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Trichloroethene and Technetium-99 Groundwater Contamination in the Regional Gravel Aquifer for Calendar Year 2007 at the Paducah Gaseous Diffusion Plant Paducah, Kentucky

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Prepared by
PADUCAH REMEDIATION SERVICES, LLC
managing the
Environmental Remediation Activities at the
Paducah Gaseous Diffusion Plant
under contract DE-AC30-06EW05001

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ACRONYMS

amsl	above mean sea level
CY	calendar year
DNAPL	dense nonaqueous-phase liquid
DOE	U.S. Department of Energy
EW	extraction well
MW	monitoring well
OREIS	Oak Ridge Environmental Information System
PGDP	Paducah Gaseous Diffusion Plant
RGA	Regional Gravel Aquifer
RI	Remedial Investigation
SWMU	solid waste management unit
^{99}Tc	technetium-99
TCE	trichloroethene
VOC	volatile organic compound
WAG	waste area grouping

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1. INTRODUCTION

This report is the eighth of a series of interpretations of groundwater data for the U.S. Department of Energy's (DOE's) Paducah Gaseous Diffusion Plant (PGDP). Previously interpretations had been revised annually for data from the calendar years (CYs) 1999 through 2005. Beginning with this report, revisions are being prepared every two years. This report assesses contaminant trends over time and the extent of trichloroethene (TCE) and technetium-99 (^{99}Tc) in the shallow aquifer for CY2007, including revision of the site groundwater plume maps. The plume map revisions are based on routine groundwater monitoring data collected through the end of CY2007 and include information from various previous investigation reports by retaining trends of the previous plume maps, where the trends are in agreement with the CY2007 well data. These maps are consistent with interpreted groundwater flow directions determined from potentiometric trends of the shallow aquifer and conceptual models of the influence of surface-water bodies. The trends are shown on the potentiometric maps for each quarter of CY2007, included in this report. Significant revisions from the CY2005 edition of the plume maps are discussed in Section 4. These reports provide a basis for incorporation of routine groundwater monitoring and characterization data for planned remedial actions.

The previous site-wide investigations contributing to this report have included the following:

- *Results of the Site Investigation, Phase I, Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (CH2M HILL 1991);
- *Results of the Site Investigation, Phase II, Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (CH2M HILL 1992);
- *Report of the Paducah Gaseous Diffusion Plant Groundwater Investigation Phase III* (MMES 1992);
- *Northeast Plume Preliminary Characterization Summary Report, Paducah, Kentucky* (DOE 1995a);
- *Final Report on Drive-Point Profiling of the Northwest Plume and Analysis of Related Data* (DOE 1995b);
- *Remedial Investigation Report for the Waste Area Grouping 6 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE 1999a);
- *Remedial Investigation Report for the Waste Area Grouping 27 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE 1999b);
- *Remedial Investigation Report for the Waste Area Grouping 28 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE 2000a);
- *Data Report for the Sitewide Remedial Evaluation for Source Areas Contributing to Off-Site Groundwater Contamination at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE 2000b);
- *Site Evaluation Report for Waste Area Grouping 8 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE 2000c);
- *Remedial Investigation Report for Waste Area Grouping 3 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE 2000d);

- *Site Investigation Report for the Southwest Groundwater Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE 2006a);

- *Site Investigation Report for the C-746-S&T Landfills at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE 2006b);

- "Evaluation of the Remedial Design Support Investigation Results and Derivation of the DNAPL Volume Estimate for the Area South Of The C-400 Cleaning Building" within *Remedial Design Report, Certified for Construction Design Drawings and Technical Specifications Package, for the Groundwater Operable Unit for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE 2008a);

- *Remedial Investigation Report for the Burial Grounds Operable Unit at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE 2008b).

2. SETTING

The PGDP is located in the Jackson Purchase region of western Kentucky, approximately 10 miles west of Paducah, Kentucky and 4 miles south of the Ohio River. At depth beneath the PGDP, Cretaceous marine sediments of the Mississippian Embayment unconformably overlie Mississippian-age carbonate bedrock. Buried Pleistocene fluvial deposits of the ancestral Tennessee River, in turn, unconformably overlie the Cretaceous marine sediments directly beneath and north of PGDP. The fluvial deposits in contact with the marine sediments consist of a gravel unit, ranging in thickness from 30 ft to 50 ft, at a general depth of 60 ft below ground surface. This gravel unit forms the uppermost aquifer, the Regional Gravel Aquifer (RGA), beneath the plant area and north to the Ohio River. The RGA pinches out to the south, southeast, and southwest along the buried slope of the Porters Creek Clay Terrace. The RGA is the main conduit for groundwater flow to the north, where groundwater discharges into the Ohio River, and the main pathway for off-site contaminant plume migration. Figure 1 presents a general cross-section of the geology across the region, while Figures 2 and 3 illustrate the main features of the geology and groundwater flow systems near PGDP.

TCE, a common solvent, and ^{99}Tc, a man-made radioisotope, are the most widespread groundwater contaminants associated with PGDP. Trichloroethene occurs as pure phase (free-product) dense nonaqueous-phase liquid (DNAPL) at multiple locations in the silts and clays overlying the RGA and in the RGA itself at some locations. Technetium-99 is a widespread soil contaminant at PGDP and a common contaminant in many PGDP burial grounds. Both dissolved TCE and ^{99}Tc migrate with downward percolating water to the RGA. In addition, pools of TCE located within the RGA, slowly dissolve over time to yield the much higher levels observed in groundwater. These contaminants have resulted in large-scale dissolved-phase plumes that are migrating from PGDP toward the Ohio River. Table 1 presents a summary of PGDP groundwater plumes. Since there are no monitoring wells (MWs) downgradient of the plumes' distal ends, off-site plume length is approximated, based on interpretation.

Table 1. PGDP Groundwater Plumes, CY2007

Plume	Approximate Maximum Off-site Contaminant Levels	Off-site Plume Length	Approximate Total Area of Minimum Contour
	Trichloroethene		
Northeast	400 µg/L	2.1 miles	33,050,060 ft^2
Northwest	2,000 µg/L	2.7 miles	42,610,120 ft^2
Southwest	100 µg/L	0.3 miles	6,511,090 ft^2
C-746-S&T Area	20 µg/L	0.67 miles	4,681,300 ft^2
	Technetium-99		
Northeast	50 pCi/L	0.67 miles	6,017,960 ft^2
Northwest	300 pCi/L	2.9 miles	58,144,990 ft^2
Southwest	900 pCi/L	0.4 miles	4,499,480 ft^2

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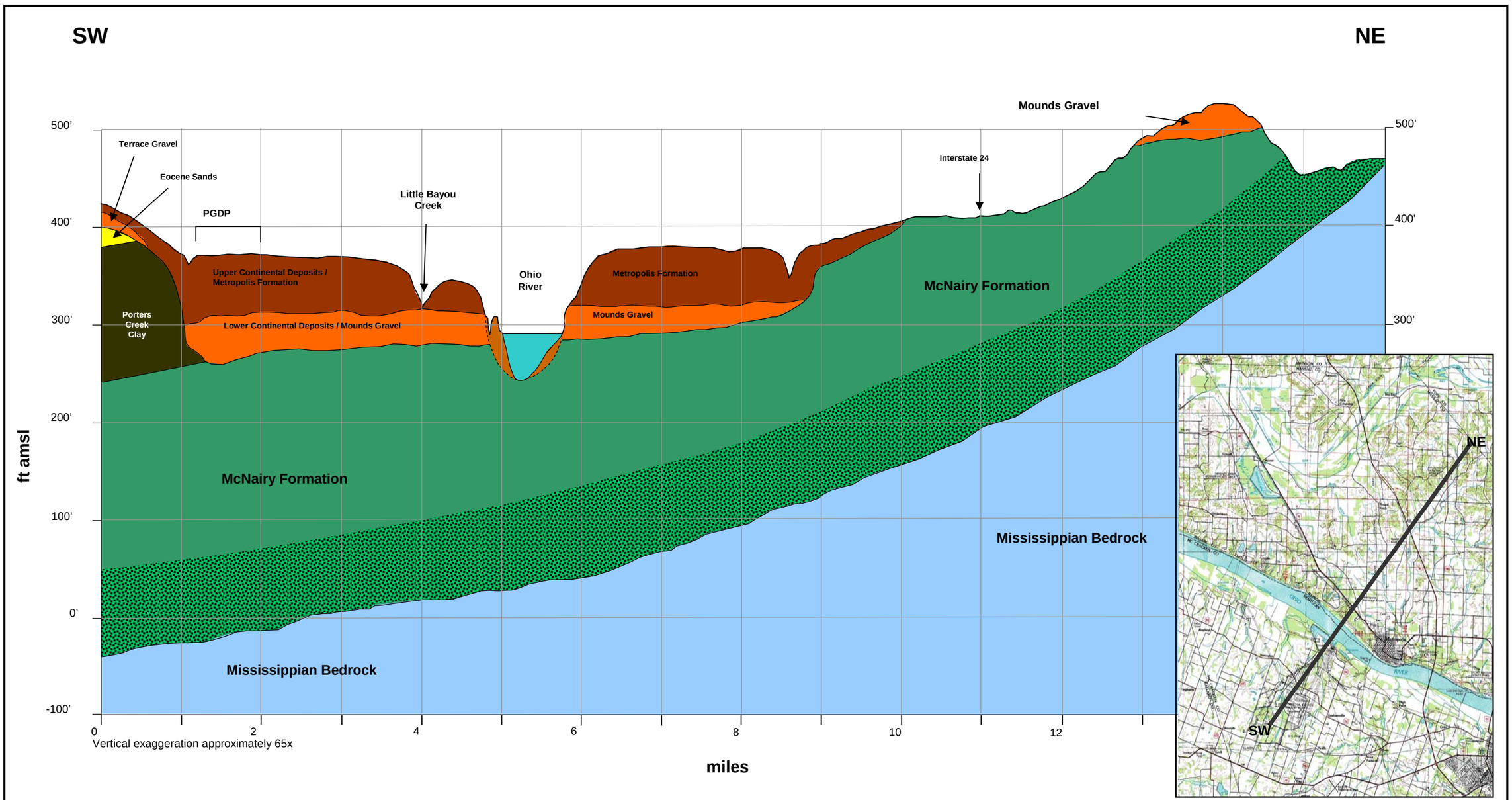

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Figure 1. Stratigraphic and Structural Relationships throughout PGDP Region

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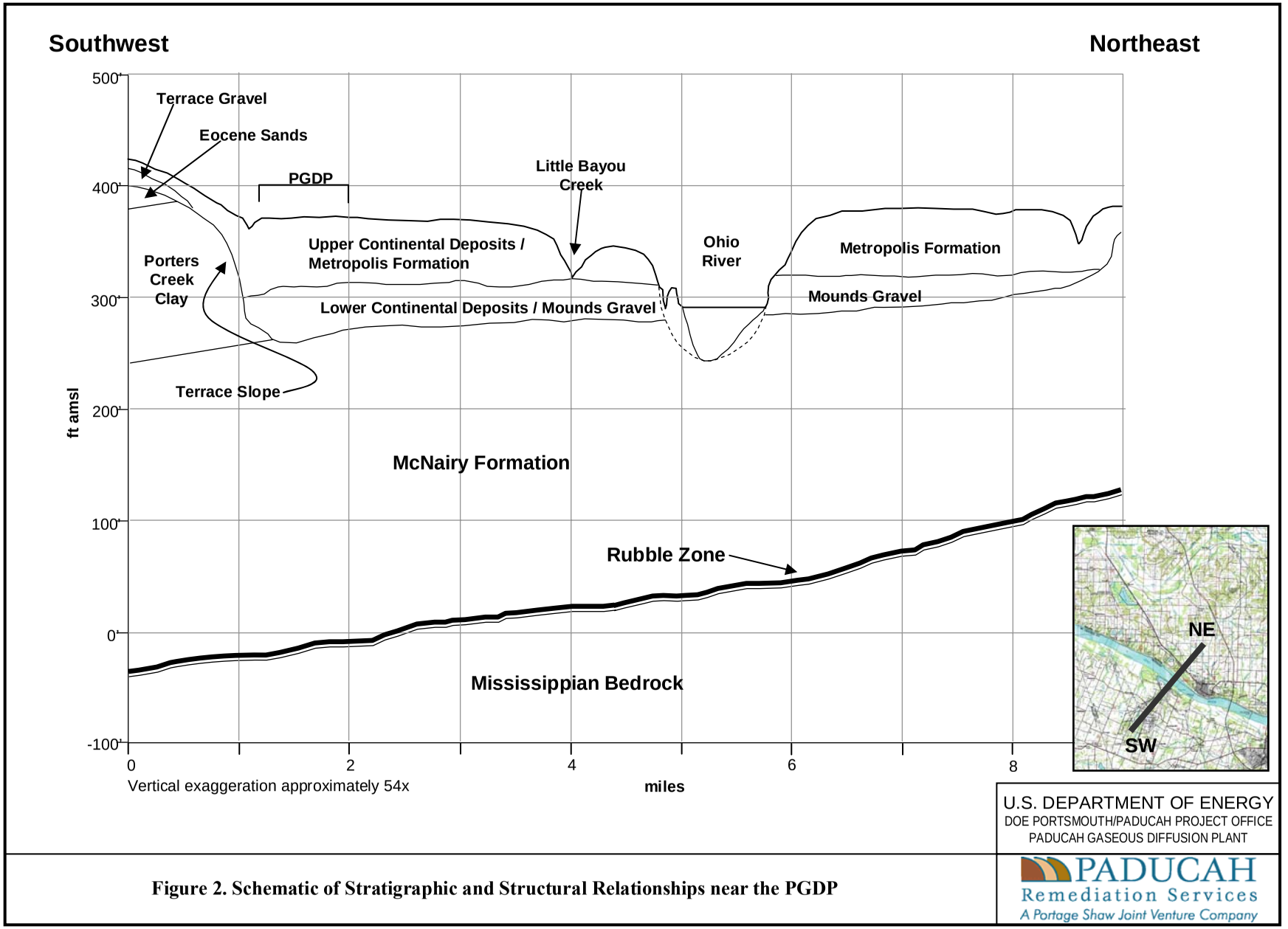

Figure 2. Schematic of Stratigraphic and Structural Relationships near the PGDP

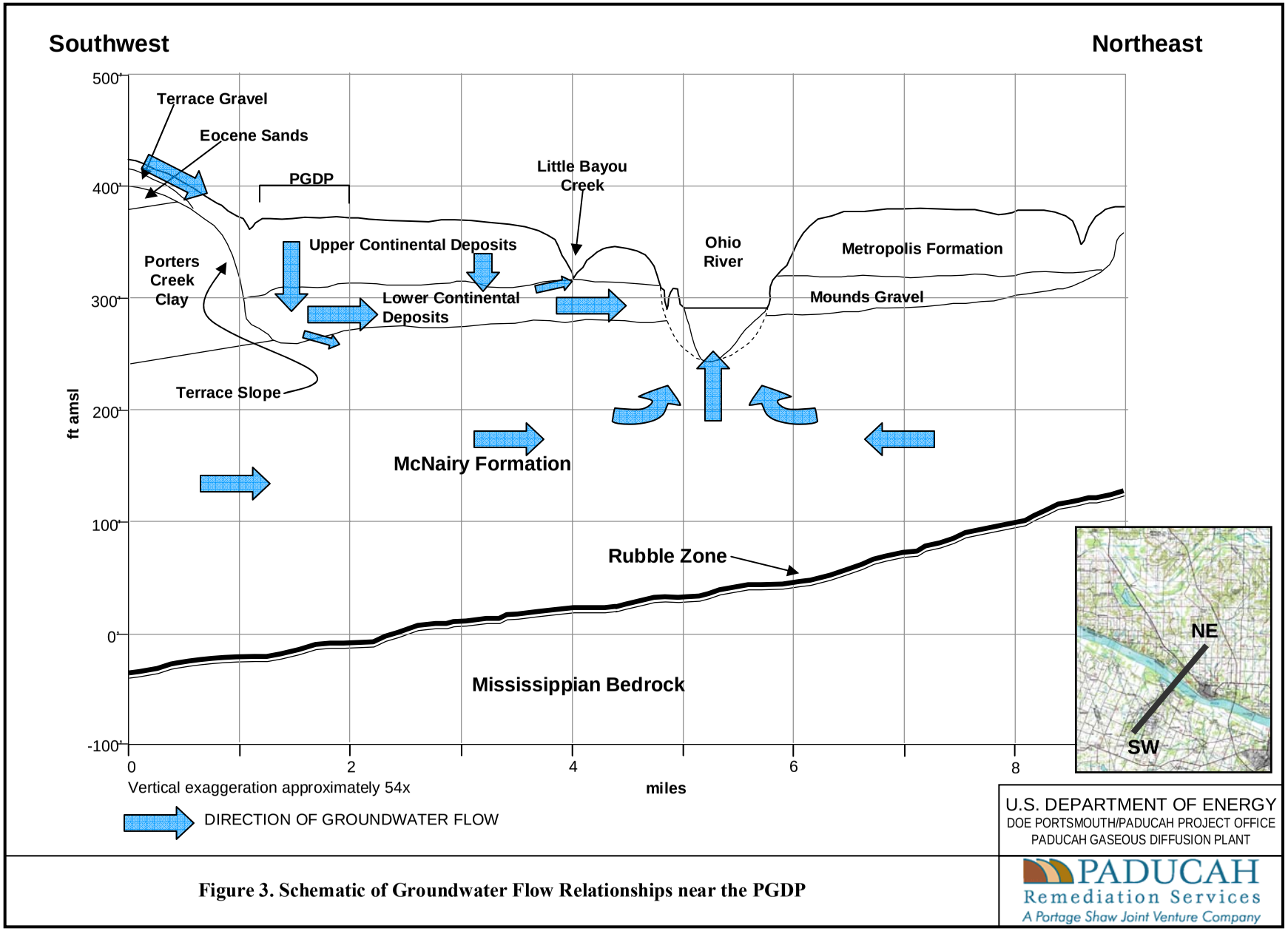

Figure 3. Schematic of Groundwater Flow Relationships near the PGDP

DOE has taken three discrete actions on the groundwater contamination to mitigate the risk to the public that is associated with groundwater. Two separate interim remedial actions installed pump-and-treat systems in the Northwest and Northeast Plumes. Both pump-and-treat systems consist of well fields originally designed to be in the high concentration core of the plumes. The Northwest Plume treatment system also includes a well field near the West Kentucky Wildlife Management Area boundary. To minimize risks to residents and businesses, DOE offered municipal water to all existing private residences and businesses within the area affected by contaminated groundwater originating at PGDP.

DOE completed a Record of Decision for an interim remedial action of the volatile organic compound (VOC) contamination at the C-400 Cleaning Building in CY2005. This interim remedial action, when implemented, will consist of electrical resistance heating of approximately 0.5 acres at the south end of the C-400 Cleaning Building, in the RGA and overlying sediments to remove VOCs, primarily TCE, at the main TCE source to the Northwest Plume. This TCE source zone also contributes contamination to the Northeast and Southwest Plumes.

3. REVISED PLUME MAPS

A primary component of this biannual groundwater report is a revision of the site maps of TCE and ^{99}Tc levels in the RGA. These maps (presented in Appendix A) represent the contaminant extent during CY2007 based upon analysis of groundwater samples collected from MWs and any relavant investigations. Appendix B includes plots of contaminant levels in individual wells over time for trends cited in this report. The attached maps are based on TCE and ^{99}Tc analyses of groundwater found in the Paducah Oak Ridge Environmental Information System (Paducah OREIS) database at the end of CY2007 for 141 RGA wells. Other than the Burial Grounds Operable Unit Remedial Investigation and site investigations of CY2004, the latest groundwater data from temporary soil borings are over five years old and no longer are reliable due to temporal changes in contaminant levels; however, in areas where there are no contemporary data, the basic plume shapes defined by older data (including temporary soil borings) have been maintained in the current interpretation. The premise is that, while some of the internal details of the plumes change from year to year, the overall shapes of the plumes do not change significantly. Unless there are specific data to support a change, the shapes of and areas covered by the plumes are not changed.

Maps of TCE and ^{99}Tc are presented at the end of this report in large scale to best present the greater available detail for PGDP and to show the larger off-site area impacted by PGDP. Note that, for this report, on-site refers to the area within the plant boundary and off-site refers to areas outside the plant boundary. Figures 4 and 5 are maps of contaminant levels observed in or estimated from trend plots of RGA MWs during CY2007. These maps are composites of three sets of working maps of the lower, middle, and upper RGA [elevations 250 to 295 ft, 295 to 305 ft, and 305 to 320 ft above mean seal level (amsl)]. Additional discussion of how the maps were developed is presented in Appendix B. The data set and trend plots for MWs used in the interpretation also are included in Appendix B. Figure 6 shows the areas of solid waste management units (SWMUs) identified in the text. Also, Figures 7 and 8 show the locations of wells that are referenced in this report.

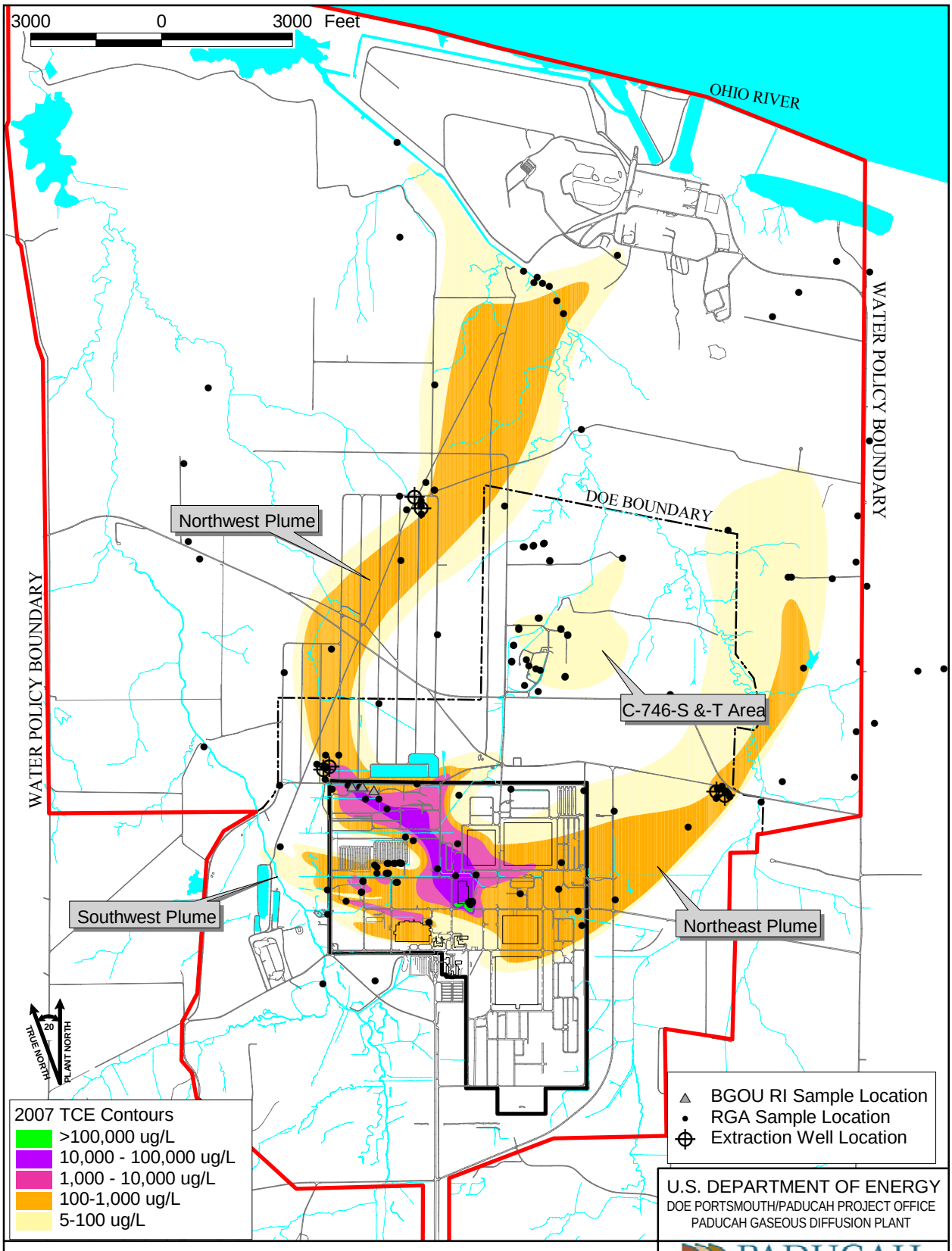

Figure 4. Composite Trichloroethene Contours for the RGA

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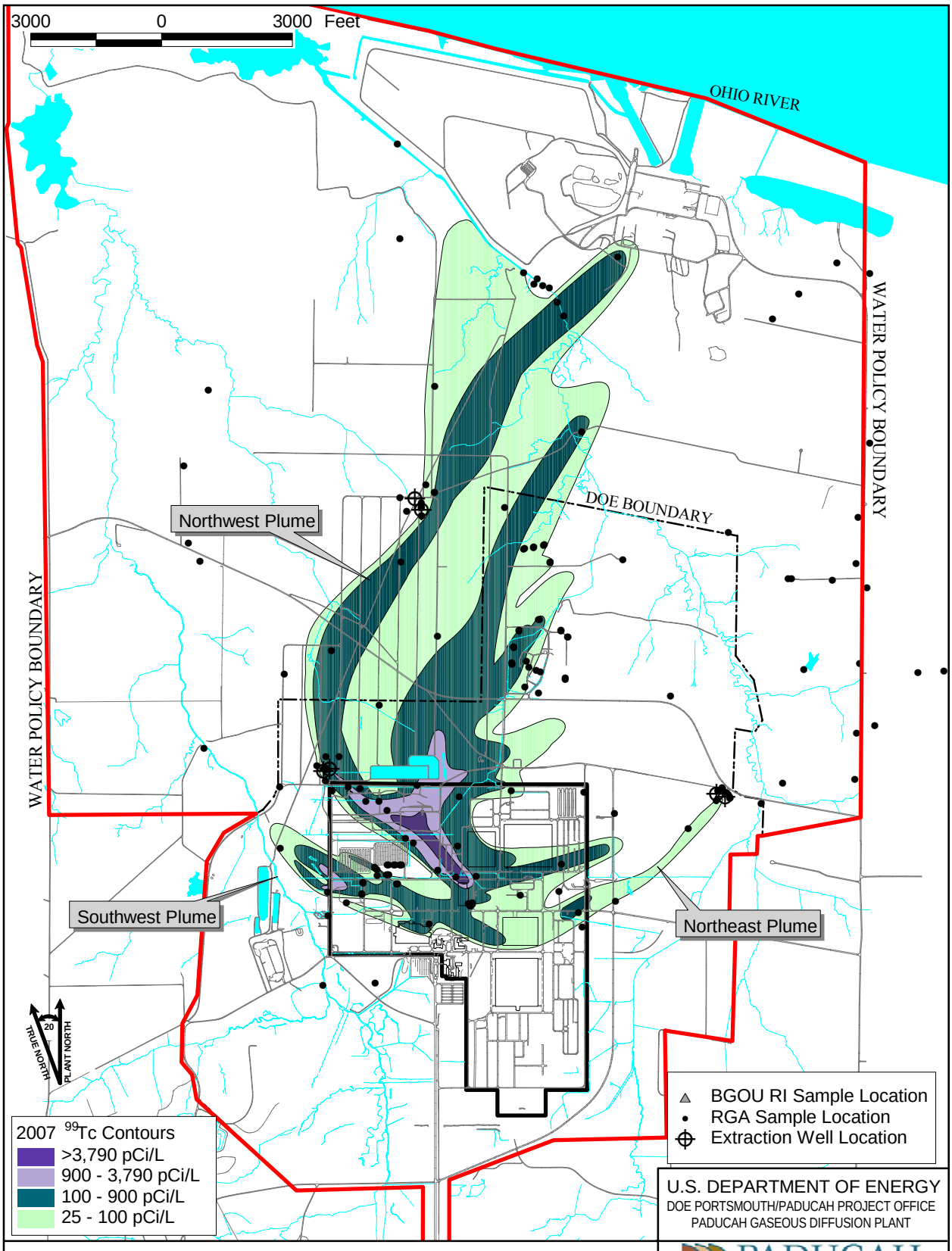

Figure 5. Composite Technetium-99 Contours for the RGA

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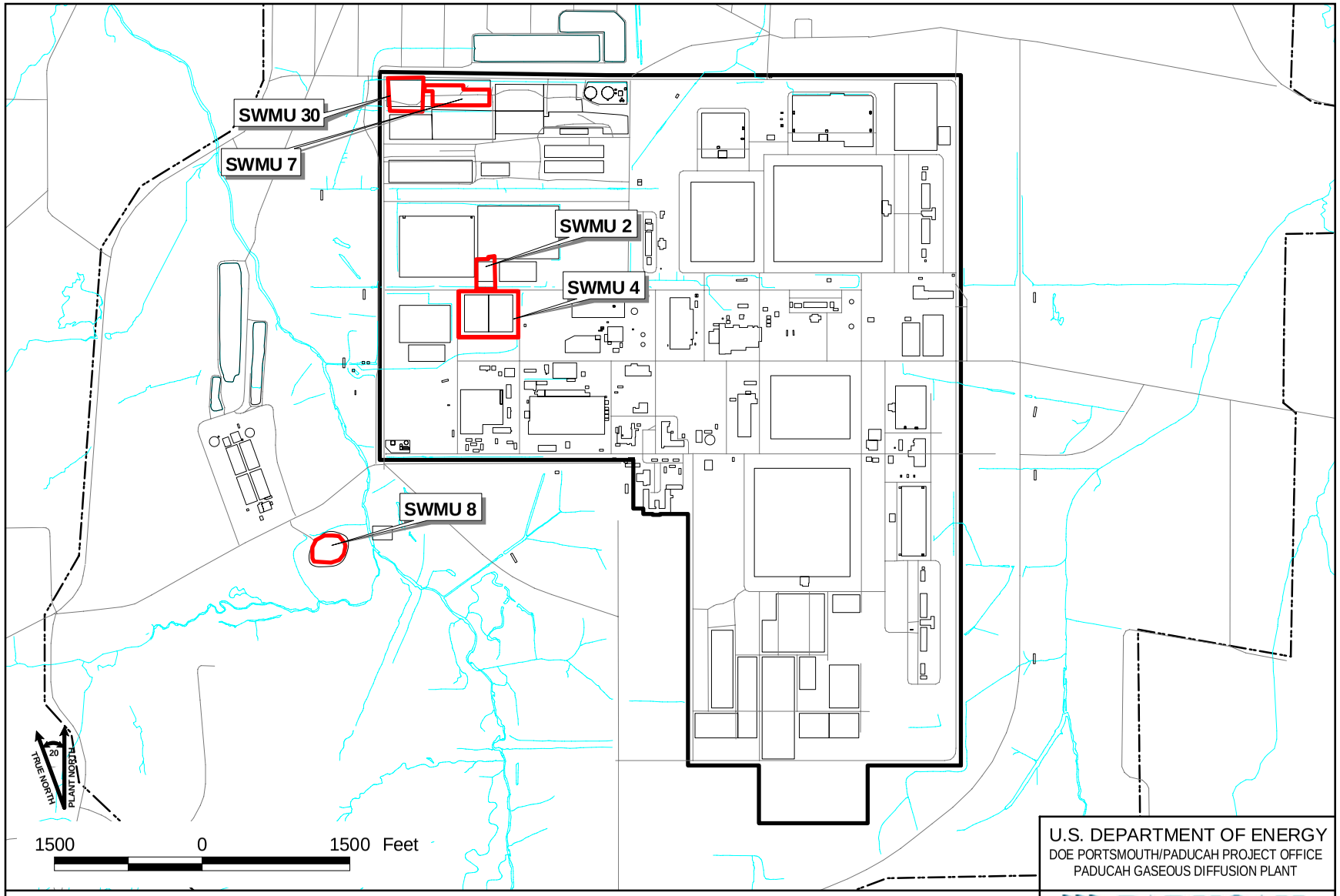

Figure 6. Location of SWMUs for the PGDP Referenced in this Report

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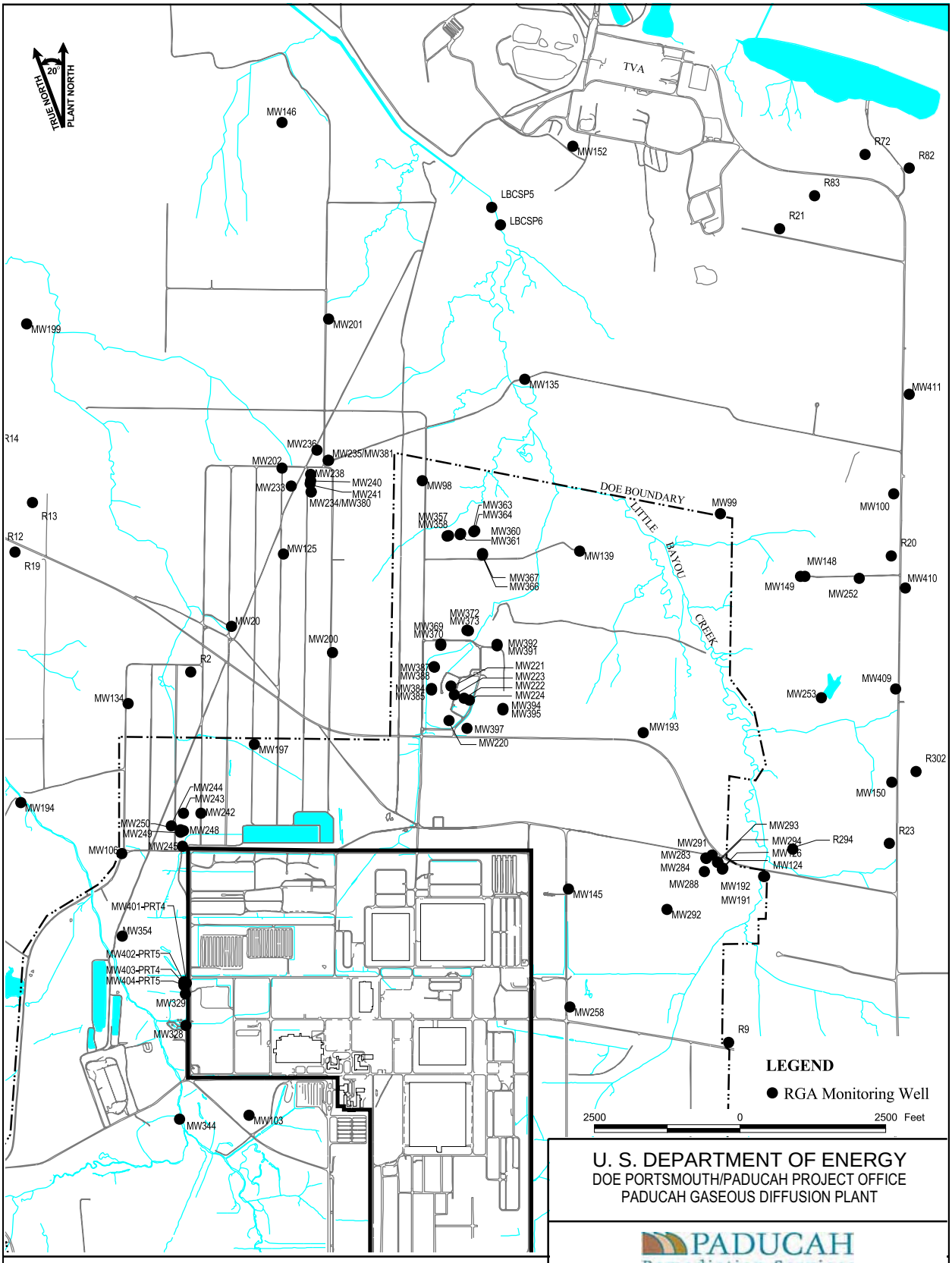

Figure 7. Location of Wells in the PGDP Area
That Are Referenced inThis Report

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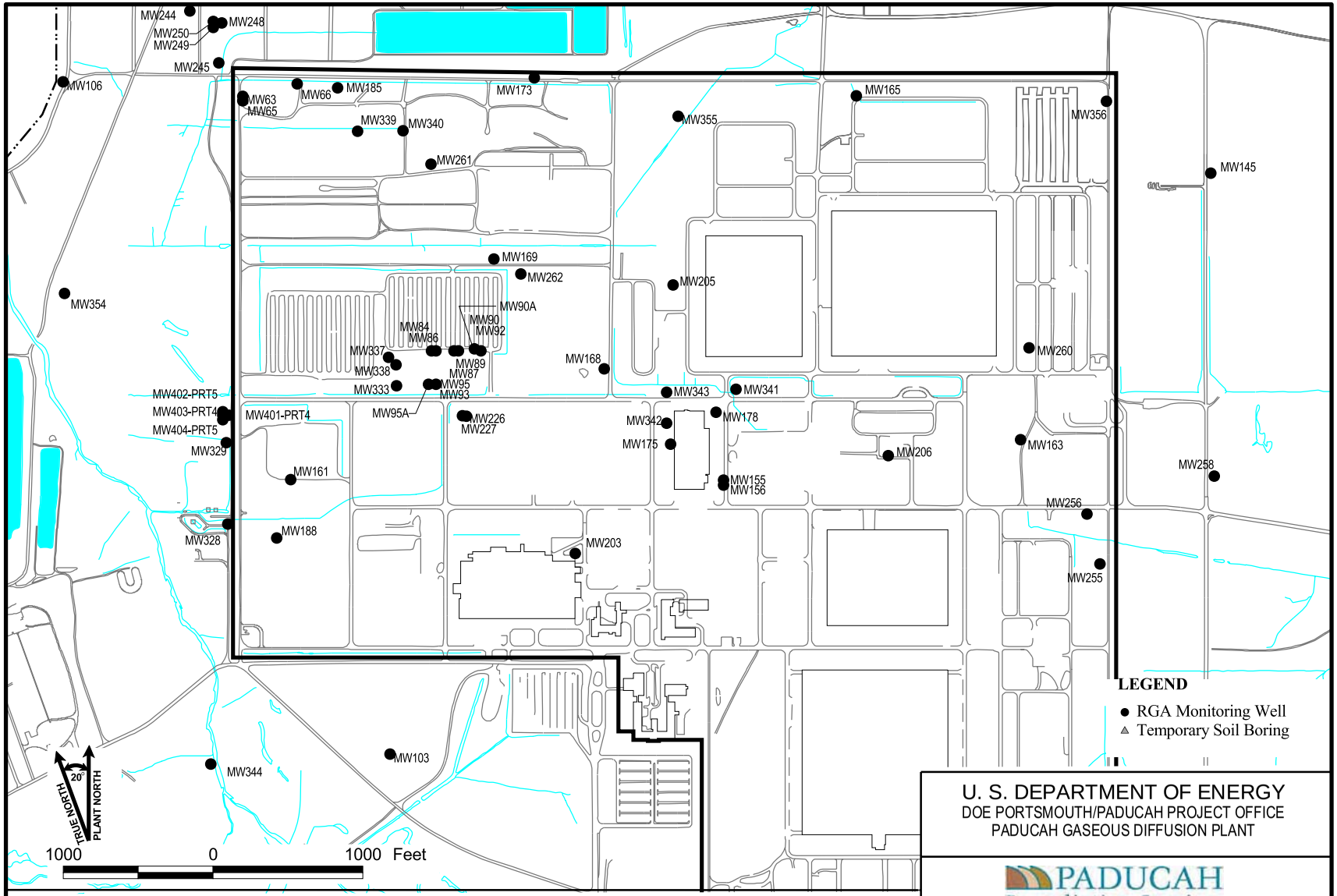

Figure 8. Location of Borings and Wells at the PGDP That Are Referenced in This Report

FIGURE No. 2005wells_borings.apr
DATE 03-28-06

4. REVISIONS TO PREVIOUS PLUME MAPS

This year's (CY2007) plume maps continue the basic interpretation presented in the plume maps for CY2005 and preceding years. The primary revisions for CY2007 reflect the following: (1) decreasing TCE trends in MWs along the core of the Northeast Plume and over a large area to the west of the Northeast Plume well field, (2) decreased TCE and ^{99}Tc levels in MWs along the core of the Northwest Plume, and (3) reinterpretation of the C-400 source zone based on data from recent investigations.

The main revisions to the groundwater plume maps and contaminant trends for each plume are described in the following subsections. The revised maps are presented in Appendix A.

4.1 NORTHWEST PLUME

4.1.1 Trichloroethene

The primary revision for CY2007 is an extension in the area of the core of contamination of TCE mapped in the upper RGA for the Northwest Plume off-site. This extension captures the contamination measured in the Little Bayou Creek seeps north of the plant, specifically sample locations LBCSP5 and LBCSP6.

On-site, however, significant changes were made to the TCE source area near C-400 as a result of data gathered during the C-400 Remedial Design Support Investigation (RDSI). The source area, which previously was thought to reside only in the lower RGA, has been shown in all three horizons of the RGA. Additionally, the source area previously believed to extend farther to the northwest along the RGA flow path has been reduced to only that area defined by the RDSI. Additionally, TCE contamination also has been found in the McNairy. These data are presented within this report, but are not interpreted.

4.1.2 Technetium-99

The primary revision for the CY2007 ^{99}Tc maps for the Northwest Plume is the extension of the upper RGA 100-900 pCi/L contour to the intersection of Little Bayou Creek. This extension was made to honor data collected from seep sample locations LBCSP5 and LBCSP6. Further, the extension of the 25-100 pCi/L contour downstream of the Little Bayou Creek area was scaled back in the middle and lower RGA maps because there were no current data to support the extension.

Overall, the composite contours for ^{99}Tc in the RGA within the Northwest Plume look similar to those previously published.

4.2 NORTHEAST PLUME

4.2.1 Trichloroethene

Monitoring well data for the Northeast Plume well field and upgradient locations within the Northeast Plume continued to document TCE levels, below 1,000 µg/L. Only minor changes to the plume contours were necessary to honor the monitoring data.

4.2.2 Technetium-99

Contaminant levels generally are less than 25 pCi/L off-site and are only greater than 100 pCi/L at a few discrete locations off-site, near the northwest corner of PGDP.

The small, isolated area of ^{99}Tc at the northwest corner of the C-333 Building was removed from the upper and middle RGA contours. Other, minor adjustments were made to the existing contours to honor current data.

Overall, the composite contours for ^{99}Tc in the RGA look similar to those previously published.

4.3 SOUTHWEST PLUME

4.3.1 Trichloroethene

The primary trends of the CY2005 TCE plume map are retained in this CY2007 update, with only minor revisions to honor monitoring data.

4.3.2 Technetium-99

Analyses for the Southwest Plume wells for CY2007 continued the trends observed in CY2005. Revisions to the ^{99}Tc plume in the area of the Southwest Plume are minor.

4.4 C-746-S, -T, AND -U AREA

4.4.1 Trichloroethene

The CY2007 maps continue to show the area of TCE contamination near the C-746-S&T Landfills and SWMU 145 as isolated from the other TCE plumes. The CY2007 update required little revision of the CY2005 maps.

4.4.2 Technetium-99

CY2007 ^{99}Tc maps for the area depict one core of greater than 100 pCi/L contamination migrating under the east side of the C-746-S&T Landfills and another core of 100 pCi/L contamination migrating northward under the west side of the C-746-U Landfill. As in previous maps, these plumes are shown originating from within the plant and from the C-616 Lagoons (DOE 1995b).

5. TRENDS IN PGDP MONITORING WELLS

MW systems located at PGDP provide a means to assess the groundwater quality in the RGA for distinct areas. Records of TCE and ^{99}Tc levels over time for 141 RGA wells document overall groundwater contaminant trends for PGDP. The analyses of approximately 53 wells of the 141 RGA MWs have shown an increase in TCE over the past year; while 35 wells have monitored a decline in TCE levels. TCE levels in 9 wells are nearly unchanged; and 44 wells have no detectable TCE. Over the past year, the records of 31 wells have shown an increasing trend of ^{99}Tc activity and the records for 16 wells have documented a decline. The ^{99}Tc analyses for 94 wells have ^{99}Tc activities below 25 pCi/L (the practical detection limit).

The following sections summarize the interpretation of groundwater trends at PGDP.

5.1 RAINFALL AND RGA HYDRAULIC POTENTIAL TRENDS

A review of the water level graphs in Attachment B1 of Appendix B shows that large variations have occurred in measured RGA water levels over the years. Figure 9 presents rainfall and groundwater level information for the PGDP area for the period CY1990 through CY2007. The lower graph shows the cumulative impact of monthly rainfall surpluses and deficits when actual monthly rainfall totals are compared against the 30-year monthly average rainfall for the PGDP area (now available for the calendar years 1970 through 2000). A sustained rainfall deficit for the PGDP area has occurred over the period CY1992 through CY2007. CY2005 and CY2007 had overall rainfall below average (12.2 and 5.9 inches, respectively). Alternately, rainfall for CY2006 was 17.9 inches above average, displaying a cyclic trend in monthly average rainfall over the three year period. Overall, however, a period of deficient rain continues, thereby reducing the amount of water in storage in surficial soils and reducing the amount of water infiltrating through deeper soils, potentially carrying groundwater contaminants.

All of the RGA water-level records exhibit similar trends (aside from rare outliers that appear to be measurement errors) with a similar magnitude of rise and fall (see Appendix B). The data define an overall decline of approximately 3 ft for the period CY1997 to CY2007. A depressed water table in the UCRS likely has led to less annual infiltration in the RGA, resulting in less contaminant source in contact with groundwater and altered groundwater flow paths. Since all MWs show a similar decline, only localized changes in individual groundwater flow paths would be expected.

5.2 TRENDS IN CONTAMINANT LEVELS

Several groups of wells with records of increased TCE or ^{99}Tc levels occur among the 141 wells represented in this analysis. Water-level measurements can be used for comparison of contaminant levels versus water-level events to support an analysis of overall trends that may reflect cause-and-effect relationships. Subsequent figures in Section 5 present an index map that shows the locations of

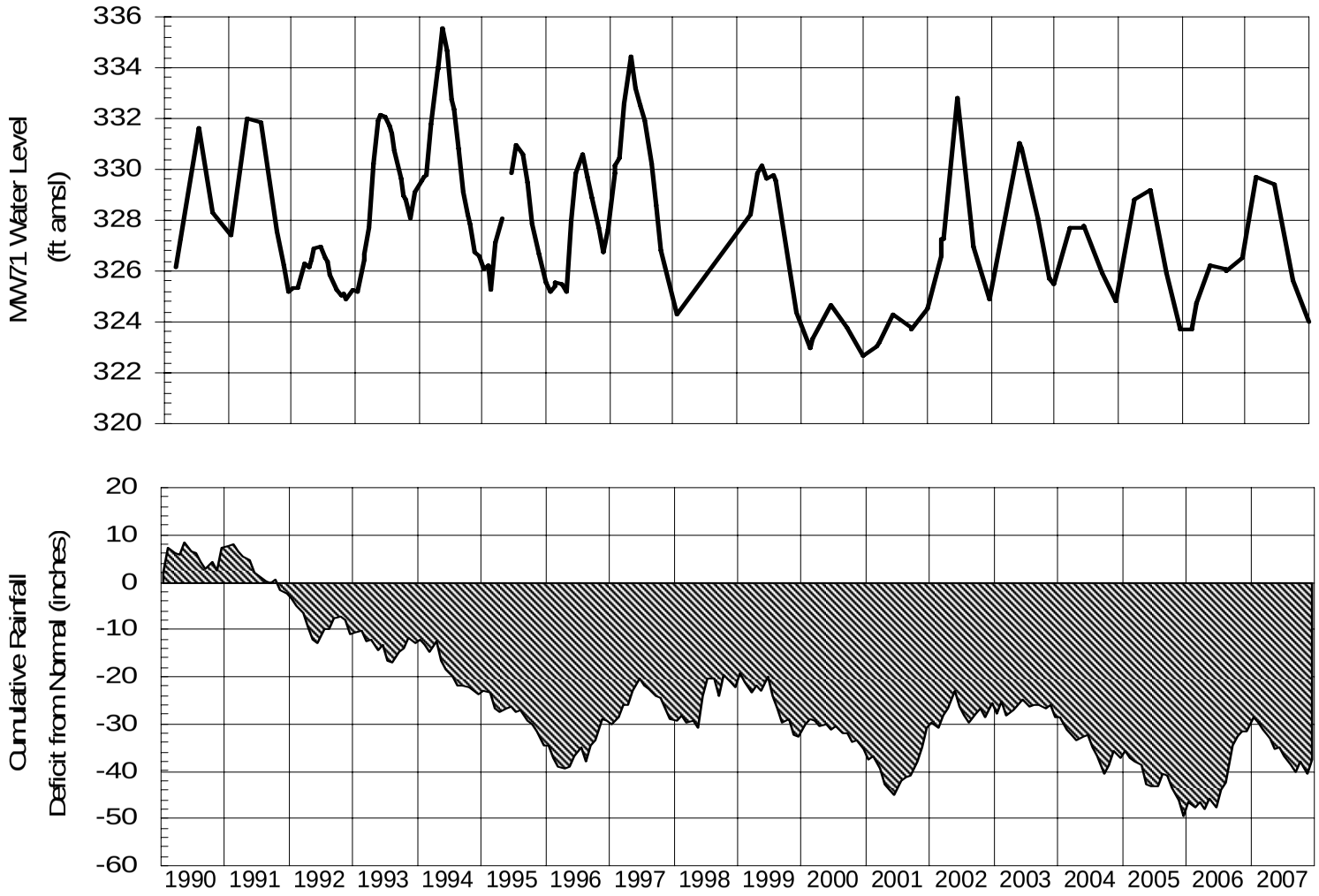

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Figure 9. Water Levels in MW71 Compared to Rainfall Deficit

wells discussed in the text and TCE and ^{99}Tc trend plots for the period CY2002 through CY2007. Attachment B1 in Appendix B contains water level, TCE, and ^{99}Tc trend plots for each well for the same time period. Trend lines have been added to some of the TCE and ^{99}Tc trend plots to summarize the overall increase or decrease of the contaminant levels.

5.2.1 C-400 Area

Currently, there are five MWs in the C-400 area that provide data trends – two (MW156 and MW168) are screened in the upper RGA; one (MW341) is screened in the middle RGA; and two (MW155 and MW343) are screened in the lower RGA. Even though these wells are less than 1,100 ft apart, there are significant variations in the TCE and ^{99}Tc trends among these wells. Figure 10 shows the relative positions of the wells and the TCE trend plot for each well. Figure 11 presents the same information for ^{99}Tc. Additionally, four multiport wells were installed for the Six-Phase Treatability Study adjacent to C-400 on the east side of the facility in 2003. These wells were analyzed for TCE and ^{99}Tc during the treatability study and again in 2007. Results for these multiport wells are presented in Appendix B. Table 2 lists the multiport wells and denotes the zone each port monitors.

Table 2. Six-Phase Treatability Study Multiport Wells

	MW405	MW406	MW407	MW408
Port 1	UCRS	UCRS	UCRS	UCRS
Port 2	Upper RGA	Upper RGA	Upper RGA	Upper RGA
Port 3	Upper RGA	Upper RGA	Upper RGA	Upper RGA
Port 4	Middle RGA	Middle RGA	Middle RGA	Upper RGA
Port 5	Middle RGA	Middle RGA	Middle RGA	Middle RGA
Port 6	Lower RGA	Lower RGA	Lower RGA	Lower RGA
Port 7	McNairy	McNairy	McNairy	McNairy

Trichloroethene. Analyses for wells MW156 and MW168 of the upper RGA each show previously declining TCE levels, but the character of their trends is indicative of their relative positions to the building. MW156, at the southeast corner of the building, had the highest TCE concentrations of all the wells in the C-400 area until CY2004 (when TCE levels in MW343 dominated) and is closest to the main TCE source area. The overall record for this well has shown a nearly steady decline in TCE levels (interrupted by a spike in early CY2003), indicating a gradually depleting source in the overlying shallow soils. A recent analysis for this well documents a slight rebound in TCE concentration. MW168, which is located approximately 1,100 ft downgradient of MW156, generally monitors lower levels of TCE. In this well, TCE increased to a peak in early CY1996. Since that time, TCE levels have declined. In MW156, TCE levels declined sharply during CY2003 and CY2004 to below 50,000 µg/L, perhaps reflecting the removal of TCE from the source area during the DNAPL source zone treatability study in CY2003. A similar style of decline in MW168 TCE levels appears to have begun in CY2004 and continued into CY2005. From CY2005 to CY2007, MW168 somewhat rebounded in TCE concentration and has shown a more cyclic trend since then. The multiport wells installed for the Six-Phase Treatability Study indicate a maximum TCE concentration in the upper RGA of 640,000 µg/L (MW408, Port 4).

The TCE trend of the middle RGA well, MW341 (located northeast of C-400), demonstrates a near-steady increase into CY2007, with a slight decrease in mid CY2007. The multiport well MW408 shows a maximum TCE level of 690,000 µg/L from its middle RGA port.

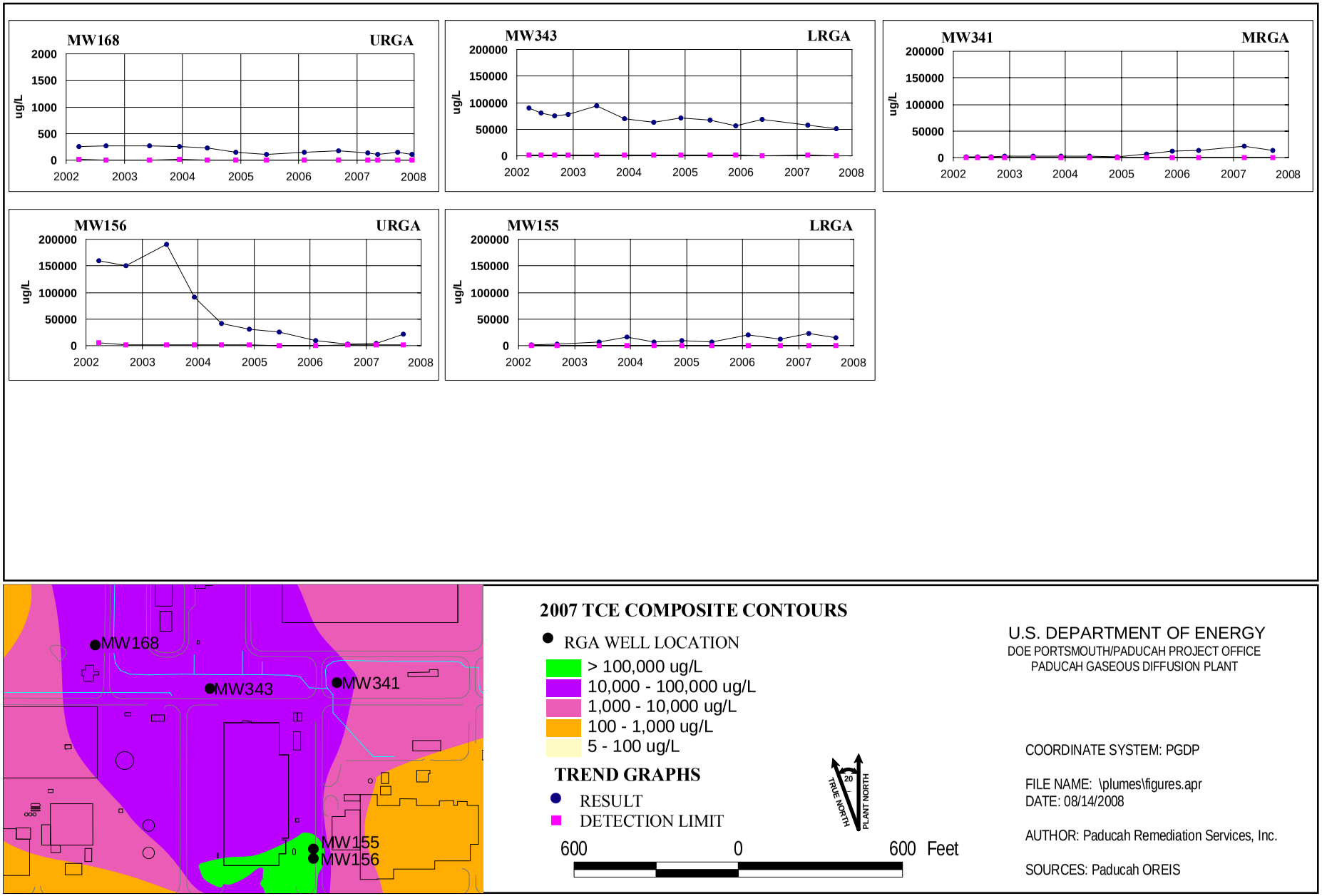

Figure 10. Trichloroethene Concentrations in Wells near C-400

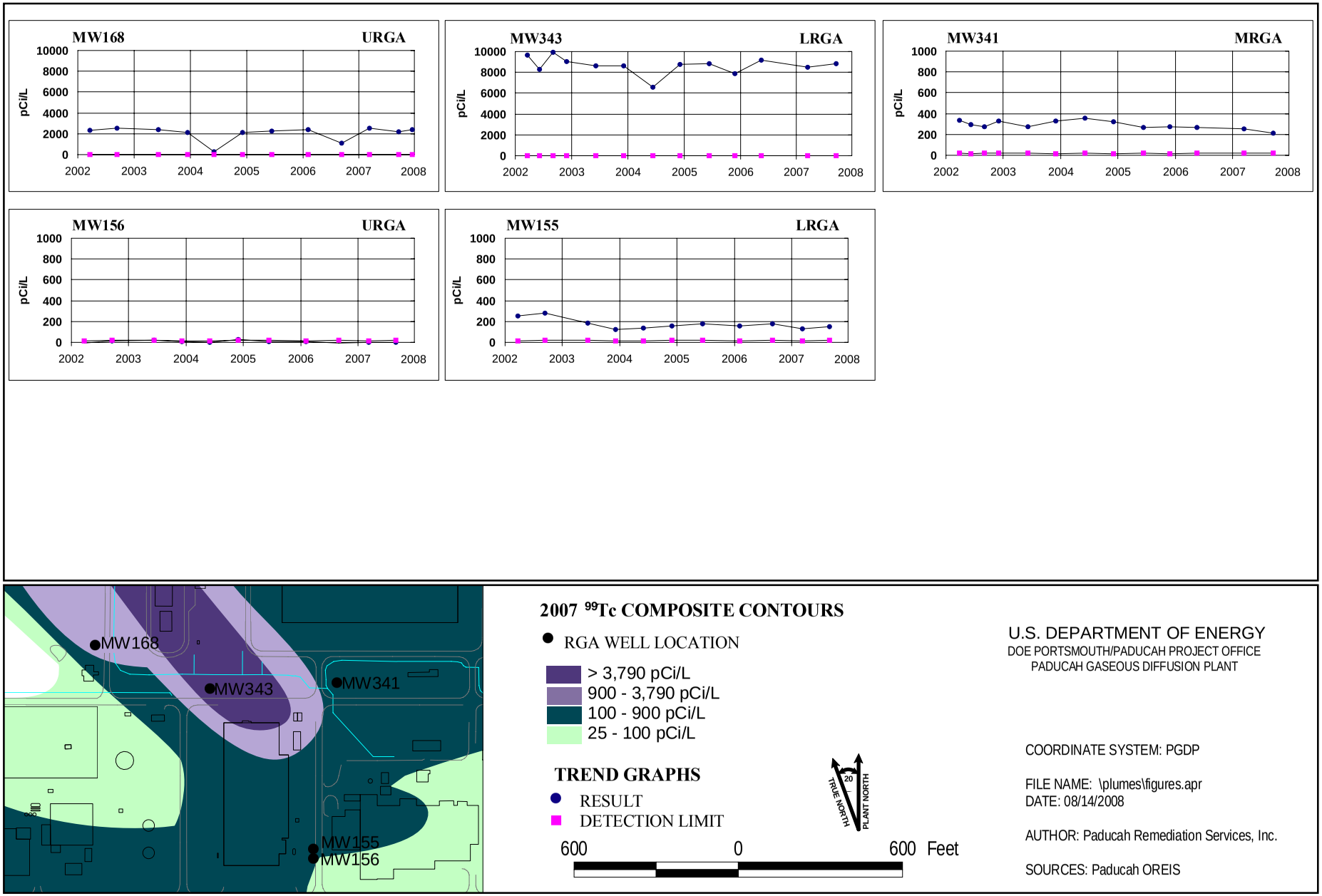

Figure 11. Technetium-99 Activities in Wells near C-400

Two wells monitor the lower RGA, MW155 (located at the southeast corner of C-400) and MW343 (located near the northwest corner of C-400). MW155 has experienced increased TCE levels since CY2002, while the MW343 trend is slightly erratic, but with an overall downward trend. MW155 is only 34 ft north of the upper RGA well MW156, but the TCE trends and levels are significantly different. The TCE levels in MW155 indicate that the well is on the edge of the contamination at the southeast corner of C-400. A sharp increase in TCE levels for MW155 during CY2003 appears to be related to a DNAPL source zone treatability study that was sited approximately 75 ft southwest of the well. MW343, with its relatively high TCE levels, is near the core of the Northwest Plume. After large fluctuations in contaminant level during its first two years of sampling, the TCE levels appeared to have stabilized near 50,000-to-65,000 µg/L during CY2006 and CY2007. It is believed MW343 monitors the dissolved TCE plume derived from the main DNAPL source zone at the southeast corner of the C-400 Building. Of the multiport wells installed for the Six-Phase Treatability Study, MW408 shows the maximum TCE level in its lower RGA port at 570,000 µg/L. Additionally, MW408, a Six-Phase Treatability Study multiport well, monitoring the below RGA/McNairy interface recorded 1,200,000 µg/L TCE in CY2007.

Technetium-99. Only two detections of ^{99}Tc in recent years from MW156 occurred during CY2003 and CY2004. MW156 is upgradient of the main ^{99}Tc source at C-400, which is likely the North-South Diversion Ditch (DOE 1999a). The other upper RGA well, MW168, monitors near steady levels of ^{99}Tc, except for two anomalously low results in CY2004 and CY2006. Additionally, a Six-Phase Treatability Study multiport well showed 60.4 pCi/L ^{99}Tc in its upper RGA monitoring port (MW408, Port 2).

The trend of ^{99}Tc activity in the middle RGA well appears to show a slight decline. In lower RGA wells MW155 and MW343, ^{99}Tc levels have remained near-stable over a five-year period.

Of the Six-Phase Treatability Study multiport wells, MW405 shows the maximum ^{99}Tc level in a middle RGA sample port at 116 pCi/L (Port 5). No ^{99}Tc activity was detected above 25 pCi/L in samples from ports in the lower RGA or from below the RGA/McNairy interface.

5.2.2 Northwest Plume Area

Plant Boundary. There are ten MWs within or immediately adjacent to the Northwest Plume within the plant boundary. Going from southeast to northwest, these wells include three upper RGA wells – MW168 (also part of the C-400 area), MW63, and MW66; two middle RGA wells – MW169 and MW185; and four lower RGA wells – MW262, MW355, MW261, MW340, and MW339. MW168 was discussed in Section 5.2.1. Figure 12 shows the subject wells and their individual TCE trend plots, while Figure 13 shows the same information for ^{99}Tc.

South Well Field. All six MWs associated with the south extraction well field for the Northwest Plume are screened in the middle RGA. MW245 is an upgradient well, while the other five wells are at various distances downgradient from the two extraction wells. Figure 14 shows the wells and TCE trends for the south well field. Figure 15 presents the ^{99}Tc trends.

North Well Field. There are four middle RGA MWs (MW233, MW235/MW381, MW238, and MW240) and three lower RGA MWs (MW202, MW234/MW380, and MW236) now monitored in the north extraction well field of the Northwest Plume. MW234/MW380 is considered an upgradient well to the extraction well field. MW240 and MW238 are within the extraction well field, while MW235/MW381 and MW236 are downgradient wells. MW202 and MW233 are west of the extraction well field. During the summer of CY2002, MW235 was abandoned and replaced with MW381, and MW234 was abandoned and replaced with MW380 due to questionable well integrity. Figure 16 shows the TCE trends and wells for the north well field, while Figure 17 presents the same information for ^{99}Tc trends.

