WCH-295
Rev. 0

River Corridor
Closure Contract

Groundwater and Leachate Monitoring and Sampling at ERDF, CY 2007

May 2008

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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ACRONYMS

COC	contaminant of concern
CY	calendar year
DOW	description of work
ERDF	Environmental Restoration Disposal Facility
ETF	Effluent Treatment Facility
GPP	groundwater protection plan
RCRA	*Resource Conservation and Recovery Act of 1976*
ROD	Record of Decision

METRIC CONVERSION CHART

Into Metric Units			Out of Metric Units		
If You Know	*Multiply By*	*To Get*	*If You Know*	*Multiply By*	*To Get*
Length			**Length**		
inches	25.4	millimeters	millimeters	0.039	inches
inches	2.54	centimeters	centimeters	0.394	inches
feet	0.305	meters	meters	3.281	feet
yards	0.914	meters	meters	1.094	yards
miles	1.609	kilometers	kilometers	0.621	miles
Area			**Area**		
sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.093	sq. meters	sq. meters	10.76	sq. feet
sq. yards	0.836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.6	sq. kilometers	sq. kilometers	0.4	sq. miles
acres	0.405	hectares	hectares	2.47	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.035	ounces
pounds	0.454	kilograms	kilograms	2.205	pounds
ton	0.907	metric ton	metric ton	1.102	ton
Volume			**Volume**		
teaspoons	5	milliliters	milliliters	0.033	fluid ounces
tablespoons	15	milliliters	liters	2.1	pints
fluid ounces	30	milliliters	liters	1.057	quarts
cups	0.24	liters	liters	0.264	gallons
pints	0.47	liters	cubic meters	35.315	cubic feet
quarts	0.95	liters	cubic meters	1.308	cubic yards
gallons	3.8	liters			
cubic feet	0.028	cubic meters			
cubic yards	0.765	cubic meters			
Temperature			**Temperature**		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius	Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity			**Radioactivity**		
picocuries	37	millibecquerel	millibecquerels	0.027	picocuries

1.0 INTRODUCTION

The Environmental Restoration Disposal Facility (ERDF) is a Hanford Site low-level mixed waste disposal facility that was brought into service on July 1, 1996. Baseline sampling and analytical data obtained from monitoring wells and the ERDF leachate collection system were used to determine contaminants of concern (COCs) and background conditions for long-term monitoring as described in the *Groundwater Protection Plan for the Environmental Restoration Disposal Facility* (ERDF GPP) (BHI 1996) and to meet the requirements of the ERDF Record of Decision (ROD) (EPA 1995). Based on about 10 years of ERDF monitoring activities and statistical evaluations of the data, the ERDF GPP was revised (WCH 2008). Any new requirements or changes in evaluation that were recommended by the new ERDF GPP are included in this report and will be in future reports. A new *Environmental Restoration and Disposal Facility Leachate Sampling and Analysis Plan* (WCH 2008a) was approved in February 2008. Due to timing of the approval, elements of this new plan are not included in this report, but will be addressed in future reports. Ongoing groundwater and leachate monitoring are performed to meet the requirements of the ERDF ROD, and details of the monitoring program are described in the *Description of Work for Routine Groundwater Sampling at the Environmental Restoration Disposal Facility* (ERDF DOW) (BHI 2005a), the revised ERDF GPP (WCH 2008), and the ERDF Amended ROD (EPA 1999).

1.1 PURPOSE AND OBJECTIVES

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

- Review routine groundwater sampling data to statistically evaluate if there have been changes in COC concentrations over time that may be attributed to ERDF operations
- Assess conditions that may indicate the presence of encroaching groundwater contaminant plumes originating from upgradient sources in the 200 West Area
- Assess data from routine ERDF leachate sampling to determine if additional constituents should be added to the ERDF groundwater monitoring COC 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.

Appendix A shows analytical results for groundwater samples that were collected from the ERDF monitoring well network from calendar year (CY) 1996 through CY 2007. 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 2005 through CY 2007 are presented in Appendix C. Leachate data collected from CY 1996 through CY 2003 are contained in previous ERDF groundwater and leachate monitoring reports (Faurote 2000; BHI 2002, 2003, 2004, 2005b; WCH 2006).

2.0 BACKGROUND

2.1 GENERAL DESCRIPTION

The ERDF site is located between the 200 East and 200 West Areas of the Hanford Site (Figure 2-1). This location was selected for the ERDF over other possible locations, in part 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, the ERDF is not permitted as a RCRA facility. Wastes disposed at ERDF contain elevated levels of radionuclides and hazardous constituents originating from the 100, 200, and 300 Area waste sites.

2.2 ENVIRONMENTAL RESTORATION DISPOSAL FACILITY

There are currently six 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. Cells 3 and 4 were constructed in 2000. Construction of cells 5 and 6 was completed during CY 2004, and two additional cells, cells 7 and 8, are currently under construction. All eight cells are roughly equal in size. Figure 2-2 shows the ERDF as it is currently constructed. Throughout CY 2007, approximately 398,455.9 metric tons of remediation wastes were disposed at the facility.

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

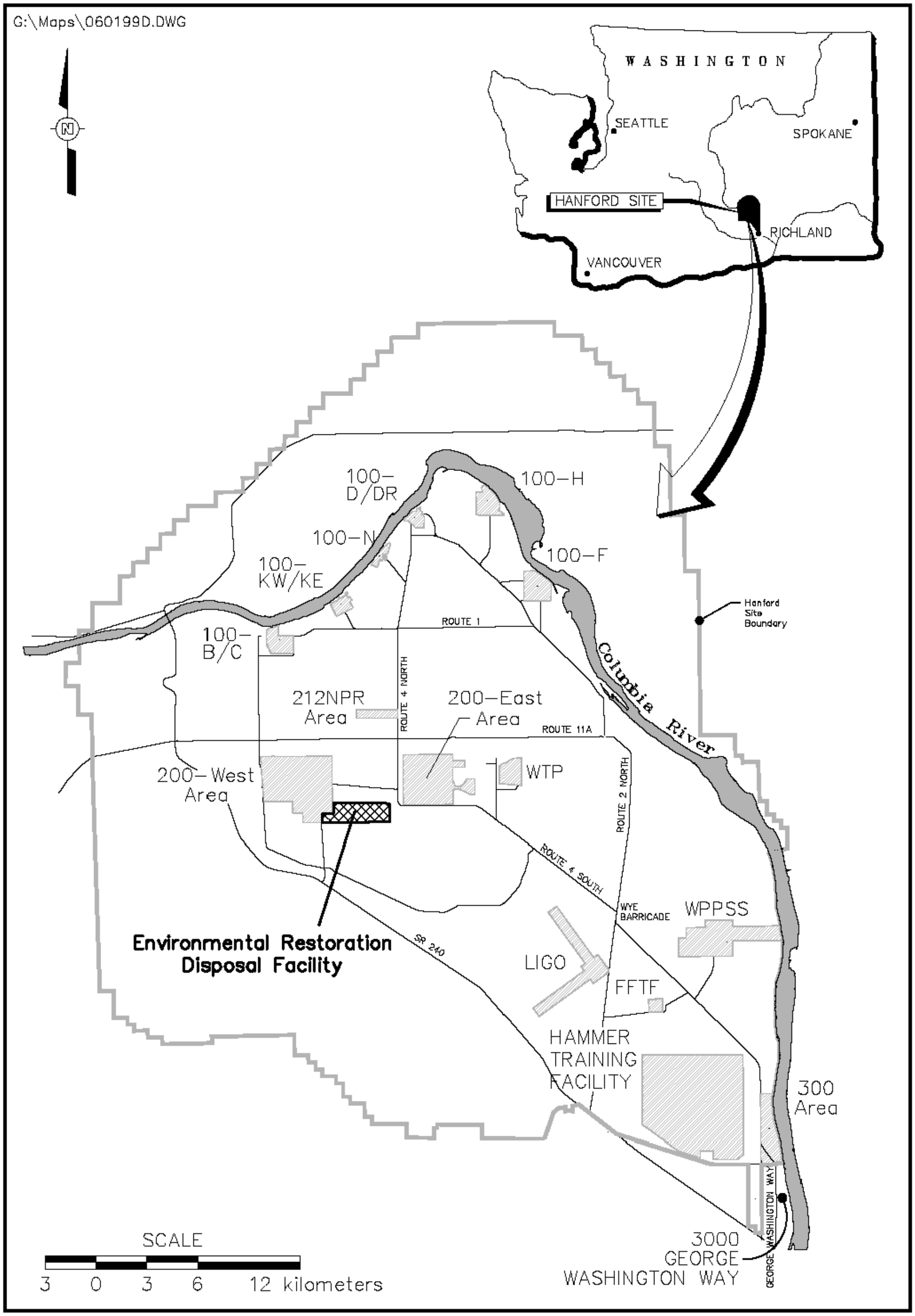
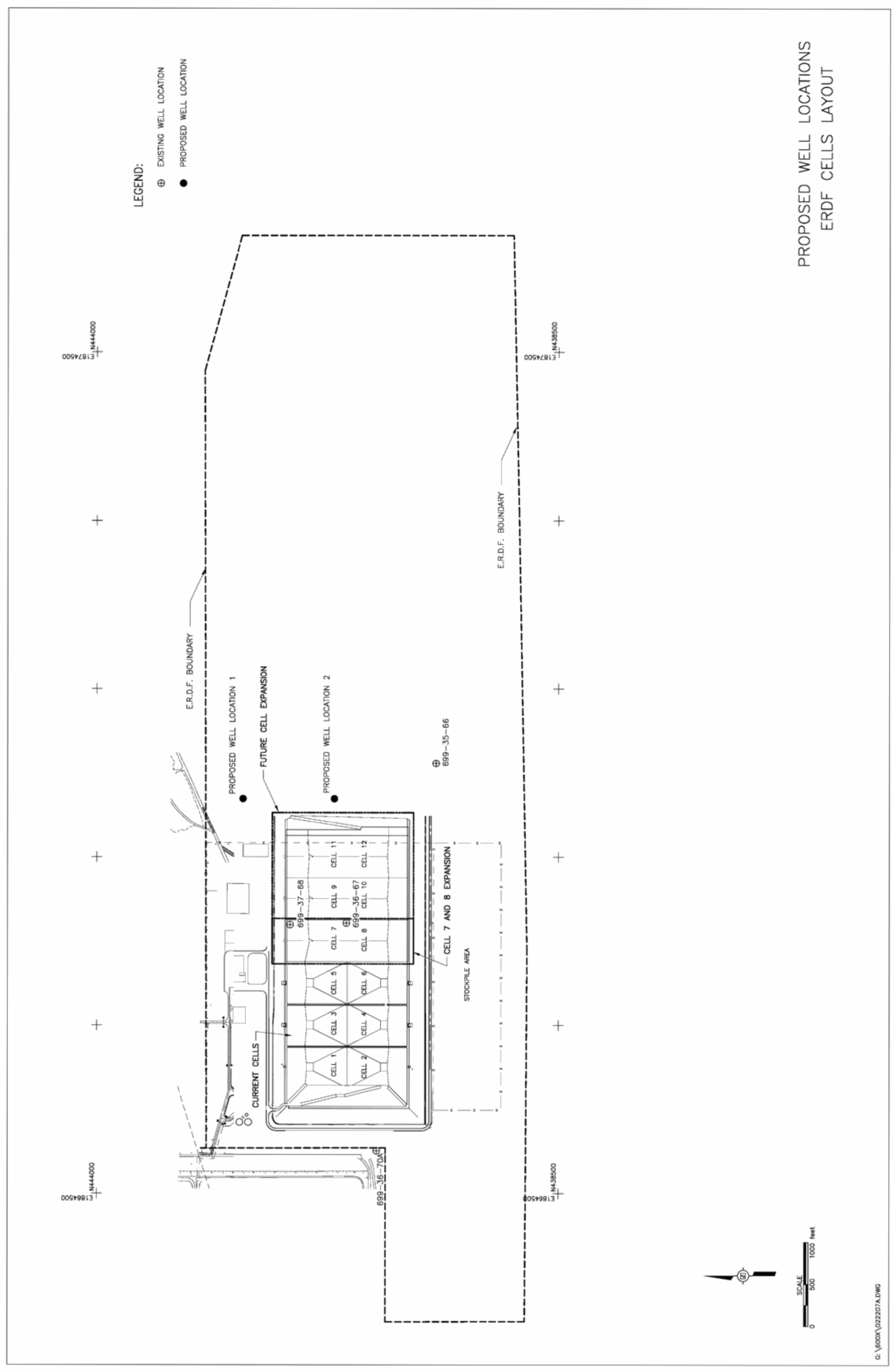


Figure 2-2. ERDF Monitoring Well Location Map.



3.0 GROUNDWATER AND LEACHATE MONITORING

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

3.1 GROUNDWATER SAMPLING

Groundwater samples are collected semiannually from four monitoring wells in the vicinity of the ERDF. This monitoring well network is scheduled for routine sampling during the first and third quarters of each year. The monitoring well network consists of one upgradient well (699-36-70A) and three downgradient wells (699-35-66A, 699-36-67, and 699-37-68). As a result of the current construction of cells 7 & 8, downgradient groundwater wells 699-37-68 and 699-36-67 were decommissioned subsequent to final sampling in October 2007. These were replaced by wells 699-37-66 and 699-36-66B at the proposed locations shown on Figure 2-2. During CY 2007, groundwater sampling was completed at all of the ERDF monitoring wells in March and September. Well locations are shown in Figure 2-2.

Guidelines for determining Contaminants of Concern (COCs) for routine groundwater monitoring are described in the ERDF DOW (BHI 2005a). The COCs for routine monitoring were determined based on the results of preoperational baseline sampling conducted in March 1996 and known contaminant plumes beneath the ERDF. Additional COCs may be added to the groundwater monitoring program if analytical results from leachate sampling indicate it is warranted. To date, no additional COCs have been identified for addition to the groundwater lists based on leachate analysis results. Table 3-1 lists the analytes for the groundwater monitoring program.

Routine groundwater sampling has been conducted since ERDF operations commenced. Sampling at the ERDF groundwater wells was not completed during March 2000 due to a Hanford Site moratorium on groundwater sampling, and well 699-37-68 was not sampled during September 2000 because of problems with a dedicated monitoring well pump (BHI 2004).

Table 3-1. List of Groundwater Analytes by Analytical Method.

Analyte	Method[a]	Practical Quantitation Limit	Accuracy[b] (%)	Precision[b] (%)
Arsenic	6010A	10 μg/L	±25	±25
Barium	6010A	20 μg/L	±25	±25
Chromium	6010A	70 μg/L	±25	±25
Lead	6010A	40 μg/L	±25	±25
Selenium	6010A	750 μg/L	±25	±25
Tin	6010A	30 μg/L	±25	±25
Vanadium	6010A	80 μg/L	±25	±25
Zinc	6010A	20 μg/L	±25	±25
Carbon tetrachloride	8260B	5 μg/L	±25	±25
Alkalinity	310.1[c]	10,000 μg/L	±20	±25
Chloride	300[d]	10,000 μg/L	±20	±25
Fluoride	300[d]	100 μg/L	±20	±25
Nitrogen (in nitrite/nitrate)	353.1	0.05 μg/L	±20	±25
Sulfate	300[d]	2,000 μg/L	±20	±25
Total dissolved solids	160.1[c]	10,000 μg/L	±20	NA
Total organic halides	9020	5 μg/L	±20	NA
Carbon-14	[e]	200 pCi/L	±20	±25
Iodine-129	[e]	5 pCi/L	±20	±25
Technetium-99	[e]	10 pCi/L	±20	±25
Radium	903.1[f]	1 pCi/L	±20	±25
Total uranium	[e]	0.1 μg/L	±20	±25
Gross alpha	900.0[f]	3 pCi/L	±20	±25
Gross beta	900.0[f]	4 pCi/L	±20	±25
pH	[g]	NA	NA	NA
Specific conductance	[g]	25 μS/cm	±20	NA
Turbidity	180.1[c]	0.05 NTU	±0.05 NTU	NA

[a] Method number indicated is from *Test Method for Evaluating Solid Wastes: Physical Chemical Methods* (SW-846) (EPA 1986), unless otherwise specified.
[b] Accuracy is expressed as percent recovery; precision is expressed as a percent relative difference.
[c] Method specified is from *Methods for Chemical Analysis of Water and Wastes* (Kopp and McKee 1983).
[d] Method specified is from *Determination of Inorganic Anions in Aqueous and Solids Samples by Ion Chromatography* (Lindahl 1984), and is a modification of EPA Method 300.0.
[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 1980).
[g] Parameter will be measured in the field.

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

3.1.1 General Approach to Evaluating Results

Groundwater samples collected from the ERDF monitoring well network were analyzed in accordance with the requirements of U.S. Environmental Protection Agency SW-846 (EPA 1986), industry standard, or laboratory-specific test methods as presented in 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 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.
- 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 2008) and *Hanford Site Groundwater Monitoring Setting, Sources and Methods* (PNNL 2000). The ERDF GPP requires that background water quality be established from four consecutive groundwater sampling events using one of two methods. The background conditions can be determined using either facility-wide groundwater quality data or historical data from each well in the monitoring network. The first approach (facility-wide) results in a single background value for the site for each constituent to which subsequent groundwater quality data are compared. This is referred to as an interwell comparison (PNNL 2000).

The second approach (historical) results in background water quality data for each well to which the subsequent groundwater quality data are compared. This approach is referred to as an intrawell comparison (PNNL 2000). The interwell approach has been selected and used for the ERDF groundwater monitoring program because this method allows for the consideration of impacts from non-ERDF sources.

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

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

3.2 LEACHATE SAMPLING

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 or upper liners and the secondary or 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).

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

Initial leachate sampling (through the end of CY 2000) was performed quarterly for an extensive list of analytes as defined by the ERDF Amended ROD (EPA 1999, 2003). This “long list” of analytes is shown in Table C-2 in Appendix C. At the end of the initial baseline sampling, the analyte list was revised (short list), and leachate sampling was reduced to a semiannual basis. The short list of analytes is identified in Table C-1 of Appendix C. Once every 2 years, sampling of the long list of analytes is performed on the leachate as identified in the ERDF Amended ROD (EPA 1999, 2003).

The ERDF project continued routine sampling and analysis of landfill leachate during CY 2007. Composite leachate samples for the short list of analytes were collected during the June and December events. Historically, a composite sample of leachate media was collected in duplicate from the sumps (cells 1 through 6) associated with the upper landfill liners. The composite samples consist of equal quantities of material taken from each of the six sumps associated with the upper liners. For the June 2007 sampling event, an additional set of duplicate samples were taken from the leachate storage tanks. Subsequent to that sampling, the decision has been made to take samples from the storage tanks, which was done for the December 2007 event. Data for the current year and from the two prior years of leachate sampling (i.e., CYs 2005 to 2007) are used to identify trends that may indicate if additional laboratory analysis for groundwater samples is warranted.

3.3 GROUNDWATER LEVELS

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

During the September 2005 monitoring event the exact water level in monitoring well 699-36-67 could not be determined because the electronic tape measure (e-tape) did not appear to reach the top of the water in the well. The water level measuring device 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. Subsequent samples have returned to expected levels for this well.

Based on a water table map (Figure 3-1), groundwater in the vicinity of the ERDF generally moves from the west across the site to the east-northeast. The hydraulic gradient is about 0.001 m/m (0.011 ft/ft) (BHI 1995). 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 (Swanson et al. 1999, Hartman et al. 2005).

Figure 3-1. Water-Level Contour Map.

