)
Old Limit (Through 2006)
New Limit (2007 Onward)

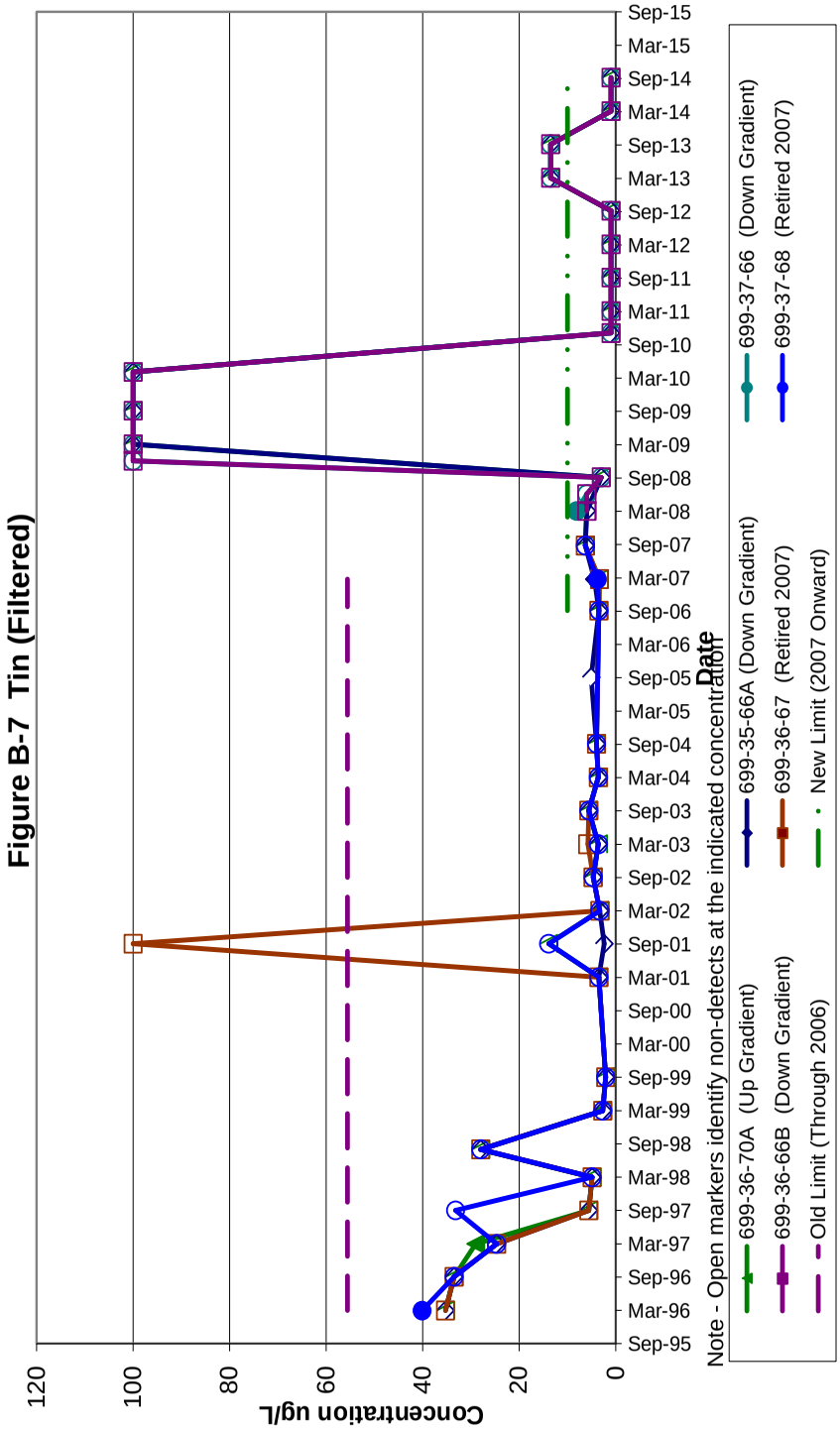


Figure B-7 Tin (Filtered)
Concentration ug/L
120
100
80
60
40
20
0
Date
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Note - Open markers identify non-detects at the indicated concentration
699-37-66 (Down Gradient)
699-37-68 (Retired 2007)
699-35-66A (Down Gradient)
699-36-67 (Retired 2007)
New Limit (2007 Onward)
699-36-70A (Up Gradient)
699-36-66B (Down Gradient)
Old Limit (Through 2006)

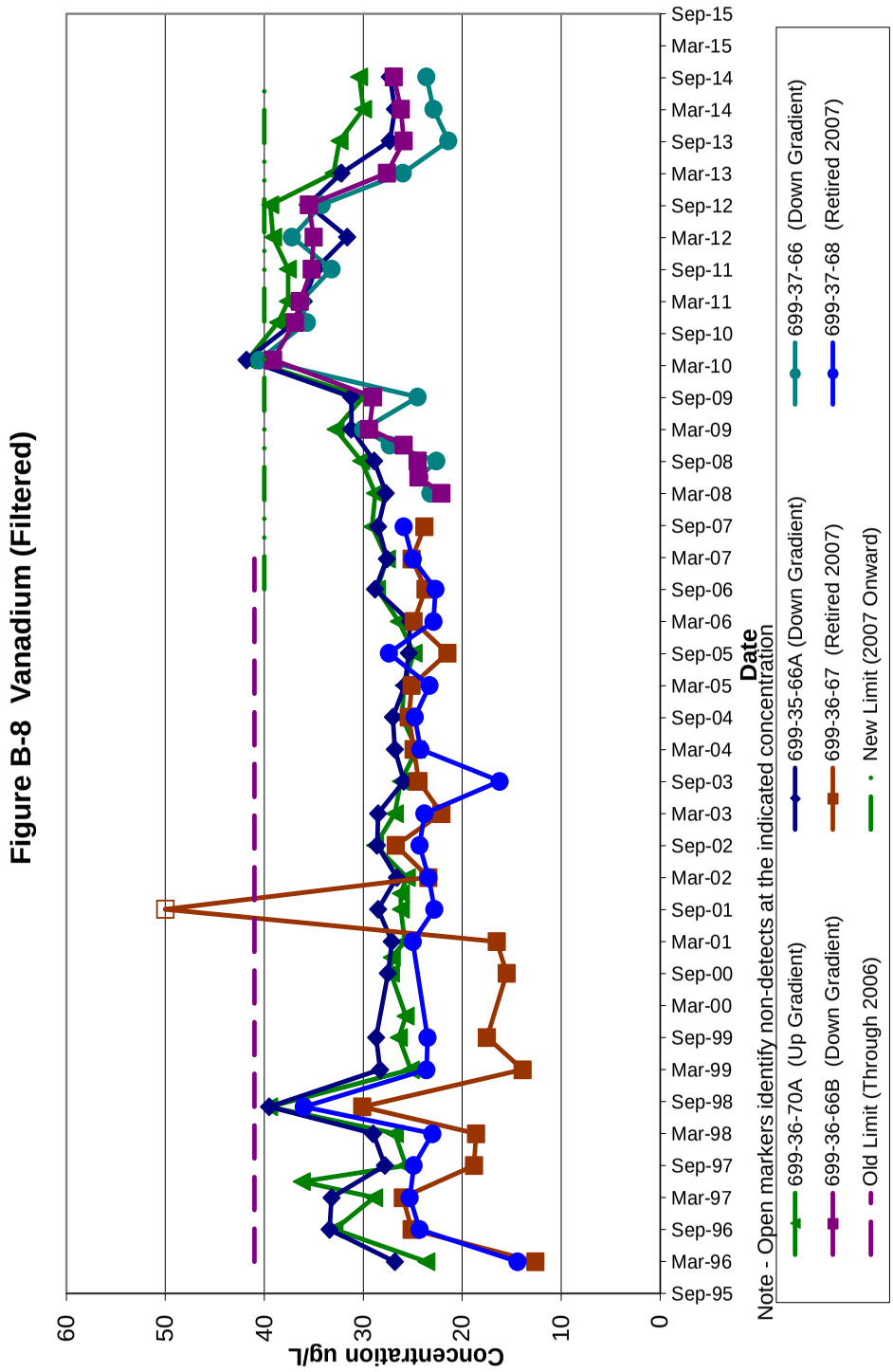


Figure B-8 Vanadium (Filtered)
Concentration ug/L
0
10
20
30
40
50
60
Date
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Note - Open markers identify non-detects at the indicated concentration
699-36-70A (Up Gradient)
699-35-66A (Down Gradient)
699-37-66 (Down Gradient)
699-36-66B (Down Gradient)
699-36-67 (Retired 2007)
699-37-68 (Retired 2007)
Old Limit (Through 2006)
New Limit (2007 Onward)

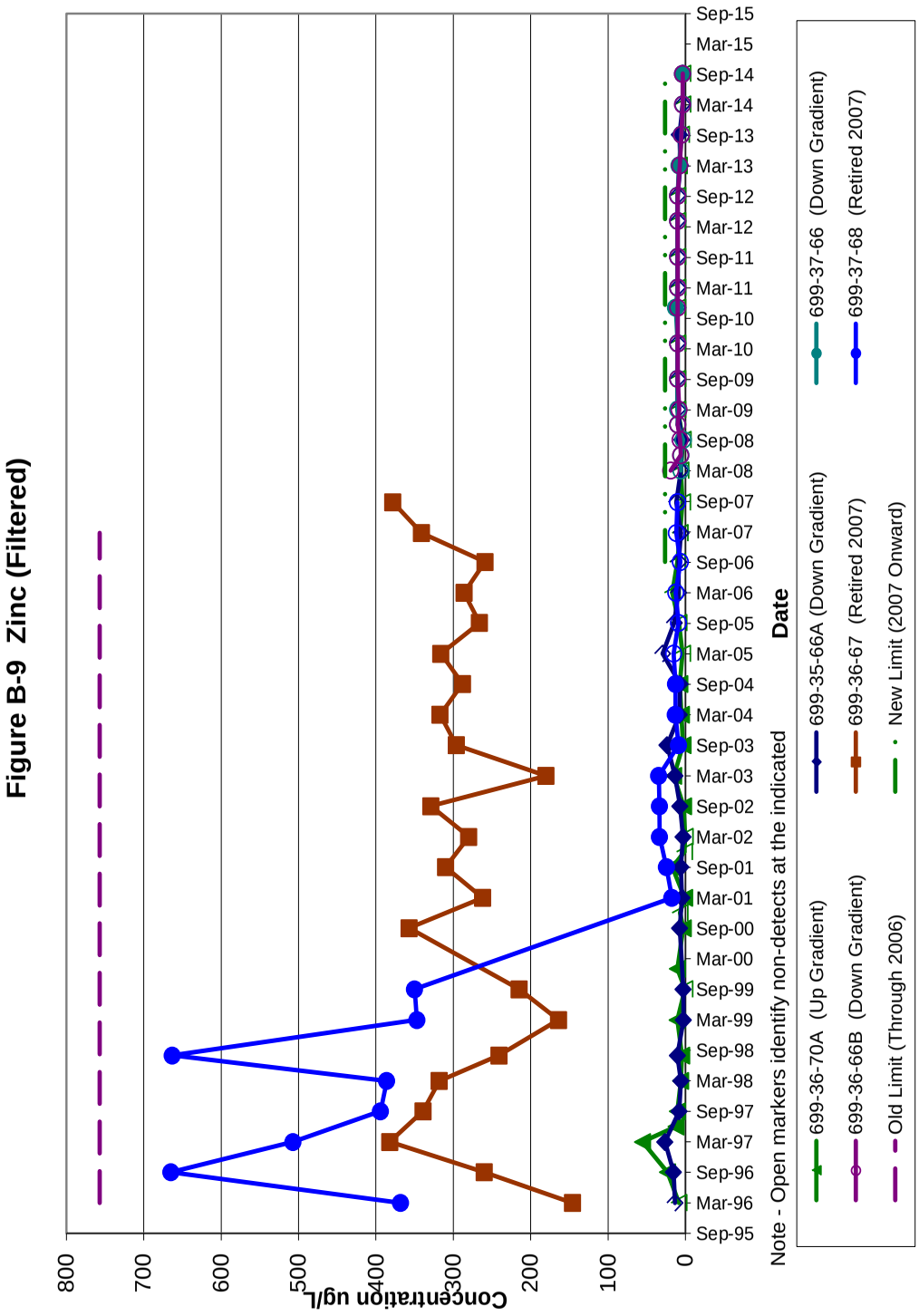


Figure B-9 Zinc (Filtered)
Concentration ug/L
800
700
600
500
400
300
200
100
0
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Date
Note - Open markers identify non-detects at the indicated
699-36-70A (Up Gradient)
699-36-66B (Down Gradient)
Old Limit (Through 2006)
699-35-66A (Down Gradient)
699-36-67 (Retired 2007)
New Limit (2007 Onward)
699-37-66 (Down Gradient)
699-37-68 (Retired 2007)

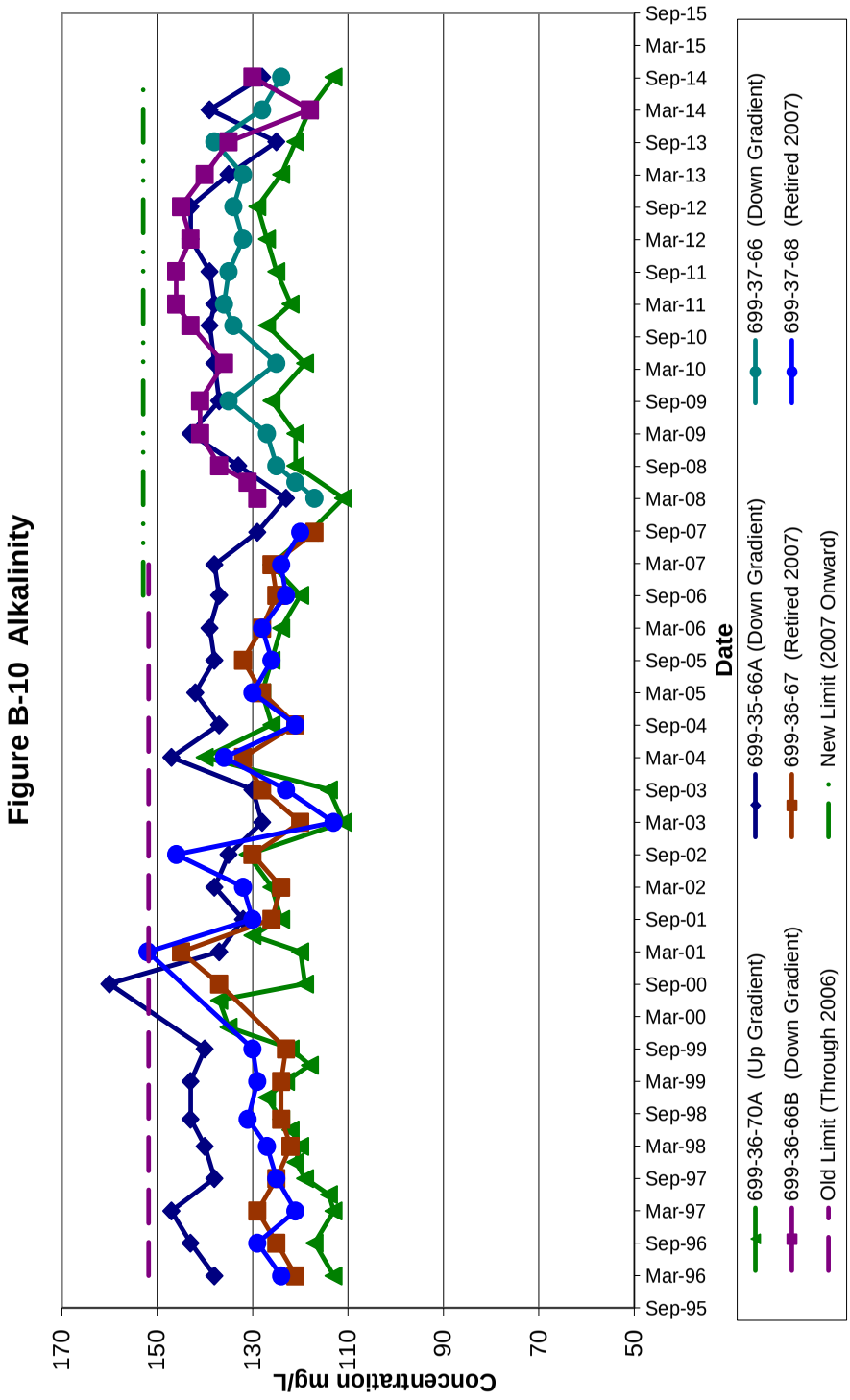


Figure B-10 Alkalinity
Concentration mg/L
170
150
130
110
90
70
50
Date
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
699-36-70A (Up Gradient)
699-36-66B (Down Gradient)
Old Limit (Through 2006)
699-35-66A (Down Gradient)
699-36-67 (Retired 2007)
New Limit (2007 Onward)
699-37-66 (Down Gradient)
699-37-68 (Retired 2007)

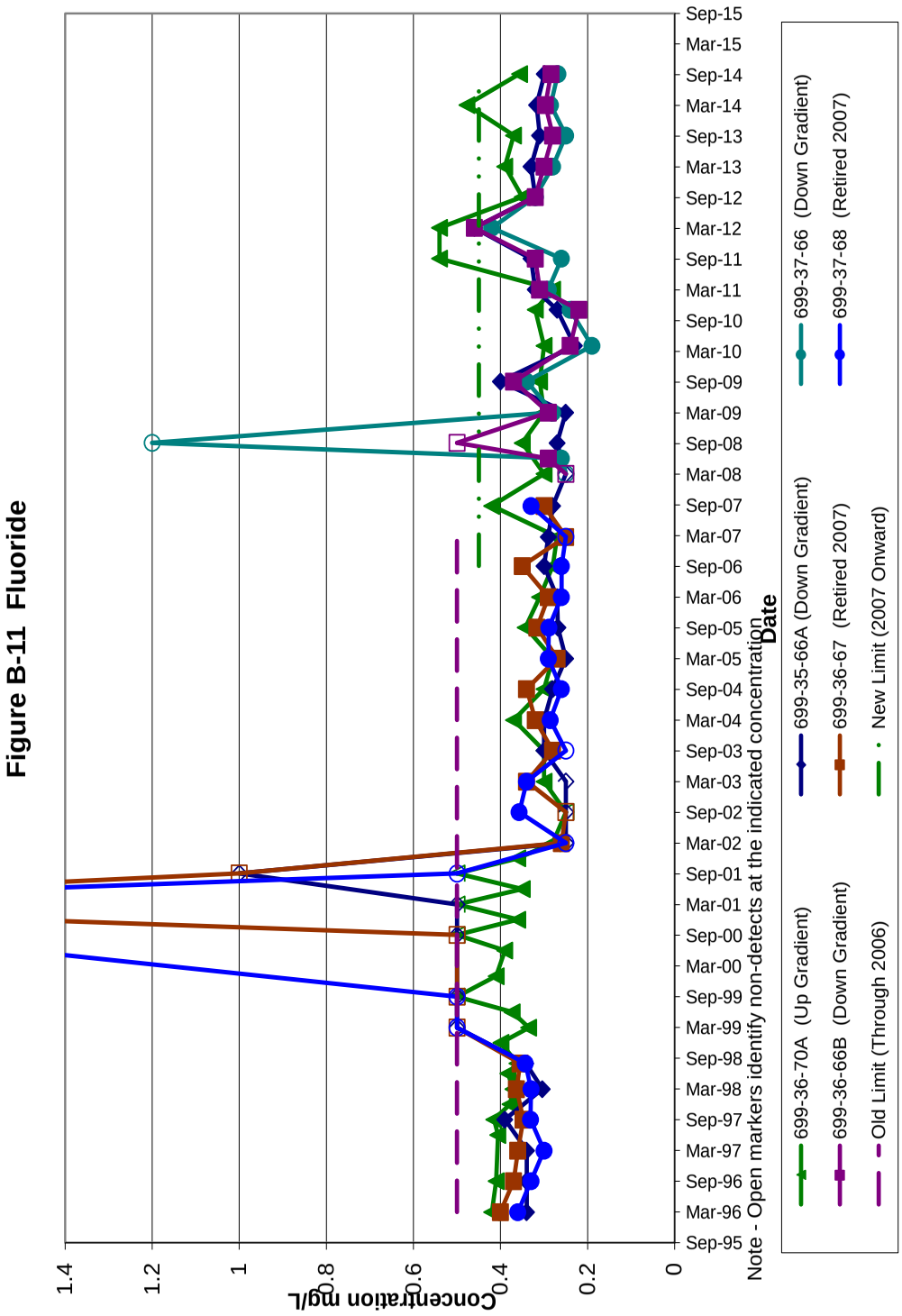


Figure B-11 Fluoride
Concentration mg/L
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Note - Open markers identify non-detects at the indicated concentration
Date
699-36-70A (Up Gradient)
699-36-66B (Down Gradient)
Old Limit (Through 2006)
699-35-66A (Down Gradient)
699-36-67 (Retired 2007)
New Limit (2007 Onward)
699-37-66 (Down Gradient)
699-37-68 (Retired 2007)