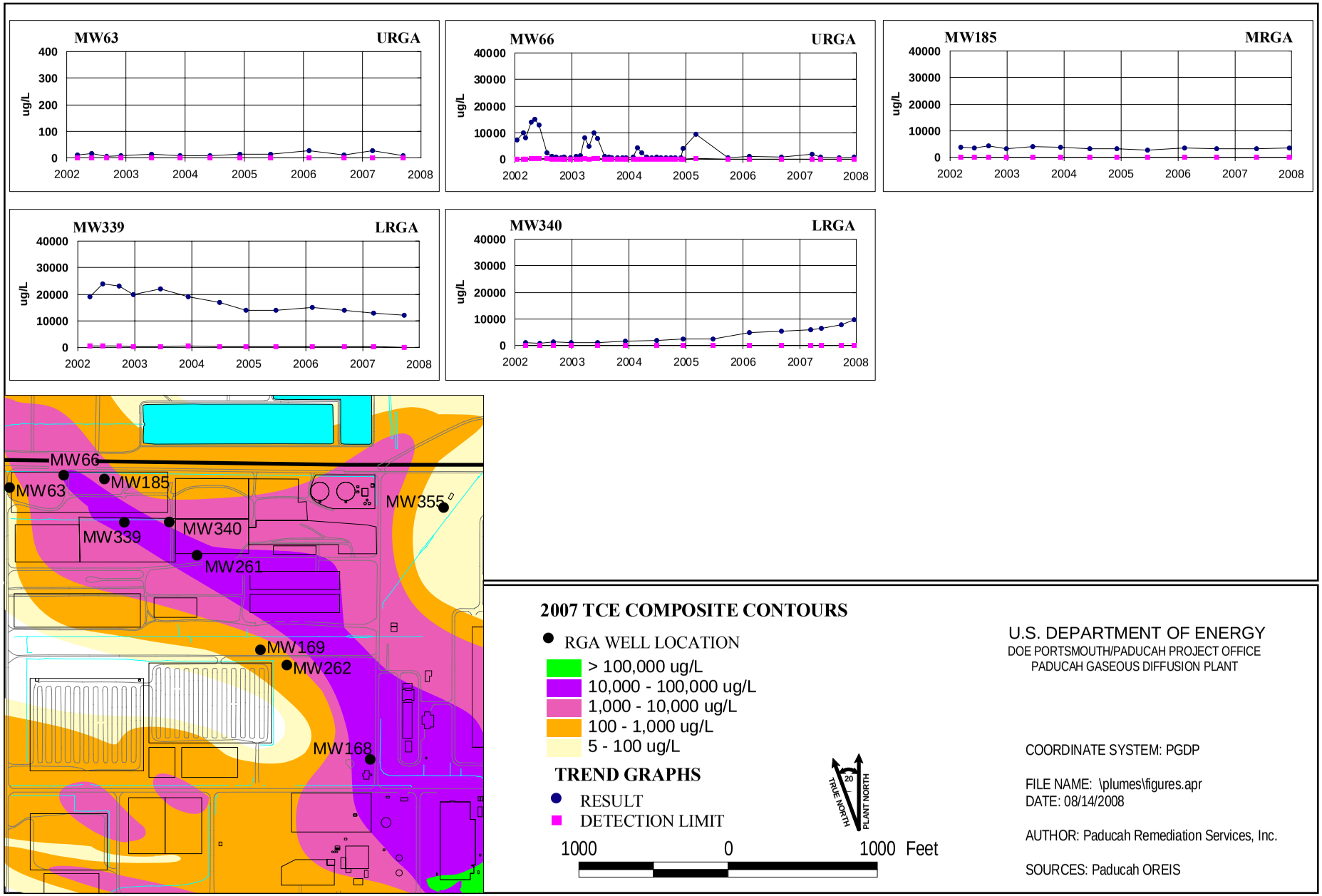

Figure 12. Trichloroethene Concentrations in Wells in Northwest Plume at PGDP

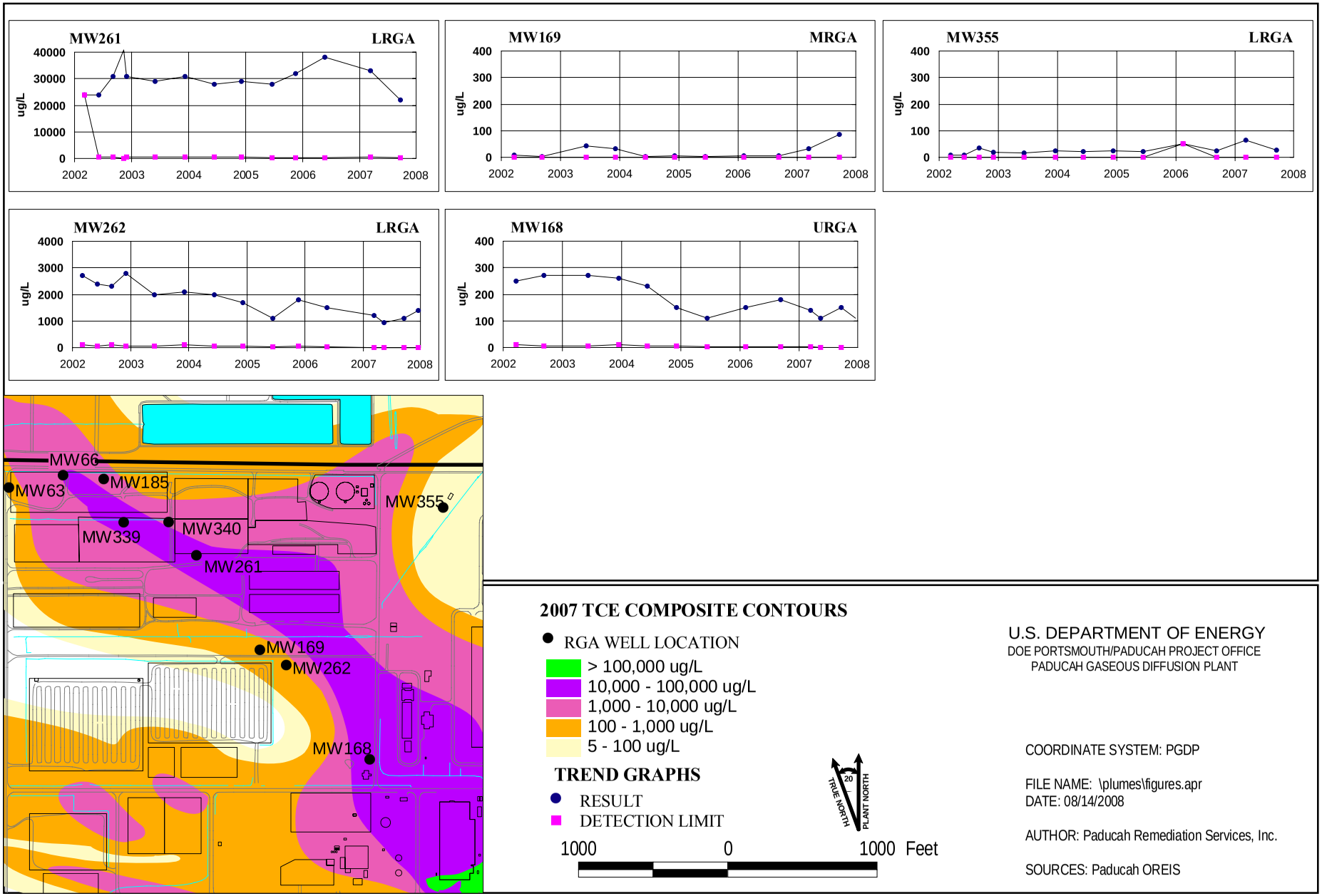

Figure 12. (Continued)

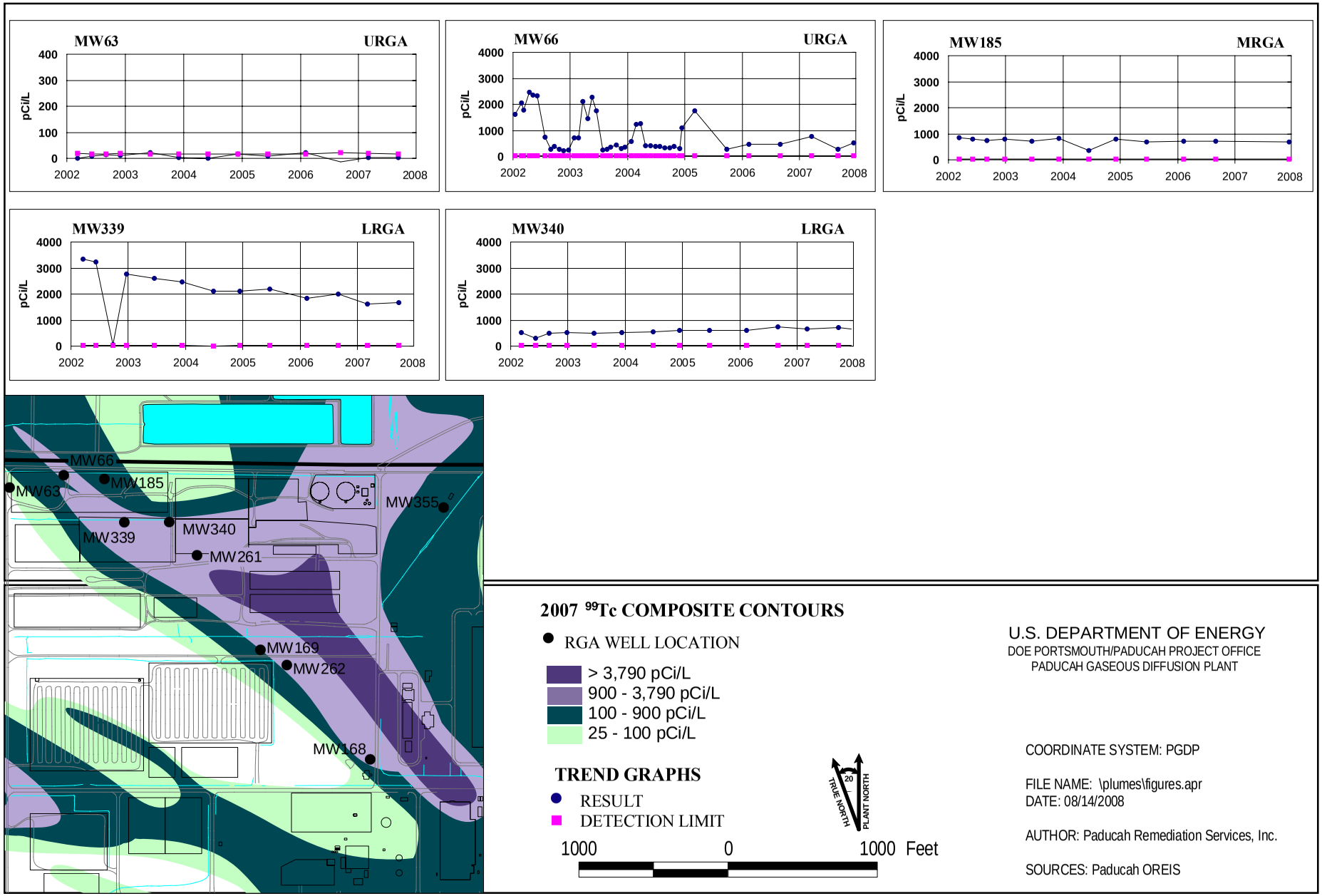

Figure 13. Technetium-99 Activities in Wells in Northwest Plume at PGDP

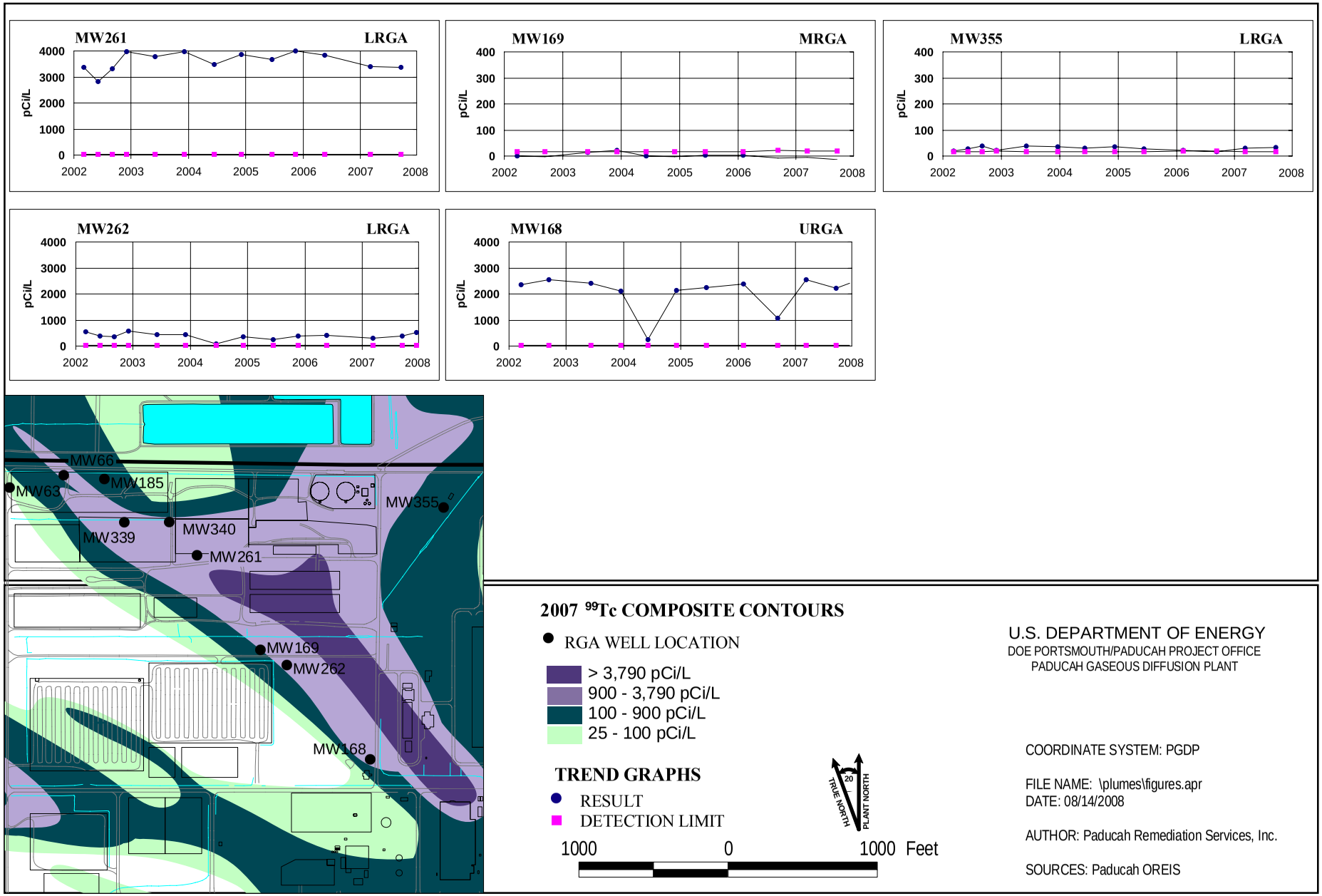

Figure 13. (Continued)

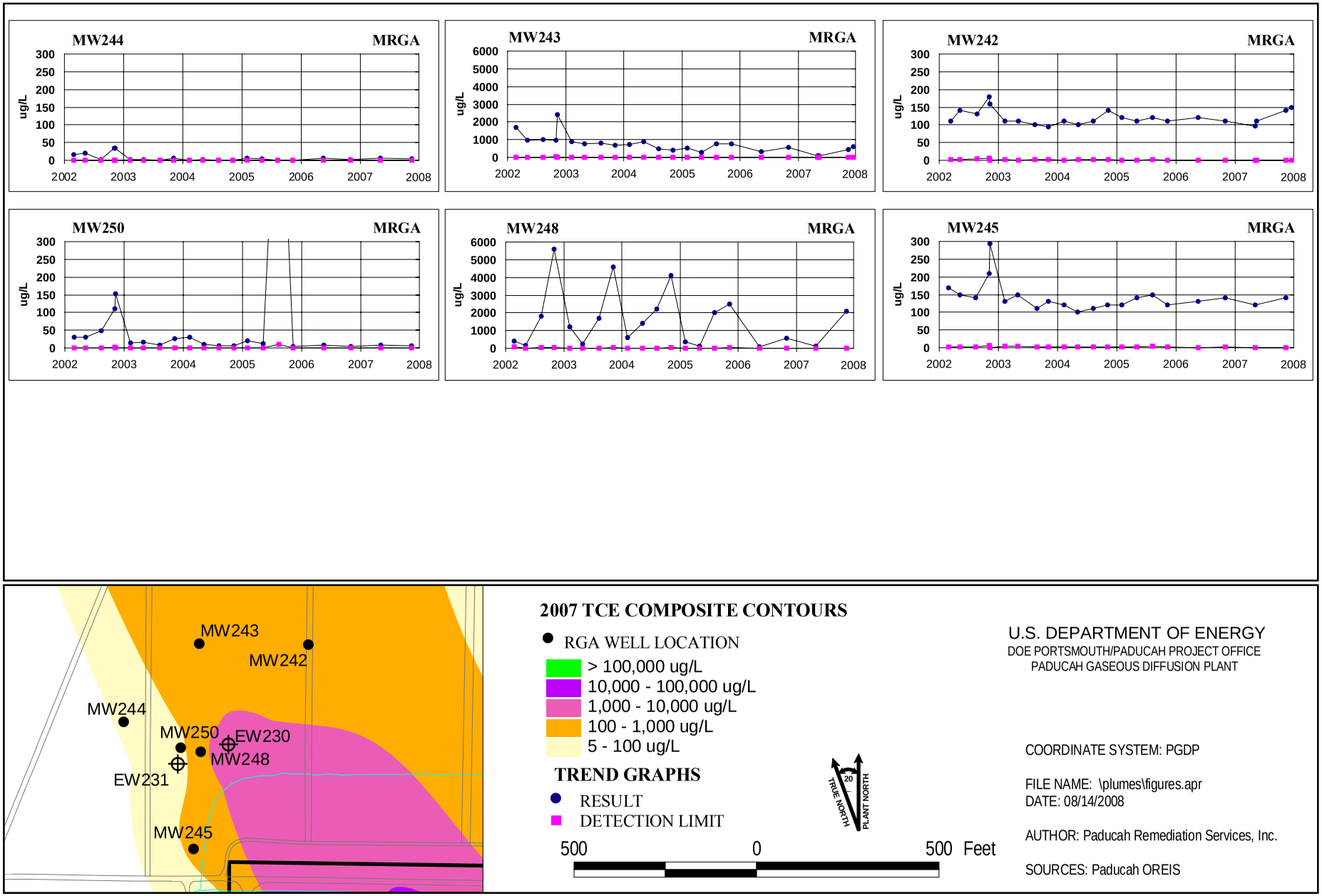

Figure 14. Trichloroethene Concentrations in Wells near Northwest Plume South Well Field

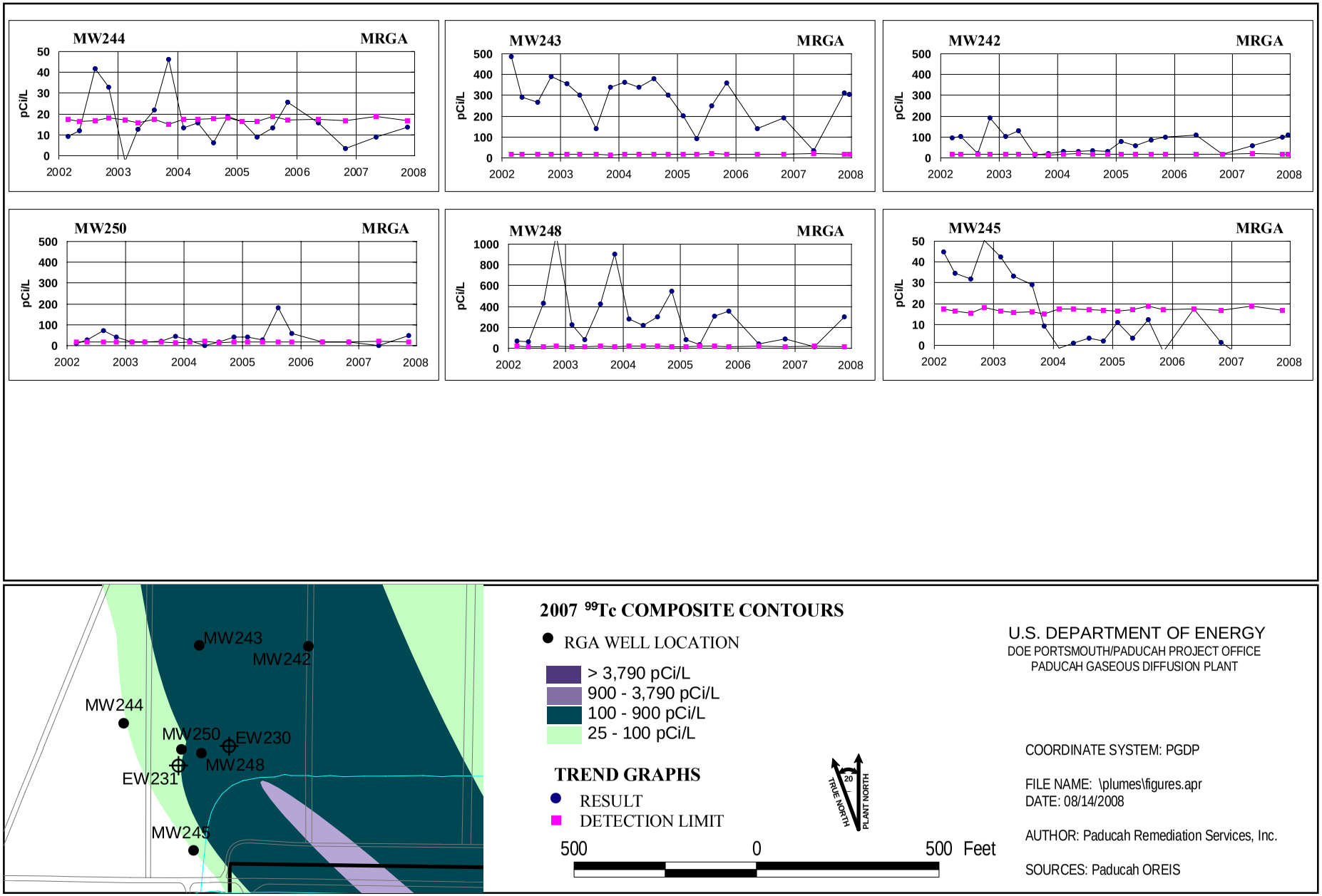

Figure 15. Technetium-99 Activities in Wells near Northwest Plume South Well Field

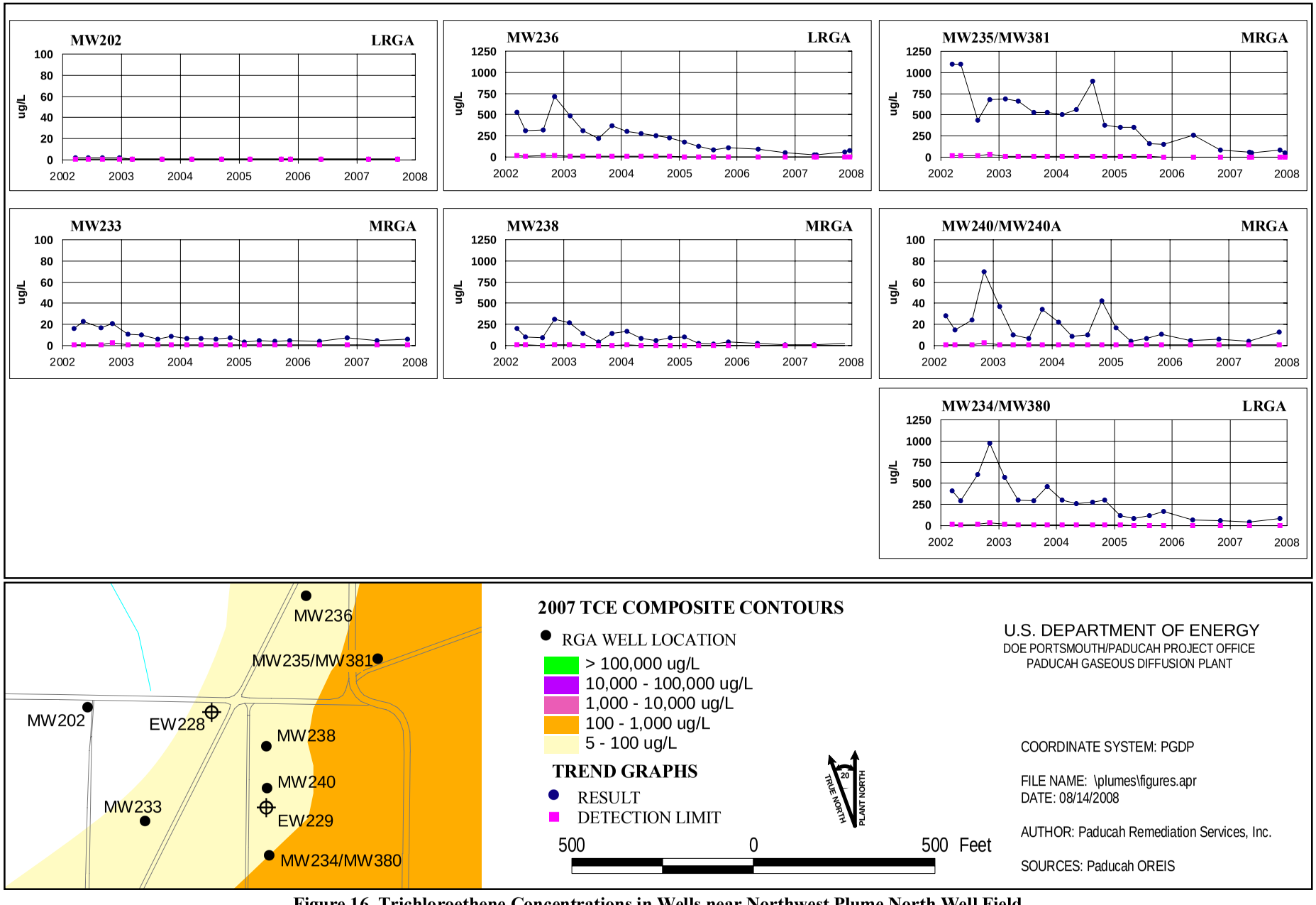

Figure 16. Trichloroethene Concentrations in Wells near Northwest Plume North Well Field

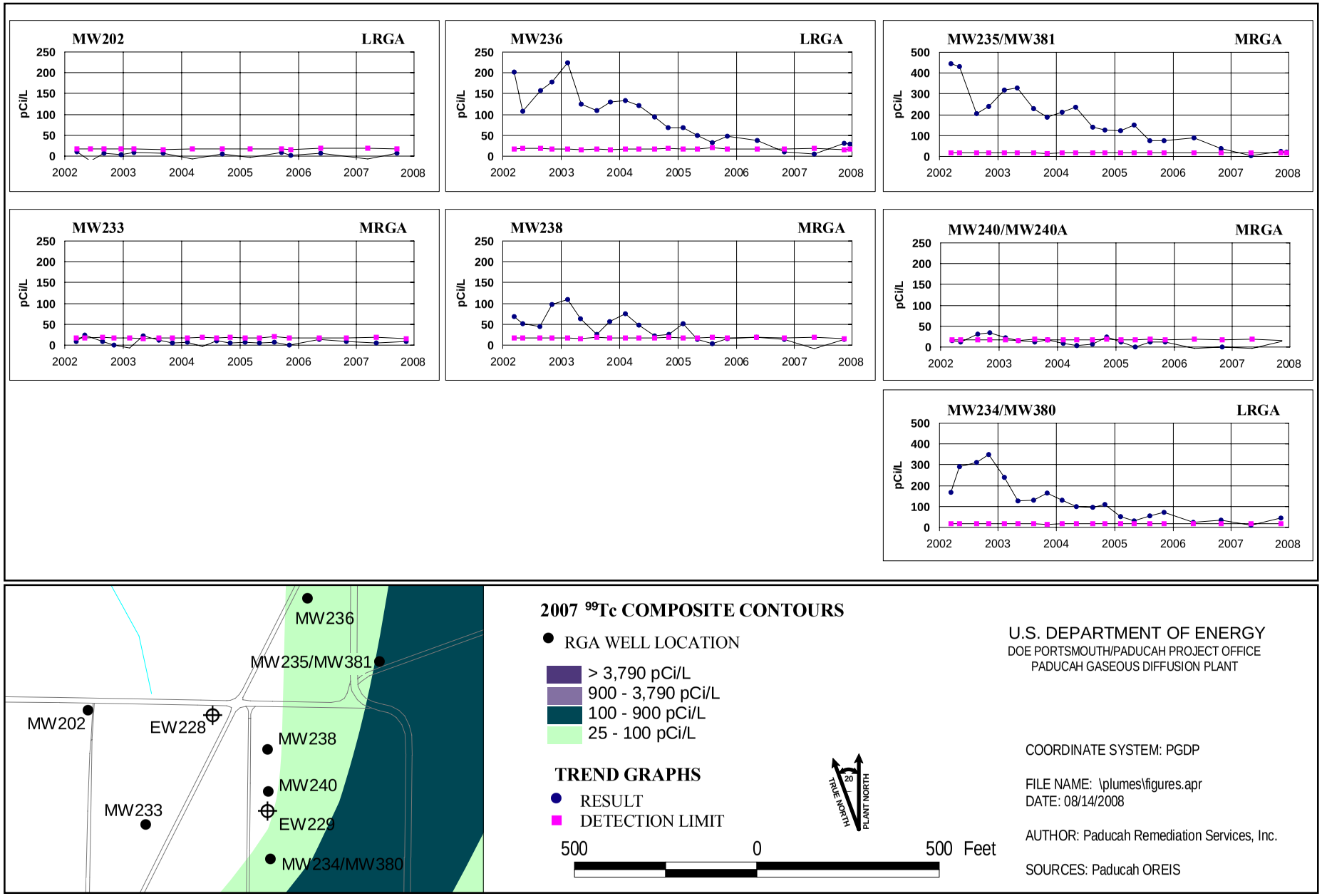

Figure 17. Technetium-99 Activities in Wells near Northwest Plume North Well Field

Off-site Wells. In addition to the MWs associated with the north and south extraction well fields, there are 12 other wells monitoring contaminant migration in the Northwest Plume outside the secured area. These wells include one upper RGA well (MW197); five middle RGA wells (MW98, MW106, MW194, MW200, and MW201); and six lower RGA wells (MW125, MW134, MW135, MW146, MW152, and MW199). Figures 18 and 19 show the locations and TCE and ^{99}Tc trends for this group of wells, respectively.

A comparison of the trends in MWs located upgradient, downgradient, and crossgradient to the south extraction wells suggests that the south extraction wells (EWs) are reducing contaminant levels in the core of the Northwest Plume. Contaminant levels in MW248, located midway between the two south EWs, are significantly less than those of upgradient MW261 and MW339. Enough data now exist to show that MW248 monitors the same groundwater flow path as upgradient MW66 (Figures 12 and 13). MW66 is thought to monitor dissolved contamination resulting from a shallow DNAPL in the SWMUs 7 and 30 Burial Grounds (DOE 2008b), which is independent of the highest concentration core of the Northwest Plume that is derived from the C-400 Cleaning Building area (DOE 2008a).

Monitoring data for the North EW Field indicate contaminant level trends are not consistent (Table 3). Further, the trends suggest that the high-concentration core of the Northwest Plume has passed east of the north extraction wells. See the Five-Year Review for Remedial Actions for additional information (DOE 2008c).

Table 3. Summary of Contaminant Levels in the Area of the North EW Field

Well	Trends 1998-2007
MW235/MW381	Abrupt rise mid-1998–2002 followed by near- steady decline
MW236	Abrupt rise mid-1998–2002 followed by near- steady decline
MW238	Continuation of overall decline
MW240	Continuation of overall decline
MW233 [b]	Sharp drop in early 1998 followed by near-steady decline
MW234[b]/MW380	Abrupt rise mid-1998–2002 followed by near-steady decline

[a] Last sampled in 2003
[b] Upgradient

One monitoring well that does appear to be monitoring the high-concentration core of the Northwest Plume is MW125. Trends in this well indicates an abrupt rise between 2002 and 2003 followed by a near steady increase through 2007.

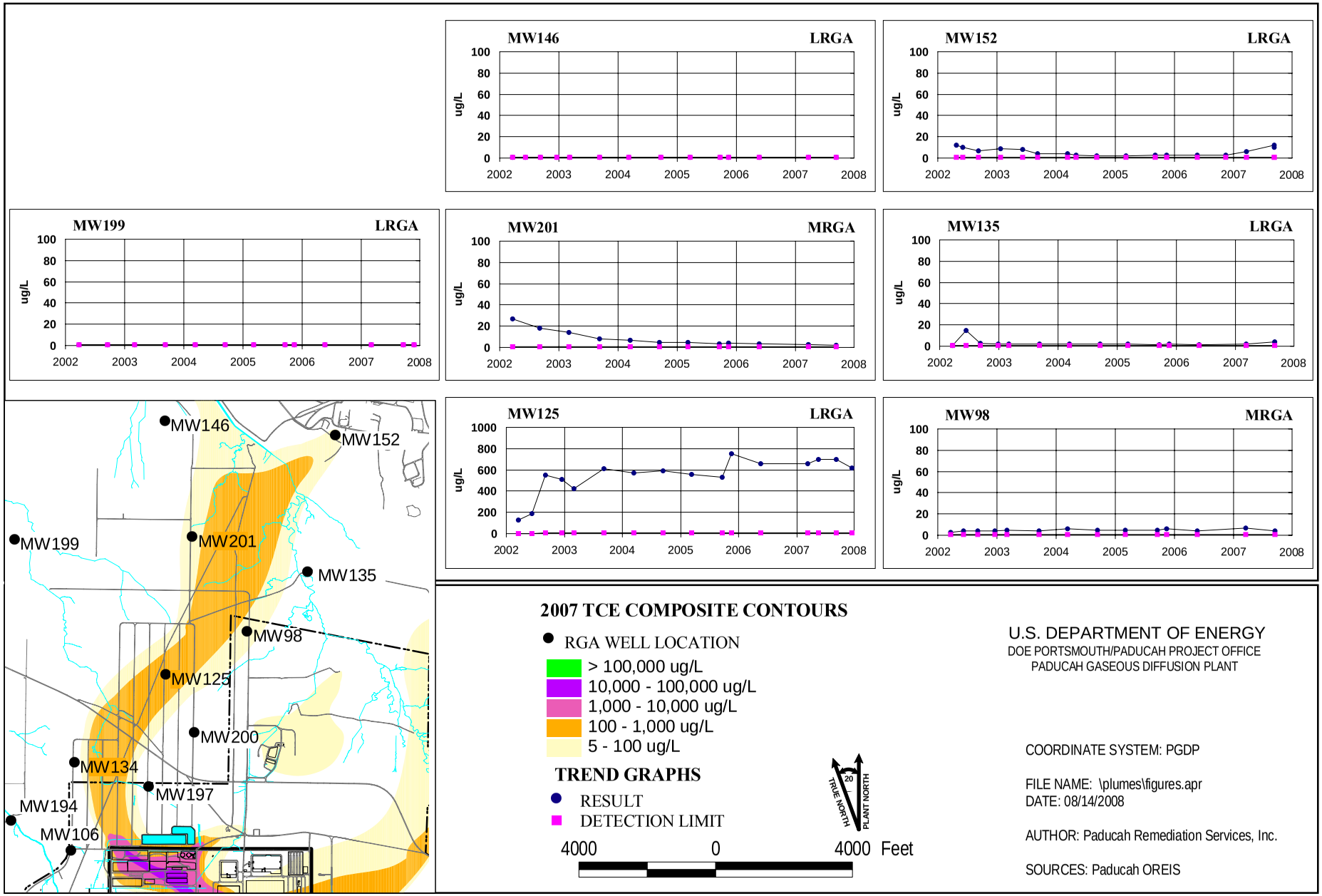

Figure 18. Trichloroethene Concentrations in Wells in Northwest Plume, Off-site

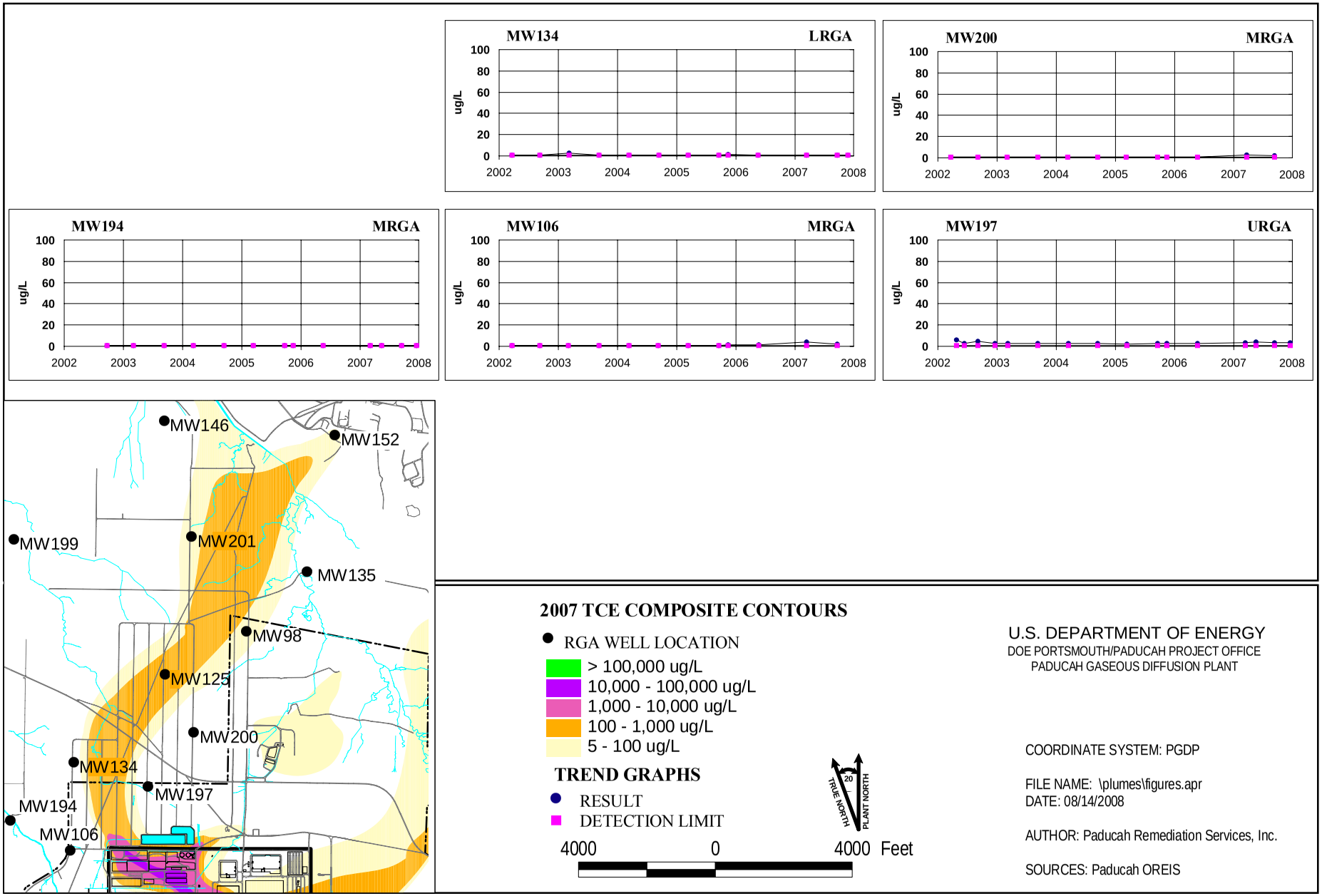

Figure 18. (Continued)

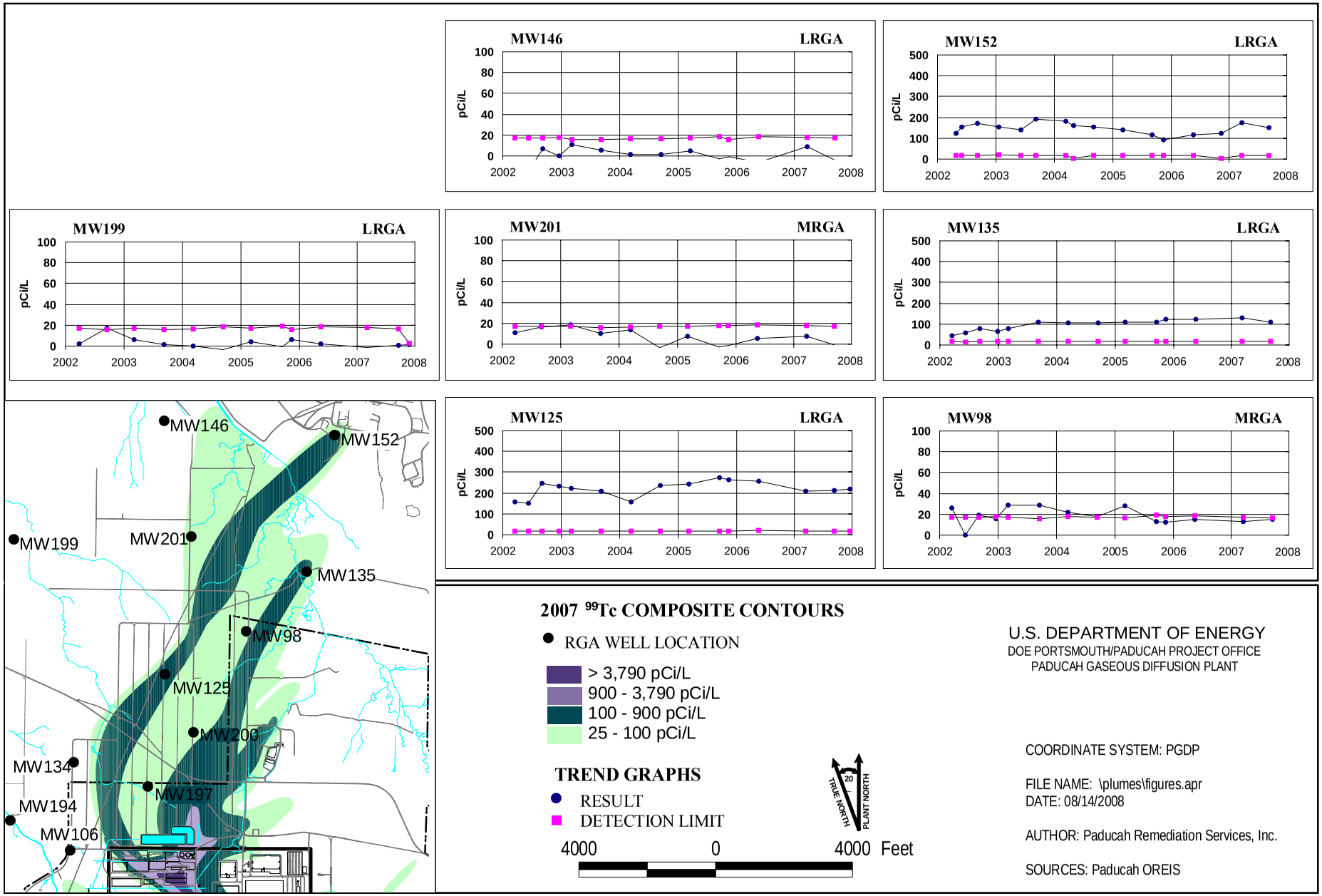

Figure 19. Technetium-99 Activities in Wells in Northwest Plume, Off-site

5.2.3 C-746-S&T Landfills Area

Due to well integrity issues, the MW network at the C-746-S&T Landfills area underwent a major well replacement project in late CY2002. At the completion of the project, there were ten wells screened in the upper RGA, four wells screened in the middle RGA, and four wells screened in the lower RGA.

Figures 20 and 21 show the TCE and ^{99}Tc trends for the wells associated with the C-746-S&T Landfills area.

Trichloroethene. Analyses of groundwater samples from MW220, at the south end of the landfill, as well as MW222 and MW223, located near the middle of the landfill area, have not detected any TCE. Samples from MW224, on the east edge of the landfill, have contained low levels of TCE. TCE levels stabilized at 2 μg/L for all of CY2002 and most of CY2003, but dropped below the detection limit by the end of CY2004. Monitoring in MW221, located on the west edge of the landfill area, has documented declining TCE levels to below laboratory detection levels in CY2003. Among wells installed as replacement wells for permit monitoring at the landfill, the three wells along the northwest and west sides of the landfill, MW369, MW384, and MW387, monitored TCE concentrations between 1 and 3 μg/L during CY2007. Analyses for samples from the two remaining permit wells, MW372 on the north side of the landfill and MW394 at the southeast corner, both documented TCE levels above the MCL. During CY2007, MW372 TCE levels ranged between 14 and 16 μg/L, and MW394 TCE levels fluctuated between 11 and 17 μg/L. Concentrations in MW372 have risen steadily, while those in MW394 have been relatively constant.

Analyses of TCE within the middle RGA, MW388, on the west side of the landfill complex, documented levels of approximately 1 μg/L during CY2007. The wells MW370 and MW395, at the northwest and southeast corners of the landfill area, respectively, yielded samples with levels of TCE near 5 μg/L in CY2007. TCE trends in both wells have been declining since their installation. Conversely, the TCE trend in MW391 at the northeast corner of the landfill area has increased from approximately 10 μg/L at its installation to 20 μg/L in CY2007.

Of the four wells screened in the lower RGA, analyses for neither MW397, on the south end, nor MW385, on the west side, have detected TCE. Both MW373 and MW392, on the north and northeast sides of the landfill area, respectively, have documented increasing TCE levels above the MCL during CY2007 at approximately 15 μg/L.

Technetium-99. The CY2007 ^{99}Tc analyses for MWs in the C-746-S&T area appear to document the migration of the eastern portion of the higher core of ^{99}Tc contamination into the area. Of the upper RGA wells in the landfill area, analyses for MW220 report ^{99}Tc levels of 26 to 45 pCi/L during CY2007, while analyses for MW369, MW372, MW384, and MW387 record higher activities. Activities of MW384 and MW387 spiked as high as 384 pCi/L in CY2007. At the same time, ^{99}Tc activity remained nondetectable or showed only one detect in upper RGA wells located in the central and east areas of the landfill complex (wells MW221, MW222, MW223, MW224, and MW394). A similar spatial trend occurred in the middle and lower RGA. In the middle RGA, analyses for wells MW370 (at 50 pCi/L) and MW388 (increasing to 228 pCi/L) documented higher ^{99}Tc activity under the northwest corner of the facility. These analyses compare to nondetectable levels in MW391 and only one detection in MW395 on the east side of the landfill complex. Trends of ^{99}Tc activity for MWs in the lower RGA on the north and west sides of the C-746-S&T Landfills, MW373 (62 pCi/L) and MW385 (285 pCi/L), likewise, compare to wells on the east side of the landfill, MW392 (nondetectable ^{99}Tc) and MW397 (30 pCi/L).

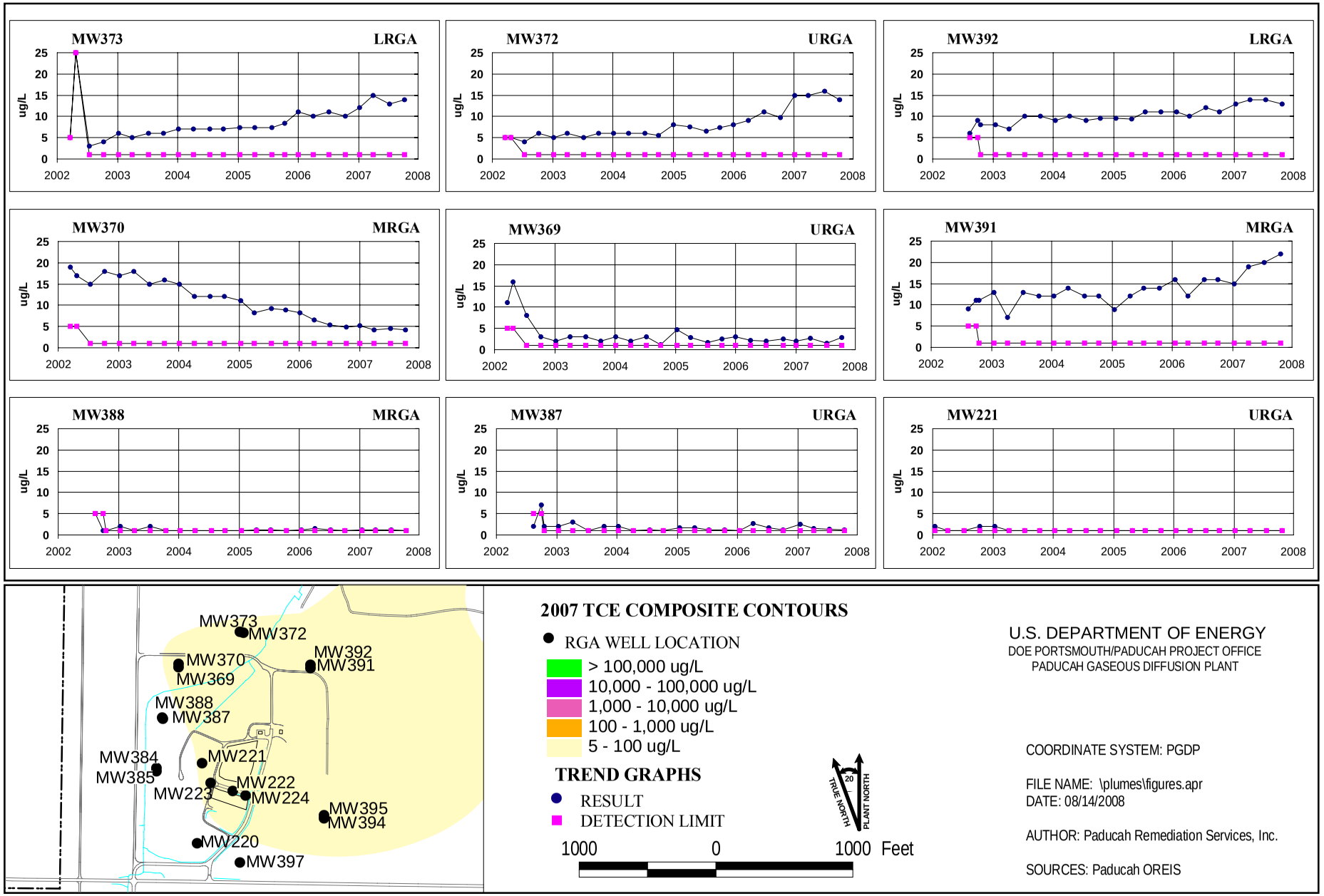

Figure 20. Trichloroethene Concentrations in Wells near C-746-S&T

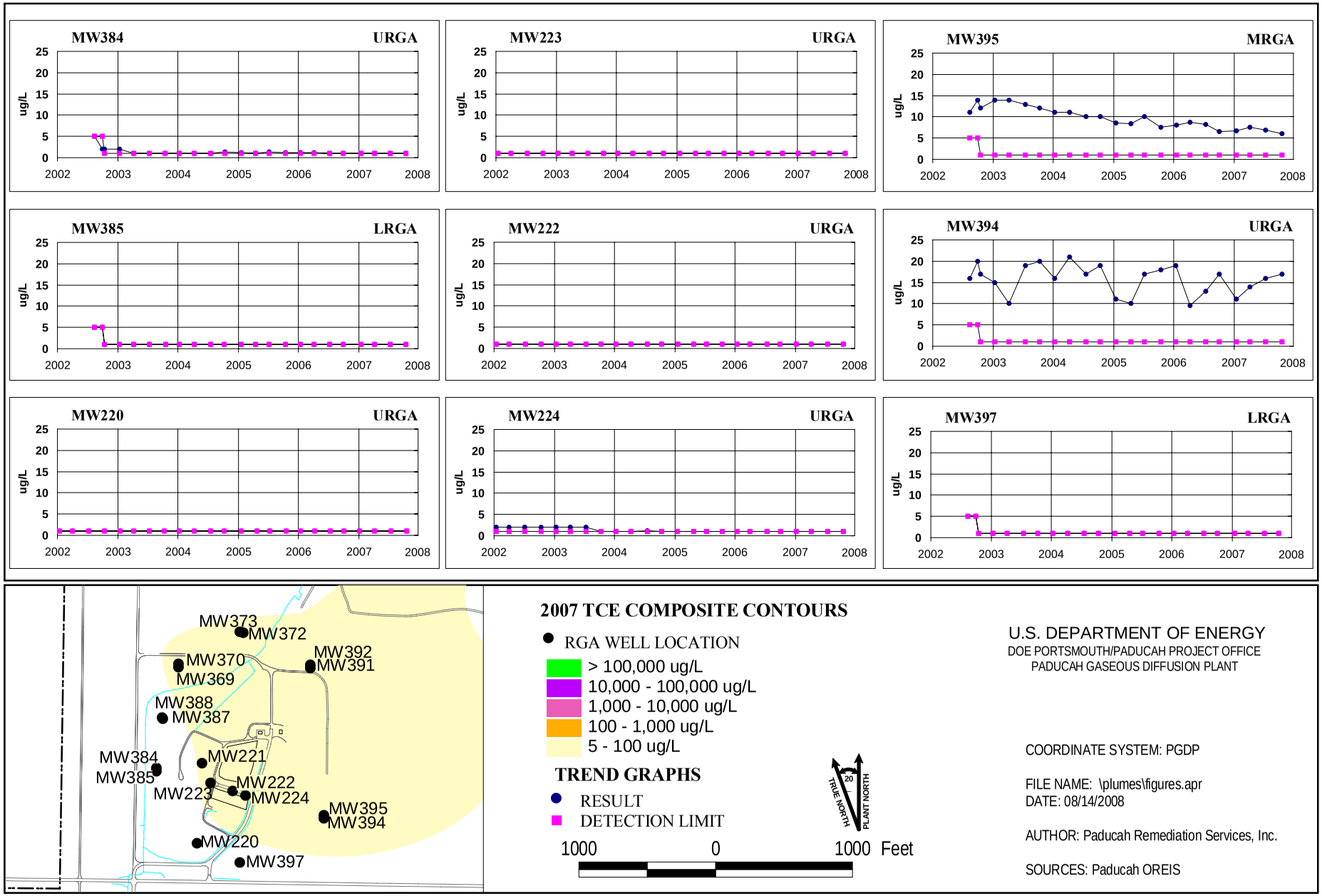

Figure 20. (Continued)

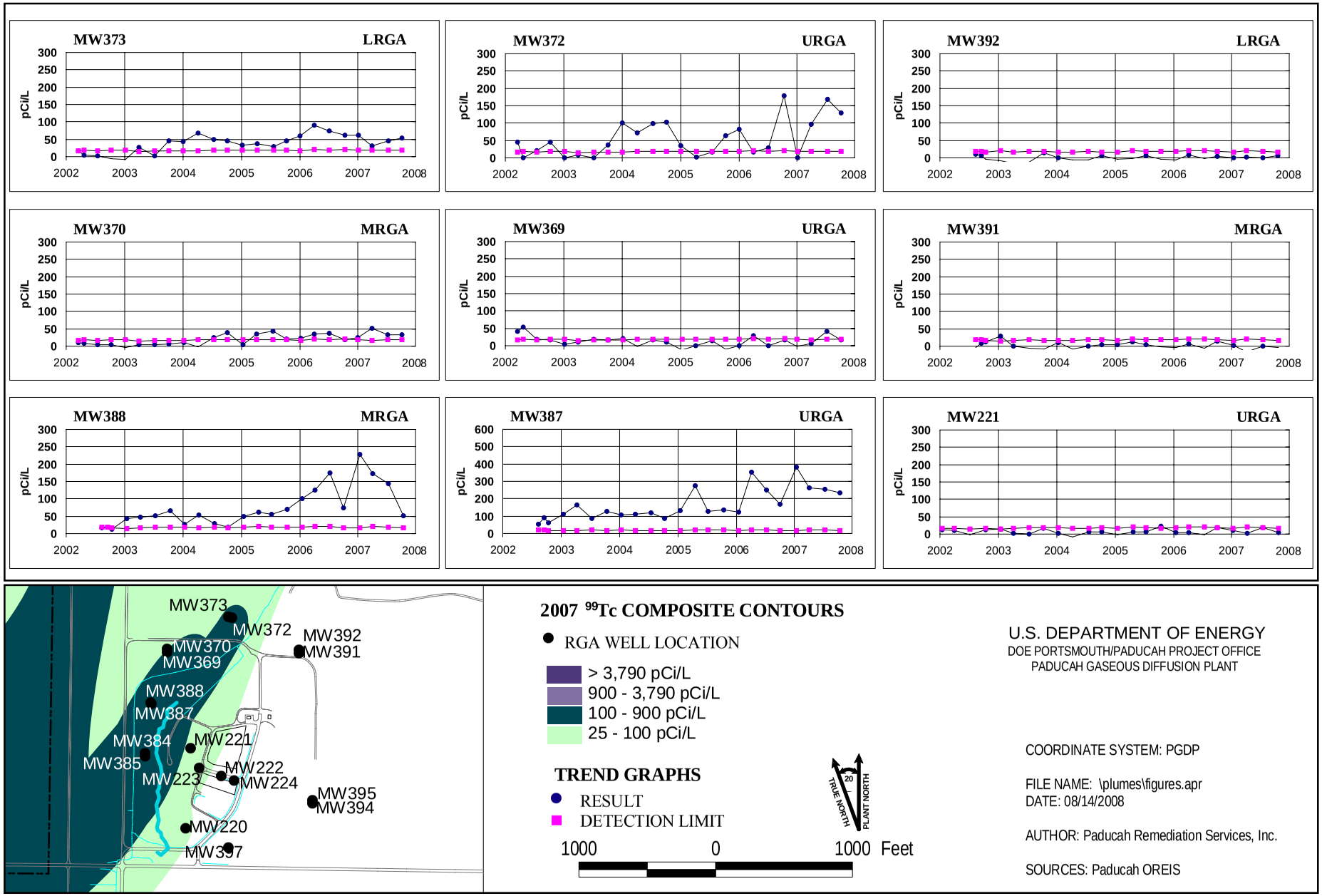

Figure 21. Technetium-99 Activities in Wells near C-746-S&T

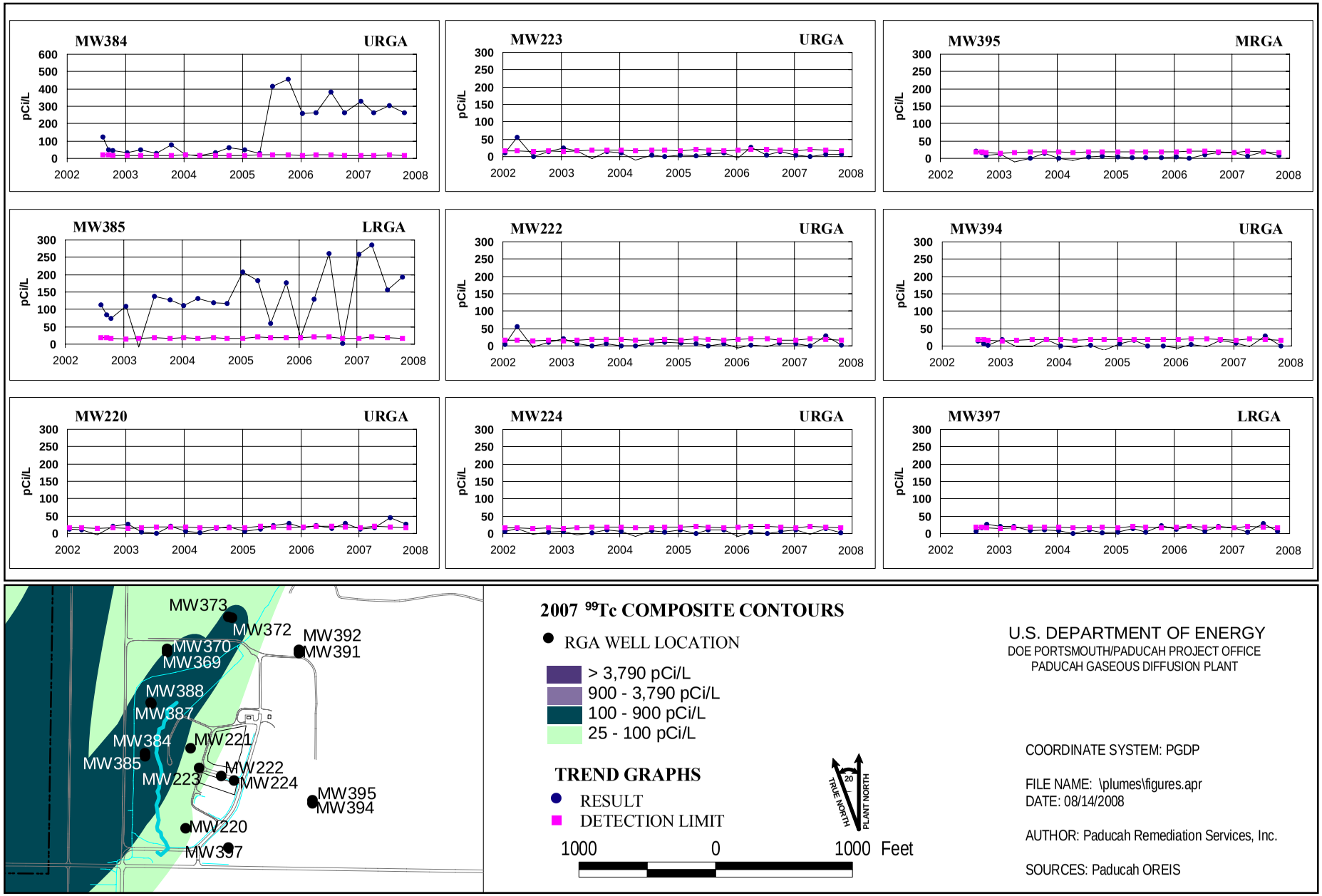

Figure 21. (Continued)

The well sample analyses, combined with the data from the CY2004 field investigation, suggest that the ^{99}Tc detected at the landfill probably is from a source located to the south and west of the landfill area. There also is a possibility that the buried portion of the old North-South Diversion Ditch is contributing ^{99}Tc to the upper RGA in the northwest corner of the area.

5.2.4 C-746-U Landfill Area

Like C-746-S&T, the MW network at the C-746-U Landfill area underwent a major well replacement project in CY2002. Because of the proximity of the C-746-S&T Landfill area, the downgradient wells to that unit may be considered upgradient wells to the C-746-U Landfill. In CY2007, groundwater analyses of monitoring at C-746-U are available for four upper RGA wells (MW357, MW360, MW363, and MW366); two middle RGA wells (MW139 and MW361); and three lower RGA wells (MW358, MW364, and MW367). The TCE and ^{99}Tc trends for the wells associated with the C-746-U Landfill area are shown in Figures 22 and 23.

Trichloroethene. Five MWs—MW357 (3 μg/L) and MW366 (2 μg/L), screened in the upper RGA at the northwest corner of the landfill area and the northeast corner of the landfill area, respectively; MW358, screened in the lower RGA and also at the northwest corner (3 μg/L); and MW139 (8 μg/L) and MW361 (1 μg/L), screened in the middle RGA east of the landfill area and north of the landfill area, respectively—had detectable TCE during CY2007. The TCE contamination in groundwater at MW357 and MW358 is derived from the eastern fringe of the Northwest Plume. The TCE levels observed in MW139, which have been increasing steadily since CY1995, represent a plume migrating from the C-746-S&T Landfills complex.

Technetium-99. The only C-746-U MWs that yield samples consistently with detectable levels of ^{99}Tc are upper RGA wells MW357 and MW366 and middle RGA well MW361, monitoring the north central, northeast, and northwest areas of the landfill area, respectively. With the exception of MW366 indicating a potential upward trend, detections of ^{99}Tc for CY2007 (20 to 78 pCi/L) are generally consistent with those of CY2005.

5.2.5 Northeast Plume Area

Plant Boundary. Within the on-site portion of the Northeast Plume there are six wells monitoring contaminant migration, one in the upper RGA (MW206), and five in the lower RGA (MW163, MW255, MW256, MW260, and MW356). There also are two lower RGA MWs immediately east of the plant boundary (MW145 and MW258). Figure 24 shows the TCE trends for these wells, and Figure 25 presents the ^{99}Tc trends.

Extraction Well Field. In addition to the two extraction wells, EW331 and EW332, the Northeast Plume Containment System includes seven MWs, one screened in the middle RGA and the rest screened in the lower RGA. The middle RGA well is MW126, located on the east side of the extraction well field and lateral to EW332. The lower RGA wells are MW124, MW283, MW288, MW291, and MW292. Both MW292 and MW288 are upgradient wells; MW283, MW291, and MW294/MW293A all are downgradient wells. MW124 is located on the east side of the extraction well field next to MW126. Figures 26 and 27 show the TCE and ^{99}Tc trends for these wells.