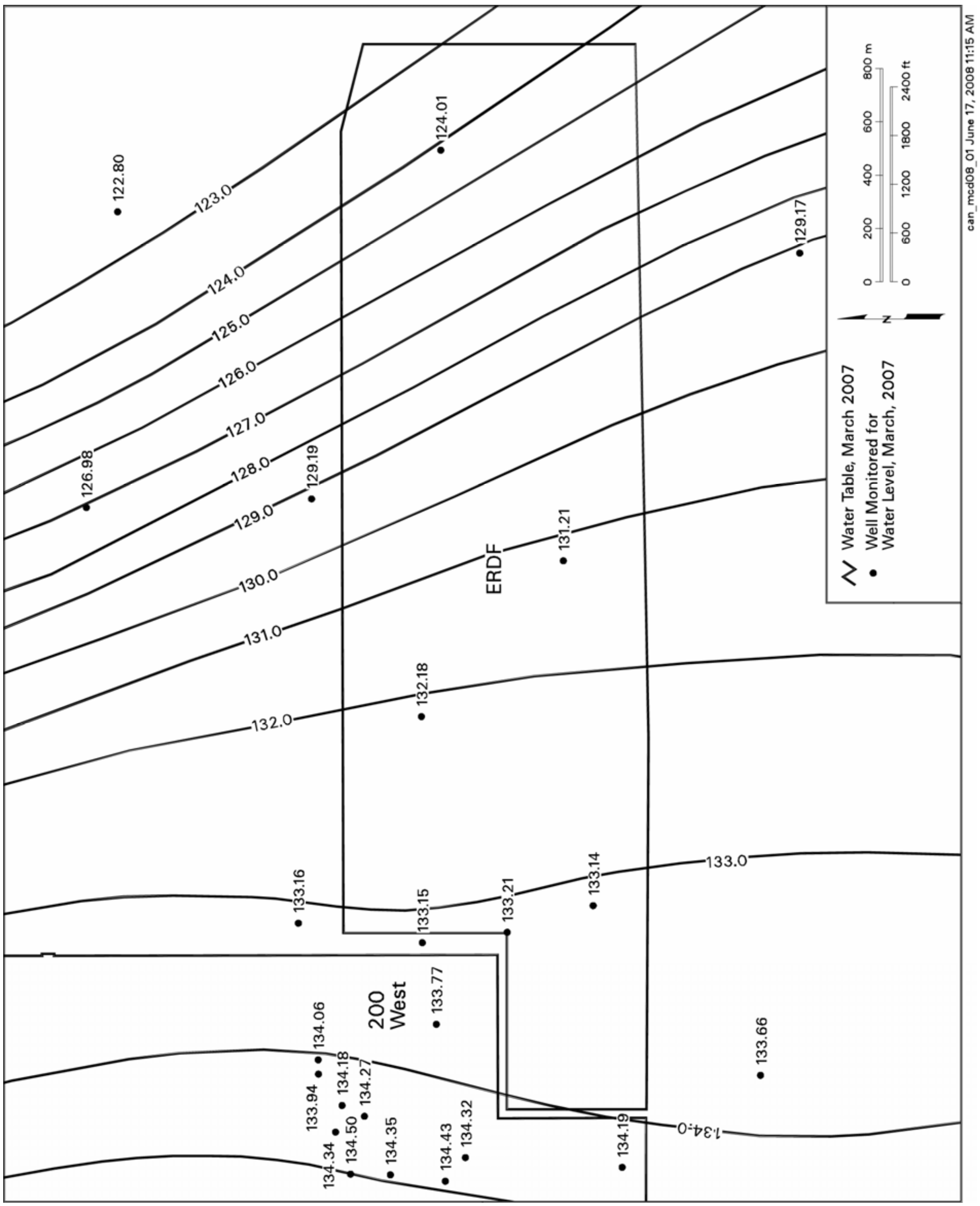
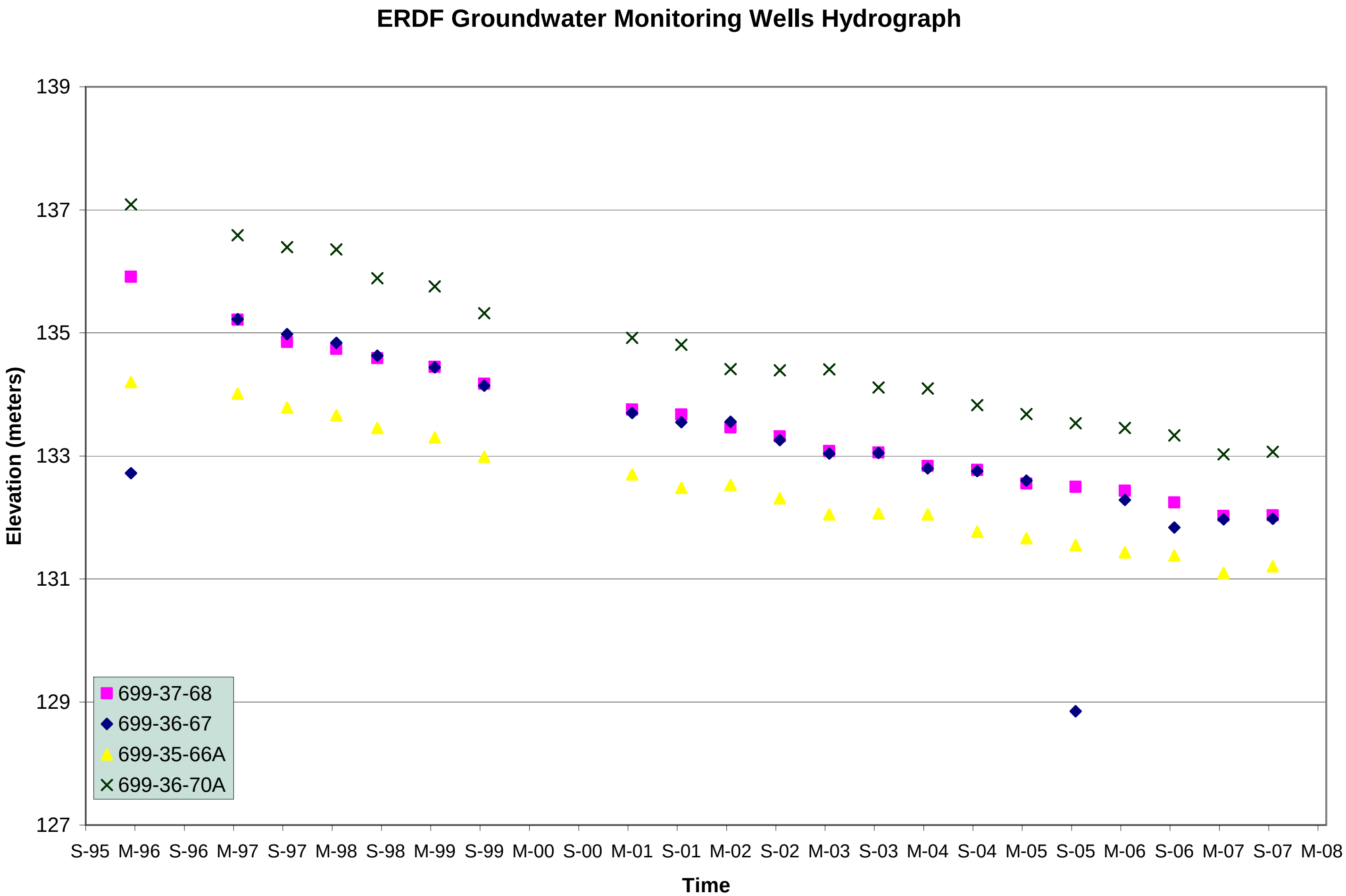


Figure 3-2. Hydrograph from ERDF Groundwater Monitoring Wells.



4.0 ANALYTICAL RESULTS AND FIELD DATA

Analytical results for leachate and groundwater samples collected during CY 2007 are discussed in the following subsections. Also discussed are the data resulting from CY 2007 groundwater-level measurements.

4.1 SUMMARY OF GROUNDWATER ANALYSES

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

Groundwater monitoring results and apparent trends based on CY 2007 data are summarized in Table 4-1.

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

Analyte	Upper Tolerance Interval[a]	Well(s) Exceeding Upper Tolerance Interval in CY 2007[b]				Comments
		70A	66A	67	68	
Arsenic	4.2 μg/L	Yes	Yes	No	No	Arsenic concentrations in well 66A remained elevated relative to the tolerance level. Arsenic concentrations in well 70A exceeded the tolerance limit for the March 2007 sampling but were non-detect in the September 2007 sample. Arsenic concentrations were not detected in the remaining wells from the 2007 sampling. All arsenic detections are very close to analytical detection limits (i.e. higher analytical uncertainty). No apparent trending in the data was seen. It should also be noted that the reported arsenic detects for CY 2007 remained below the Hanford Site background levels listed in the ERDF GPP (WCH 2008) for arsenic (11.8 ppb).
Barium	122.3 μg/L	No	No	No	No	All wells exhibited concentrations below the tolerance interval, stable with regards to previous years.
Chromium	13.4 μg/L	No	Yes	No	No	Chromium levels in 66A are elevated relative to the new tolerance limit, but have not changed significantly from previous years. The other wells were all below the upper tolerance level.

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

Analyte	Upper Tolerance Interval[a]	Well(s) Exceeding Upper Tolerance Interval in CY 2007[b]				Comments
		70A	66A	67	68	
Lead	5 μg/L	No	No	No	No	Lead concentrations from the September 2007 sampling were not detected and are below the tolerance interval, consistent with previous analyses and appear very stable.
Selenium	5.6 μg/L	Yes	Yes	No	Yes	Selenium levels in wells 70A, 66A, and 68A were elevated relative to the tolerance level from the March 2007 sampling. Spikes in the Selenium values in the wells have appeared in previous years (e.g., 1999, 2002, and 2004). Selenium concentrations in all of the wells from the September 2007 sampling are below the tolerance interval and overall appear consistent with long term levels.
Tin	10 μg/L	No	No	No	No	Tin concentrations in wells 66A and 68 were above detection level, but below the upper tolerance level. Tin concentrations from the September 2007 sampling were not detected and are below the tolerance interval, consistent with previous analyses and appear very stable.
Uranium	3.4 μg/L	No	No	No	No	All wells exhibited stable concentrations below the tolerance interval and appears to be very stable.
Vanadium	40 μg/L	No	No	No	No	All wells exhibited concentrations below the tolerance interval and very stable with regards to previous years.
Zinc	26.5 μg/L	No	No	Yes	No	Well 67 continued to exhibit stable but elevated concentrations relative to the other three wells, apparently as a continuing impact of galvanic corrosion to well components in previous years. For the remaining wells, validation of detects of the CY05, CY06, and CY07 data indicates that all low-level zinc detects should be flagged as nondetect due to laboratory contamination.
Alkalinity	152.9 mg/L	No	No	No	No	All wells exhibited concentrations below the tolerance interval, stable with regards to previous years.
Chloride	26 mg/L	No	No	No	Yes	Chloride levels in well 68 were elevated relative to the tolerance level from the March 2007 sampling. Spikes in the Chloride value in this well have appeared in previous years (2003). The values in all wells from the September 2007 sampling exhibited concentrations below the upper tolerance interval and overall appear consistent with long term levels.
Fluoride	0.45 mg/L	No	No	No	No	All wells exhibited concentrations below the tolerance interval, stable with regards to previous years.
Sulfate	37.8 mg/L	No	No	No	No	All wells exhibited concentrations below the tolerance interval, stable with regards to previous years.

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

Analyte	Upper Tolerance Interval[a]	Well(s) Exceeding Upper Tolerance Interval in CY 2007[b]				Comments
		70A	66A	67	68	
Gross alpha	2.98 pCi/L	Yes	No	Yes	No	Gross Alpha activity in the wells was not detected in the March 2007 sampling. However, the values from the September 2007 for wells 70A and 67 exceed the tolerance level. Spikes in the Gross Alpha values in these wells have appeared in previous years (2000 and 2003). The values from the September 2007 sampling in the other two wells continued below detection limits, below the tolerance interval, and stable with regards to previous years. All gross alpha detections are very close to analytical detection limits (i.e. higher analytical uncertainty). No apparent trending in the data was seen.
Gross beta	31.5 pCi/L	No	Yes	Yes	Yes	Gross beta activity appears to be upward trending in the downgradient wells (66A, 67, and 68) continuing to exceed the tolerance interval. Maximum values in upgradient well 70A remained below the tolerance level.
Carbon-14	58.1 pCi/L	No	No	No	No	Carbon-14 was not detected in any of the wells during the 2007 monitoring events.
Iodine-129	21.1 pCi/L	No	No	No	No	All wells exhibited concentrations below the tolerance level.
Radium	0.695 pCi/L	No	No	No	No	Radium was not detected in any of the wells during the 2007 monitoring events; all detection limits were below the tolerance interval in all wells and appear to be stable relative to previous years.
Technetium-99	93.8 pCi/L	No	No	No	No	All wells exhibited concentrations below the tolerance level.
Carbon tetrachloride	11 μg/L	No	No	No	No	All wells exhibited concentrations below the tolerance interval with no significant trends identified.
Total organic halides (TOX)	5 μg/L	No	No	No	Yes	Total Organic Halides concentrations were not detected in any of the wells except for well 68 in the March 2007 sampling; however the laboratory detection limits were slightly above the tolerance interval. Spikes have been noted in TOX values in previous sampling and no specific trends are apparent.
Nitrogen in nitrite and nitrate	51.1 mg/L	No	No	No	No	All wells exhibited concentrations below the tolerance interval, stable with regards to previous years with an indication of downtrending concentrations in all wells.
Total dissolved solids	570 mg/L	No	No	No	No	All wells exhibited stable concentrations below the tolerance interval.
Specific conductance	774 μS/m	No	No	No	No	All wells exhibited concentrations below the tolerance interval, stable with regards to previous years.

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

Analyte	Upper Tolerance Interval[a]	Well(s) Exceeding Upper Tolerance Interval in CY 2007[b]				Comments
		70A	66A	67	68	
pH	8.01 units	No	Yes	No	Yes	The pH measured in well 68 in March 2007 and well 66A in September 2007 were elevated relative to the tolerance level. The other wells were below the upper tolerance limit. These high measurements in the two wells do not appear to indicate a trend.
Turbidity	49.8 NTU	No	No	No	No	All wells exhibited concentrations below the tolerance interval, stable with regards to previous years.

[a] New Upper Tolerance Levels have been set for 2007 onward in the revised ERDF GPP (WCH 2008)..

[b] Well identification:

70A = upgradient monitoring well 699-36-70A
66A = downgradient monitoring well 699-35-66A
67 = downgradient monitoring well 699-36-67
68 = downgradient monitoring well 699-37-68

CY = calendar year

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 2008). 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 wells 699-36-67, 699-36-70A, and 699-37-68.

- **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. Most recent samples have reported nondetect values. The September 2007 values for wells 67 and 70A did show detection above the upper tolerance levels. Similar spikes have appeared in the results from previous years. No trending is noted.

- **Gross Beta Activity**. Activity for gross beta generally increased over the course of the ERDF monitoring activities for all well through CY2002. Recent sampling results suggest that gross beta activity in the upgradient well (70A) has entered a downward trend. Downgradient wells 66A and 68 are showing a continuing long term upward trend. Downgradient well 67 has remained essentially stable.

- **Technetium-99**. Technetium-99 activity concentrations in the ERDF monitoring wells have remained stable have generally been within tolerance intervals over the course of ERDF monitoring activities. Recent sampling results suggest that activity in two wells (67 and 70A) may be entering a downward trend and the other two wells (66A and 68) show a very slight upward trend over the long term.

- **Iodine-129**. Iodine-129 activity has remained stable in all monitoring wells over the course of ERDF monitoring activities, and no wells have exceeded the upper tolerance interval. However, Iodine-129 in well 67 may be showing a slight uptrend over the long term.

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

Downgradient well 699-36-67 continues to exhibit elevated zinc concentrations that are significantly above the revised upper tolerance interval (WCH 2008)l. The zinc concentrations in this well, and previously in well 699-37-68, were attributed to galvanic corrosion of the galvanized riser pipe with sampling pump equipment (BHI 2003, 2004, 2005b; WCH 2006). Monitoring well 699-36-67 has not been modified to remedy this issue, and the continued elevated zinc concentration in well 699-36-67 suggests that galvanic corrosion of the pumping equipment may be continuing. This well was decommissioned and removed in late CY 2007 to allow for the next ERDF cell expansion (cells 7 and 8). The replacement well should eliminate this zinc contamination issue.

4.2 SUMMARY OF LEACHATE ANALYSIS

Data associated with leachate sampling conducted from CY 2005 through CY 2007 are presented in Appendix C, Table C-1. Only analytical results that were reported as significant detects (>1 ppb) or that were reported as nondetected values but which are on the routine short list or groundwater monitoring COC lists are included in this report.

Leachate samples contained detectable concentrations of common metals, anions, and mobile radionuclides. Based on the CY 2007 Leachate sampling results, the constituents that were generally increasing in activity include gross alpha, gross beta, and total uranium. The following is an update of those constituents for which concentrations/activities appeared to be increasing in evaluation of the CY 2006 sampling results:

- **Chromium**. Chromium concentrations that were previously slowly increasing have stabilized and are beginning to slowly decrease.

- **Nickel**. Nickel, which is on the long list of analytes and monitored once every 2 years, appeared in previous evaluations to be increasing in concentration. Nickel was not sampled during the CY 2007 sampling but will be evaluated for the CY 2008 report.

- **Potassium**. Potassium appears to be stabilized and slightly decreasing in concentration based on data collected during CY 2007.

- **Specific Conductance**. Specific conductance appears to remain stable during the CY 2007 monitoring events.

- **Bromide**. Bromide was not detected in leachate samples during the CY 2007 monitoring events.

- **Nitrate**. Nitrate concentrations have remained stable though the CY 2007 monitoring.

- **Total Dissolved Solids**. Total dissolves solids was indicating a slight upward trend through the end of CY 2006, have stabilized during the CY 2007 monitoring.

- **Gross Alpha**. Gross alpha activity concentrations have generally continued to increase over the past 3 years.

- **Gross Beta**. Gross beta activity, which has generally increased through the CY 2006 monitoring, appears to have stabilized based on the CY 2007 monitoring.

- **Uranium**. Uranium activity has generally continued to increase over the past 3 years and have reached a new maximum during the CY 2007 monitoring.

4.3 SUMMARY OF WATER-LEVEL MEASUREMENTS

Groundwater monitoring wells in the ERDF well network have exhibited a gradual rate of decline in water levels since monitoring was initiated in September 1996. Water-level measurements collected during CY 2007 from wells 699-36-67, 699-37-68, 699-35-66A, and 699-36-70A show a rate of decline that may be starting to stabilize.

Based on the measured water levels in the four ERDF monitoring wells, it was determined that the height of the water columns in the ERDF monitoring wells are 4.0 m (13 ft) at well 699-35-66A, 4.9 m (16 ft) of water at well 699-36-70A, 5.0 m (16 ft) of water at well 699-36-67, and 6.0 m (20 ft) of water at well 699-37-68. At the current average rate of decline, the monitoring wells would be available for use, as they are currently constructed, for approximately 15 to 22 years.

Wells 699-36-67 and 699-37-68 were decommissioned and removed in late CY 2007 to allow for the ERDF cells 7 and 8 expansions. Downgradient replacement wells, 699-37-66 and 699-36-66B, have been put in place.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the CY 2007 analytical results, the statistical analysis of monitoring data, an evaluation of leachate monitoring data, and a review of the water-level measurement data, the following conclusions and recommendations are presented:

Nitrogen, carbon tetrachloride, gross beta, technetium-99, iodine-129, and uranium present in samples collected from the ERDF monitoring wells are due to the migration of contaminants from non-ERDF sources in the 200 West Area.

Although arsenic concentrations remain well below Hanford site background reference values, concentrations in well 699-36-67 may be trending upward. No Hanford-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 the contamination seen.

Total organic halide concentrations significantly spiked during the CY 2006 monitoring but were not detected during the September 2007 sampling. Analysis has shown periodic spikes in the groundwater data in the past. No correlations can be seen between total organic halide results and the volatile organic analyses (VOA) performed at the same time (VOA will report unexpected detections of chlorinated organics – the most likely contributor to total organic halide results). Total organic halide analysis is only an indicator analysis. Any future indication of consistent contamination must be monitored closely to establish the source and composition of the compounds.