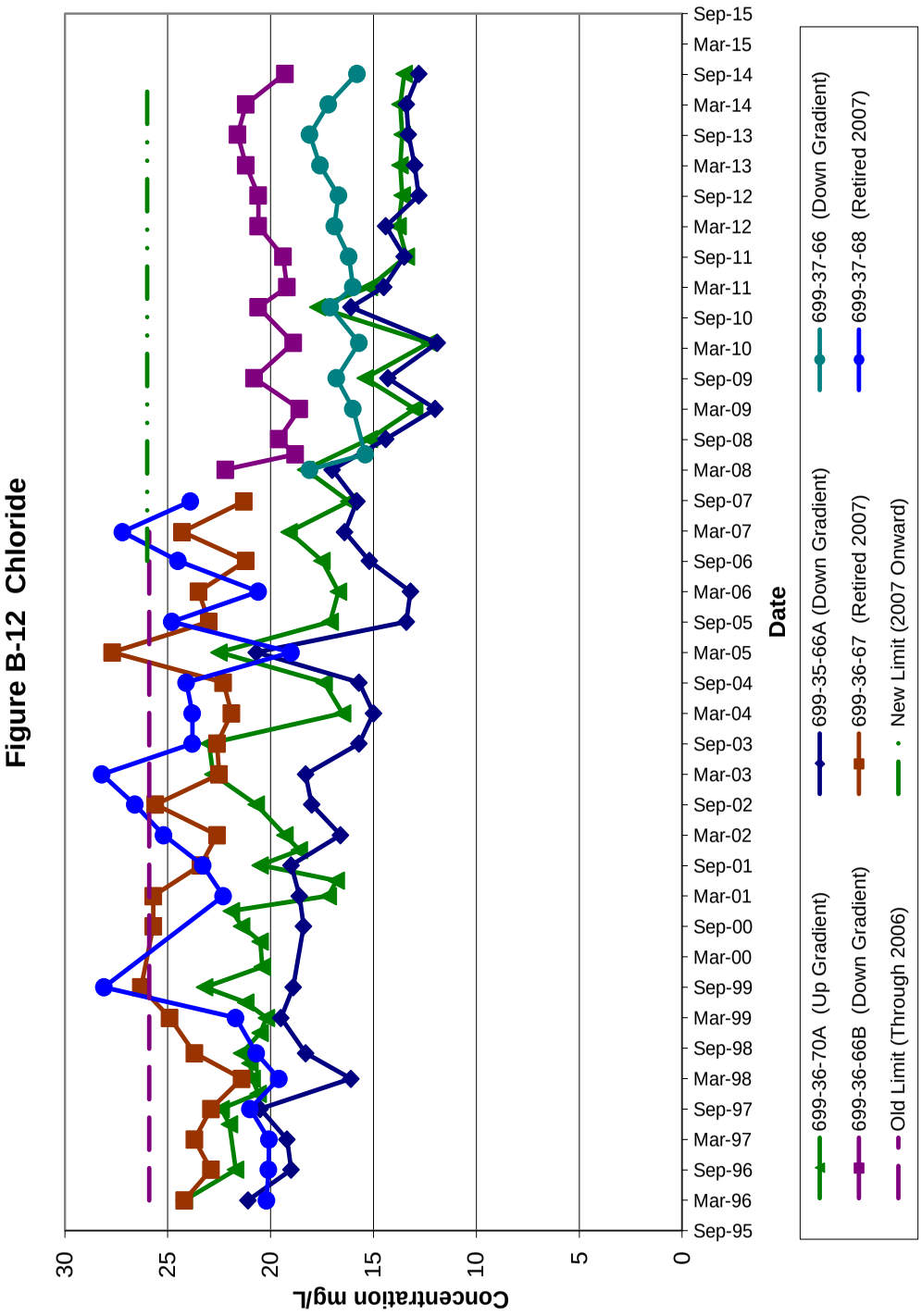


Figure B-12 Chloride

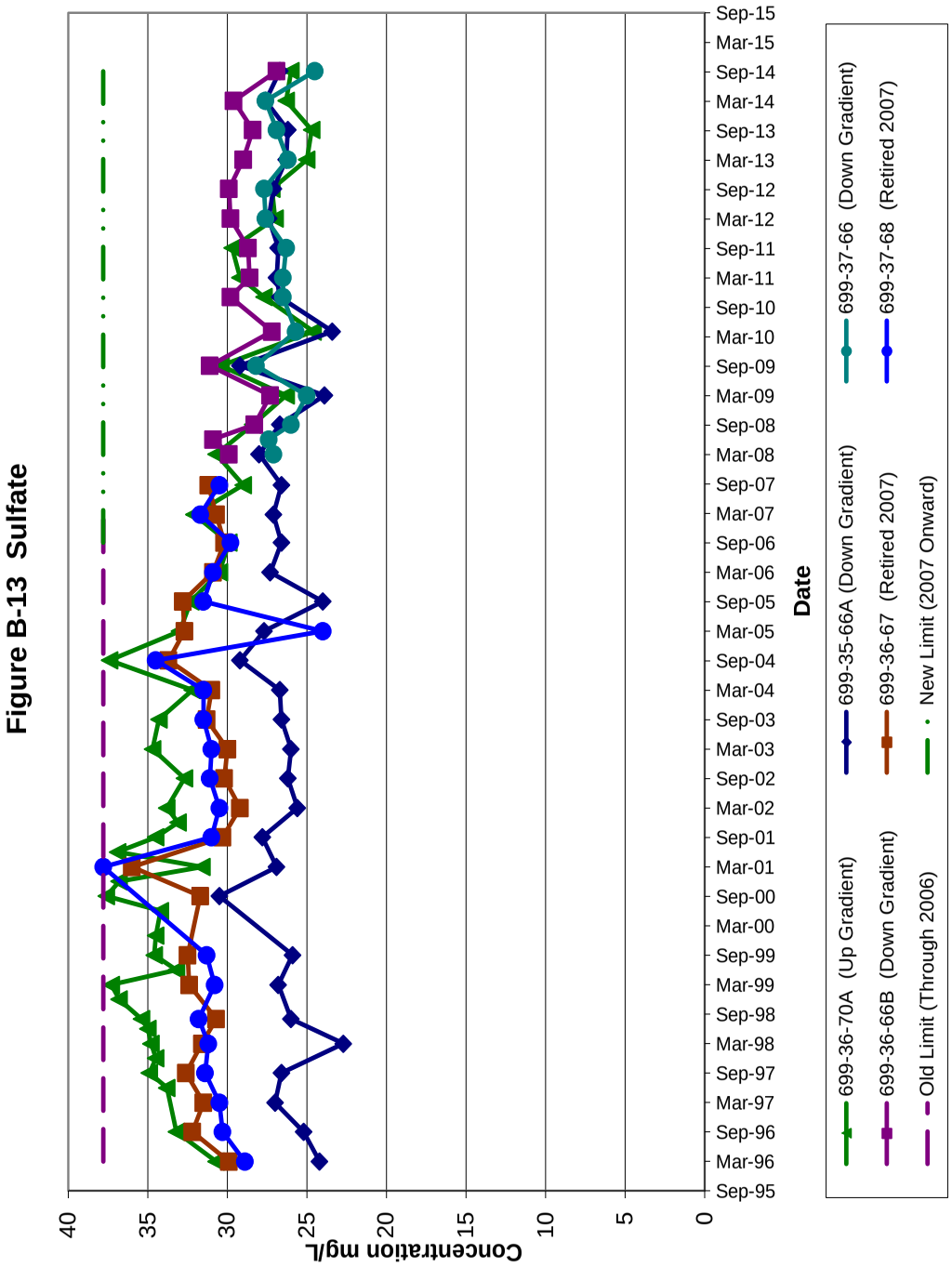


Figure B-13 Sulfate

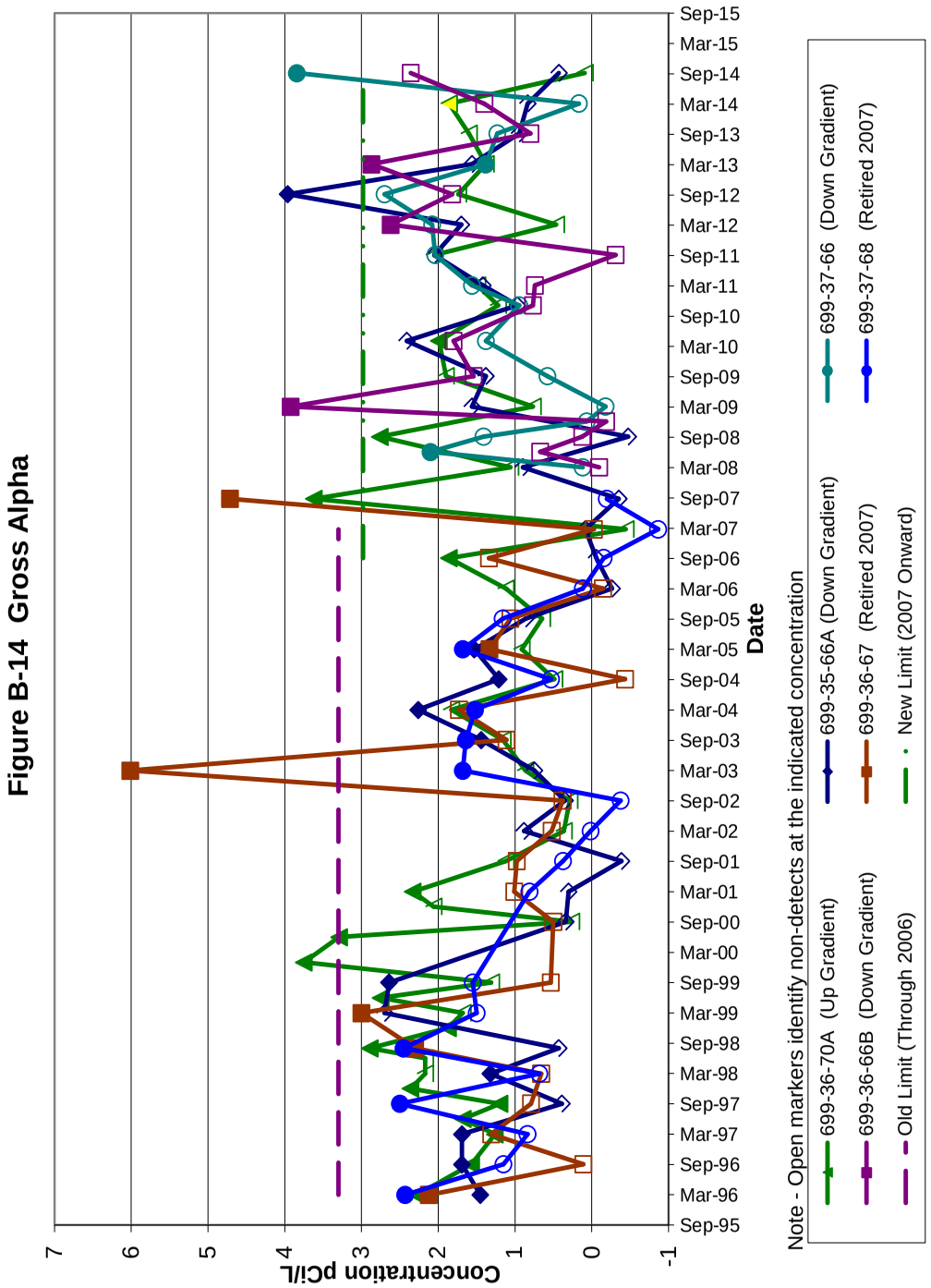


Figure B-14 Gross Alpha
Concentration pCi/L
7
6
5
4
3
2
1
0
-1
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Date
Note - Open markers identify non-detects at the indicated concentration
699-36-70A (Up Gradient)
699-35-66A (Down Gradient)
699-37-66 (Down Gradient)
699-36-66B (Down Gradient)
699-36-67 (Retired 2007)
699-37-68 (Retired 2007)
Old Limit (Through 2006)
New Limit (2007 Onward)

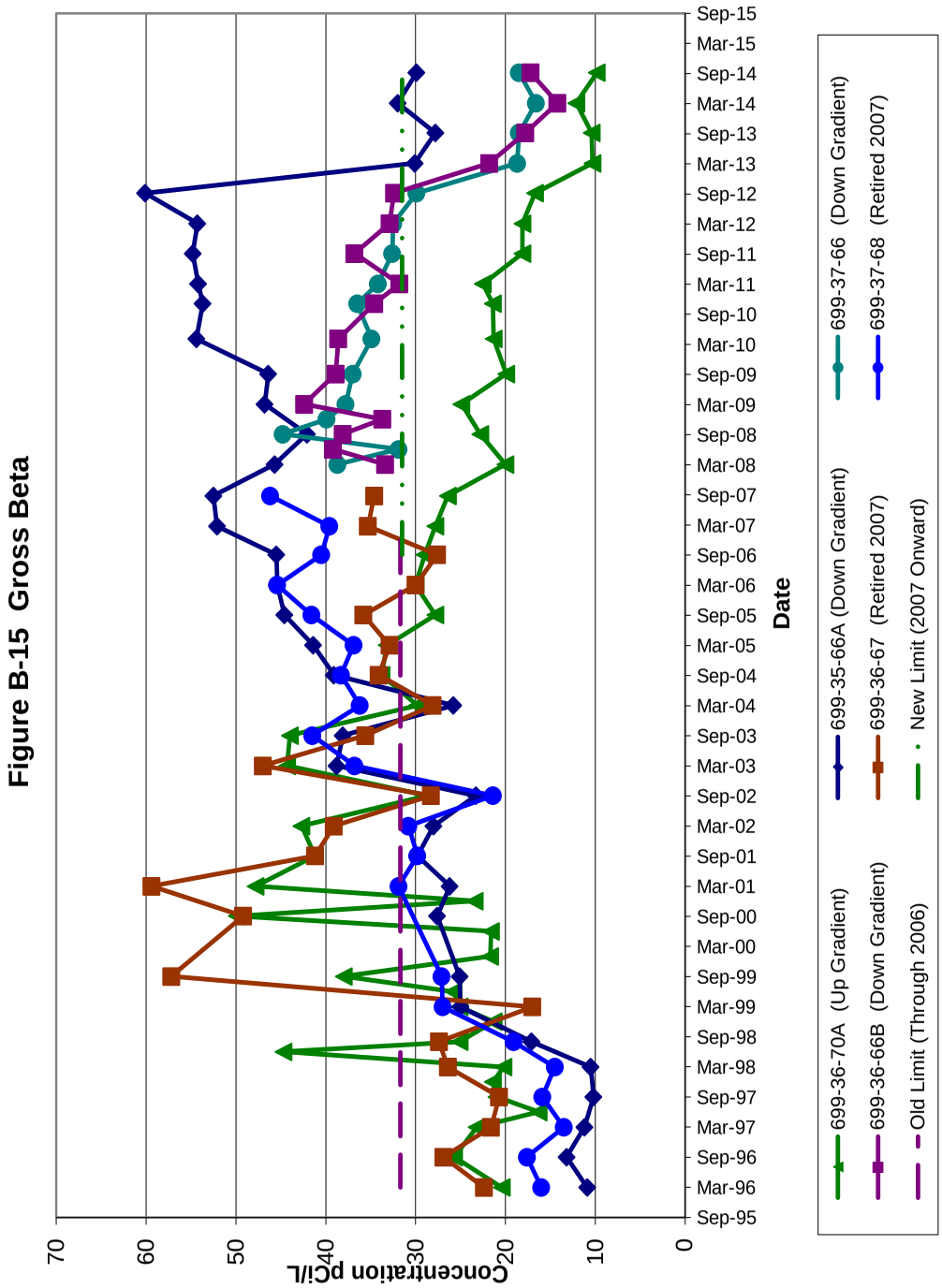


Figure B-15 Gross Beta
Concentration pCi/L
0
10
20
30
40
50
60
70
Date
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
699-36-70A (Up Gradient)
699-36-66B (Down Gradient)
Old Limit (Through 2006)
699-35-66A (Down Gradient)
699-36-67 (Retired 2007)
New Limit (2007 Onward)
699-37-66 (Down Gradient)
699-37-68 (Retired 2007)

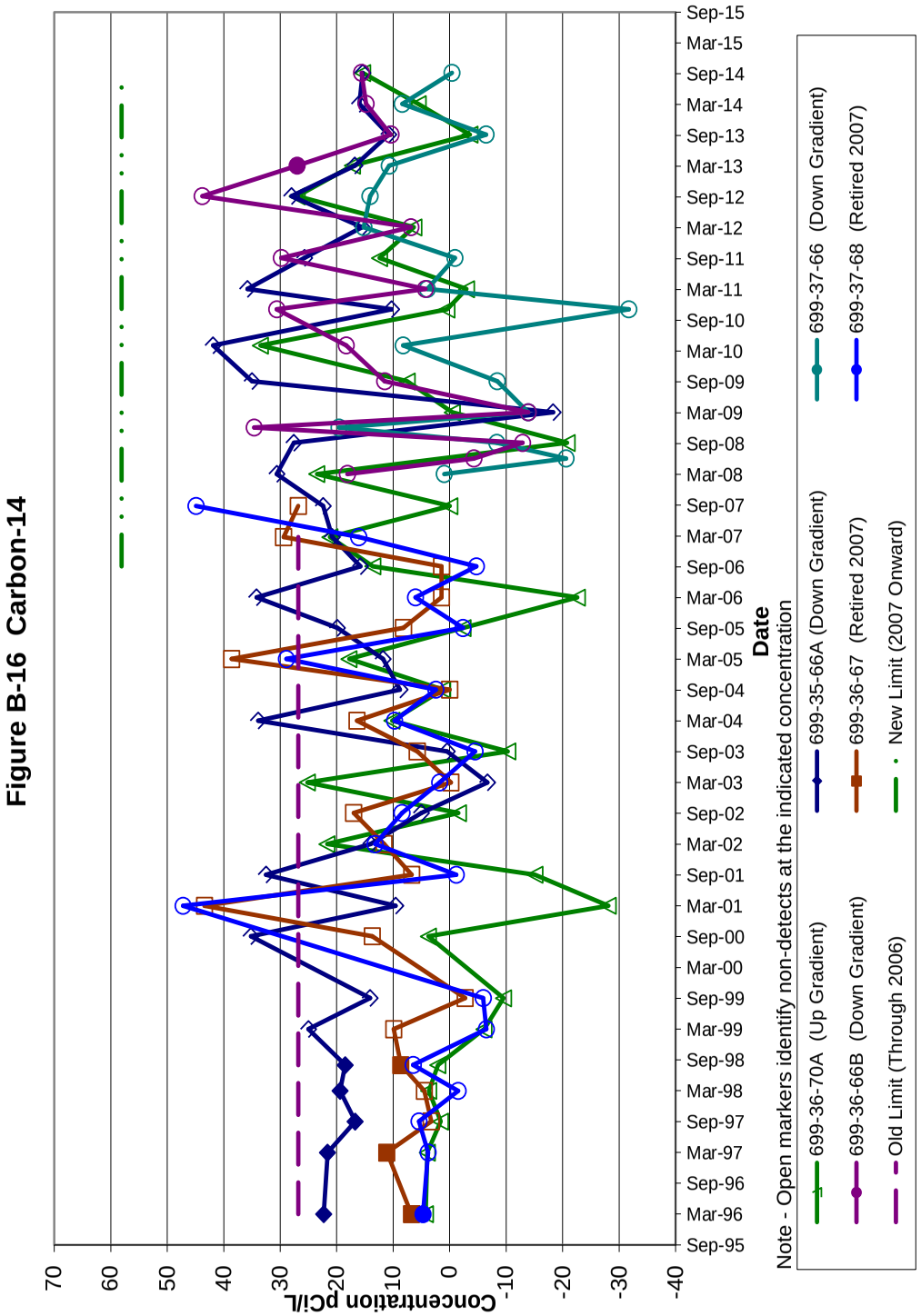


Figure B-16 Carbon-14
Concentration pCi/L
70
60
50
40
30
20
10
0
-10
-20
-30
-40
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Date
Note - Open markers identify non-detects at the indicated concentration
699-36-70A (Up Gradient)
699-35-66A (Down Gradient)
699-37-66 (Down Gradient)
699-36-66B (Down Gradient)
699-36-67 (Retired 2007)
699-37-68 (Retired 2007)
Old Limit (Through 2006)
New Limit (2007 Onward)

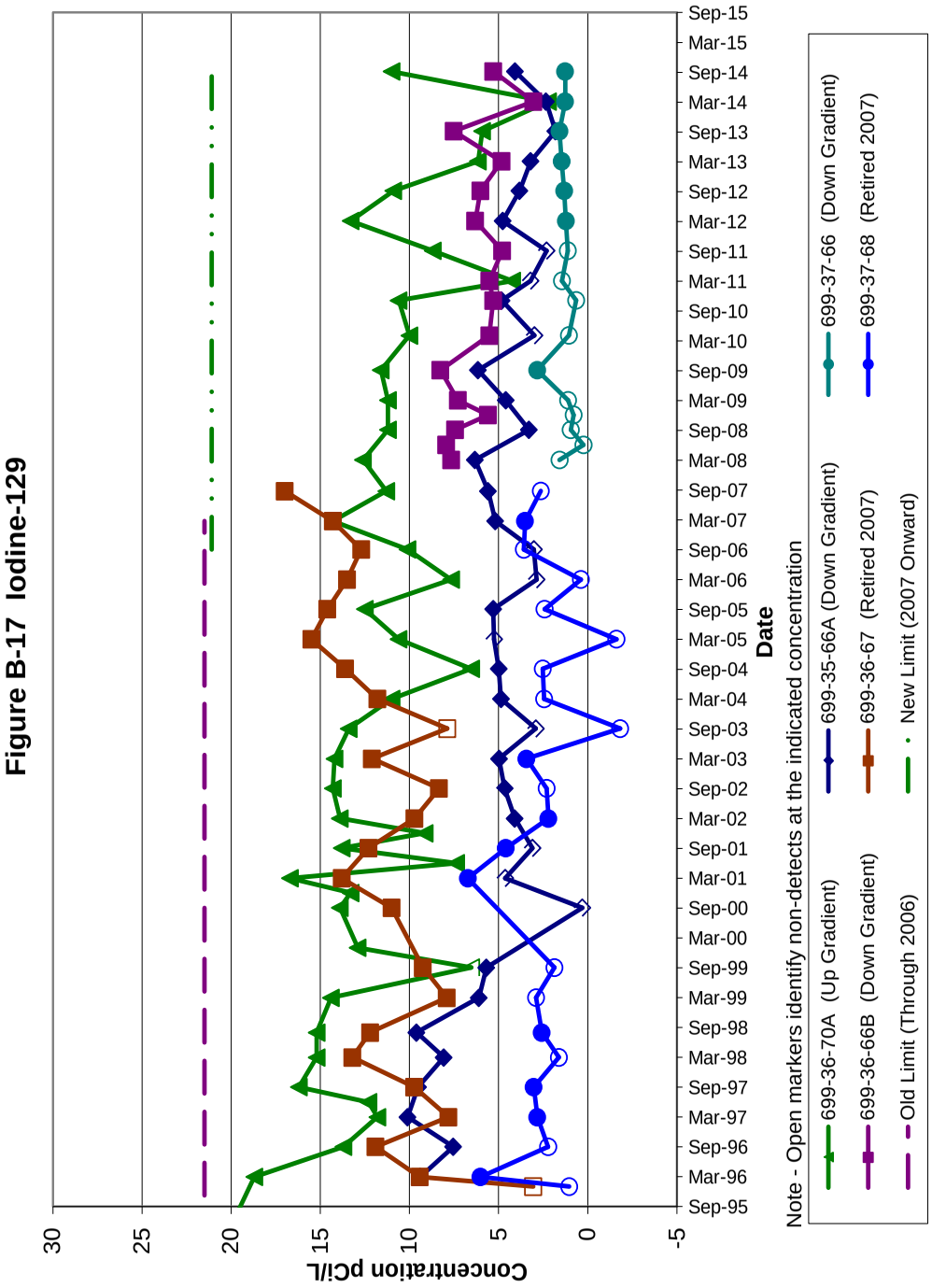


Figure B-17 Iodine-129
Concentration pCi/L
30
25
20
15
10
5
0
-5
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Date
Note - Open markers identify non-detects at the indicated concentration
699-36-70A (Up Gradient)
699-35-66A (Down Gradient)
699-37-66 (Down Gradient)
699-36-66B (Down Gradient)
699-36-67 (Retired 2007)
699-37-68 (Retired 2007)
Old Limit (Through 2006)
New Limit (2007 Onward)