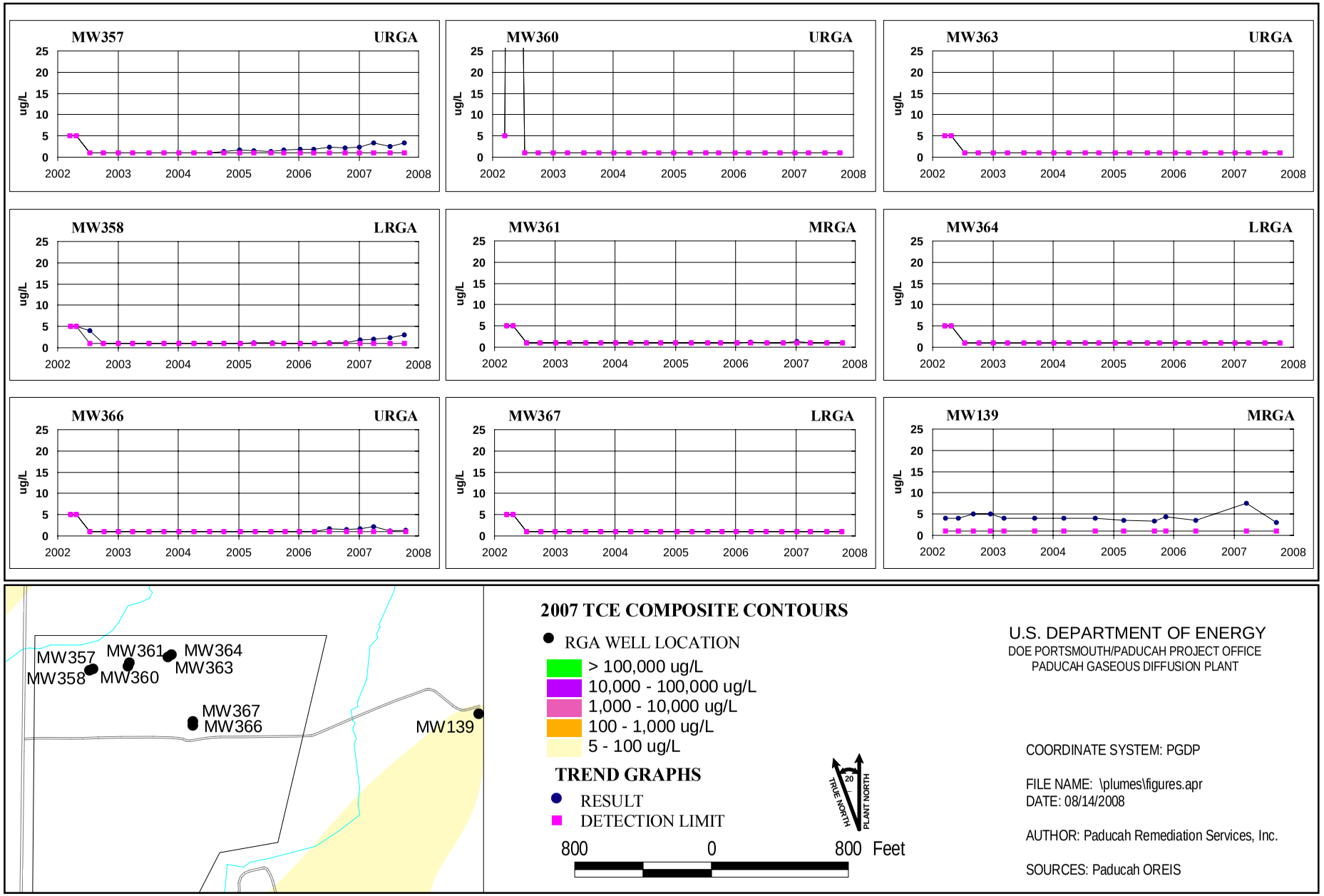

Figure 22. Trichloroethene Concentrations in Wells near C-746-U

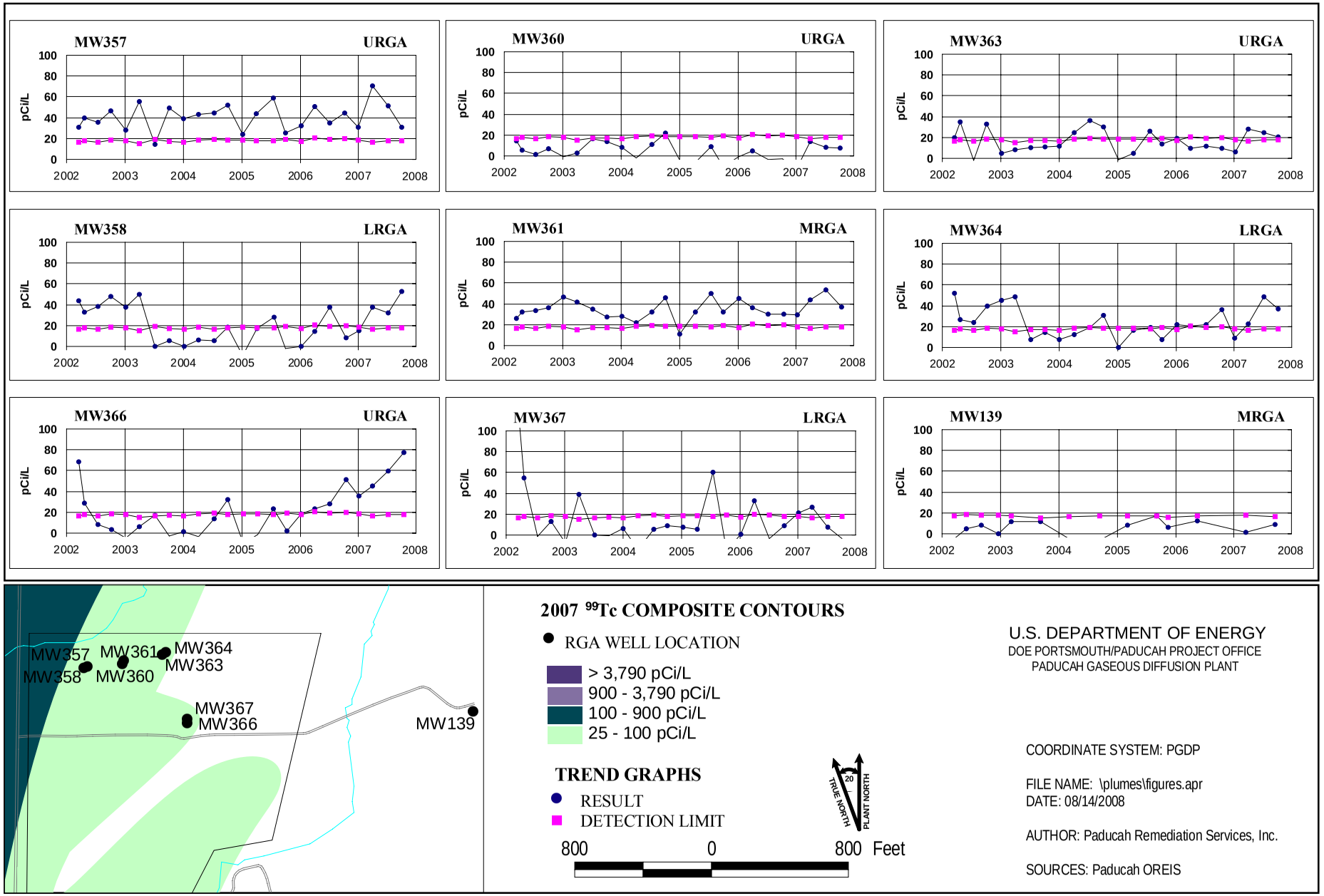

Figure 23. Technetium-99 Activities in Wells near C-746-U

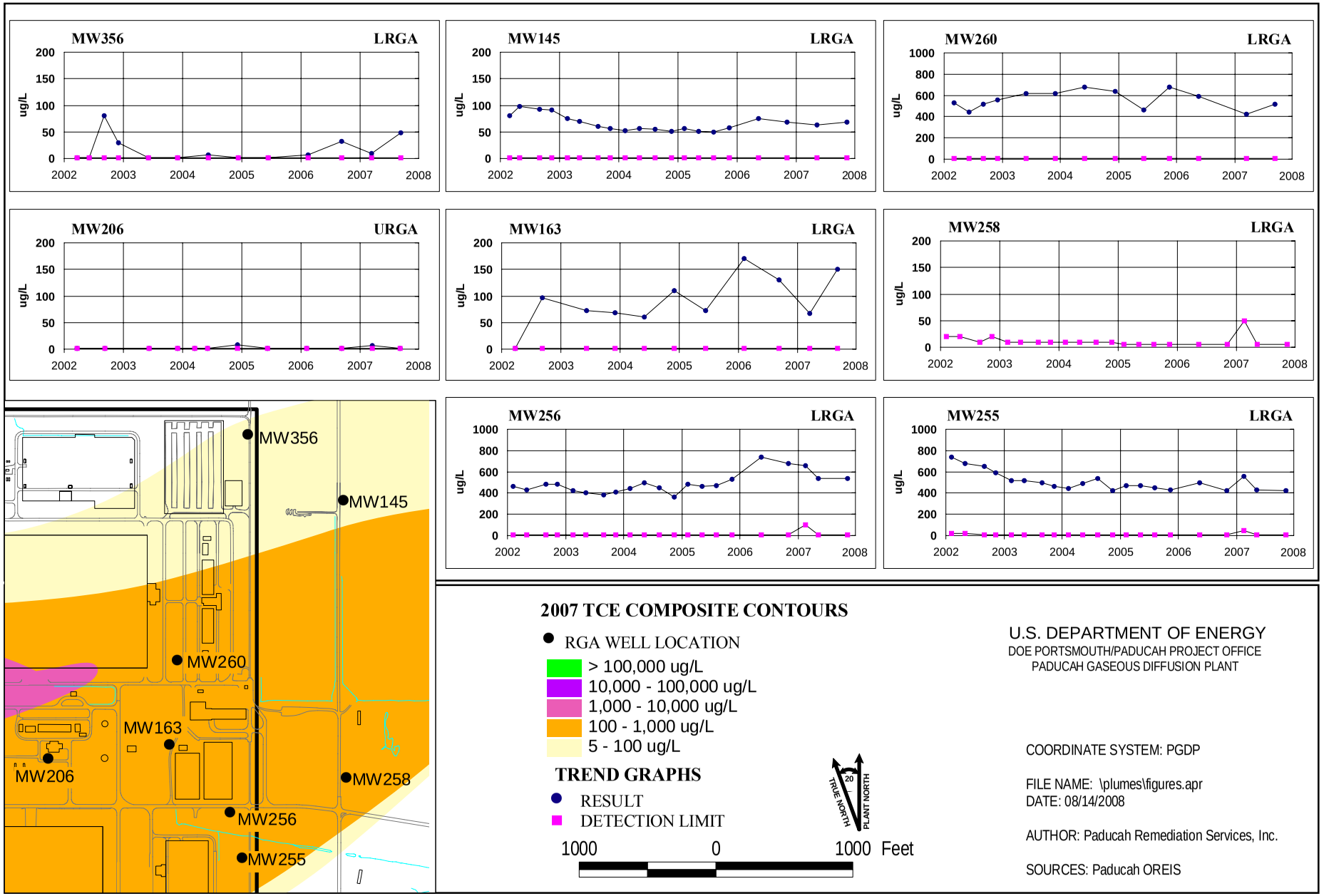

Figure 24. Trichloroethene Concentrations in Wells in Northeast Plume, On-site

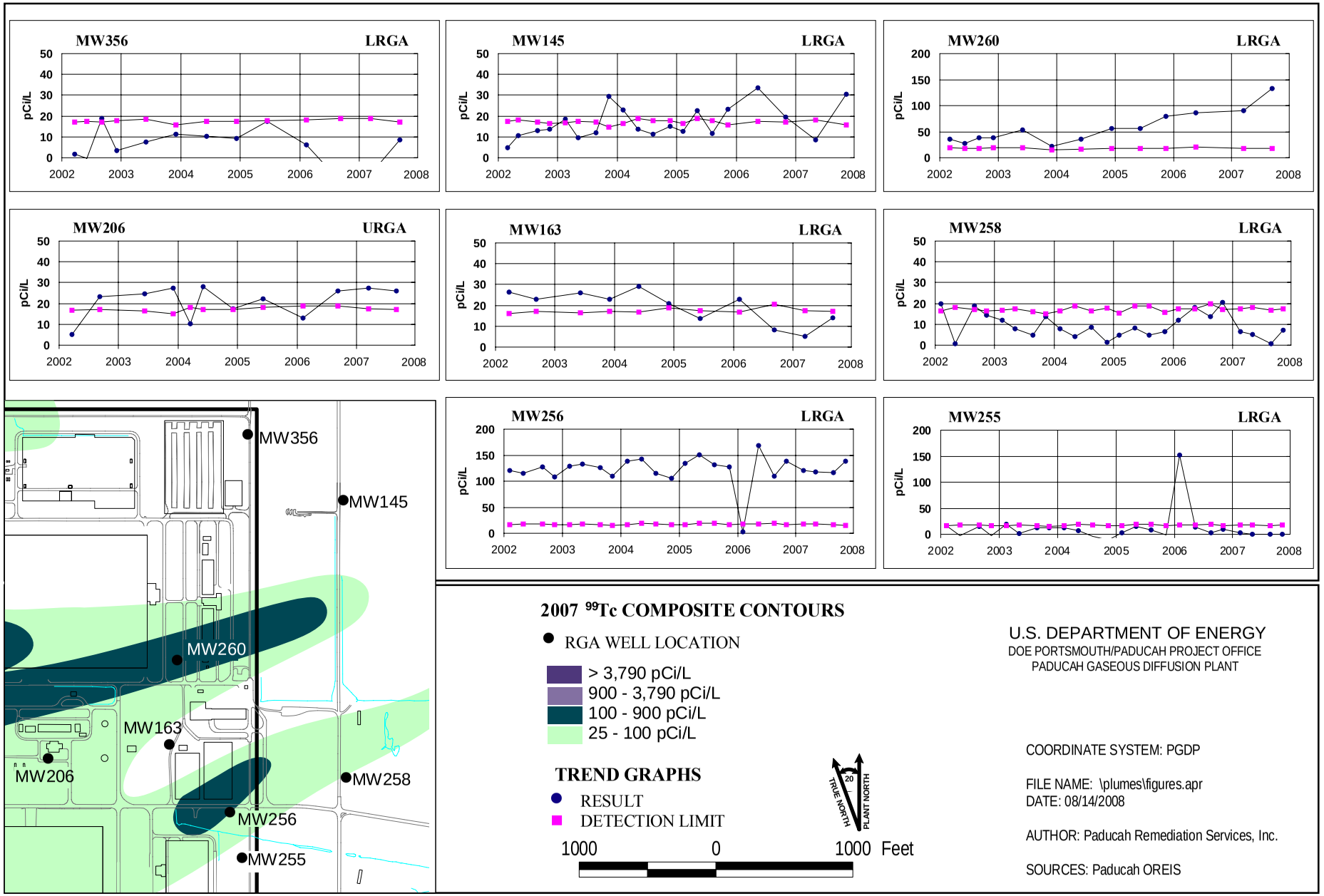

Figure 25. Technetium-99 Activities in Wells in Northeast Plume, On-site

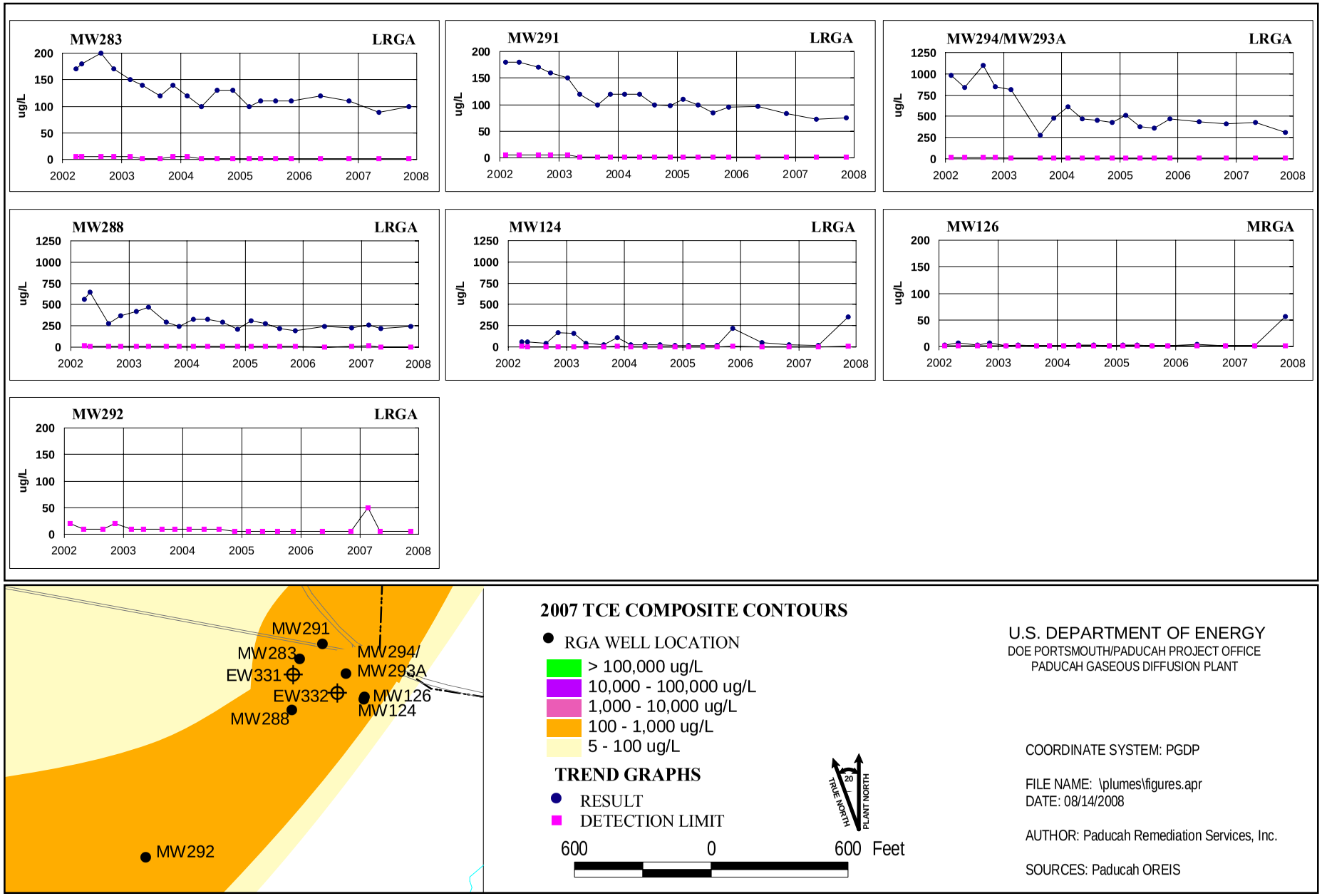

Figure 26. Trichloroethene Concentrations in Wells near Northeast Plume Extraction Well

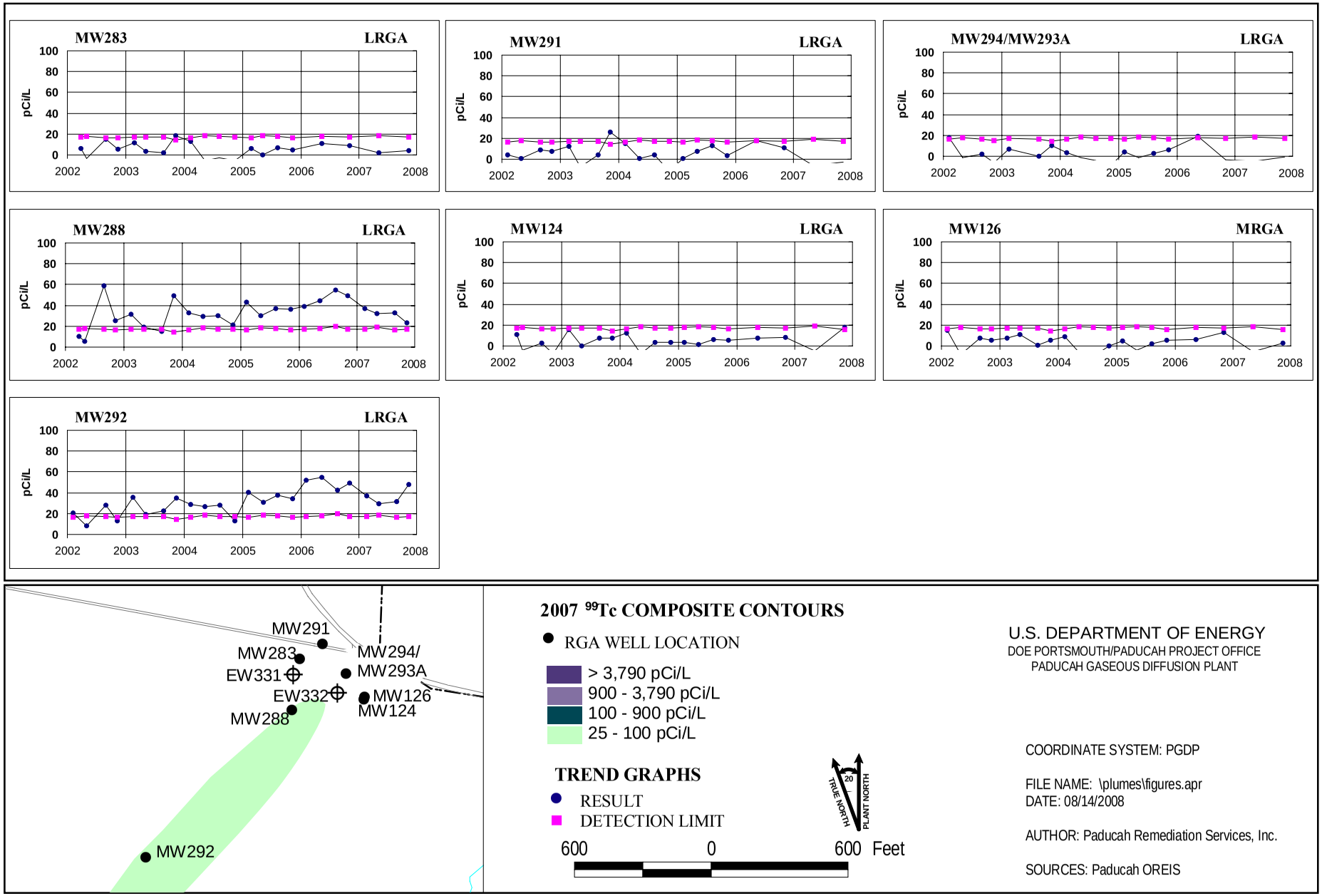

Figure 27. Technetium-99 Activities in Wells near Northeast Plume Extraction Well Field

Off-site Wells. There were 12 other RGA wells monitoring contaminant migration in the Northeast Plume outside the plant boundary during CY2007. These wells include one upper RGA well, MW149; four middle RGA wells, MW99, MW148, MW191 and MW193; and seven lower RGA wells, MW100, MW150, MW252, MW253, MW409, MW410, and MW411. Wells MW150, and MW191 are on the eastern flank of the plume, while MW100, MW252, MW409, MW410, and MW411 are at the distal end of the plume. Figure 28 presents the TCE trends for these wells (except the new wells MW409, MW410, and MW411, all with no detections of contaminants).

Trends among these wells recently were assessed as part of the CERCLA five-year review process. Trends of TCE concentrations in groundwater of the Northeast Plume EW field monitoring system clearly show that TCE levels have been reduced by the pump-and-treat system (Table 4).

Table 4. Summary of TCE Concentration in the Northeast Plume EW Field

	TCE Concentration (µg/L)			Concentration Trends	
Well	Early 1997	Low of 2000	2007	Through 1999	1999 – 2002
MW283	1300	180	88–99	Reduction	Near steady reduction
MW291	1600	200	72–75	Reduction	Near steady reduction
MW294/293A	2000	420	310–430	Reduction	Low of 420 µg/L in 2000, rise to 1100 µg/L in 2002, followed by near-steady reduction
MW288*	1600	120	210–260	Reduction	Near steady reduction
MW292*	800	800	320–440	Rise to 1400 µg/L, then decline to 1000 µg/L	Near steady reduction

*MW288 and MW292 are upgradient wells.

The Northeast Plume extraction wells were inoperable for a 2-week period in early July 2007 for routine maintenance. Upon restart of the extraction wells on July 18, 2007, three groundwater samples were collected from each of the extraction wells within the first 1.5 hours of operation to characterize ^{99}Tc and TCE levels in the core of the Northeast Plume at the extraction wells. The highest ^{99}Tc levels in the groundwater samples were 21 pCi/L from EW331 and 41 pCi/L from EW332. (The highest TCE levels in the samples were 190 ug/L from EW331 and 390 ug/L from EW332.)

MW124 and MW126 monitoring the Northeast Plume to the east, adjacent to the buried terrace scarp that cuts through the Porters Creek Clay and defines the southeast limit of the RGA in the area and the southeast boundary of the Northeast Plume. TCE levels in MW124, the well with higher levels, has most recently shown a period of sustained low TCE levels, though TCE levels spiked in late 2007 in both MW124 and MW126 (neither spike appears to have carried through into 2008). TCE levels in upgradient MW288 (proximal) and MW292 (remote) previously had declined, but for 2006 and 2007 have remained near-steady. This trend is similar to declining TCE concentrations in upgradient MW255 and MW258, located near the core of the Northeast Plume near its source (DOE 2008c).

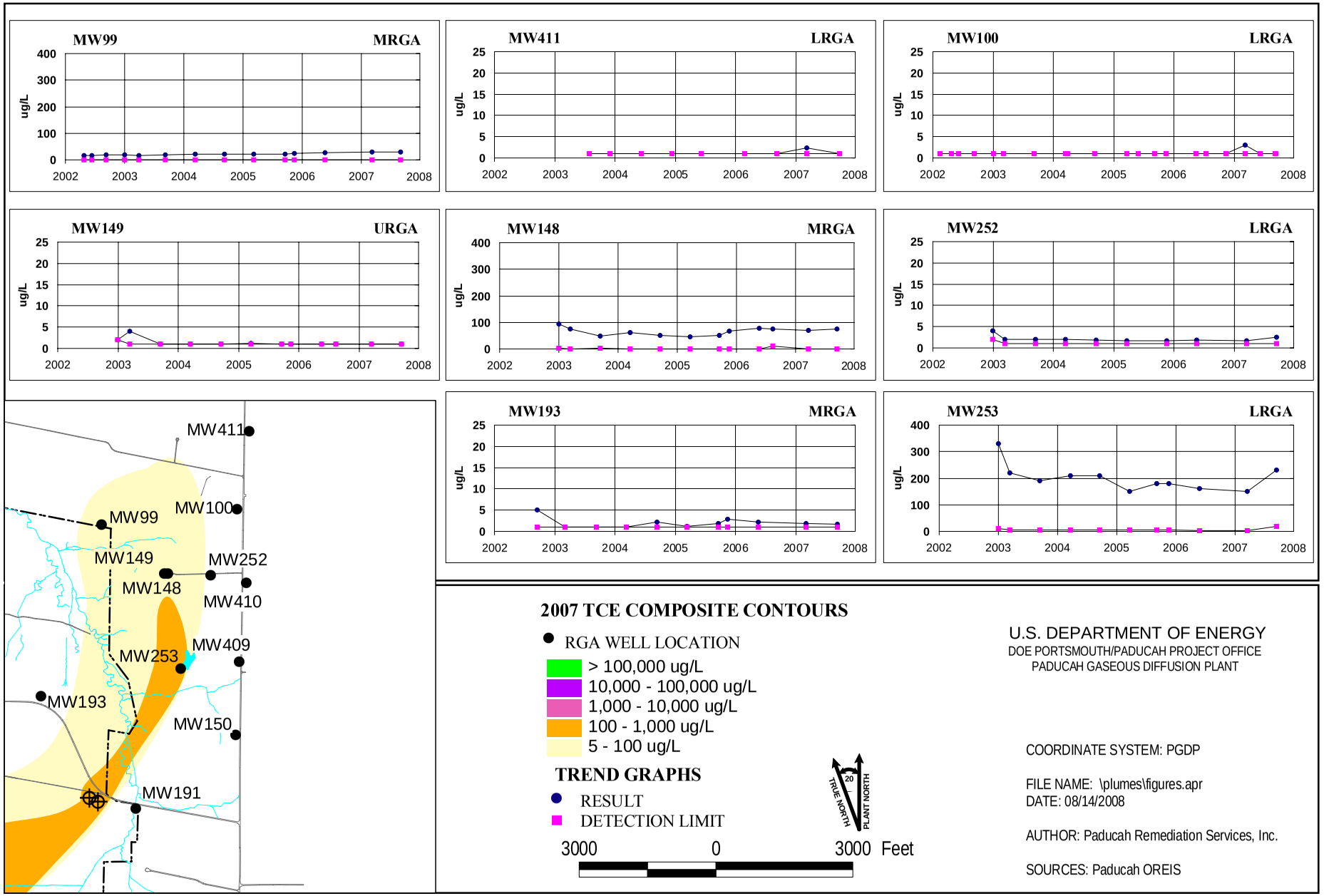

Figure 28. Trichloroethene Concentrations in Wells near Northeast Plume, Off-Site

5.2.6 Southwest Plume Area

During CY2007, the PGDP sampled five wells associated with the Southwest Plume, two of the wells are located within the plant boundary, two wells are positioned immediately outside the plant boundary, and one of the wells is located to the west of the plant. One of the wells is screened in the upper RGA (MW329 is located immediately west of the plant boundary); three wells are screened in the middle RGA (MW203 is located within the plant area, MW328 is located immediately outside the plant boundary, and MW354 is located west of the plant); and one well is screened in the lower RGA (MW161, located within the plant area). The analyses for these wells, along with contaminant trends determined from the Southwest Plume Site Investigation (DOE 2004) form the basis of the maps for the Southwest Plume. Figures 29 and 30 show the TCE and ^{99}Tc trends for the MWs in this area. Multi-port wells (MW405, MW406, MW407, and MW408) are located near the plant boundary, but were not sampled in 2007. Their data plots are included in Appendix B.

Trichloroethene. The data for MW161, located immediately north of the C-747-C Oil Landfarm, document a trend of significantly increasing TCE (up to 1900 μg/L) since prior to CY2002. Well MW203 monitors groundwater in the C-720 area. Since late CY2002, TCE levels have increased slightly from 100 μg/L to 130 μg/L.

The two clustered well sets, MW414/MW415 and MW416/MW417, monitor the western edge of SWMU 4. Data for trending in these wells are available CY2005 through CY2007. These trends indicate an overall increase in TCE in the lower RGA well at the southern end of SWMU 4, while MW415, monitoring the northern end, indicates an overall decreasing trend. Trends in the two upper RGA MWs are not as evident, but appear to be increasing slightly.

West of the plant secured area, middle RGA wells, MW328 and MW354, and upper RGA MW329 show no clear trends for TCE levels.

Technetium-99. The record for MW203 (C-720 area) shows a cyclical trend in ^{99}Tc activity during the CY2002—CY2007 time period. MW161, MW415, and MW417, located within the plant, and MW328, and MW329, located to the west of the plant, do not have any significant detections of ^{99}Tc. MW414 and MW416, monitoring the upper RGA west of SWMU 4, indicate ^{99}Tc activities in the range of 200 to 350 pCi/L, although there is no detectable trend due to the limited amount of data available. MW354 documents variable ^{99}Tc activity at the far west end of the plume, from nondetect levels to approximately 33 pCi/L.

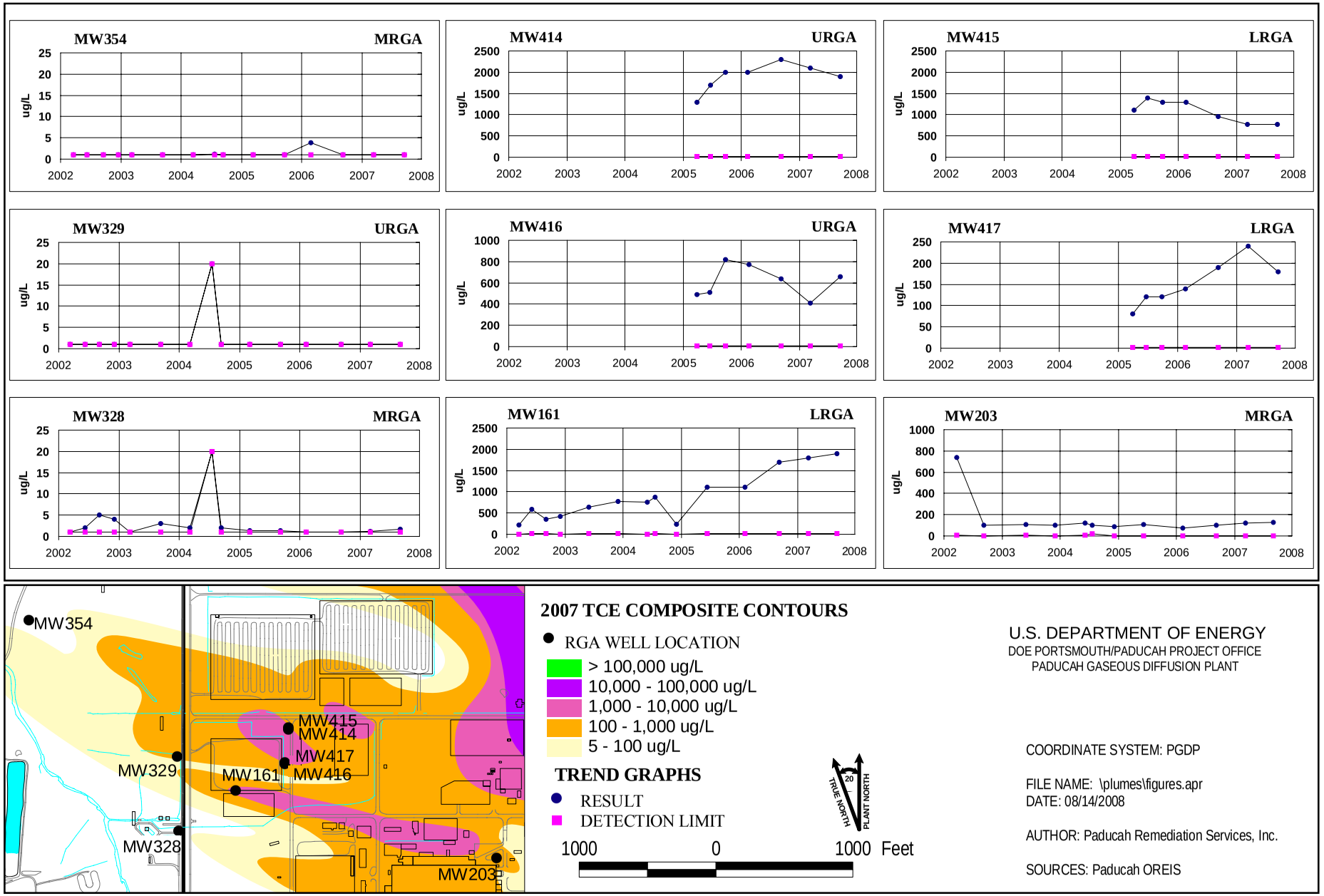

Figure 29. Trichloroethene Concentrations in Wells near Southwest Plume

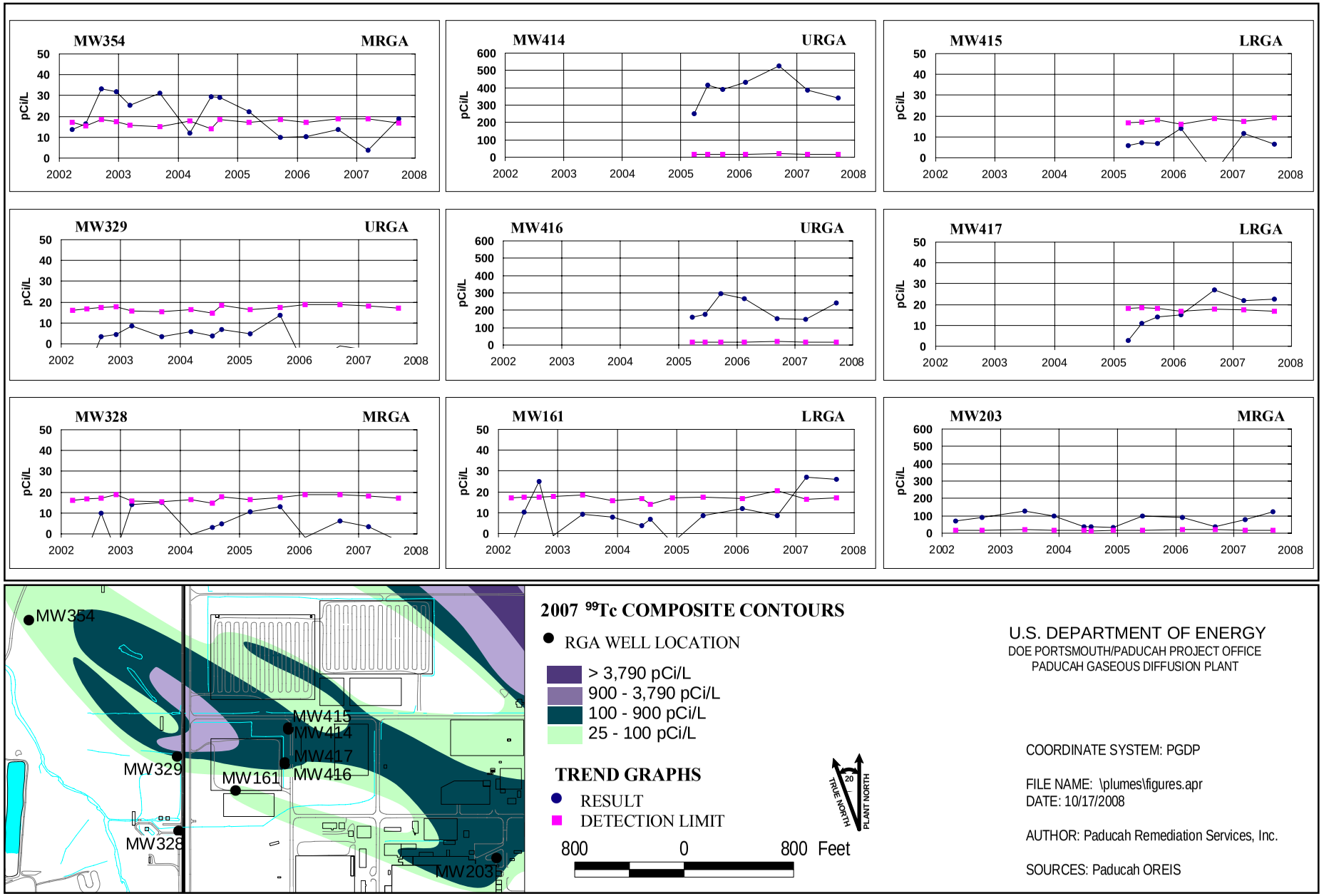

Figure 30. Technetium-99 Activities in Wells near Southwest Plume

5.2.7 C-404 and SWMU 2 Area

There are 14 RGA MWs currently being sampled in the C-404/SMWU 2 Area. Three wells—MW227 (upgradient area), MW90A (C-404), and MW338 (C-749)—are screened in the upper RGA. Five wells—MW84, MW87, and MW93 (C-404), and MW333 and MW337 (C-749)—are screened in the middle RGA. There also are five wells screened in the lower RGA—MW86, MW89, MW92, and MW95/MW95A (C-404)—and MW226 (upgradient area). MW90 and MW95 were replaced by MW90A and MW95A, respectively, in the fall of CY2001. Figure 31 shows the TCE trends for the wells in the C-404 and C-749 areas, while Figure 32 presents the ^{99}Tc trends for these same wells.

A hydrogeological evaluation was completed for this area as part of the Burial Grounds Operable Unit Remedial Investigation. The evaluation documented that trends of TCE in the area MWs reveal a prevailing groundwater flow path passing northward through MW93 and MW95A (upgradient) to MW84 and MW86 (downgradient). Another distinct groundwater flow path is defined by the occurrence of dissolved ^{99}Tc in MW226 (upgradient) and MW337 (downgradient to SWMU 2), the only two wells to consistently yield groundwater with significant ^{99}Tc activity in the area. Although the TCE trends in these wells are not identical, both wells record increasing TCE levels of the same magnitude and similar periods between "spikes" of TCE (PRS 2007).

5.2.8 Little Bayou Creek Seeps

Just south of the Shawnee Steam Plant, water containing both TCE and ^{99}Tc is discharging into Little Bayou Creek from a series of seeps along the creek. Since both TCE and ^{99}Tc have been identified in the water discharging from these seeps, the Northwest Plume is the most likely source. The highest concentrations of both TCE and ^{99}Tc are seen at LBCSP5, which coincides with the area where the core of the Northwest Plume appears to cross under the creek to the northernmost monitoring point at MW152. TCE and ^{99}Tc levels decrease both upstream and downstream of this point. Contaminants have been detected in surface water as far downstream (northwest) as station L12. This occurrence suggests that groundwater flow paths turn downstream in the immediate vicinity of Little Bayou Creek, in response to the discharge zone formed by the creek. The hydraulic mound caused by ash ponds of the Shawnee Steam Plant, bordering the creek on the north side, prevents contaminant migration under the creek to northwest of station L241.

5.3 SUMMARY

In the area of C-400, both TCE and ^{99}Tc concentrations are generally decreasing with two exceptions. MW341, near the northeast corner, appears to be monitoring a different flow path than other wells in the vicinity. MW155, located near the main source area at the southeast corner, appears to have been impacted by the treatability study conducted in that area during CY2003.

Within the on-site portion of the Northwest Plume, the analyses for wells closest to the C-400 area generally define stable to gradually decreasing TCE trends, while records for some wells closer to the northwest corner of the plant secured area indicate increasing levels of TCE contamination. In most cases, ^{99}Tc activity trends coincide with TCE trends.

In the off-site portion of the Northwest Plume, the core of the plume appears to have shifted to the east, bypassing the north well field. At the distal end of the plume, both TCE and ^{99}Tc from the RGA have been detected in seeps in Little Bayou Creek. In addition to the main body of the Northwest Plume, the area analyses indicate the presence of a separate ^{99}Tc plume. The source of this plume appears to be located in the area of the C-616 water treatment lagoons (DOE 1995b).

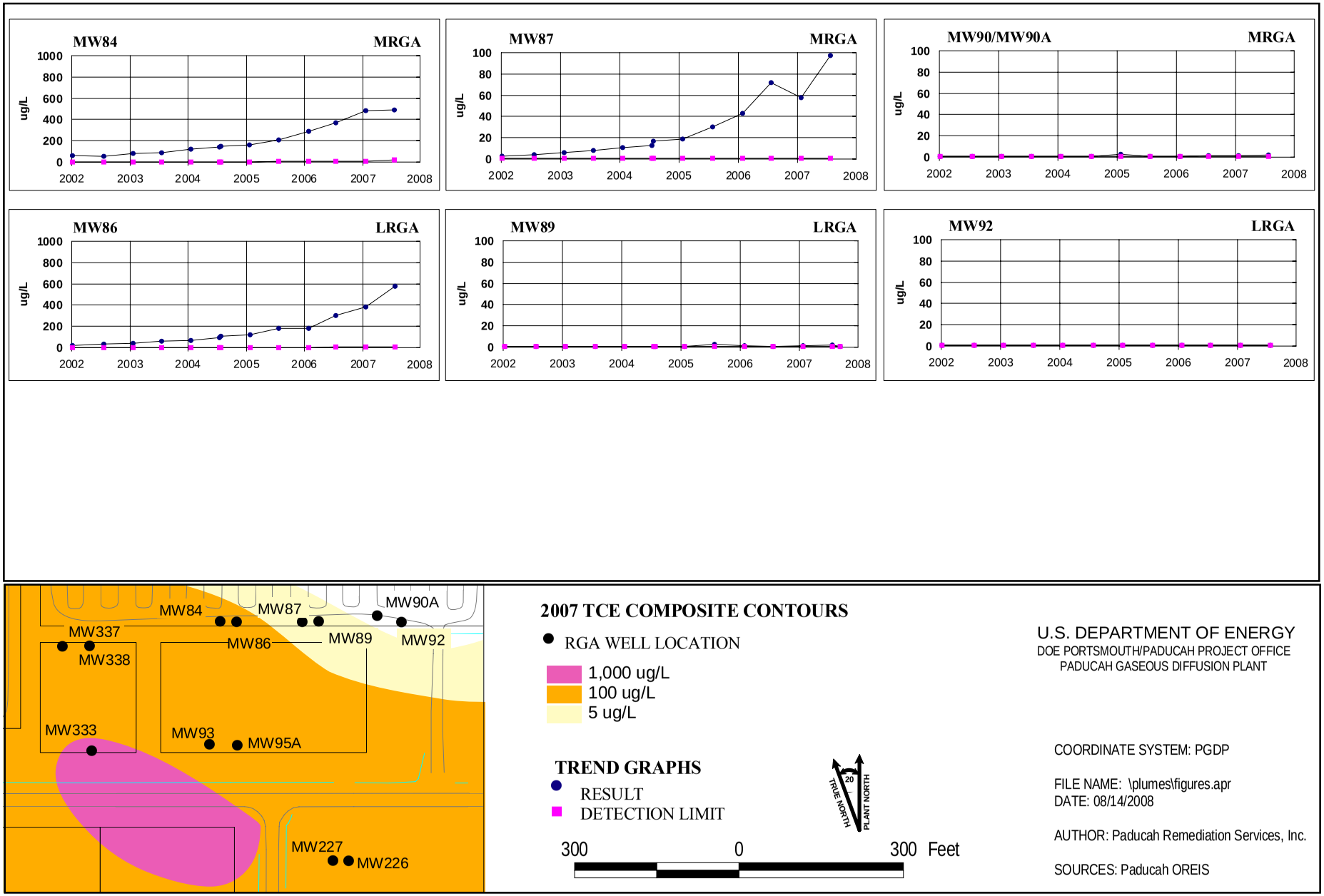

Figure 31. Trichloroethene Concentrations in Wells near C-404 and SWMU 2

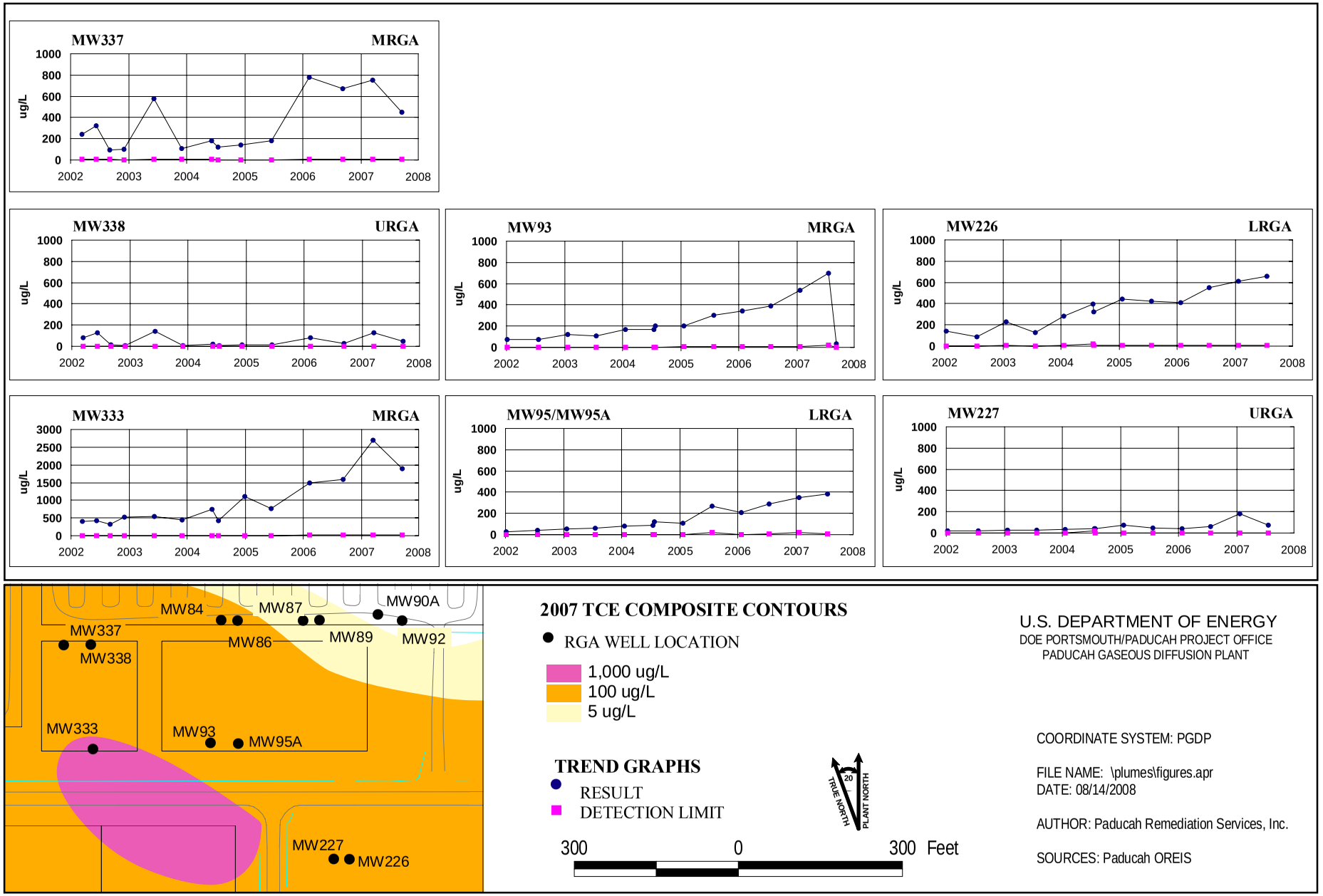

Figure 31. (Continued)

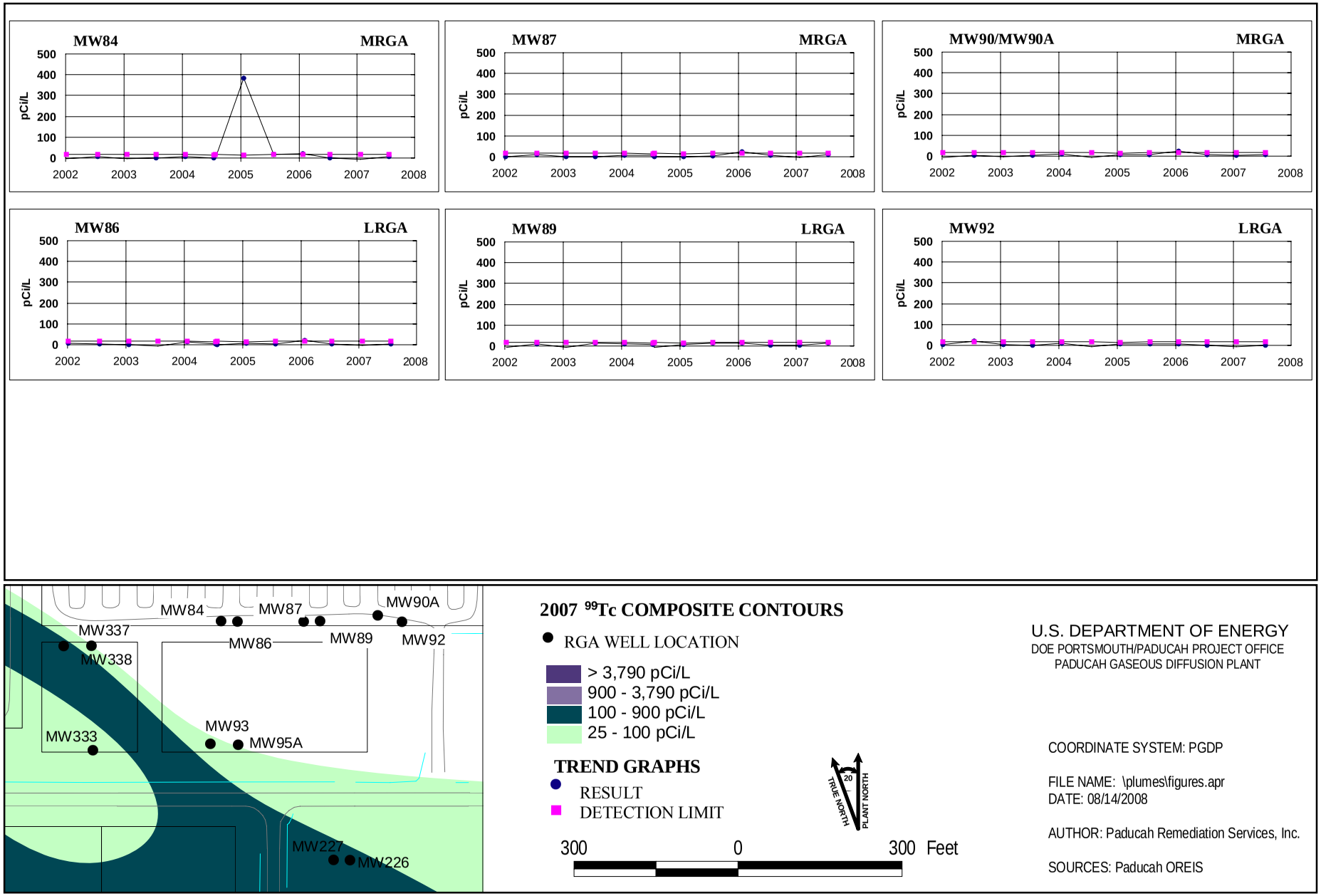

Figure 32. Technetium-99 Activity in Wells near C-404 and SWMU 2

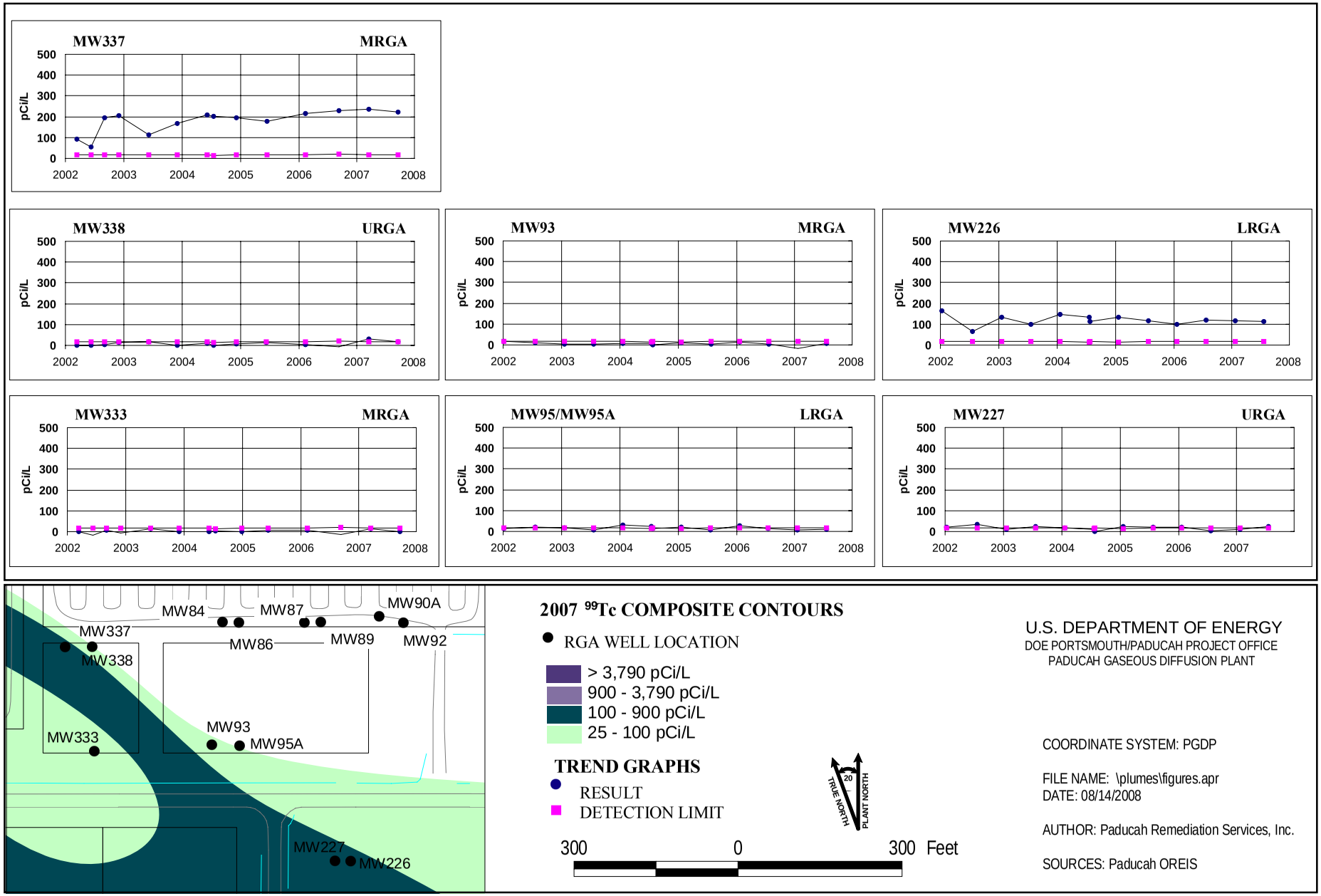

Figure 32. (Continued)

A distinct plume of low TCE concentration is present in the C-746-S&T Landfills area. Area groundwater contamination by ^{99}Tc is derived from a source area closer to, or within, the plant (DOE 2006b).

Monitoring of the Northeast Plume generally documents declining levels of TCE; however, ^{99}Tc continues to be detected in two off-site wells during CY2007. As a result, ^{99}Tc is now shown in the off-site portion of the plume, upgradient of the extraction wells.

In the Southwest Plume, TCE levels are significantly increasing in the area of the C-747-C Oil Landfarm. Meanwhile, detections of both TCE and ^{99}Tc remain sporadic for the downgradient MWs.

6. POTENTIOMETRIC DATA

The potentiometric surface of the RGA was contoured for each quarter of CY2007 using water level data collected during quarterly water level suites and routine sampling. These maps are presented in Appendix A (Figures A.13 through A.16), following the plume maps. Each water level measurement record included barometric pressure in addition to depths to water. Water level elevations were normalized for the quarter using a barometric pressure of 30.0 inches of mercury. The collection dates for the data set were evaluated and each "quarter" was defined, based on when the preponderance of the data was collected. The potentiometric data is presented in Tables B.3 through B.6. Some data values were excluded from the hand-contoured map. Reasons for excluding data, such as multiple data values available for the well and data points not matching surrounding wells, are denoted in the tables in Appendix B.

In general, the contours follow the shape of the terrace slope and indicate flow toward the Ohio River. A significant effort was made to integrate the contaminant concentration maps and the potentiometric maps so that the two data sets present a complementary picture. The two data sets were contoured independently then overlaid and adjustments made to each map to bring the interpretation of the two data sets into better agreement. The influence of streams, lagoons, or other surficial features in the area, is not readily obvious on these potentiometric maps, although in the more detailed plant area maps, there are some indications where significant sources of recharge may exist. The apparent lack of influence may be related to the density of well coverage in these areas and the range of the contour interval.

Regionally, groundwater flow generally is toward the Ohio River as expected. There are, however, a couple of features of interest. Although the 1-ft contour interval defines the cones of depression associated with the Northeast Plume well field and the south well field of the Northwest Plume containment system. A lesser cone of depression (because of a lower pumping rate) forms around the north well field of the Northwest Plume containment system.

7. USES OF THIS REPORT

This evaluation of groundwater contaminant trends for CY2007 supports several goals of the PGDP environmental program. Foremost, the updated plume maps and definition of trends will be used as an input to remedial action decisions for the Groundwater Operable Unit to provide the following information:

- Define additional areas contributing significant contamination to the RGA,
- Scope the dimensions of potential remedial actions, and
- Refine the extent of off-site areas that will be addressed by temporary or permanent institutional controls.

This same assessment will support the ongoing evaluation of the adequacy of DOE's Water Policy and effectiveness of the PGDP groundwater monitoring program. The trends and extent of contamination defined by this report will be used as an aid in data interpretation and project planning.

8. REFERENCES

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APPENDIX A

PLUME MAPS AND POTENTIOMETRIC CONTOURS

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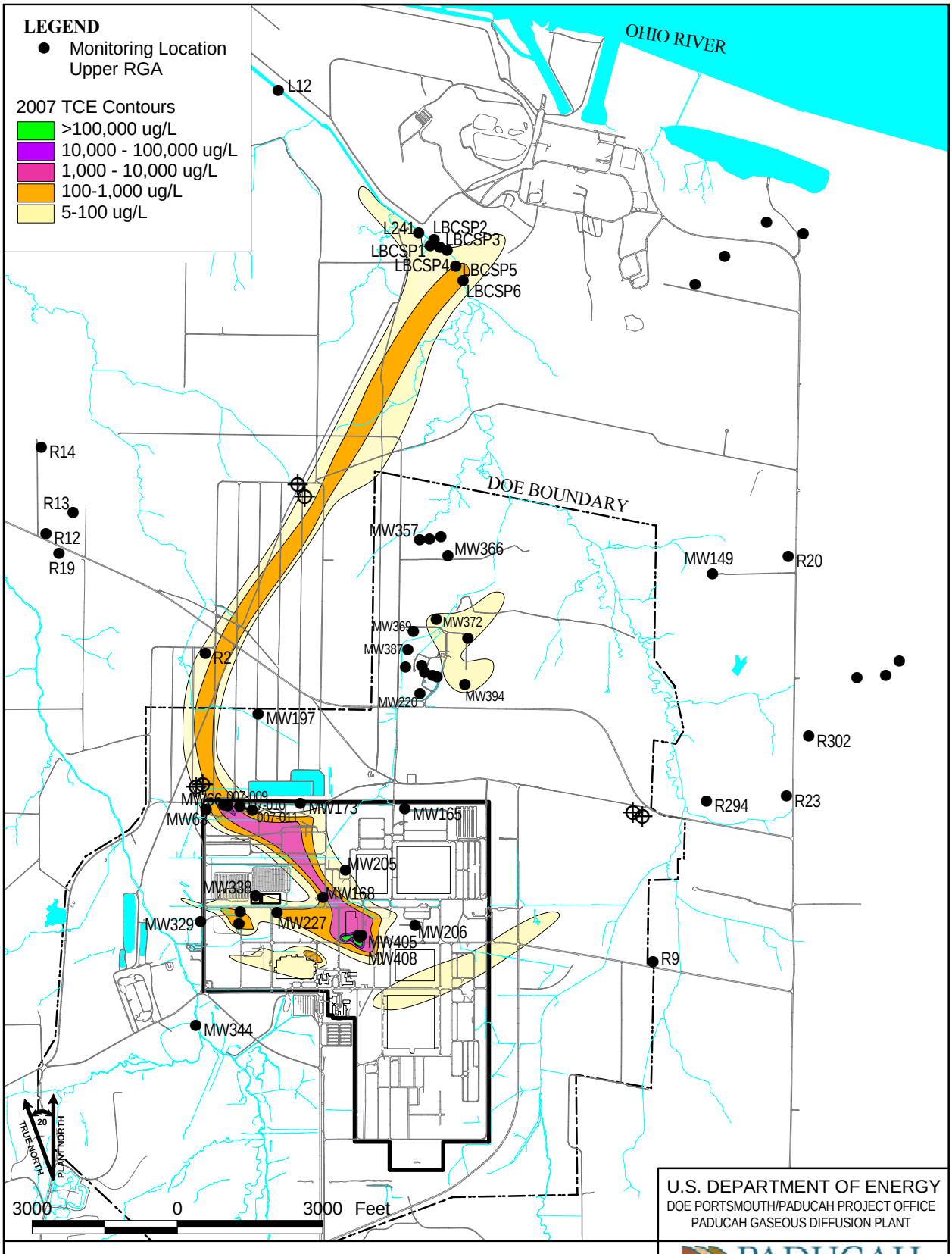