Trends indicating increasing activity of gross alpha, gross beta, and uranium were noted for leachate samples collected over the past 3 years. Groundwater monitoring data for these constituents were examined to determine potential impacts to groundwater from ERDF operations. Groundwater activity from uranium has remained stable. Groundwater activity from gross alpha showed upward spikes during the CY 2007 monitoring, however the overall trend indicates a slight long term decrease. Groundwater activity from gross beta indicates an upward trend in the most downgradient wells with the upgradient well remaining stable below the upper tolerance level. Groundwater activity from gross alpha and gross beta needs to be monitored closely in future events to determine if the ERDF leachate is negatively impacting the groundwater at this location. Two of the existing down gradient wells will be decommissioned and replacement wells will be constructed further down gradient to allow for the ERDF expansion. This may extend the time period needed to allow the contaminant peak from historical releases in 200W to pass the down gradient wells due to the increased travel time of the groundwater between monitoring locations. The contaminant peak appears to have passed the upgradient well around 2005 establishing a slight down trend in the upgradient well.

Based on this CY 2007 evaluation, no additional analytes are recommended for the groundwater monitoring program and no additional analysis is necessary for the routine leachate sampling. Although the current monitoring frequency appears to be appropriate for future monitoring needs, initially new wells 699-37-66 and 699-36-66B will be sampled on a quarterly basis for the first year to provide additional baseline data.

The removal of the zinc contamination source associated with the pump equipment in well 699-36-67 should require reevaluation of an appropriate tolerance interval for this element. Other elements may also be affected from these well replacements.

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APPENDIX A

GROUNDWATER SAMPLING RESULTS, 1996-2007

Table A-1. Arsenic Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	3	B		1.1	B		3	B		1.7	B	1.7B	4.4	
Sep-96	2.6	B	3.8B	0.98	B		2.1	B		0.67	B		4.4	
Mar-97	2.8	B	2.7B	2	B		2.5	B		1.4	B		4.4	
Sep-97	3.5	B	2.8B	1.9	B		3.3	B		1.6	U		4.4	
Mar-98	2.1	B		1.6	B	1.1B	2.6	B		0.6	U		4.4	
Aug-98	2.8	B		1	U		1.2	B		1.4	B	1U	4.4	
Mar-99	3.3	U		3.3	U	3.3U	3.3	U		3.3	U		4.4	
Sep-99	3.3	U	3.3U	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		10U	52.1	U		52.1	U		4.4	
Mar-02	4.4		3U	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	4.2U	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	3.4U	4.4	
Sep-04	3.6	U		3.7		3.6U	3.6	U		3.6	U		4.4	
Mar-05	34	U	34U	34	U		34	U		34	U		4.4	
Sep-05	4.7	U		23.6	U		23.6	U		27.5		23.6U	4.4	
Mar-06													4.4	
Sep-06	5.3			3.7	U	3.7U	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	4.1U	4.1	U		4.1	U			4.2

Table A-2. Barium Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	46	B		81.9	B		92.1	B		92	B	90.6B	123.3	
Sep-96	42.9	B	0.0402B	66.7	B		80.8	B		77.9	B		123.3	
Mar-97	46.3	B	47B	87.6	B		93.4	B		102	B		123.3	
Jun-97							83.6						123.3	
Sep-97	42.2	B	40.9B	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	69B	123.3	
Mar-99	40.5			59		58.4	76.1		72.8	73.2			123.3	
Sep-99	40.3	B	40.2B	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	200U	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	57.2C	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

Table A-3. Chromium Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	13.4			4.4	U		5.9	B		7.7	B	5.1B	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	3.6B	3.5	U		16.5	
Mar-98	16.6			3.3	B	3.6B	6.8	B	5.4B	4.1	B		16.5	
Aug-98	13.5			4.2	U		4.2	U		4.2	U	4.2U	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	10U	7.4			5.4			16.5	
Dec-01							1.5	B					16.5	
Mar-02	16.3		16.2	5.2			6			11.3			16.5	
Sep-02	16.2			5.6		1.2	5.5			8.7			16.5	
Mar-03	16.3			2.5			3.8			9.9			16.5	
Sep-03	16.2	C	17.2C	3.6			4.9			12	C		16.5	
Mar-04	16.6			4.1			4			4.4		3.8	16.5	
Sep-04	15.6			5.5		5.3	3.8			11.6			16.5	
Mar-05	15.9		17.1	9.7	U		9.7	U		9.7	U		16.5	
Sep-05	14.4			3.6	UC		3.6	UC		3.6	UC	5.4UC	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

Table A-4. Lead Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	1	UJ		1	UJ		1	UJ		1	UJ	1UJ	70.4	
Sep-96	42.1	U	0.002U	42.1	U		42.1	U		42.1	U		70.4	
Mar-97	26	U	26U	26	U		34.8	B		26	U		70.4	
Sep-97	1.1	U	1.1U	1.1	U		1.1	U		47.1	U		70.4	
Mar-98	1.1	U		1.1	U	1.1U	1.1	U		2.4	B		70.4	
Aug-98	30.2	U		30.2	U		30.2	U		30.2	U	30.2U	70.4	
Mar-99	1.8	U		1.8	U	1.8U	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	2.1U				70.4	
Mar-01	2.6	U		2.6	U		2.6	U		2.6	U	2.6U	70.4	
Sep-01	3.7			6.8		3U	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	2.4U	2.4	U		2.4	U		70.4	
Mar-03	2.6	U		2.3	U		2.6	U		2.6	U		70.4	
Sep-03	1.9	U	1.9U	1.9	U		1.9	U		1.9	U		70.4	
Mar-04	2	U		2	U		2	U		2	U	2	70.4	
Sep-04	1.9	U		1.9	U	1.9U	1.9	U		1.9	U		70.4	
Mar-05	24.7	U	24.7U	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	31.9U	70.4	
Mar-06													70.4	
Sep-06	3.3	UC		1.2	U	1.2U	1.2	U		1.2	U		70.4	5
Mar-07	2.8	U		2.8	U		2.8	U	2.8U	2.8	U		70.4	5
Sep-07	3.3	U		3.3	U	3.3U	3.3	U		3.3	U			5

Table A-5. Selenium Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	2.1	B		2.6	B		3.5	B		3.4	B	3.6B	5.6	
Sep-96	3.1	B	0.003U	3.8	B		4.1	B		4.8	B		5.6	
Mar-97	2.6	BN	2.3BN	3.5	BN		3.1	BN		3.9	BN		5.6	
Sep-97	3.2	B	2.9B	3.6	B		4.8	B		4.6	B		5.6	
Mar-98	3.2	B		3.6	B	3.6B	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		2.6U	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	4.1U	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	3.4U	5.6	
Sep-04	3.9	U		3.9	U	3.9U	3.9	U		3.9	U		5.6	
Mar-05	48.5	U	48.5U	48.5	U		48.5	U		48.5	U		5.6	
Sep-05	6.2	C		44	U		44	U		44	U	44.0U	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	5.2		5.9			5.6	5.6
Sep-07	4.8			4.3	U	4.3U	4.3	U		4.3	U			5.6

Table A-6. Tin Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	35.3	U		35.3	U		35.3	U		40.1	B	35.3U	55.6	
Sep-96	33.5	U	0.033U	33.5	U		33.5	U		33.5	U		55.6	
Mar-97	24.7	U	24.7U	24.7	U		29	B		24.7	U		55.6	
Sep-97	5.6	U	5.6U	5.6	U		5.6	U		33.2	U		55.6	
Mar-98	4.9	U		4.9	U	4.9U	4.9	U		4.9	U		55.6	
Aug-98	28	U		28	U		28	U		28	U	28U	55.6	
Mar-99	2.7	U		2.7	U	2.7U	2.7	U		2.7	U		55.6	
Sep-99	2.1	U	2.1U	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	3.5U	55.6	
Sep-01	2.4	U		100	U	100U	13.9	U		13.9	U		55.6	
Mar-02	3.3	U	3.3U	3.3	U		3.3	U		3.3	U		55.6	
Sep-02	4.7	U		4.7	U	4.7U	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	5.6U	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	3.6U	55.6	
Sep-04	4	U		4	U	4U	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	6.3U	6.3	U		6.3	U			10

Table A-7. Uranium Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	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	2.38B	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

Table A-8. Vanadium Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	26.8	J		12.6	J		23.6	J		14.4	J	15.1J	41	
Sep-96	33.4	B	0.0258B	25.1	B		32.9	B		24.3	B		41	
Mar-97	33.2	B	30.3B	26	B		28.9	B		25.3	B		41	
Jun-97							36.2						41	
Sep-97	27.8	B	27.2B	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	33.9B	41	
Mar-99	28.3			13.9		15	25.2		30	23.6			41	
Sep-99	28.7	B	28.6B	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	50U	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	23.2C	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

Table A-9. Zinc Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	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	0.003U	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		5.1U	394			757	
Mar-98	5.8	B		318		321	6.1	B	2.2U	386			757	
Aug-98	10.3	B		241			4.7	B		663		629	757	
Mar-99	2.6			164		144	10.6		0.8U	347			757	
Sep-99	2.9	B	3.5B	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	2.6C	296			3.1			8.9	C		757	
Mar-04	7.8	C		317	C		5.1	C		12.9	C	9.9C	757	
Sep-04	6.9			288		286C	7.3	C		12.8			757	
Mar-05	29.6	UC	5.6UC	316	C		3.8	UC		15.4	UC		757	
Sep-05	14.5	UC		266	C		8.5	UC		9.1	UC	8.6UC	757	
Mar-06	9	UC	15.9UC	286	C		17	UC		12.4	UC		757	
Sep-06	8.7	UC		259	C	260C	10.3	UC		6.6	UC		757	26.5
Mar-07	5.8	UCJ		341			7	UCJ	6.1UCJ	11.7	UCJ		757	25.5
Sep-07	11.8	UC		378		375	3.8	UC		10.3	UC			26.5

Table A-10. Alkalinity Data.

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

Table A-11. Chloride Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	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	21.4D	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	DC					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	15.6D	22.6	D		23	D		23.8	D		25.9	
Mar-04	15	D		21.9	D		16.5	D		23.8	D	24.3D	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	24.5D	25.9	
Mar-06	13.2	D	13.9D	23.5	D		16.7	D		20.6	D		25.9	
Sep-06	15.2			21.2	D	21D	17.5			24.5	D		25.9	26
Mar-07	16.4	D		24.3	D		19.1	D	18.9D	27.2	D		25.9	26
Sep-07	15.8	D		21.3		21.9D	16.2	D		23.9	D			26

Table A-12. Fluoride Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	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	0.5U	0.335		0.5U	0.5	U		0.5	
Jun-99							0.373						0.5	
Sep-99	0.5	U	0.5U	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	0.5U				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	1U	0.5	U		0.5	U		0.5	
Dec-01							0.36						0.5	
Mar-02	0.25	U	0.25U	0.26			0.28			0.25	U		0.5	
Sep-02	0.25	U		0.25	U	0.25U	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		.25U	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

Table A-13. Sulfate Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	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	31.4D	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		35.2D	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	26.7D	31.3	D		34.3	D		31.5	D		37.8	
Mar-04	26.7	D		31	D		32.2	D		31.5	D	32.4D	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	31.1D	37.8	
Mar-06	27.3	D	27.4D	30.9	D		30.5	D		30.9	D		37.8	
Sep-06	26.6			30.2	D	29.4D	29.9			29.8	D		37.8	37.8
Mar-07	27.1	D		30.7	D		32.1	D	31.8D	31.7	D		37.8	37.8
Sep-07	26.6	D		31.2	D	30.1D	29	D		30.5	D			37.8

Table A-14. Gross Alpha Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	1.45	J		2.12	J		2.28	J		2.43	J	1.73J	3.3	
Sep-96	1.69	J		0.109	U		1.57	J		1.15	U		3.3	
Mar-97	1.69	J	0.199U	1.31	U		1.26	J		0.837	U		3.3	
Jun-97							1.68	J					3.3	
Sep-97	0.39	U	1.66J	0.791	U		1.2	J		2.5	J		3.3	
Dec-97							2.36	J					3.3	
Mar-98	1.32	J		0.659	U	1.4J	2.17	J		0.683	U		3.3	
Jun-98							2.17	U					3.3	
Aug-98	0.431	U		2.3	J		2.89	J		2.45	J	3.37	3.3	
Dec-98							1.87	J					3.3	
Mar-99	2.7	J		3		1.3U	1.68	U	1.3U	1.5	U		3.3	
Jun-99							2.75	J					3.3	
Sep-99	2.64	J	0.565U	0.535	U		1.31	U	0.928U	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	1.28U				3.3	
Dec-00							2.06	U					3.3	
Mar-01	0.303	U		1.01	U		2.33	J		0.812	U	1.43U	3.3	
Sep-01	-0.386	U		0.976	U	0.751U	1.12	U		0.374	U		3.3	
Mar-02	0.884	U	0.227U	0.522	U		0.363	U		0.016	U		3.3	
Sep-02	0.348	U		0.38	U	0.91U	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		0.882U	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	-0.173U	0.487	U		0.531	U		3.3	
Mar-05	1.53		0.817U	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	1.16U	-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	-.857U	-0.864	U		3.3	2.98
Sep-07	-0.352	U		4.71		1.05U	3.62			-0.194	U			2.98

Table A-15. Gross Beta Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	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

Table A-16. Carbon-14 Data

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	22.3	J		6.76	J		4.26	J		4.72	J	2.48U	26.8	
Sep-96													26.8	
Mar-97	21.6	J	22.2J	11.1	J		3.94	U		3.81	U		26.8	
Sep-97	16.7	J	10.7J	3.27	U		1.6	U		5.43	U		26.8	
Mar-98	19.4	J		4.5	U	7.16U	3.69	U		-1.49	U		26.8	
Aug-98	18.5	J		8.63	J		2.07	U		6.46	U	6.4U	26.8	
Mar-99	25	U		9.9	U	12U	-6.1	U		-6.5	U		26.8	
Sep-99	14.1	U	7.43U	-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	4.81U				26.8	
Mar-01	9.56	U		43.4	U		-28.1	U		47.2	U	57J	26.8	
Sep-01	32.5	U		6.73	U	22.5U	-15.1	U		-1.16	U		26.8	
Mar-02	14	U	21.4U	11.6	U		21.7	U		13.2	U		26.8	
Sep-02	5.02	U		17	U	32.6U	-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	3.32U	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	-12.4U	26.8	
Sep-04	8.8	U		0	U	6.99U	1.22	U		2.45	U		26.8	
Mar-05	11.8	U	42.2U	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	-10.7U	26.8	
Mar-06	34.2	U	16.1U	1.44	U		-22.6	U		6.04	U		26.8	
Sep-06	15.8	U		1.42	U	-5.16U	13.6	U		-4.74	U		26.8	58.1
Mar-07	20.8	U		29.4	U		21.2	U	7.41U	16.1	U		26.8	58.1
Sep-07	22.4	U		26.8	U	26.4U	-0.045	U		44.9	U			58.1

Table A-17. Iodine-129 Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	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		3.69U	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		4.54U	13.2		9.83U	15.2		15.2	1.62	U	1.62U	21.5	
Aug-98	9.6			12.2			15.2			2.57		2.78	21.5	
Mar-99	6.1			7.9		1.2U	14.4		3.8U	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		2.74U	21.5	
Jun-01							7.37						21.5	
Sep-01	3.1	U		12.3		-5.52U	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		2.16U	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	-9.28U	7.88	U		13.4			-1.82	U		21.5	
Mar-04	4.86			11.8			11			2.44	U	1.64U	21.5	
Sep-04	4.99			13.6		13.3	6.53			2.52	U		21.5	
Mar-05	5.25	U	3.66U	15.5			10.6			-1.61	U		21.5	
Sep-05	5.30			14.6			12.5			2.42	U	2.45U	21.5	
Mar-06	2.87	U	1.91U	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

Table A-18. Technetium-99 Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	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	U	0U	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

Table A-19. Radium Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	0.141	U		0.207	U		0.521	J		0.276	U	0.235J	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	J		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	0.103U	0.148	U		0.114	U		0.5	
Aug-98	0.0391	U		0.0864	U		0.14	U		0.135	U	0.0544U	0.5	
Mar-99	0.001	U		0.088	U	0U	0.087	U		0.017	U		0.5	
Sep-99	0.025	U	.088U	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	0.182U				0.5	
Mar-01	0.144	U		0.431	U		-0.037	U		0.033	U	0.931U	0.5	
Sep-01	-0.387	U		-0.537	U	0.506U	0.675	U		0.18	U		0.5	
Mar-02	0.94	J	0.599U	0.063	U		0.383	U		0.258	U		0.5	
Sep-02	-0.147	U		0.332	U	-0.143U	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	-.009U	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	0.411U	0.5	
Sep-04	-0.022	U		-0.05	U	-0.128U	-0.083	U		-0.051	U		0.5	
Mar-05	0.144	U	-.045U	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	0.04U	0.5	
Mar-06	-0.294	U	-0.042U	0.045	U		-0.199	U		-0.194	U		0.5	
Sep-06	-0.215	U		-0.117	U	0.073U	-0.327	U		0.06	U		0.5	0.695
Mar-07	-0.136	UJ		-0.395	UJ		-0.301	UJ	-.21UJ	-0.327	UJ		0.5	0.695
Sep-07	-0.229	U		-0.008	U	.067U	-0.121	U		-0.399	U			0.695

Table A-20. Carbon Tetrachloride Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	5	U		2	J		4	J		5	U	5U	10.6	
Sep-96	4	J	5U	7			7			5	J		10.6	
Mar-97	4	J	3J	6			7			4	J		10.6	
Jun-97							7						10.6	
Sep-97	5	U	5U	4	J		11			5	U		10.6	
Mar-98													10.6	
Jun-98							10						10.6	
Aug-98	2	J		6			5	U		3	J	3J	10.6	
Mar-99	1	J		4	J	4J	7			3	J		10.6	
Sep-99	5	U	1J	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	4J	7			5	J		10.6	
Mar-02	1	J	1J	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	5U	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	1J	6		6	7			8			10.6	
Sep-05	5	U		6			7			8		8	10.6	
Mar-06	1	J	1J	4	J		5	J		10			10.6	
Sep-06	5	U		5	J	5J	6			6			10.6	11
Mar-07	1	J		5	J		4	J	5J	7	J		10.6	11
Sep-07	5	U		6		6	5			8				11

Table A-21. Nitrogen Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	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	20.1D	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	5.1D	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	26D	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	24D	51.5	
Mar-06	4.6	D	4.6D	12.9	D		13.8	D		23.7	D		51.5	
Sep-06	5.3			13.4	D	13.2D	13.3			22.8	D		51.5	51.1
Mar-07	4.8	D		13	D		13.8	D	14D	28.9	D		51.5	51.1
Sep-07	4.4	D		12.7	D	12.7D	10.7	D		22.7	D			51.1

Table A-22. Total Organic Halides Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Mar-96	6.6	J		10.5	J		5.6	J		6.6	J	5	9.5	
Sep-96	5	U		5	U		5	U		5	U		9.5	
Mar-97	5	U		5	U		2.9			5	U		9.5	
Jun-97							11.7						9.5	
Sep-97	6.05		4.62U	7.05			4.62	U		5	U		9.5	
Mar-98	4.62	U		4.62	U	4.62U	4.62	U		4.62	U		9.5	
Aug-98	5.9			5.85			6.7			5	U	5U	9.5	
Mar-99	24	U		12	U	24U	34.5			14.3			9.5	
Sep-99	128		12U	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	20U	9.5	
Sep-01	6.5	U		8.7	U	7.4U	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		5.2U	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	5.2U	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	5.2U	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	15.9C	5.2	UC		9.2	C		10.6	D		9.5	
Sep-06	16.9			5	U	5U	6.1			38.9			9.5	5
Mar-07	5.2	U		5.2	U		5.2	U	5.2UJ	7.2			9.5	5
Sep-07	5.2	U		5.2	U	5.2U	5.2	U		5.2	U			5

Table A-23. Total Dissolved Solids Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	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			5	U		573.6	
Mar-04	262			323			326			438		442	573.6	
Sep-04	262			331		330	355			392			573.6	
Mar-05	205		253	278			339			386			573.6	
Sep-05	292			387			403			460		500	573.6	
Mar-06	274		269	314			302			391			573.6	
Sep-06	270			464		409	311			521			573.6	570
Mar-07	271	J		312	J		310	J	314J	388	J		573.6	570
Sep-07	259	J		309	J	363J	304	J		498	J			570

Table A-24. Turbidity Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Jun-95							5.02						50	
Sep-95							5.01						50	
Mar-96	0.34	J		0.3	J		0.26	J		3.21	J	1.48J	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

Table A-25. pH Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Upper (Through 2006)	New Upper (2007 Onward)
Jan-95							6.4						8	
Jun-95							7						8	
Sep-95							7.65						8	
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	
Mar-00													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

Table A-26. Specific Conductance Data.