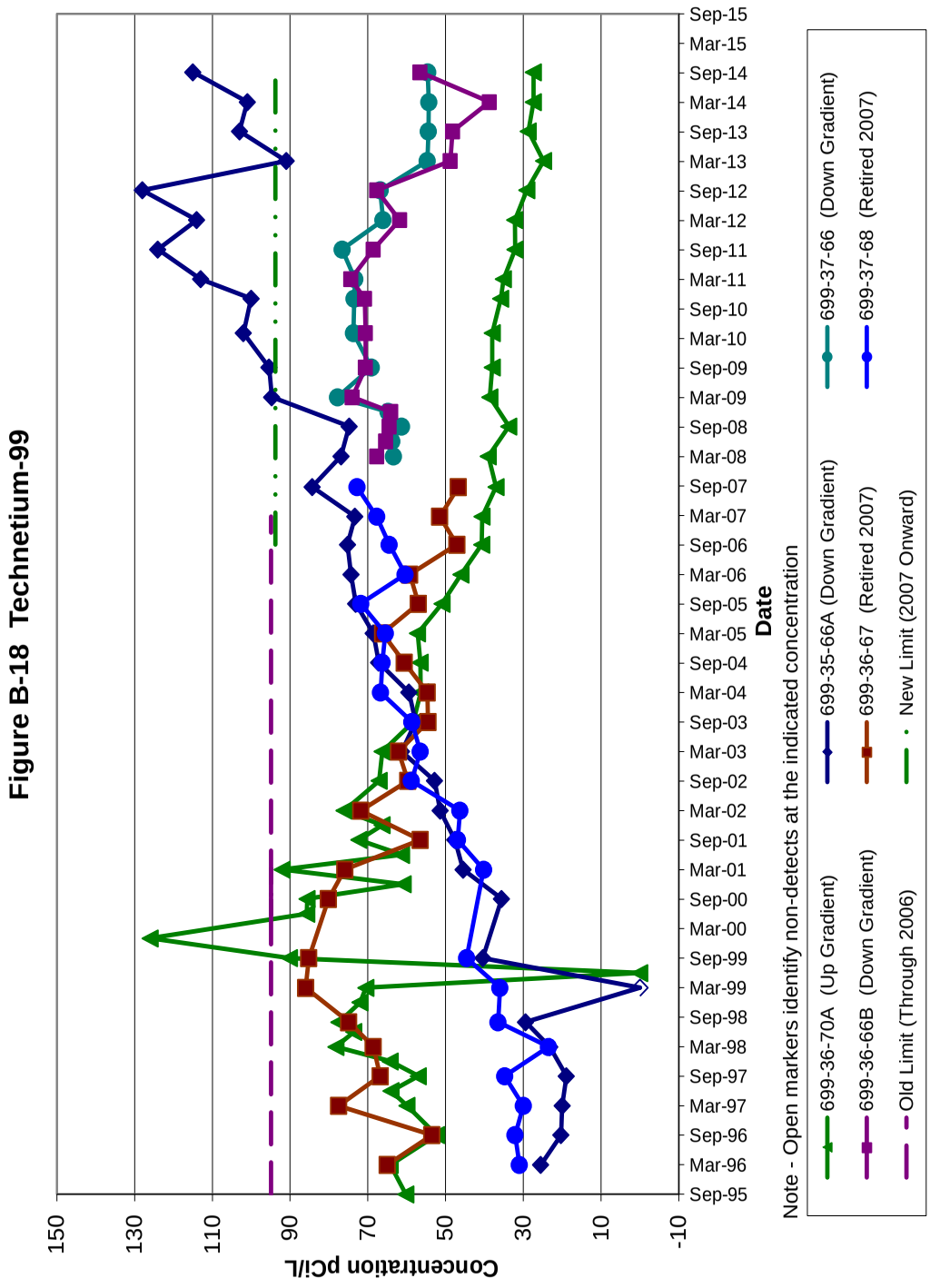


Figure B-18 Technetium-99
Concentration pCi/L
150
130
110
90
70
50
30
10
-10
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Date
Note - Open markers identify non-detects at the indicated concentration
699-36-70A (Up Gradient)
699-35-66A (Down Gradient)
699-37-66 (Down Gradient)
699-36-66B (Down Gradient)
699-36-67 (Retired 2007)
699-37-68 (Retired 2007)
Old Limit (Through 2006)
New Limit (2007 Onward)

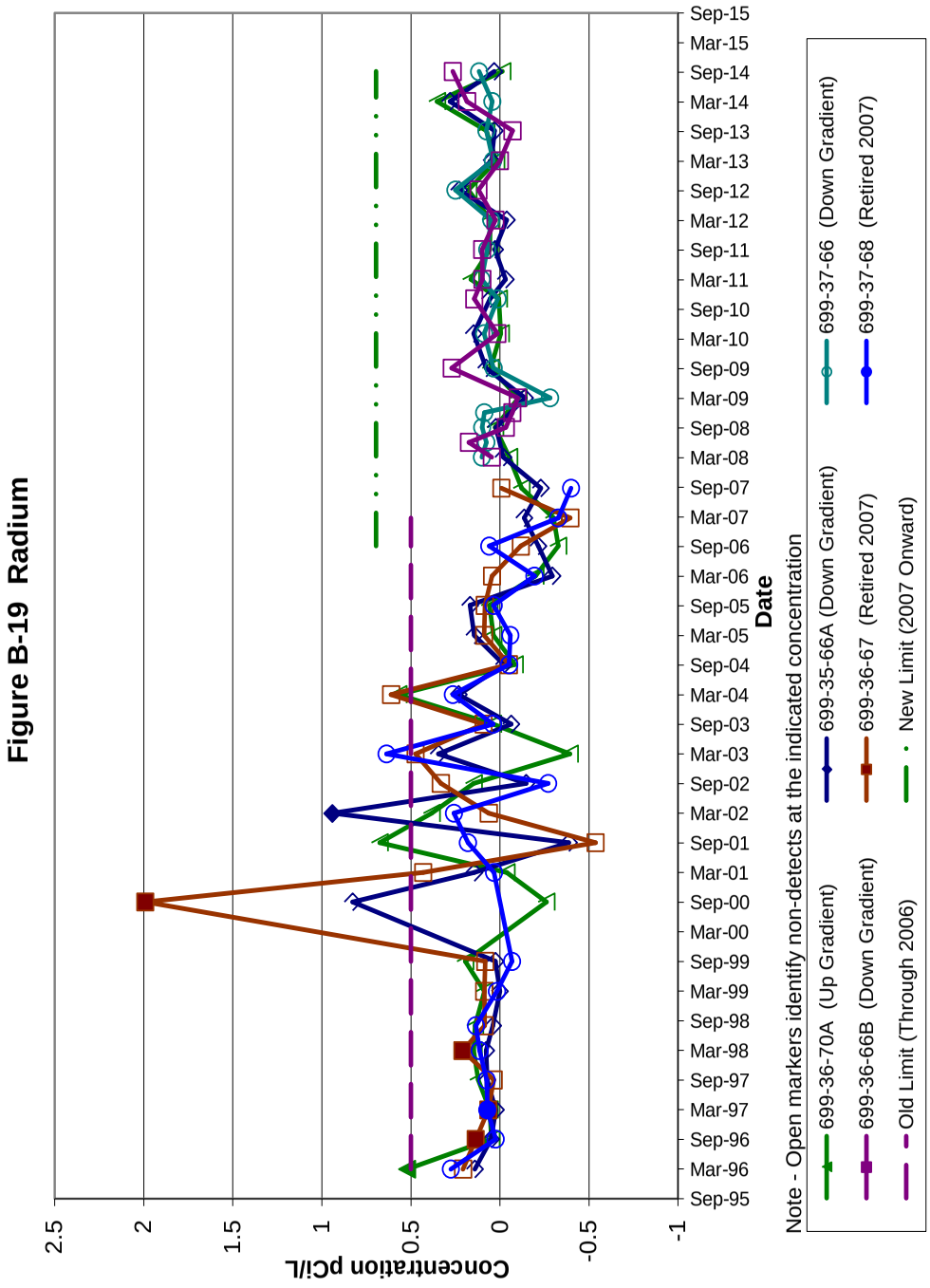


Figure B-19 Radium
Concentration pCi/L
2.5
2
1.5
1
0.5
0
-0.5
-1
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Date
Note - Open markers identify non-detects at the indicated concentration
699-36-70A (Up Gradient)
699-35-66A (Down Gradient)
699-37-66 (Down Gradient)
699-36-66B (Down Gradient)
699-36-67 (Retired 2007)
699-37-68 (Retired 2007)
Old Limit (Through 2006)
New Limit (2007 Onward)

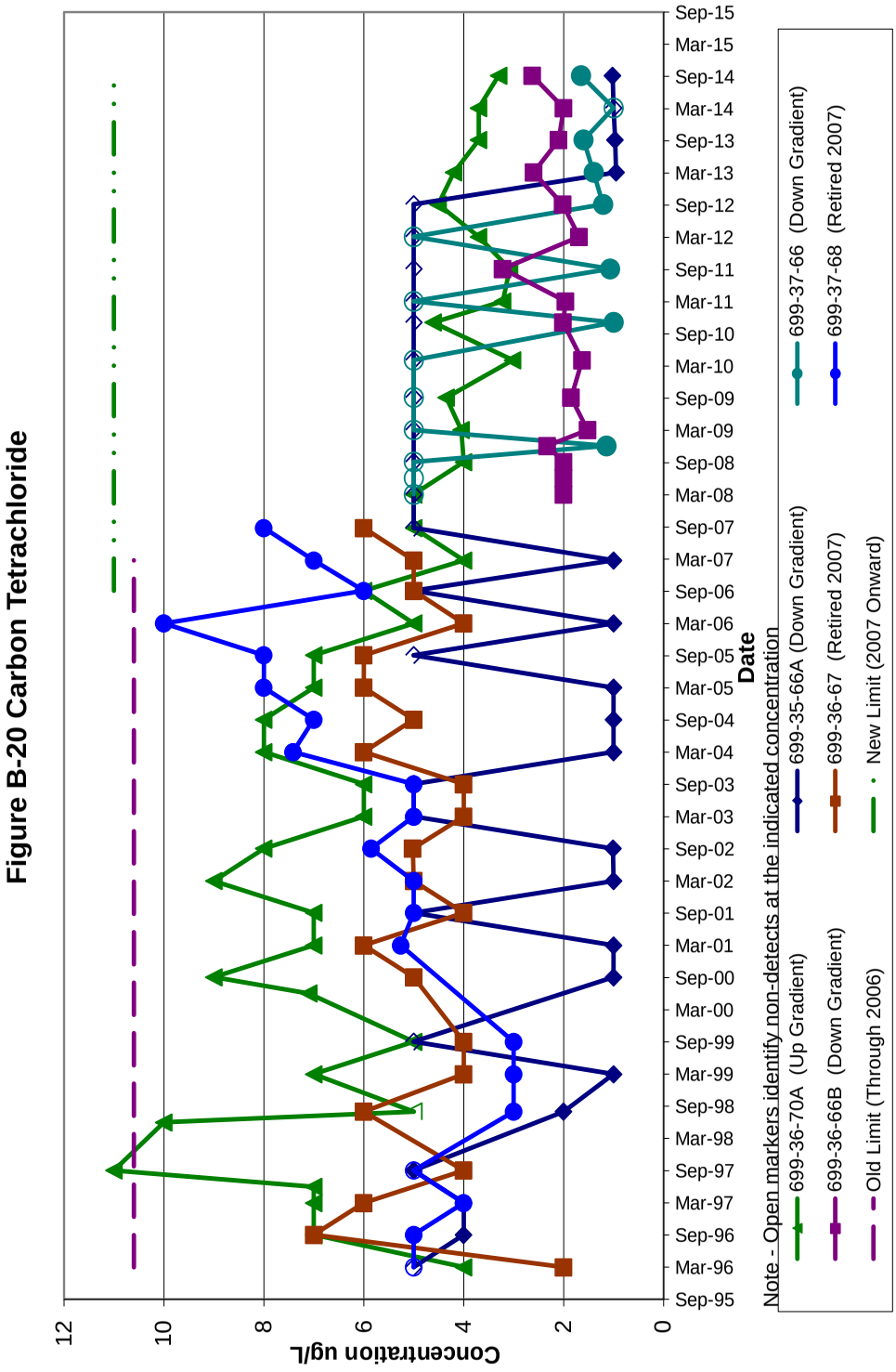


Figure B-20 Carbon Tetrachloride
Concentration ug/L
0
2
4
6
8
10
12
Date
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Note - Open markers identify non-detects at the indicated concentration
699-36-70A (Up Gradient)
699-35-66A (Down Gradient)
699-37-66 (Down Gradient)
699-36-66B (Down Gradient)
699-36-67 (Retired 2007)
699-37-68 (Retired 2007)
Old Limit (Through 2006)
New Limit (2007 Onward)

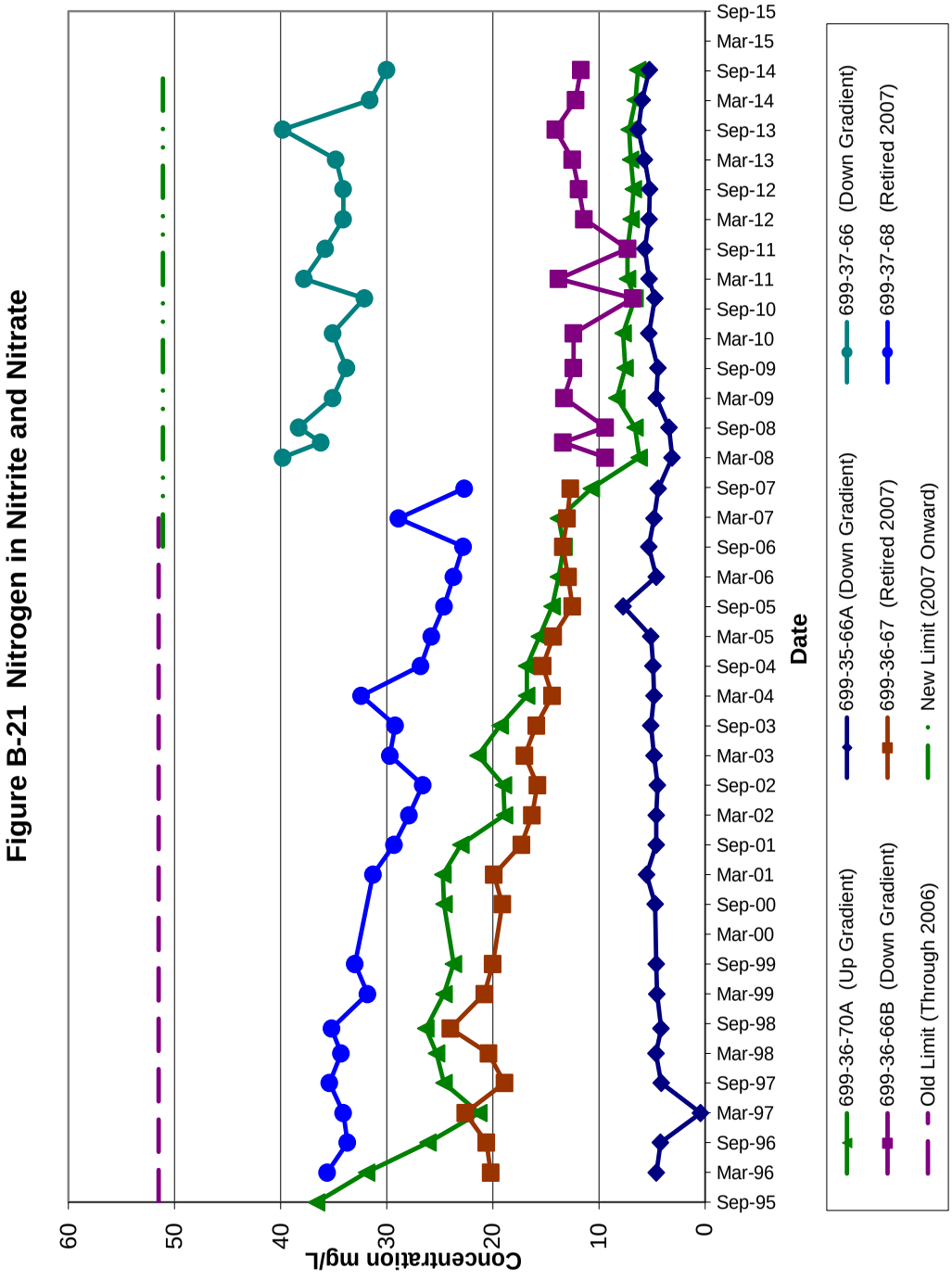


Figure B-21 Nitrogen in Nitrite and Nitrate
Concentration mg/L
0
10
20
30
40
50
60
Date
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
699-37-66 (Down Gradient)
699-35-66A (Down Gradient)
699-37-68 (Retired 2007)
699-36-70A (Up Gradient)
699-36-66B (Down Gradient)
699-36-67 (Retired 2007)
Old Limit (Through 2006)
New Limit (2007 Onward)

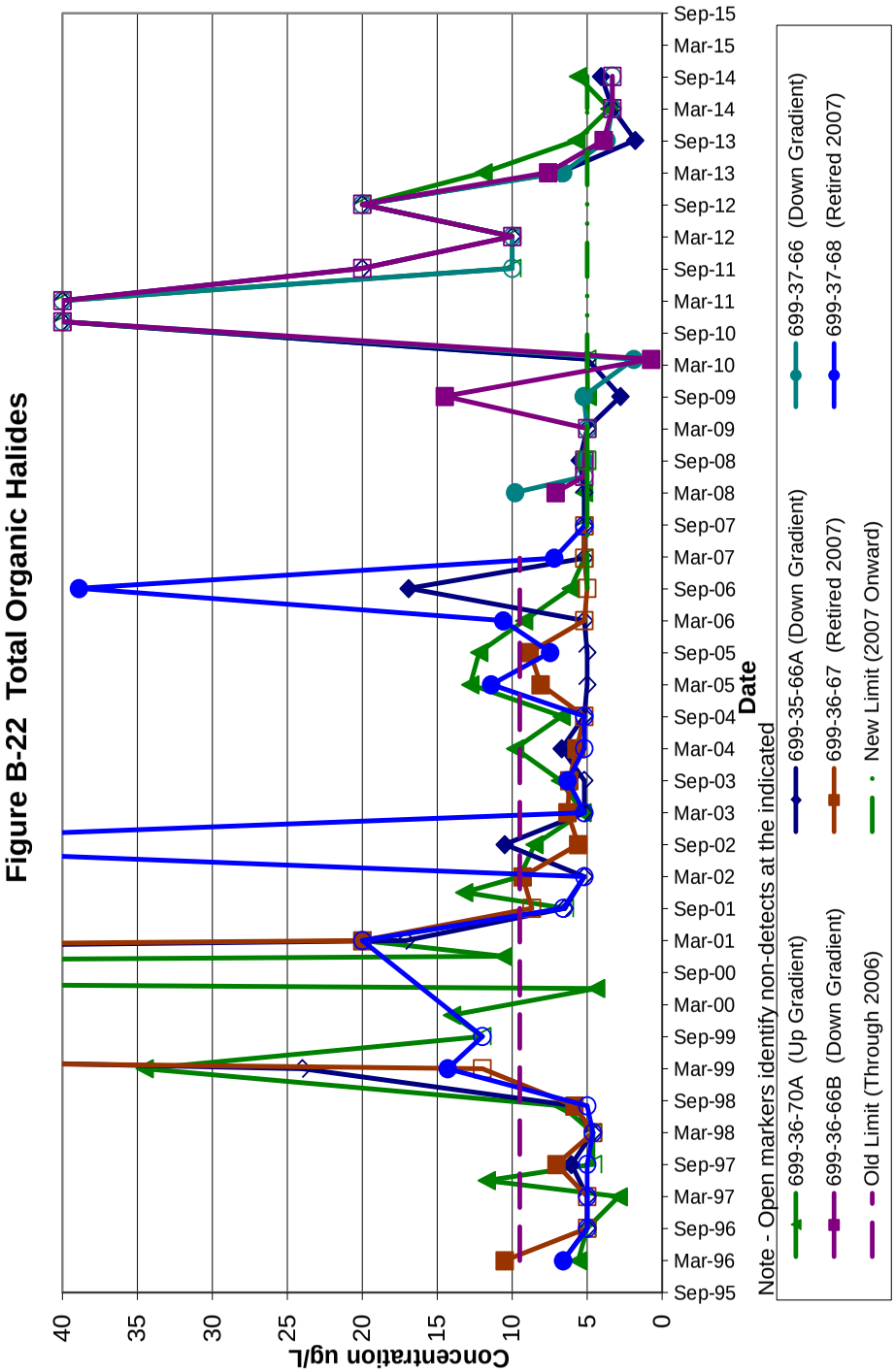


Figure B-22 Total Organic Halides
Concentration ug/L
0
5
10
15
20
25
30
35
40
Date
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
Note - Open markers identify non-detects at the indicated
699-36-70A (Up Gradient)
699-36-66B (Down Gradient)
Old Limit (Through 2006)
699-35-66A (Down Gradient)
699-36-67 (Retired 2007)
New Limit (2007 Onward)
699-37-66 (Down Gradient)
699-37-68 (Retired 2007)