Figure A.1. Trichloroethene in the Upper RGA

Figure No. \plumes\2007\tce.apr
DATE 06-19-08

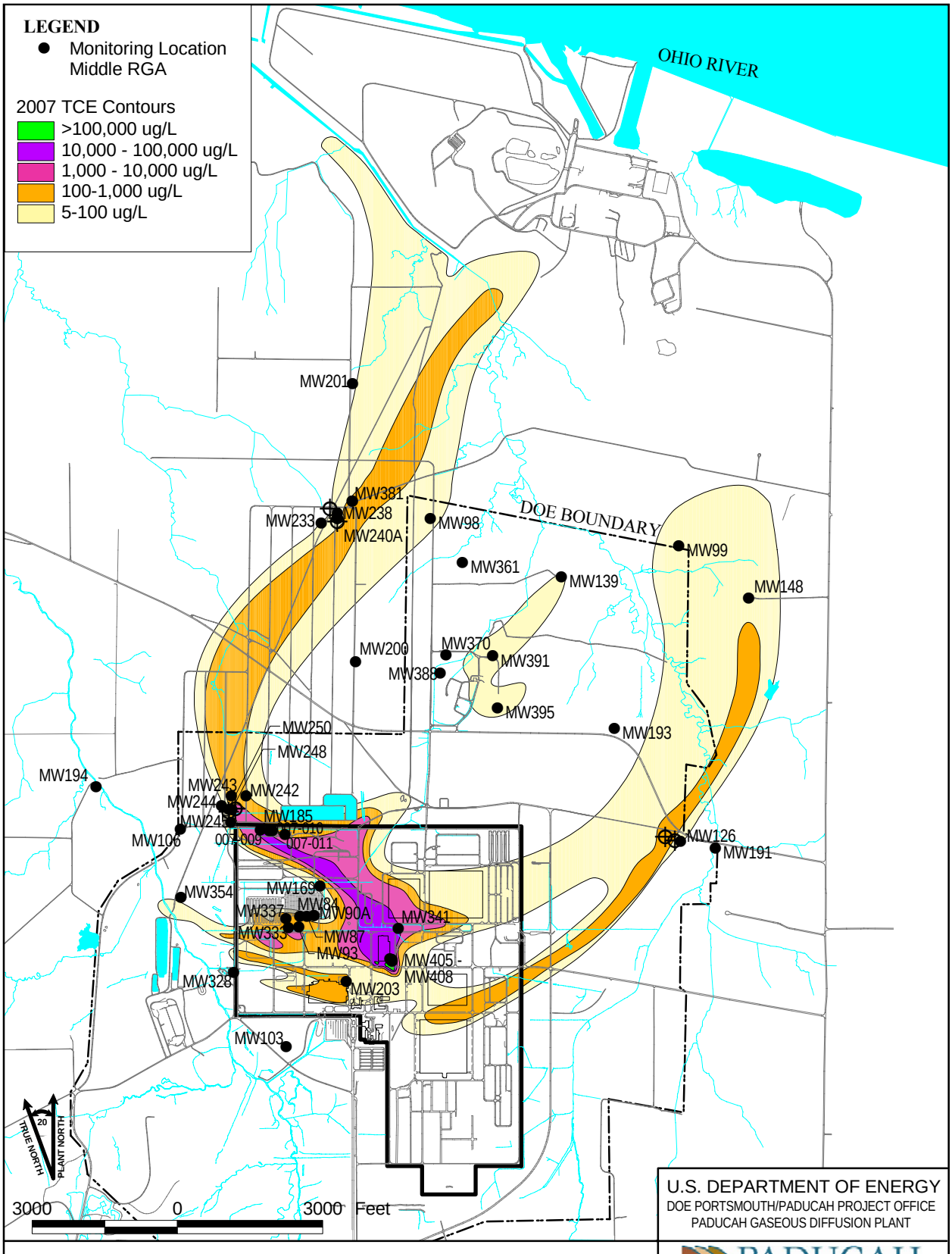


Figure A.2. Trichloroethene in the Middle RGA

Figure No. \plumes\2007\tce.apr
DATE 06-19-08

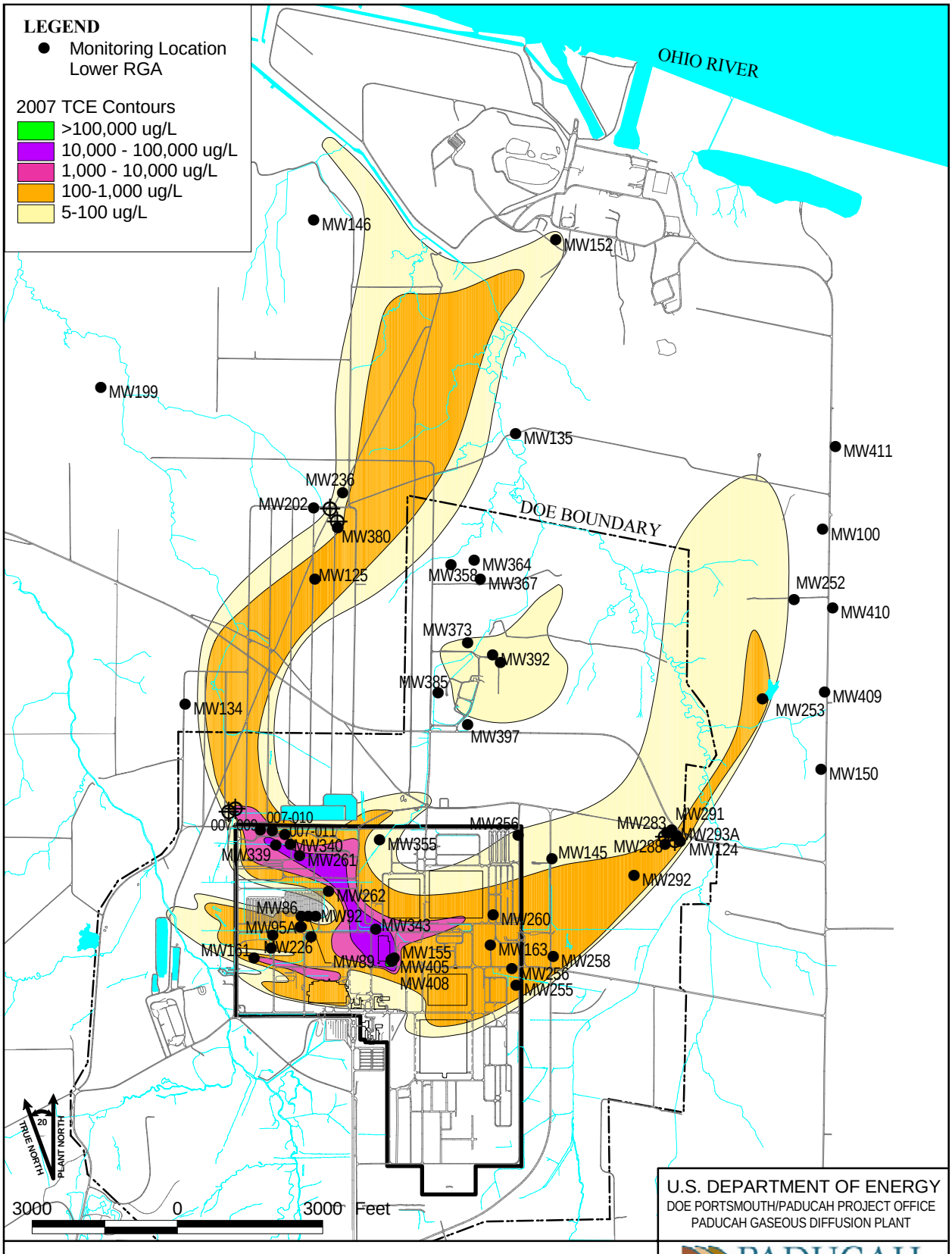


Figure A.3. Trichloroethene in the Lower RGA

Figure No. \plumes\2007\tce.apr
DATE 06-19-08

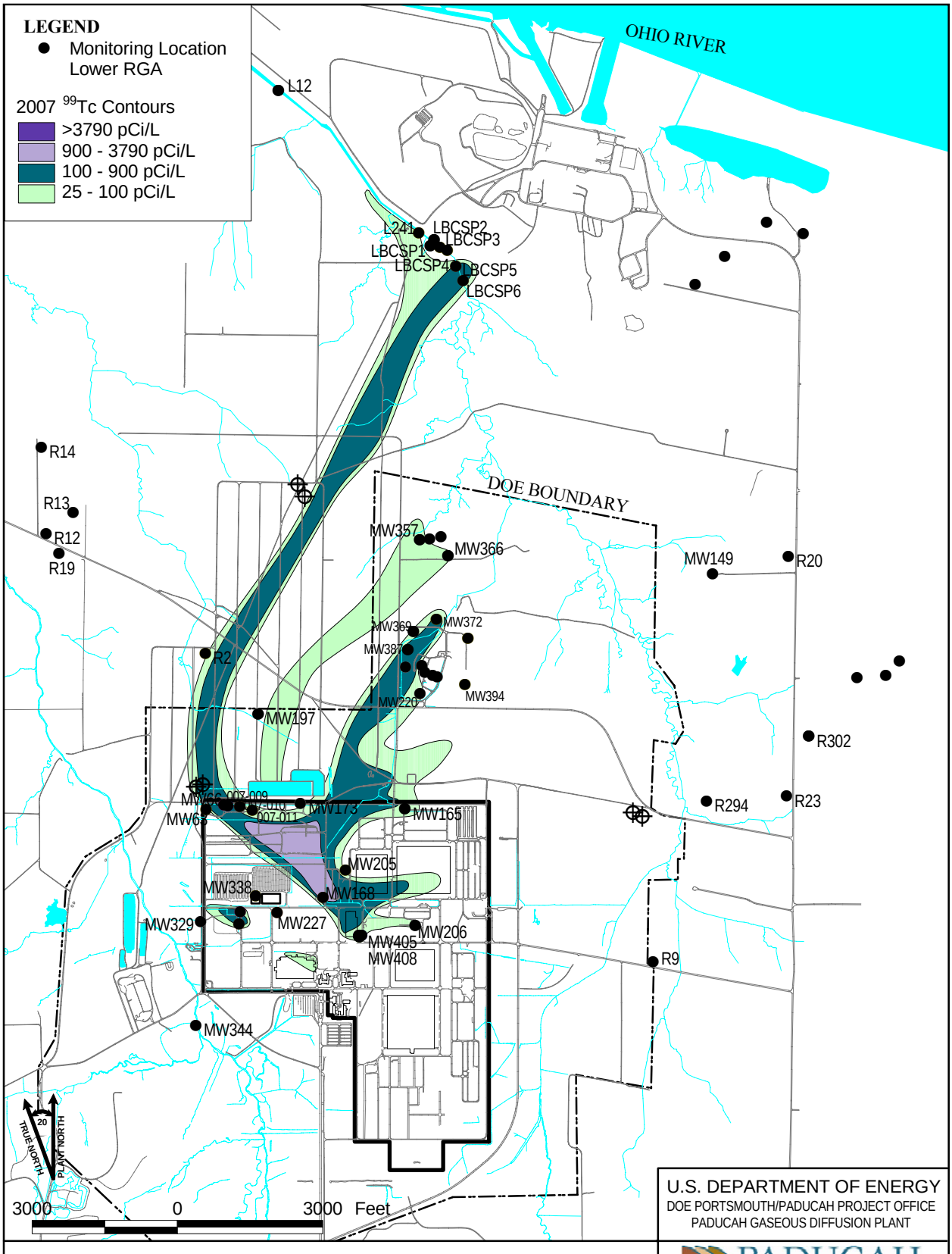


Figure A.4. Technetium-99 in the Upper RGA

Figure No. \plumes\2007\tc99.apr
DATE 06-19-08

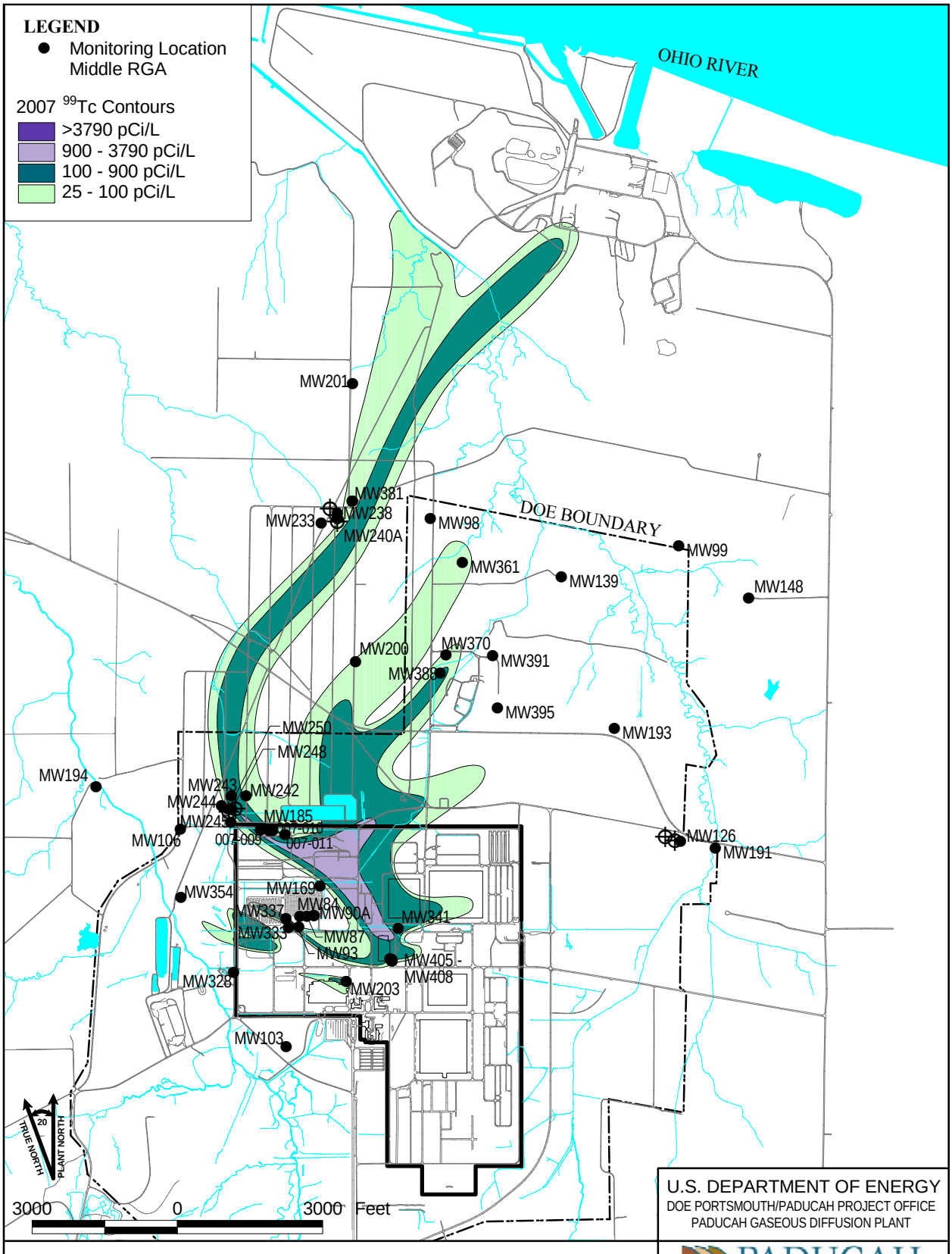


Figure A.5. Technetium-99 in the Middle RGA

Figure No. \plumes\2007\tc99.apr
DATE 06-19-08

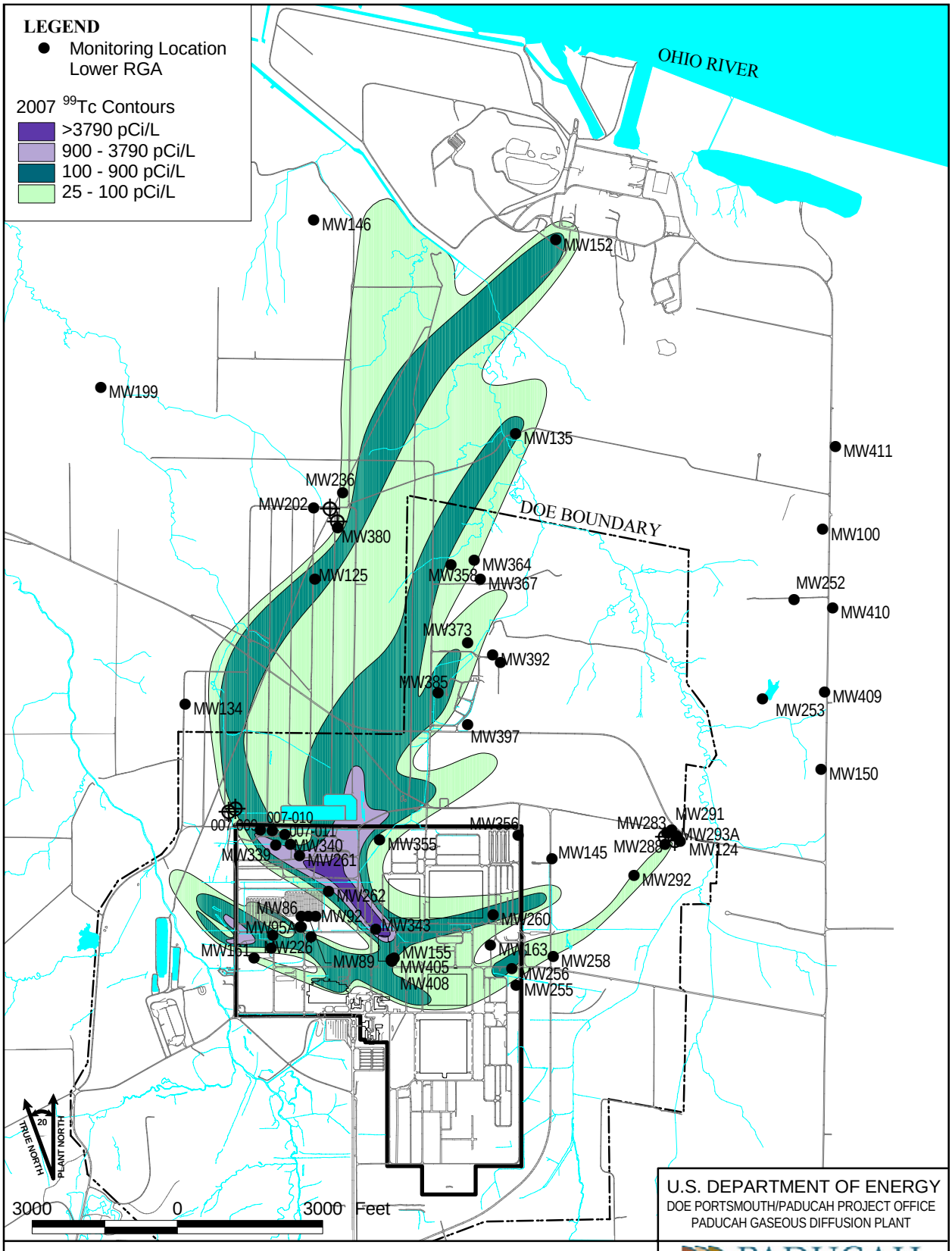
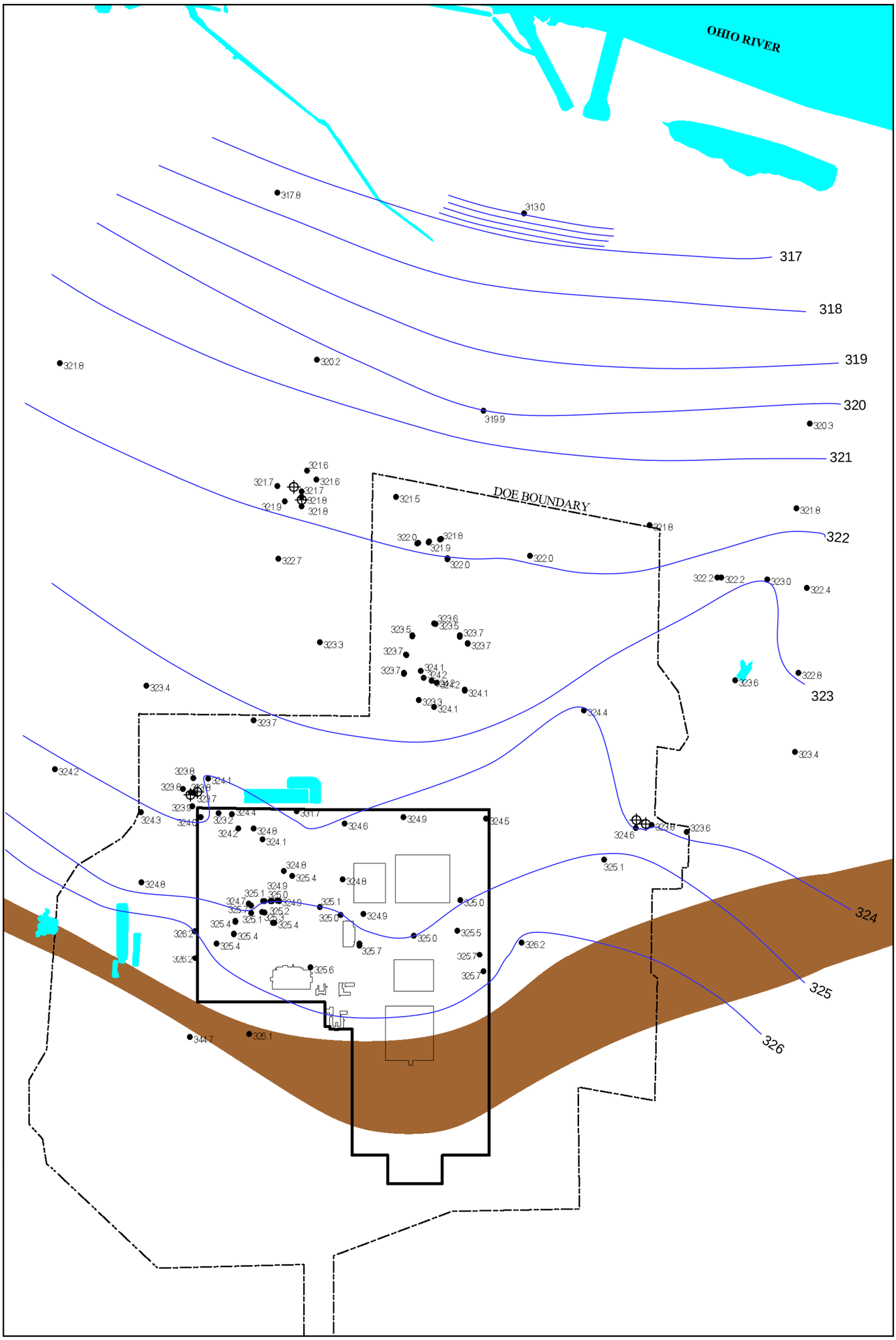


Figure A.6. Technetium-99 in the Lower RGA

Figure No. \plumes\2007\tc99.apr
DATE 06-19-08



RGA Potentiometric Surface: July - September 2007

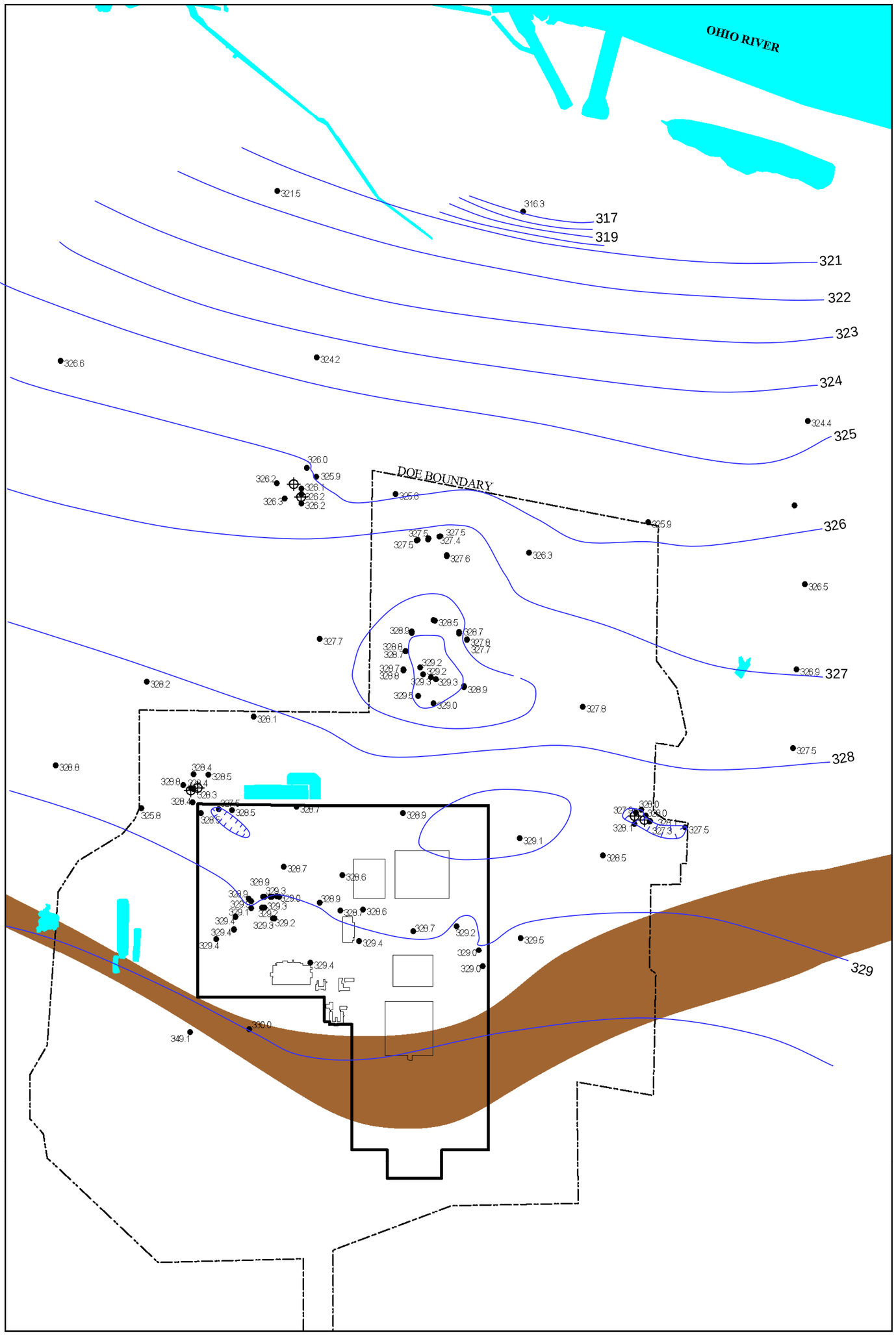
- POTENTIOMETRIC CONTOUR
- MONITORING WELL
- EXTRACTION WELL
- TERRACE SLOPE

2000 0 2000 Feet

TRUE NORTH
PLANT NORTH

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

COORDINATE SYSTEM: PGDP
FILE NAME: WaterLev.ppt
DATE: 10/17/2008
AUTHOR: Paducah Remediation Services, Inc.
SOURCES: Paducah OREIS

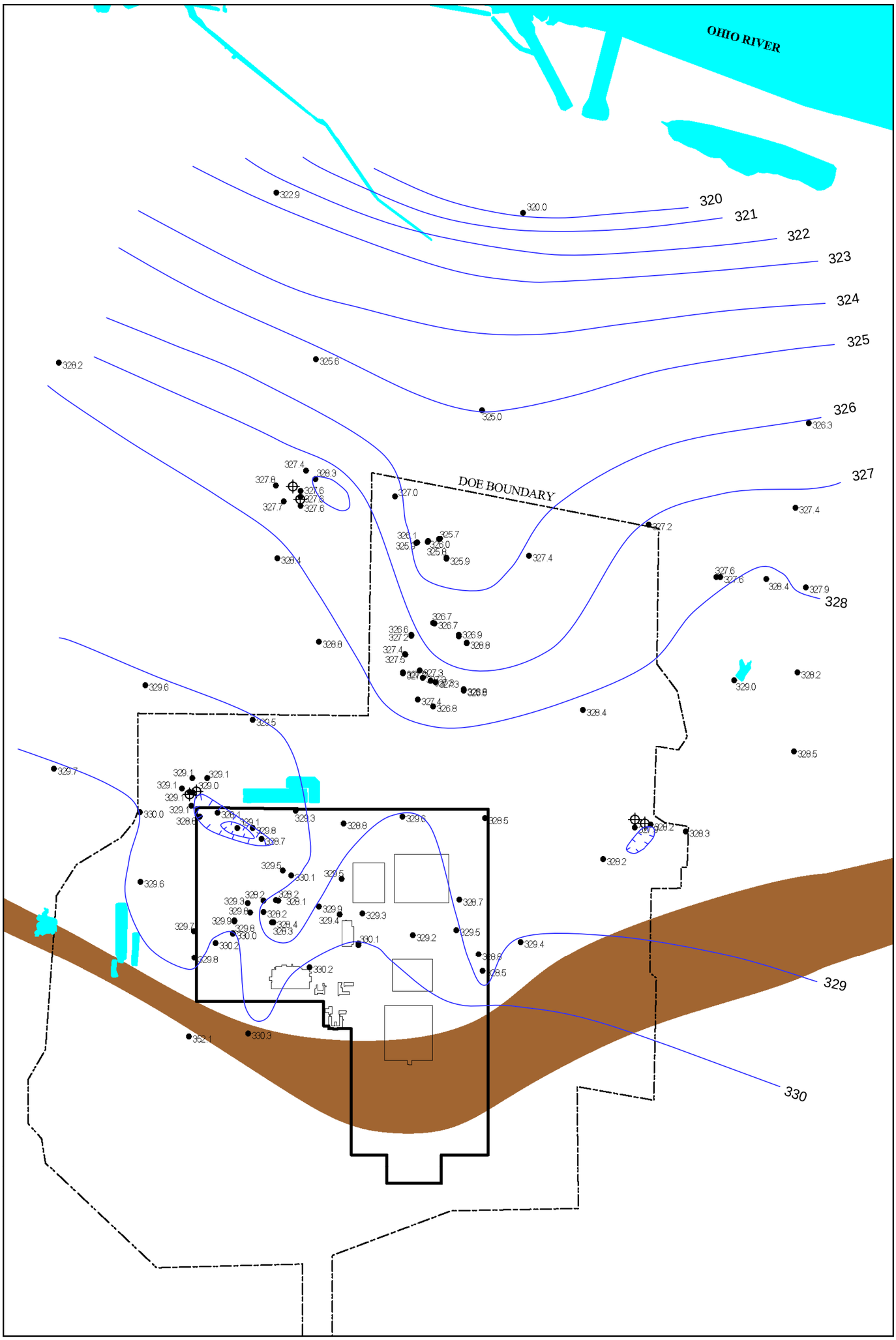


RGA Potentiometric Surface: April - June 2007

- POTENTIOMETRIC CONTOUR
- MONITORING WELL
- EXTRACTION WELL
- TERRACE SLOPE

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

COORDINATE SYSTEM: PGDP
FILE NAME: WaterLev.ppt
DATE: 10/17/2008
AUTHOR: Paducah Remediation Services, Inc.
SOURCES: Paducah OREIS



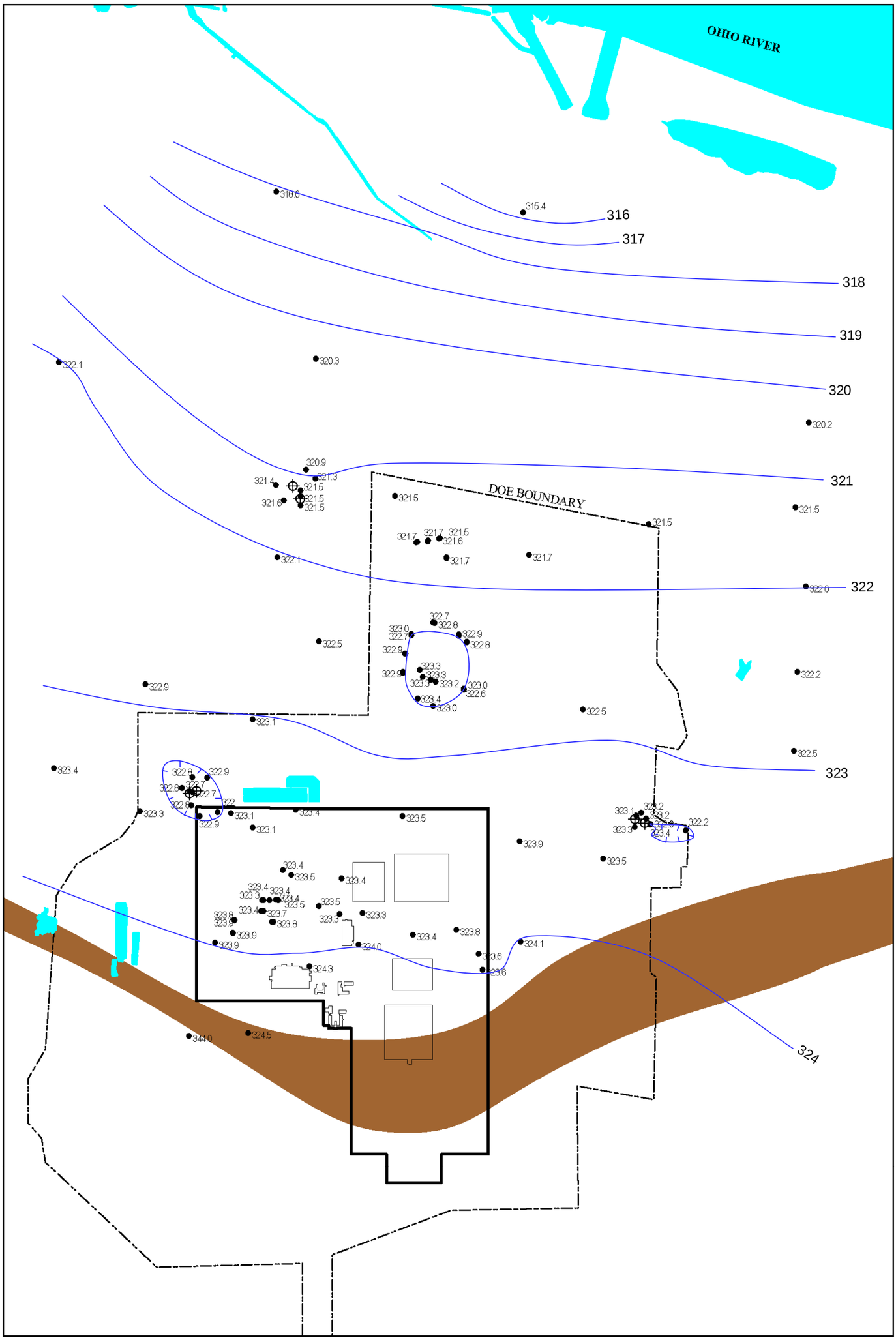
RGA Potentiometric Surface: January - March 2007

- POTENTIOMETRIC CONTOUR
- MONITORING WELL
- EXTRACTION WELL
- TERRACE SLOPE

2000 0 2000 Feet

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

COORDINATE SYSTEM: PGDP
FILE NAME: WaterLev.ppt
DATE: 10/17/2008
AUTHOR: Paducah Remediation Services, Inc.
SOURCES: Paducah OREIS



RGA Potentiometric Surface: October - December 2007

- POTENTIOMETRIC CONTOUR
- MONITORING WELL
- EXTRACTION WELL
- TERRACE SLOPE

2000 0 2000 Feet

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

COORDINATE SYSTEM: PGDP
FILE NAME: WaterLev.ppt
DATE: 10/17/2008
AUTHOR: Paducah Remediation Services, Inc.
SOURCES: Paducah OREIS

APPENDIX B

DATA SET

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B.1 DEVELOPMENT OF DATA SET

B.1.1 DESCRIPTION OF MAPS

The maps generated for this report graphically portray TCE and ^{99}Tc concentrations in the Regional Gravel Aquifer (RGA). For purposes of this report, the RGA is defined as those sediments found between the elevations of 250 ft and 320 ft amsl and bound by the Porters Creek terrace slope to the south and the Ohio River to the north. The east and west boundaries of the study area are defined by Metropolis Lake Road and Bethel Church Road, respectively.

The upper and lower boundaries were selected so that the shallowest and deepest portions of the RGA would be included. As a result, some of the groundwater samples in the data set actually may be from the Upper Continental Recharge System or from the McNairy Formation. However, it is appropriate to include these samples since they serve as boundaries to the plumes and help define the lateral and vertical extents of contamination.

B.1.2 DESCRIPTION OF DATA SET

The data set used for this plume map revision consists of groundwater data from MWs whose screen mid-point is between elevations 250 ft and 320 ft amsl and a few samples of seeps in Little Bayou Creek. Wells sampled with the residential program were considered upper RGA wells for purposes of mapping.

B.1.3 SELECTION OF DATA POINTS

To identify those wells that fit the depth criteria, the Paducah Oak Ridge Environmental Information System (OREIS) database was queried for all groundwater samples analyzed for TCE or ^{99}Tc. Elevation of the mid-point of the well screen was used to assign the sample depth. The data were filtered to exclude those samples outside the elevations used to define the RGA. Then the samples were segregated into lower, middle, and upper RGA intervals, defined as elevations 250 to 295 ft, 295 to 305 ft, and 305 to 320 ft amsl, respectively. The interval for the lower RGA is larger than the upper or middle, so that data from "channels" identified in various portions of the plant would be included in the interpretation. Once the sample points were assigned to one of the three intervals, base maps were printed for each interval that showed only those wells that collected a sample from that interval.

B.1.4 SELECTION OF GROUNDWATER DATA

The groundwater data set consists of TCE concentrations and ^{99}Tc activities for those data points defined as RGA in this report. The data were selected from all groundwater data collected on or before December 31, 2007, entered into Paducah OREIS, and analyzed by a fixed-base laboratory. For MW data, time versus concentration plots were created and trend lines developed. Only those wells in which data have been collected within the last year were used. All available TCE and ^{99}Tc data, as defined previously, were used in creating the plots, with exceptions as noted. To normalize the data, these trend lines were used to determine the probable concentration of the well as of June 30, 2007. This value then was plotted on the base maps. The trend graphs are presented in Attachment B1 to this Appendix. The values used for contouring are shown in Table B.1 and on the trend graphs.

B.1.5 MAPPING OF DATA

After all data were plotted on the base maps, the data were manually contoured. Separate maps were made for both TCE and ^{99}Tc in the upper, middle, and lower RGA intervals. The contour intervals for TCE and ^{99}Tc were as follows.

Trichloroethene	Technetium-99
5 µg/L	25 pCi/L
100 µg/L	100 pCi/L
1,000 µg/L	900 pCi/L
10,000 µg/L	3,790 pCi/L
100,000 µg/L	

The contour intervals for ^{99}Tc reflect intermediate levels (25 and 100 pCi/L) and regulatory benchmarks (900 and 3,790 pCi/L). After contouring was completed, the maps were digitized for each of the three RGA intervals. These maps are presented in Appendix A. For each of the contaminants, the individual contours for the three RGA intervals were overlaid. The results were composite maps for TCE and ^{99}Tc.

B.2 POTENTIOMETRIC CONTOURING

The potentiometric surface of the RGA was contoured for each quarter of CY2007 using water level data collected during quarterly water level suites and regular sampling. In addition to depths to water, barometric pressure also was collected. Depths to water were normalized using a reference barometric pressure of 30.0 inches of mercury. Assuming a barometric efficiency of 1.0, the change in elevation is equal to the change in pressure, divided by the specific gravity.

The potentiometric data is presented in Tables B.2 through B.5. Data values that were excluded from consideration in mapping are denoted in Tables B.2 through B.5, with an explanation as to why they were excluded.

ATTACHMENT B1

MONITORING WELL TREND GRAPHS

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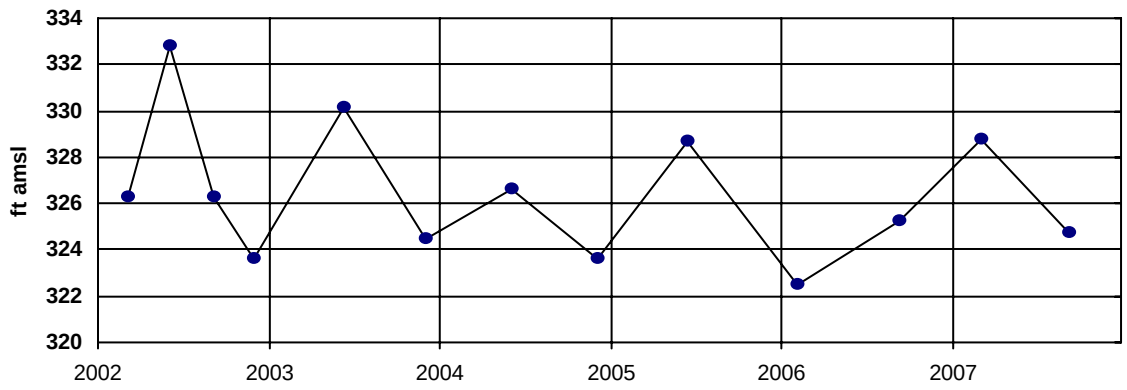
MW63 URGA

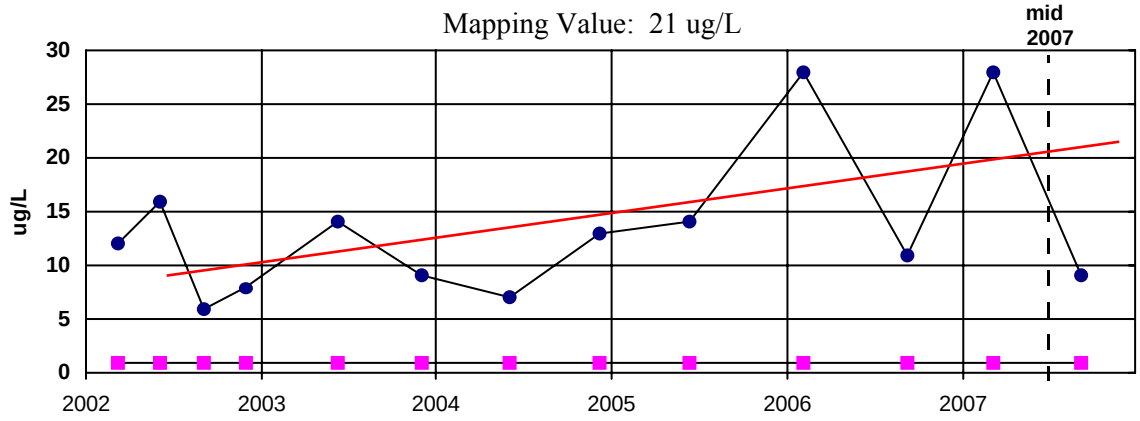
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 21 ug/L



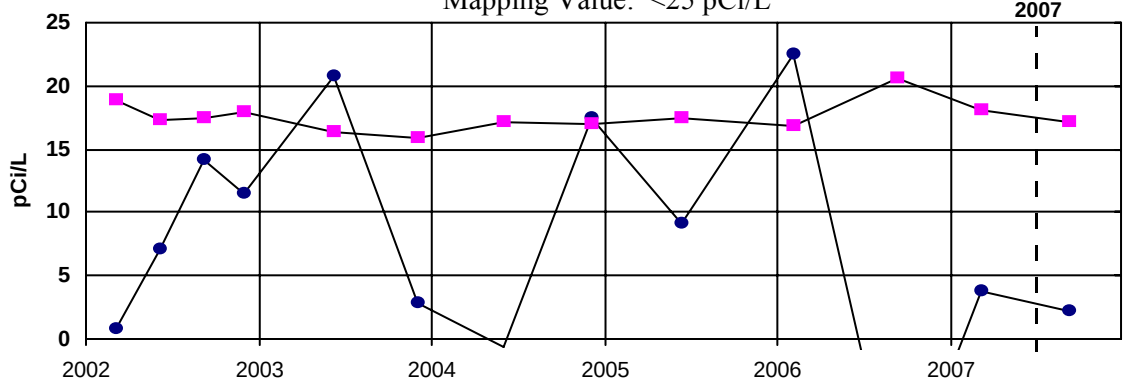
2007 Data: ug/L

03/08	28
09/10	9.1

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

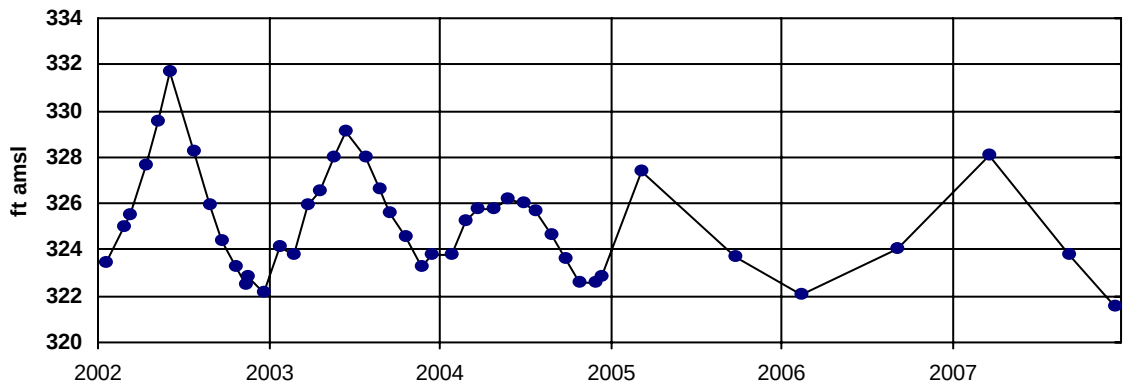
03/08	ND
09/10	ND

ND=not detected

MW66 URGA

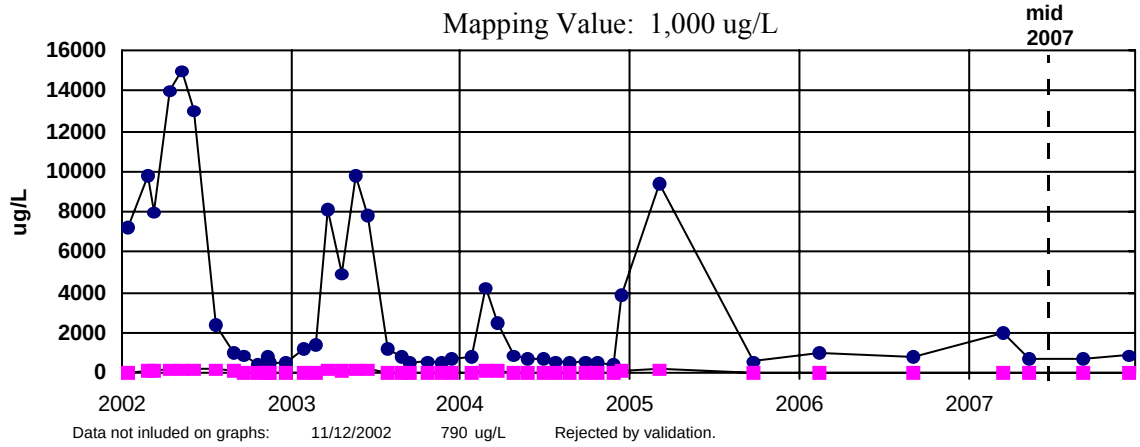
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1,000 ug/L



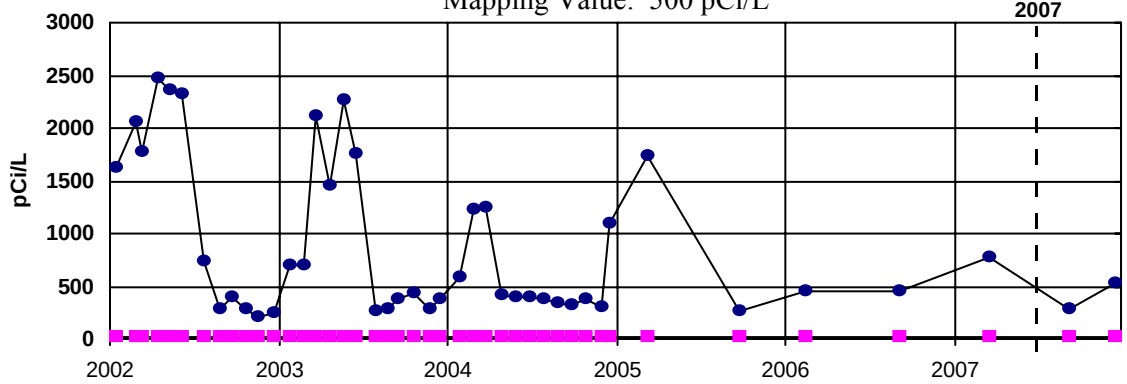
Data not inluded on graphs: 11/12/2002 790 ug/L Rejected by validation.

2007 Data:	ug/L
03/22	2000
05/15	700
09/10	660
12/19	930

ND=not detected

Technetium-99

Mapping Value: 500 pCi/L



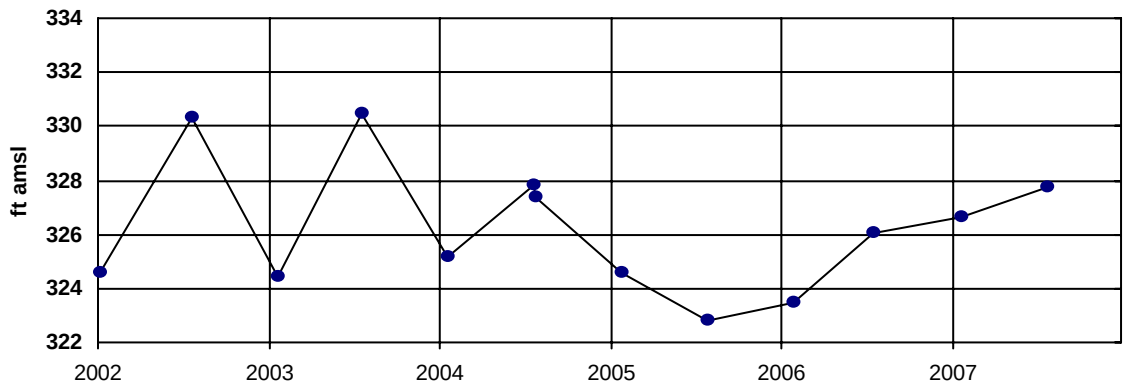
2007 Data:	pCi/L
03/22	767
09/10	274
12/19	530

ND=not detected

MW84 MRGA

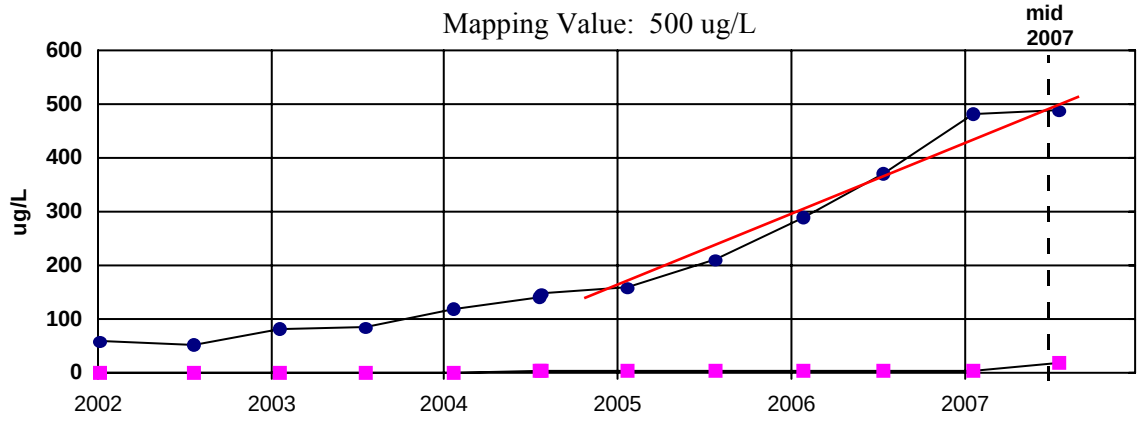
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 500 ug/L



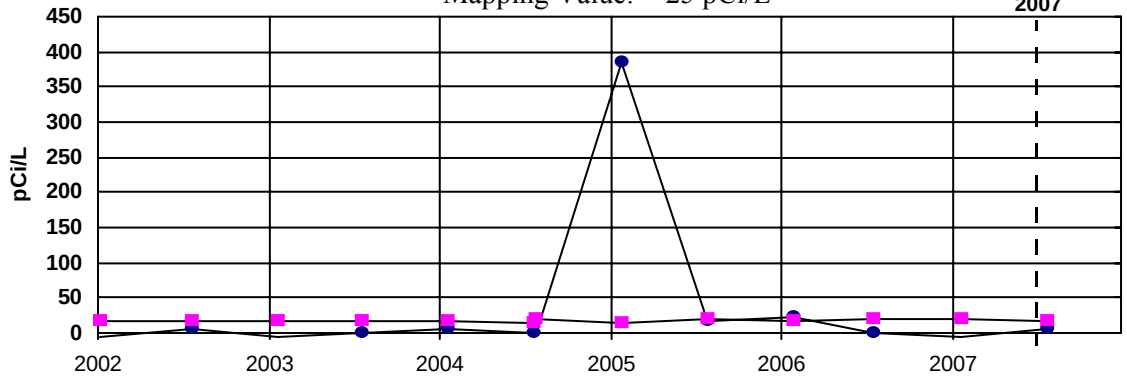
2007 Data: ug/L

01/24	480
07/24	490
07/24	430

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

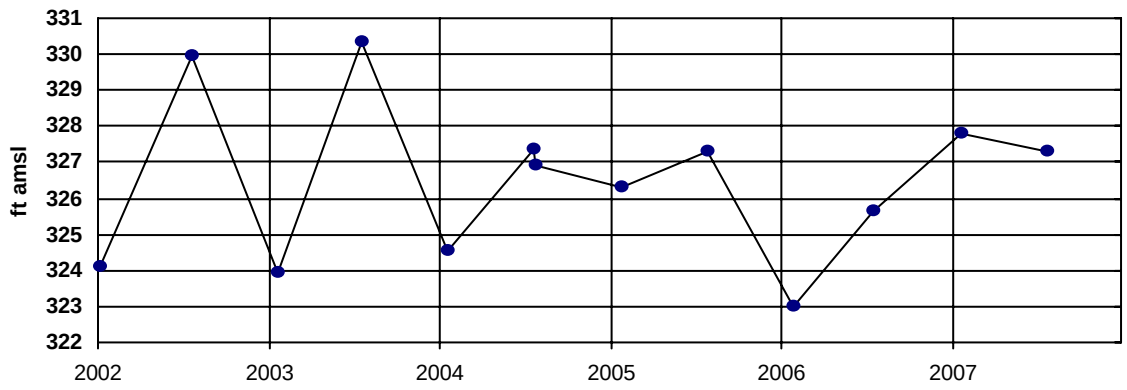
01/24	ND
07/24	ND
07/24	ND

ND=not detected

MW86 LRGA

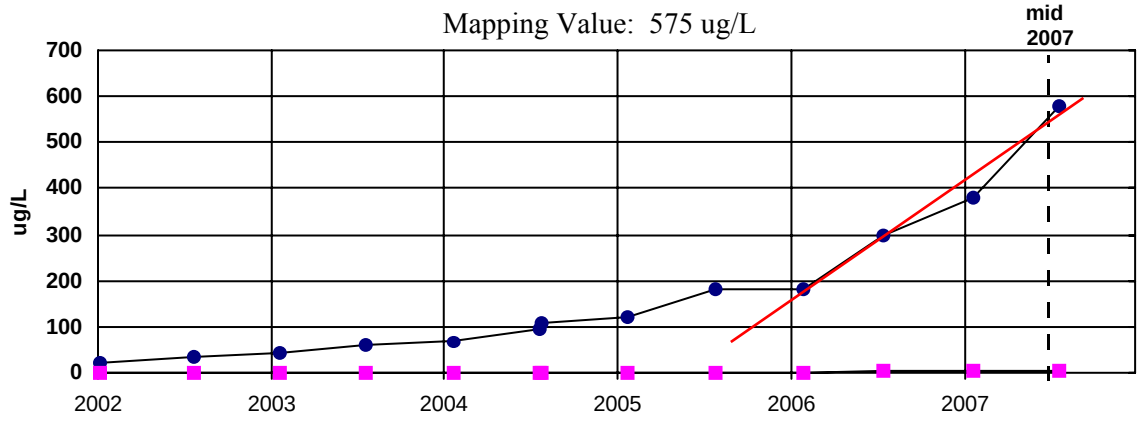
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 575 ug/L

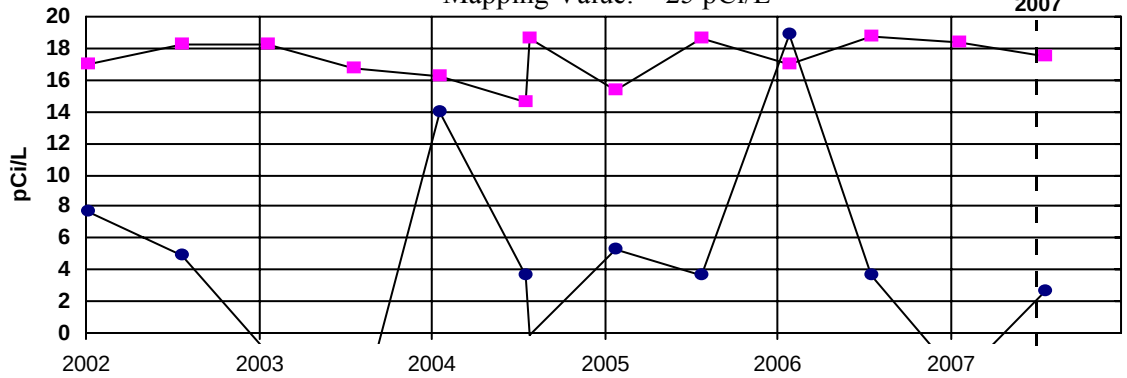


2007 Data:	ug/L
01/24	380
07/25	580
07/25	460

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



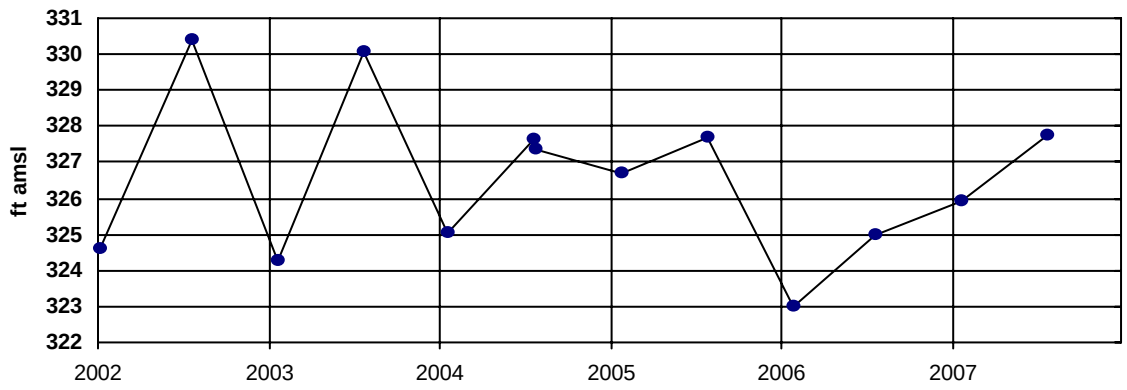
2007 Data:	pCi/L
01/24	ND
07/25	ND
07/25	ND

ND=not detected

MW87 **MRGA**

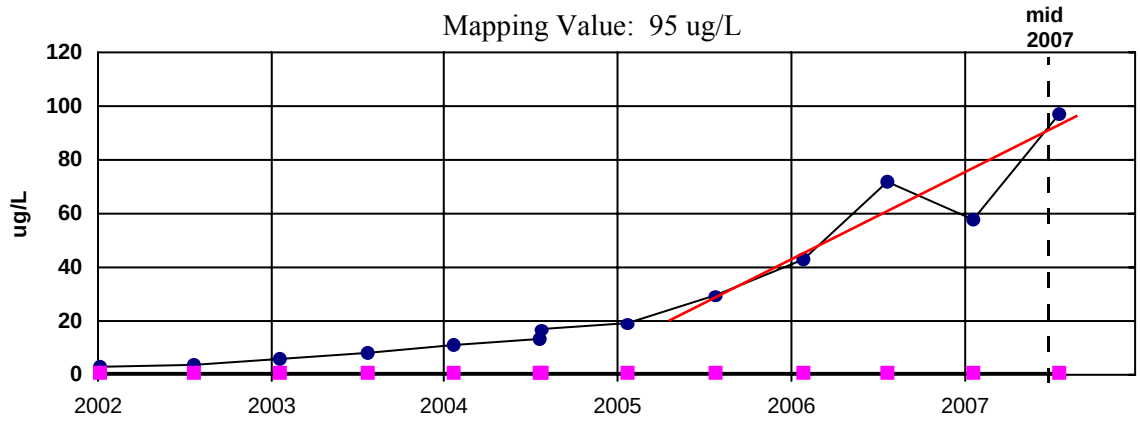
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 95 ug/L



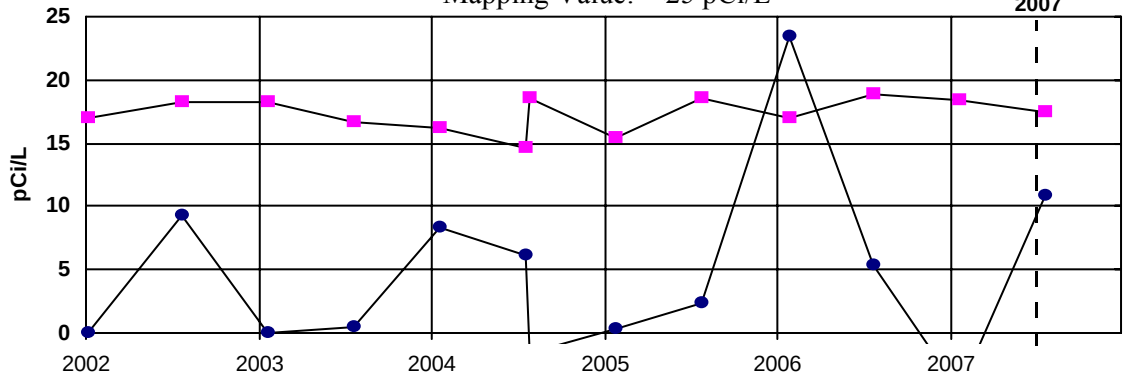
2007 Data: ug/L

01/24	58
07/25	97

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

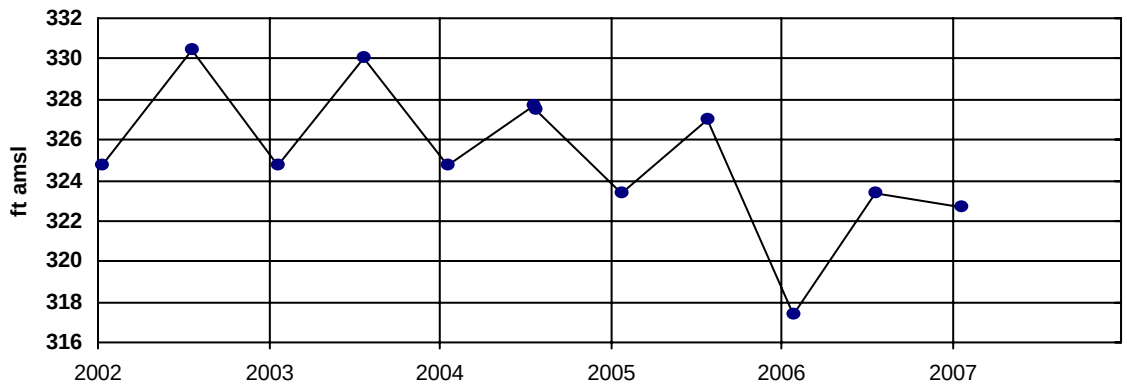
01/24	ND
07/25	ND

ND=not detected

MW89 **LRGA**

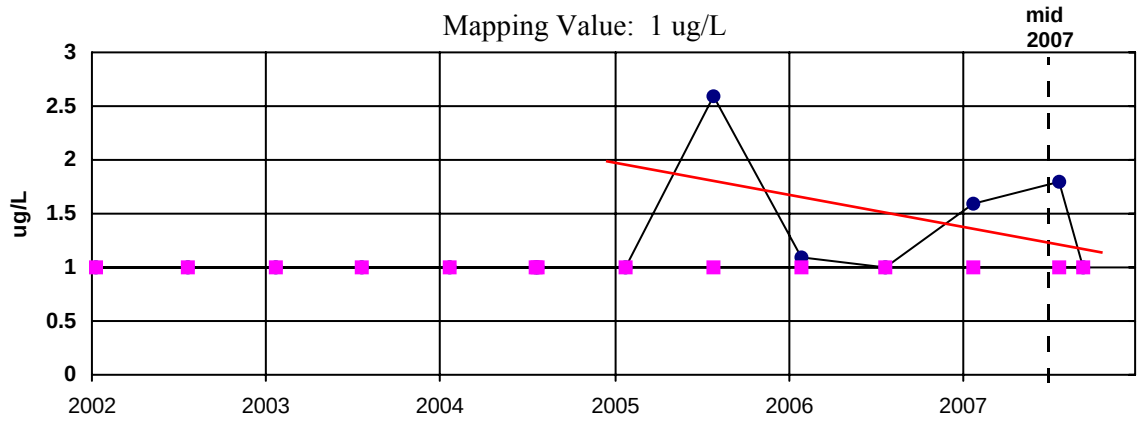
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1 ug/L



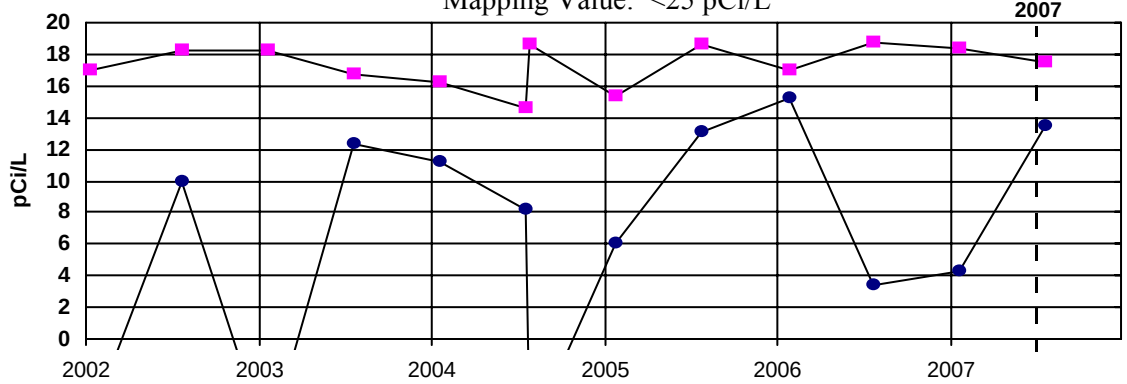
2007 Data: ug/L

01/24	1.6
07/25	1.8
09/12	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

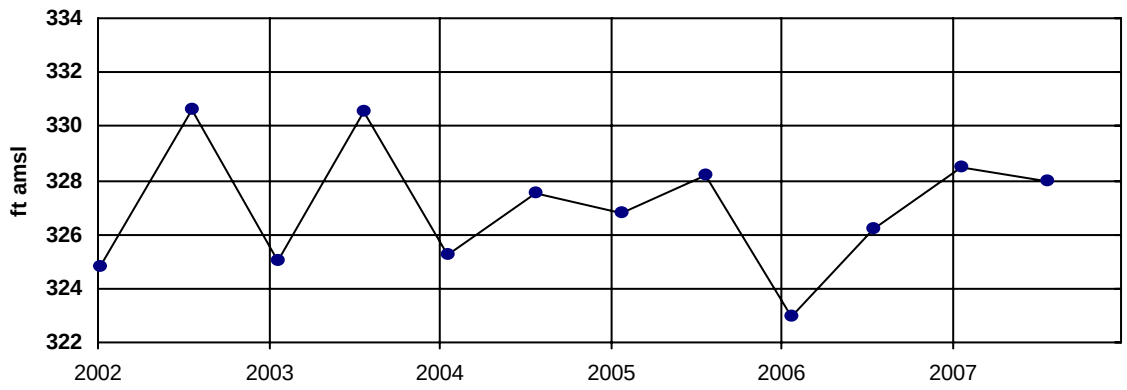
01/24	ND
07/25	ND

ND=not detected

MW90/MW90A MRGA

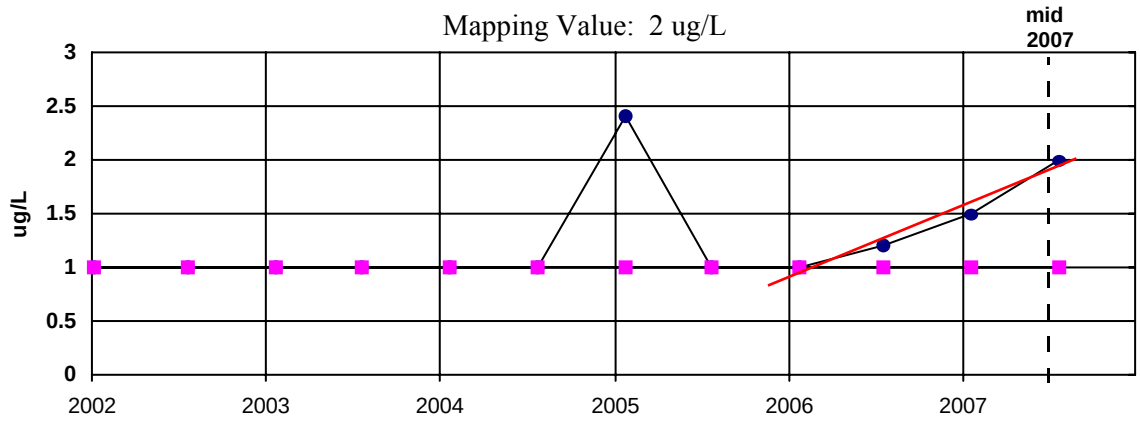
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 2 ug/L



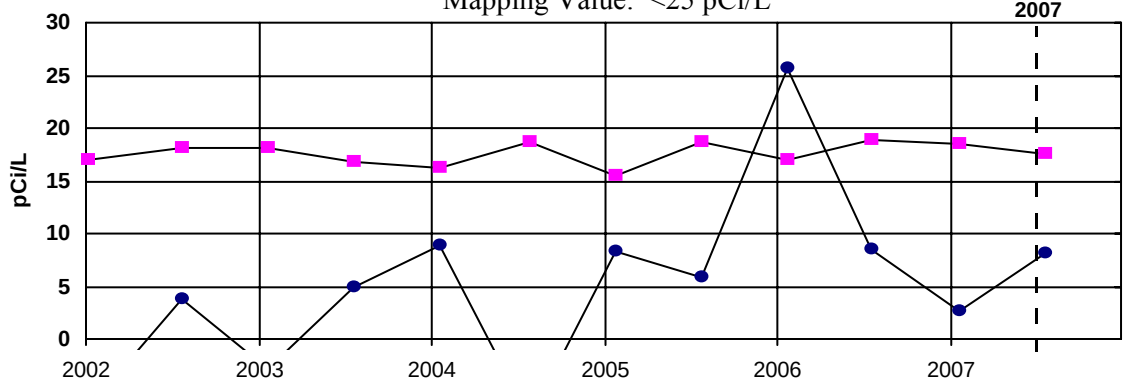
2007 Data: ug/L

01/23	1.5
01/23	1.3
07/24	2

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

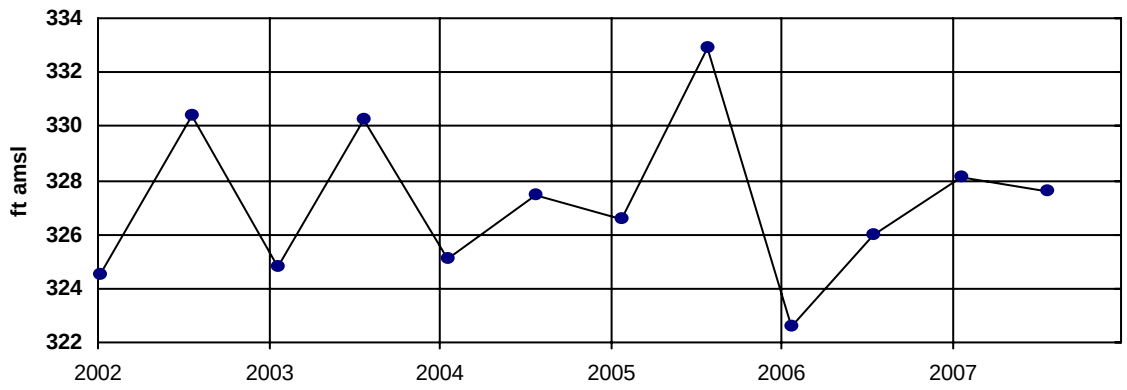
01/23	ND
01/23	ND
07/24	ND

ND=not detected

MW92 LRGA

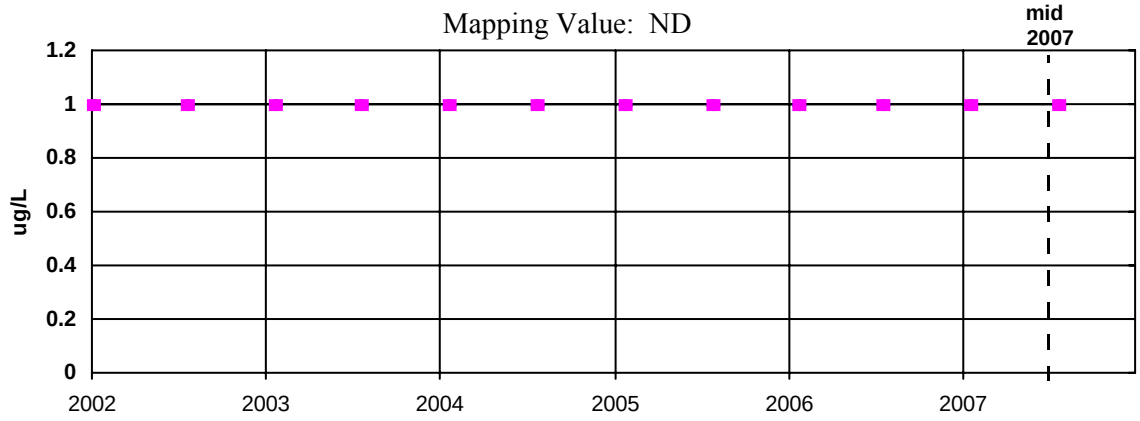
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

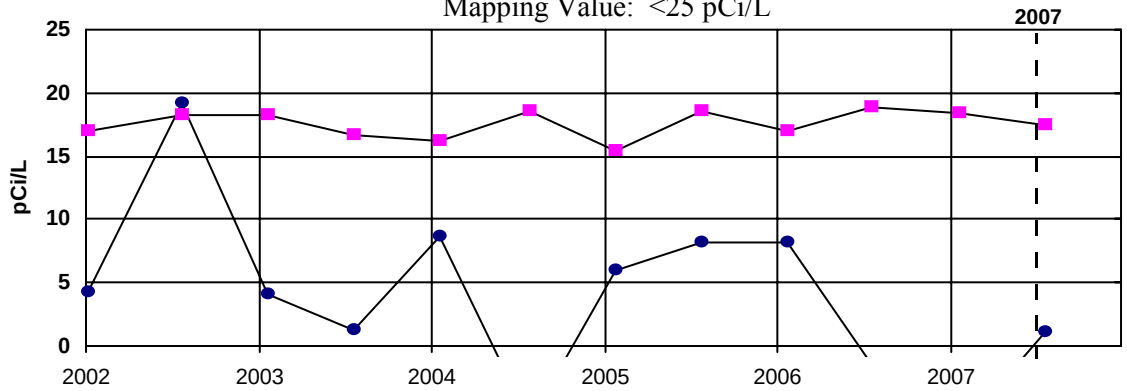


2007 Data:	ug/L
01/23	ND
01/23	ND
07/25	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



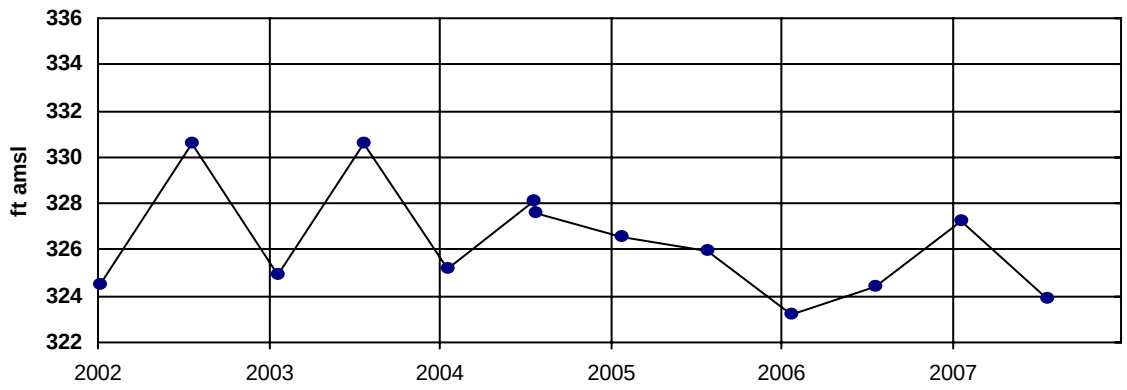
2007 Data:	pCi/L
01/23	ND
01/23	ND
07/25	ND

ND=not detected

MW93 MRGA

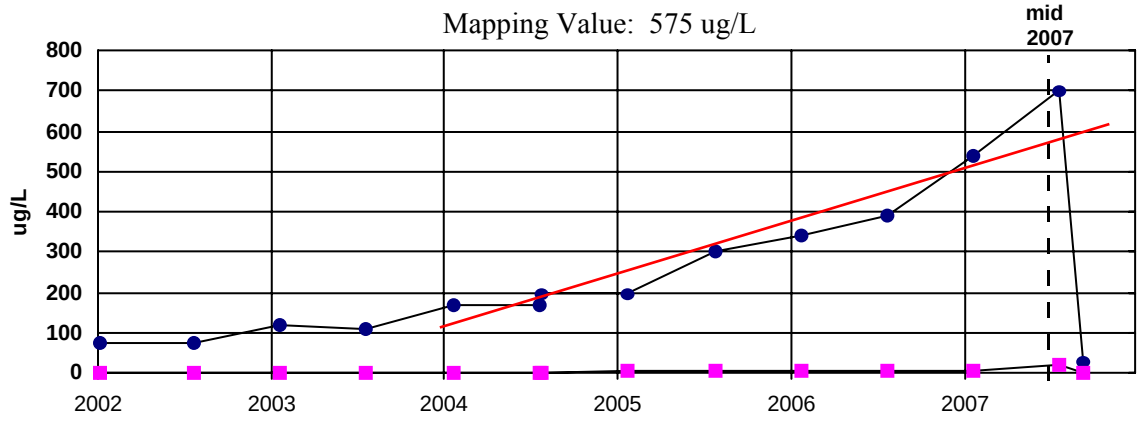
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 575 ug/L

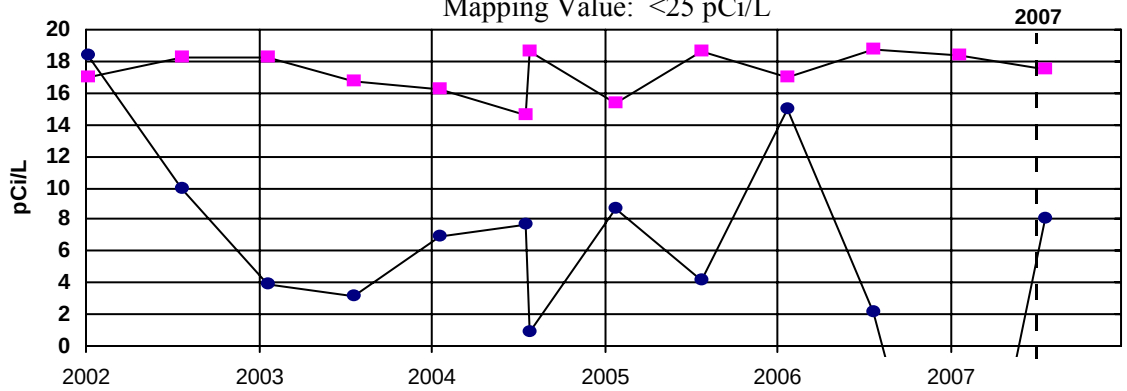


2007 Data:	ug/L
01/24	540
07/24	700
07/24	350
09/12	31

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



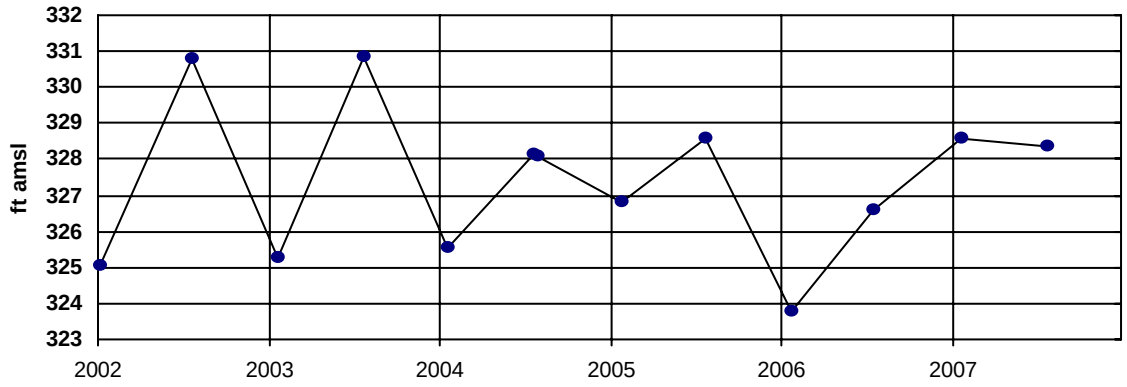
2007 Data:	pCi/L
01/24	ND
07/24	ND
07/24	ND

ND=not detected

MW95/MW95A LRGA

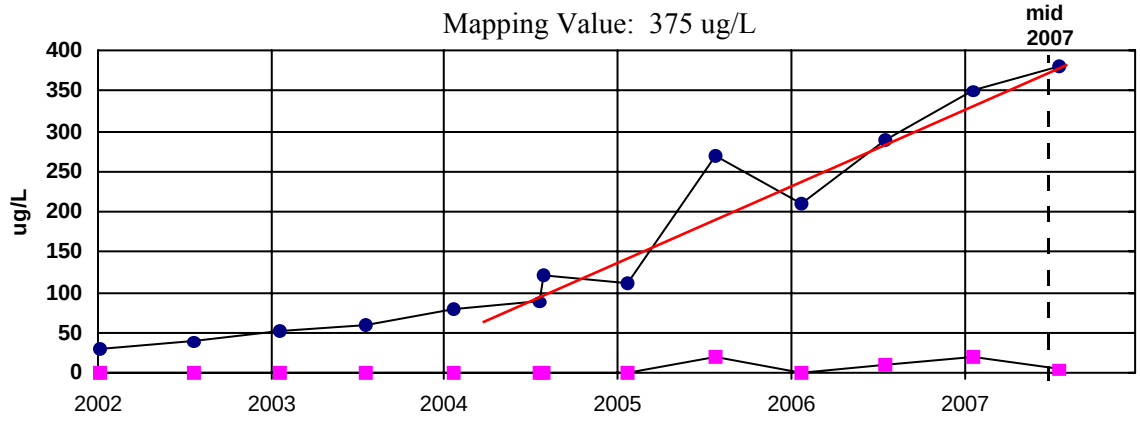
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 375 ug/L



2007 Data: ug/L

01/23	350
01/23	290
07/24	380

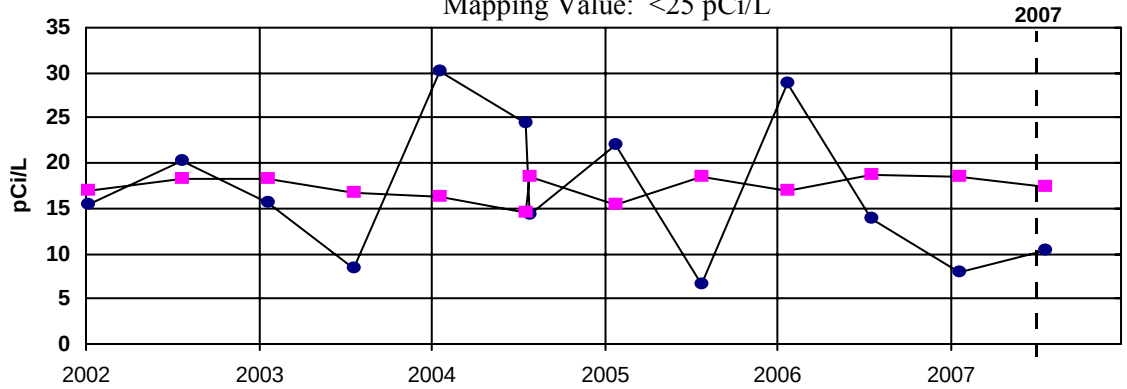
Data not inluded on graphs:

7/22/2003	49 ug/L	Rejected by validation.
7/26/2005	270 ug/L	Rejected by validation.
7/20/2006	290 ug/L	Rejected by validation.