Sample Date	699-35-66A (Down Gradient)	Qual	DUP	699-36-67 (Down Gradient)	Qual	DUP	699-36-70A (Up Gradient)	Qual	DUP	699-37-68 (Down Gradient)	Qual	DUP	Old Limit (Through 2006)	New Limit (2007 Onward)
Jan-95							641						743	
Jun-95							578						743	
Sep-95							653						743	
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		571C				743	
Mar-99				577			585		552C				743	
Jun-99							556	C	571C				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

APPENDIX B

GROUNDWATER SAMPLING TRENDS, 1996-2007

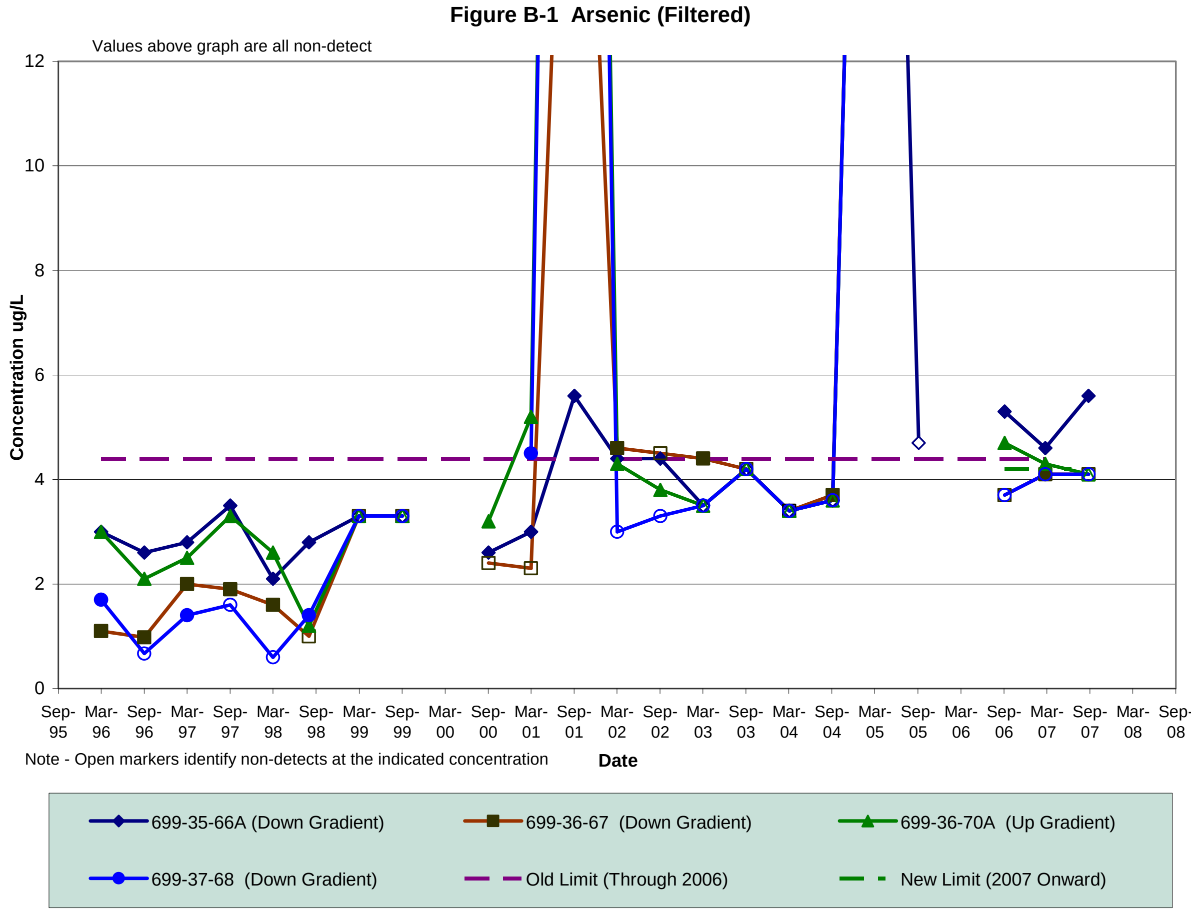


Figure B-1 Arsenic (Filtered)
Values above graph are all non-detect
Concentration ug/L
0
2
4
6
8
10
12
Sep-95
Mar-96
Sep-96
Mar-97
Sep-97
Mar-98
Sep-98
Mar-99
Sep-99
Mar-00
Sep-00
Mar-01
Sep-01
Mar-02
Sep-02
Mar-03
Sep-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Note - Open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

Appendix B – Groundwater Sampling Trends, 1996-2007

Figure B-2 Barium (Filtered)

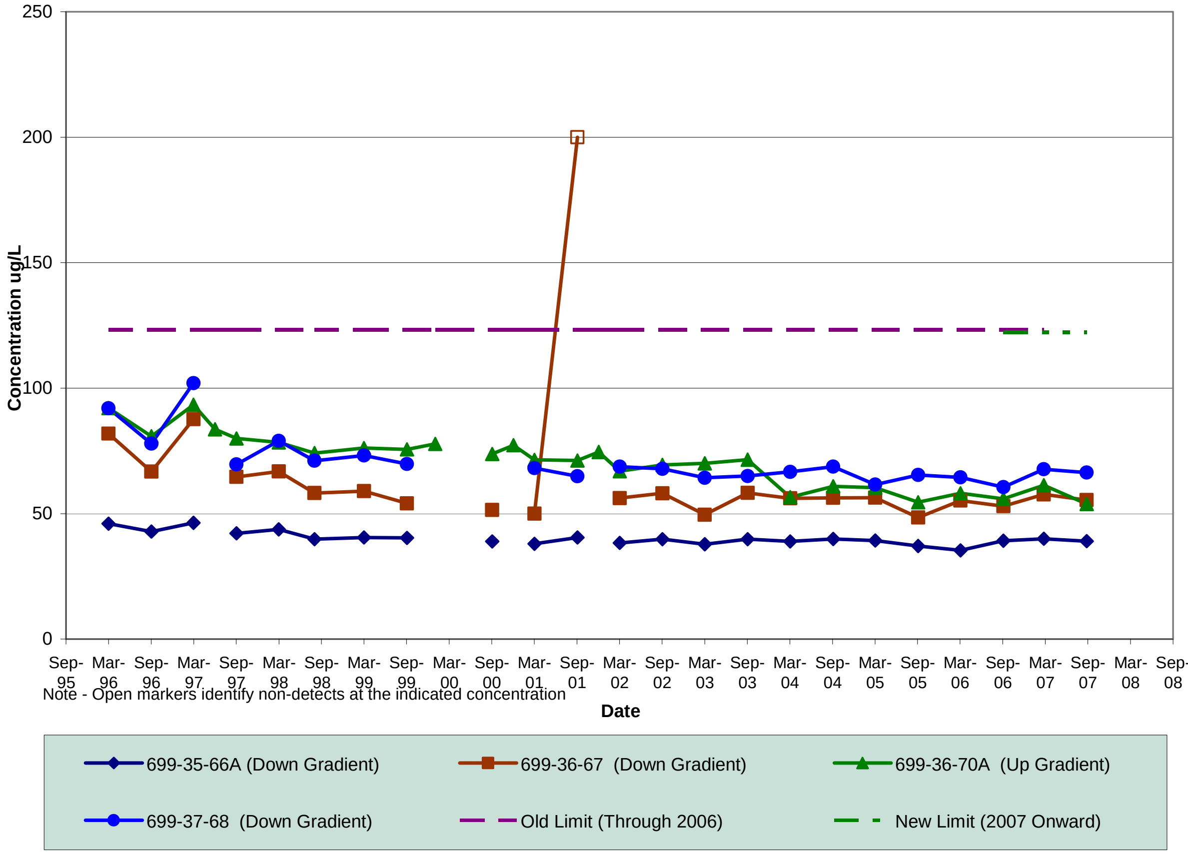


Figure B-3 Chromium (Filtered)

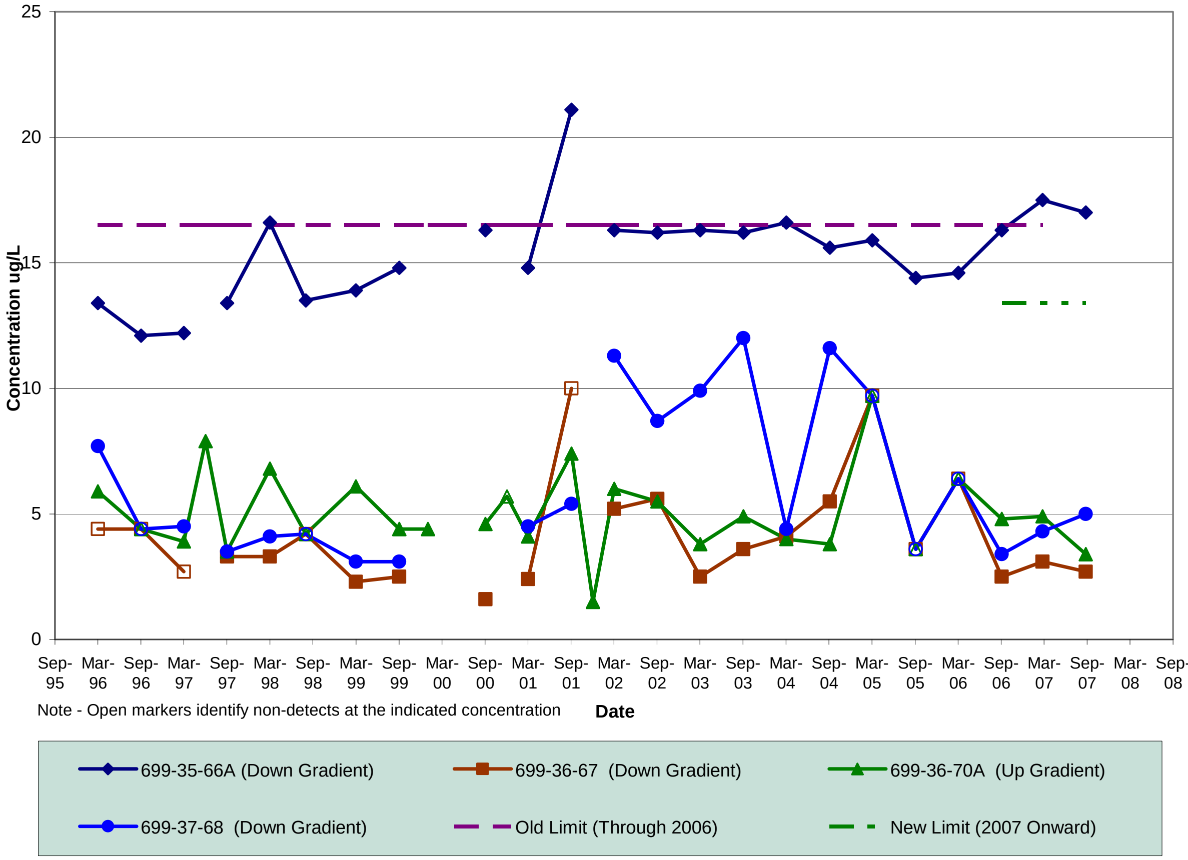
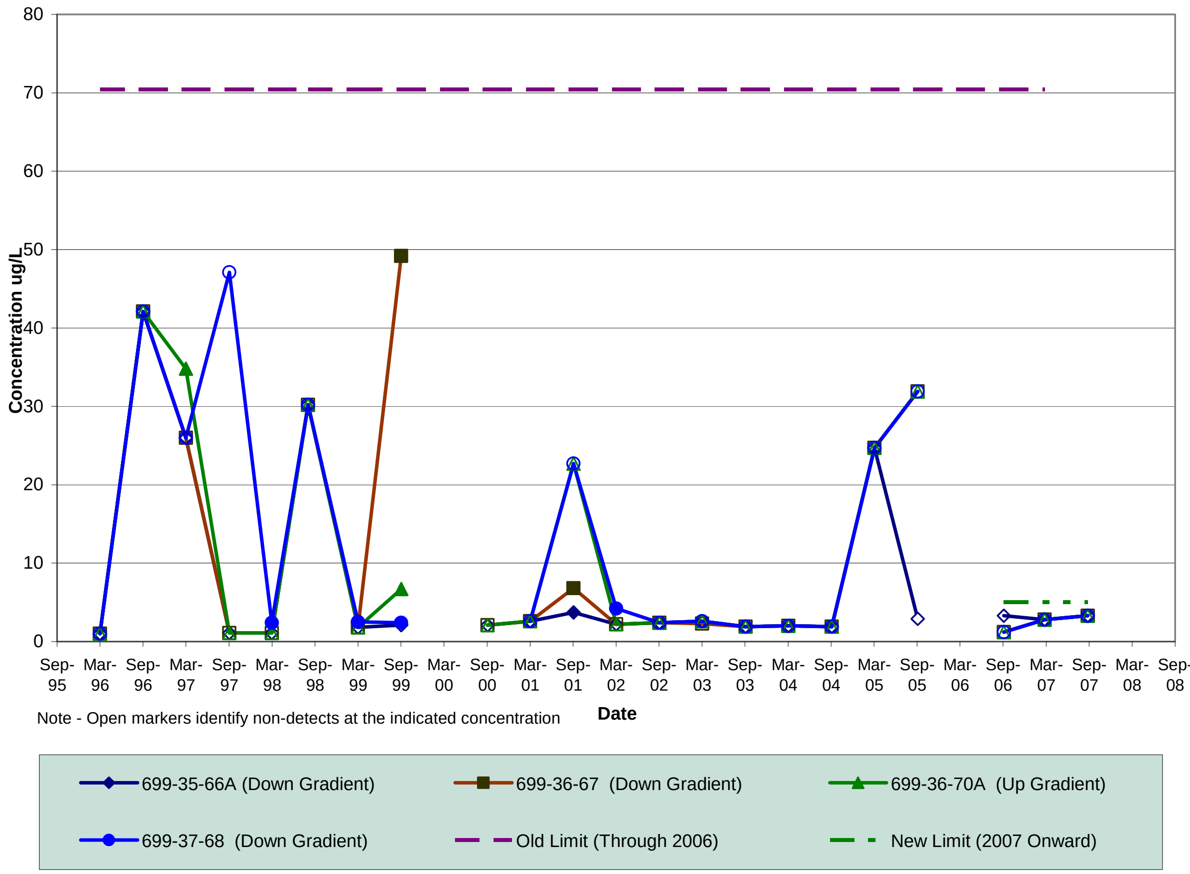


Figure B-4 Lead (Filtered)



Note - Open markers identify non-detects at the indicated concentration

Figure B-5 Selenium (Filtered)

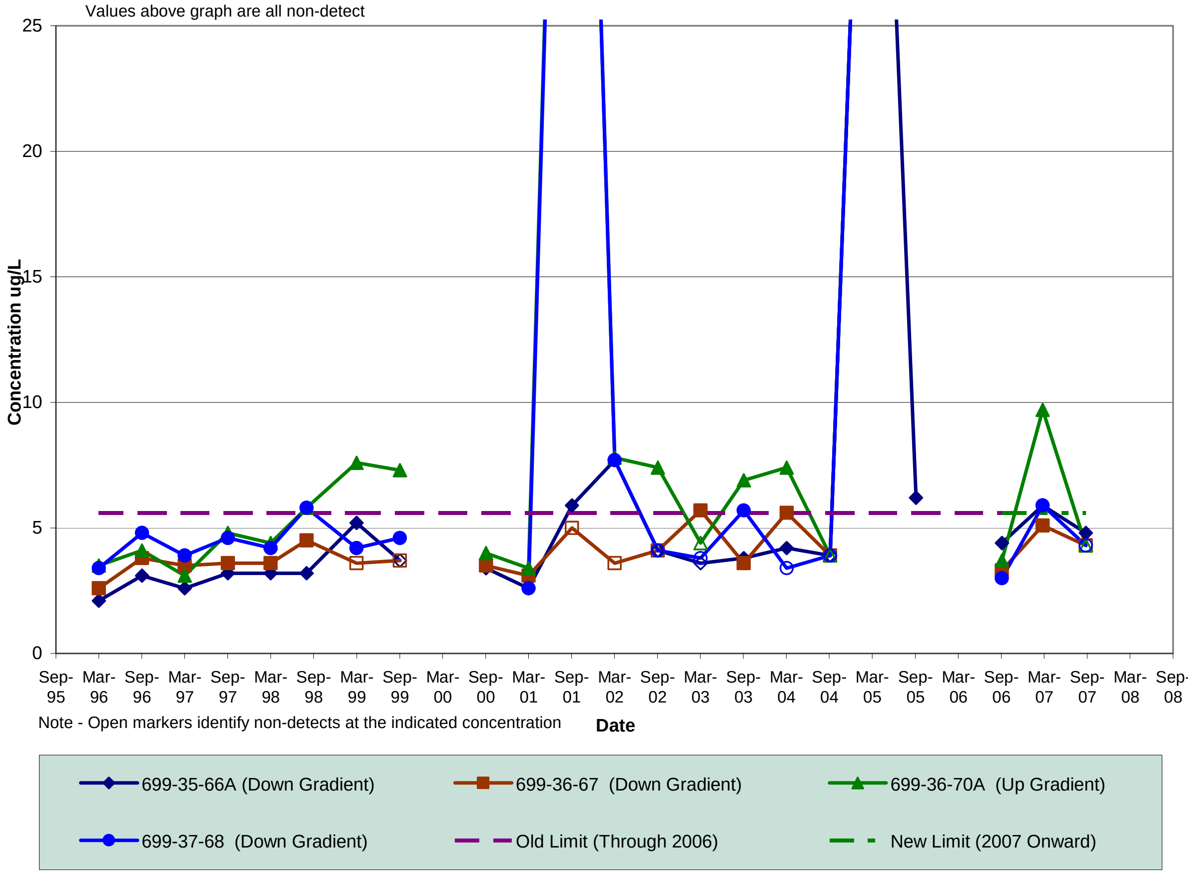


Figure B-6 Uranium (Filtered)

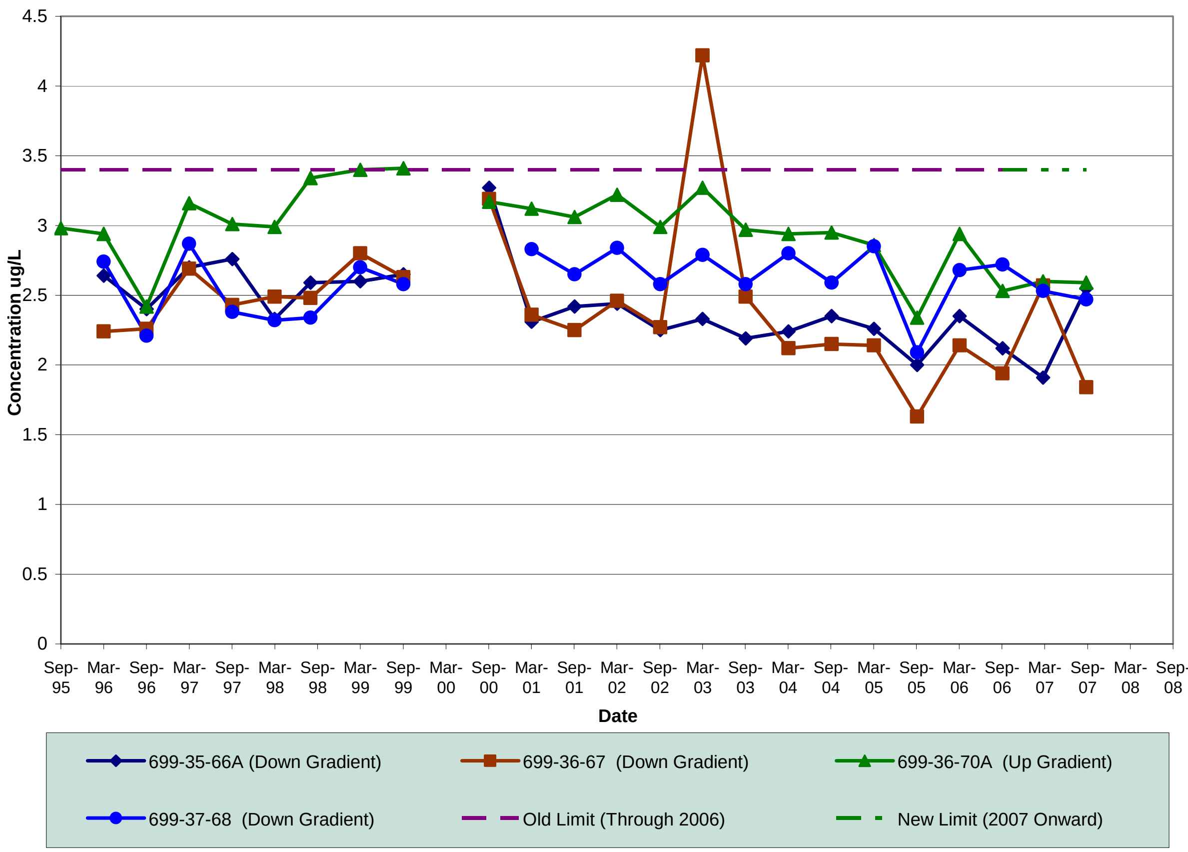


Figure B-7 Tin (Filtered)