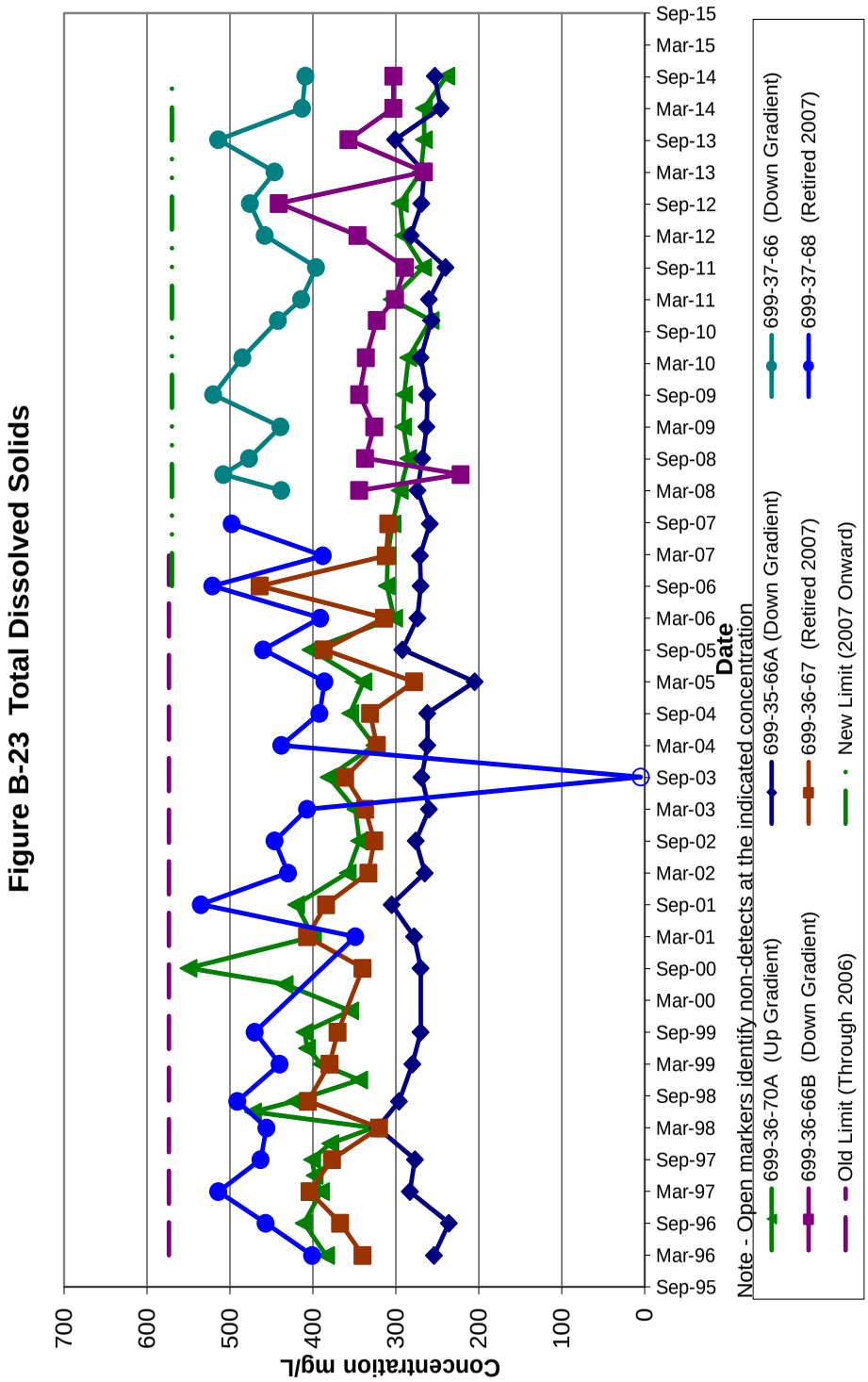


Figure B-23 Total Dissolved Solids
Concentration mg/L
0
100
200
300
400
500
600
700
Date
Sep-95
Mar-96
Sep-96
Mar-97
Sep-97
Mar-98
Sep-98
Mar-99
Sep-99
Mar-00
Sep-00
Mar-01
Sep-01
Mar-02
Sep-02
Mar-03
Sep-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Mar-09
Sep-09
Mar-10
Sep-10
Mar-11
Sep-11
Mar-12
Sep-12
Mar-13
Sep-13
Mar-14
Sep-14
Mar-15
Sep-15
Note - Open markers identify non-detects at the indicated concentration
699-35-66A (Down Gradient)
699-36-67 (Retired 2007)
New Limit (2007 Onward)
699-37-66 (Down Gradient)
699-37-68 (Retired 2007)
699-36-70A (Up Gradient)
699-36-66B (Down Gradient)
Old Limit (Through 2006)

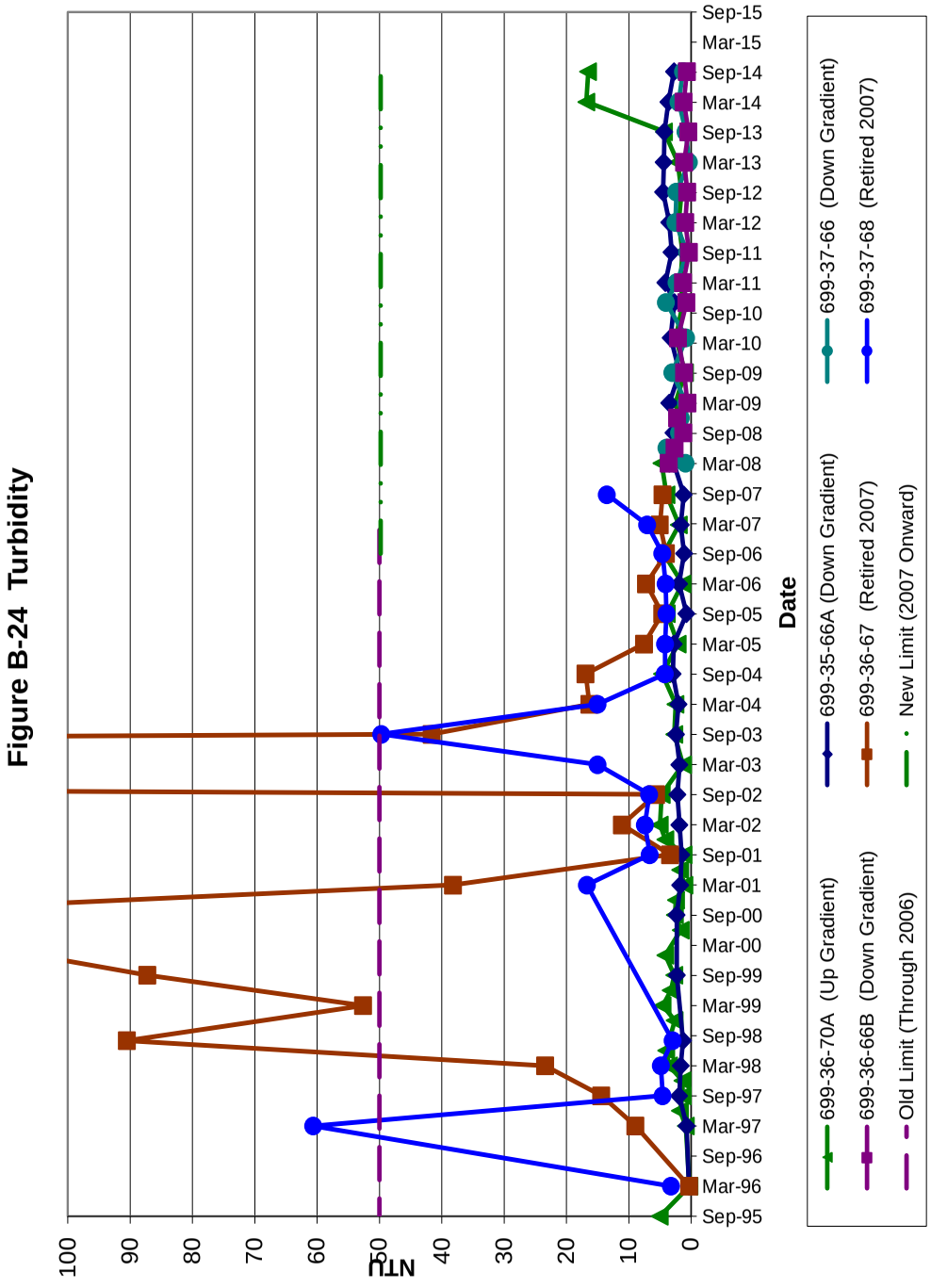


Figure B-24 Turbidity
NTU
Date
100
90
80
70
60
50
40
30
20
10
0
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
699-36-70A (Up Gradient)
699-35-66A (Down Gradient)
699-37-66 (Down Gradient)
699-36-66B (Down Gradient)
699-36-67 (Retired 2007)
699-37-68 (Retired 2007)
Old Limit (Through 2006)
New Limit (2007 Onward)

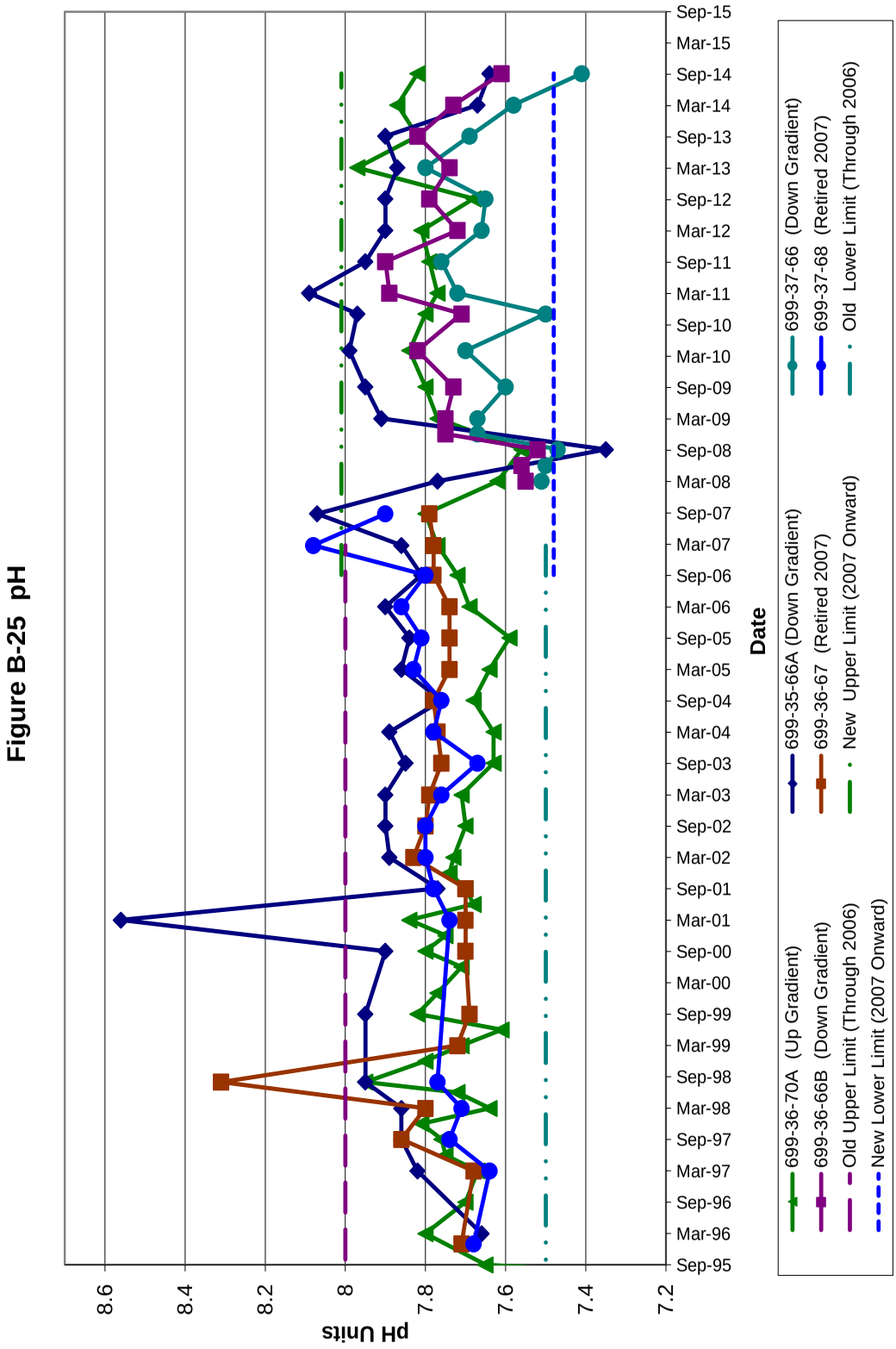


Figure B-25 pH
pH Units
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
Date
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
699-36-70A (Up Gradient)
699-36-66B (Down Gradient)
Old Upper Limit (Through 2006)
New Lower Limit (2007 Onward)
699-35-66A (Down Gradient)
699-36-67 (Retired 2007)
New Upper Limit (2007 Onward)
699-37-66 (Down Gradient)
699-37-68 (Retired 2007)
Old Lower Limit (Through 2006)

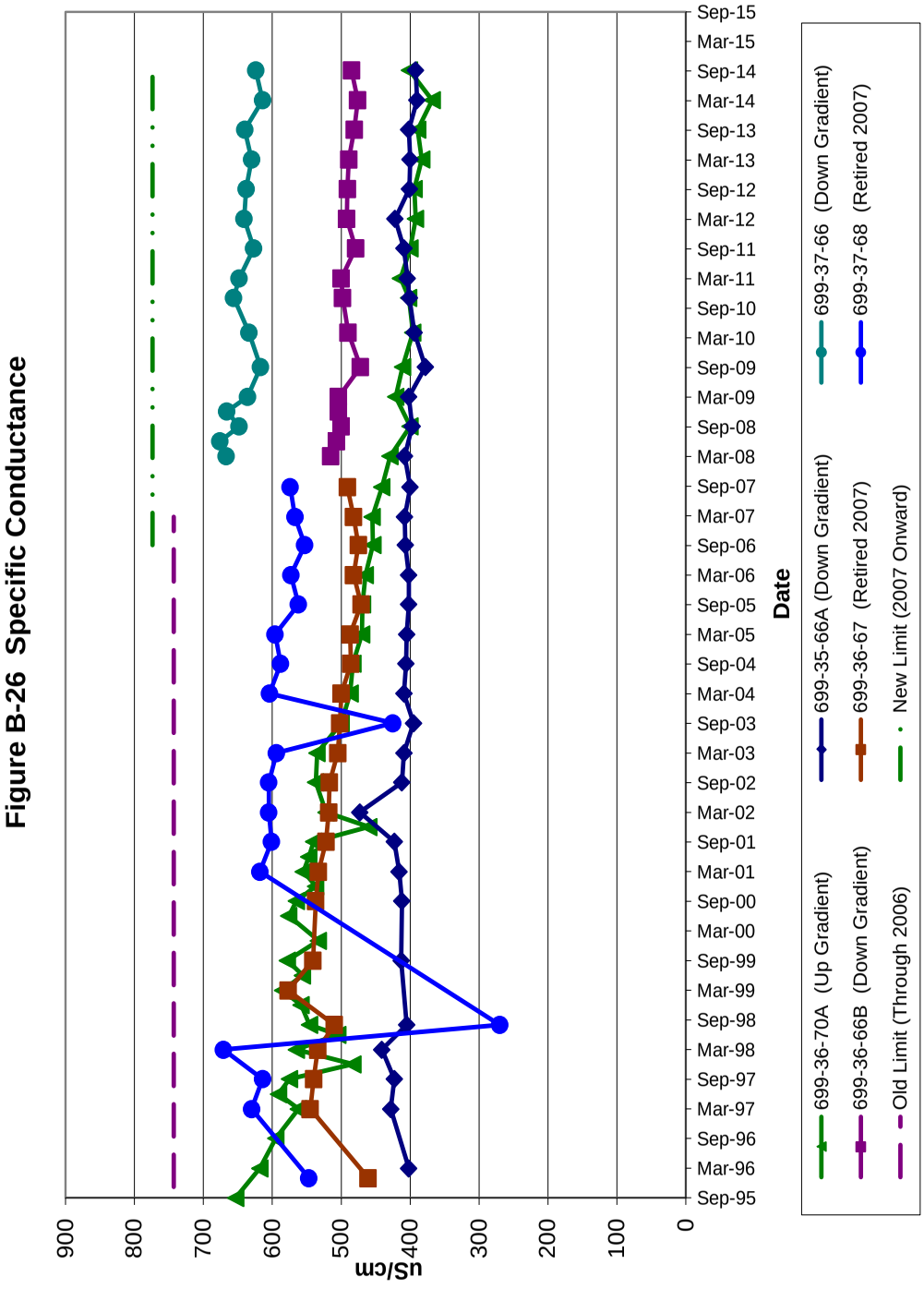


Figure B-26 Specific Conductance
uS/cm
900
800
700
600
500
400
300
200
100
0
Date
Sep-15
Mar-15
Sep-14
Mar-14
Sep-13
Mar-13
Sep-12
Mar-12
Sep-11
Mar-11
Sep-10
Mar-10
Sep-09
Mar-09
Sep-08
Mar-08
Sep-07
Mar-07
Sep-06
Mar-06
Sep-05
Mar-05
Sep-04
Mar-04
Sep-03
Mar-03
Sep-02
Mar-02
Sep-01
Mar-01
Sep-00
Mar-00
Sep-99
Mar-99
Sep-98
Mar-98
Sep-97
Mar-97
Sep-96
Mar-96
Sep-95
699-36-70A (Up Gradient)
699-36-66B (Down Gradient)
Old Limit (Through 2006)
699-35-66A (Down Gradient)
699-36-67 (Retired 2007)
New Limit (2007 Onward)
699-37-66 (Down Gradient)
699-37-68 (Retired 2007)

APPENDIX C

LEACHATE SAMPLING RESULTS SUMMARY, 2012-2014

Table C-1. Leachate Sample Data. (2 Pages)

Constituent	Mar-12	Mar-12	Sep-12	Sep-12	Mar-13	Mar-13	Feb-14	Feb-14	Mar-14	Mar-14	Nov-14	Nov-14	Units
Aluminum	NR	NR	17.8 U	21.5 U	NR	NR	NR	NR	NR	NR	18 U	18 U	µg/L
Antimony	NR	NR	6 U	6 U	NR	NR	NR	NR	NR	NR	3.1 U	3.1 U	µg/L
Arsenic[a]	5.55	6.64	4.02	5.67	6 B	6.4 B	6.6	6.6	4.4 U	5.2	7.4 B	9.4 B	µg/L
Barium[a]	99	104	72.8	72.5	97	96	90	90	90	91	81	82	µg/L
Beryllium[a]	1 U	1 U	2 U	2 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	µg/L
Calcium	265000	274000	180000	184000	267000	261000	292000	286000	284000	283000	284000	287000	µg/L
Chromium[a]	19.9	20.5	21.5	21.5	53	50	54	53	63	63	58	59	µg/L
Hexavalent Chromium	20	18	NR	NR	NR	NR	NR	NR	NR	NR	57.6	57.3	µg/L
Copper	NR	NR	145	145	NR	NR	NR	NR	NR	NR	6.8 B	7.2 B	µg/L
Iron	NR	NR	15.5 B	13 B	NR	NR	NR	NR	NR	NR	22 U	22 U	µg/L
Lead[a]	10	10	5	5	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	µg/L
Magnesium	NR	NR	53000	54500	NR	NR	NR	NR	NR	NR	77100	78500	µg/L
Nickel	NR	NR	6.34 B	6.29 B	NR	NR	NR	NR	NR	NR	14 B	15 B	µg/L
Potassium[a]	19000	19800	14000	14000	20600	20500	20000	19900	19300	19400	19800	20100	µg/L
Selenium[a]	10	10	3.28	3.44	4.9 U	4.9 U	14	9.7 B	7.6 B	5.4 B	4.9 B	4.9 B	µg/L
Silcon[a]	20900	21800	16200	16600	19600	19800	21000	20500	21300	21500	21800	22100	µg/L
Sodium[a]	209000	213000	154000	153000	212000	212000	235000	233000	233000	234000	225000	229000	µg/L
Tin[a]	5	5	100	100	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	µg/L
Thallium[a]	5 U	5 U	5 U	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	µg/L
Vanadium[a]	27.1	27.9	33.2	33.2	19	19	18	18	19	18	18	17	µg/L
Zinc[a]	20	20	10	13.3	4.5 U	4.5 U	5.3 BC	6 BC	7.1 BC	7.1 BC	4.7 B	4.9 B	µg/L
Carbon tetra-chloride[a]	5 U	5 U	5 U	5 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	µg/L
Trichloro-ethene[a]	5 U	5 U	5 U	5 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	µg/L
Methyl alcohol	NR	NR	5 U	5 U	NR	NR	NR	NR	NR	NR	150 U	150 U	µg/L
Trichloro-fluoromethane	NR	NR	5 U	5 U	NR	NR	NR	NR	NR	NR	0.29 U	0.29 U	µg/L
pH[a]	7.61	7.68	8.09	8.09	7.39	7.77	7.58	7.63	7.74	7.68	8.06	8.03	Ph
Specific conductance[a]	3270 D	3240 D	1970	1960	2600	2670	2670	2700	2490	2370	2180	2080	µS/cm
Bromide[a]	1820	1900	1320	1350	2300 BD	2300 BD	3400	3500 N	1900 MN	1900	2400 D	2100 D	µg/L
Chloride[a]	273000 D	273000 D	168000	170000	261000 D	258000 D	309000 D	310000 D	261000 ND	257000 D	317000 D	315000 D	µg/L
Fluoride[a]	240B	240B	250 B	270 B	270 B	290 B	330 B	330 G	360 BN	240 B	300 B	300 B	µg/L
Nitrate[a]	281000 D	283000 D	172000	171000	244100 D	242800 D	293300 D	290600 D	268458D	264471 D	298139 D	308771 D	µg/L
Nitrite[a]	5000 UD	5000U D	1000 U	1000 U	160 U	160 U	160 U	160 U	160 UN	160 U	161.21 U	161.21 U	µg/L

Table C-1. Leachate Sample Data. (2 Pages)