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

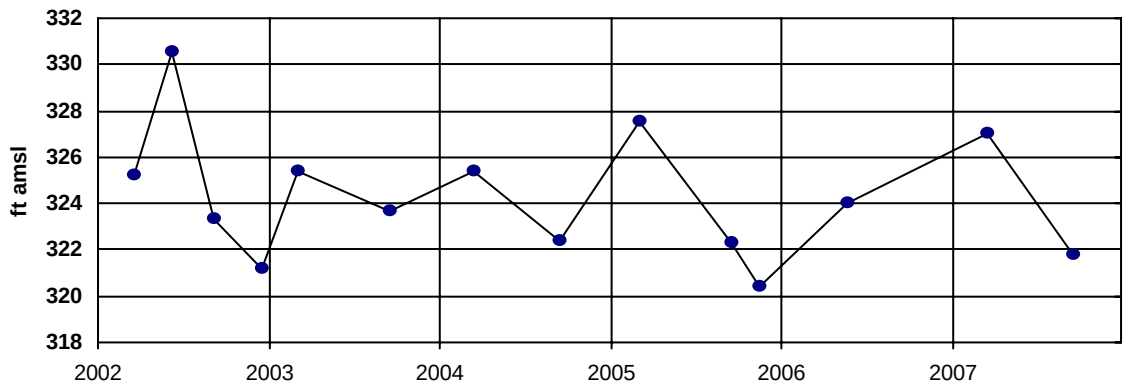
01/23	8
01/23	ND
07/24	ND

ND=not detected

MW98 MRGA

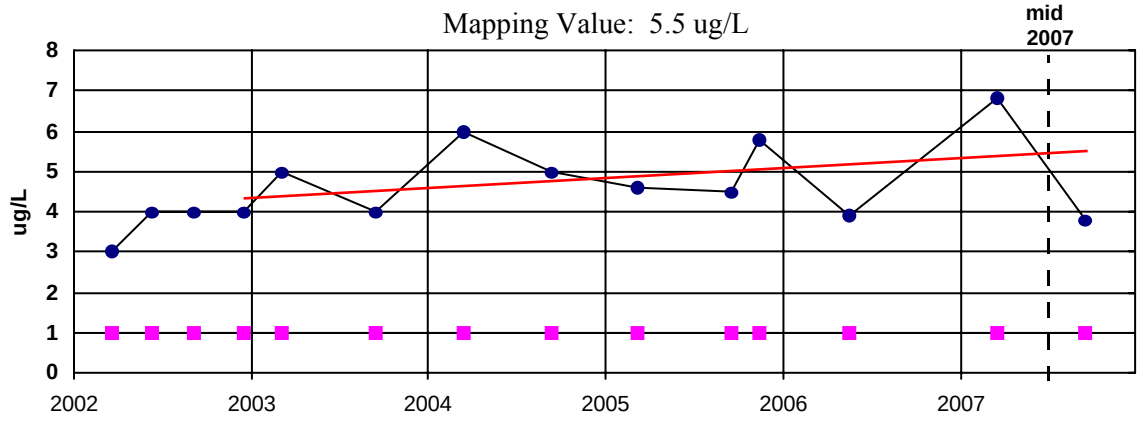
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 5.5 ug/L



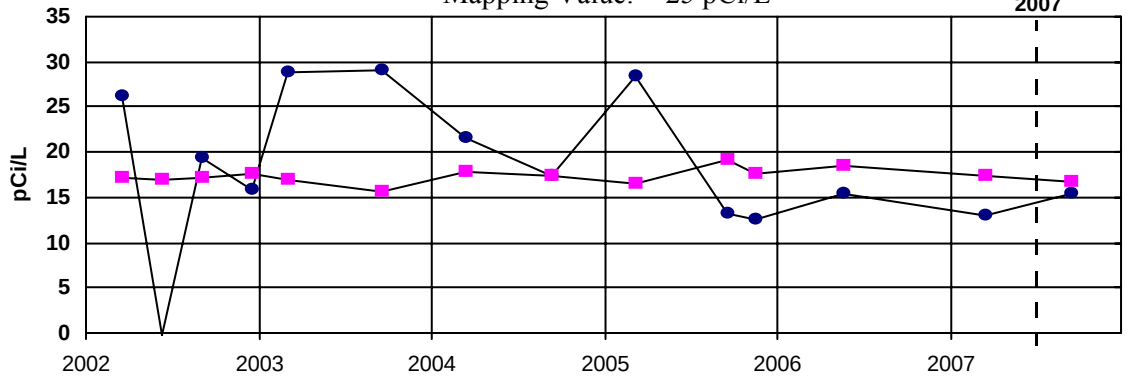
2007 Data: ug/L

03/20	6.8
09/18	3.8

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

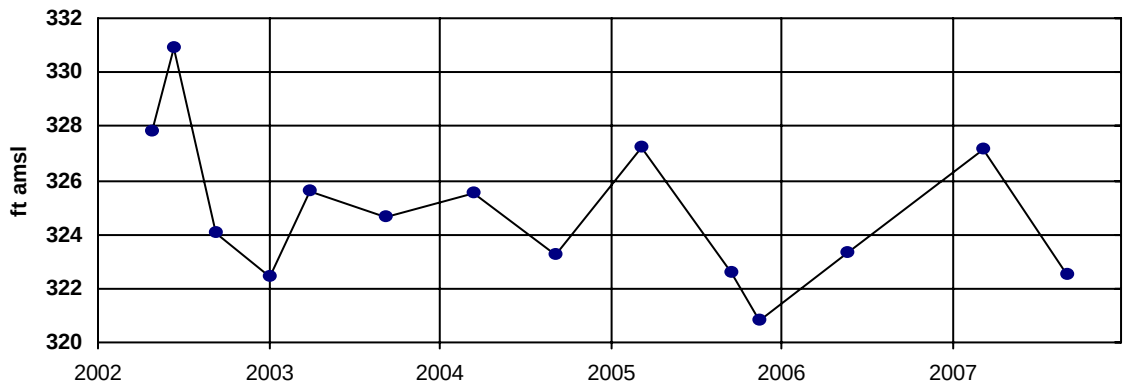
03/20	ND
09/18	ND

ND=not detected

MW99 MRGA

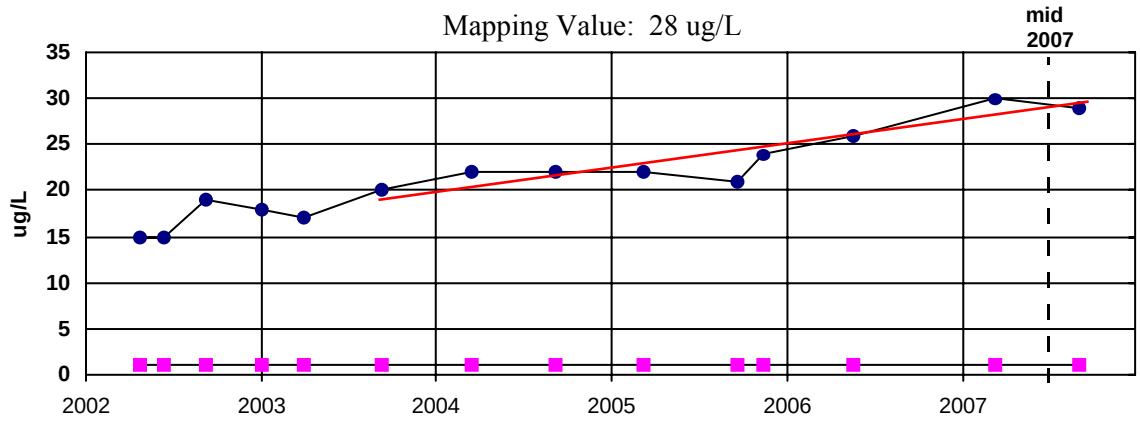
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 28 ug/L



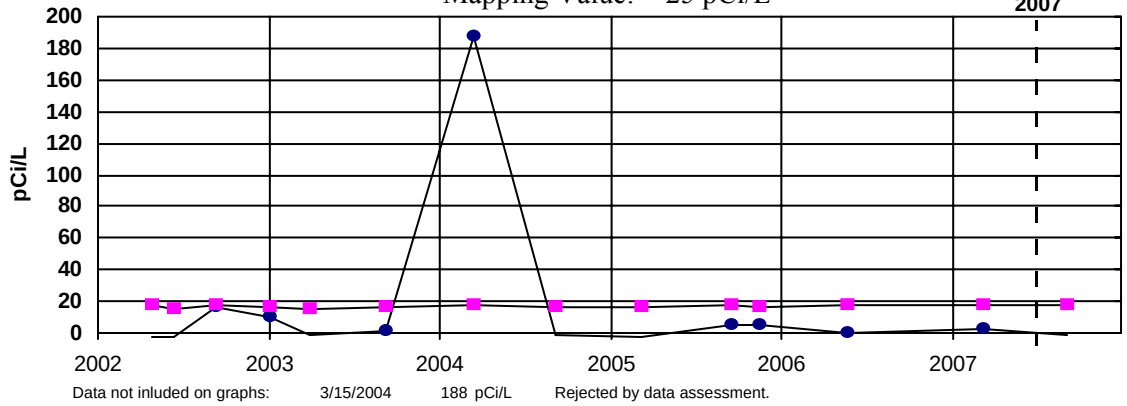
2007 Data: ug/L

03/12	30
09/05	29

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



Data not inluded on graphs: 3/15/2004 188 pCi/L Rejected by data assessment.

2007 Data: pCi/L

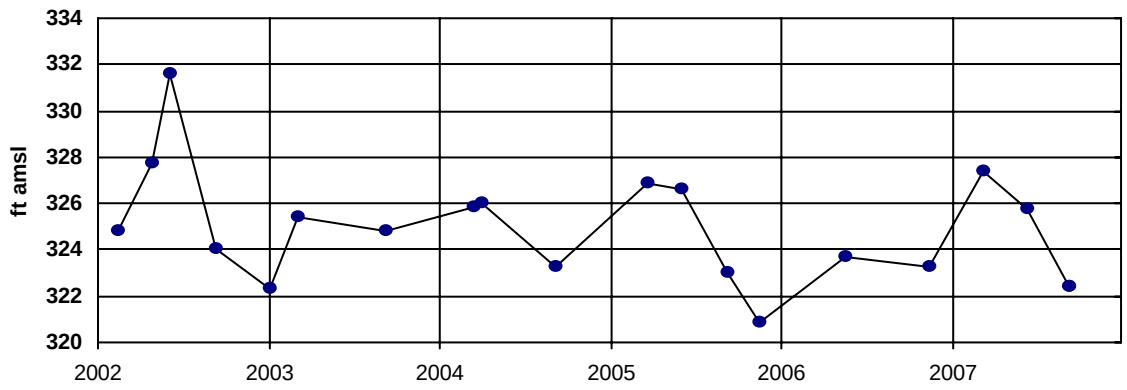
03/12	ND
09/05	ND

ND=not detected

MW100 LRGA

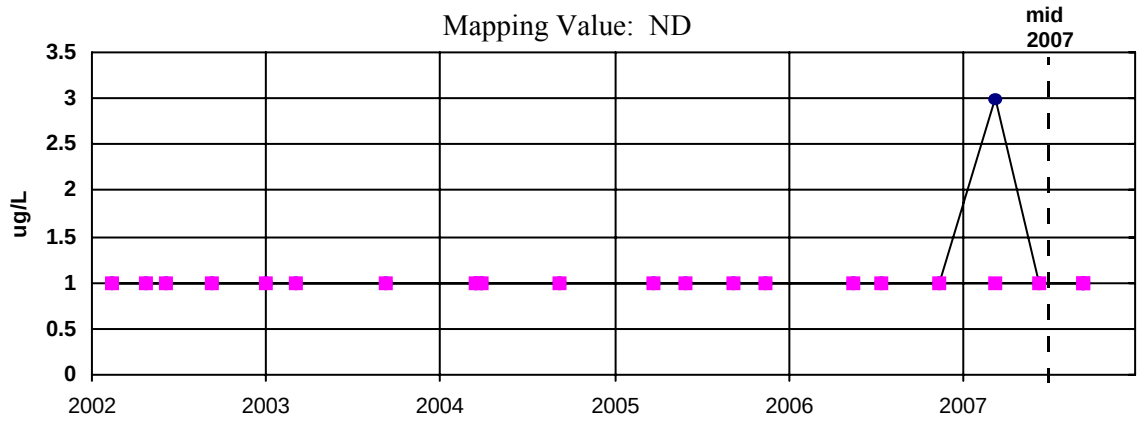
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

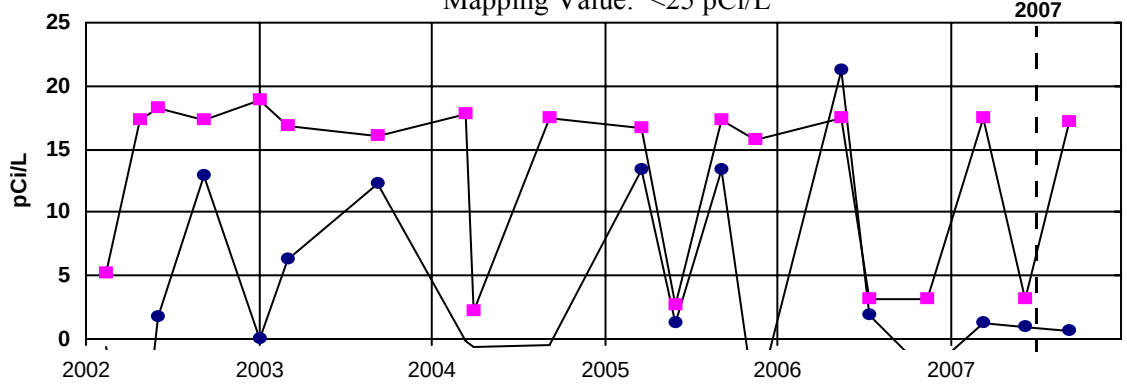


2007 Data:	ug/L
03/13	3
03/13	0.39
06/12	ND
09/11	ND
09/12	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



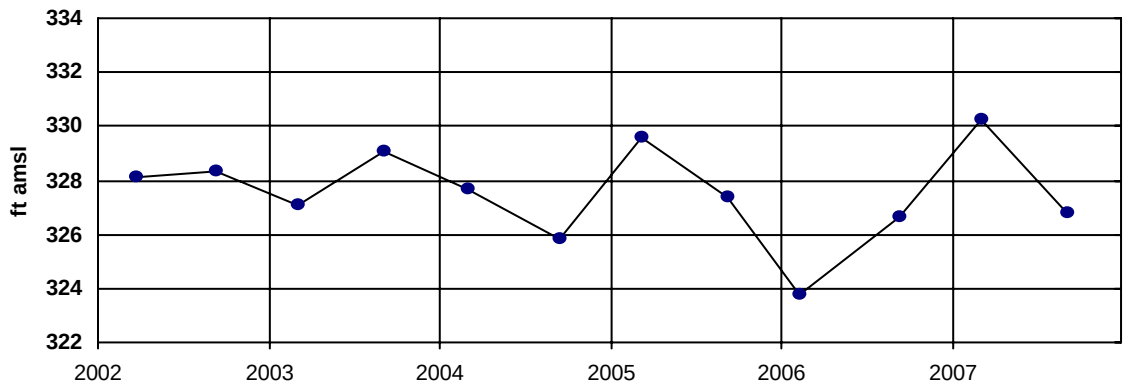
2007 Data:	pCi/L
03/13	ND
03/13	ND
06/12	ND
09/11	ND
09/11	ND

ND=not detected

MW103 MRGA

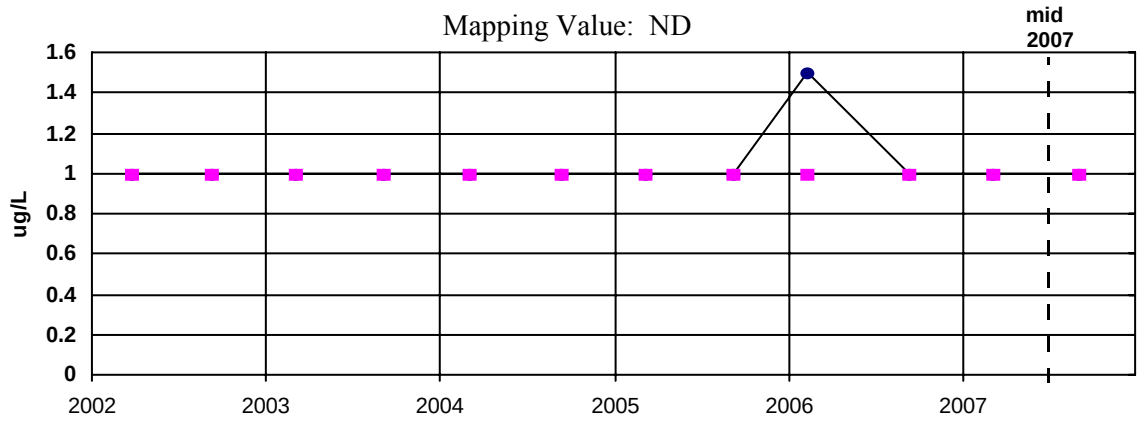
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND



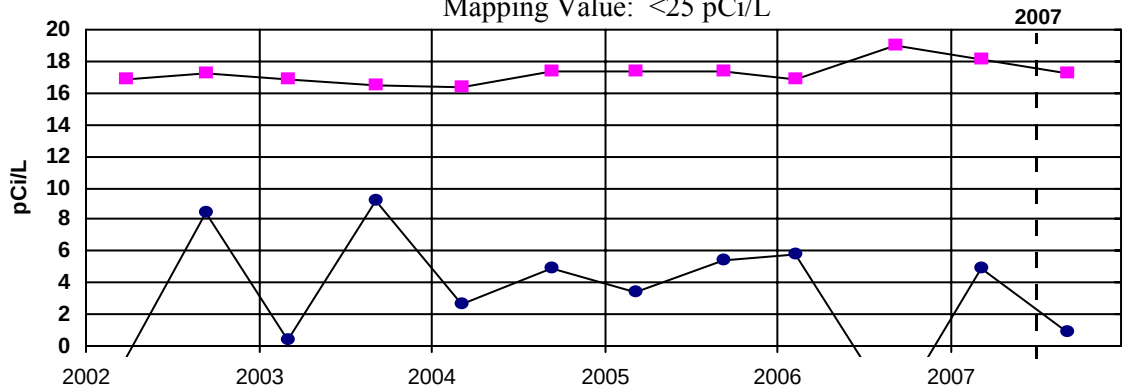
2007 Data: ug/L

03/08	ND
09/06	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

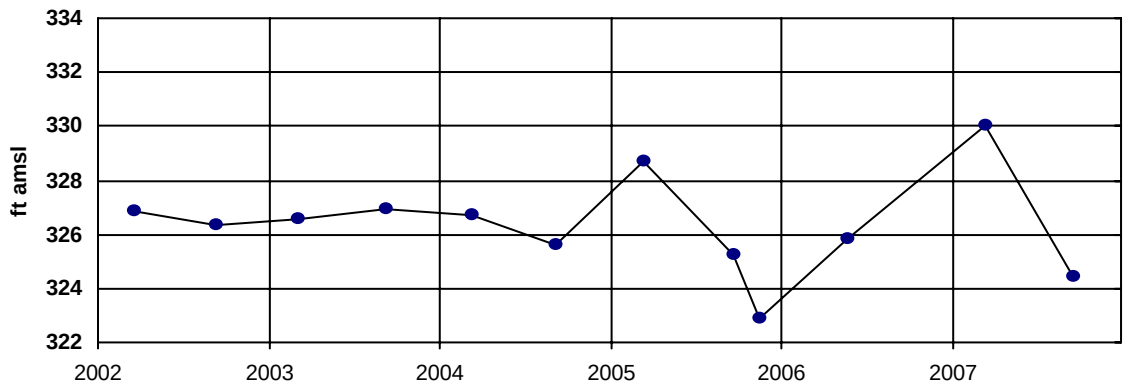
03/08	ND
09/06	ND

ND=not detected

MW106 MRGA

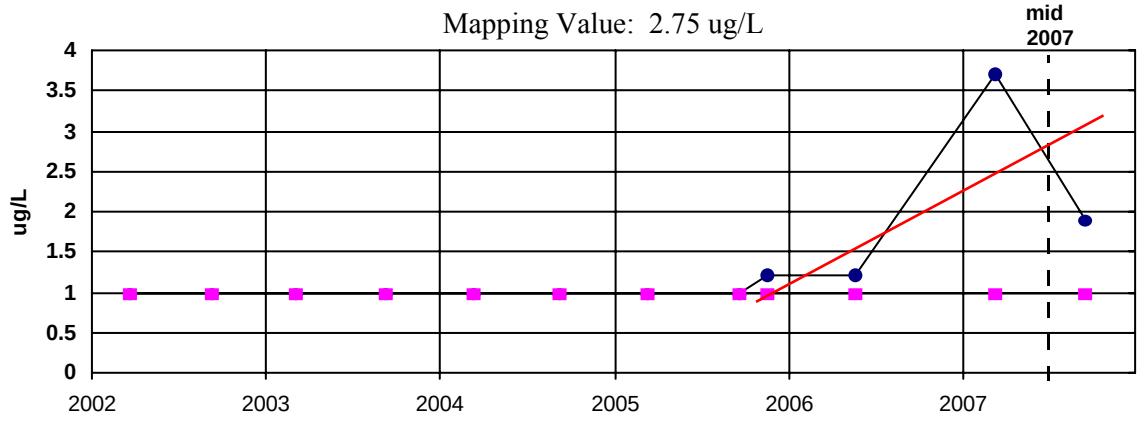
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 2.75 ug/L



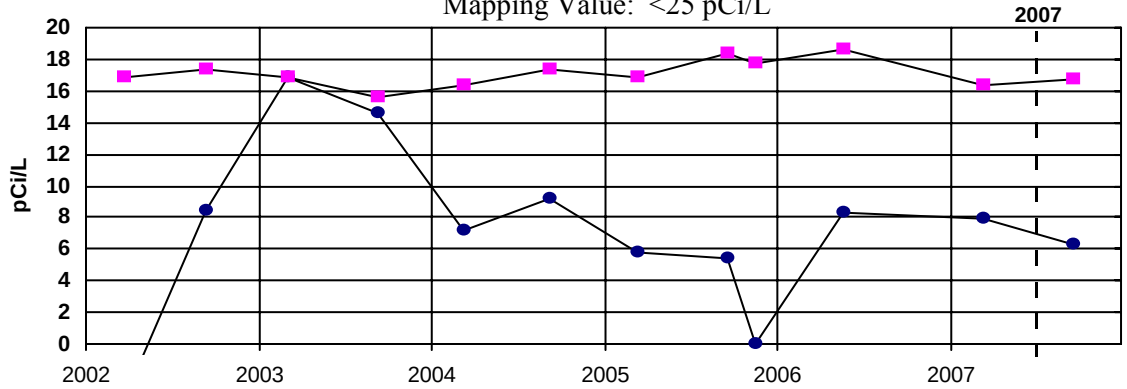
2007 Data: ug/L

03/14	3.7
09/19	1.9

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

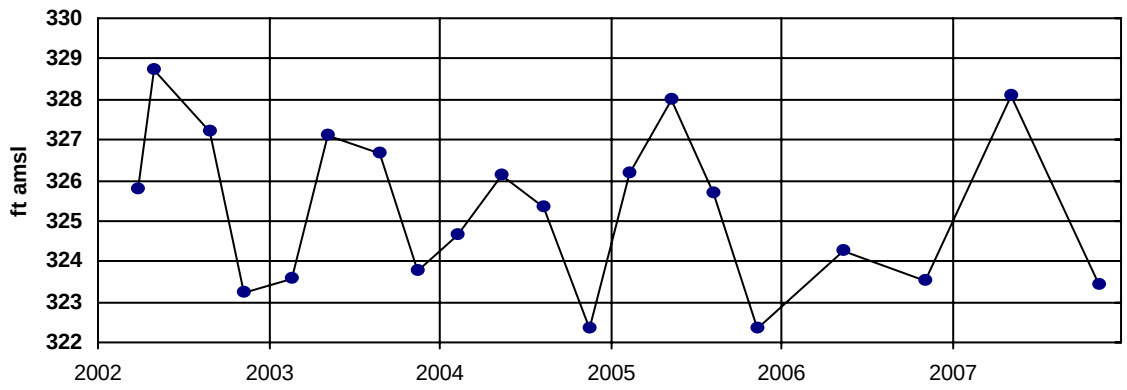
03/14	ND
09/19	ND

ND=not detected

MW124 LRGA

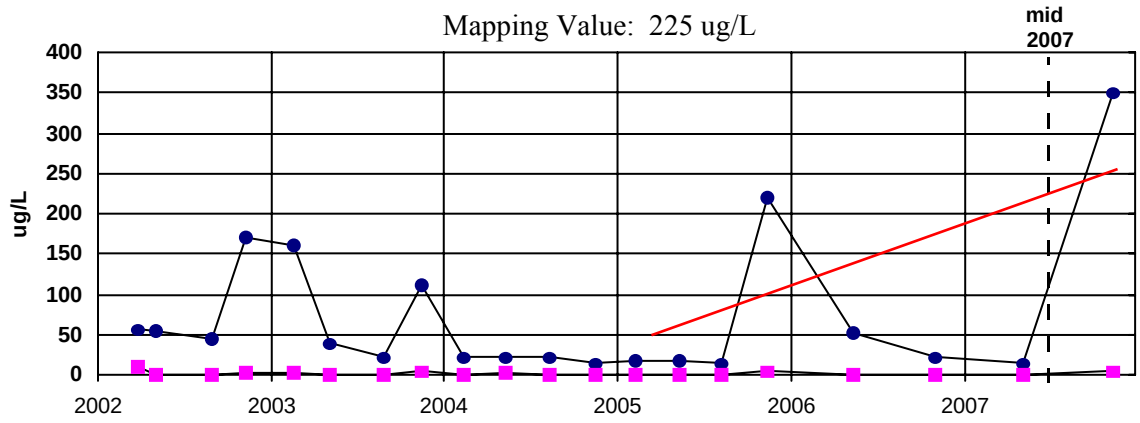
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 225 ug/L



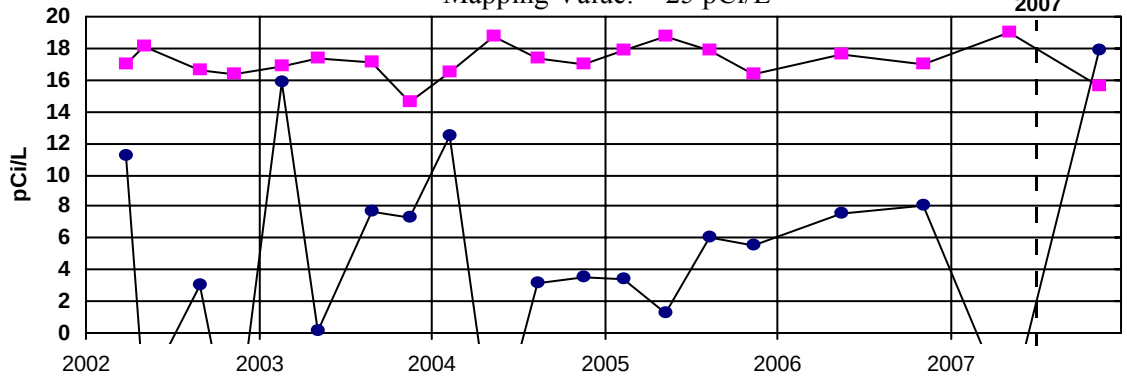
2007 Data: ug/L

05/09	14
11/13	350

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

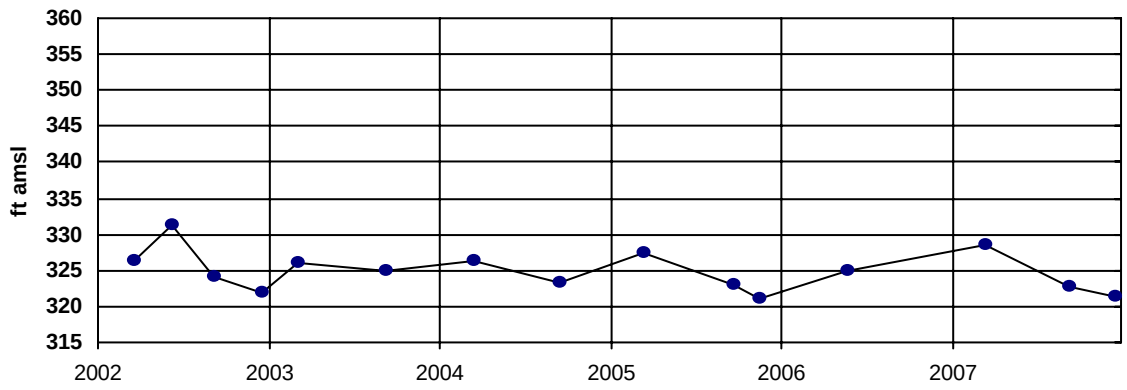
05/09	ND
11/13	17.9

ND=not detected

MW125 LRGA

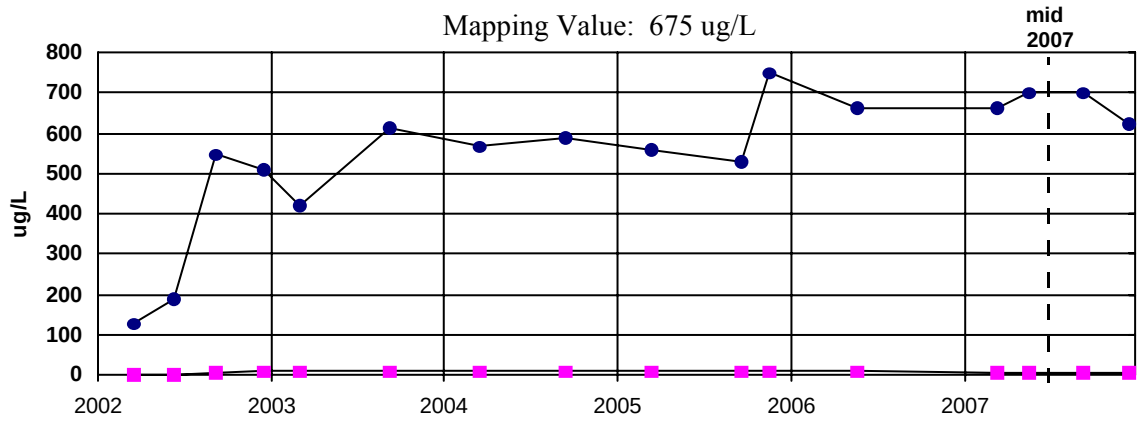
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 675 ug/L

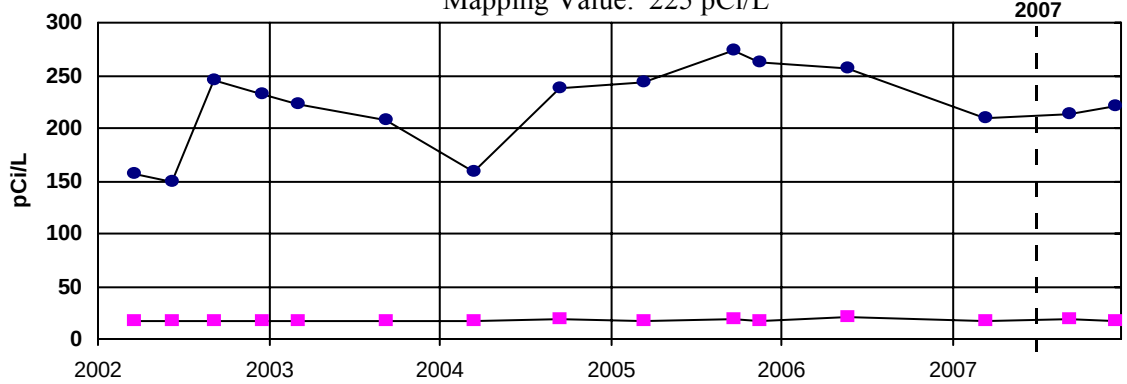


2007 Data:	ug/L
03/15	660
05/21	700
09/11	700
12/19	620

ND=not detected

Technetium-99

Mapping Value: 225 pCi/L



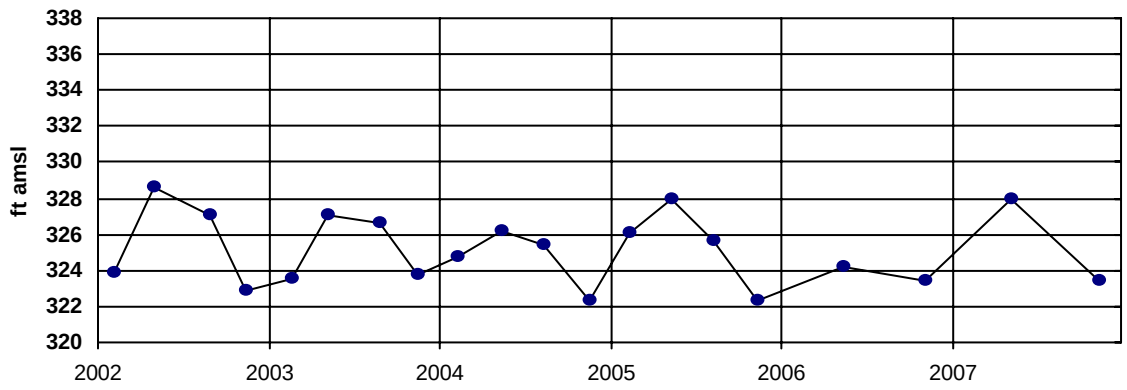
2007 Data:	pCi/L
03/15	209
09/11	213
12/19	220

ND=not detected

MW126 MRGA

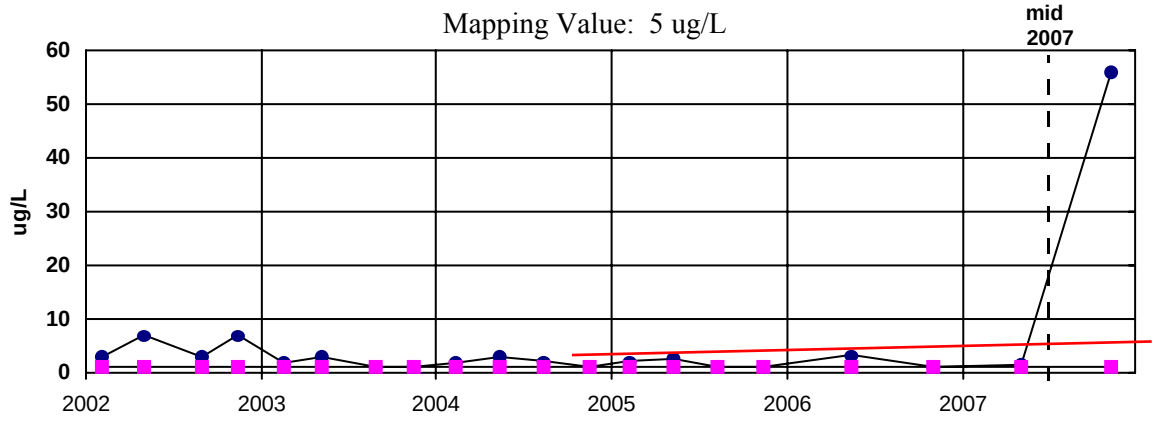
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 5 ug/L



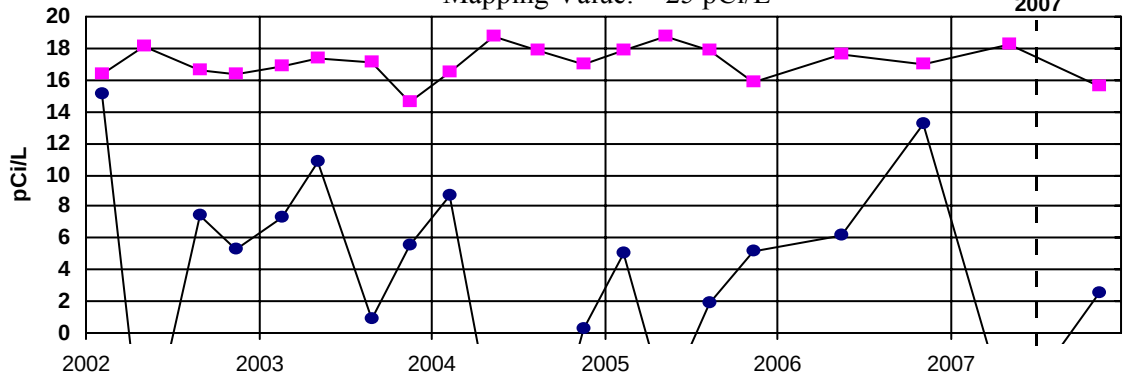
2007 Data: ug/L

05/09	1.3
11/13	56

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

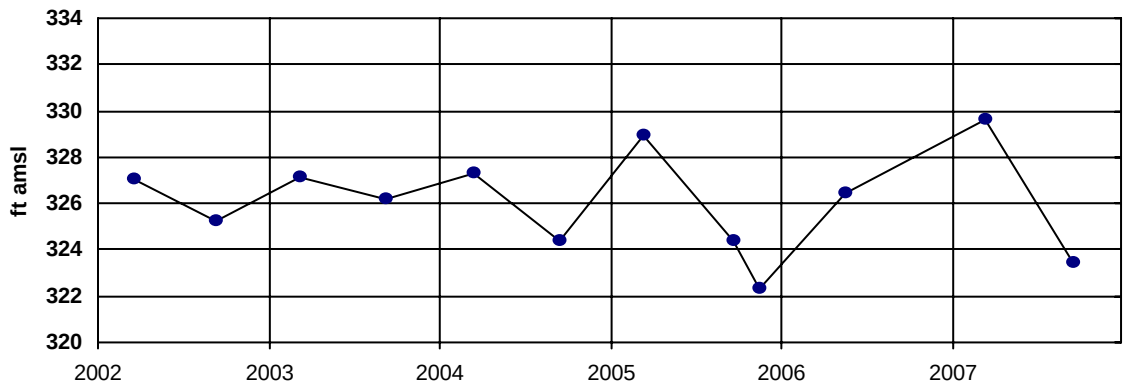
05/09	ND
11/13	ND

ND=not detected

MW134 **LRGA**

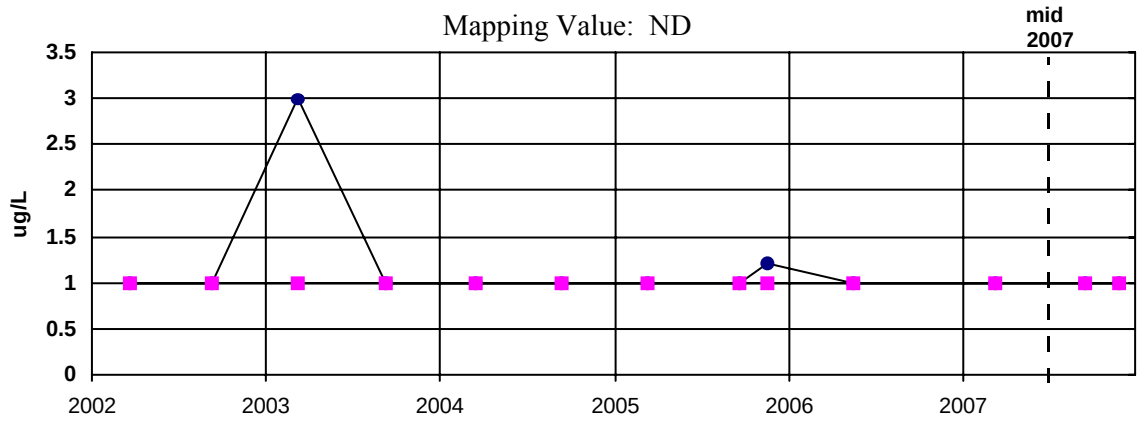
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

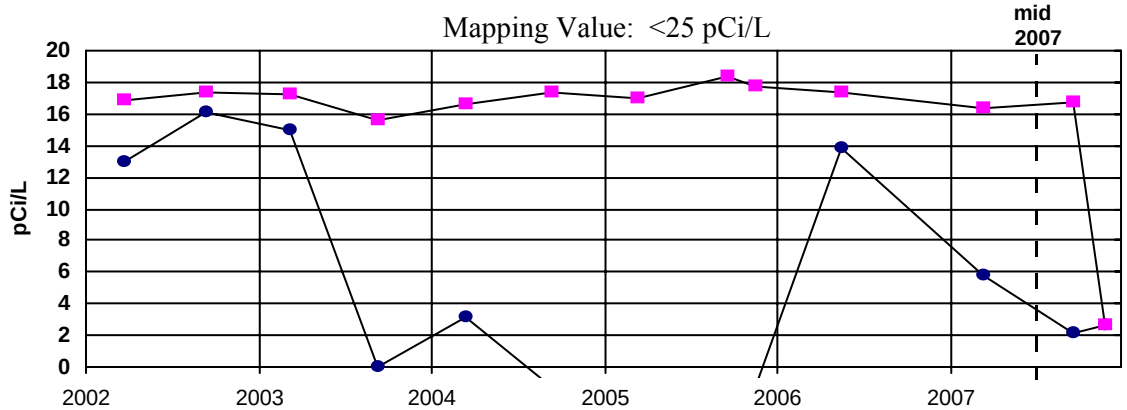


2007 Data:	ug/L
03/14	ND
09/19	ND
11/27	0.99

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



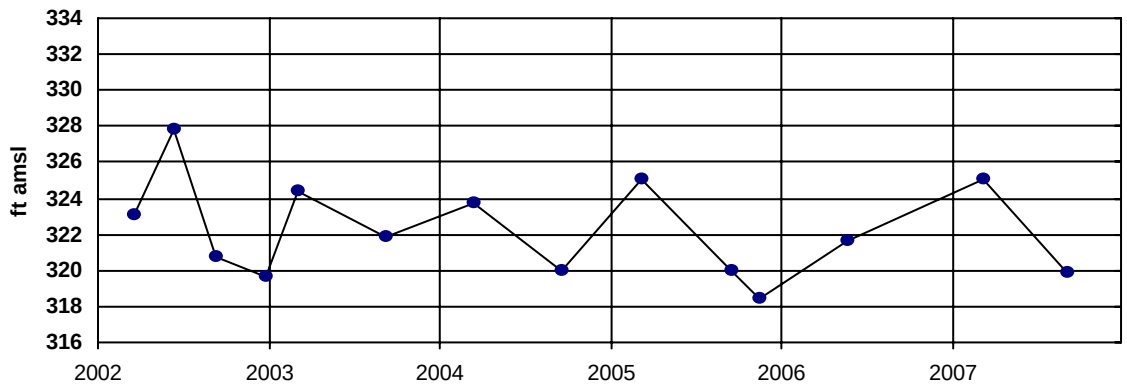
2007 Data:	pCi/L
03/14	ND
09/19	ND
11/27	2.7

ND=not detected

MW135 LRGA

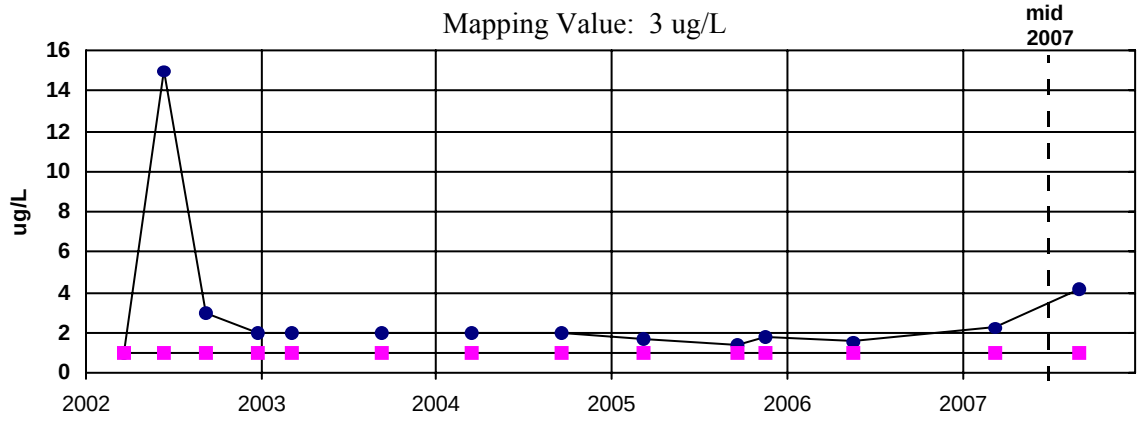
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 3 ug/L



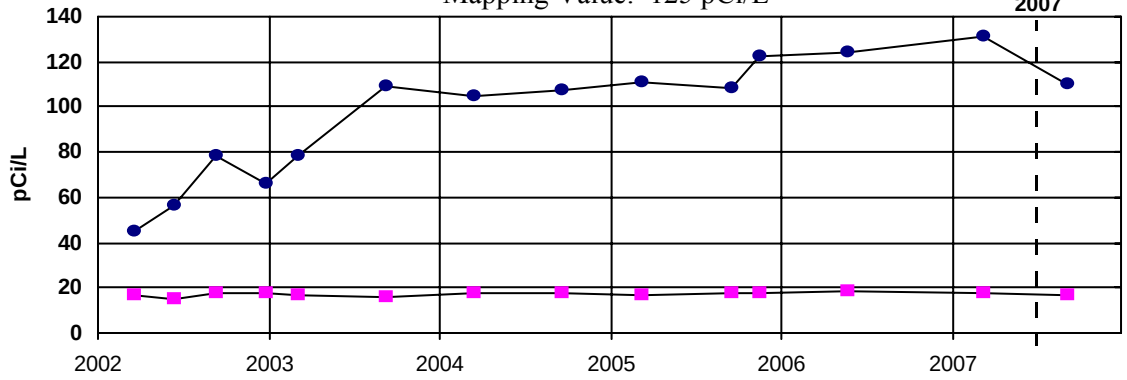
2007 Data: ug/L

03/12	2.3
09/05	4.1

ND=not detected

Technetium-99

Mapping Value: 125 pCi/L



2007 Data: pCi/L

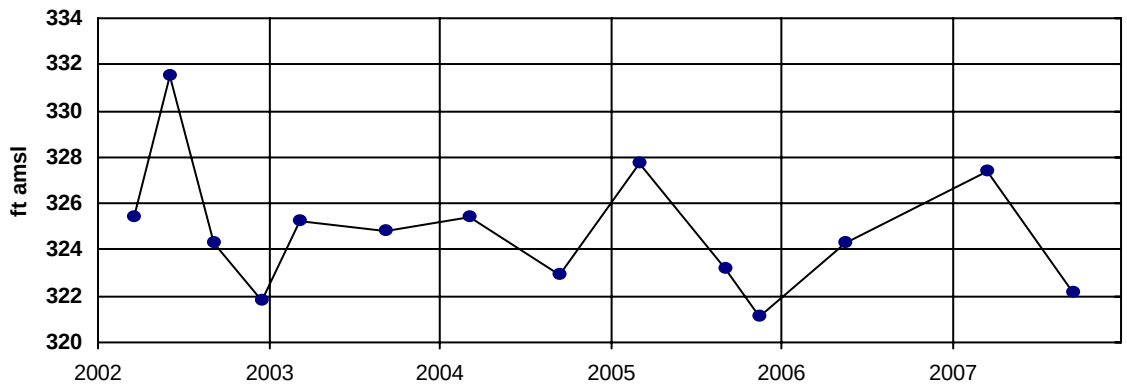
03/12	131
09/05	110

ND=not detected

MW139 MRGA

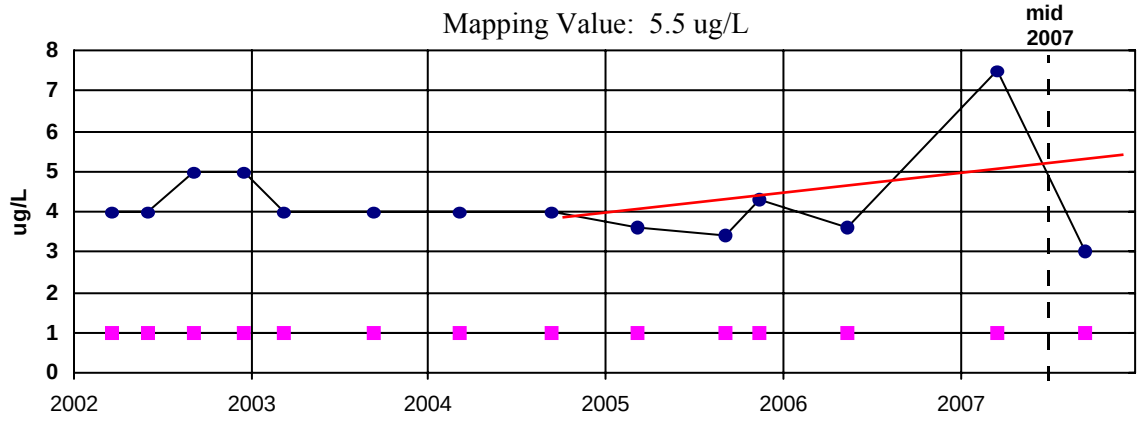
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 5.5 ug/L



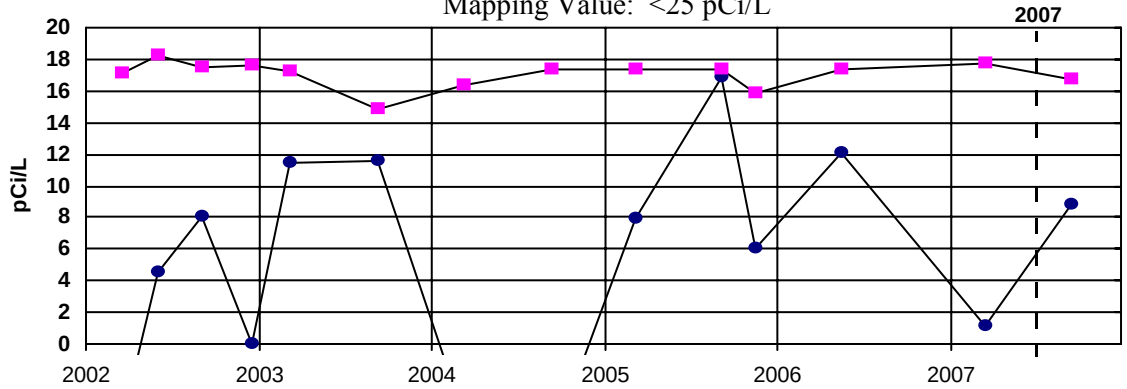
2007 Data: ug/L

03/20	7.5
09/18	3
09/18	2.9

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

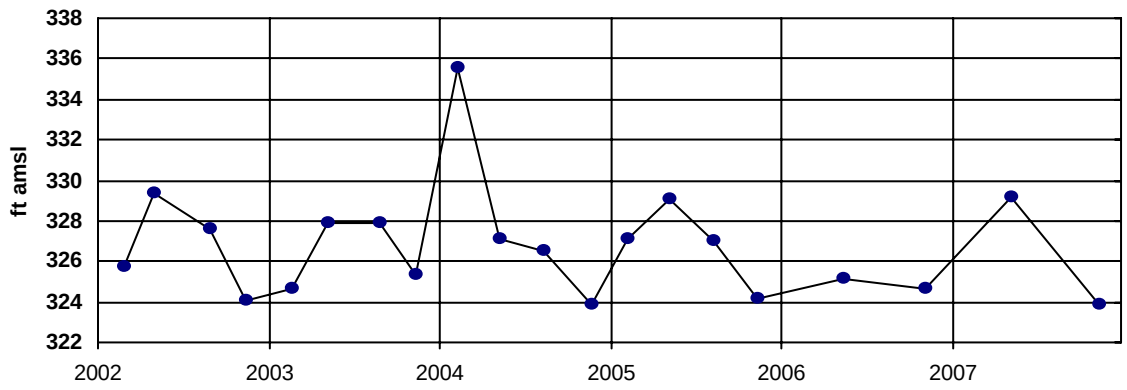
03/20	ND
09/18	ND
09/18	2.4

ND=not detected

MW145 LRGA

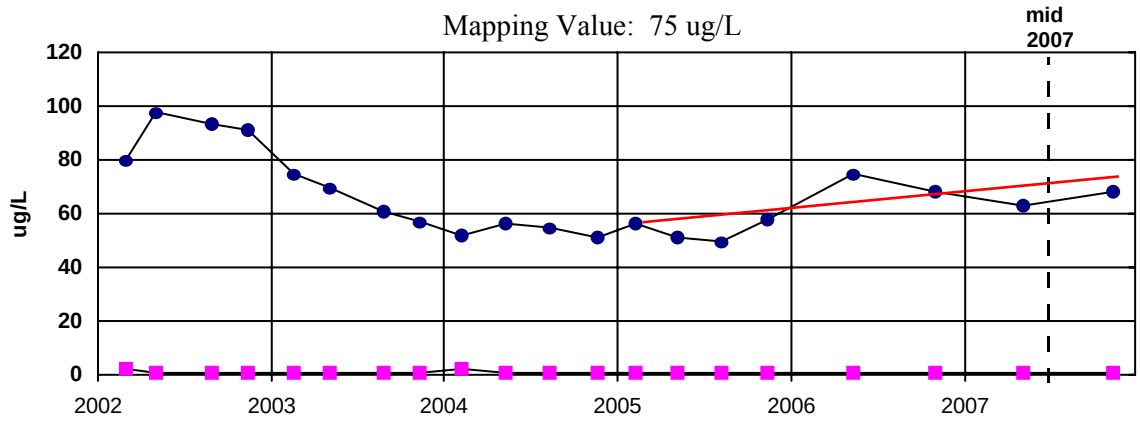
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 75 ug/L



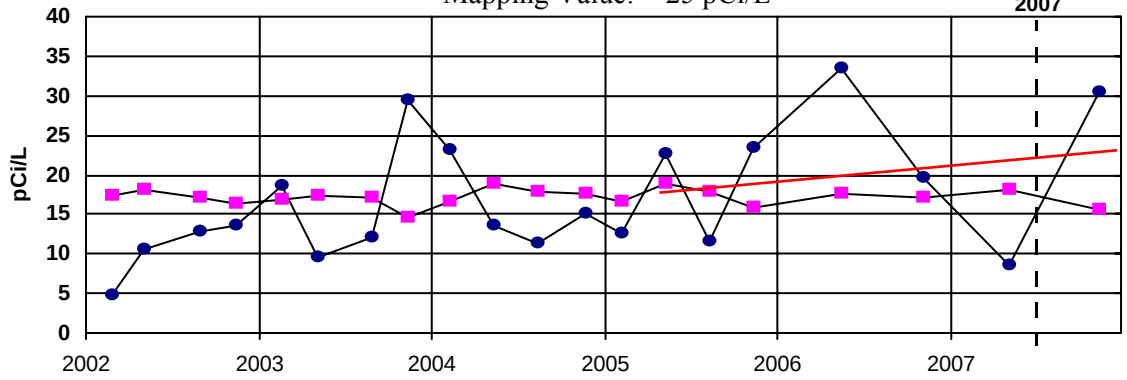
2007 Data: ug/L

05/10	63
11/13	68

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

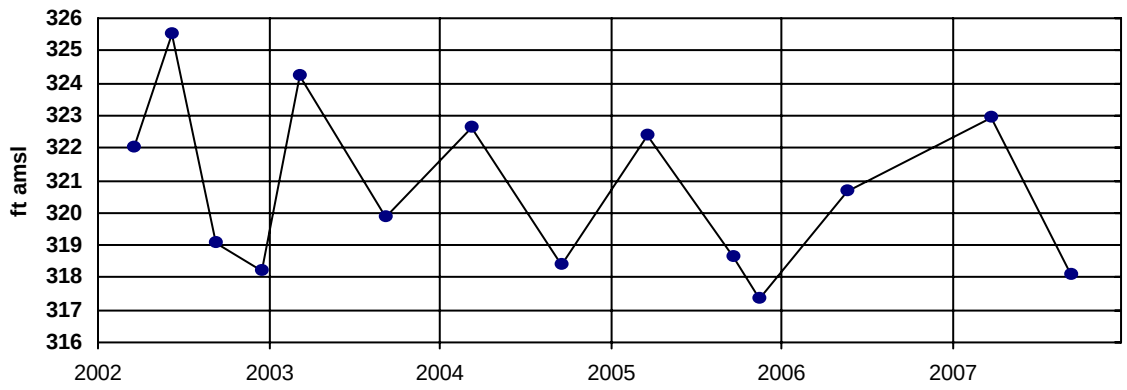
05/10	ND
11/13	30.4

ND=not detected

MW146 LRGA

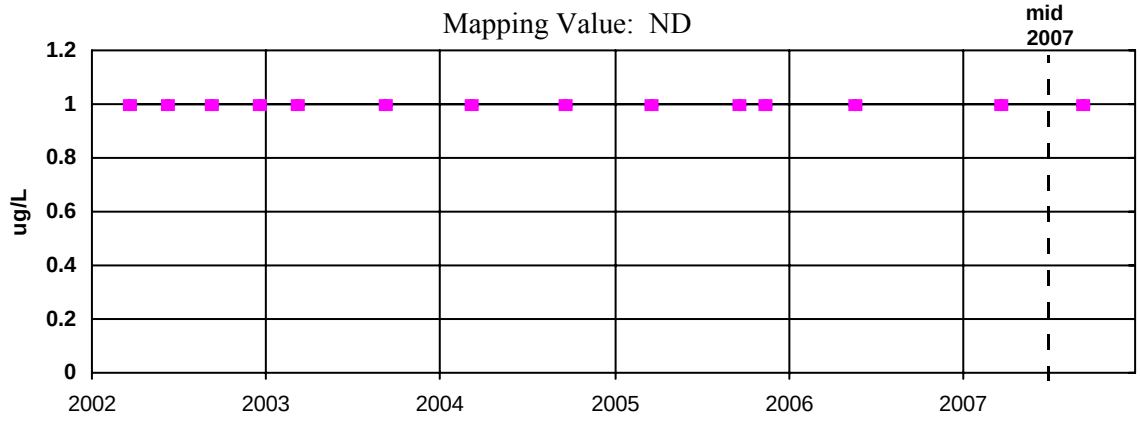
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND