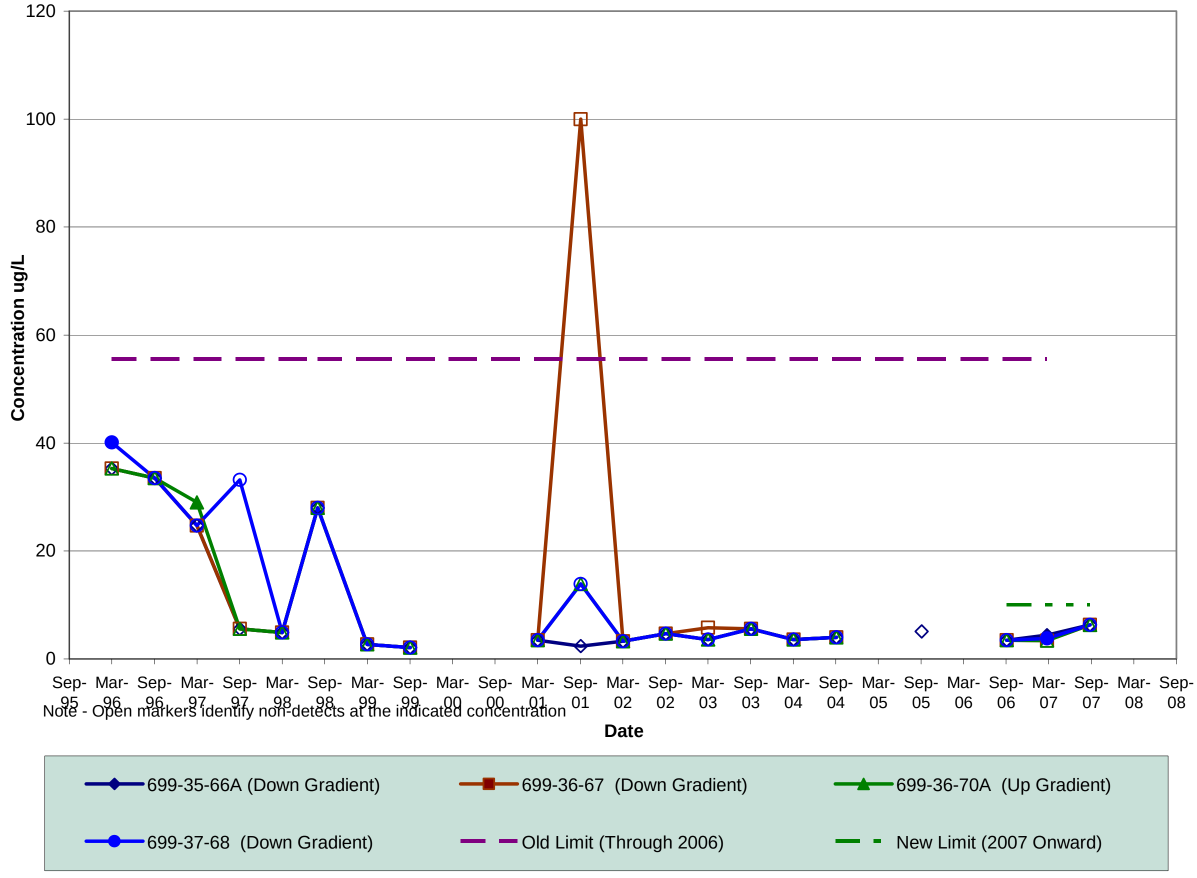
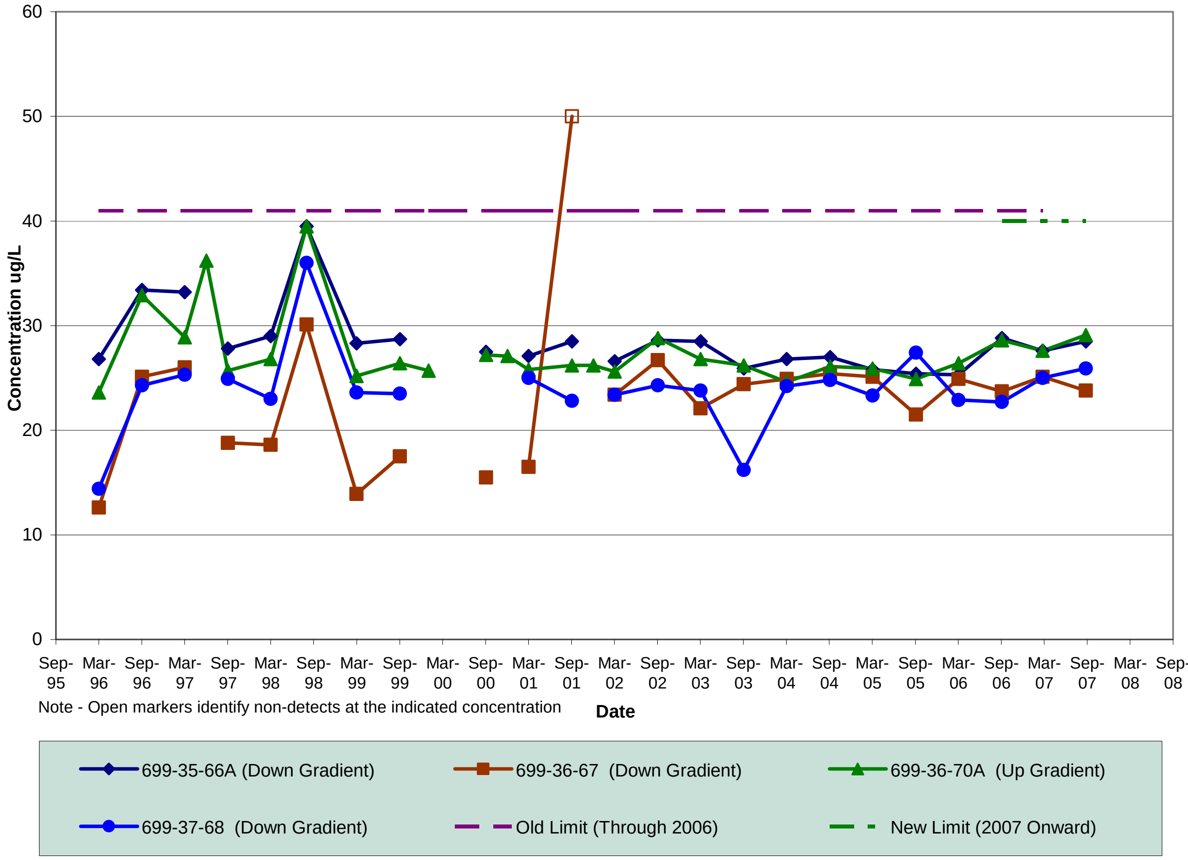


Figure B-8 Vanadium (Filtered)



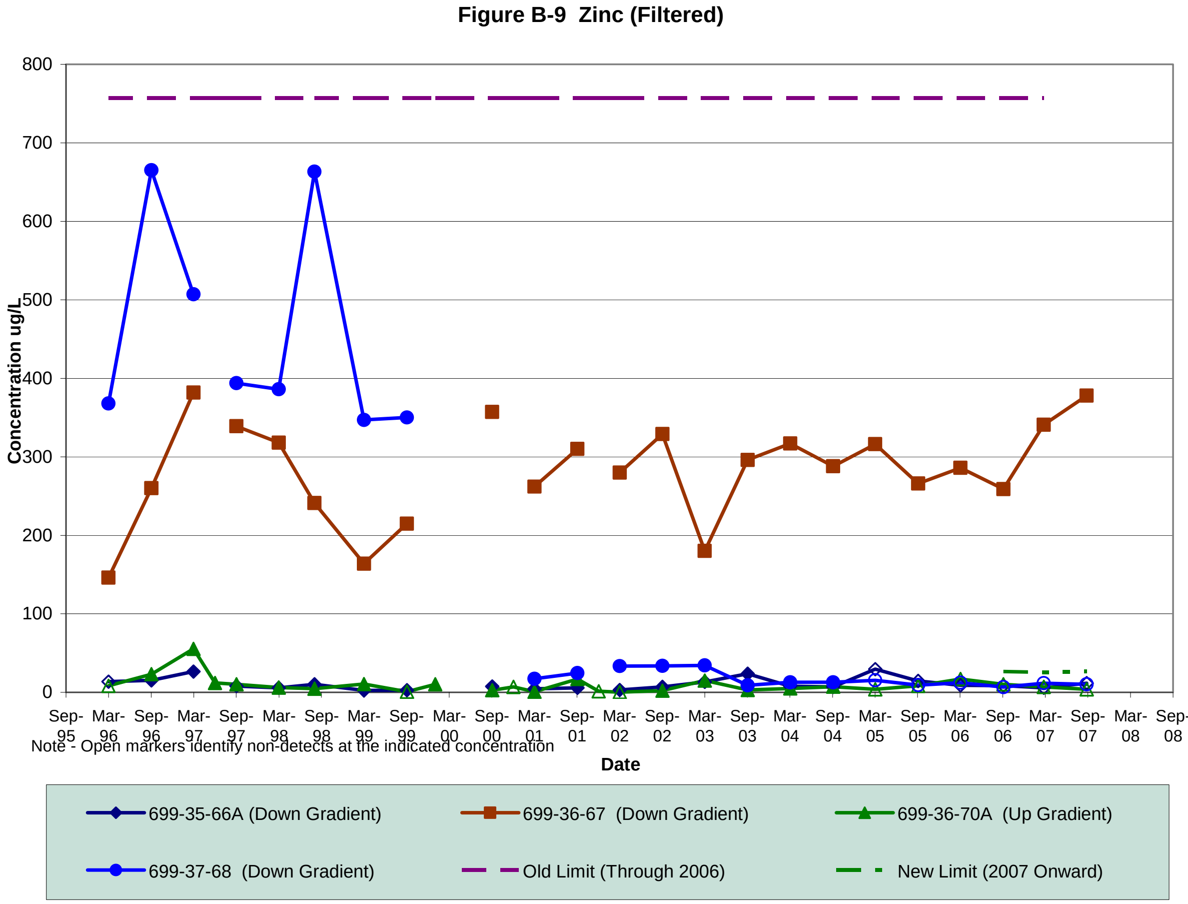


Figure B-9 Zinc (Filtered)
800
700
600
500
400
300
200
100
0
Concentration ug/L
Sep-95
Mar-96
Sep-96
Mar-97
Sep-97
Mar-98
Sep-98
Mar-99
Sep-99
Mar-00
Sep-00
Mar-01
Sep-01
Mar-02
Sep-02
Mar-03
Sep-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Note - Open markers identify non-detects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

Figure B-10 Alkalinity

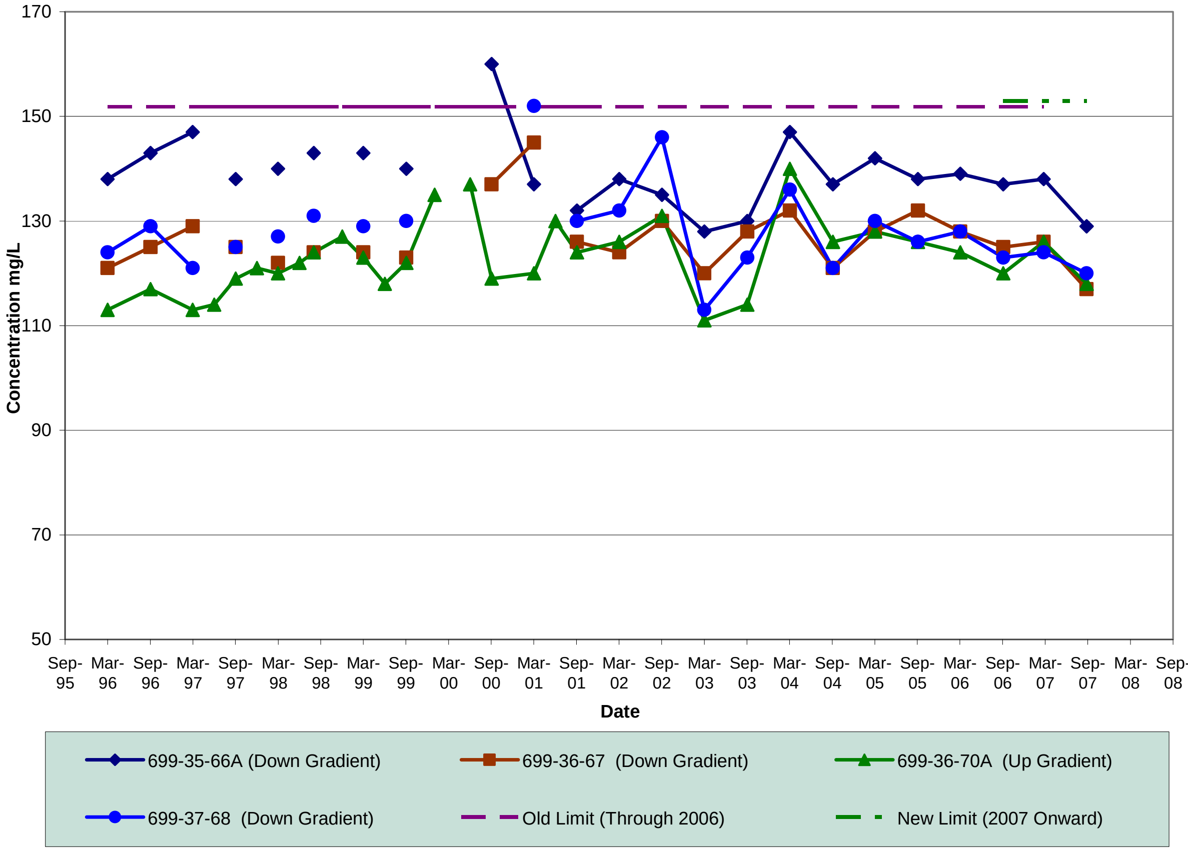


Figure B-11 Fluoride

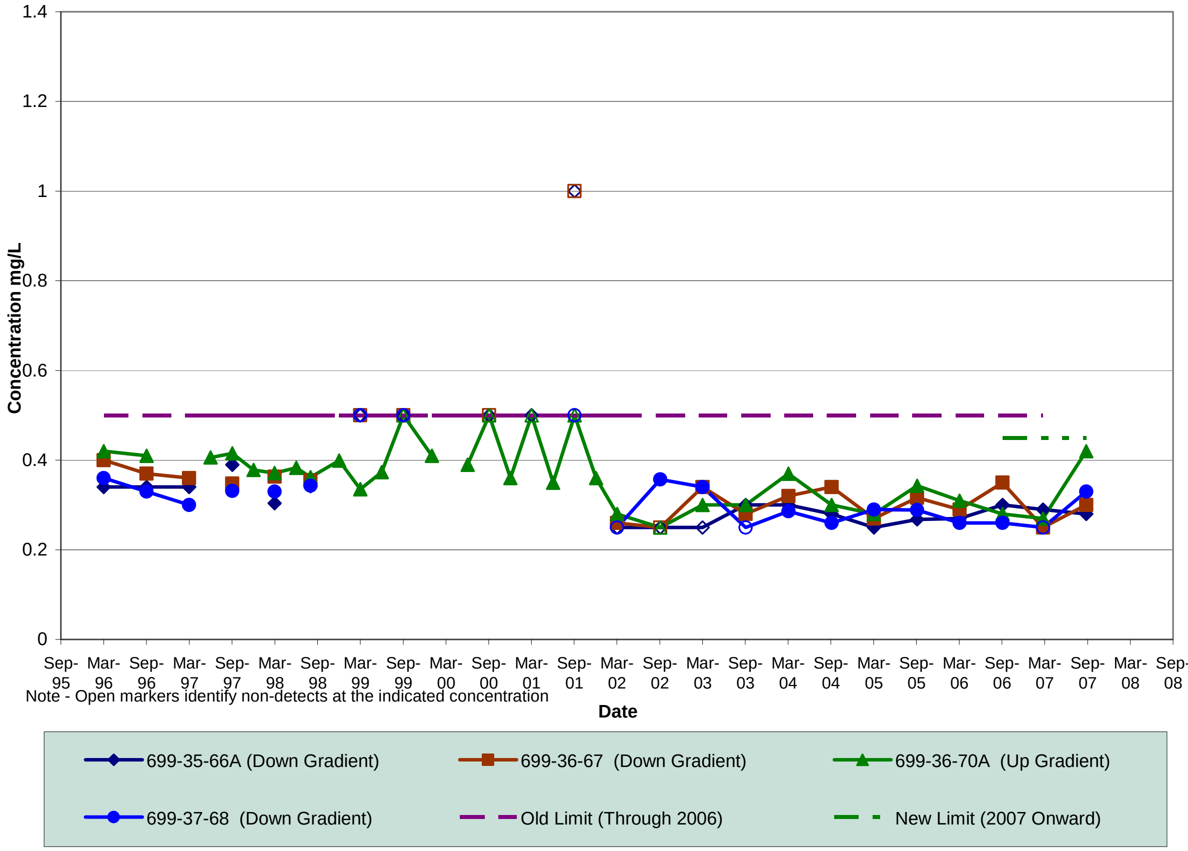
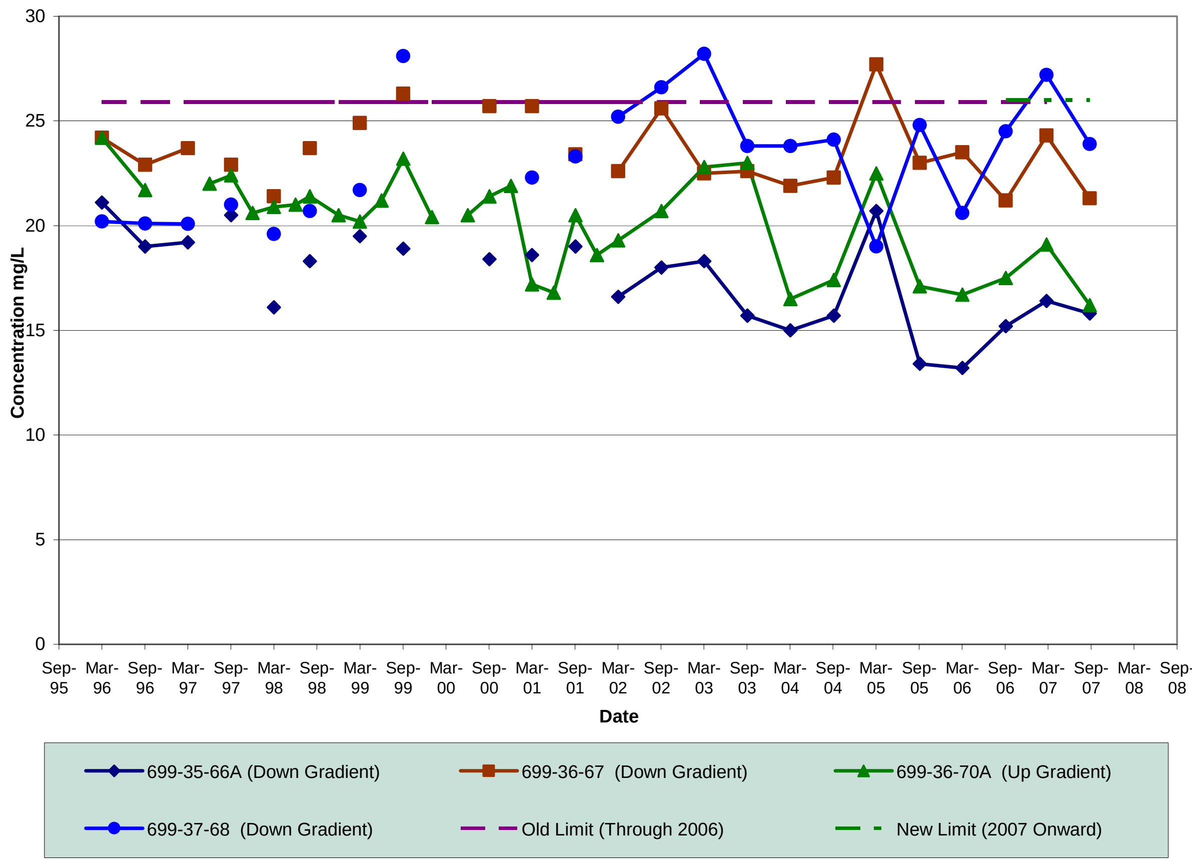