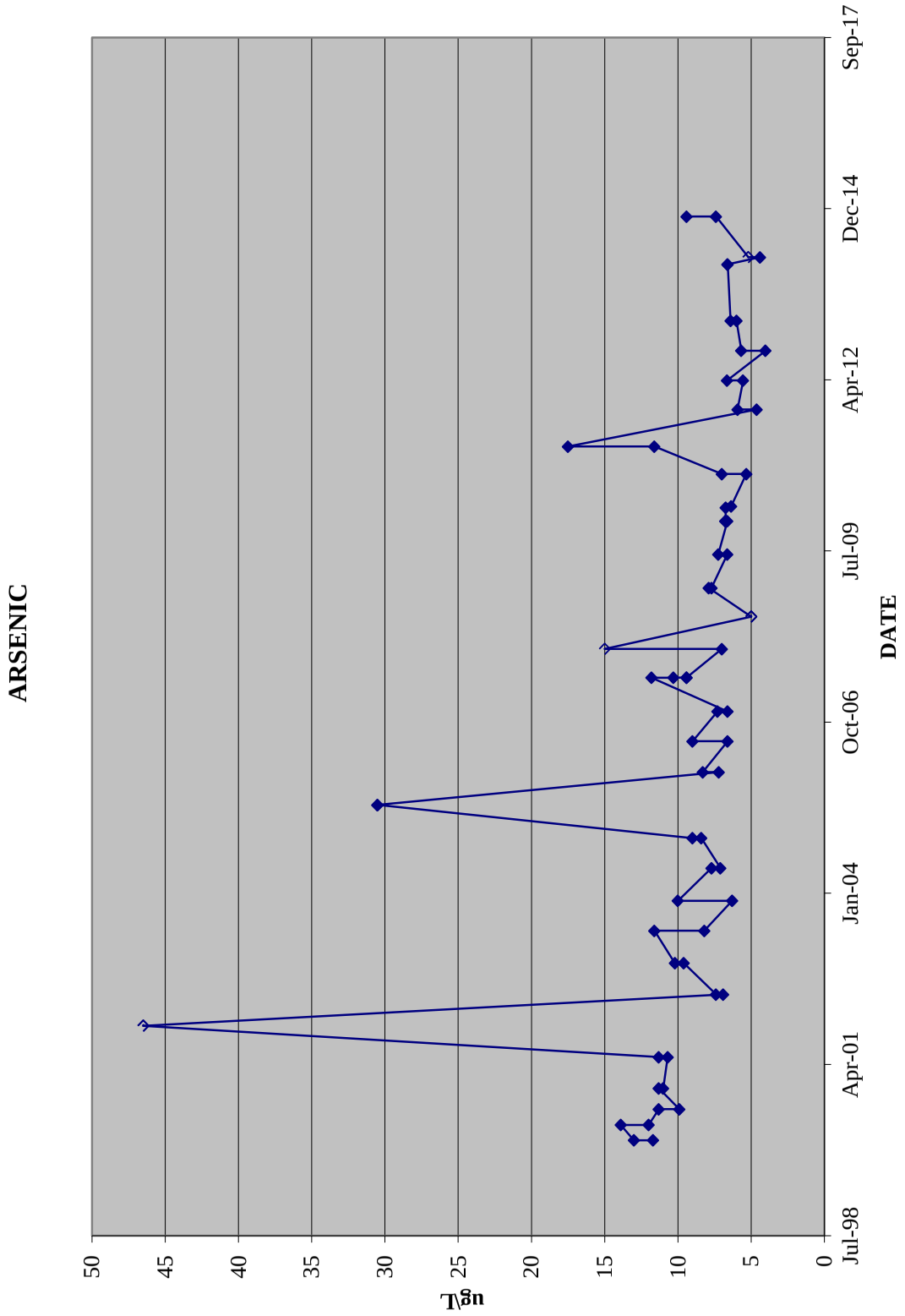
Constituent	Mar-12	Mar-12	Sep-12	Sep-12	Mar-13	Mar-13	Feb-14	Feb-14	Mar-14	Mar-14	Nov-14	Nov-14	Units
Sulfate[a]	538000 D	542000 D	379000	383000	599000 D	582000 D	582000 D	576000 D	539000 ND	577000 D	615000 D	612000 D	µg/L
Total organic carbon	NR	NR	6350	6380	NR	NR	NR	NR	NR	NR	8300	8200	µg/L
Total organic halides[a]	33.9 B	28 B	20 U	20 U	52	59	69	79	50	48 N	60 ND	54	µg/L
Oil and grease	NR	NR	2000 U	5700 B	NR	NR	NR	NR	NR	NR	1800 BC	1600 U	µg/L
Total dissolved solids[a]	1760000	2080000	1350000	1370000	1820000	1830000	1970000	1970000	1920000	1930000	1970000	1970000	µg/L
Total suspended solids[a]	5000	5000	5000	5000	1100 U	2000 B	1100 U	2800 U	2000 B	1200 B	2800 BM	2800 B	µg/L
Alkalinity[a]	380000	378000	234000	234000	303000	308000	307000	309000	305000	310000	236000	241000	µg/L
Gross alpha[a]	536	558	502	466	528	603	350	380	476	578	666	689	pCi/L
Gross beta[a]	474	498	340	355	468	477	396	390	398	407	417	386	pCi/L
Carbon-14[a]	43.1 U	19.5 U	48.2 U	54.4 U	280	181	218	210	87.5	100	256	250	pCi/L
Technetium-99[a]	409	413	259	253	255	248	309	300	378	403	324	315	pCi/L
Uranium (total) [a]	1320	1350	744	714	889	982	1350	1370	1140	1110	1210	1270	µg/L
Iodine-129[a]	-0.811 U	-1.62 U	-0.45 U	0.16 U	-0.179 U	0.861 U	0.984 U	0.219 U	-0.163 U	0.455 U	-0.385 U	0.746 U	pCi/L
Total radium alpha emissions[a]	0.021 U	0.022 U	0.046 U	0.049 U	0.0512 U	0.0058 U	0.644 U	0.402 U	-0.259 U	0.263 U	0.152 U	0.589 U	pCi/L
Tritium[a]	70800	69800	53400	53600	73400	73800	95400	96900	85100	85000	93200	93800	pCi/L

[a] Routine short list analyses performed on 6-month cycle. Routine analysis includes gamma energy analysis, no detected analytes reported to date.

B = Results detected at a value less than the required PQL, but greater than or equal to the detection limit
C = Detected in both the sample and the analytical batch preparation blank, and sample concentration was </= 5x the blank concentration
D = Reported from dilution
M = Analytical batch preparation duplicate precision criteria not met.
N = Spike sample recovery is outside control limits
NR = Not reported in that analytical round.
U = Result is nondetected

APPENDIX D

LEACHATE SAMPLING TRENDS, 1998-2014


ARSENIC
ug/L
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40
35
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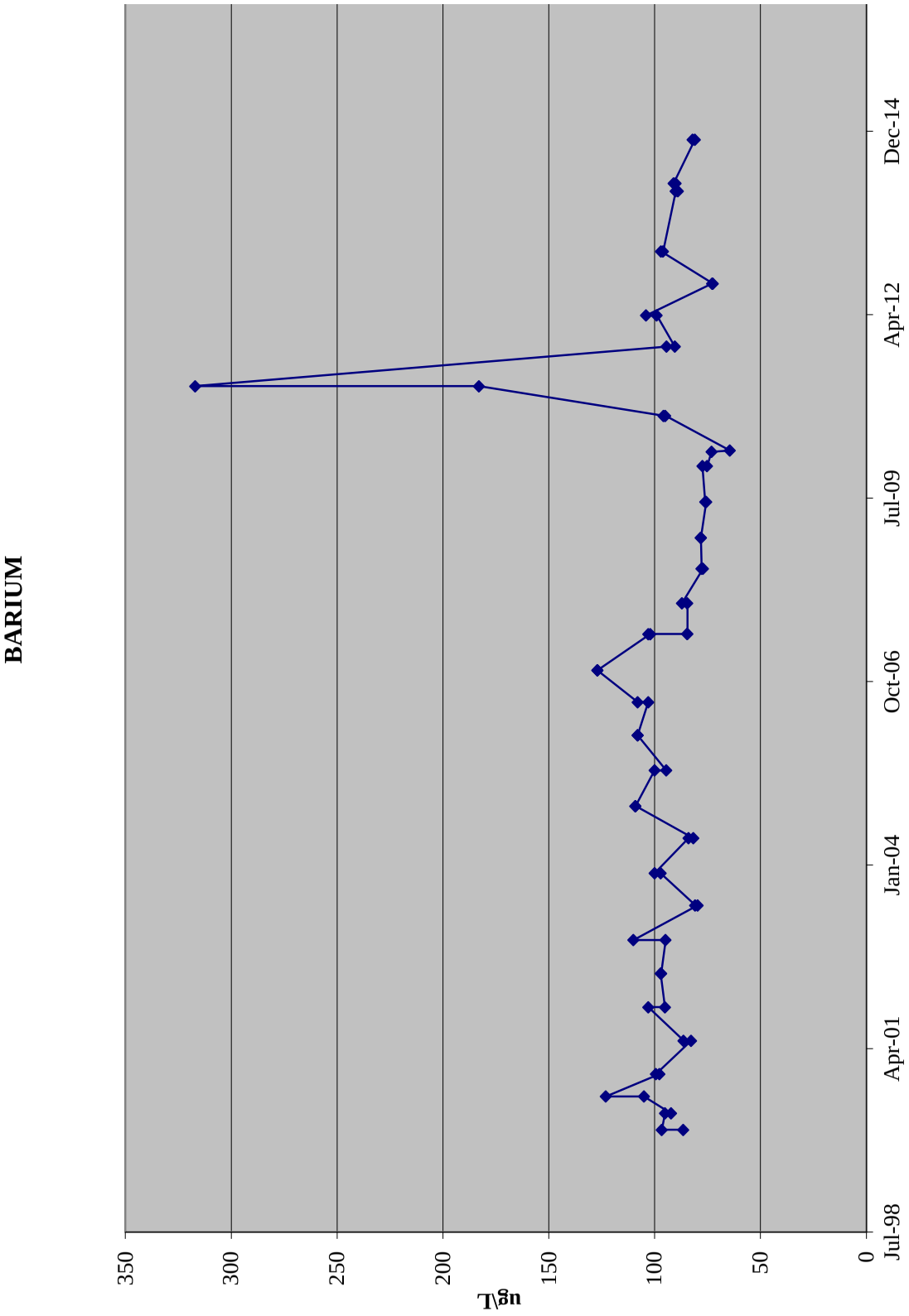
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
DATE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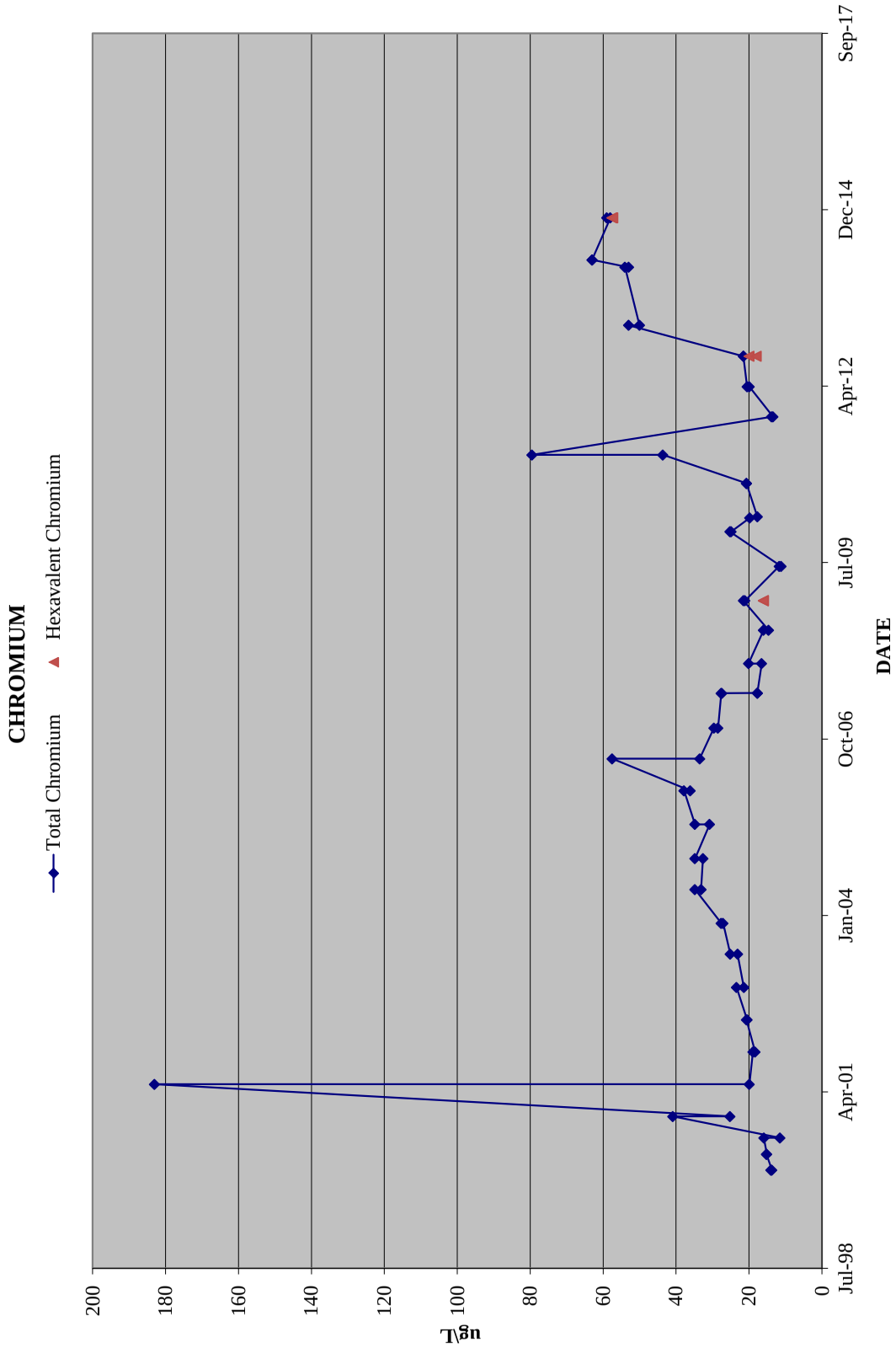
Apr-12
Dec-14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Total Chromium
Hexavalent Chromium
ug/L
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120
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Jul-09
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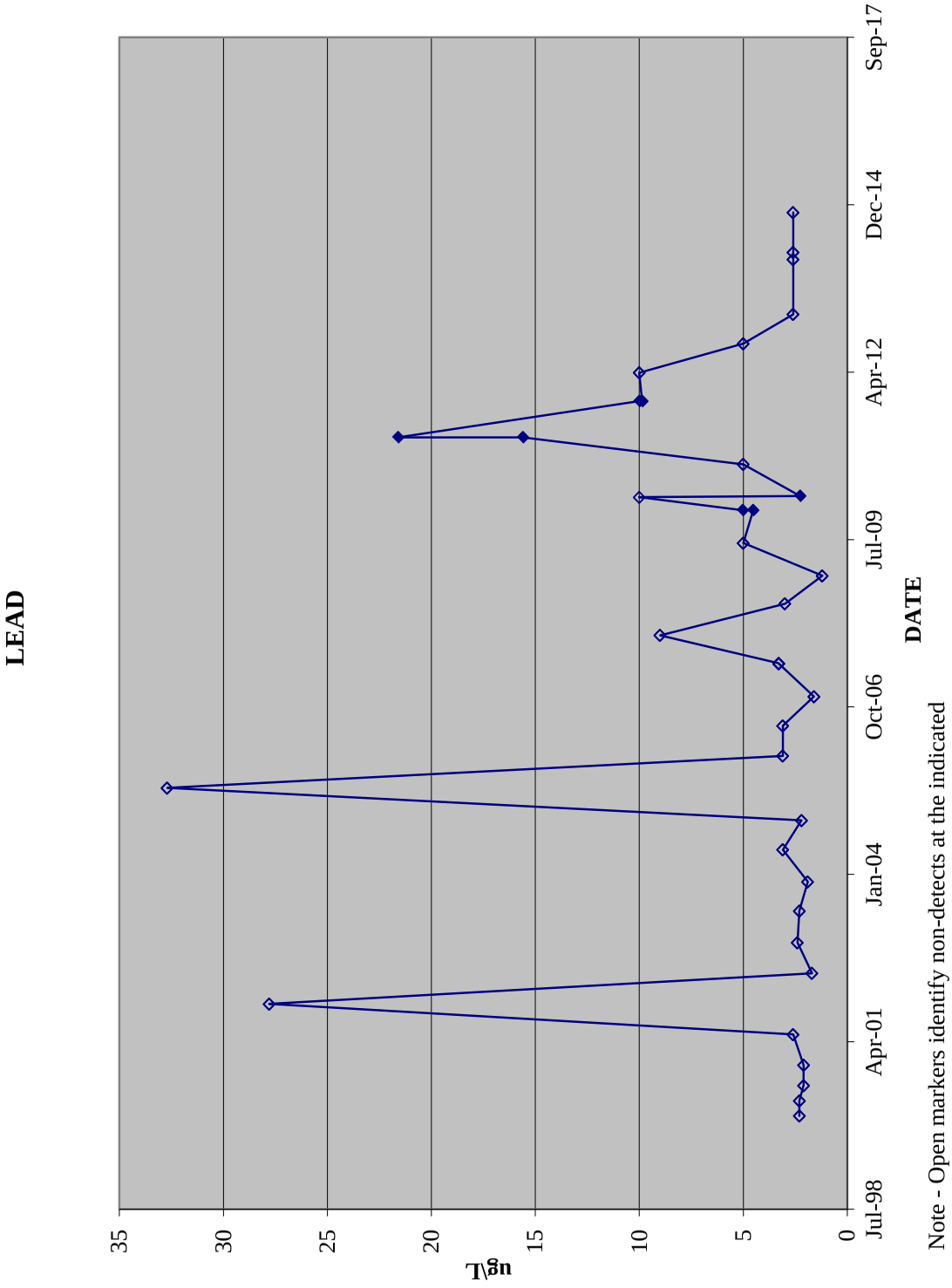
DATE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30
25
20
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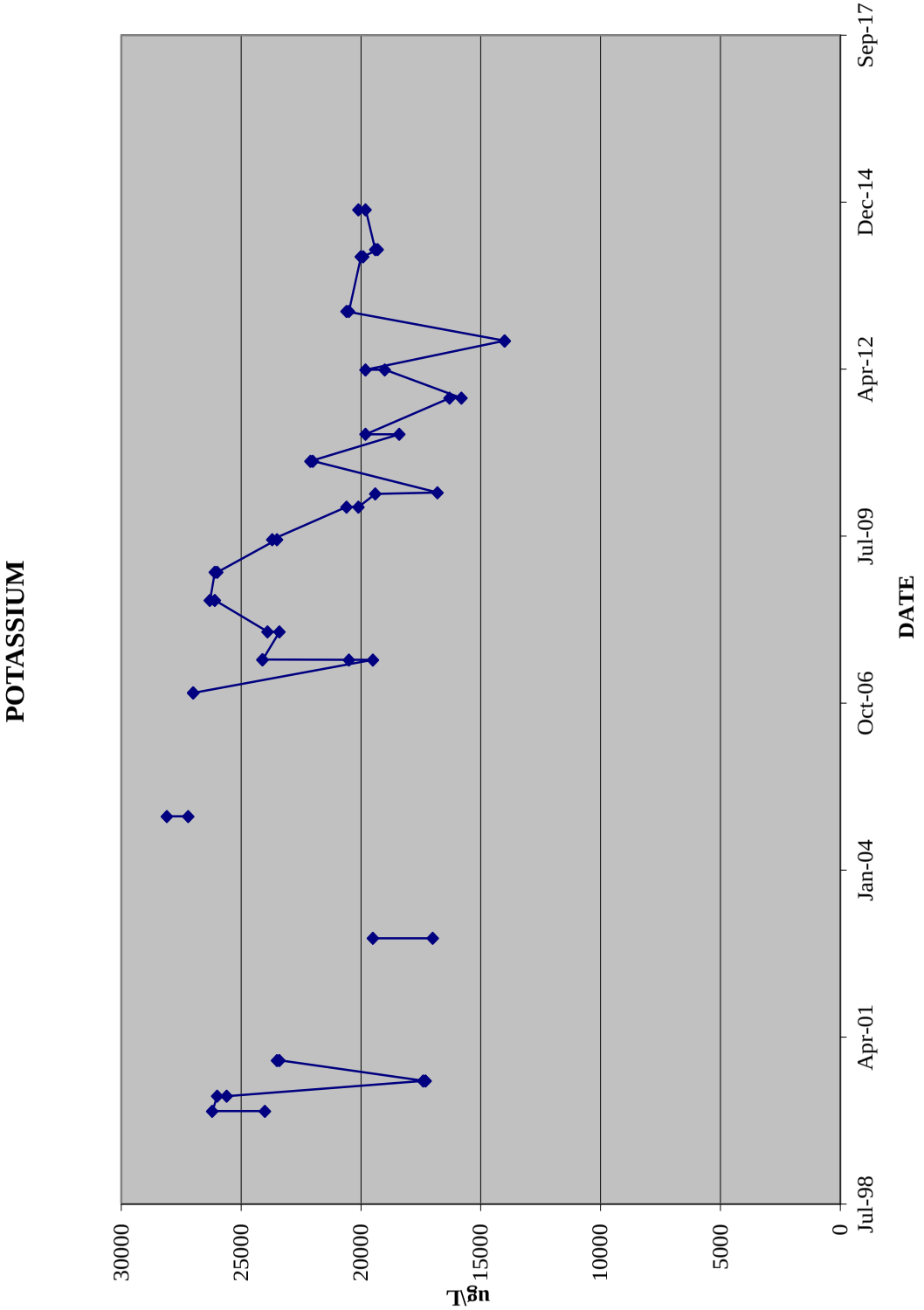
Apr-12
Dec-14
Sep-17
DATE
Note - Open markers identify non-detects at the indicated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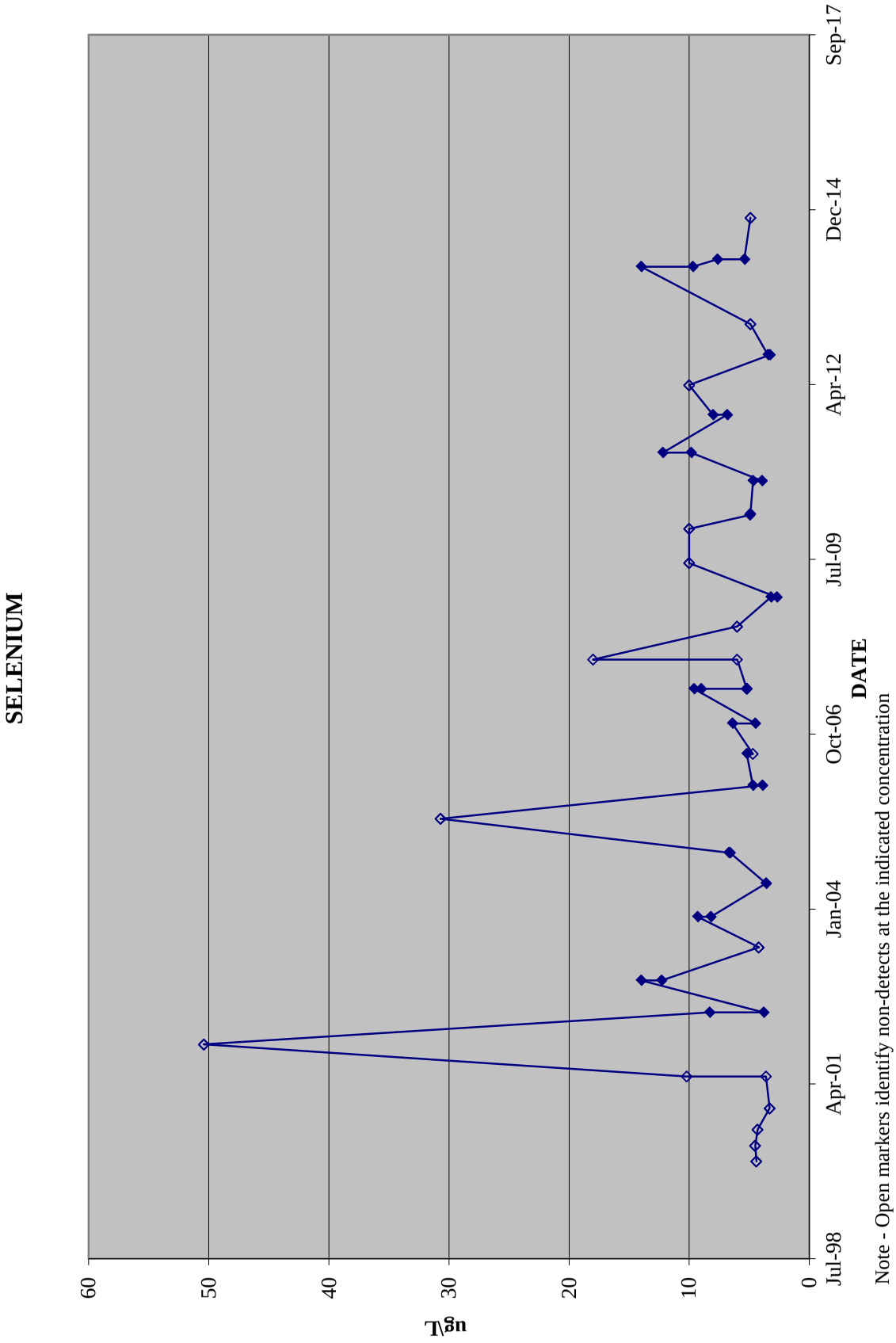
Sep-17
DATE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ug/L
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50
40
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20
10
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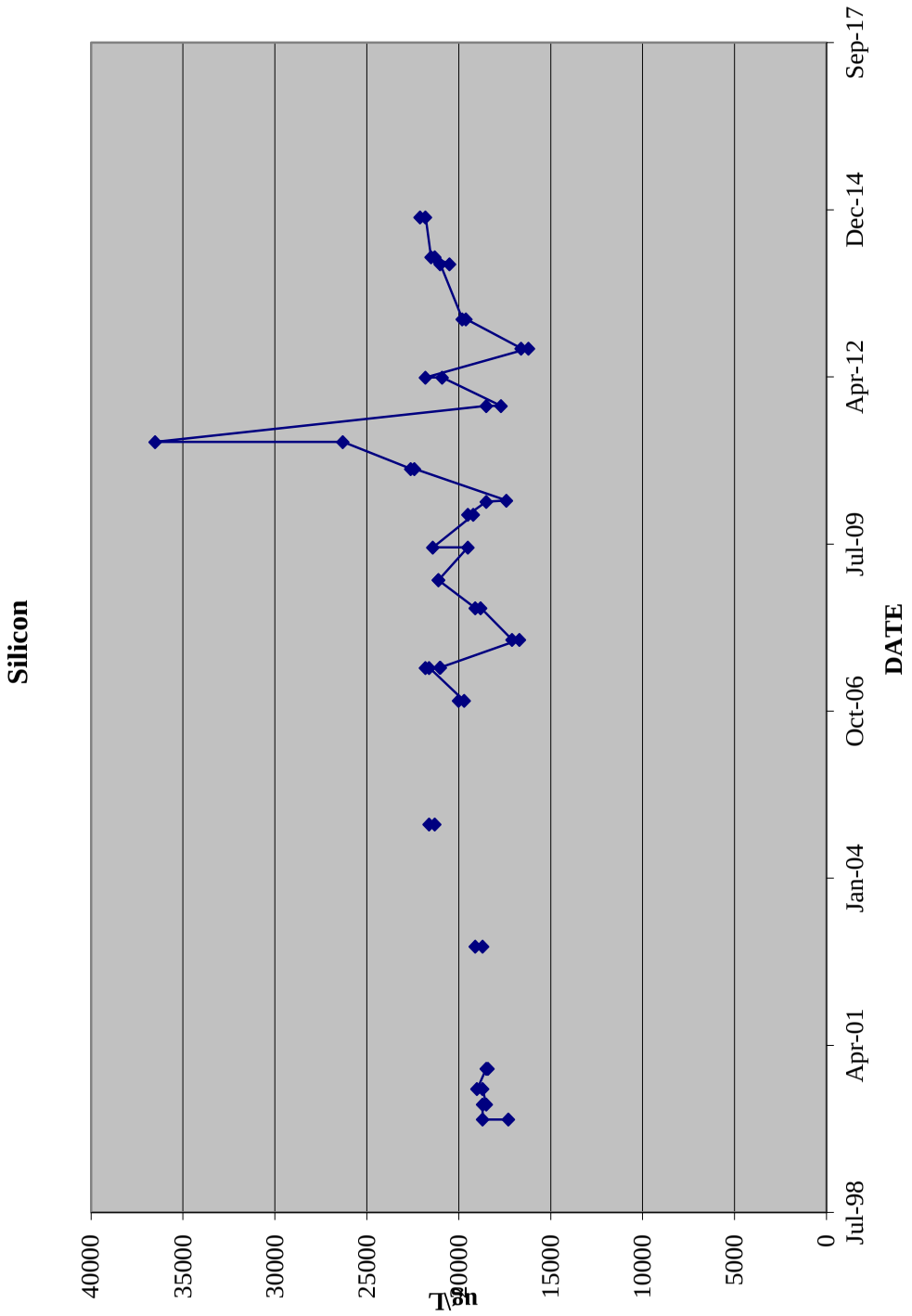
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
DATE
Note - Open markers identify non-detects at the indicated concentration