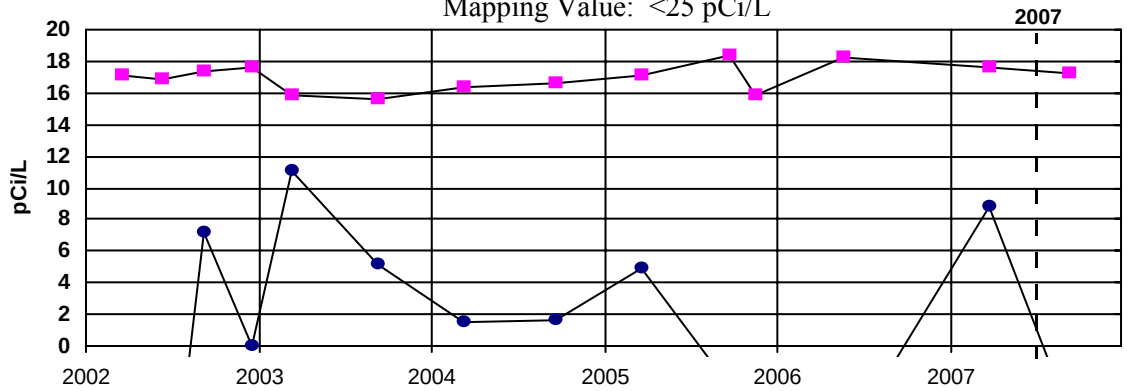
2007 Data: ug/L

03/26	ND
03/26	ND
09/13	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

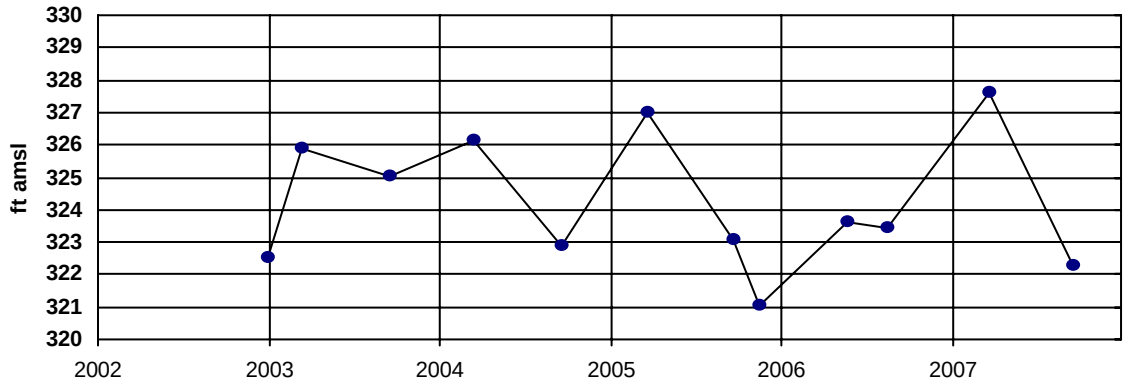
03/26	ND
03/26	ND
09/13	ND

ND=not detected

MW148 MRGA

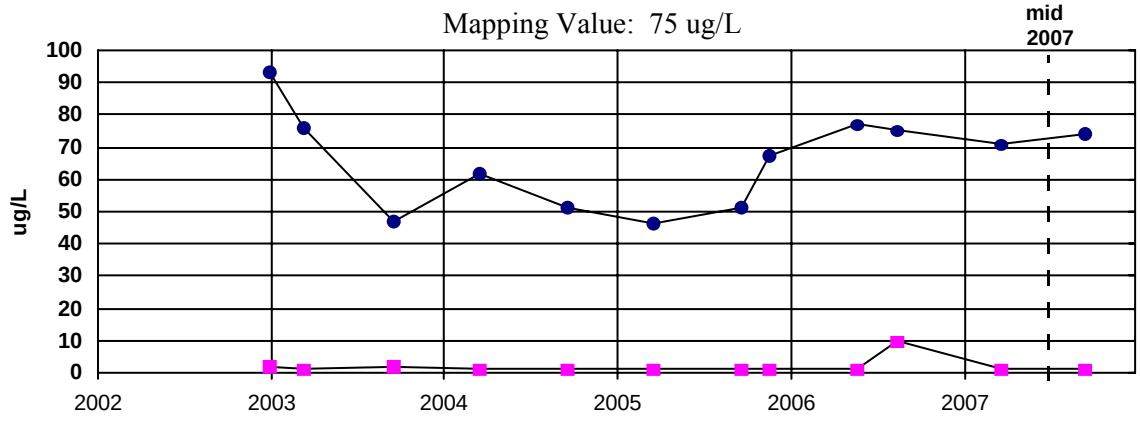
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 75 ug/L



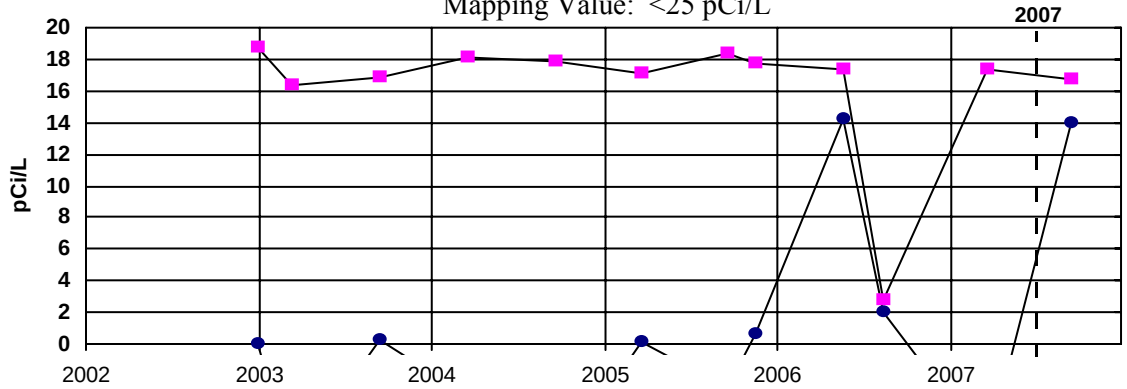
2007 Data: ug/L

03/22	71
09/18	74

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

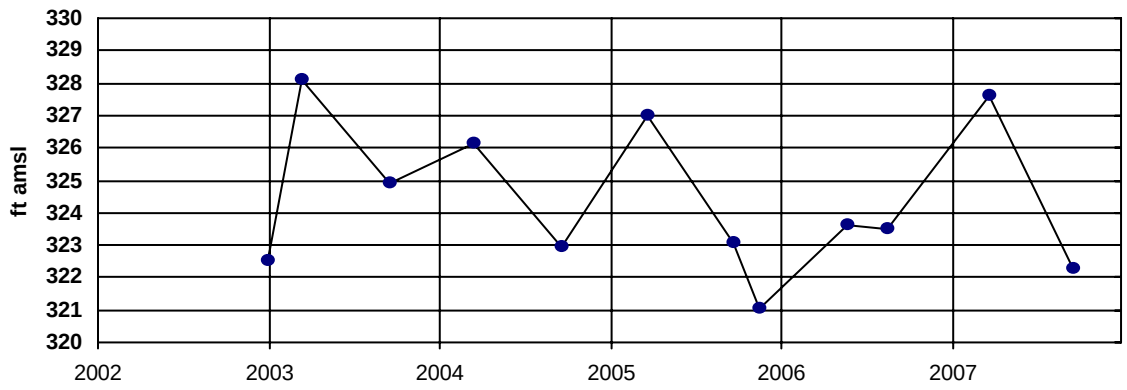
03/22	ND
09/18	ND

ND=not detected

MW149 URGA

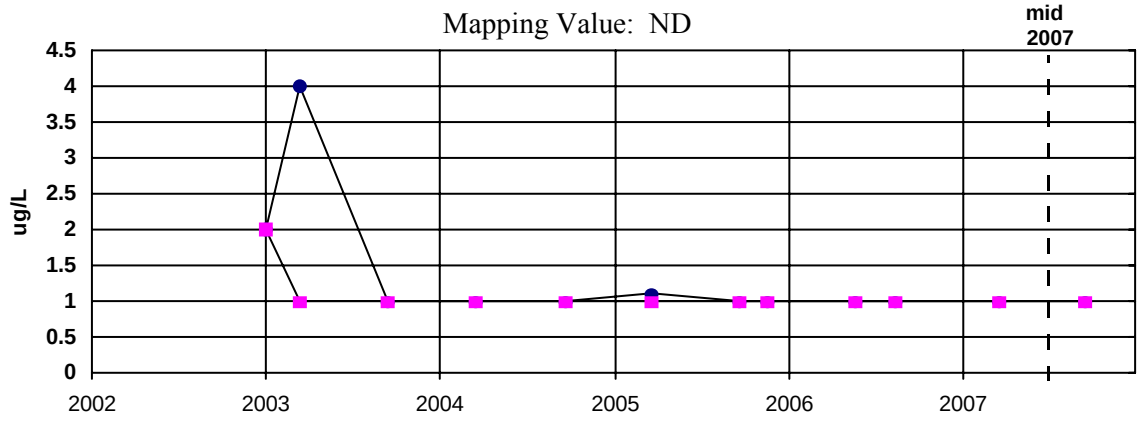
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND



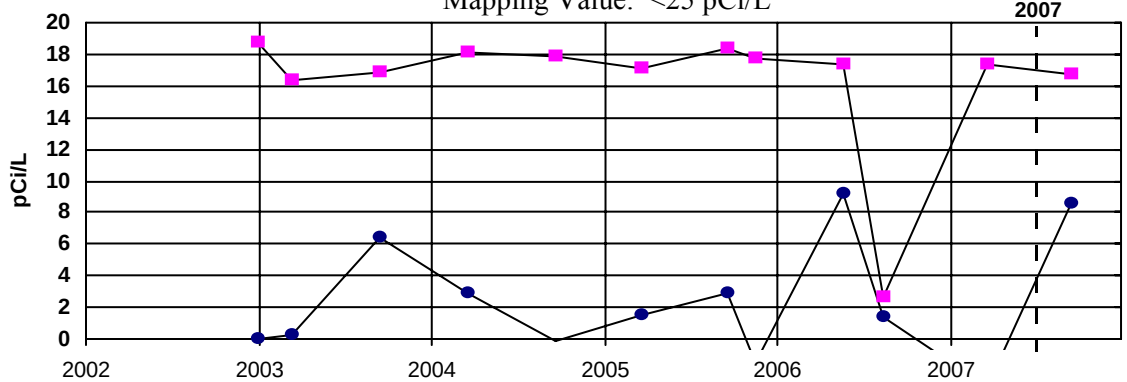
2007 Data: ug/L

03/22	ND
09/18	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

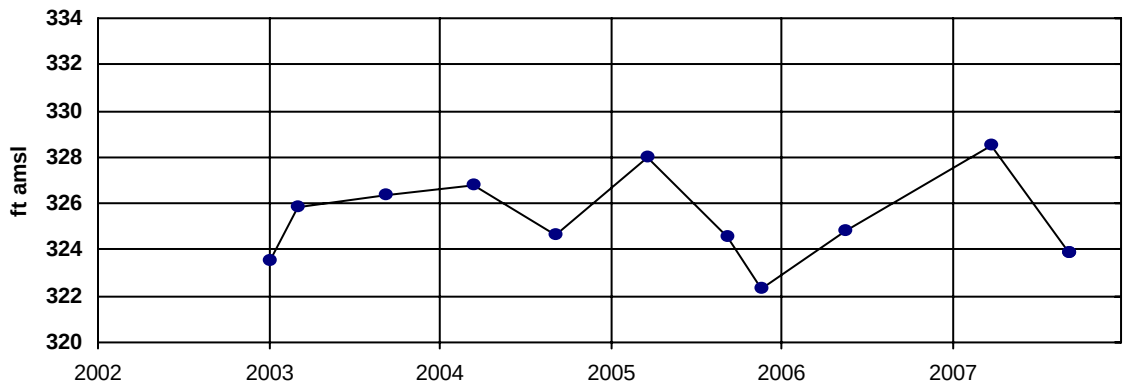
03/22	ND
09/18	ND

ND=not detected

MW150 LRGA

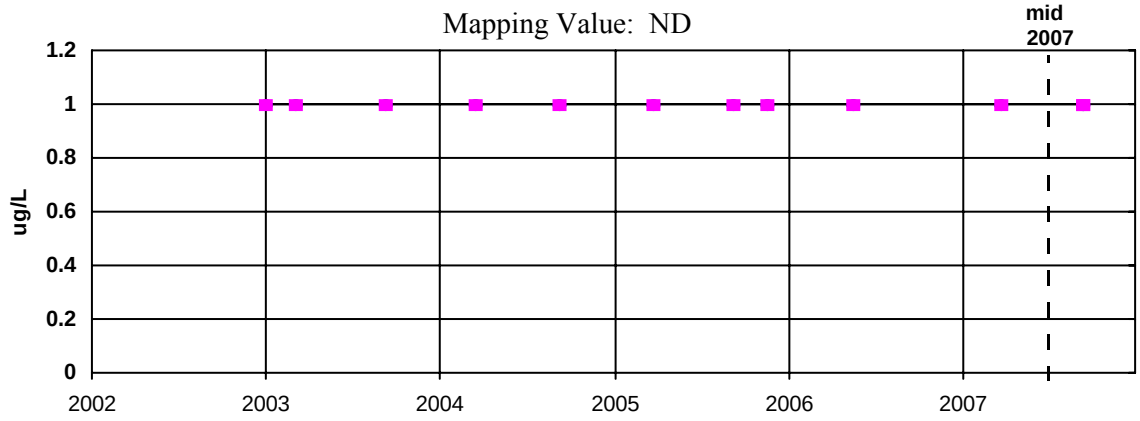
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

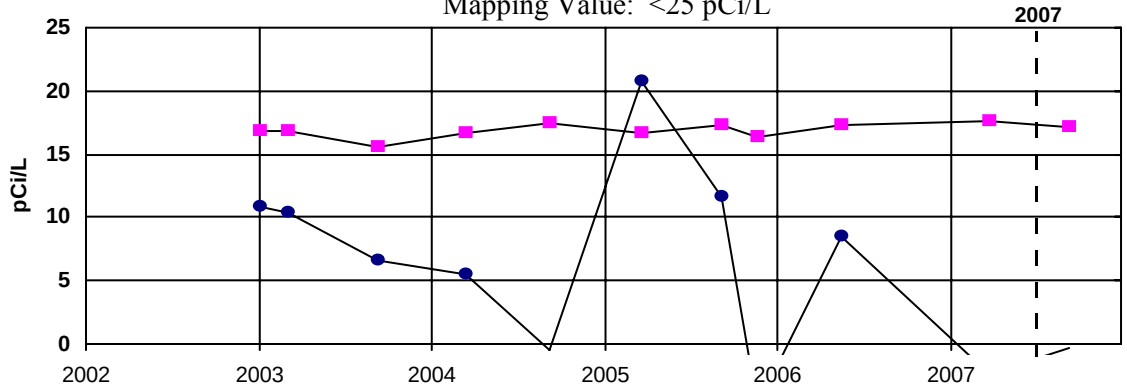


2007 Data:	ug/L
03/26	ND
09/11	ND
09/12	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



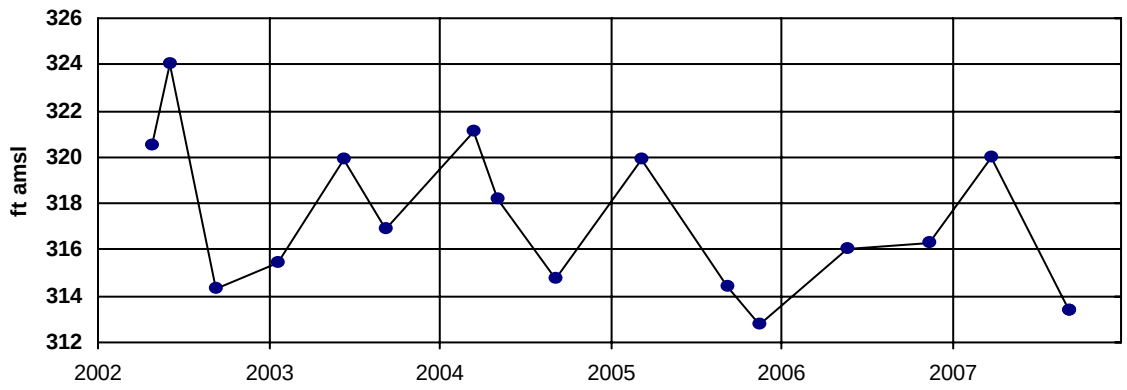
2007 Data:	pCi/L
03/26	ND
09/11	ND
09/11	ND

ND=not detected

MW152 LRGA

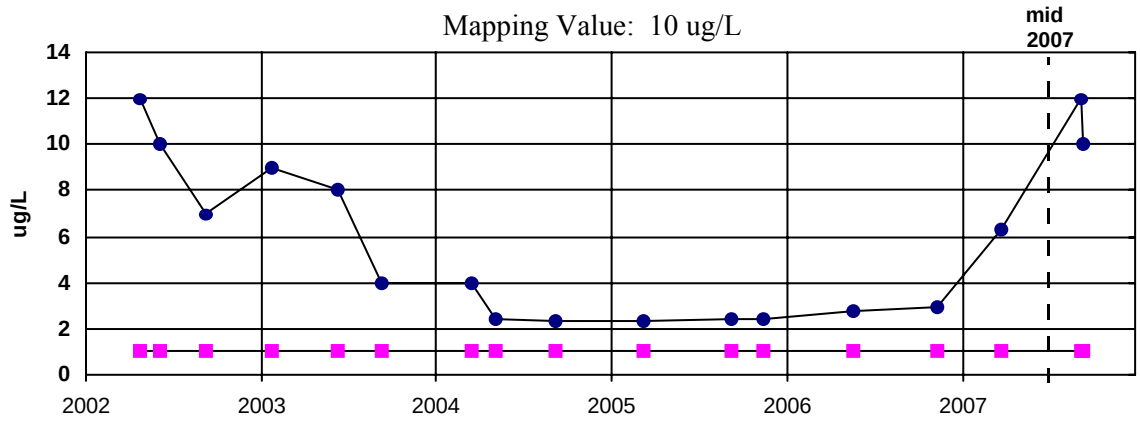
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 10 ug/L

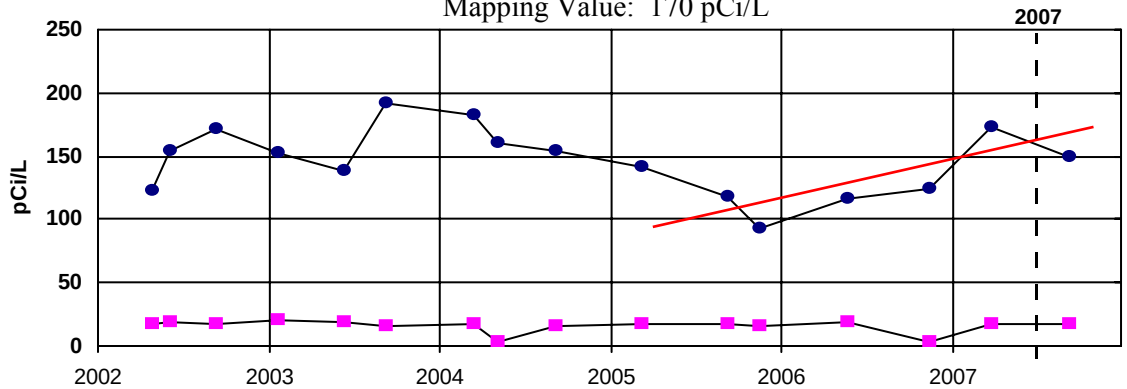


2007 Data:	ug/L
03/26	6.3
09/11	12
09/12	10

ND=not detected

Technetium-99

Mapping Value: 170 pCi/L



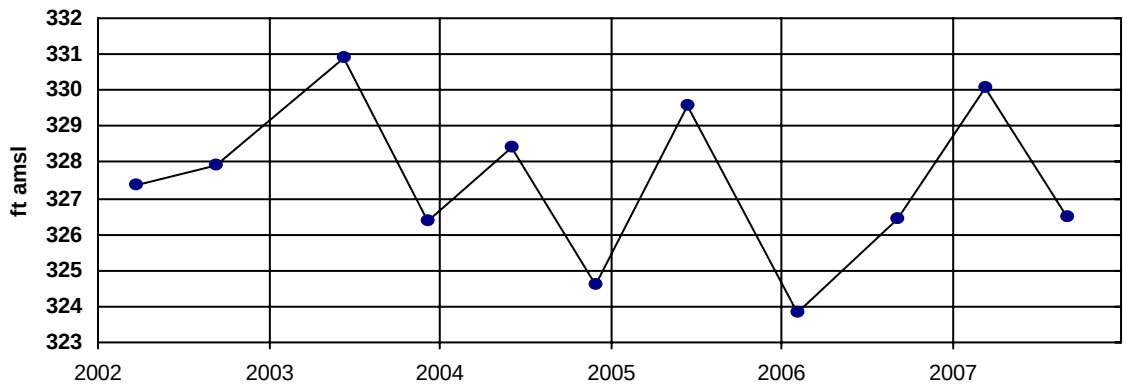
2007 Data:	pCi/L
03/26	173
09/11	121
09/11	149

ND=not detected

MW155 LRGA

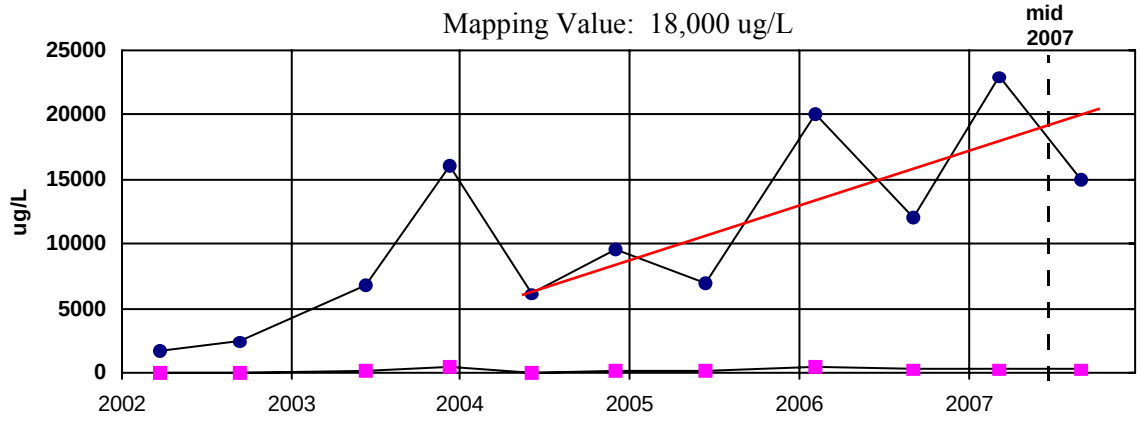
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 18,000 ug/L



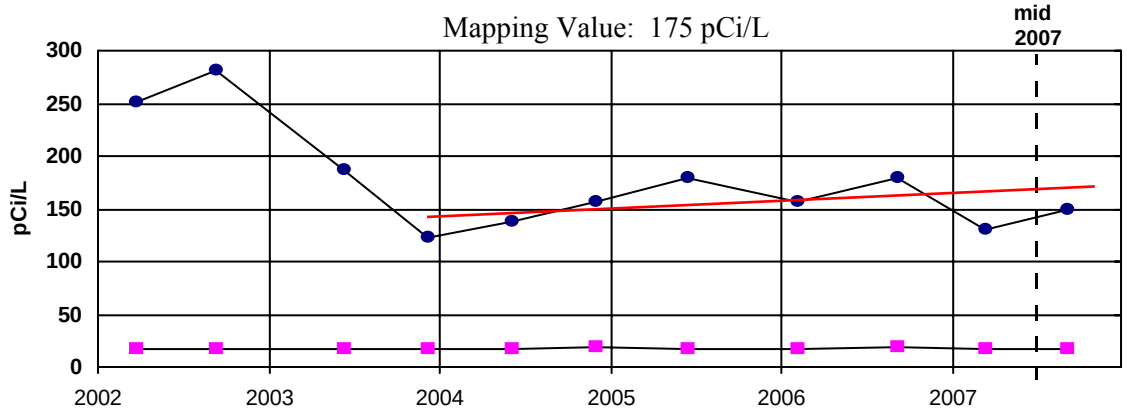
2007 Data: ug/L

03/14	23000
09/05	15000

ND=not detected

Technetium-99

Mapping Value: 175 pCi/L



Data not inluded on graphs: 9/11/2002 282 pCi/L Rejected by validation.

2007 Data: pCi/L

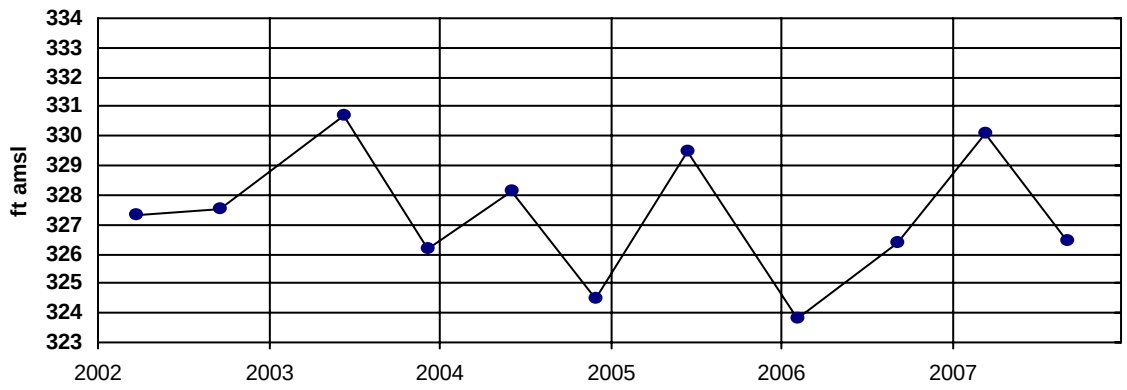
03/14	131
09/05	150

ND=not detected

MW156 URGA

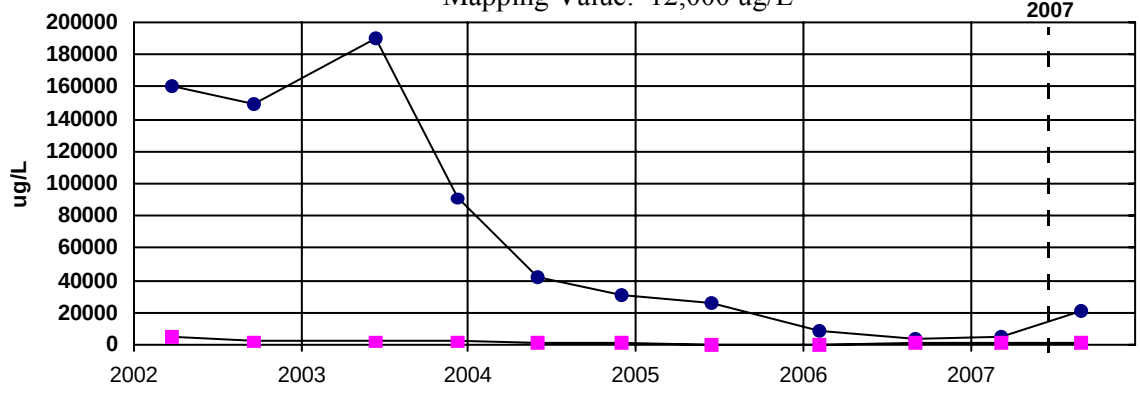
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 12,000 ug/L



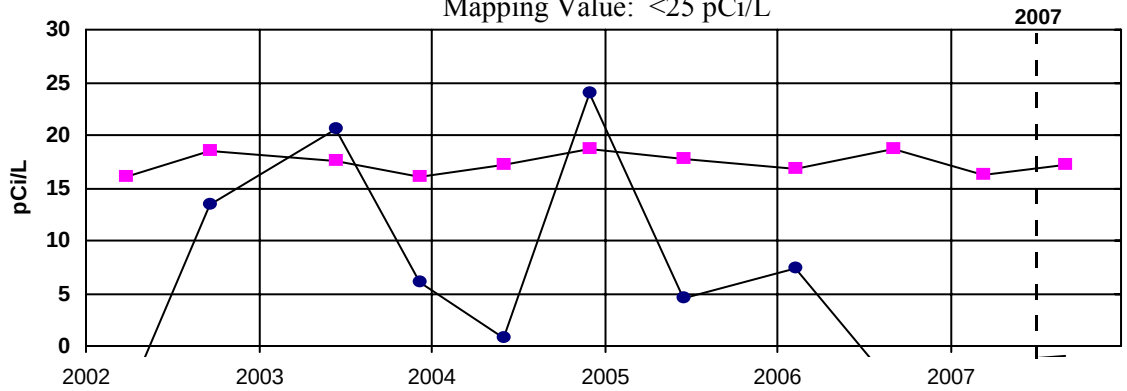
2007 Data: ug/L

03/14	4600
09/05	21000

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

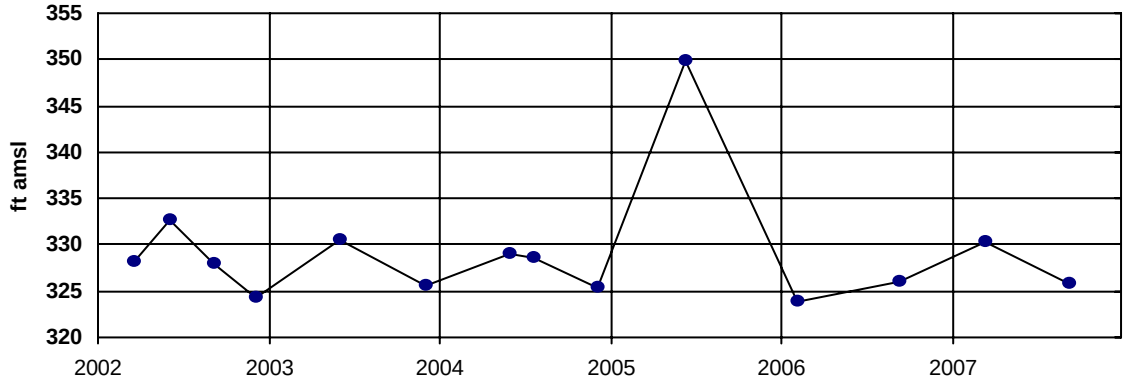
03/14	ND
09/05	ND

ND=not detected

MW161 LRGA

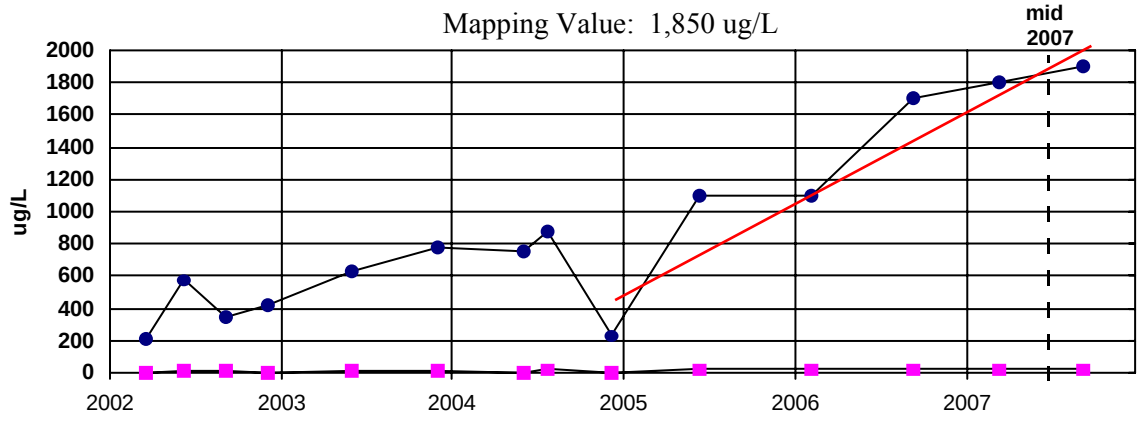
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1,850 ug/L



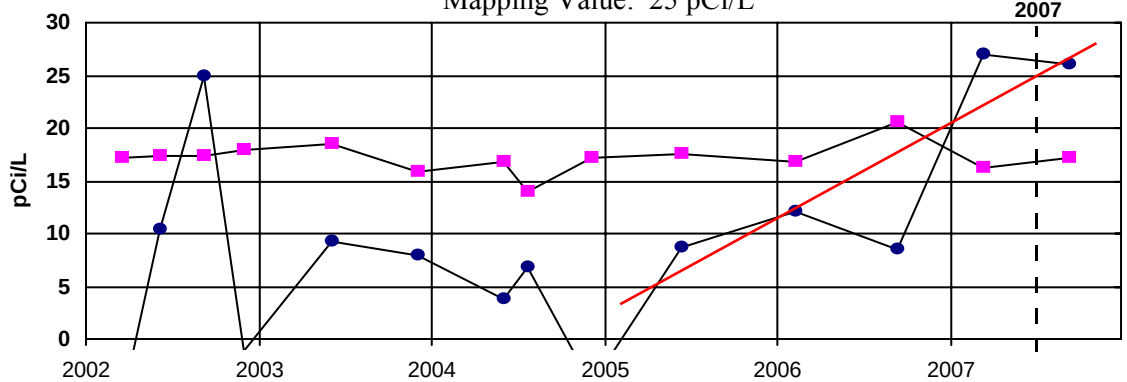
2007 Data: ug/L

03/14	1800
09/12	1900

ND=not detected

Technetium-99

Mapping Value: 25 pCi/L



2007 Data: pCi/L

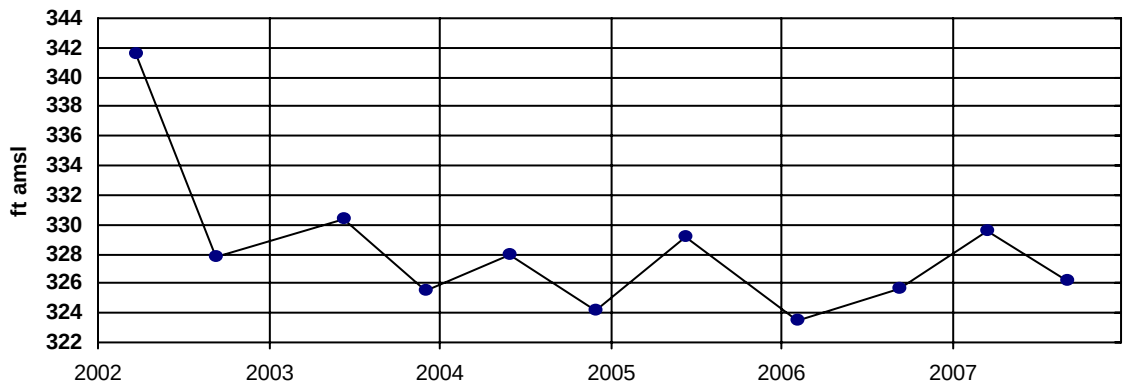
03/14	26.9
09/12	26

ND=not detected

MW163 LRGA

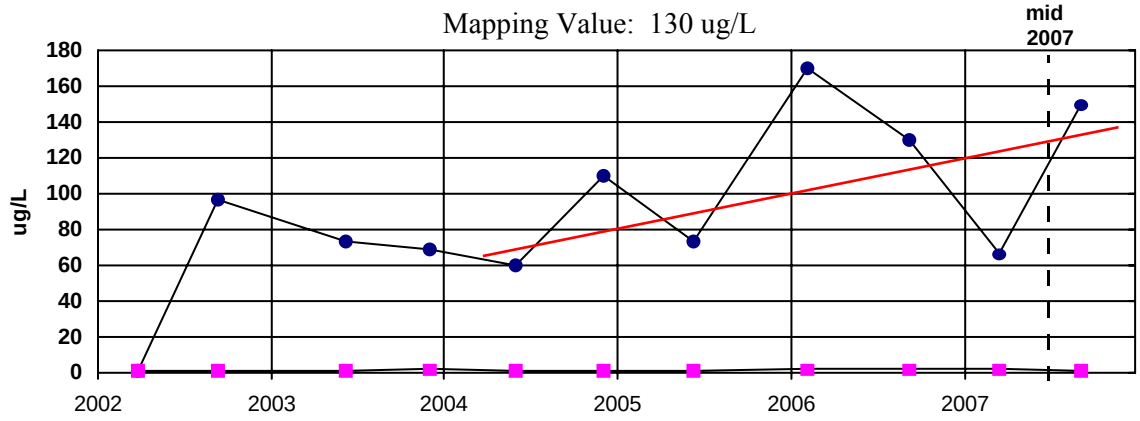
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 130 ug/L



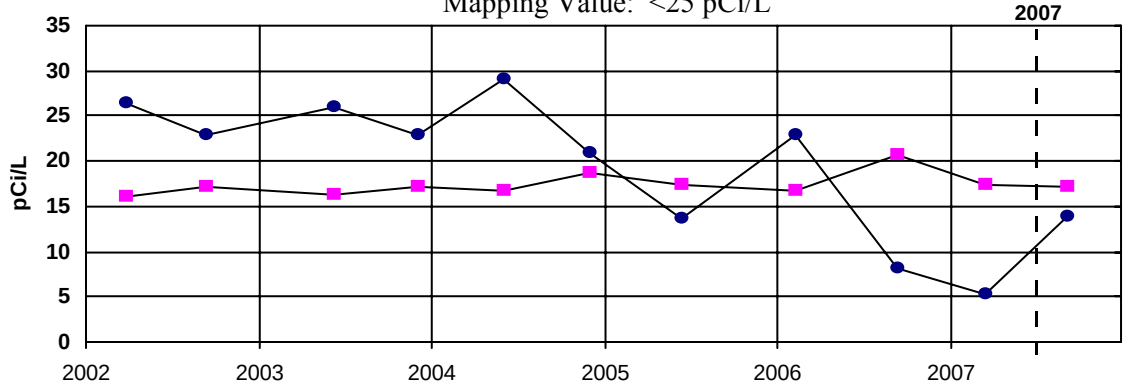
2007 Data: ug/L

03/20	67
09/06	150

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



Data not inluded on graphs: 9/10/2002 22.9 pCi/L Rejected by validation.

2007 Data: pCi/L

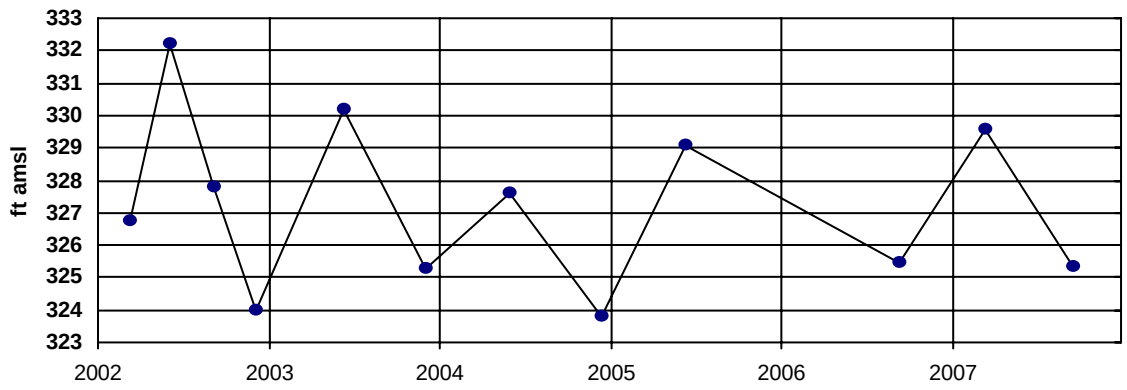
03/20	ND
09/06	ND

ND=not detected

MW165 URGA

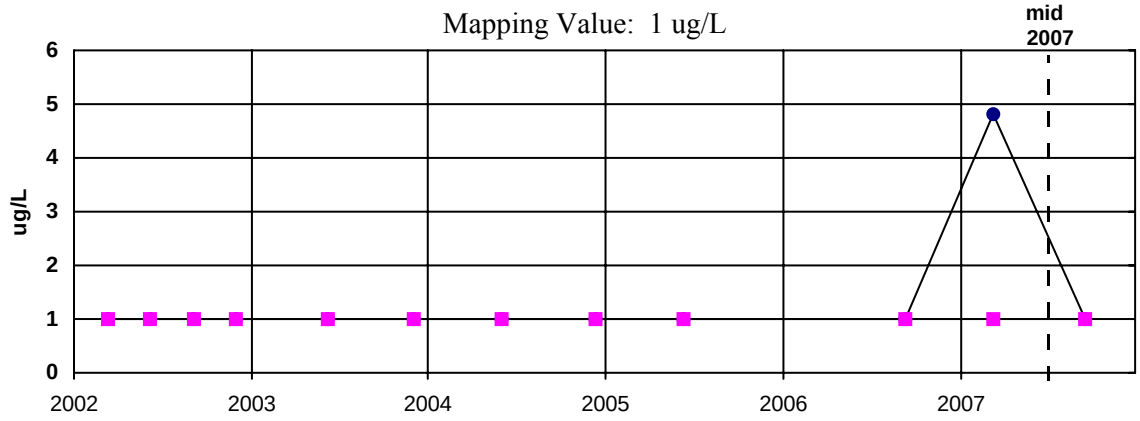
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1 ug/L



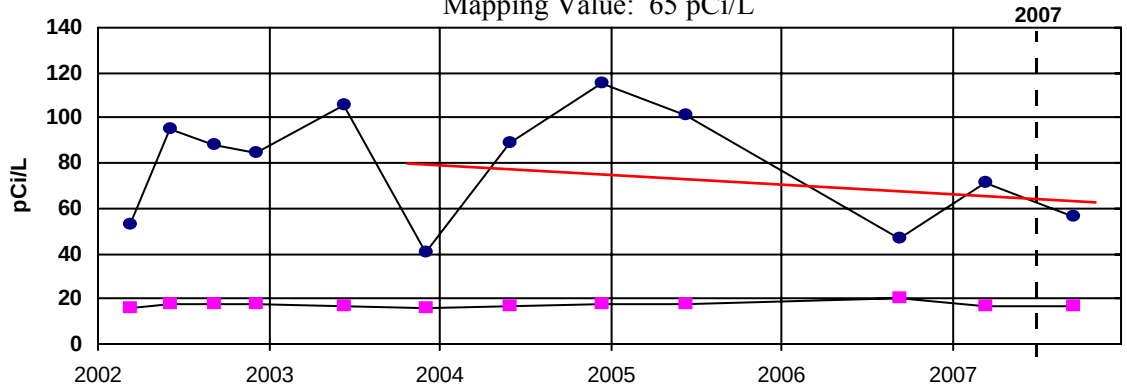
2007 Data: ug/L

03/14	4.8
09/19	ND

ND=not detected

Technetium-99

Mapping Value: 65 pCi/L



2007 Data: pCi/L

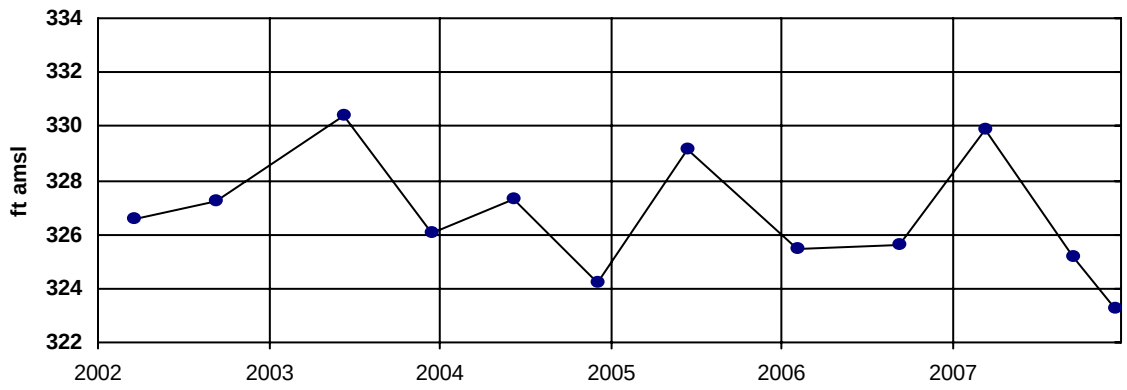
03/14	71.2
09/19	56.2

ND=not detected

MW168 URGA

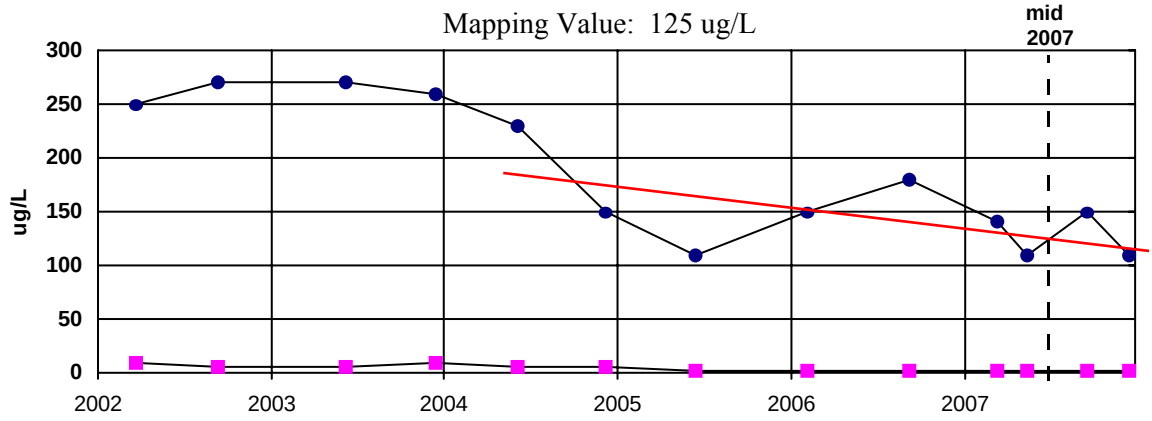
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 125 ug/L

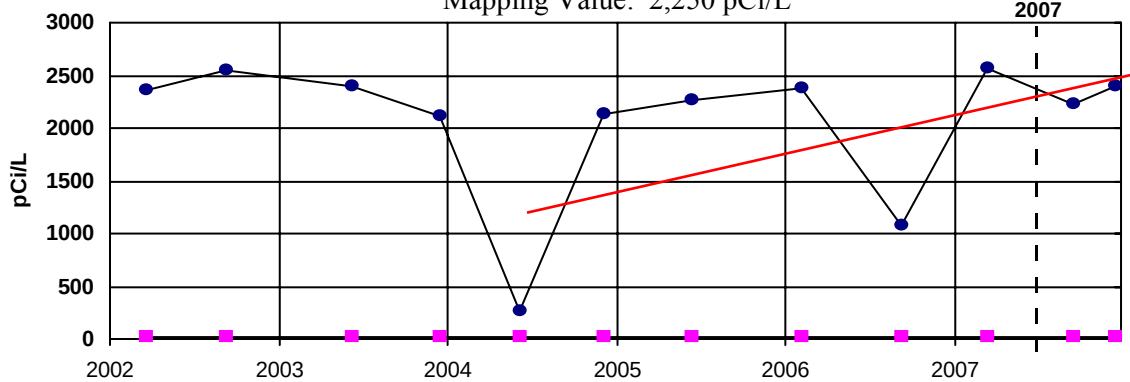


2007 Data:	ug/L
03/14	140
05/16	110
09/20	150
12/19	110

ND=not detected

Technetium-99

Mapping Value: 2,250 pCi/L



2007 Data:	pCi/L
03/14	2560
09/20	2220
12/19	2400

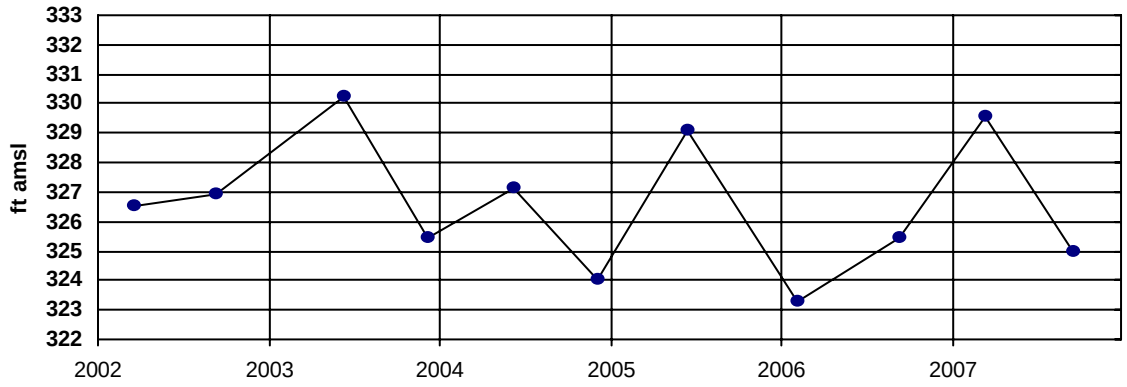
Data not inluded on graphs:			
	9/11/2002	2540 pCi/L	Rejected by validation.
	9/11/2002	2450 pCi/L	Rejected by validation.

ND=not detected

MW169 **MRGA**

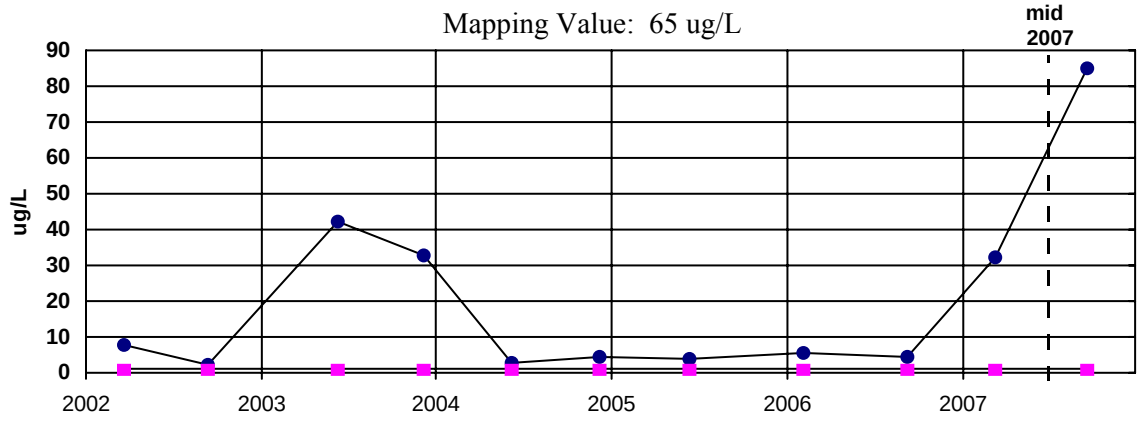
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 65 ug/L



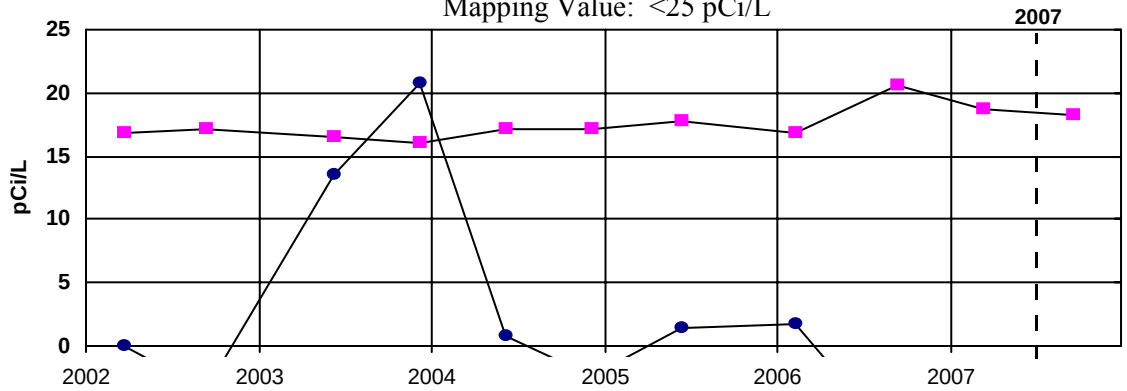
2007 Data: ug/L

03/15	32
09/20	85

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

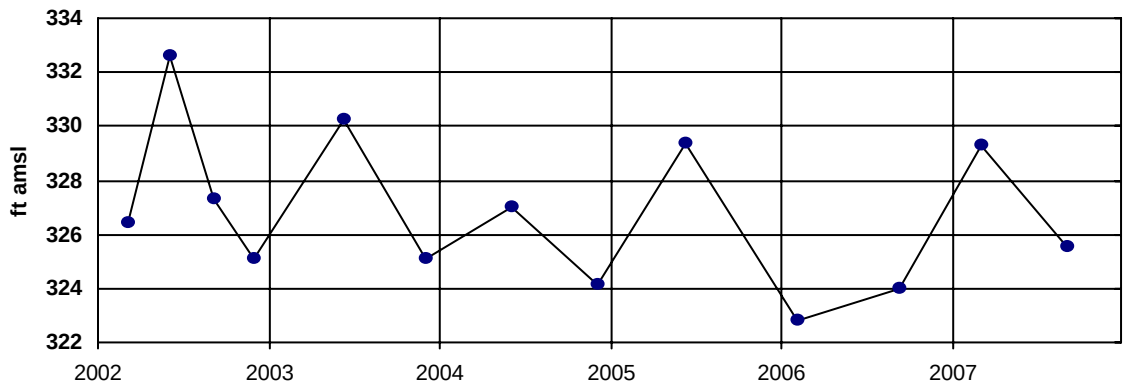
03/15	ND
09/20	ND

ND=not detected

MW173 URGA

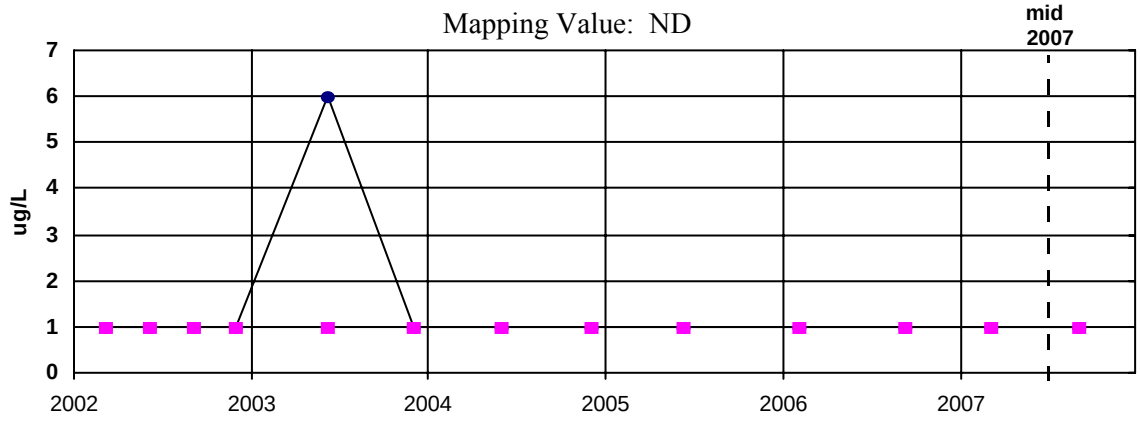
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND



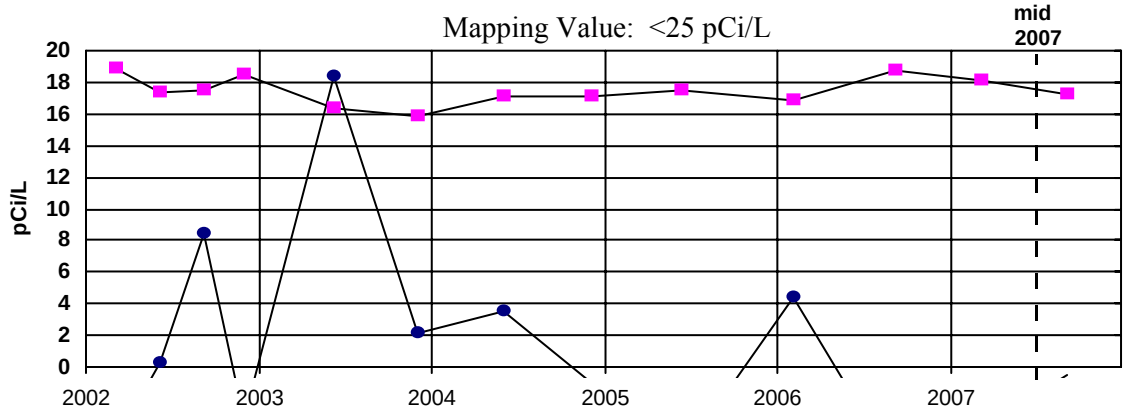
2007 Data: ug/L

03/08	ND
09/06	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

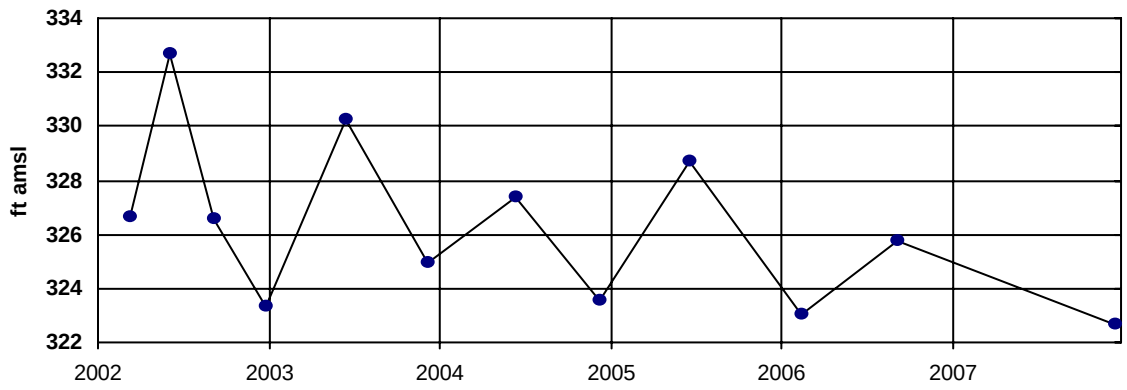
03/08	ND
09/06	ND

ND=not detected

MW185 MRGA

Result | Detection Limit | Trend Line

Water Level Elevation

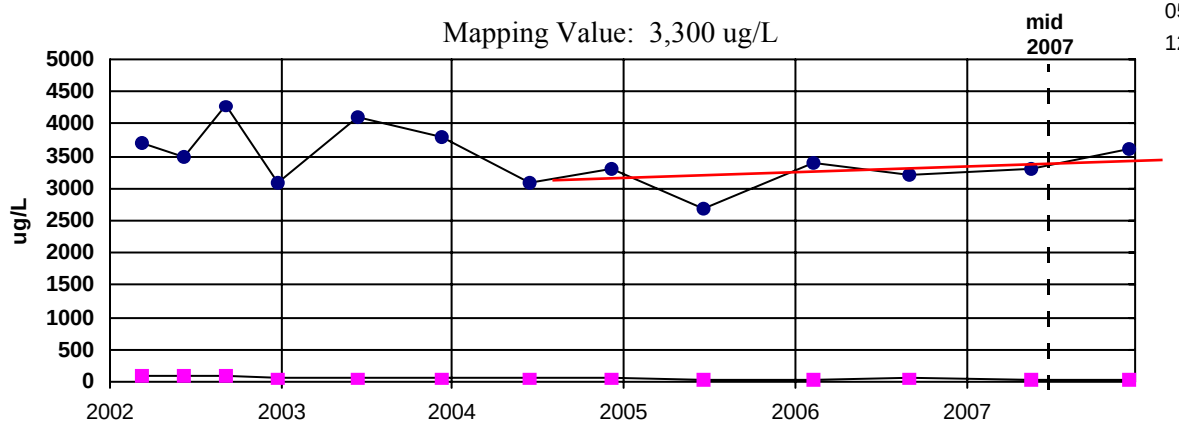


Trichloroethene

Mapping Value: 3,300 ug/L

2007 Data: ug/L

05/23	3300
12/19	3600



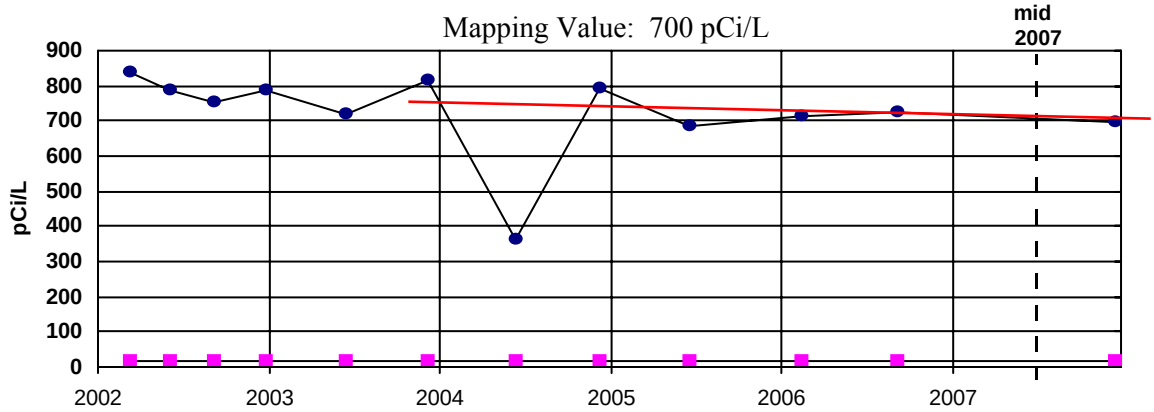
ND=not detected

Technetium-99

Mapping Value: 700 pCi/L

2007 Data: pCi/L

12/19	696

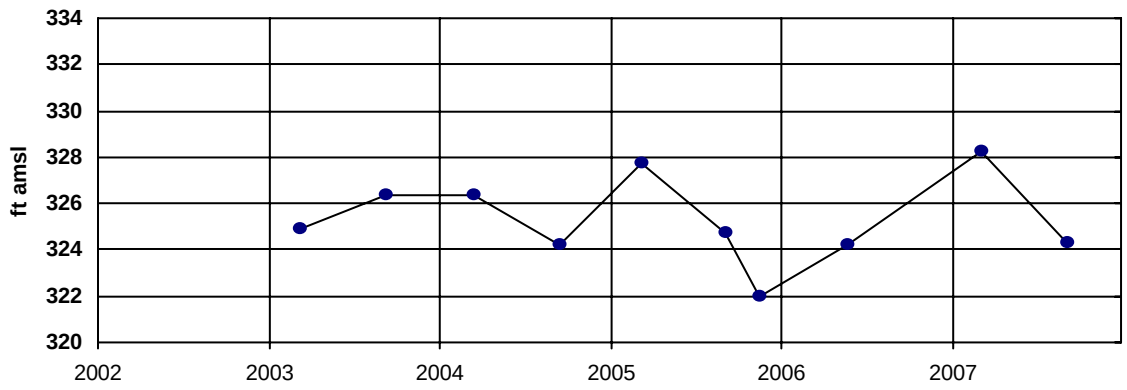


ND=not detected

MW191 MRGA

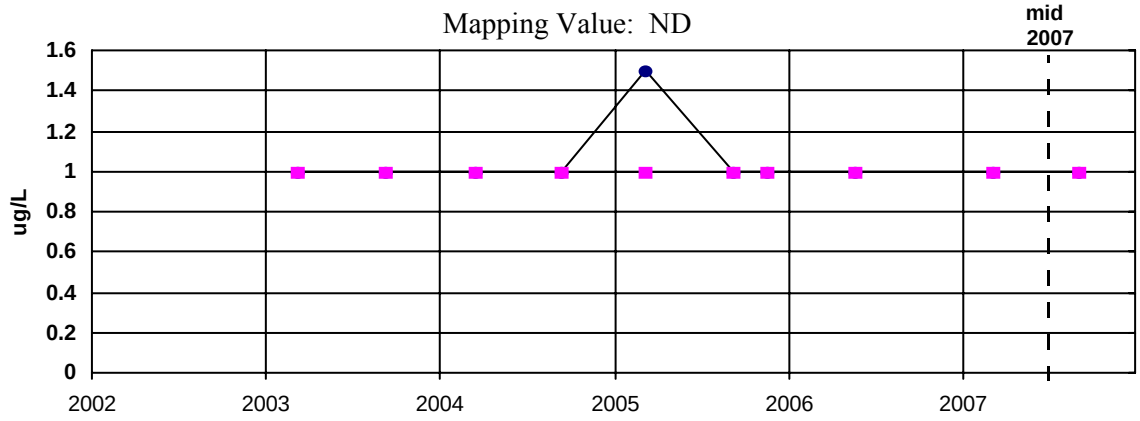
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND



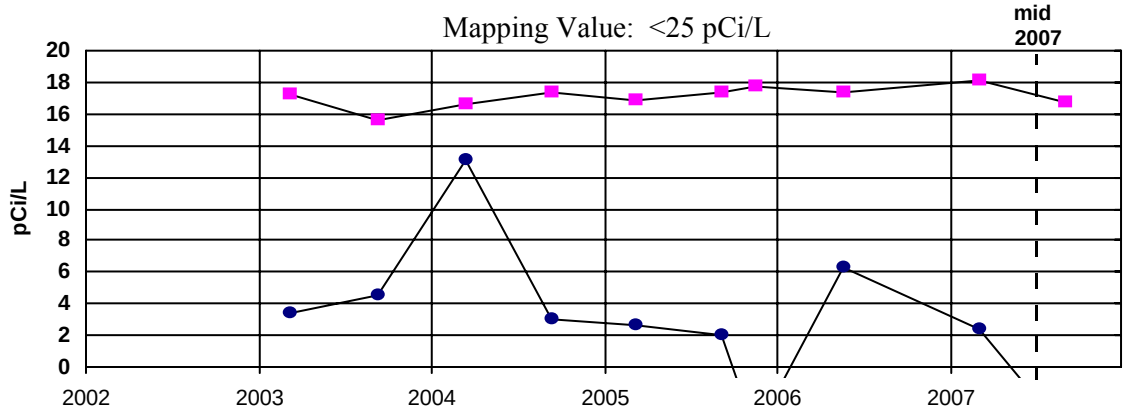
2007 Data: ug/L

03/07	ND
09/05	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

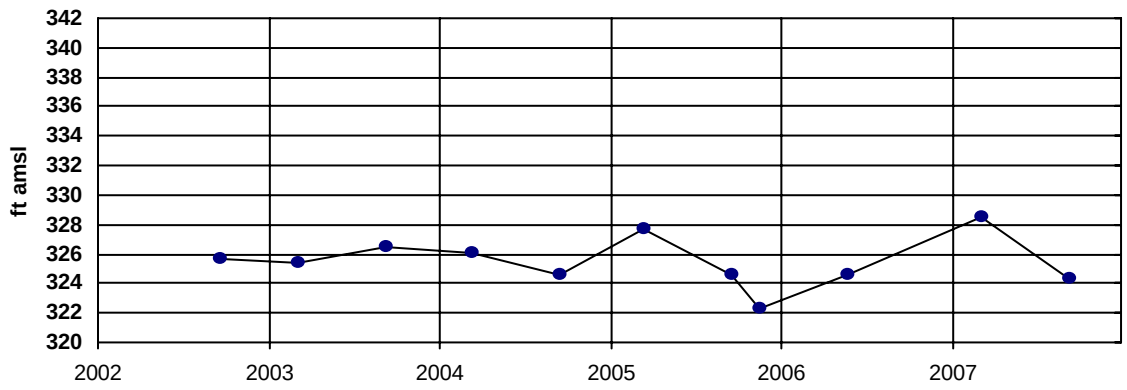
03/07	ND
09/05	ND

ND=not detected

MW193 MRGA

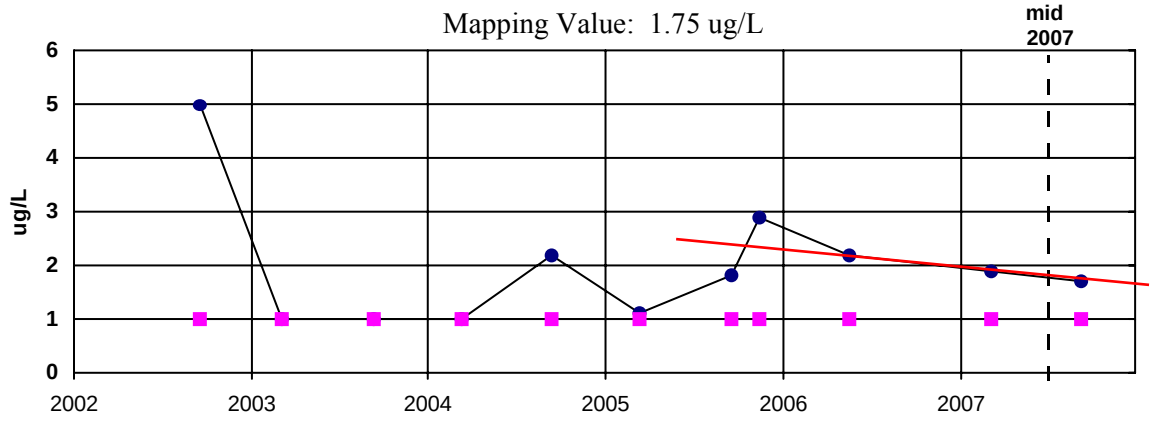
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1.75 ug/L