Figure B-12 Chloride



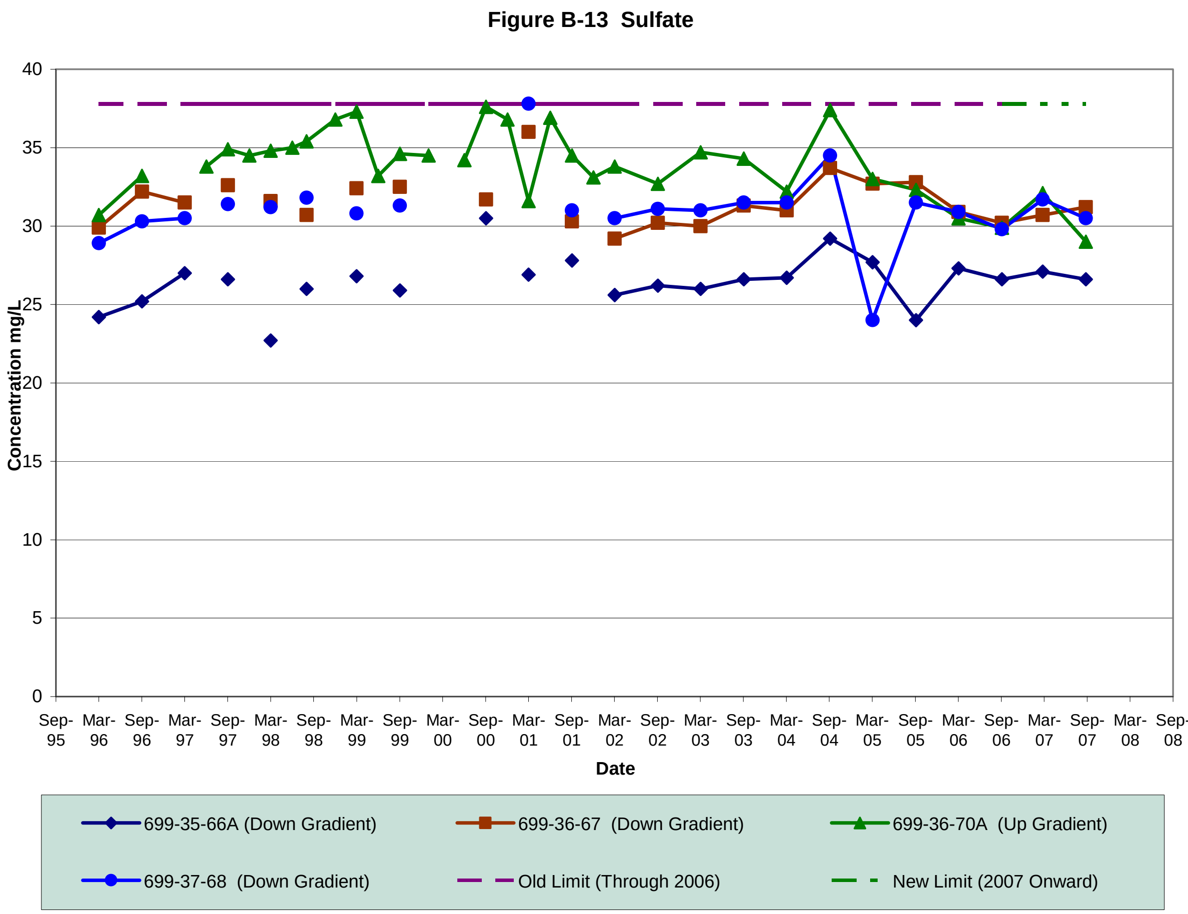
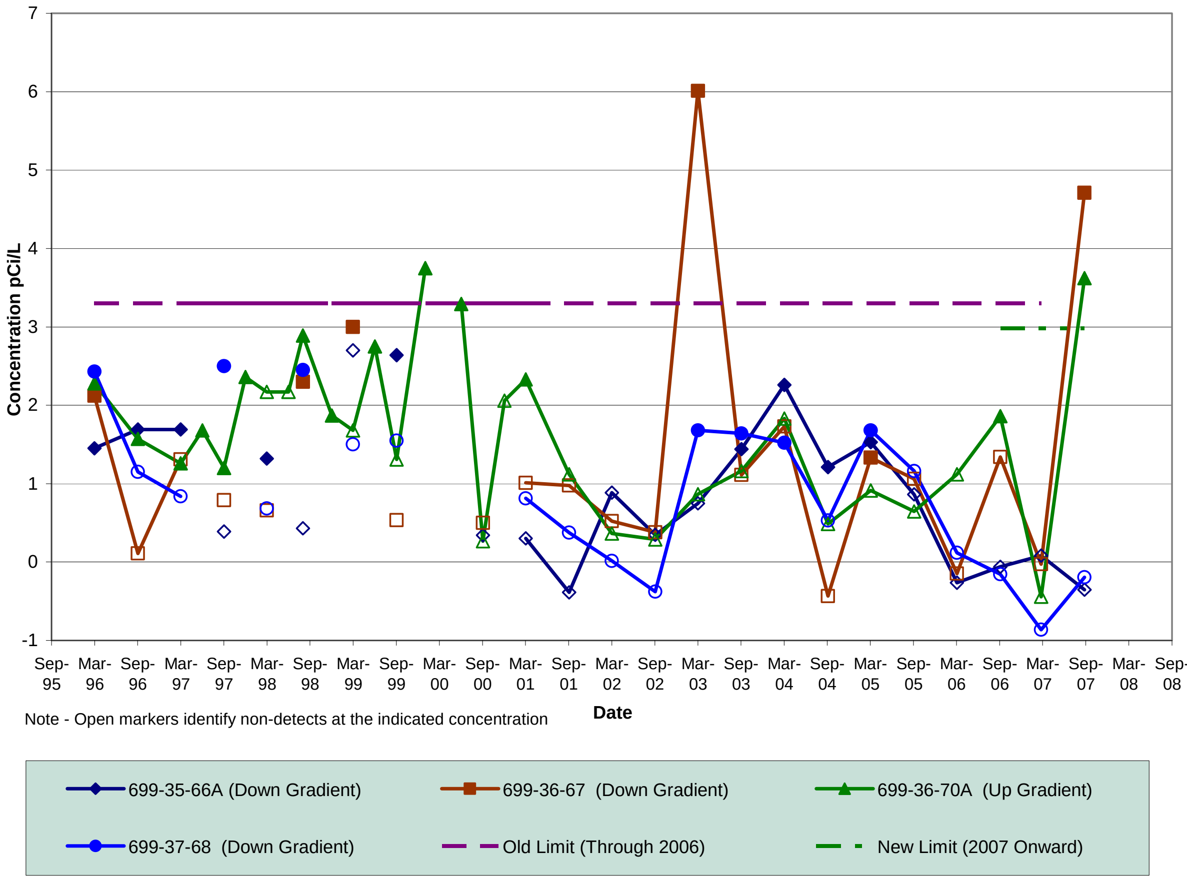


Figure B-13 Sulfate
Concentration mg/L
0
5
10
15
20
25
30
35
40
Sep-95
Mar-96
Sep-96
Mar-97
Sep-97
Mar-98
Sep-98
Mar-99
Sep-99
Mar-00
Sep-00
Mar-01
Sep-01
Mar-02
Sep-02
Mar-03
Sep-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Date
699-35-66A (Down Gradient)
699-36-67 (Down Gradient)
699-36-70A (Up Gradient)
699-37-68 (Down Gradient)
Old Limit (Through 2006)
New Limit (2007 Onward)

Figure B-14 Gross Alpha



Note - Open markers identify non-detects at the indicated concentration

Figure B-15 Gross Beta

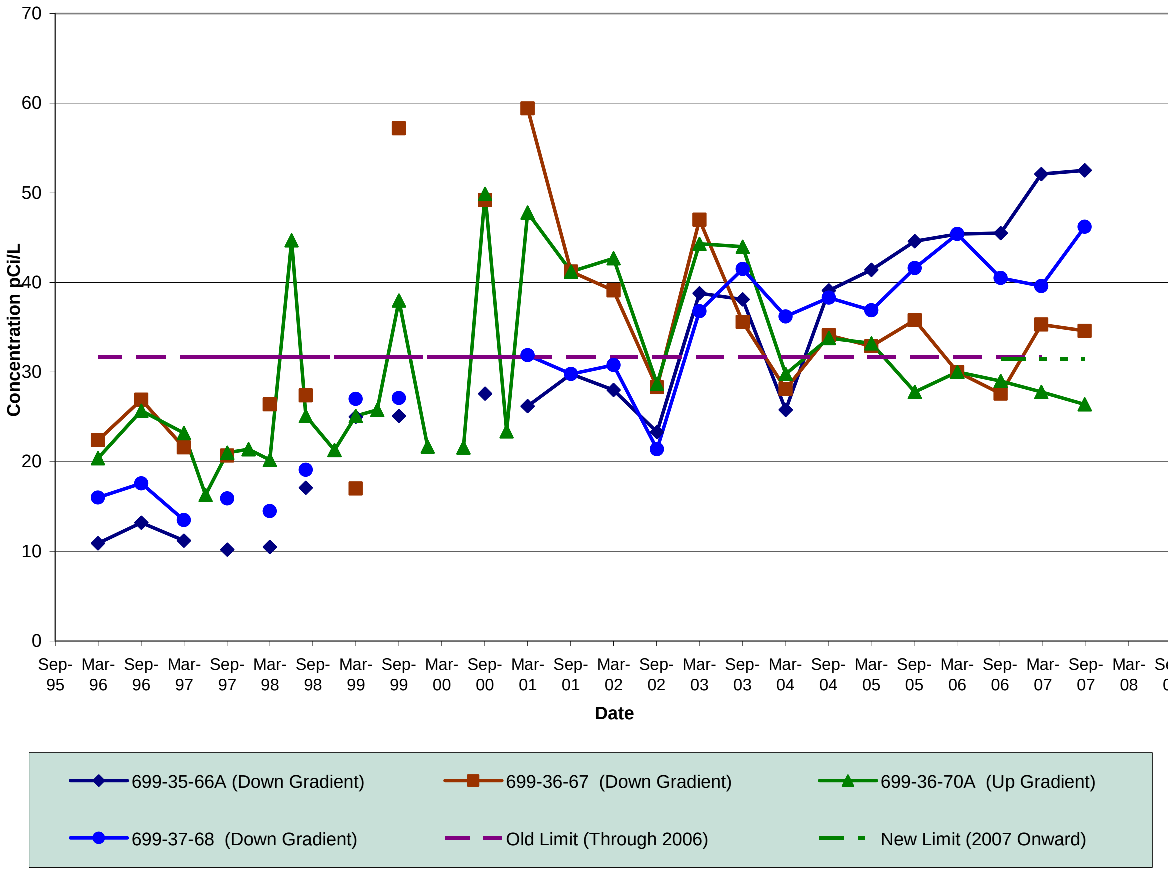


Figure B-16 Carbon-14

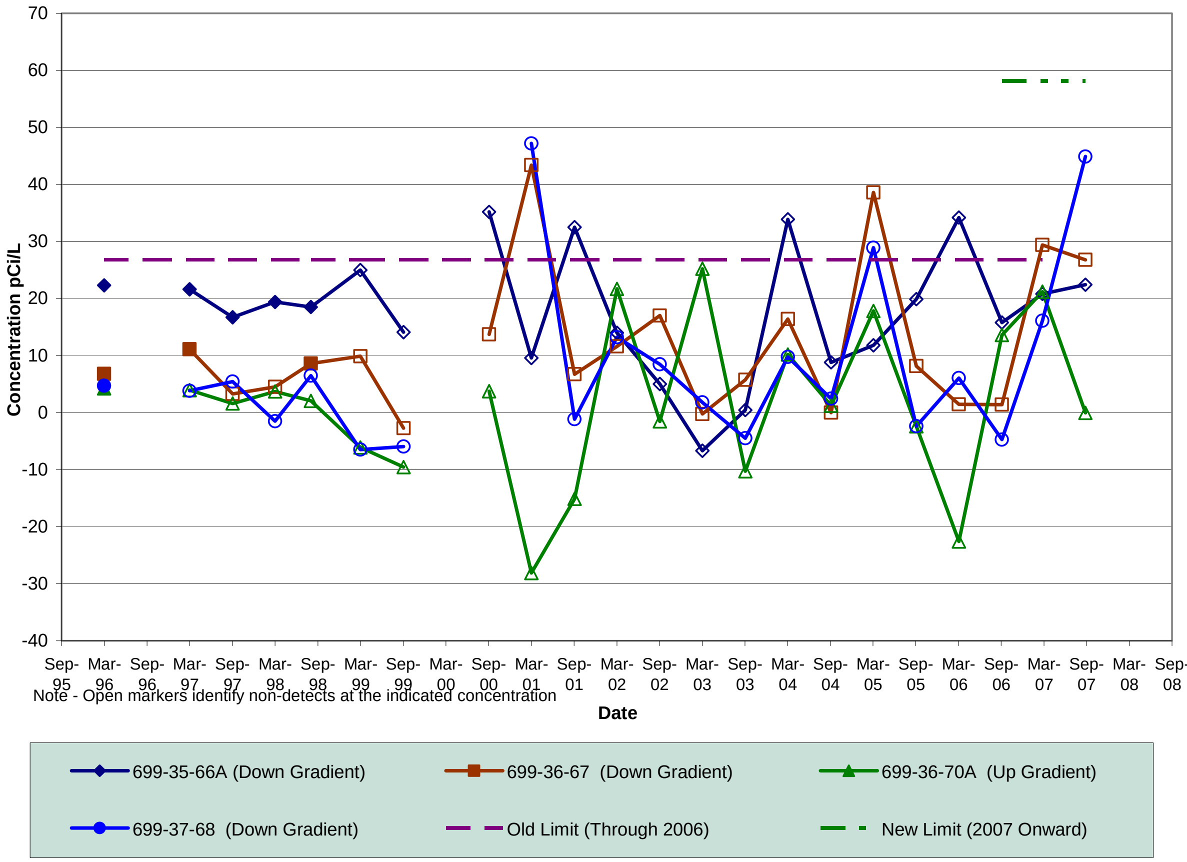


Figure B-17 Iodine-129

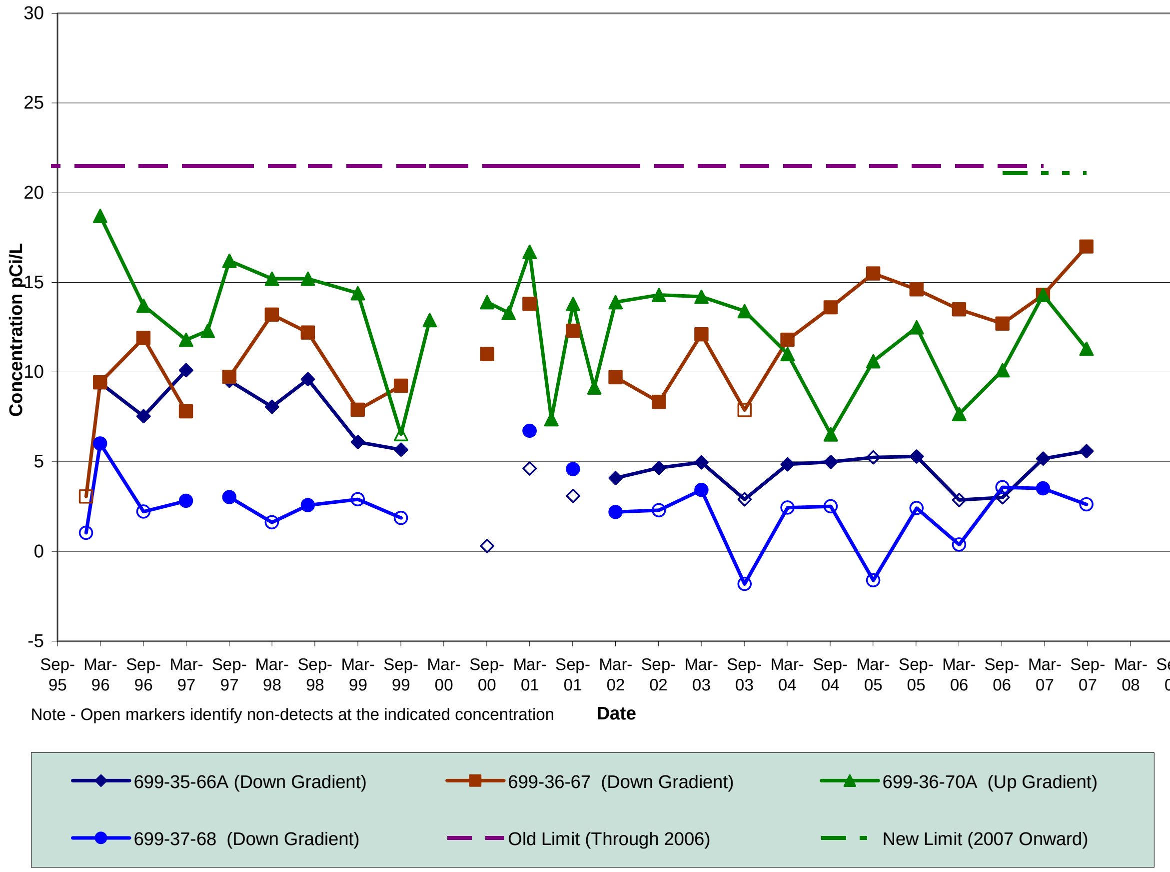
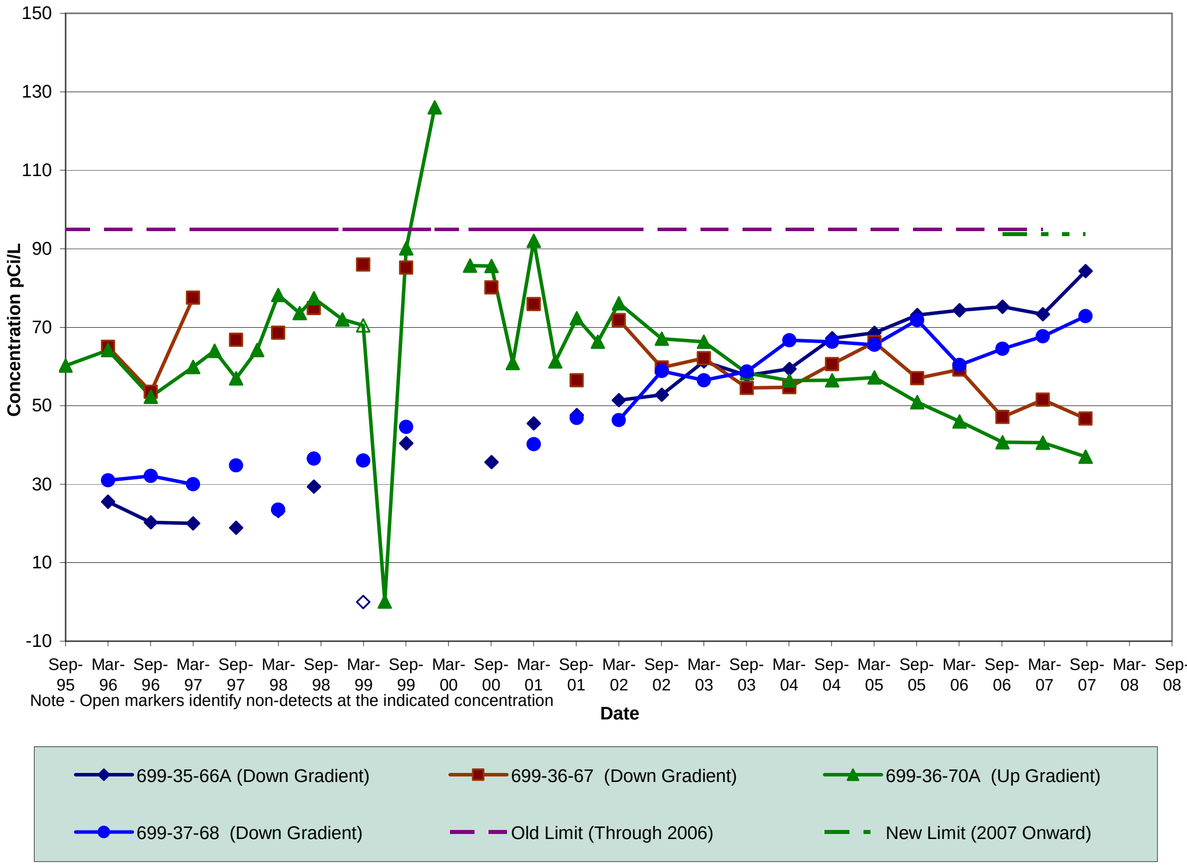