Silicon
DATE
Tsih
40000
35000
30000
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10000
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0
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Oct-06
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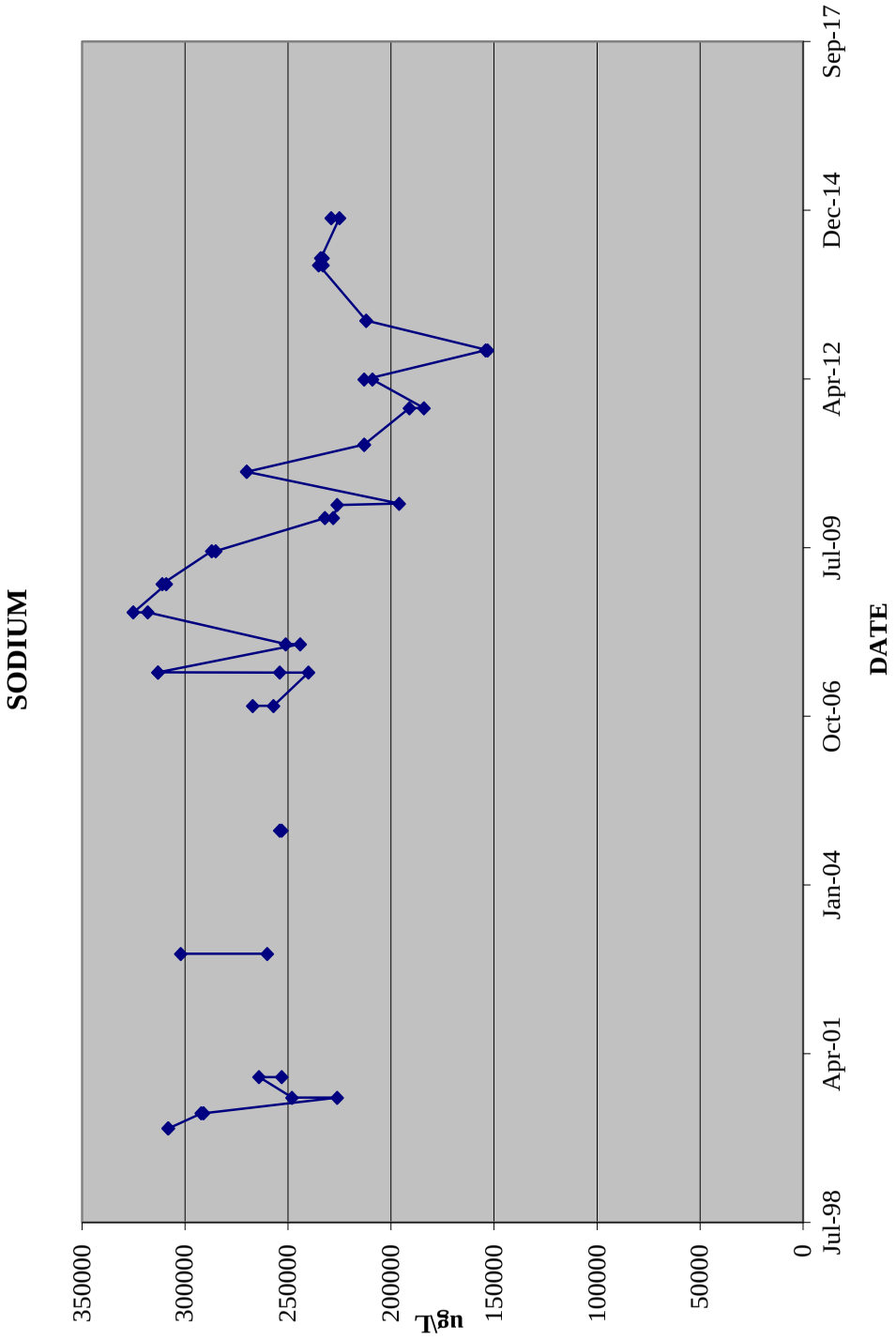
Sep-17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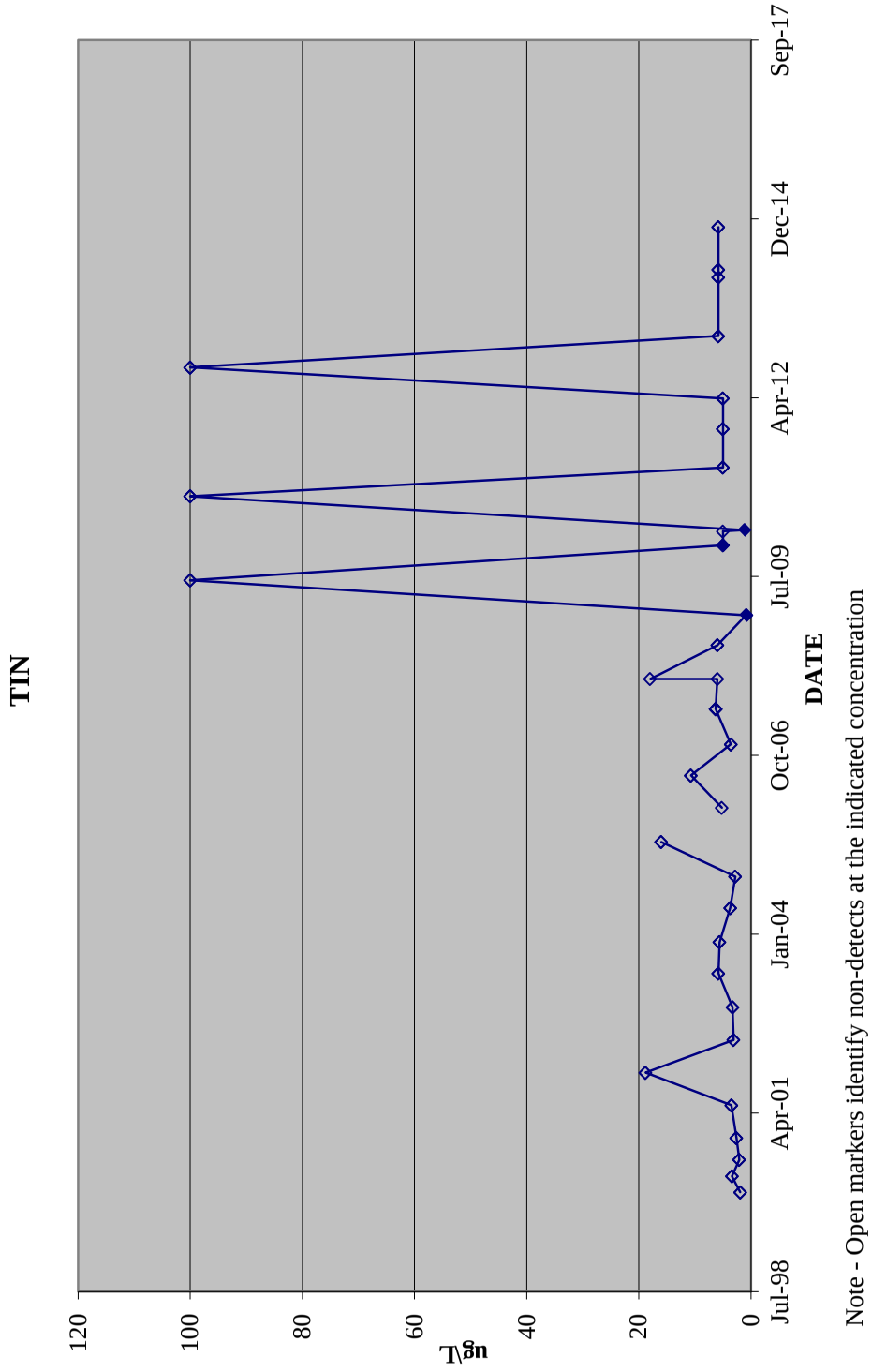
Sep-17
DATE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80
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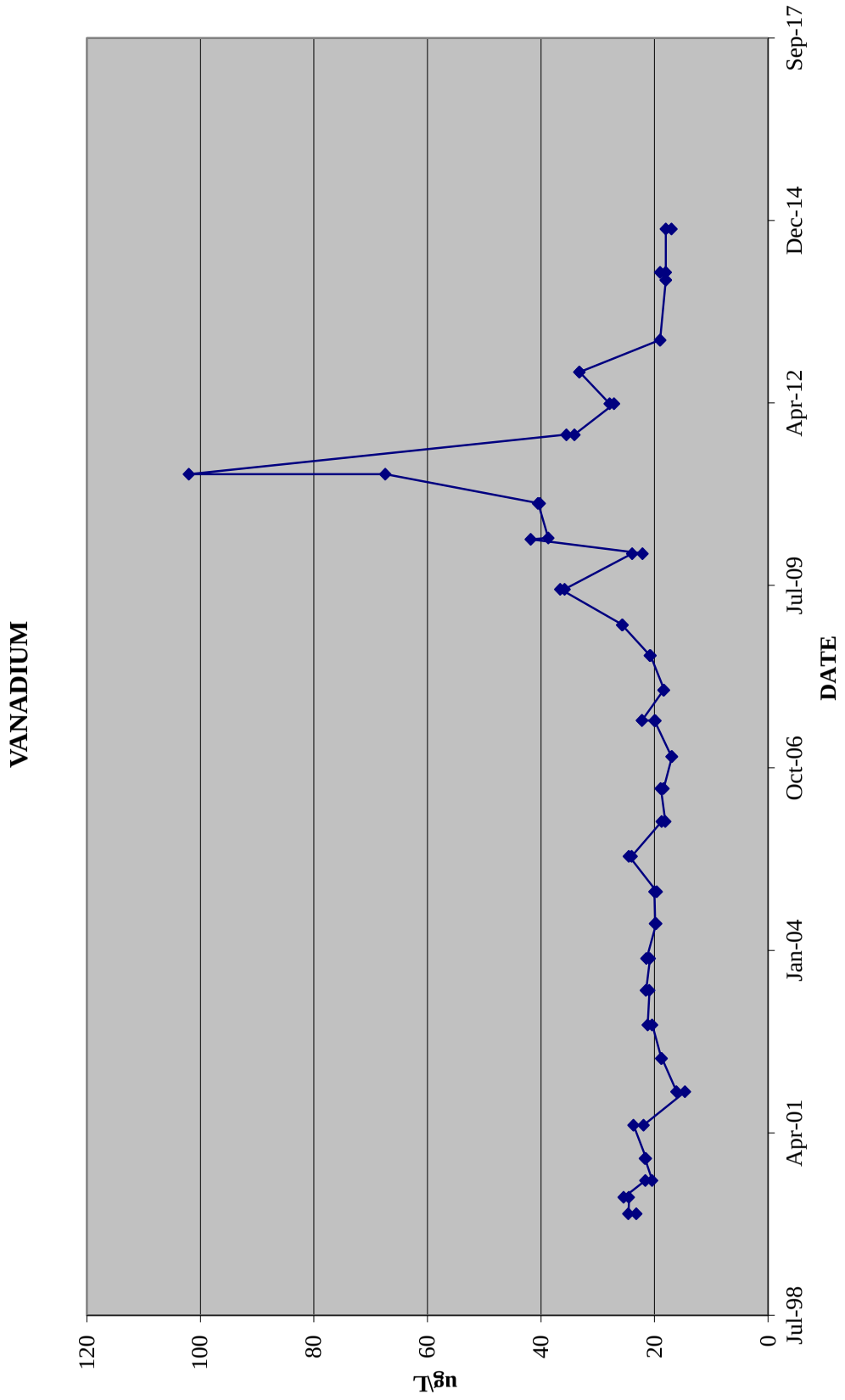
Apr-12
Dec-14
Sep-17
DATE
Note - Open markers identify non-detects at the indicated concentration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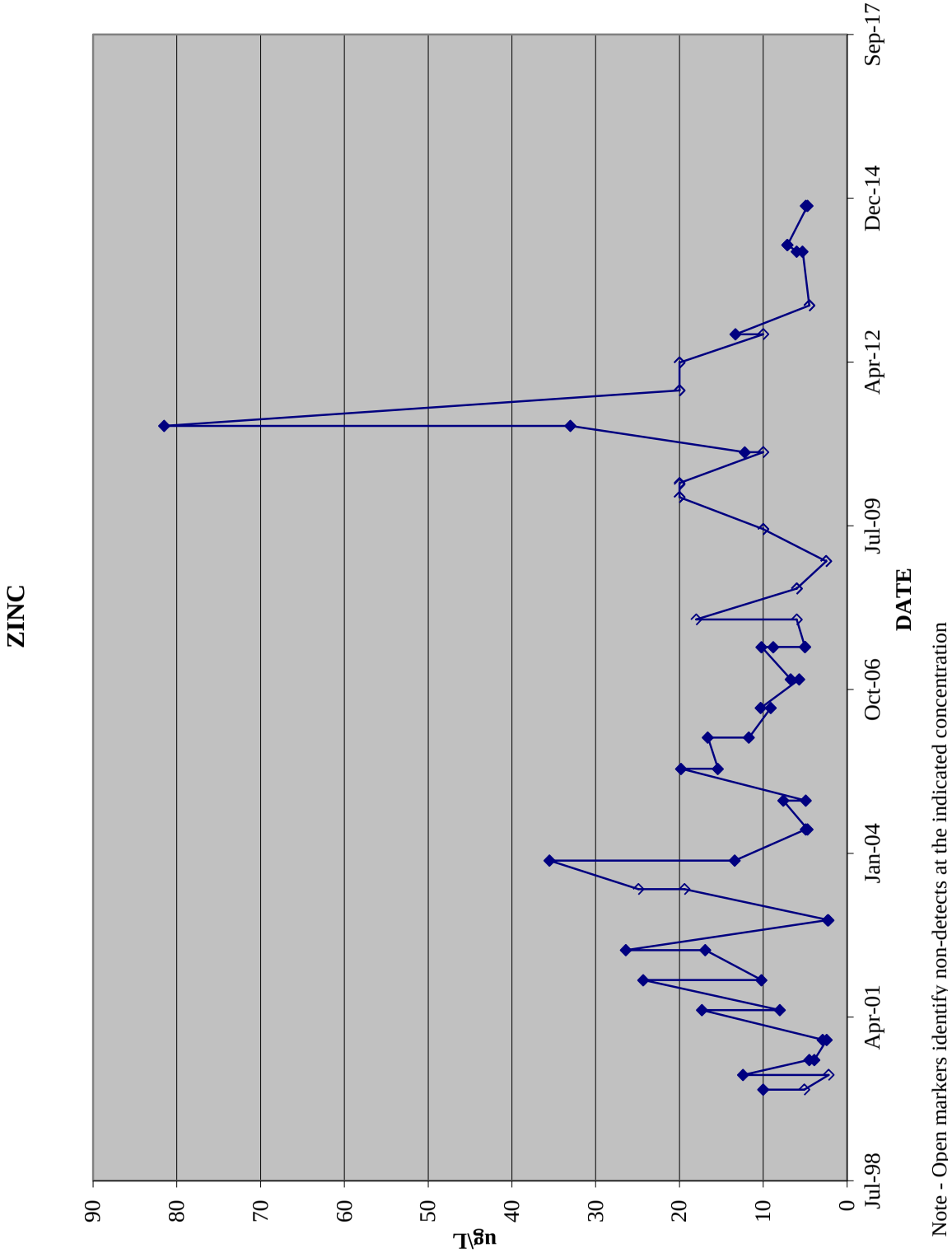
Dec-14
Sep-17
DATE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50
40
30
20
10
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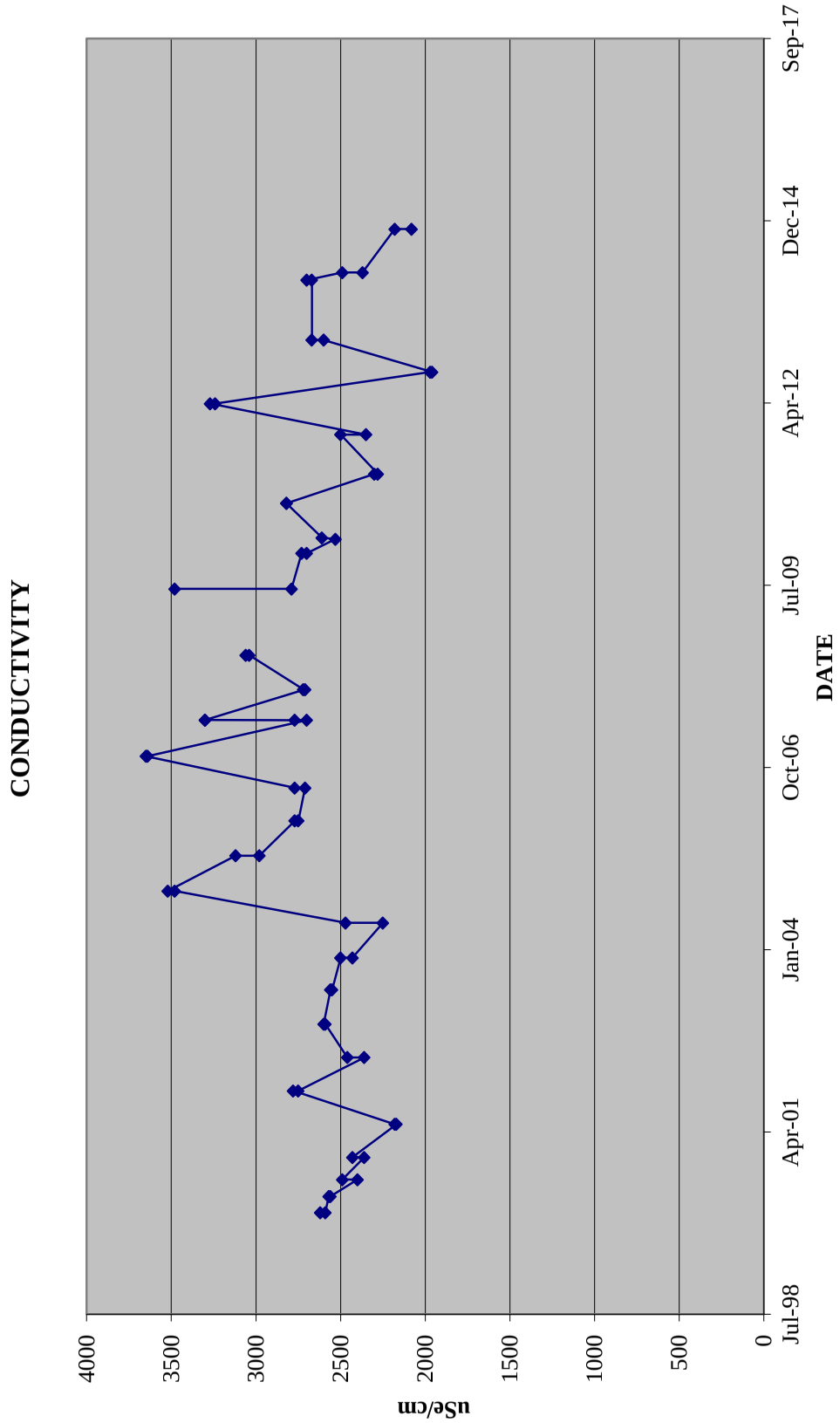
Apr-12
Dec-14
Sep-17
DATE
Note - Open markers identify non-detects at the indicated concentration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uSe/cm
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Dec-14
Sep-17
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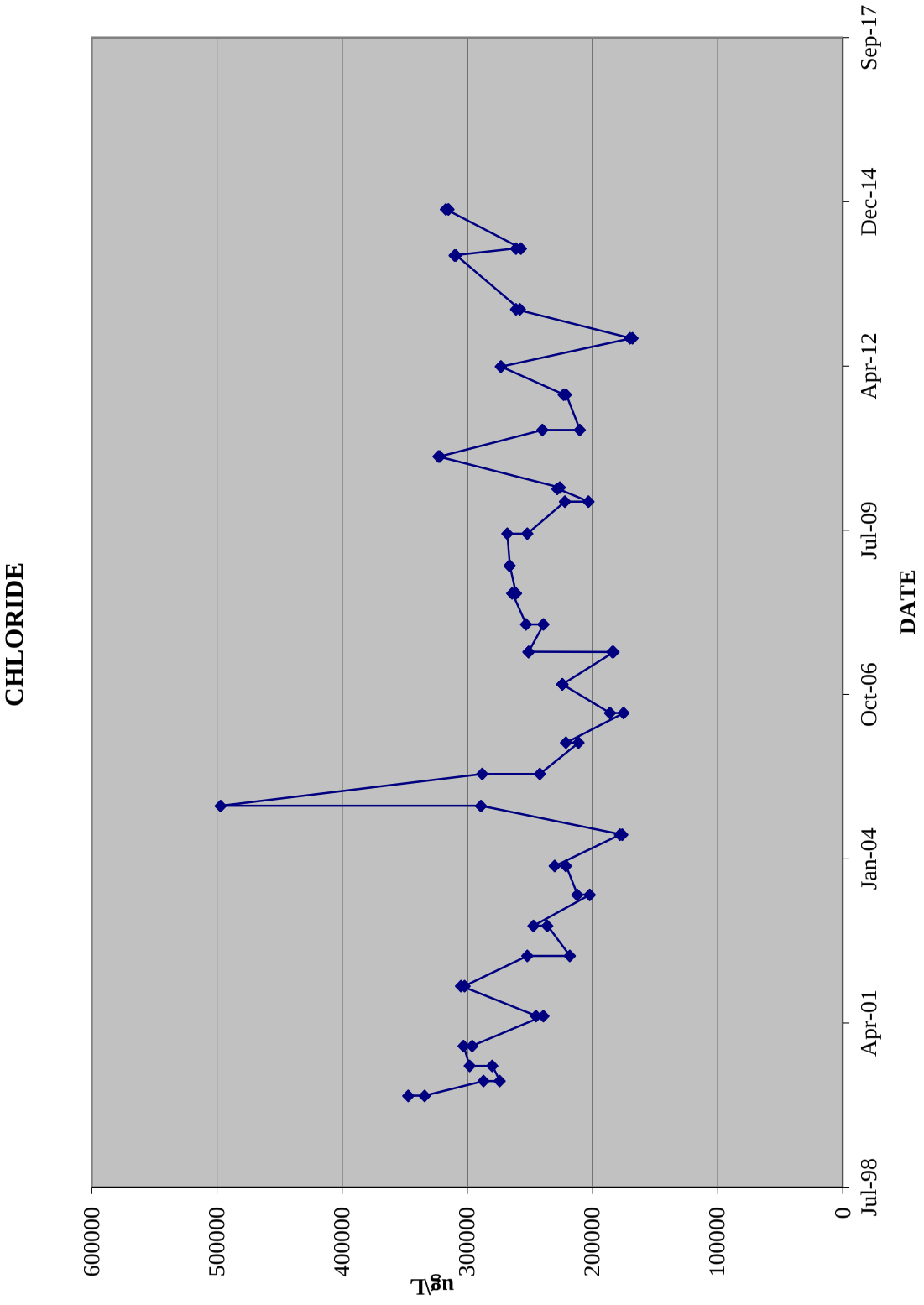
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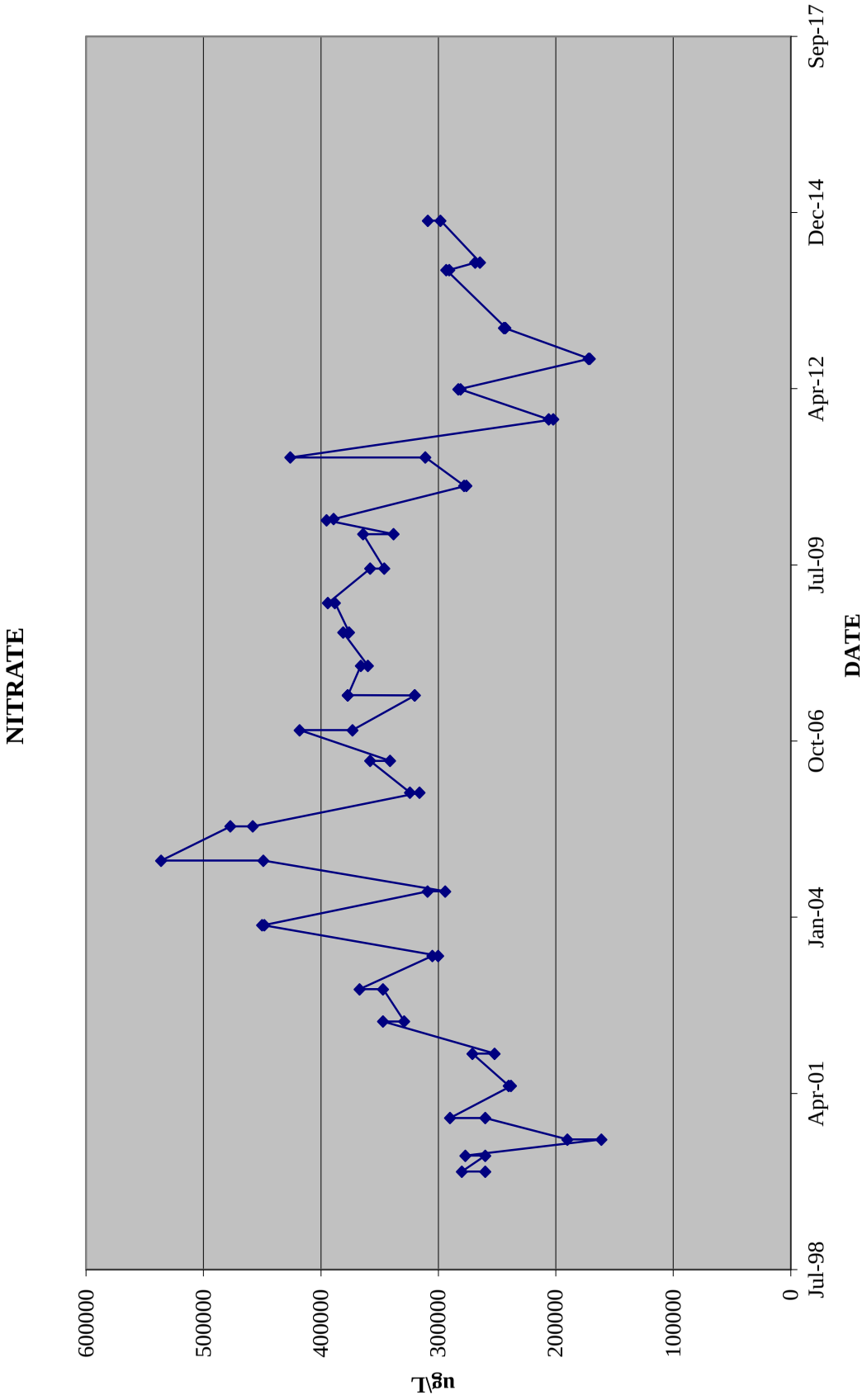
DATE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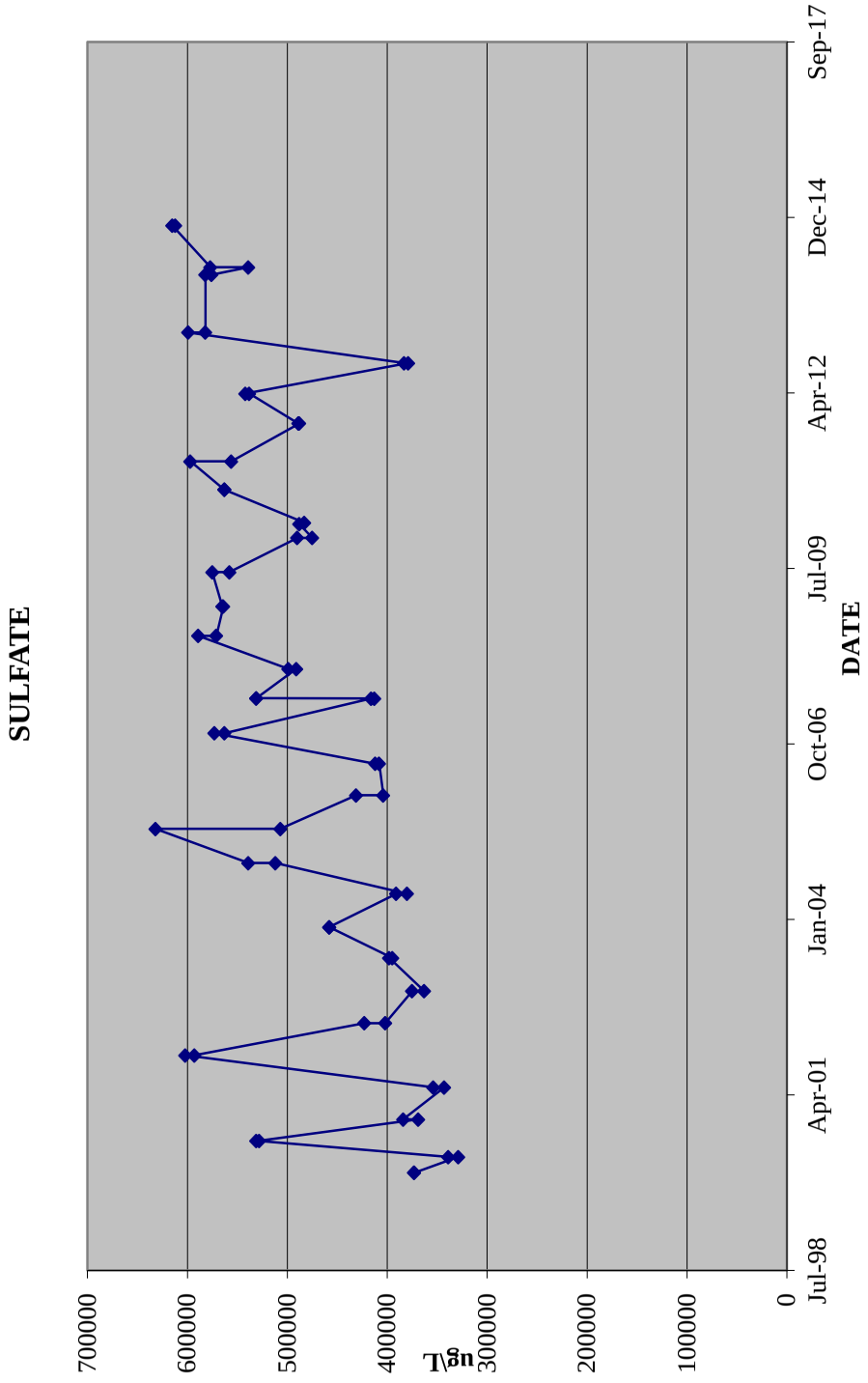
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DATE
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Oct-06
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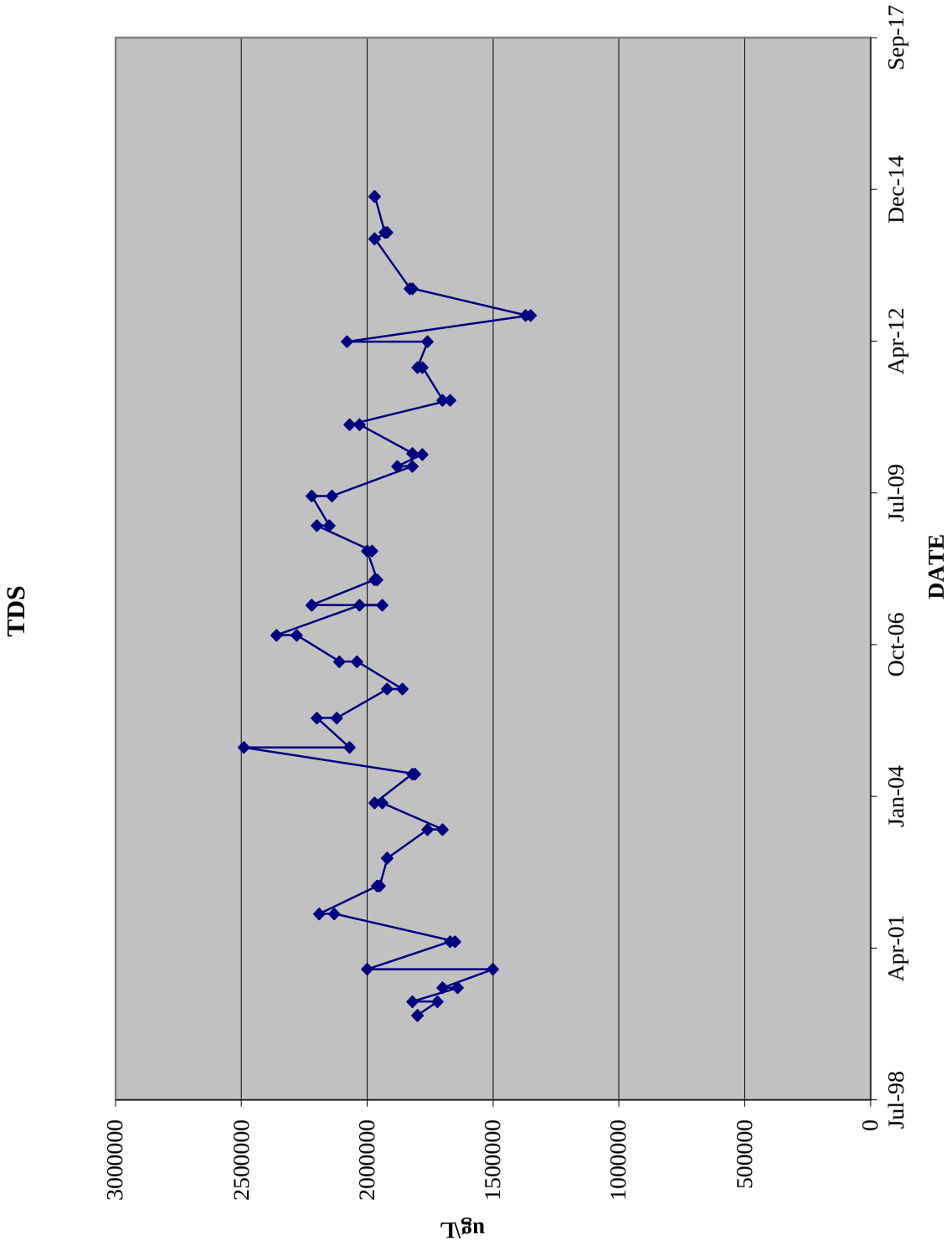
Sep-17