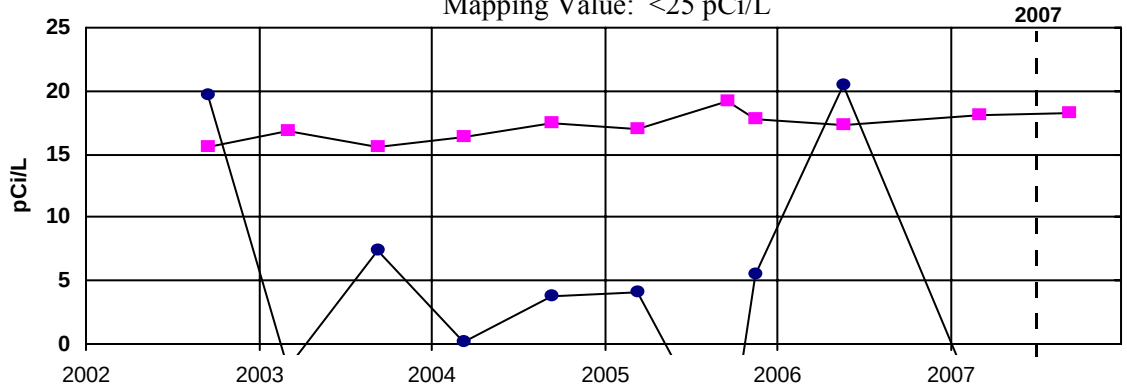
2007 Data: ug/L

03/07	1.9
09/12	1.7

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

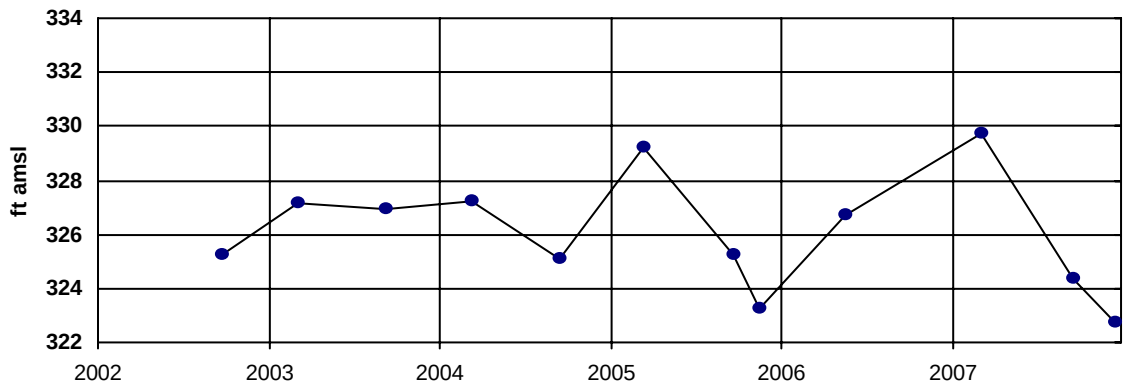
03/07	ND
09/12	ND

ND=not detected

MW194 MRGA

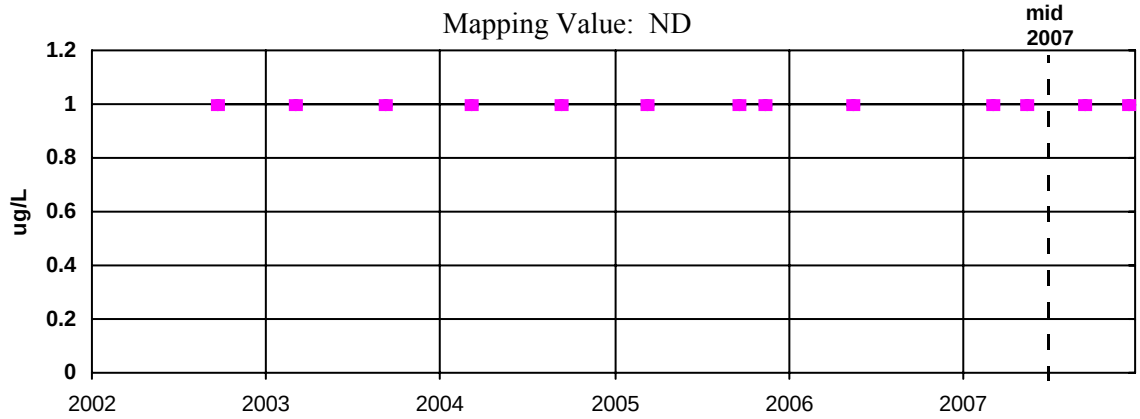
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

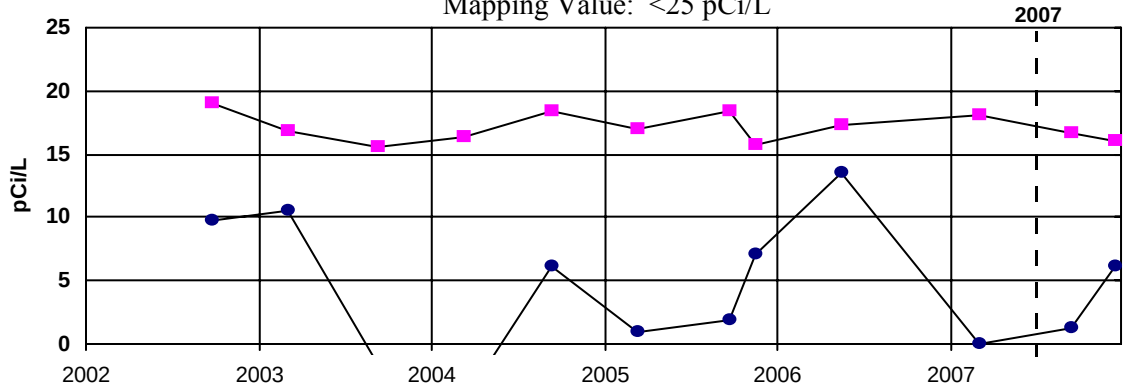


2007 Data:	ug/L
03/07	ND
05/17	ND
09/18	ND
09/18	ND
12/19	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



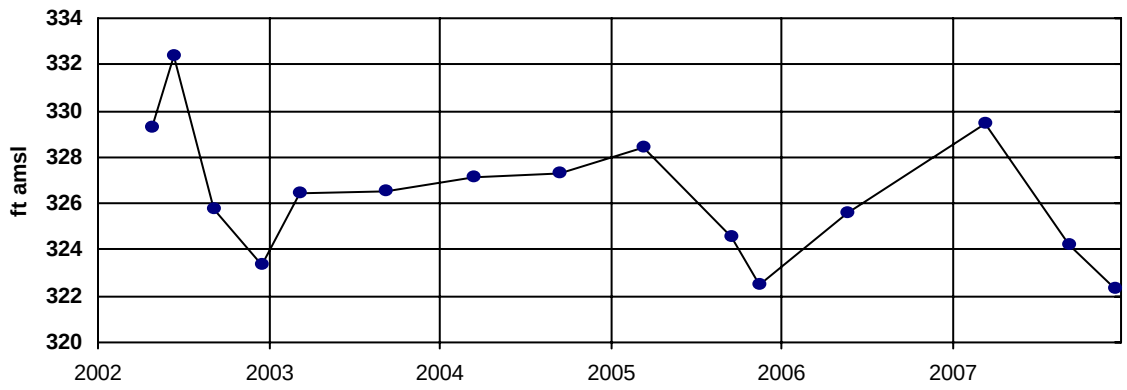
2007 Data:	pCi/L
03/07	ND
09/18	ND
09/18	ND
12/19	ND

ND=not detected

MW197 **URGA**

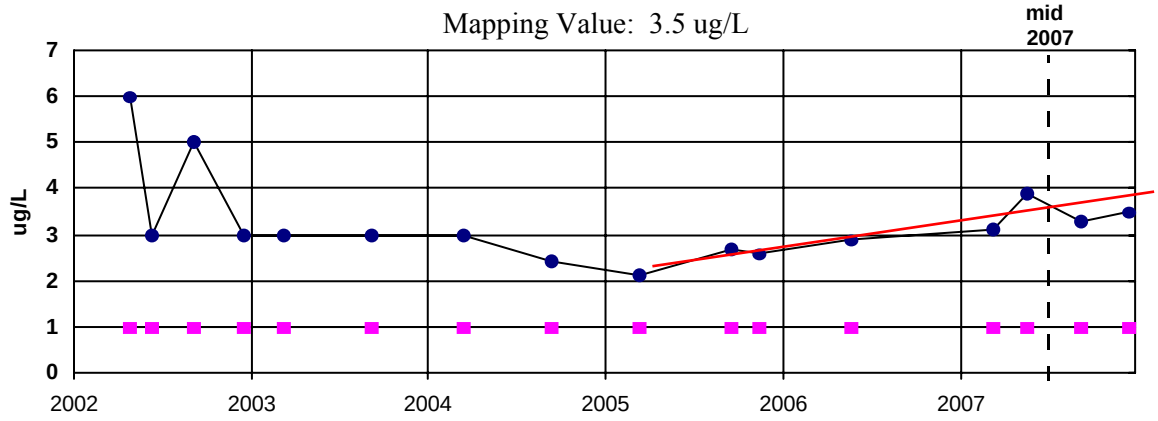
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 3.5 ug/L

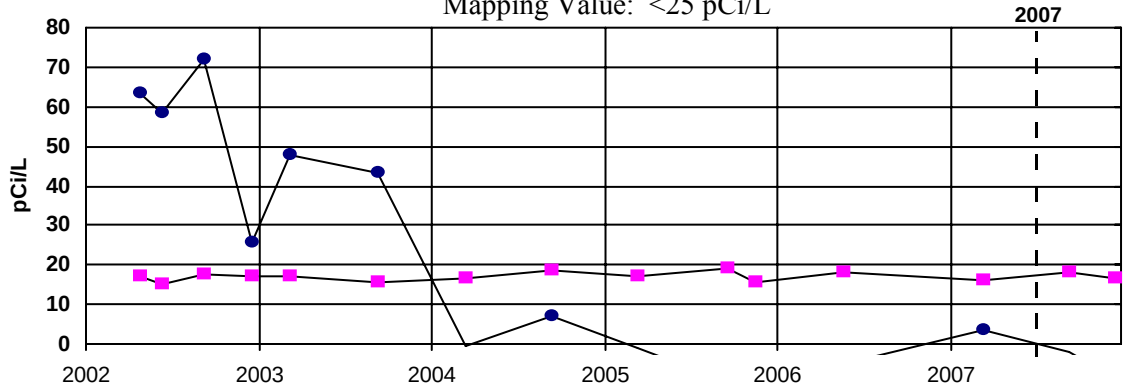


2007 Data:	ug/L
03/14	3.1
05/21	3.9
09/11	3.3
09/11	3.3
12/19	3.5

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



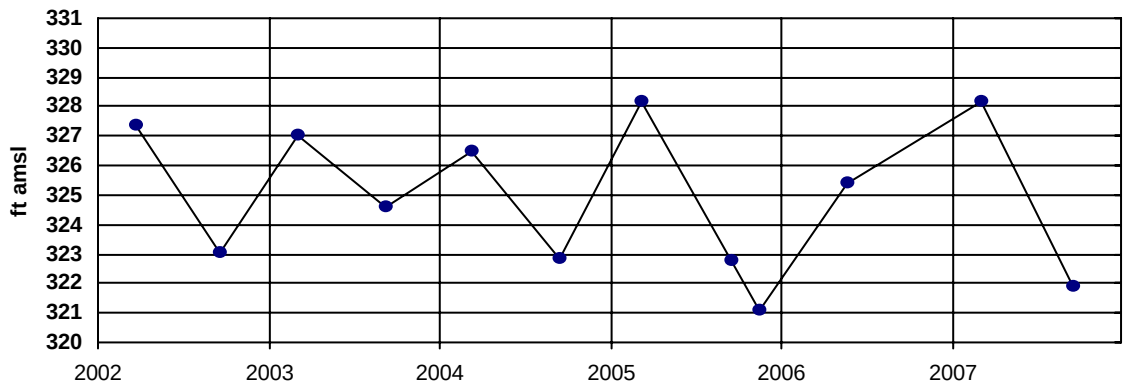
2007 Data:	pCi/L
03/14	ND
09/11	ND
09/11	ND
12/19	ND

ND=not detected

MW199 LRGA

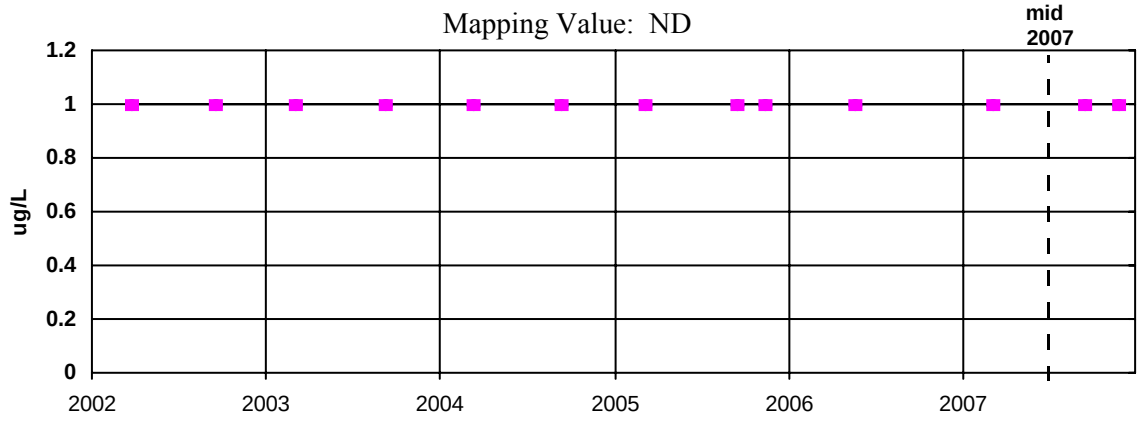
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND



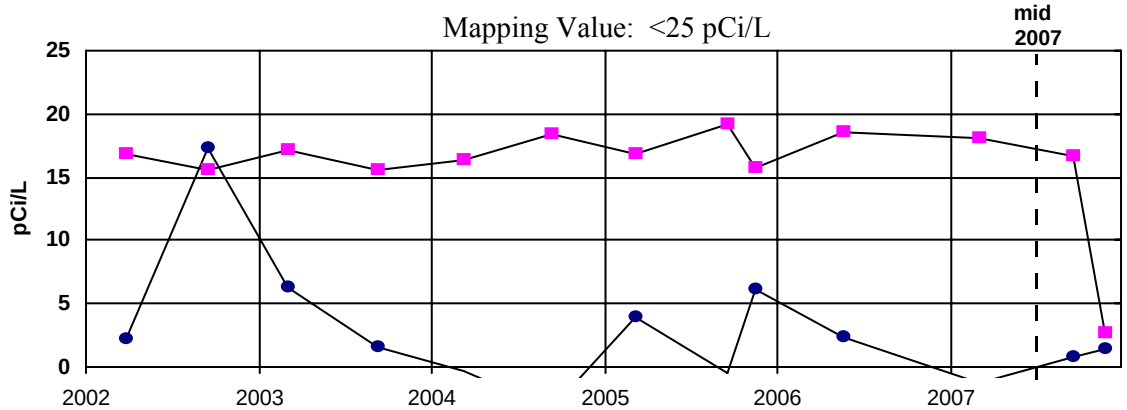
2007 Data: ug/L

03/07	ND
09/19	ND
11/27	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

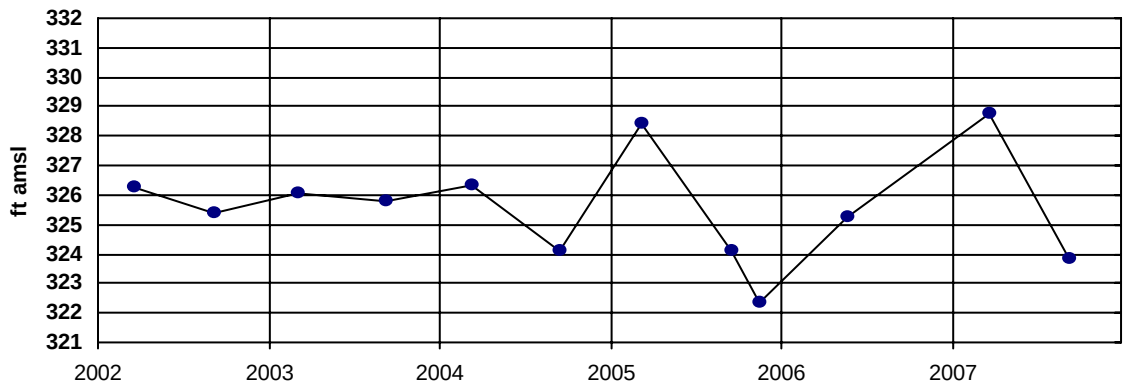
03/07	ND
09/19	ND
11/27	ND

ND=not detected

MW200 **MRGA**

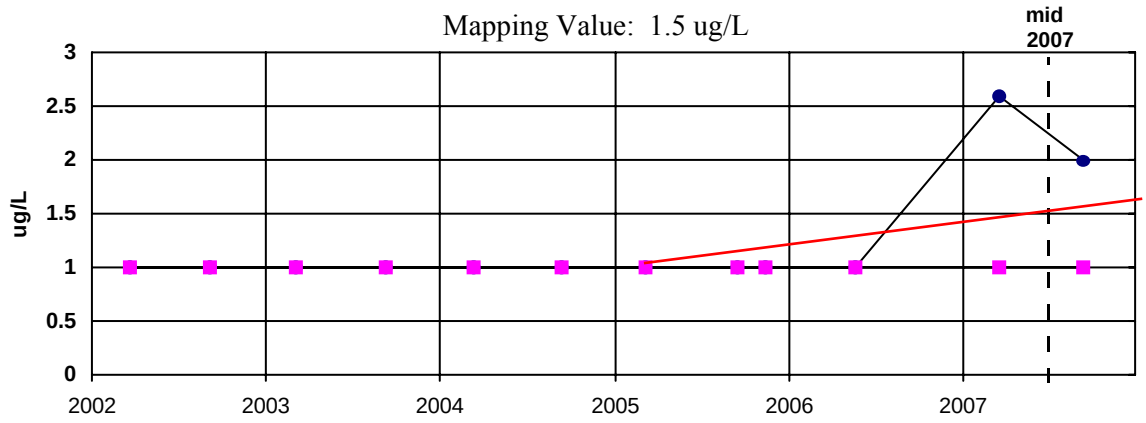
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1.5 ug/L

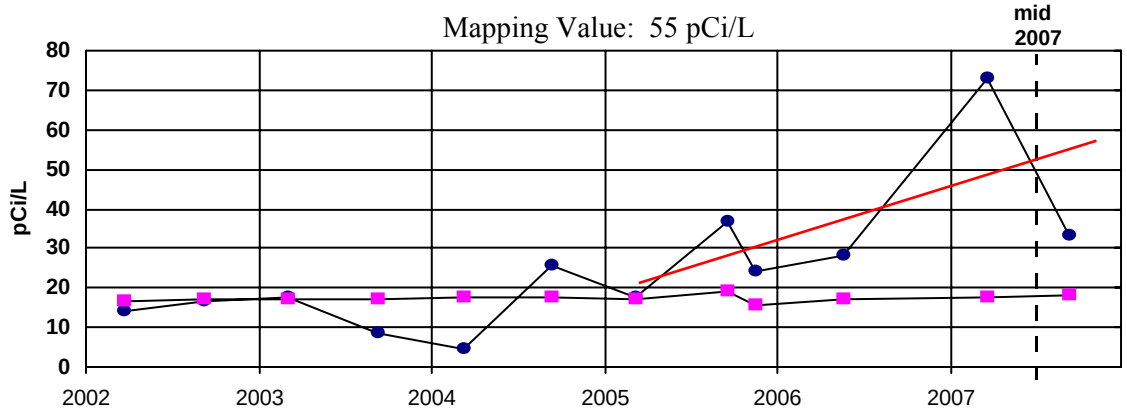


2007 Data:	ug/L
03/22	2.6
03/22	2.4
09/11	2

ND=not detected

Technetium-99

Mapping Value: 55 pCi/L



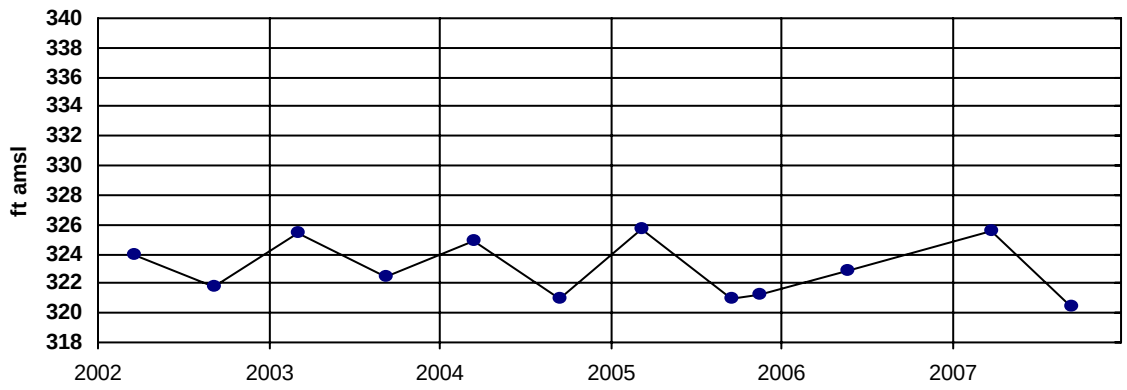
2007 Data:	pCi/L
03/22	72.8
03/22	54
09/11	33.3

ND=not detected

MW201 MRGA

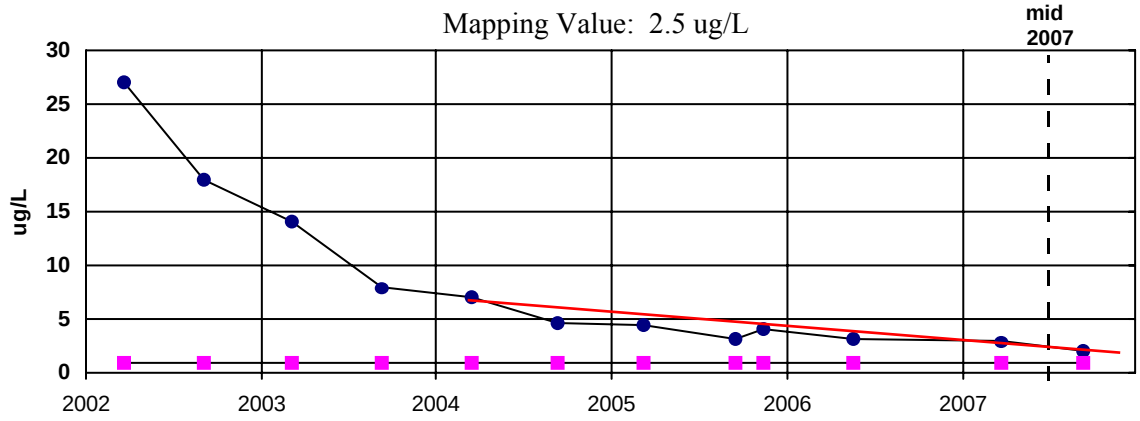
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 2.5 ug/L



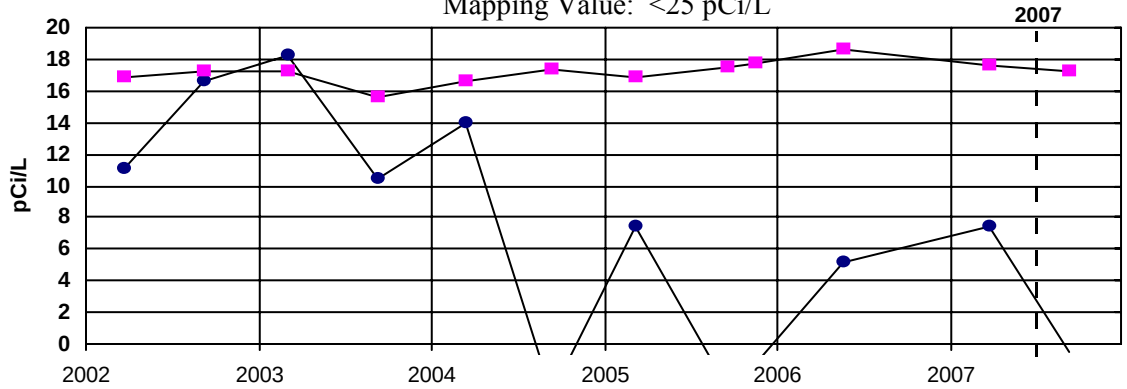
2007 Data: ug/L

03/26	3
09/13	2.1

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

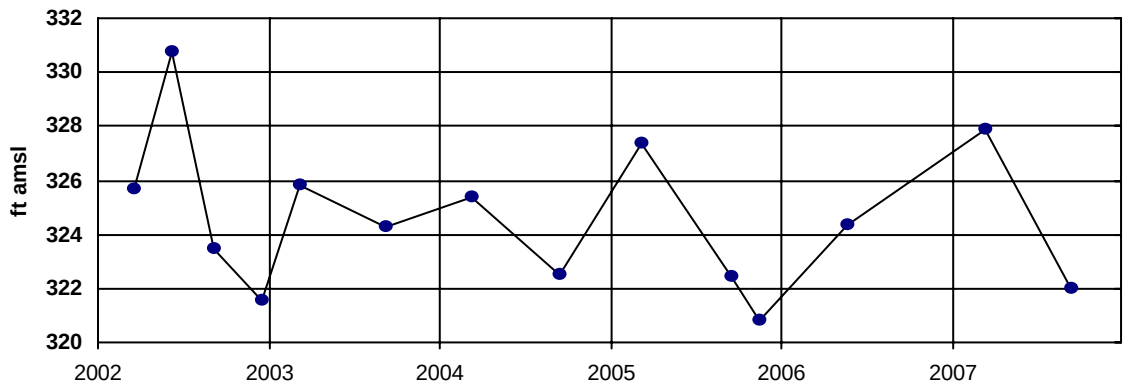
03/26	ND
09/13	ND

ND=not detected

MW202 LRGA

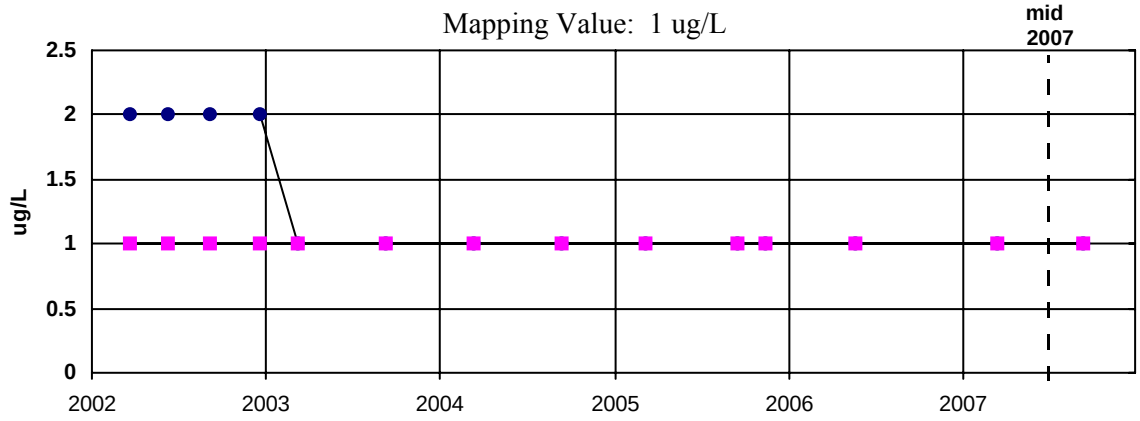
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1 ug/L



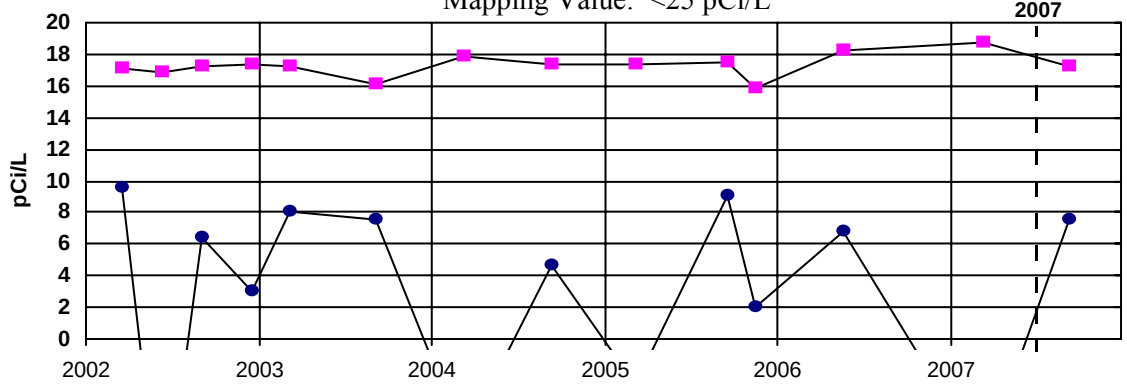
2007 Data: ug/L

03/15	1
09/13	1

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

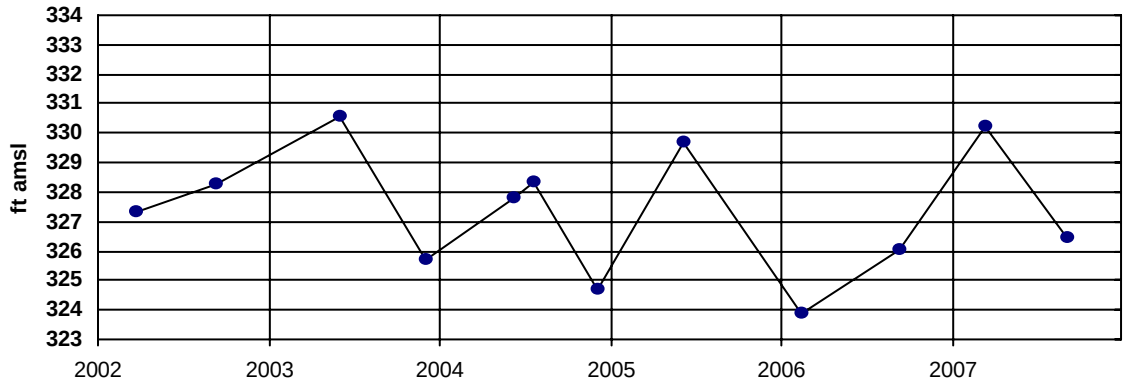
03/15	ND
09/13	ND

ND=not detected

MW203 MRGA

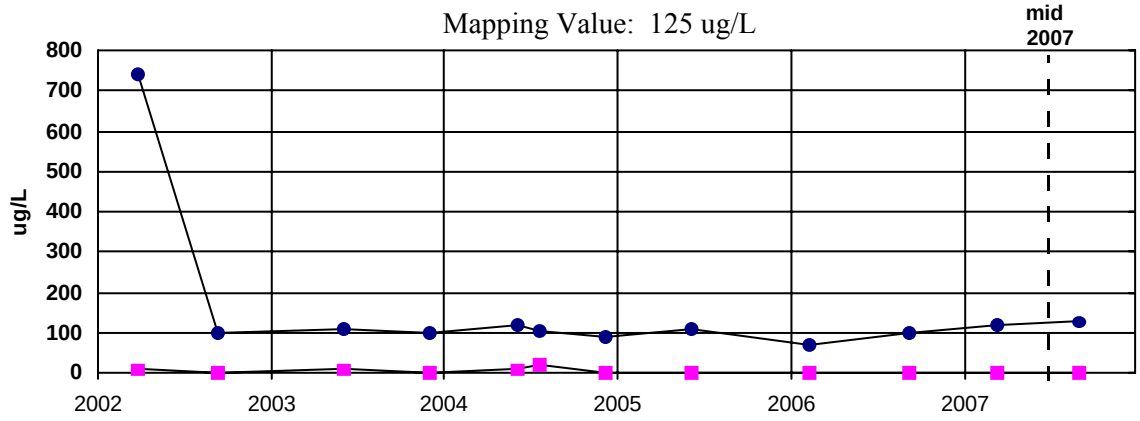
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 125 ug/L



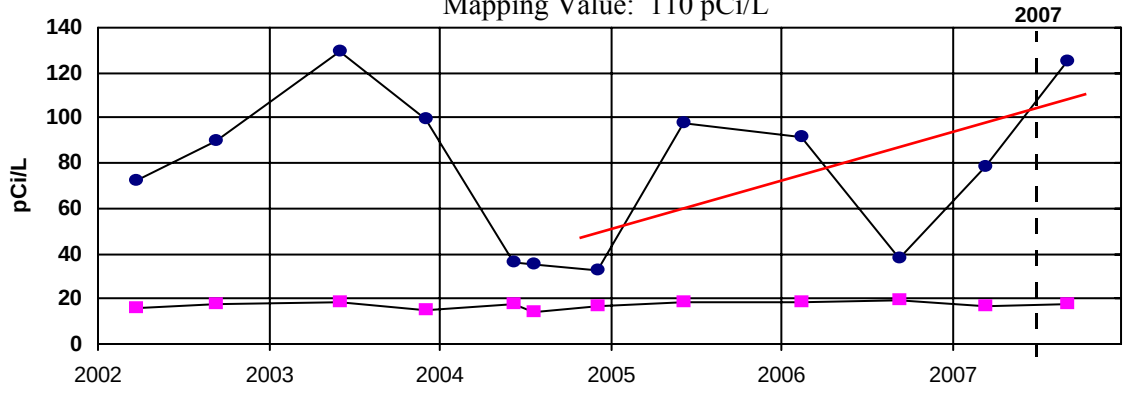
2007 Data: ug/L

03/14	120
09/05	130

ND=not detected

Technetium-99

Mapping Value: 110 pCi/L



Data not inluded on graphs: 9/10/2002 89.7 pCi/L Rejected by validation.

2007 Data: pCi/L

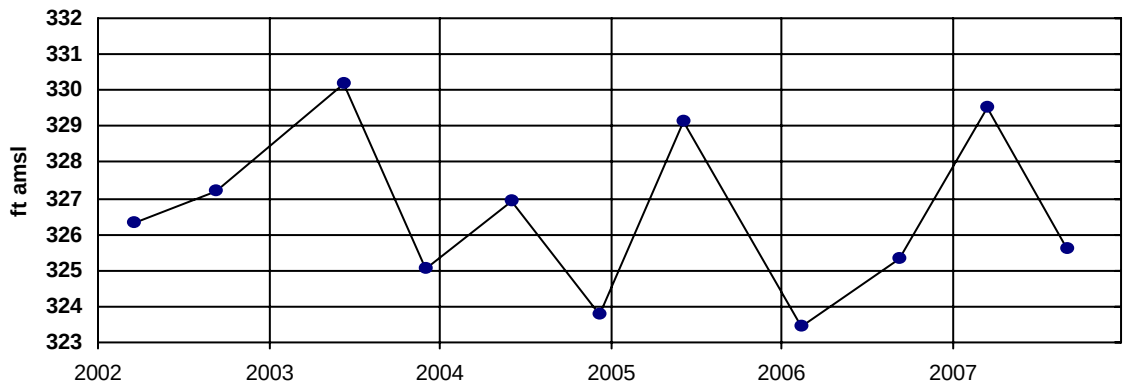
03/14	78.6
09/05	125

ND=not detected

MW205 URGA

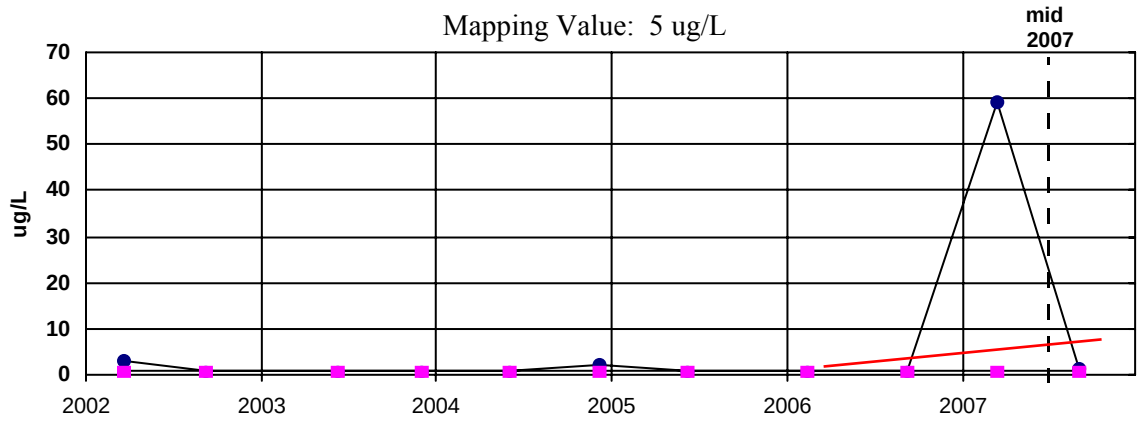
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 5 ug/L



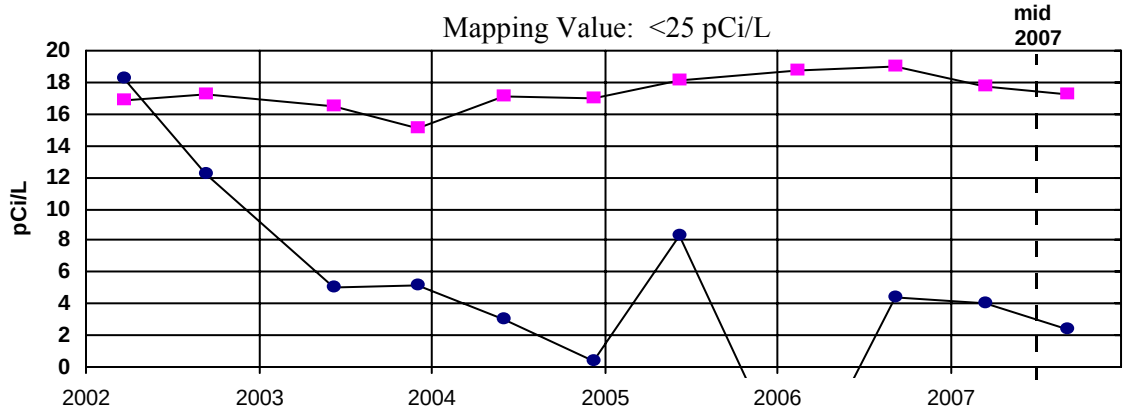
2007 Data: ug/L

03/19	59
09/06	1.2

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

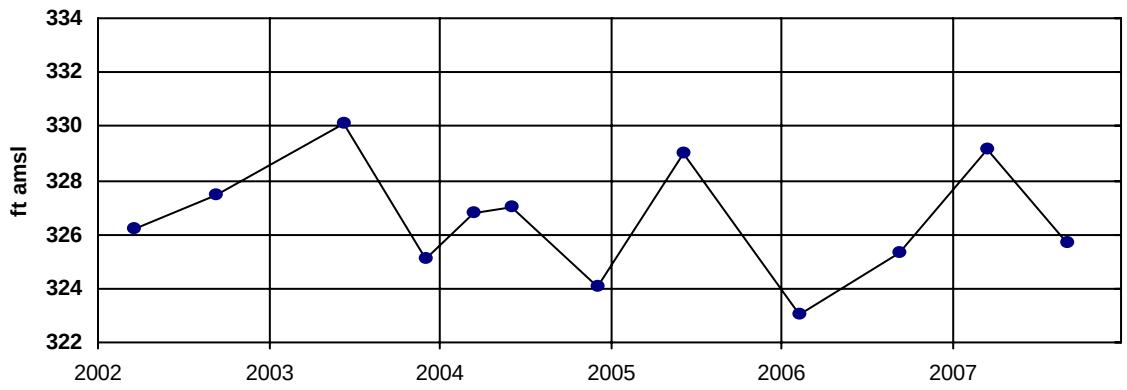
03/19	ND
09/06	ND

ND=not detected

MW206 URGA

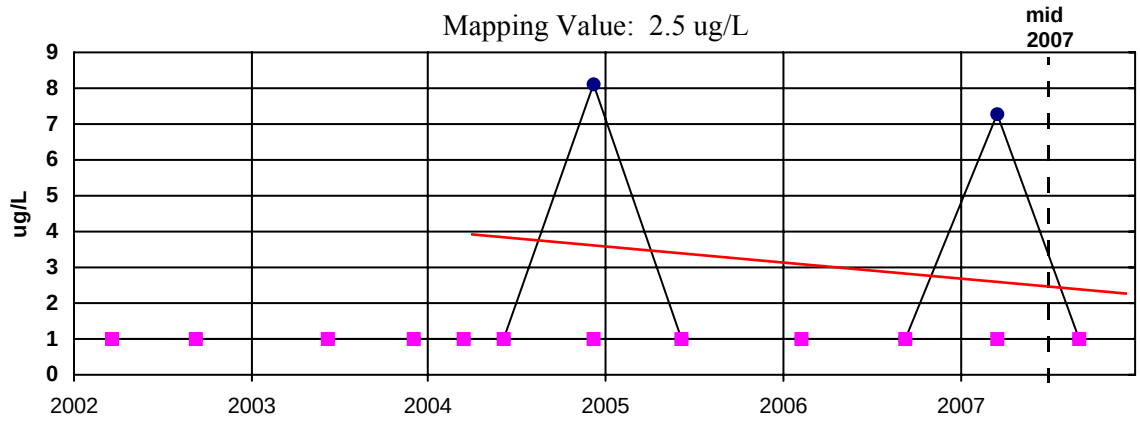
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 2.5 ug/L



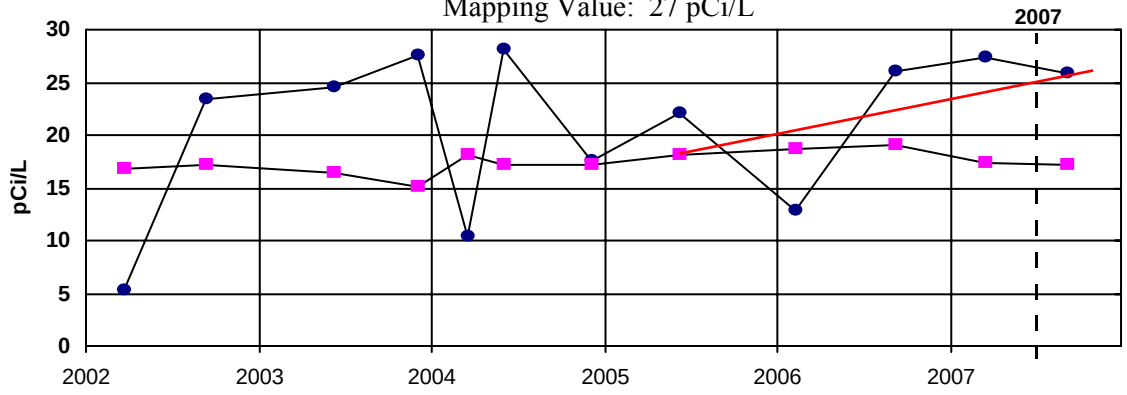
2007 Data: ug/L

03/20	7.3
09/06	ND

ND=not detected

Technetium-99

Mapping Value: 27 pCi/L



Data not inluded on graphs: 9/10/2002 23.4 pCi/L Rejected by validation.

2007 Data: pCi/L

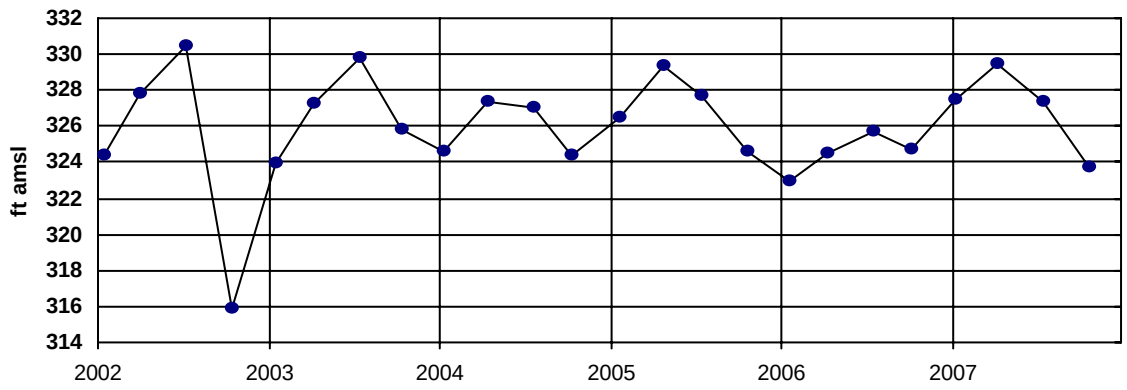
03/20	27.4
09/06	25.9

ND=not detected

MW220 URGA

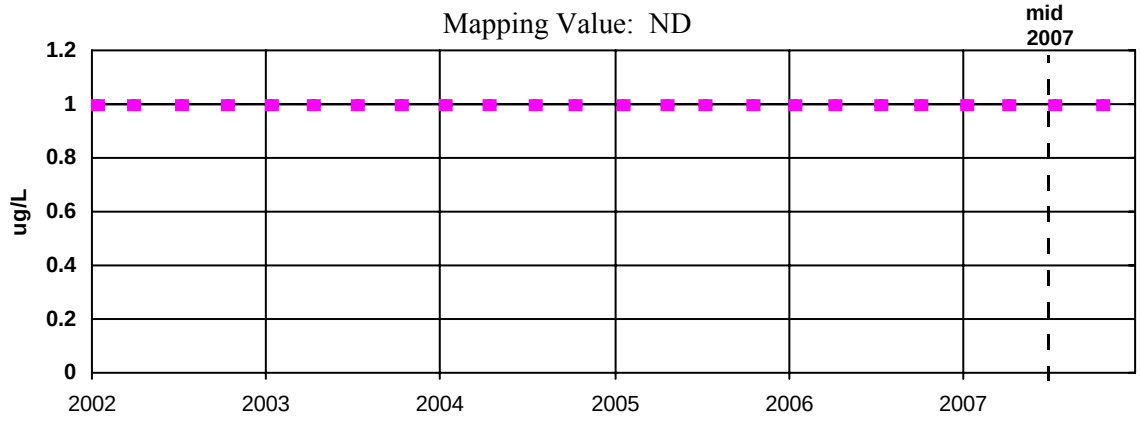
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

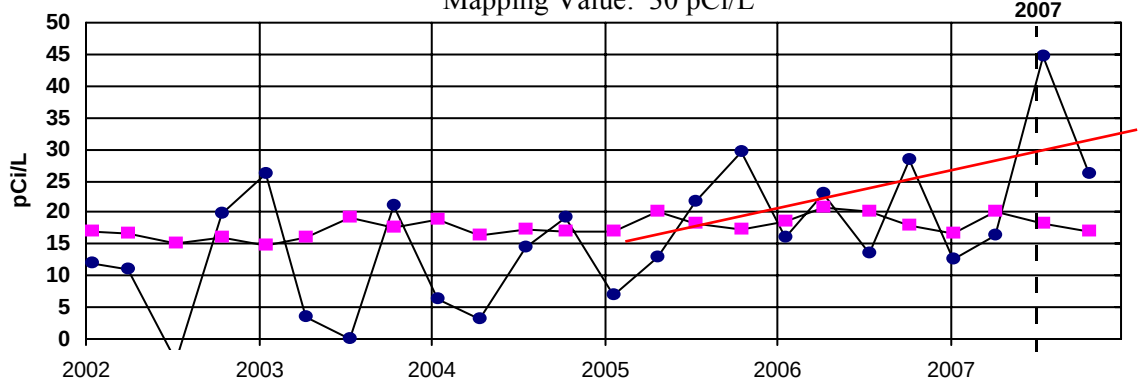


2007 Data:	ug/L
01/11	ND
04/10	ND
07/18	ND
10/24	ND

ND=not detected

Technetium-99

Mapping Value: 30 pCi/L



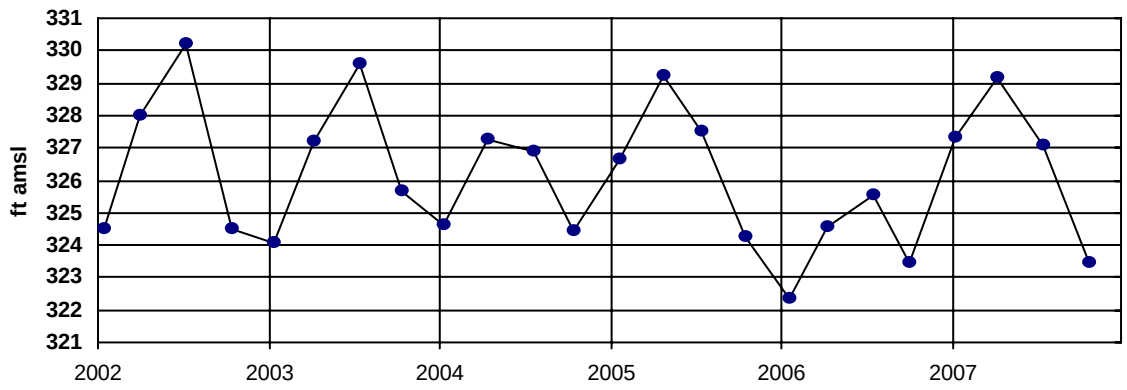
2007 Data:	pCi/L
01/11	ND
04/10	ND
07/18	44.8
10/24	26.2

ND=not detected

MW221 URGA

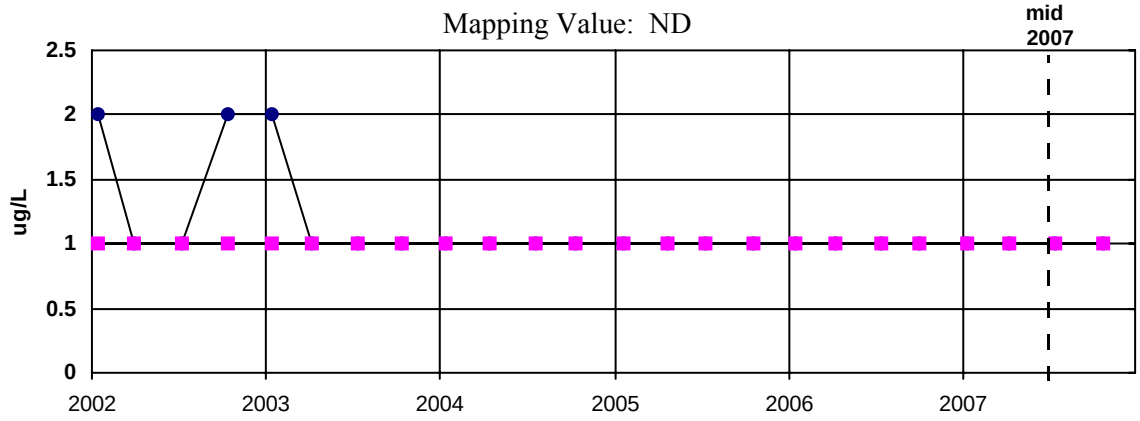
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

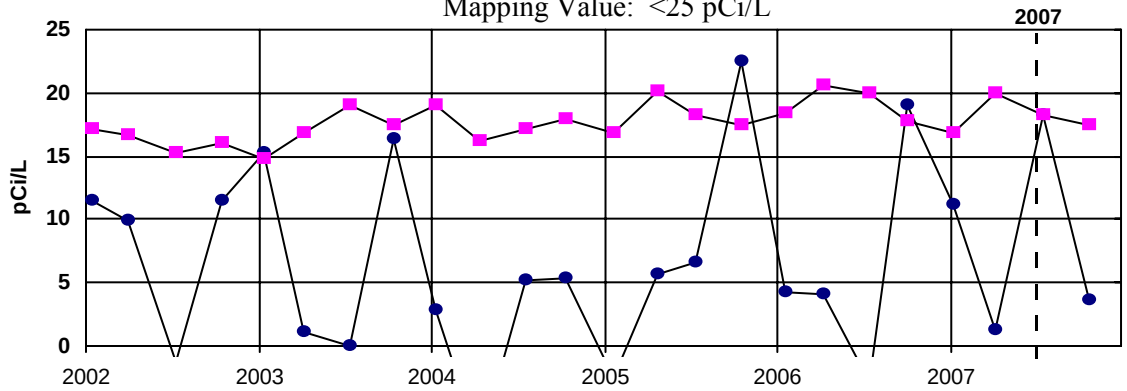


2007 Data:	ug/L
01/11	ND
04/10	ND
07/18	ND
10/23	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



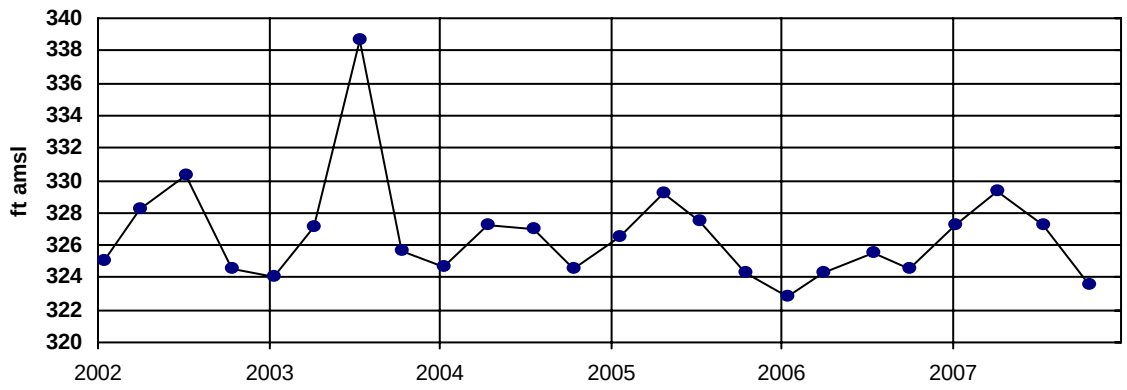
2007 Data:	pCi/L
01/11	ND
04/10	ND
07/18	ND
10/23	ND

ND=not detected

MW222 **URGA**

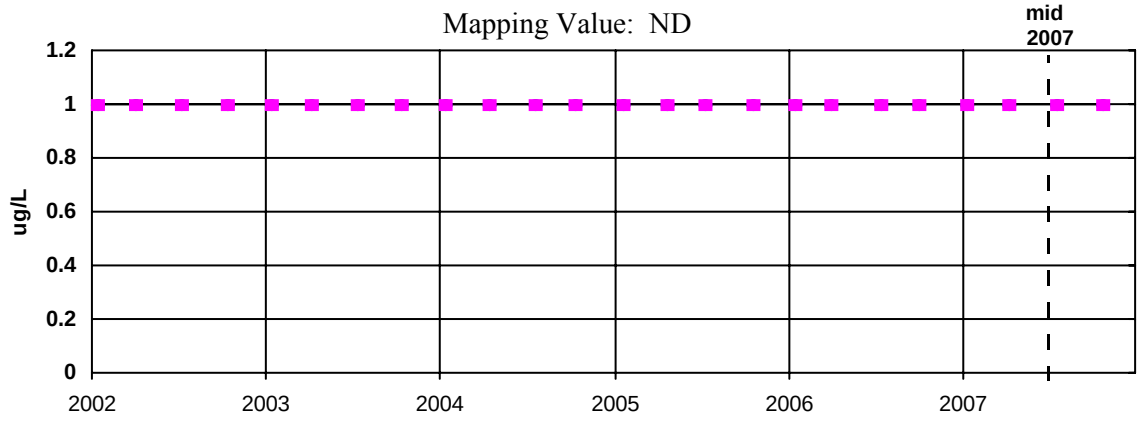
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

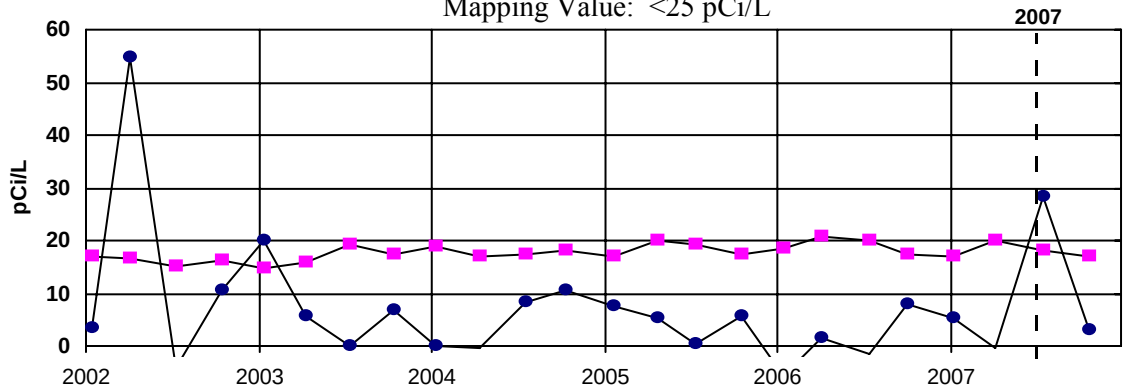


2007 Data:	ug/L
01/11	ND
04/10	ND
07/19	ND
10/23	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



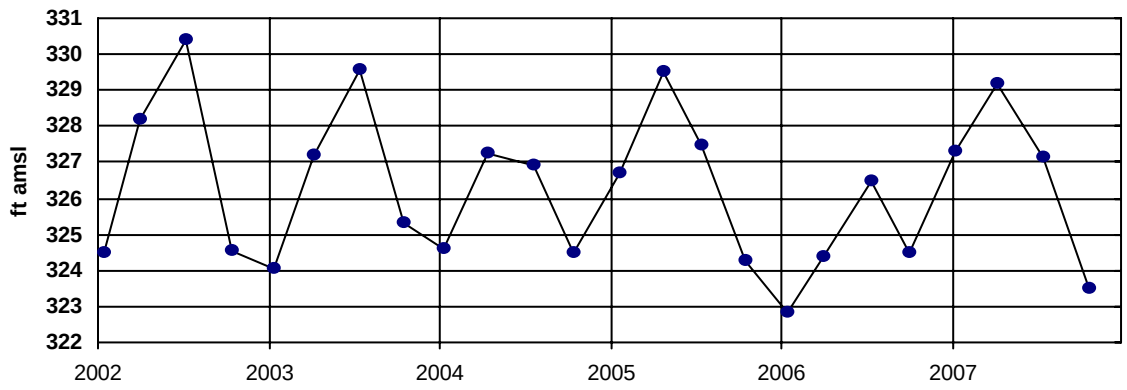
2007 Data:	pCi/L
01/11	ND
04/10	ND
07/19	28.2
10/23	ND

ND=not detected

MW223 URGA

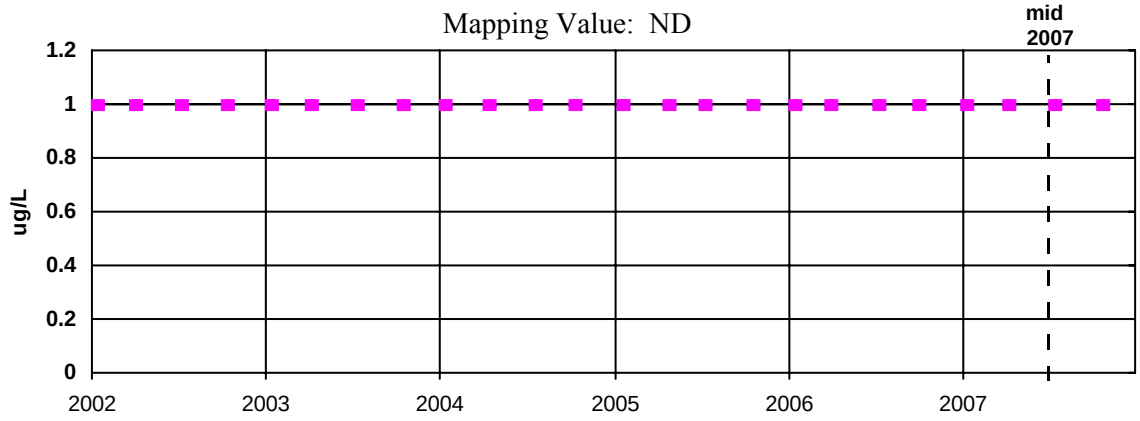
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

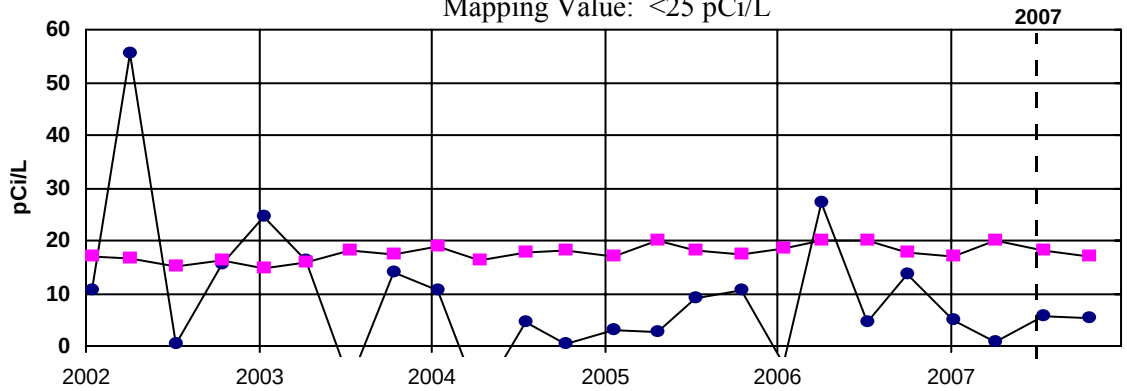


2007 Data:	ug/L
01/11	ND
04/10	ND
07/18	ND
10/23	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



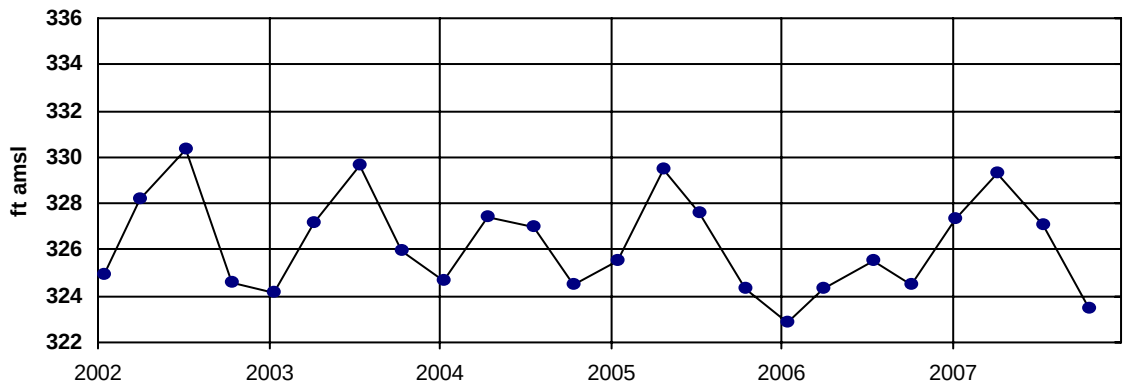
2007 Data:	pCi/L
01/11	ND
04/10	ND
07/18	ND
10/23	ND

ND=not detected

MW224 URGA

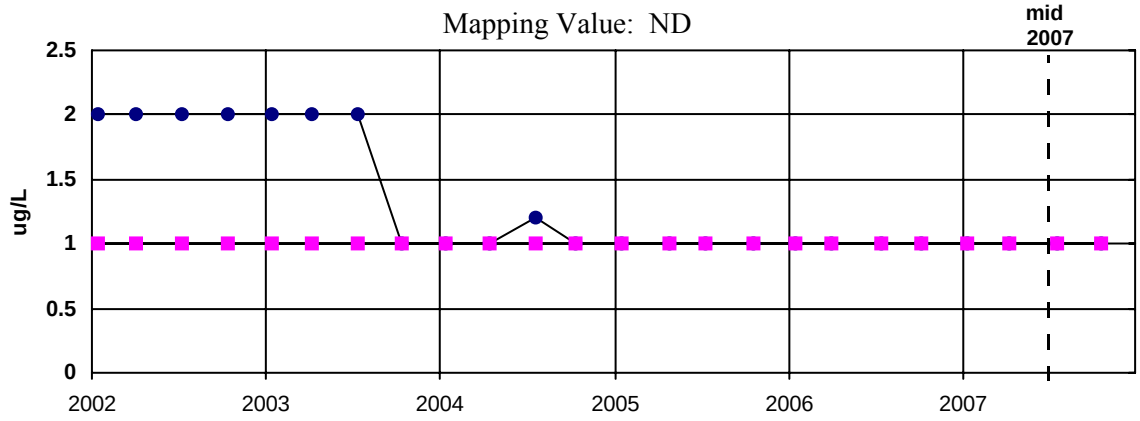
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

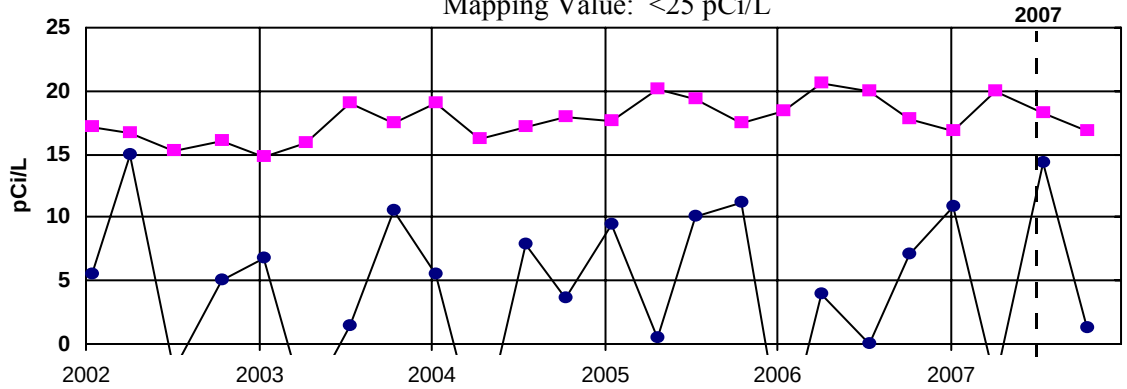


2007 Data:	ug/L
01/11	ND
04/10	ND
07/19	ND
10/22	ND
10/22	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



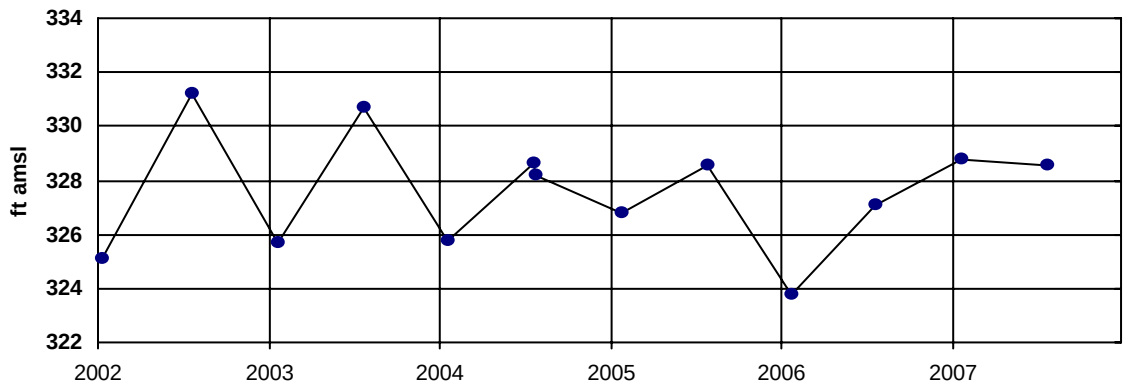
2007 Data:	pCi/L
01/11	ND
04/10	ND
07/19	ND
10/22	ND
10/22	ND