Figure B-18 Technetium-99



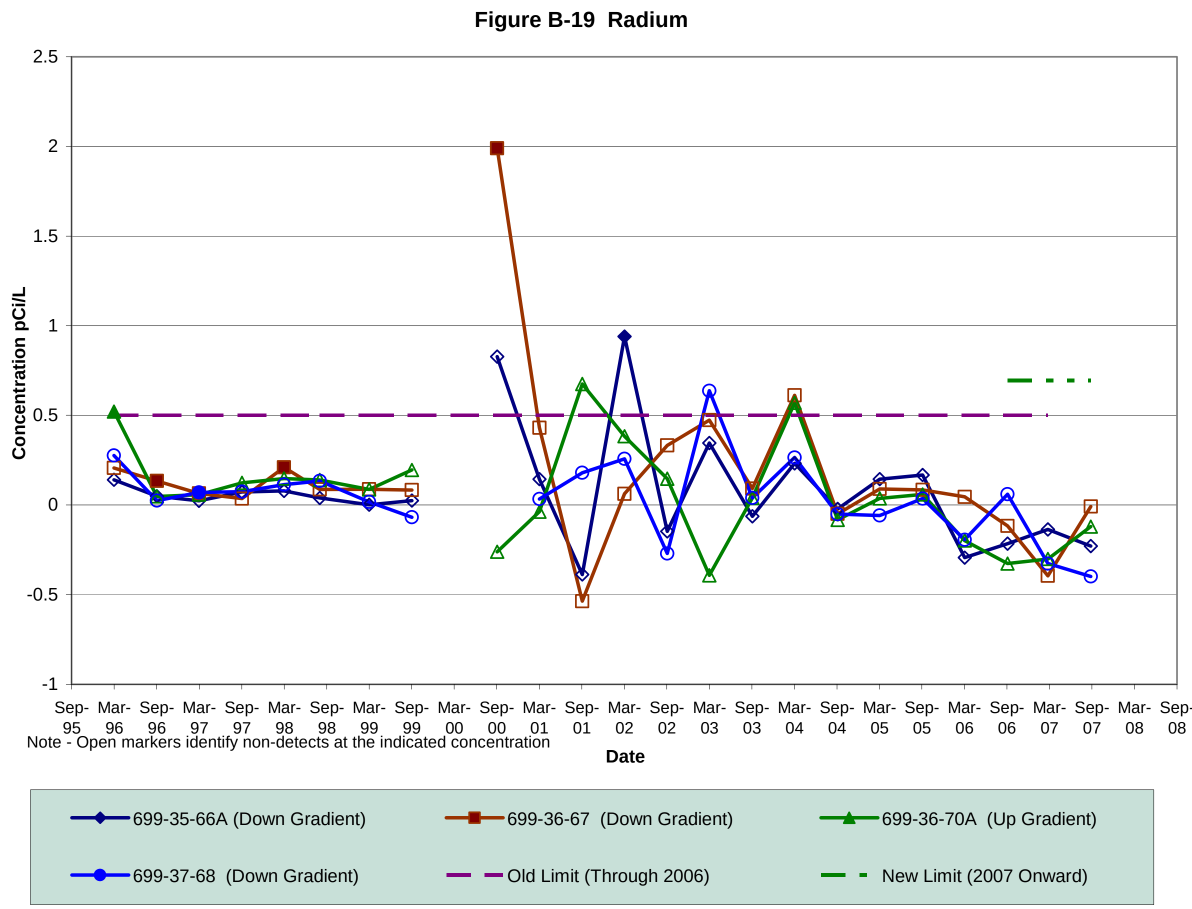


Figure B-19 Radium
Concentration pCi/L
2.5
2
1.5
1
0.5
0
-0.5
-1
Sep-95
Mar-96
Sep-96
Mar-97
Sep-97
Mar-98
Sep-98
Mar-99
Sep-99
Mar-00
Sep-00
Mar-01
Sep-01
Mar-02
Sep-02
Mar-03
Sep-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Note - Open markers identify non-detects at the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