TDS
DATE
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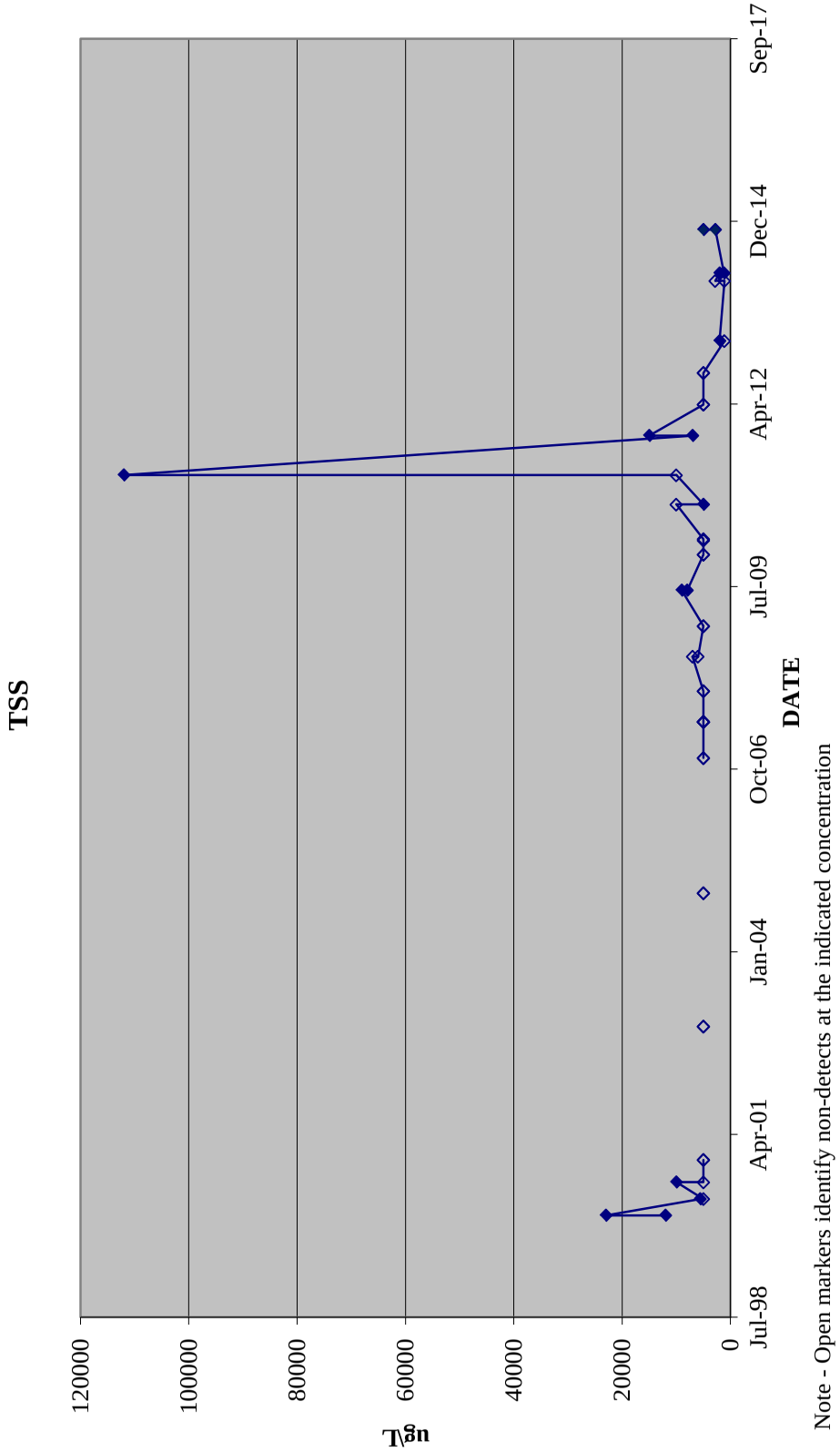
Dec-14
Sep-17