Figure B-20 Carbon Tetrachloride

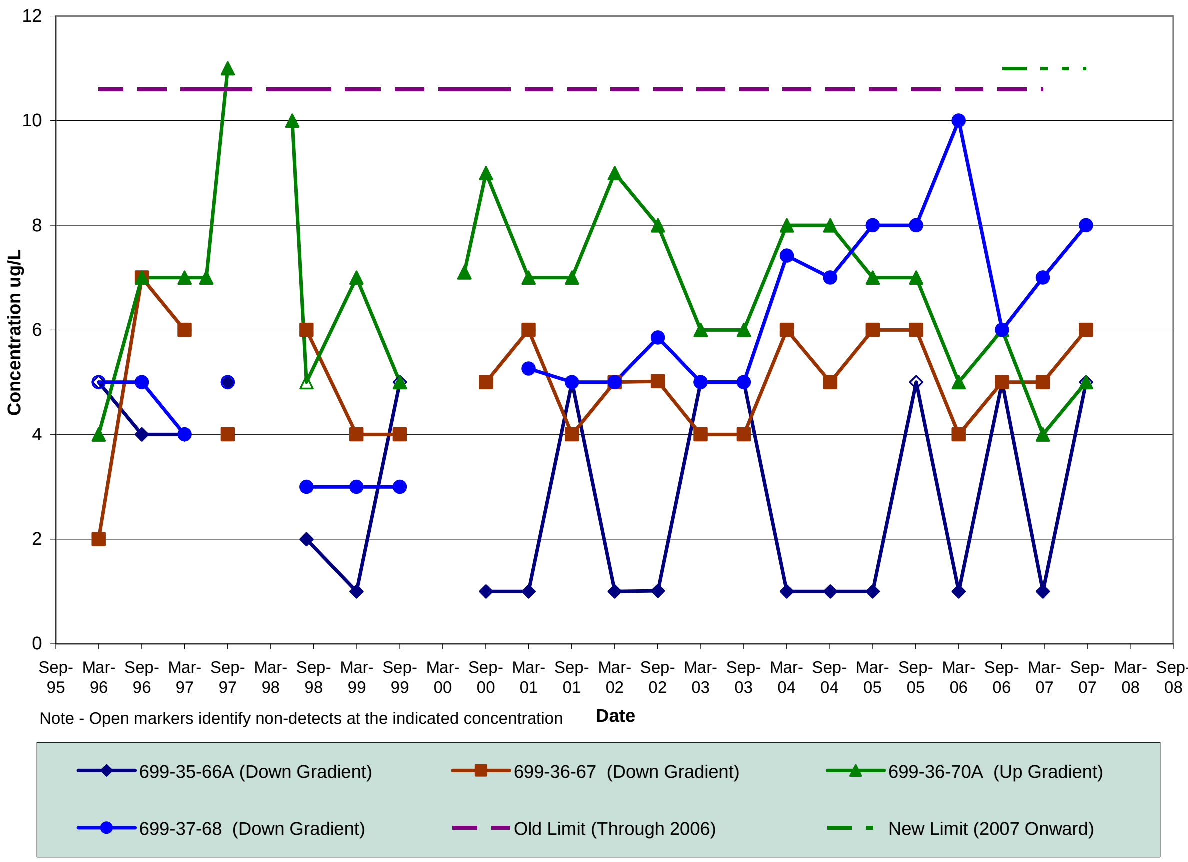


Figure B-21 Nitrogen in Nitrite and Nitrate

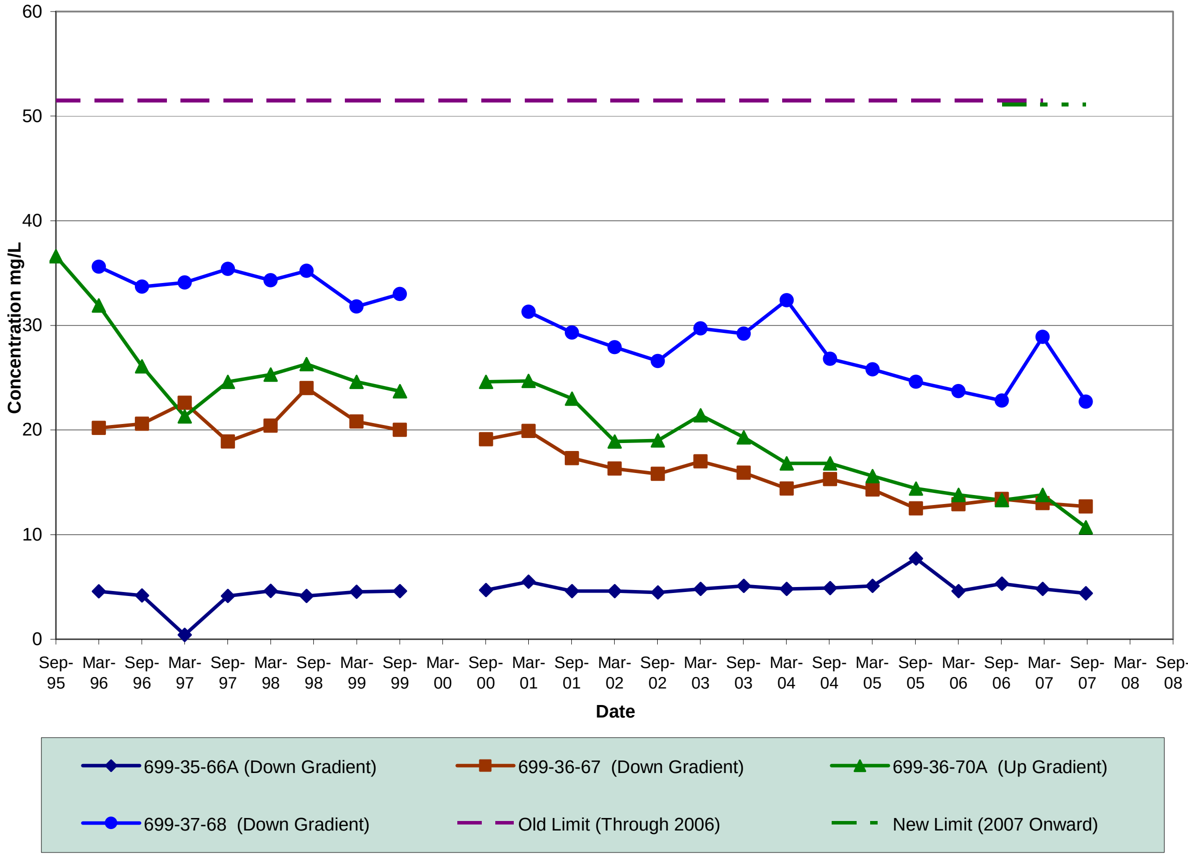


Figure B-22 Total Organic Halides

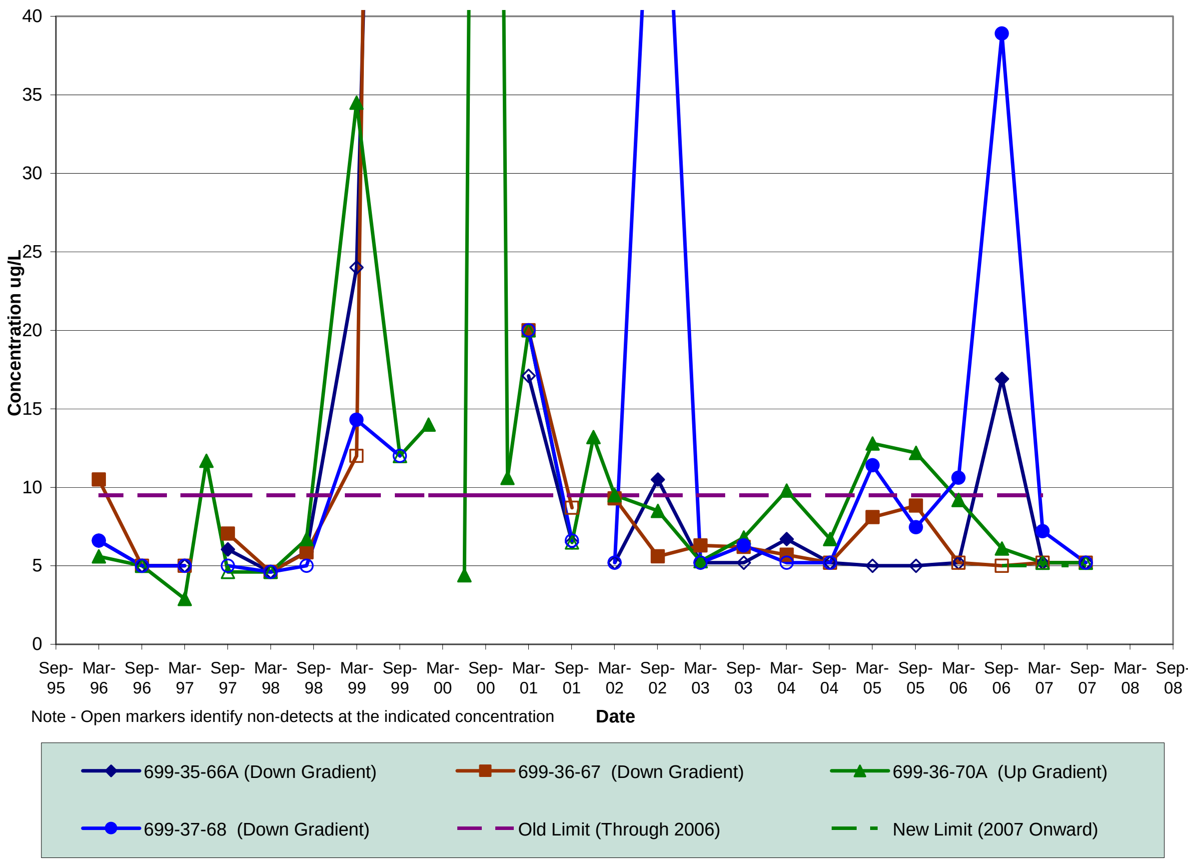


Figure B-23 Total Dissolved Solids

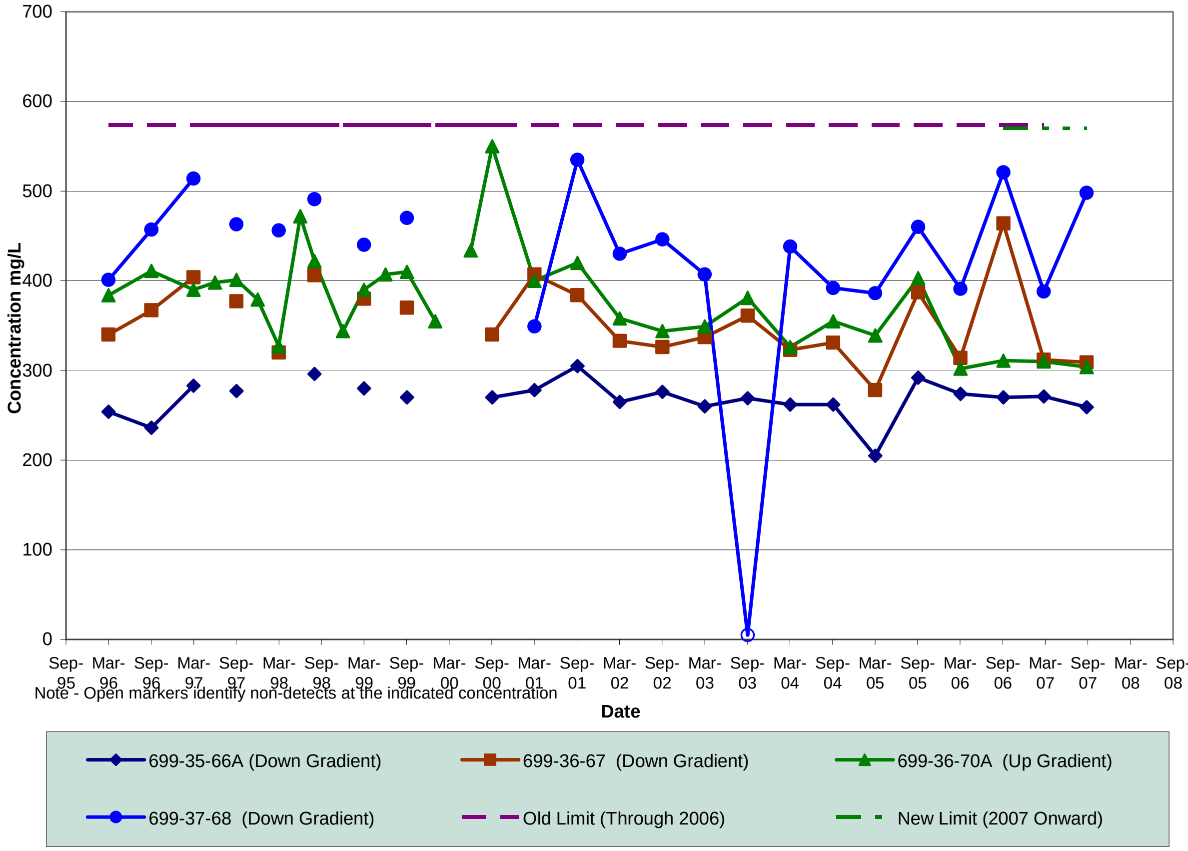


Figure B-24 Turbidity

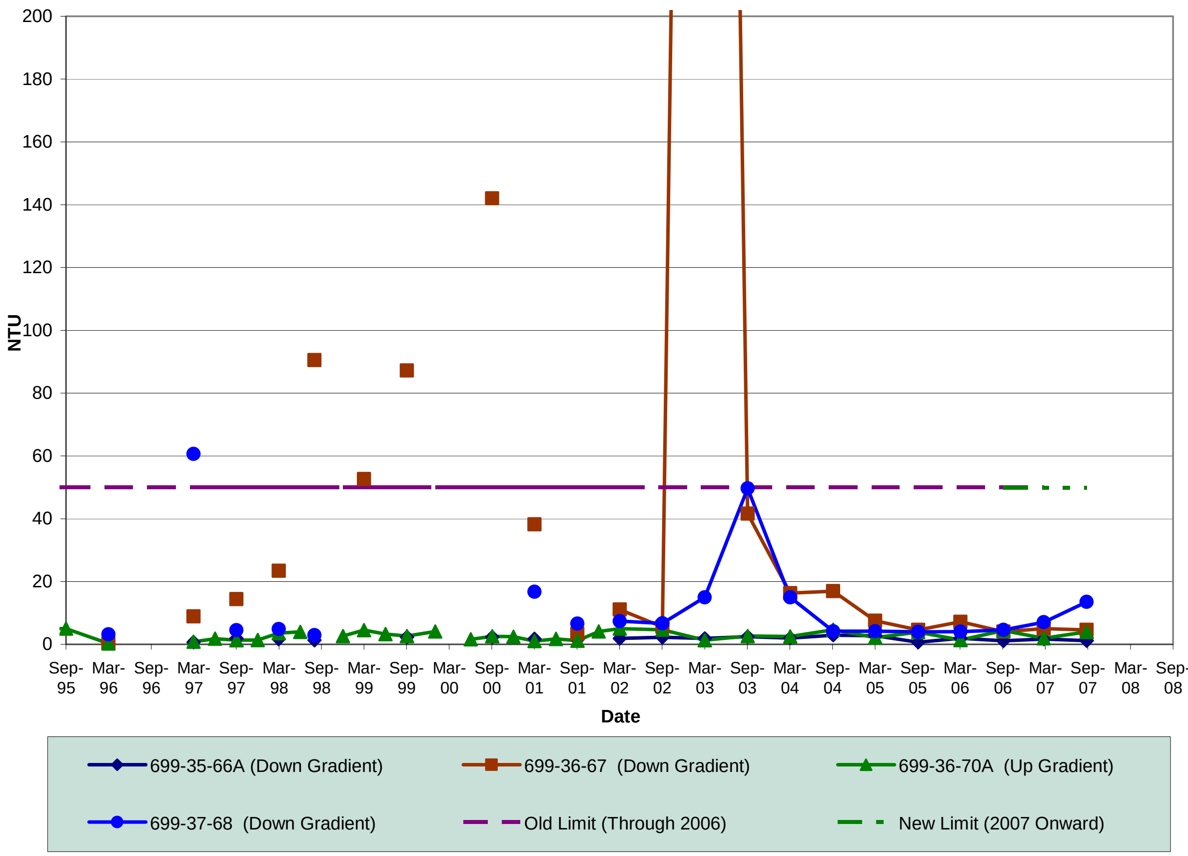


Figure B-25 pH

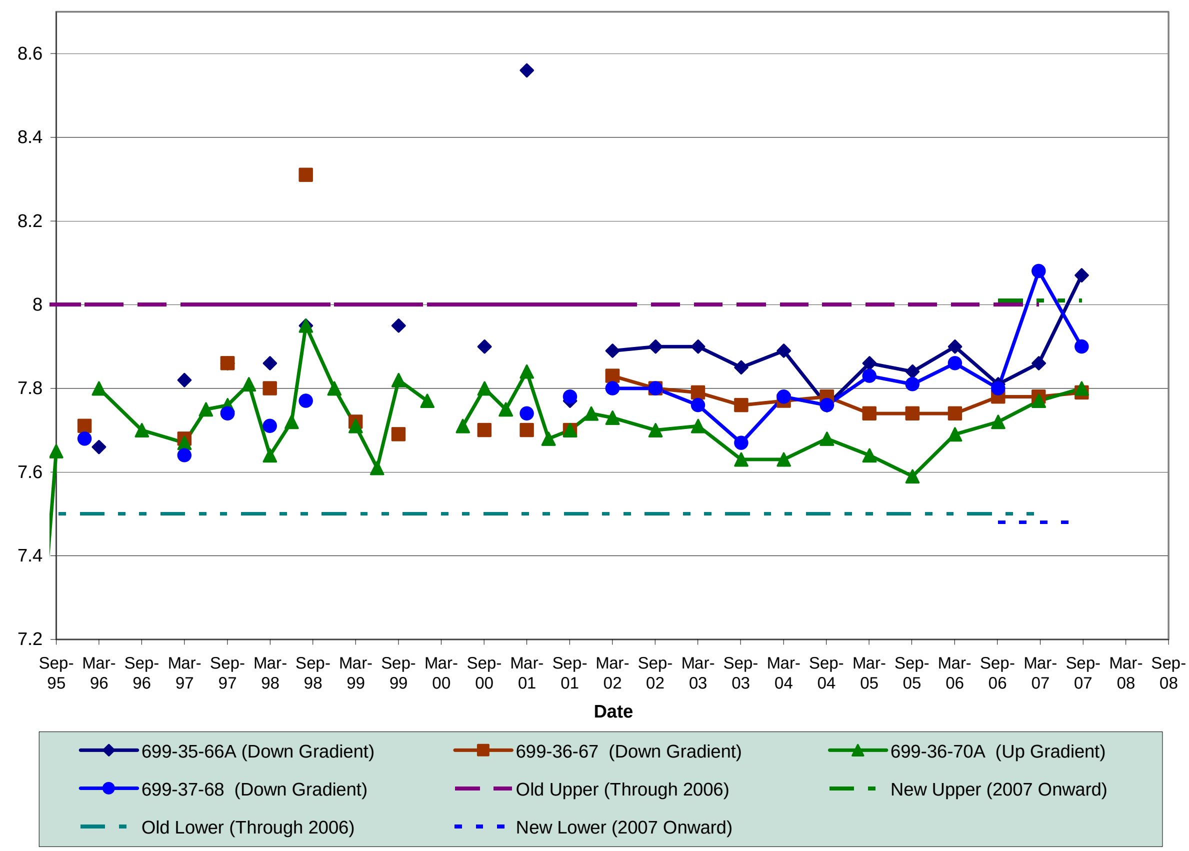
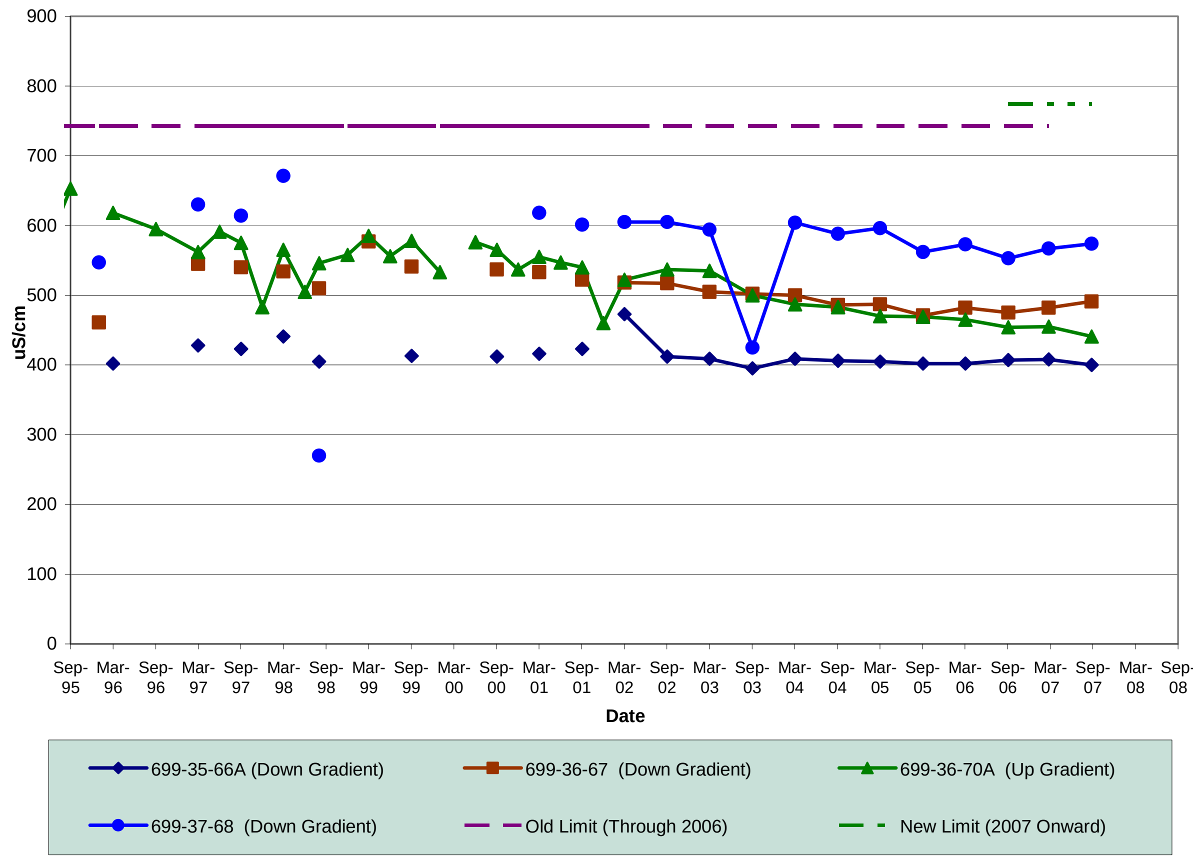


Figure B-26 Specific Conductance



APPENDIX C

LEACHATE SAMPLING SUMMARY, 2005-2007

Table C-1. Summary of Leachate Sampling Results, 2005-2007. (2 Pages)

Constituent	Jun-05	Jun-05	Dec-05	Dec-05	Jun-06	Jun-06	Dec-06	Dec-06	Jun-07	Jun-07	Jun-07	Jun-07	Dec-07	Units
Aluminum	NR	NR	NR	NR	NR	NR	54.4UC	63.2UC	NR	NR	NR	NR	NR	ug/L
Antimony	NR	NR	NR	NR	NR	NR	2.5U	2.5U	NR	NR	NR	NR	NR	ug/L
Arsenic	30.5U	30.5U	7.2	8.3	6.6	9	7.3	6.6	11.8	10.3	9.4	9.4	7	ug/L
Barium	100	94.5	108	108	103	108	127C	127C	102	103	84.5	84.5	84.5	ug/L
Calcium	NR	NR	NR	NR	NR	NR	260000C	254000C	241000C	243000C	199000C	199000C	199000	ug/L
Chromium	30.8	34.8	37.8	36.1	57.5	33.5	29.6	28.5	27.6	27.4	17.7	17.7	16.5	ug/L
Copper	NR	NR	NR	NR	NR	NR	9	9.1	NR	NR	NR	NR	NR	ug/L
Iron	NR	NR	NR	NR	NR	NR	91.1	58.9	NR	NR	NR	NR	NR	ug/L
Lead	32.7U	32.7U	3.1U	3.1U	3.1U	3.1U	1.6U	1.6U	3.3U	3.3U	3.3U	3.3U	9U	ug/L
Magnesium	NR	NR	NR	NR	NR	NR	76100C	76600C	NR	NR	NR	NR	NR	ug/L
Nickel	NR	NR	NR	NR	NR	NR	22.7	18.7	NR	NR	NR	NR	NR	ug/L
Potassium	NR	NR	NR	NR	NR	NR	27000	27000	19500	20500	24100	24100	23400	ug/L
Selenium	30.7U	30.7U	3.9	4.7	5.2	4.7U	6.4	4.5	9.6C	9C	5.2C	5.2C	6U	ug/L
Silcon	NR	NR	NR	NR	NR	NR	20000C	19700C	21600	21800	21000	21000	16700	ug/L
Sodium	NR	NR	NR	NR	NR	NR	267000C	257000C	240000	254000	313000	313000	244000	ug/L
Tin	16U	16U	NR	5.2U	10.7U	10.7U	3.6U	3.6U	6.3U	6.3U	6.3U	6.3U	6U	ug/L
Vanadium	24.5	24	18.7	18.1	18.9	18.4	16.9	17	20	19.8	22.2	22.2	18.4C	ug/L
Zinc	19.8	15.4	16.6	11.7	9.1	10.3	5.7	6.7	10.2C	8.8C	5C	5C	6U	ug/L
Carbon tetrachloride	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	ug/L
Methyl alcohol	NR	NR	NR	NR	NR	NR	5000U	5000U	NR	NR	NR	NR	NR	ug/L
Trichlorofluoromethane	NR	NR	NR	NR	NR	NR	5J	5	NR	NR	NR	NR	NR	ug/L
pH	NR	NR	NR	NR	7.3	7.3	7.3	7.6	7.1	7.1	7.4	7.4	7.7	pH
Specific Conductance	3120	2980	2770	2750	2710	2770	3650	3640	2700	2770	3300	3300	2710	umS/cm
Bromide	900	920	805	781	1100	1100	2500UD	2500UD	1200U	1200UD	2500UD	2500UD	2500UD	ug/L
Chloride	288000D	242000D	211000D	221000D	175000D	186000D	224000D	224000D	183000D	184000D	251000D	251000D	239000D	ug/L
Fluoride	260	250U	279	273	290	310	2500UD	2500UD	1200UD	1200UD	2500UD	2500UD	250U	ug/L
Nitrate	477000D	458000D	316000D	324000D	358000D	341000D	418000D	373000D	320000D	320000D	377000D	377000D	366000D	ug/L
Nitrite	2500UD	2500UD	5000UD	5000UD	2500UD	2500UD	2500UD	2500UD	2500UD	2500UD	2500UD	2500UD	5000UD	ug/L
Sulfate	632000D	507000D	431000D	404000D	408000D	412000D	573000D	563000D	416000D	413000D	531000D	531000D	491000D	ug/L
Total Organic Carbon	NR	NR	NR	NR	NR	NR	12000	11900	NR	NR	NR	NR	NR	ug/L
Oil & Grease	NR	NR	NR	NR	NR	NR	1100U	1100U	NR	NR	NR	NR	NR	ug/L
Total Dissolved Solids	2200000	2120000	1920000	1860000	2040000	2110000	2280000	2360000	2030000	1940000	2220000	2220000	1970000	ug/L
Total Suspended Solids	NR	NR	NR	NR	NR	NR	5000U	5000U	5000U	5000U	5000U	5000U	5000U	ug/L
Gross alpha	414	445	444	340	652	578	1310	1090	2950	2480	2960	2960	2150	pCi/L
Gross beta	736	704	530	471	633	613	764	1100	855	894	1050	1050	876	pCi/L
Carbon-14	75.8U	67.7U	12.8U	25.3U	33.4U	46.8U	118U	20.1U	51.1U	51.5U	21.4U	21.4U	60U	pCi/L
Technetium-99	808	814	631	612	738	55.4	738	817	529	632	816	816	587	pCi/L
Uranium (Total)	1090	1030	941	754	930	932	1730	1740	2070	2130	2120	2120	1990	ug/L
Iodine-129	-0.366U	0.41U	0.951U	0.844U	-1.2U	-2.61U	-0.375U	-0.481U	-0.352U	0.577U	0.053U	0.053U	0.054U	pCi/L
Total Radium Alpha Emissions	0.054U	0.06U	-0.02U	0.135U	-0.168U	0.022U	-0.316U	-0.046U	-0.129U	-0.079U	0.015U	0.015U	-0.36U	pCi/L

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

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

Constituent	Constituent	Constituent	Constituent
Aluminum	1,2-cis-Dichloroethene	2,4,6-Trichlorophenol	Nitrobenzene
Antimony	1,2-Dichloroethane	2,4-Dichlorophenol	N-Nitroso-di-n-propylamine
Arsenic	1,2-Dichloropropane	2,4-Dimethylphenol	N-Nitrosodiphenylamine
Barium	1,2-trans-Dichloroethene	2,4-Dinitrophenol	N-Nitrosomorpholine
Beryllium	1,3-Butadiene	2,5-Diamintoluene	N-Nitroso-N,N-dimethylamine
Cadmium	cis-1,3-Dichloropropene	2-Chloronaphthalene	O,O,O-Triethyl phosphorothioate
Calcium	trans-1,3-Dichloropropene	2-Chlorophenol	Pentachlorophenol
Chromium	1,4-Dioxane	2-Cyclohexyl-4,6-dinitrophenol	Phenol
Cobalt	1-Chloroethene (Vinyl Chloride)	2-Naphthylamine	p-Phenylenediamine
Copper	(1-Methylethyl)benzene	4-Bromophenylphenyl ether	Pyrene
Lead	2-Butanone (MEK)	4-Chloro-3-methylphenol	Pyridine
Magnesium	2-Butenaldehyde (Crotonaldehyde)	4-Nitrophenol	Tetrahydrofuran
Manganese	2-Chloroethyl vinyl ether	7,12-Dimethylbenz[a]anthracene	Formaldehyde
Nickel	2-Methyl-2-propenenitrile (Methacrylonitrile)	Acenaphthene	Bendiocarb
Potassium	2-Methylpropyl alcohol (Isobutyl alcohol)	Acetophenone	Cyanide
Selenium	2-Propanone (Acetone)	alpha-Naphthylamine	Sulfide
Silcon	2-Propen-1-ol (Allyl alcohol)	Aniline	pH
Silver	3-Chloropropene (Allyl chloride)	Anthracene	Specific Conductance
Sodium	4-Methyl-2-pentanone (MIBK)	Benzo(a)anthracene	Bromide
Thallium	Acetic acid ethyl ester (Ethyl acetate)	Benzo(a)pyrene	Chloride
Tin	Acetic acid vinyl ester (Vinyl acetate)	Benzo(b)fluoranthene	Fluoride
Vanadium	Acetonitrile	Benzo(k)fluoranthene	Nitrate
Zinc	Acrolein	Benzyl alcohol	Nitrite
Mercury	Acrylonitrile	Bis(2-Chloroethoxy)methane	Phosphate
4,4-DDD	Benzene	Bis(2-chloroethyl) ether	Sulfate
4,4-DDE	Bromodichloromethane	Bis(2-Chloroisopropyl) ether	Ammonia
4,4-DDT	Bromomethane	Bis(2-ethylhexyl) phthalate	Total Organic Carbon
Aldrin	Carbon disulfide	Butylbenzylphthalate	Oil & Grease
alpha-BHC	Carbon tetrachloride	Chrysene	Total Dissolved Solids
beta-BHC	Chlorobenzene	o-Cresol	Total Suspended Solids
Dieldrin	Chloroethane	m-Cresol	Gross alpha
Endrin	Chloroform	p-Cresol	Gross beta
Gamma-BHC (lindane)	Chloromethane	Dibenz[a,h]anthracene	Carbon-14
Heptachlor	Dibromochloromethane	1,2-Dichlorobenzene	Technetium-99
Heptachlor Epoxide	Dichlorodifluoromethane	1,3-Dichlorobenzene	Uranium (Total)

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

Constituent	Constituent	Constituent	Constituent
Toxaphene	Dichloromethane (Methylene Chloride)	1,4-Dichlorobenzene	Potassium-40
PCB-1016	Dichloroproponol	Diethyl phthalate	Cobalt-60
PCB-1221	Ethyl benzene	Dimethyl phthalate	Cesium-137
PCB-1232	Ethyl ether	Di-n-butylphthalate	Europium-152
PCB-1242	Ethylene dibromide	1,3-Dinitrobenzene	Europium-154
PCB-1248	Methyl alcohol	1,4-Dinitrobenzene	Europium-155
PCB-1254	n-Butyl alcohol	Di-n-octylphthalate	Radium-226
PCB-1260	Styrene	Ethyl methanesulfonate	Radium-228
2,4-D	Toluene	Fluoranthene	Thorium-228
1,1,1-Trichloroethane	Tribromomethane (Bromoform)	Fluorene	Thorium-232
1,1,2,2-Tetrachloroethane	Trichlorofluoromethane	Hexachlorobutadiene	Uranium-235
1,1,2,2-Tetrachloroethene	Trichloromethanetiol	Hexachloroethane	Uranium-238
1,1,2-Trichloroethane	Xylene	Hexachlorophene	Americium-241
1,1,2-Trichloroethylene	1,2,4-Trichlorobenzene	Indeno(1,2,3-cd)pyrene	Iodine-129
1,1-Dichloroethane	1,2-Diphenylhydrazine	Isophorone	Total radium alpha emissions
1,1-Dichloroethene	1-Acetyl-2-thiourea	N,N-Diphenylamine	
1,2,2-Trichlorotrifluoroethane	2,4,5-Trichlorophenol	Naphthalene	

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