TSS
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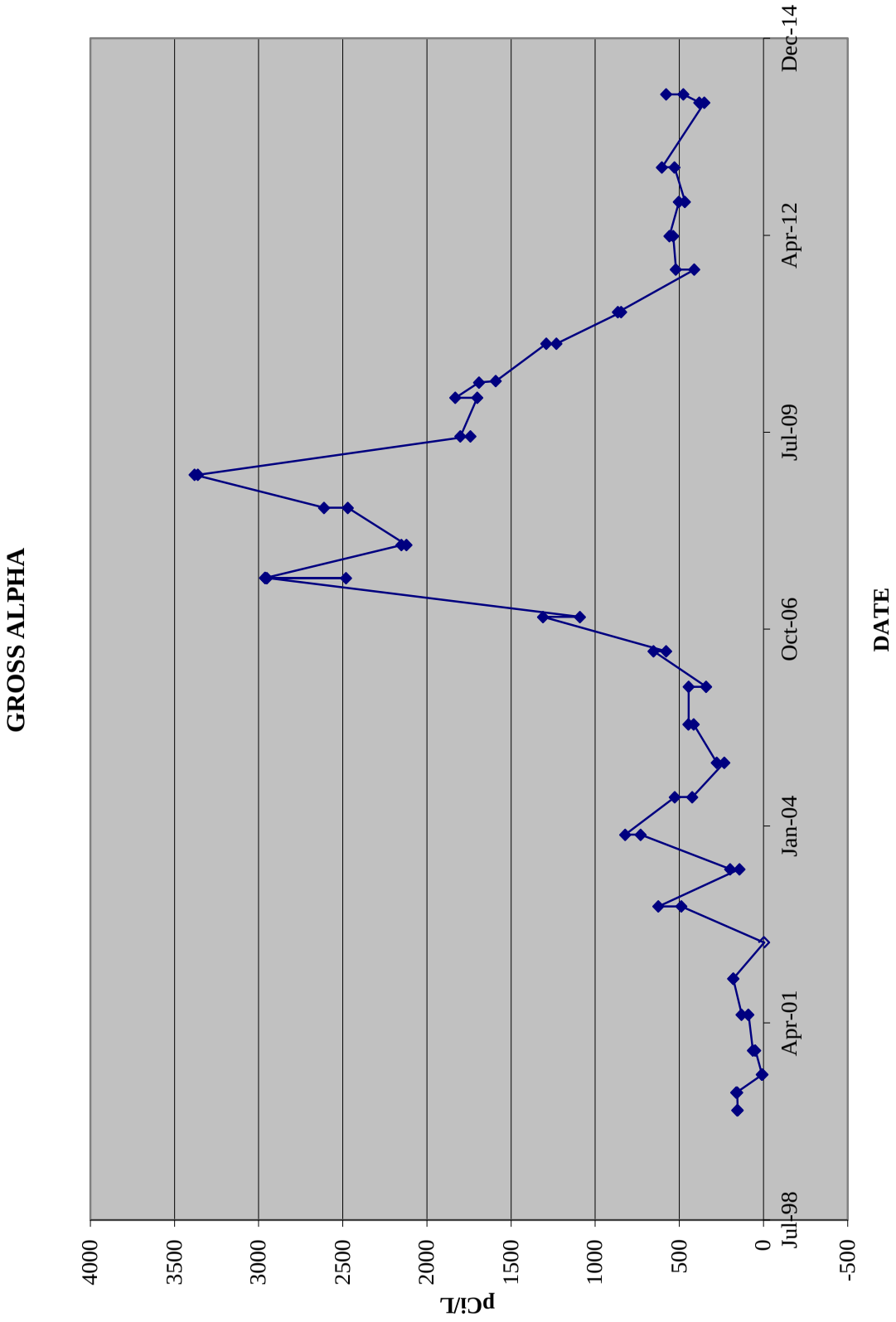
Sep-17
DATE
Note - Open markers identify non-detects at the indicated concentration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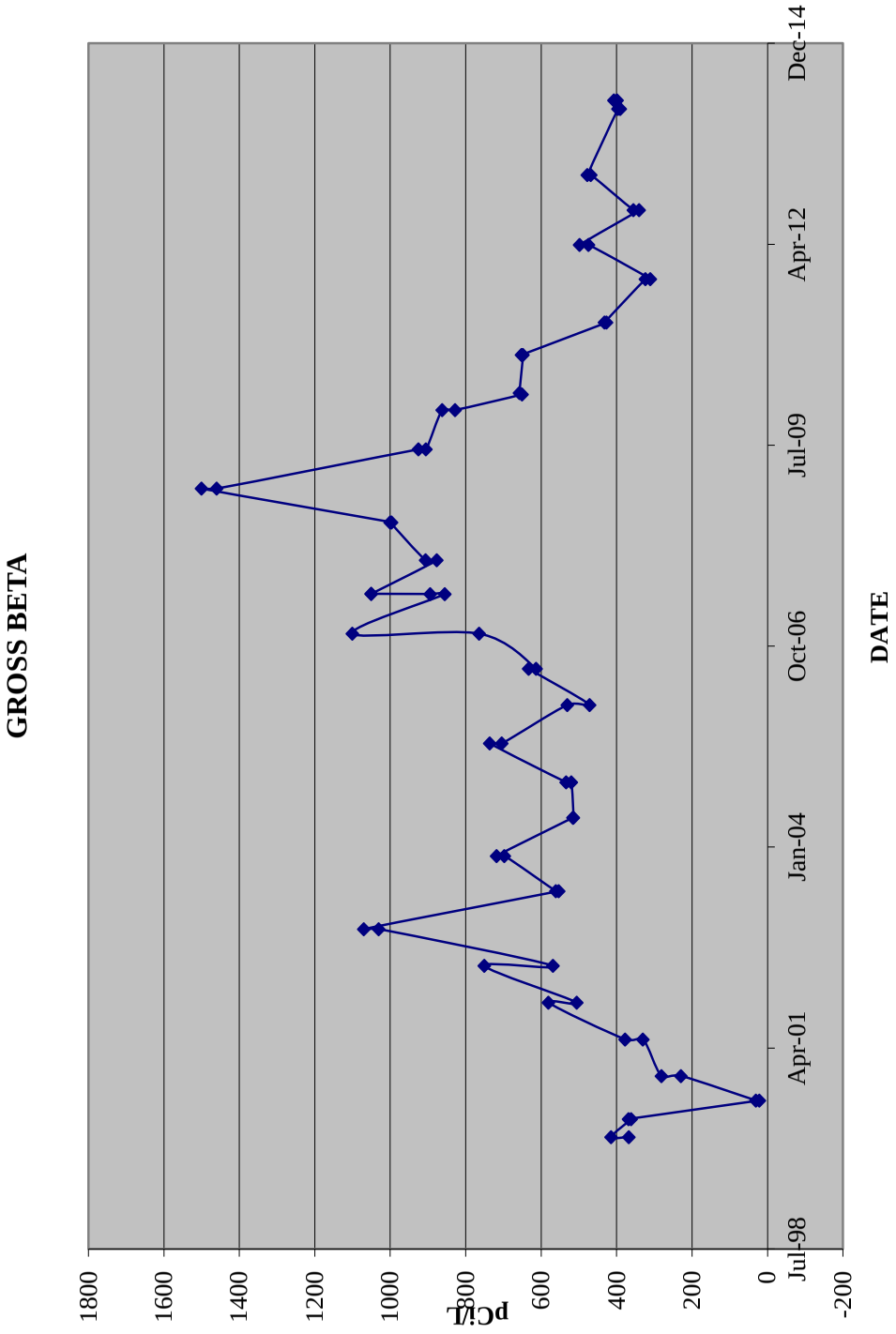
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pCi/L
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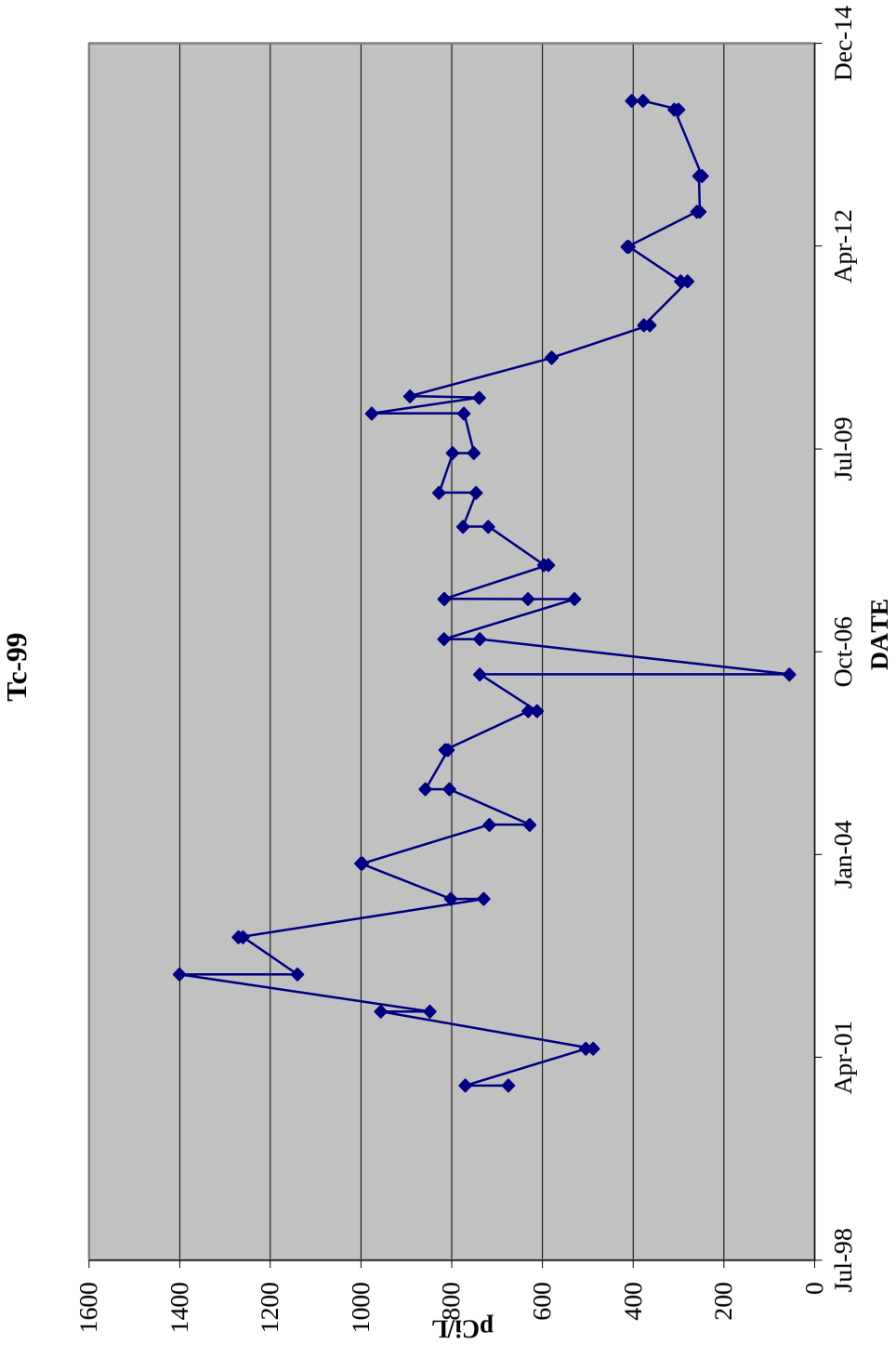
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pCi/L
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Jan-04
Oct-06
Jul-09
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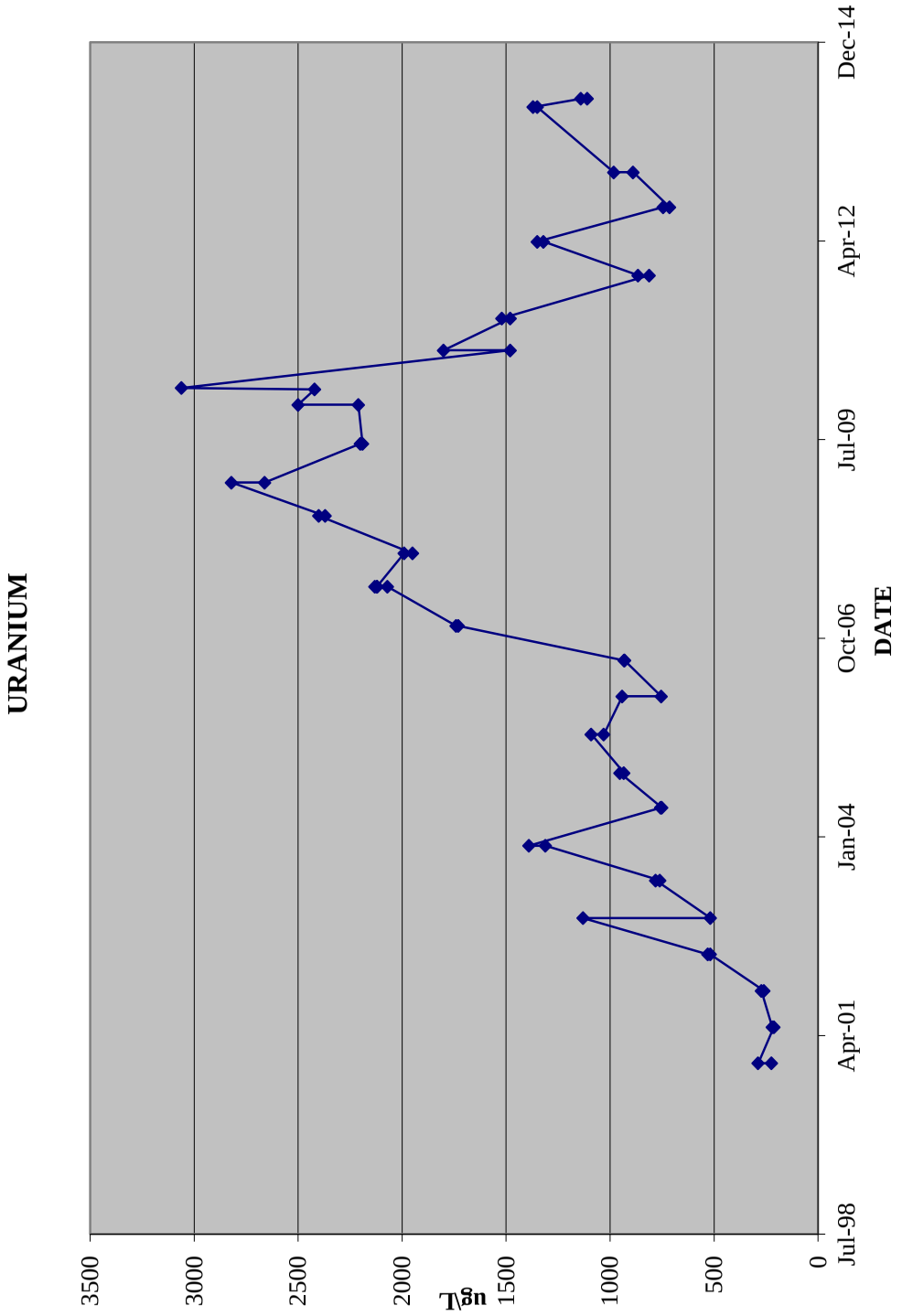
Dec-14
DATE


URANIUM
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Jul-98
Apr-01
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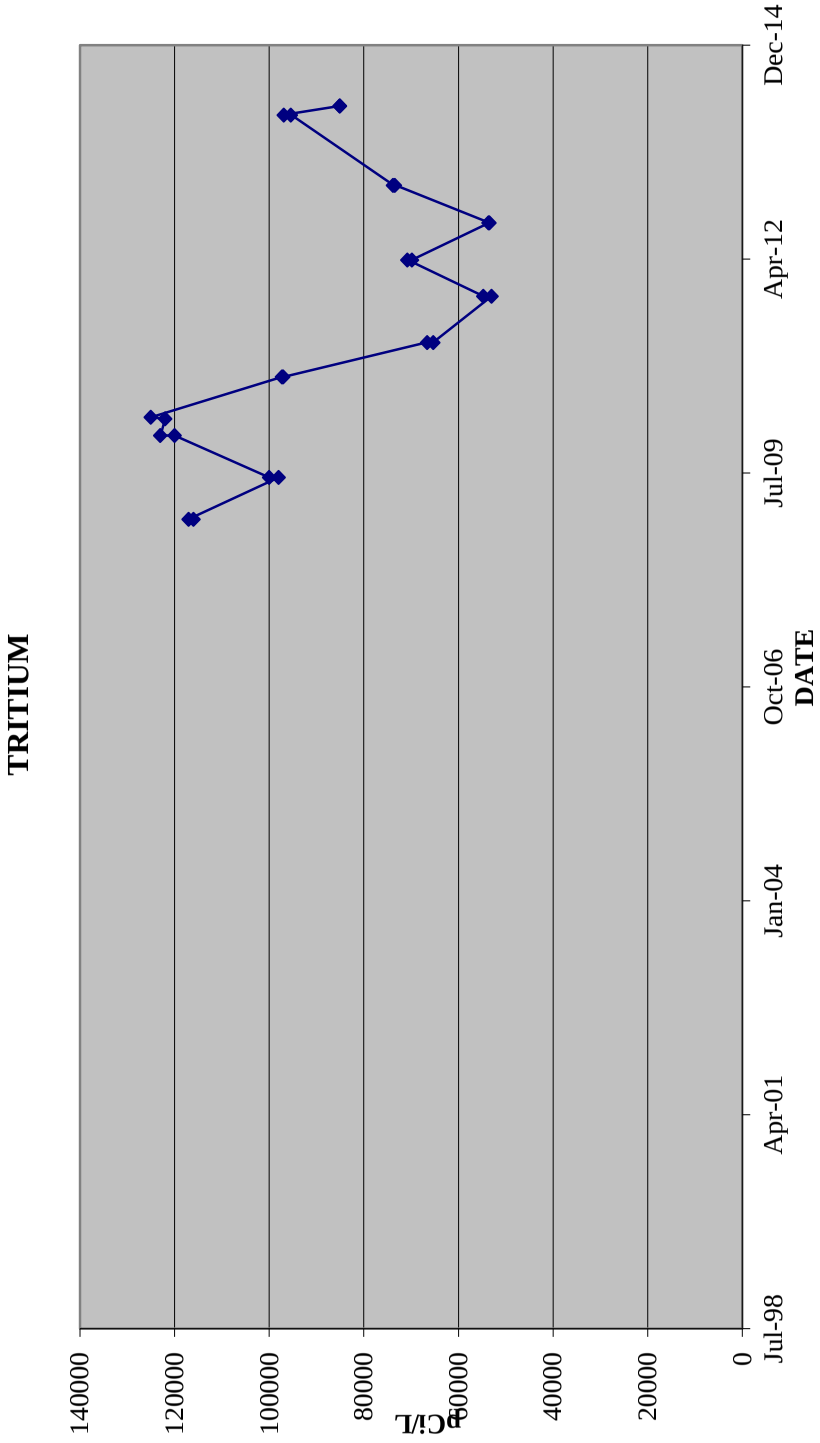
Dec-14
DATE


TRITIUM
pCi/L
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60000
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20000
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Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
DATE

APPENDIX E

ERDF LYSIMETER SAMPLING RESULTS, CY 2014

Table E-1. Lysimeter Analytical Results.

Constituent	Cell 5 April 2014	Cell 5 Sept 2014	Cell 6 April 2014	Cell 6 Sept 2014	Cell 7 April 2014	Cell 7 Sept 2014	Units
Calcium	586	580	363	352	455	407	mg/L
Magnesium	103 X	98.4 X	0.89 X	0.76	108 X	90.6	mg/L
Potassium	27.9	25.6	24.8	22.4	33.1	25	mg/L
Sodium	173	165	172	161	242	233	mg/L
Chloride	44.9	86.5	92.1 D	104	90 D	100	mg/L
Nitrogen (in nitrite/nitrate)	58.4 D	52.6 D	63.7 D	58.1 D	21.2 D	22.3 D	mg/L
Nitrate	48.3 D	46.7 D	53.5 D	50.9 D	16.5 D	19.7 D	mg/L
Sulfate	1860 D	1720 D	908 D	808 D	1480 D	1500 D	mg/L
Total dissolved solids	3260	3290	1890	2000	2550	2710	mg/L
Total suspended solids	97.2	76.8	26.8	38.4	5080	544	mg/L
Total organic carbon	9.3	8.7	12.7	12.2	10	8.7	mg/L
Gross alpha	31.2	22.1 U	-1.18 U	3.9 U	87.1	38	pCi/L
Gross beta	36.3	43.2	24.8	23.4	116	59.9	pCi/L
Technetium-99	3.08 U	-1.46 U	0.169 U	-1.69 U	7.74 U	-3.62 U	pCi/L
Uranium (total)	0.0337	0.0349	0.00012	0.000262	0.0466	0.0462	mg/L
Uranium (filtered)	0.0373	0.0286	0.000115	0.000132	0.0486	0.0432	mg/L
pH	7.85	7.91	8.97	9.18	7.61	7.86	pH
Specific conductance	3280	2760	2180	1960	2990	2480	µS/cm

D = Result reported from secondary dilution
U = Result is nondetected
X = Serial dilution in the analytical batch indicates that physical and chemical interferences are present

Table E-2. Lysimeter Analytical Results.

Constituent	Cell 8 April 2014	Cell 8 Sept 2014	Cell 9 April 2014	Cell 9 Sept 2014	Cell 10 April 2014	Cell 10 Sept 2014	Units
Calcium	516	603	428	481	263	232	mg/L
Magnesium	118 X	145	34.4 X	40.2	0.98 X	2.4	mg/L
Potassium	23.1	25.7	18.7	18.8	16	13	mg/L
Sodium	146	168	124	117	137	113	mg/L
Chloride	130 D	171	94.8 D	125	60.1 D	56	mg/L
Nitrogen (in nitrite/nitrate)	57.2 D	56.5 D	61.5 D	63.6 D	38.4 D	28 D	mg/L
Nitrate	47.1 D	50.5 D	52.2 D	57.5 D	29.4 D	25 D	mg/L
Sulfate	1680 D	1910 D	100 D	1070 D	729 D	563 D	mg/L
Total dissolved solids	2860	3630	2080	2410	1420	1280	mg/L
Total suspended solids	20.8	28.4	604	348	20.8	216	mg/L
Total organic carbon	14	12.1	8.7	8.6	8.8	9.3	mg/L
Gross alpha	25.6	30.2 U	70.6	14.2 U	2.88 U	1.28 U	pCi/L
Gross beta	36.5	50.9	117	21.6	14.3	14.2	pCi/L
Technetium-99	3.16 U	1.29 U	0.801 U	-5.1 U	1.88 U	-4.61 U	pCi/L
Uranium (total)	0.0371	0.058	0.00882	0.00287	0.0000763	0.000371	mg/L
Uranium (filtered)	0.0433	0.0471	0.00193	0.00208	0.0000655U	0.000309	mg/L
pH	7.64	7.87	7.92	7.79	8.7	7.99	pH
Specific conductance	3110	2890	2400	2170	1710	1370	μS/cm

D = Result reported from secondary dilution
U = Result is nondetected
X = Serial dilution in the analytical batch indicates that physical and chemical interferences are present

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