ND=not detected

MW226 LRGA

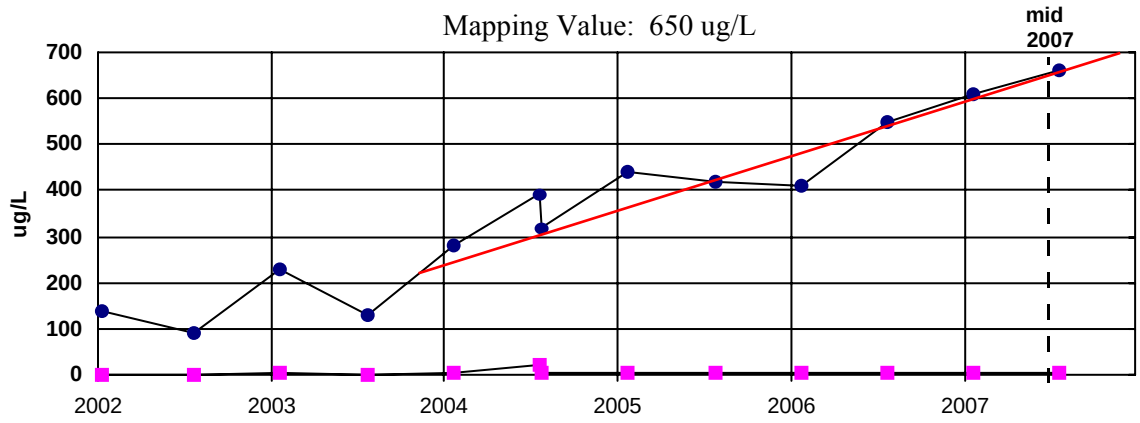
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 650 ug/L



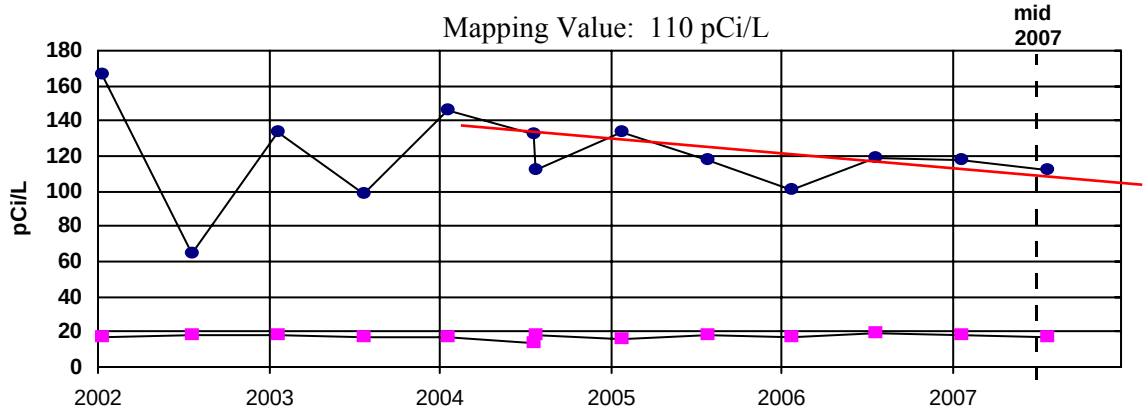
2007 Data: ug/L

01/24	610
07/24	660

ND=not detected

Technetium-99

Mapping Value: 110 pCi/L



2007 Data: pCi/L

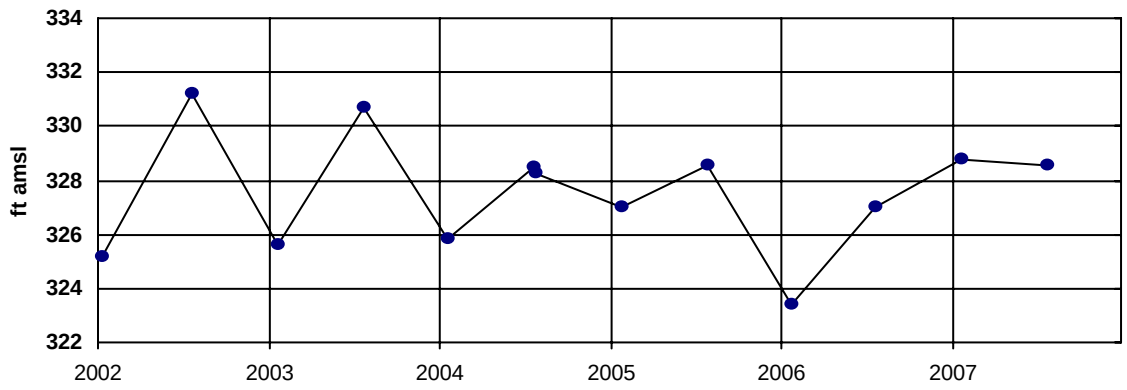
01/24	118
07/24	112

ND=not detected

MW227 URGA

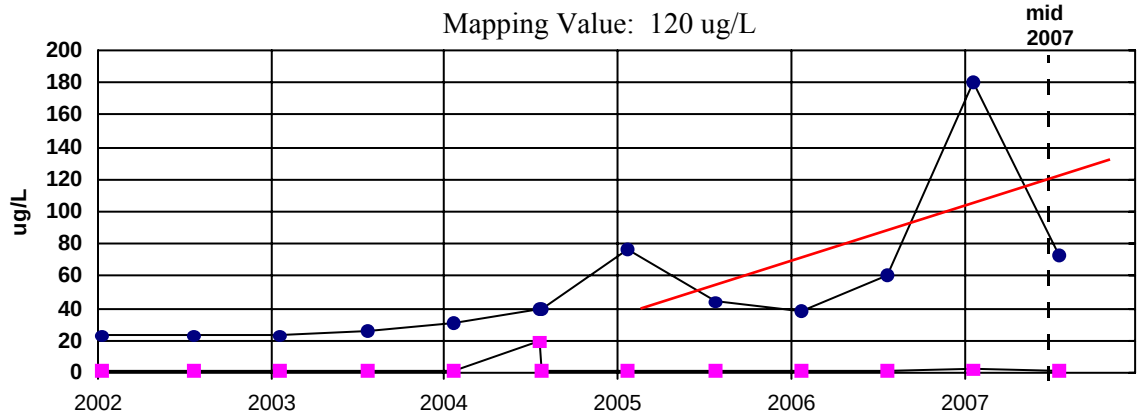
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 120 ug/L



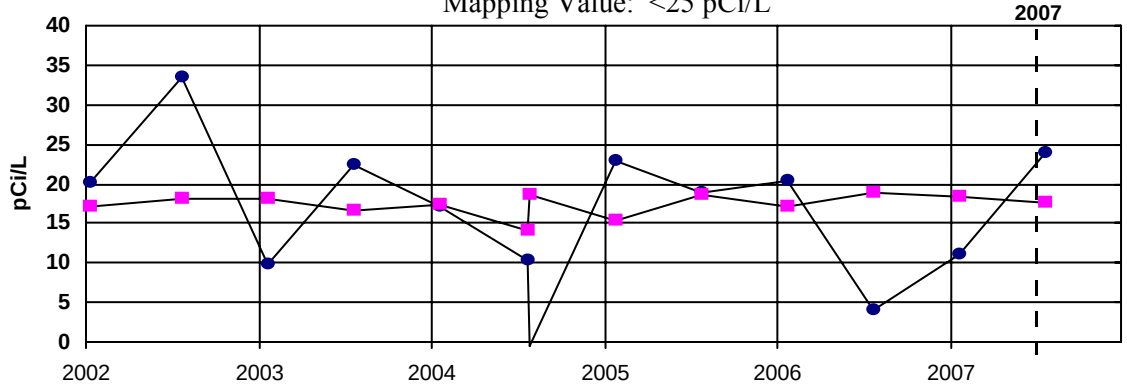
2007 Data: ug/L

01/24	180
07/24	73

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

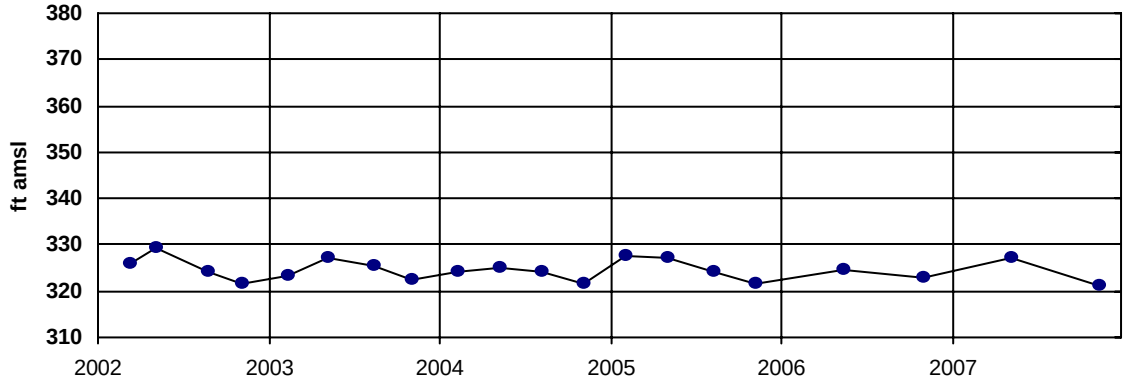
01/24	ND
07/24	24

ND=not detected

MW233 MRGA

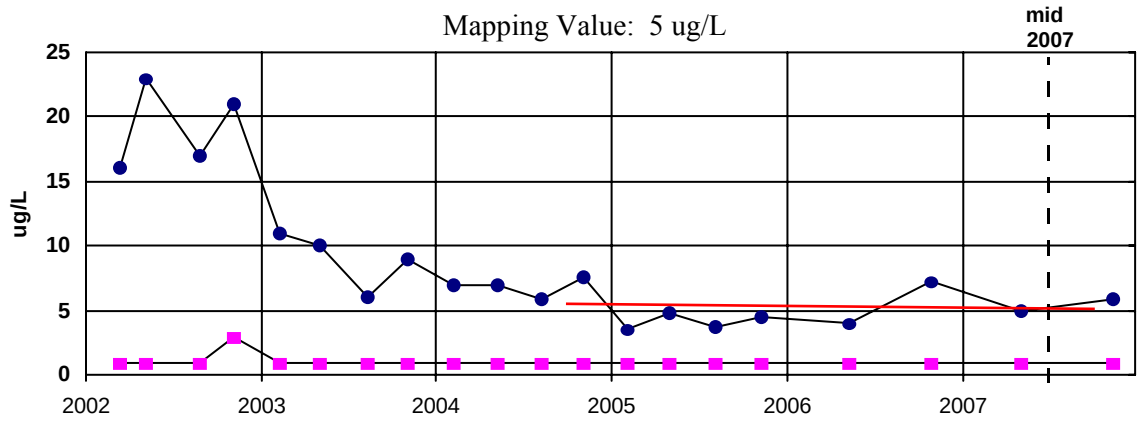
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 5 ug/L



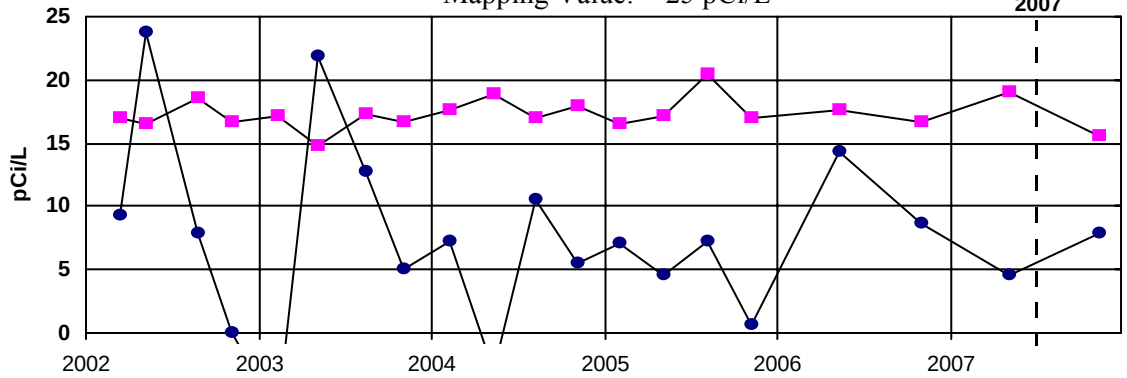
2007 Data: ug/L

05/08	5
11/14	5.9

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

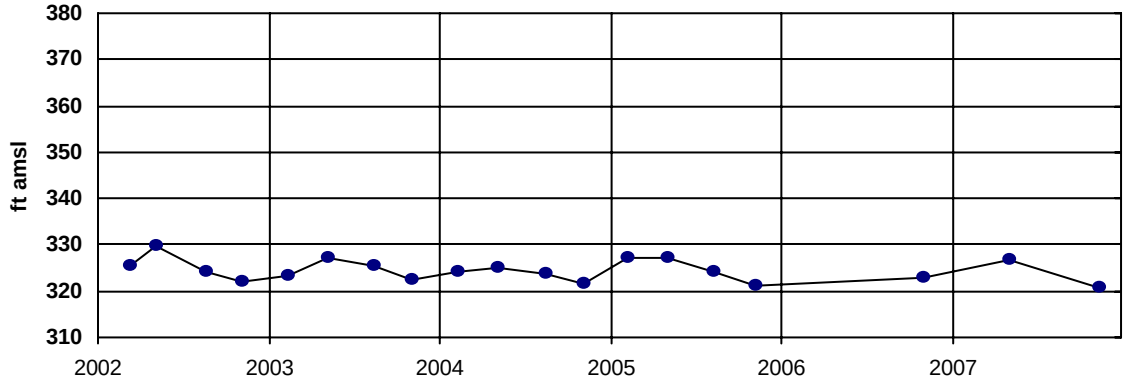
05/08	ND
11/14	ND

ND=not detected

MW234/MW380 LRGA

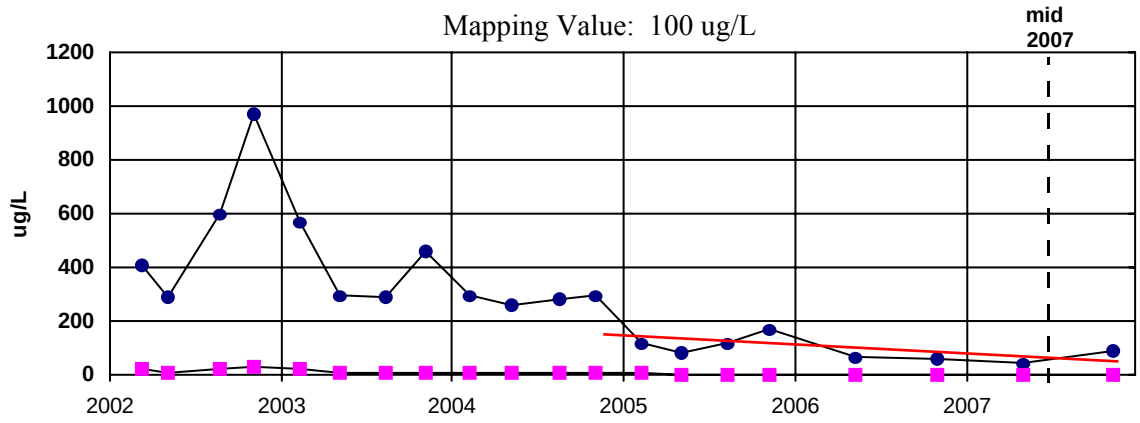
Result
Detection Limit
Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 100 ug/L



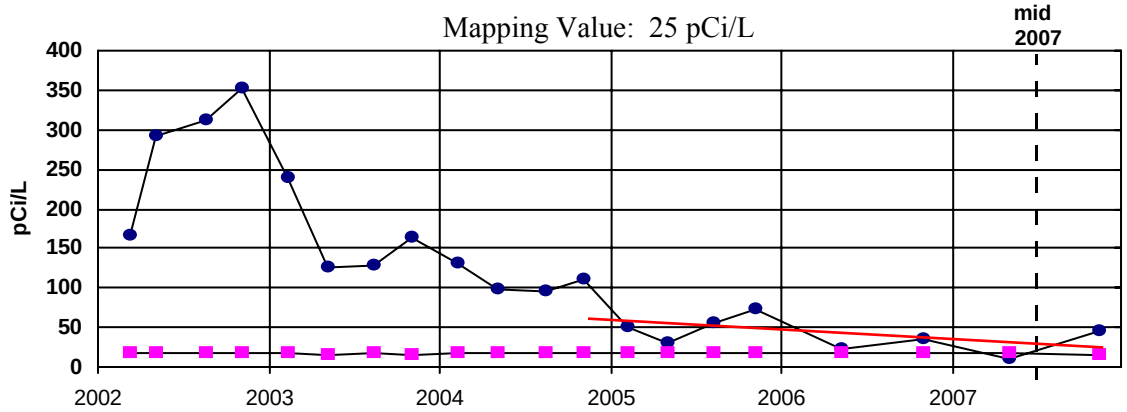
2007 Data: ug/L

05/07	45
11/14	87

ND=not detected

Technetium-99

Mapping Value: 25 pCi/L



2007 Data: pCi/L

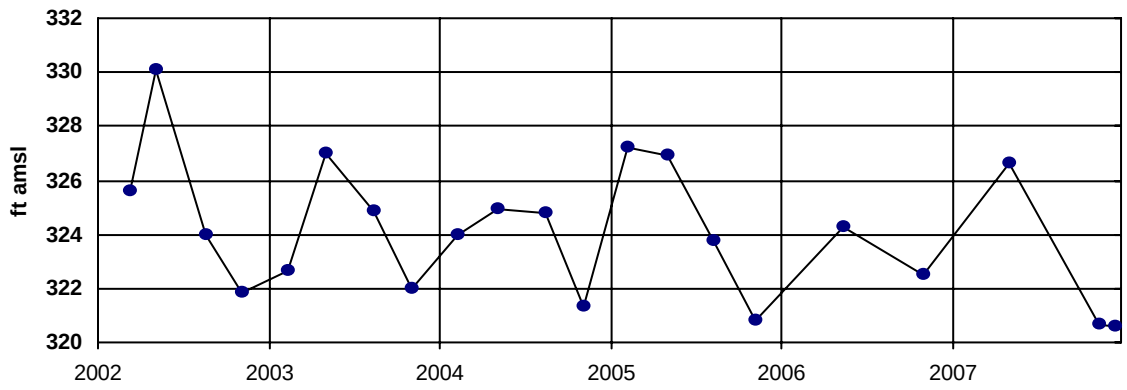
05/07	ND
11/14	44.6

ND=not detected

MW235/MW381 MRGA

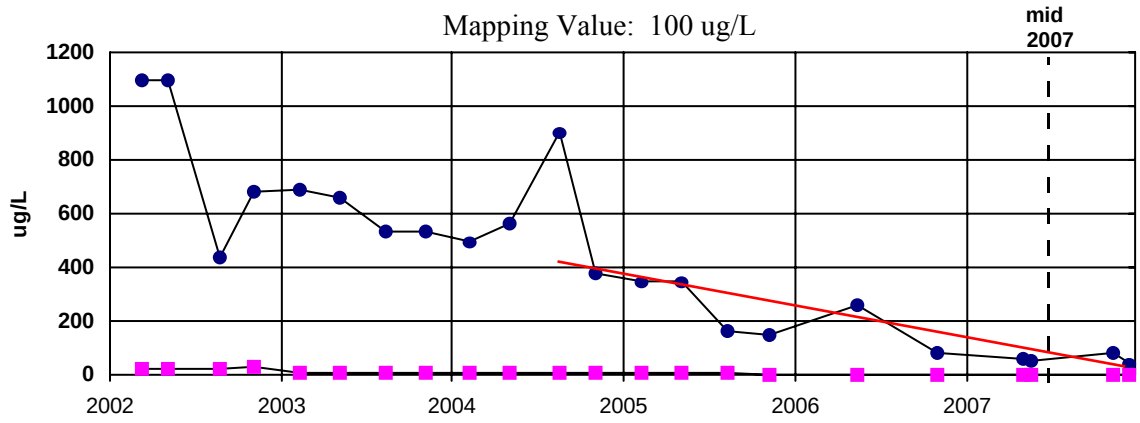
Result
Detection Limit
Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 100 ug/L

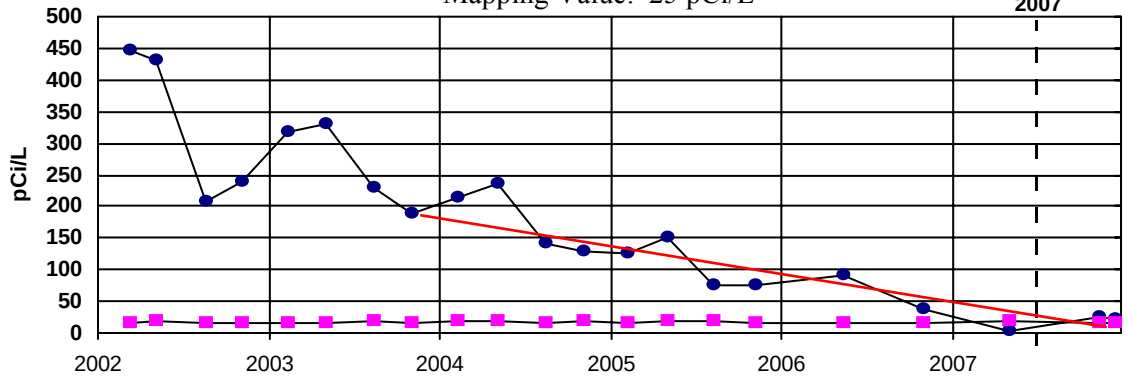


2007 Data:	ug/L
05/07	57
05/22	50
11/14	83
12/19	47

ND=not detected

Technetium-99

Mapping Value: 25 pCi/L



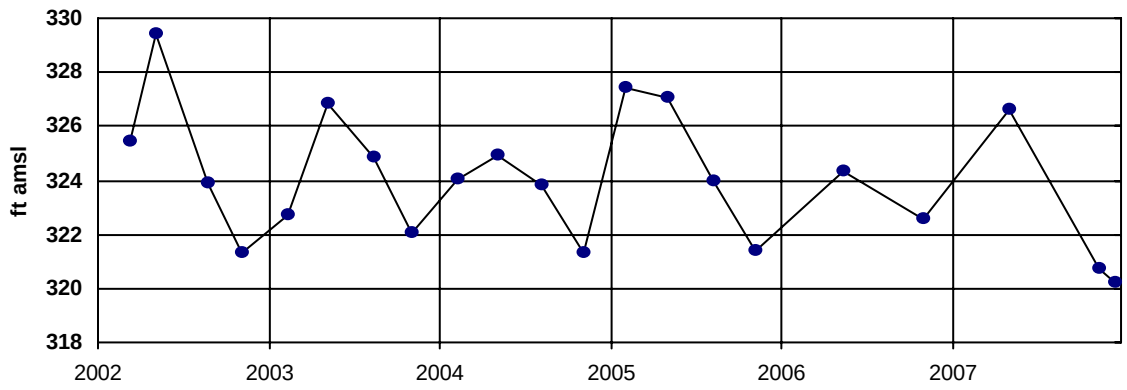
2007 Data:	pCi/L
05/07	ND
11/14	25.6
12/19	21.5

ND=not detected

MW236 LRGA

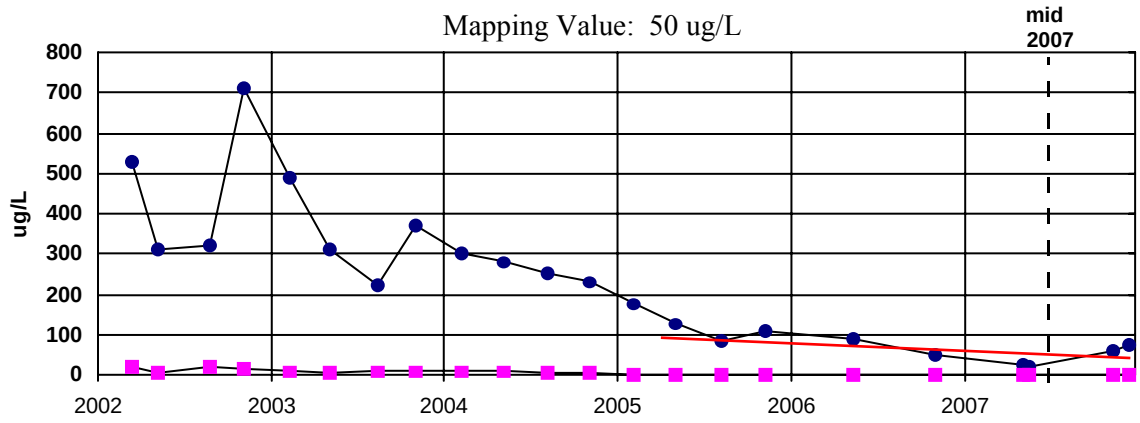
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 50 ug/L

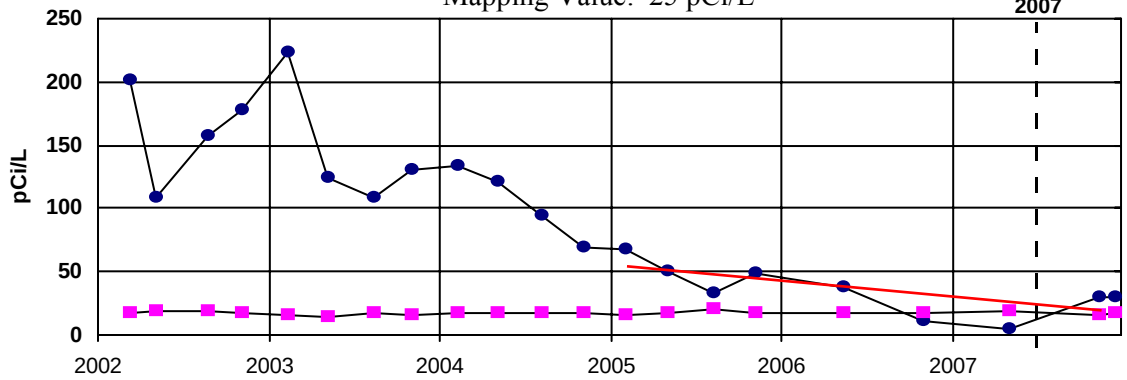


2007 Data:	ug/L
05/07	24
05/07	23
05/22	21
05/22	22
11/14	58
11/14	58
12/19	72

ND=not detected

Technetium-99

Mapping Value: 25 pCi/L



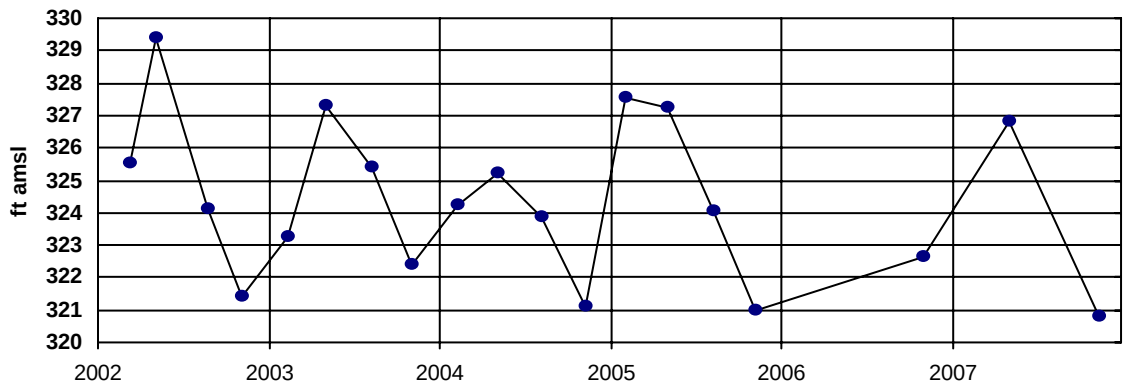
2007 Data:	pCi/L
05/07	ND
05/07	ND
11/14	30
11/14	27.5
12/19	29.1

ND=not detected

MW238 MRGA

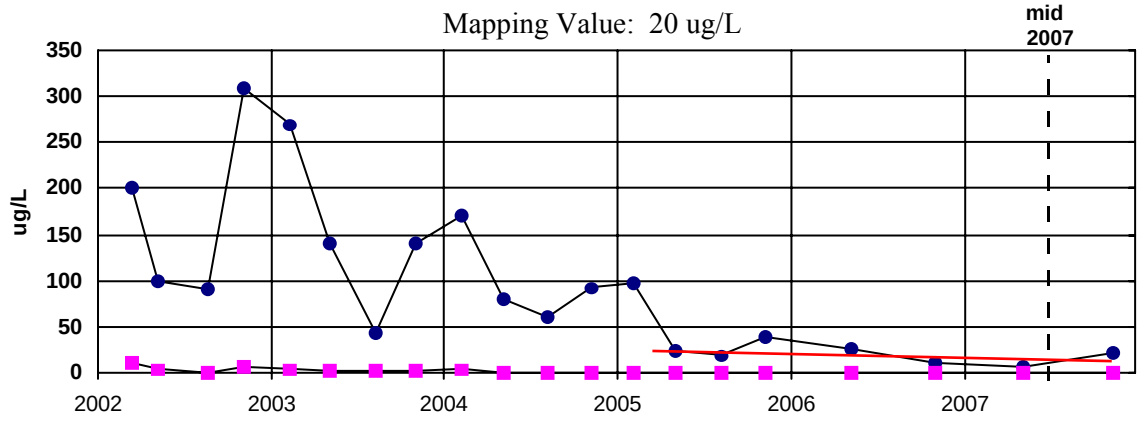
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 20 ug/L



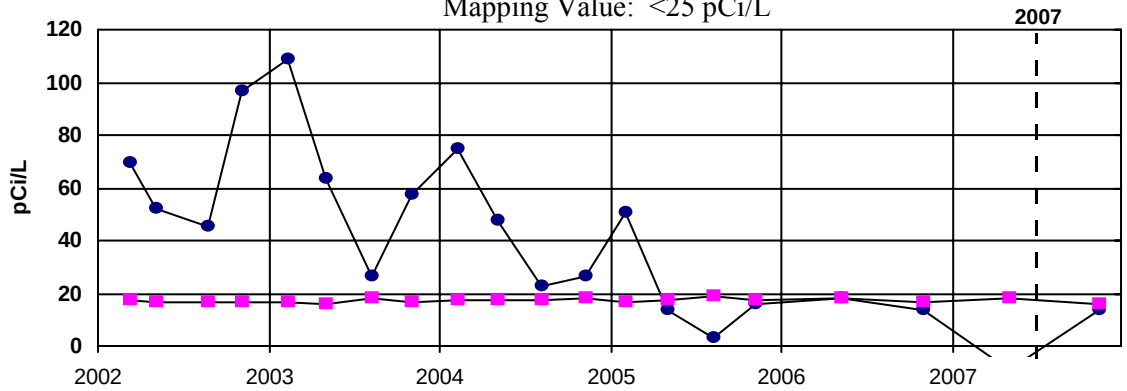
2007 Data: ug/L

05/07	7.2
11/14	21

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

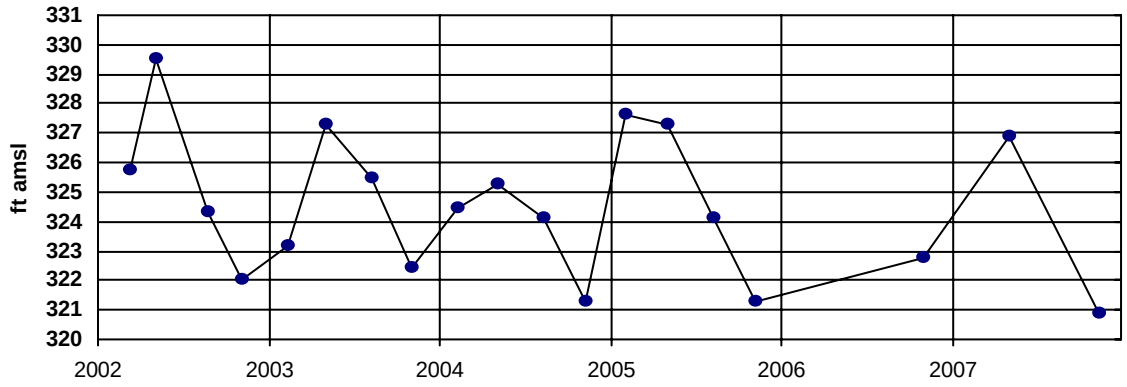
05/07	ND
11/14	ND

ND=not detected

MW240/MW240A MRGA

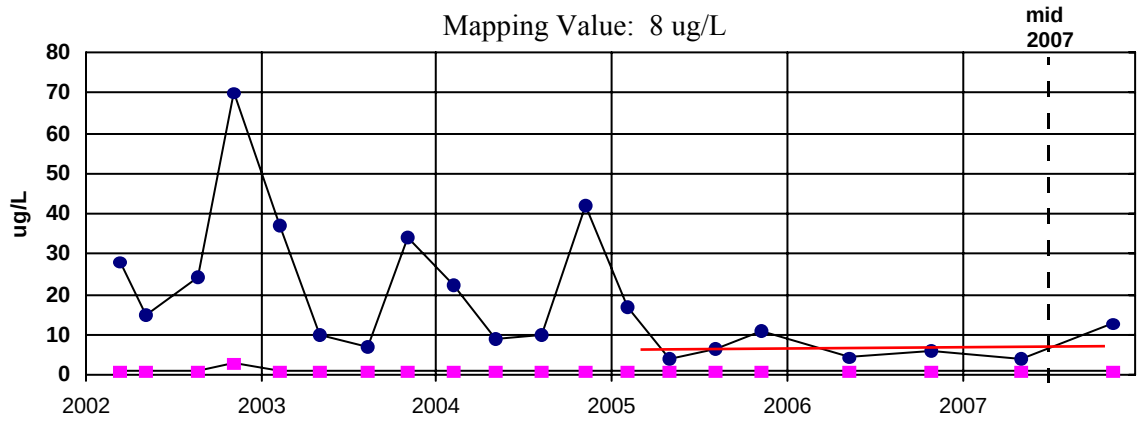
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 8 ug/L



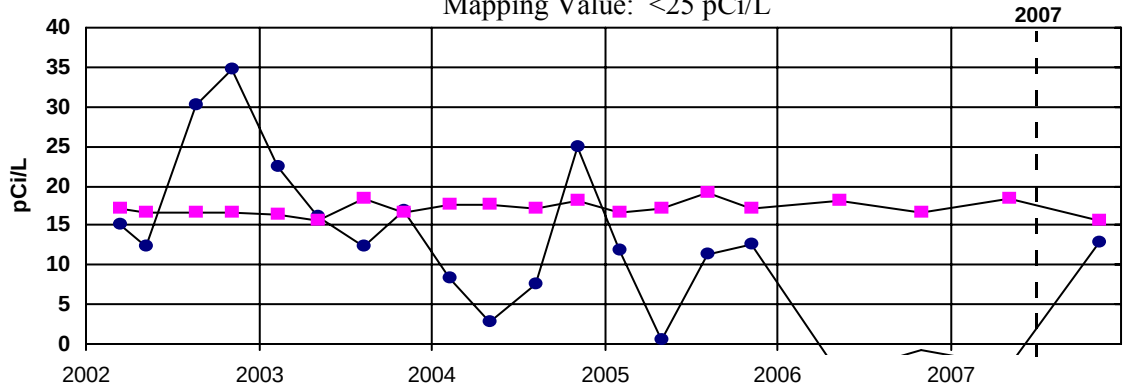
2007 Data: ug/L

05/07	4
11/14	13

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

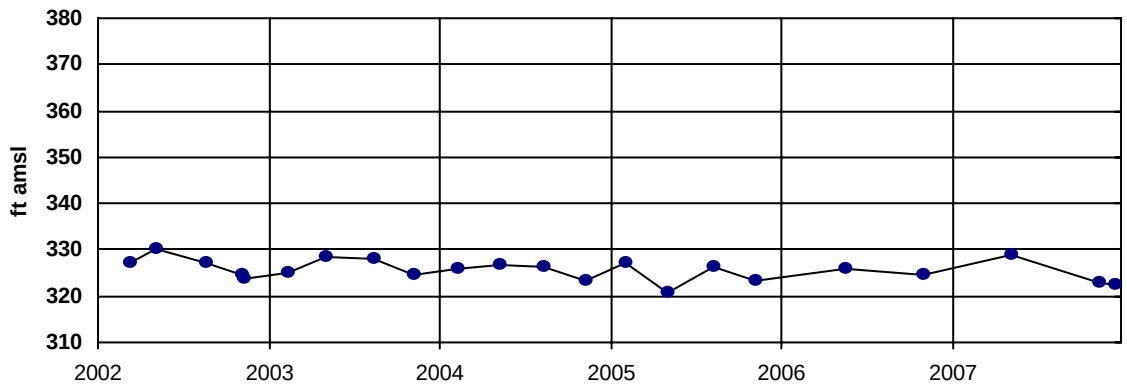
05/07	ND
11/14	ND

ND=not detected

MW242 MRGA

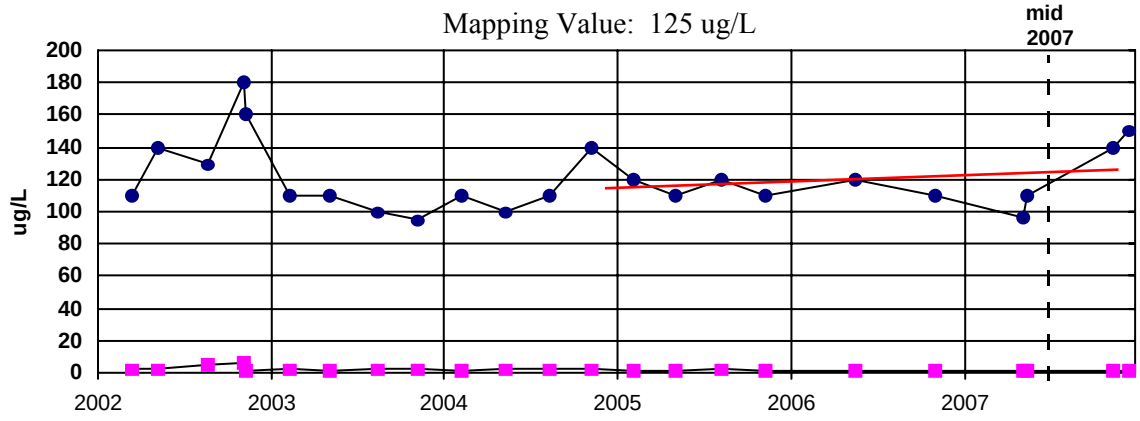
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 125 ug/L



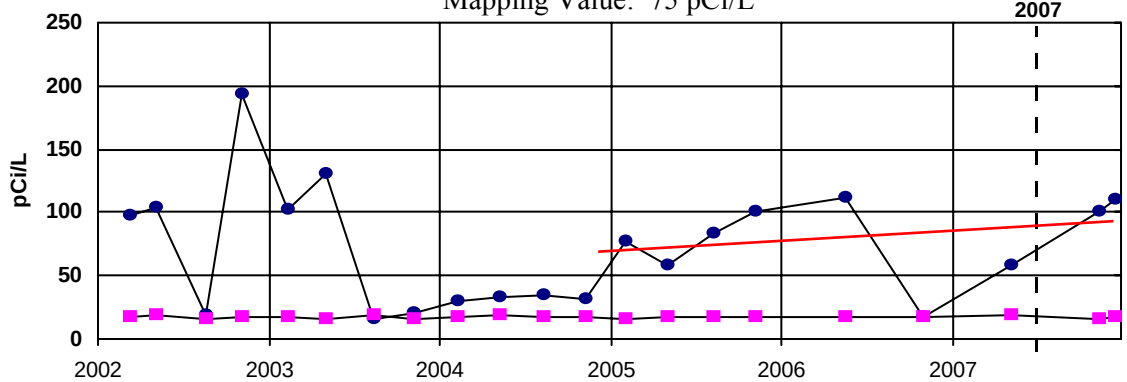
2007 Data:	ug/L
05/08	96
05/17	110
11/13	140
12/19	150

Data not inluded on graphs: 11/11/2002 160 ug/L Rejected by validation.
11/11/2002 157 ug/L Rejected by validation.

ND=not detected

Technetium-99

Mapping Value: 75 pCi/L



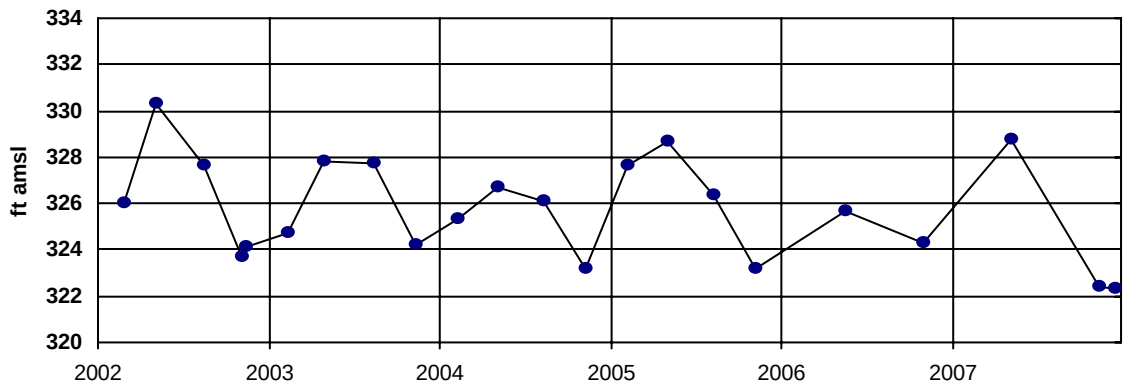
2007 Data:	pCi/L
05/08	58.5
11/13	101
12/19	110

ND=not detected

MW243 MRGA

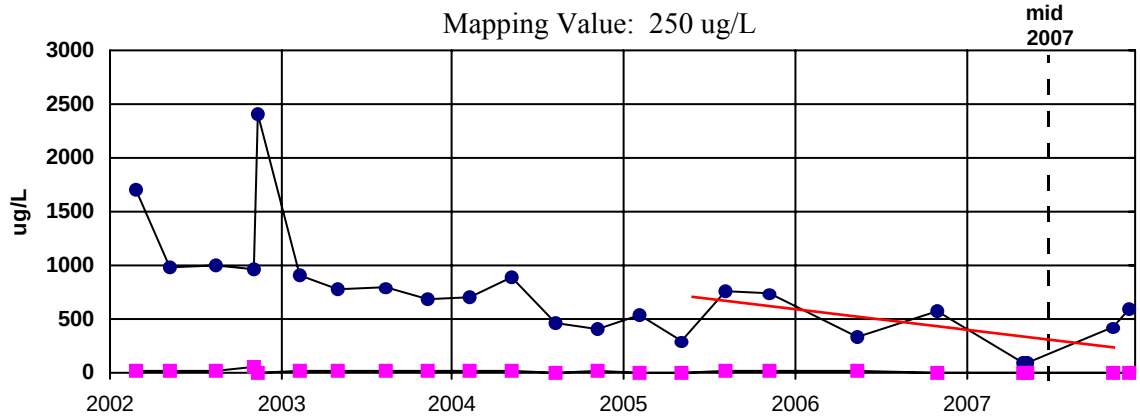
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 250 ug/L



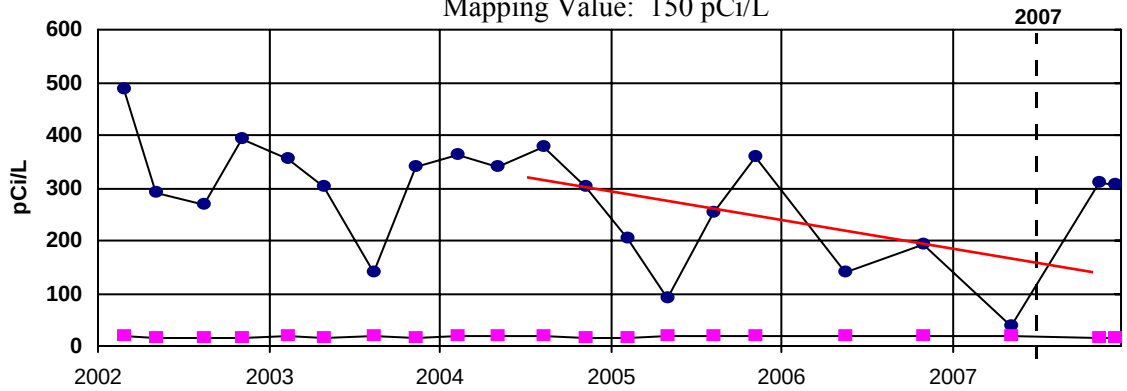
Data not inluded on graphs: 11/12/2002 2416 ug/L Rejected by validation.

2007 Data:	ug/L
05/08	100
05/15	100
11/15	430
12/19	590

ND=not detected

Technetium-99

Mapping Value: 150 pCi/L



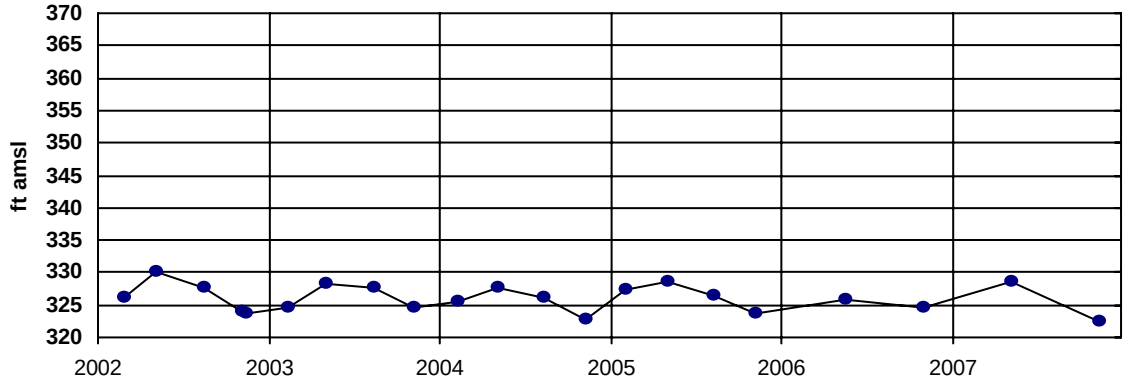
2007 Data:	pCi/L
05/08	35.9
11/15	311
12/19	306

ND=not detected

MW244 MRGA

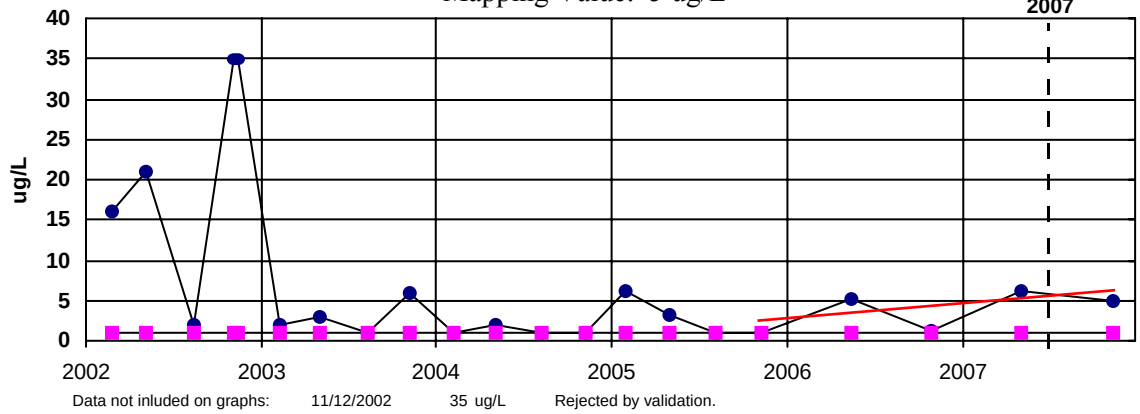
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 5 ug/L



Data not inluded on graphs: 11/12/2002 35 ug/L Rejected by validation.

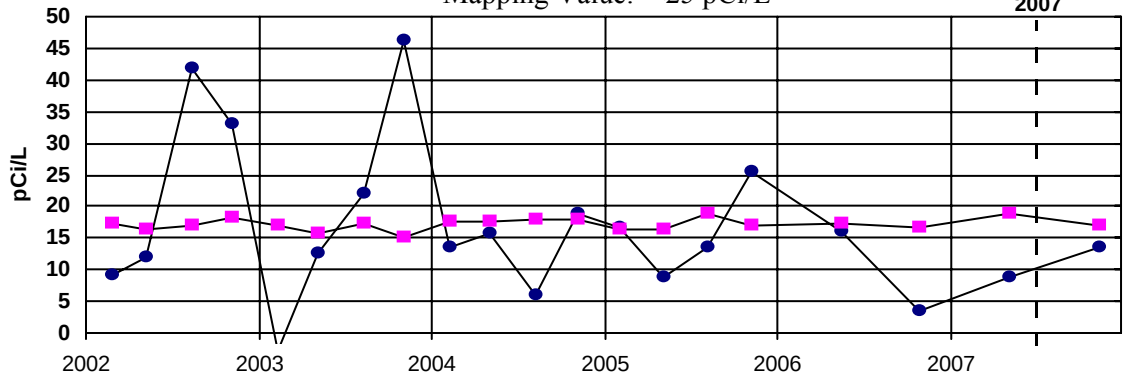
2007 Data: ug/L

05/08	6.2
11/15	4.9

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

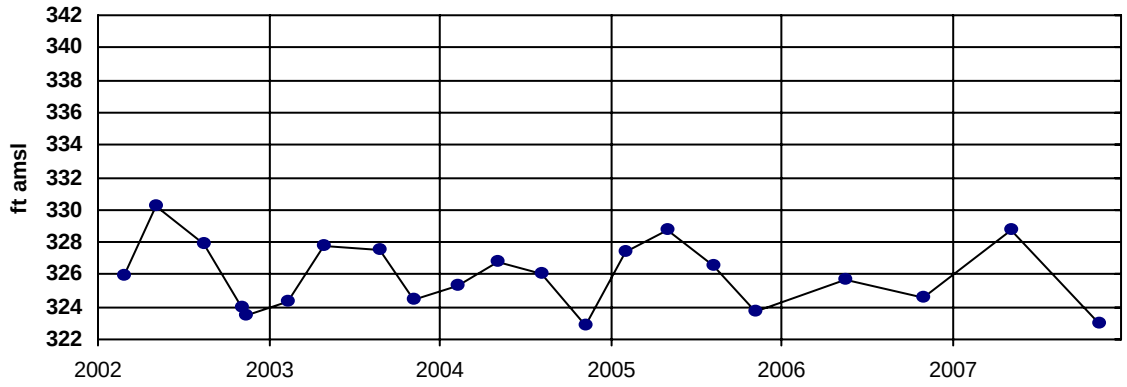
05/08	ND
11/15	ND

ND=not detected

MW245 MRGA

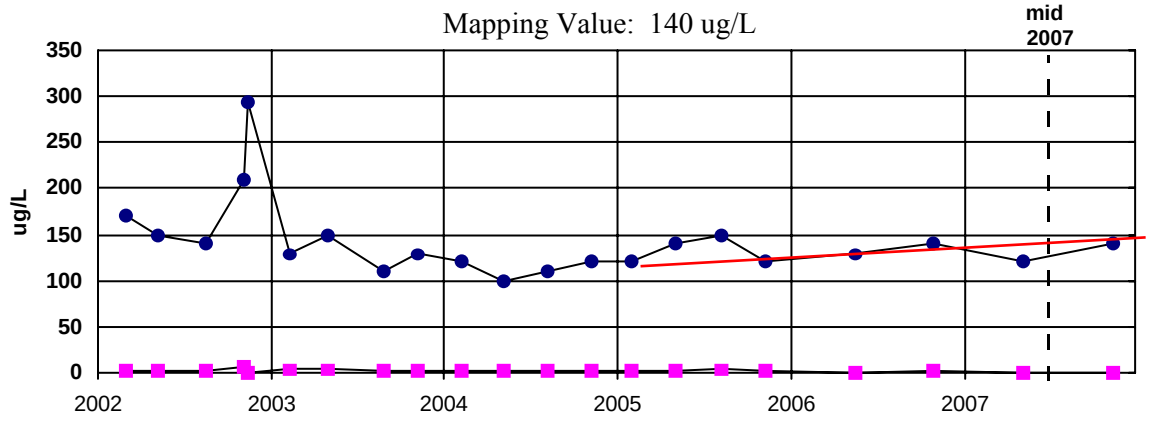
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 140 ug/L



Data not inluded on graphs: 11/12/2002 293 ug/L Rejected by validation.
2/12/2003 84 ug/L Rejected by validation.

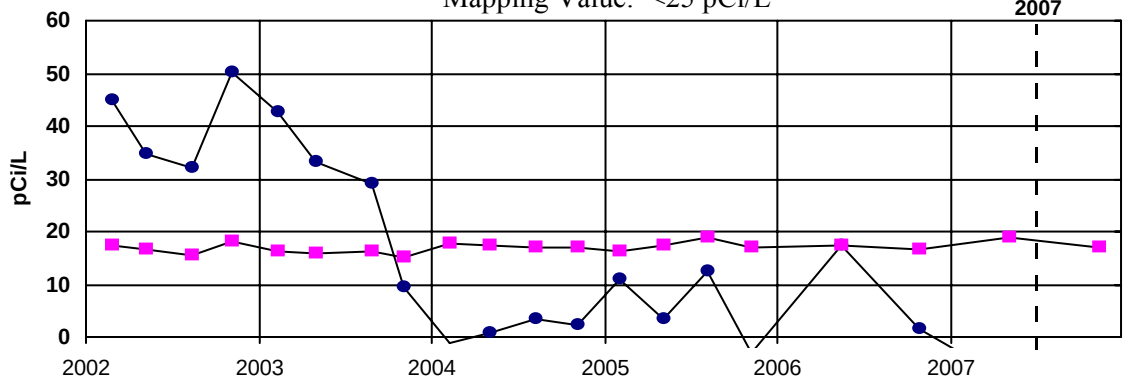
2007 Data: ug/L

05/08	120
11/14	140

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

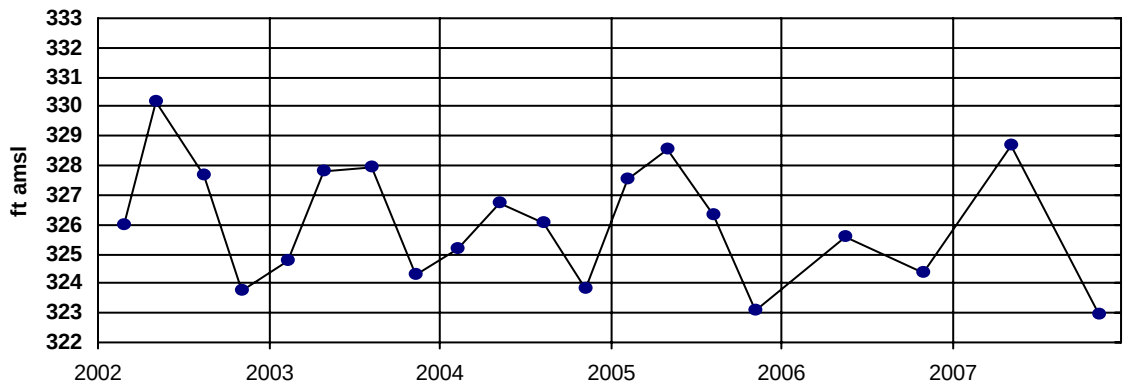
05/08	ND
11/14	ND

ND=not detected

MW248 MRGA

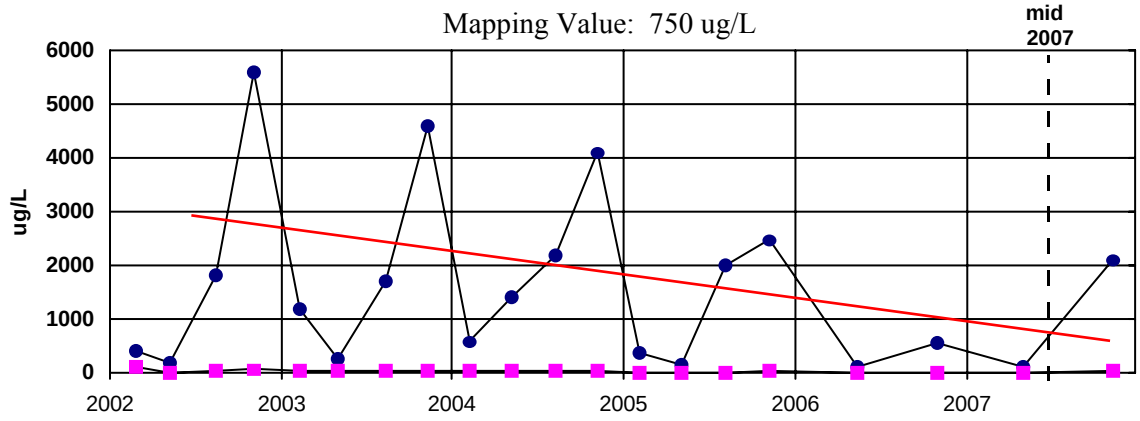
Result
Detection Limit
Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 750 ug/L



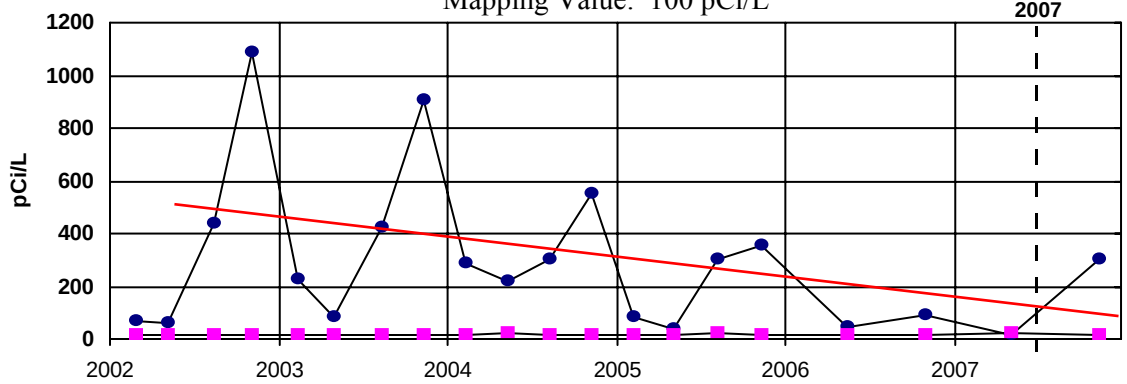
2007 Data: ug/L

05/08	110
11/14	2100

ND=not detected

Technetium-99

Mapping Value: 100 pCi/L



2007 Data: pCi/L

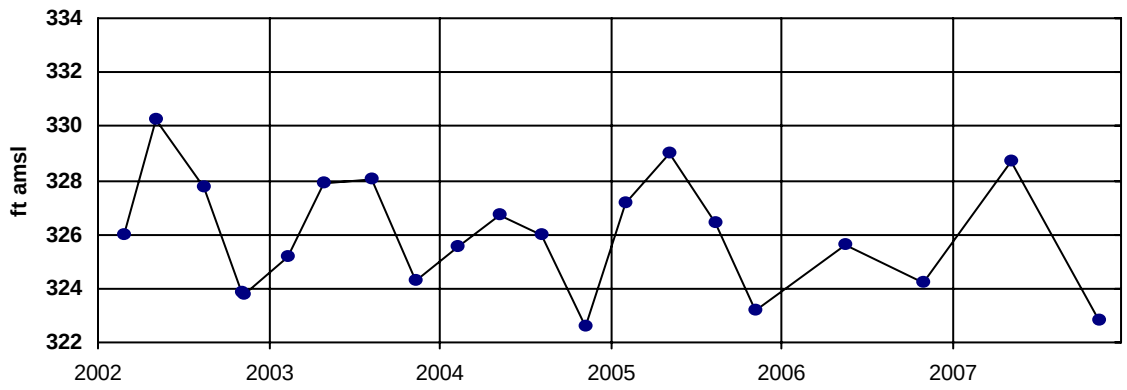
05/08	ND
11/14	303

ND=not detected

MW250 MRGA

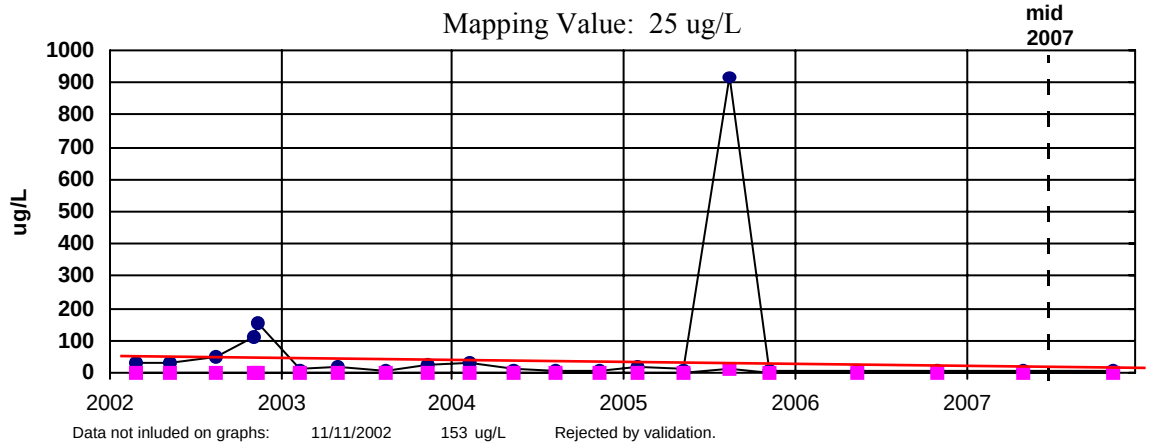
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 25 ug/L



Data not inluded on graphs: 11/11/2002 153 ug/L Rejected by validation.

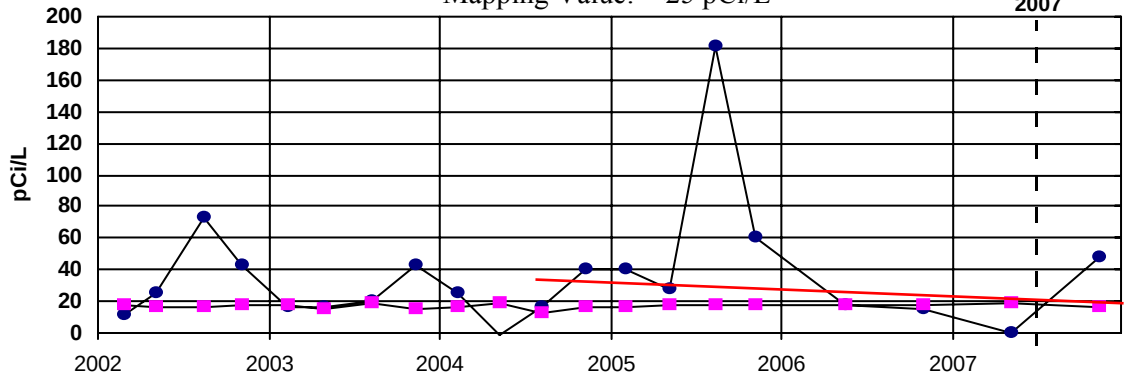
2007 Data: ug/L

05/08	7.8
11/14	5.1

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

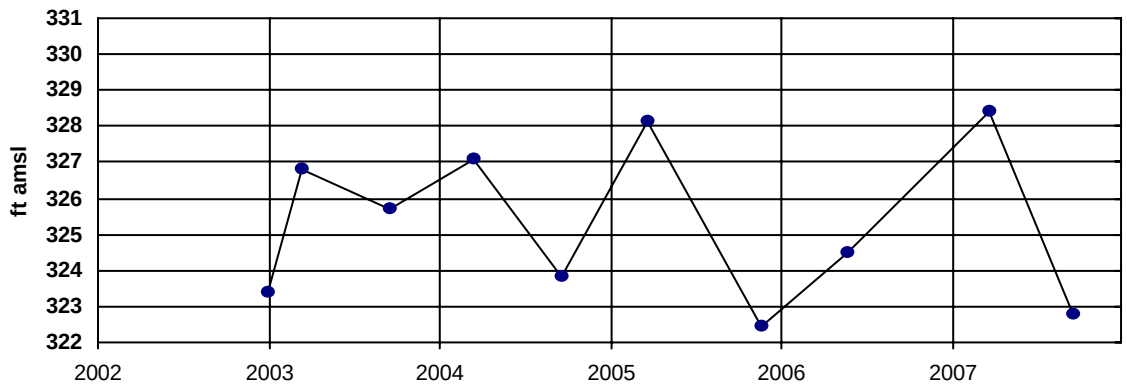
05/08	ND
11/14	48.3

ND=not detected

MW252 LRGA

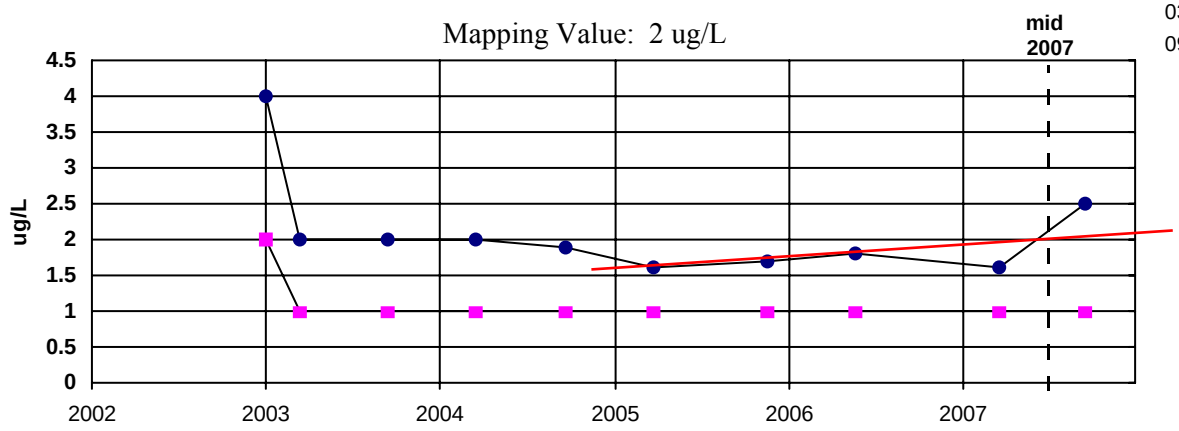
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 2 ug/L



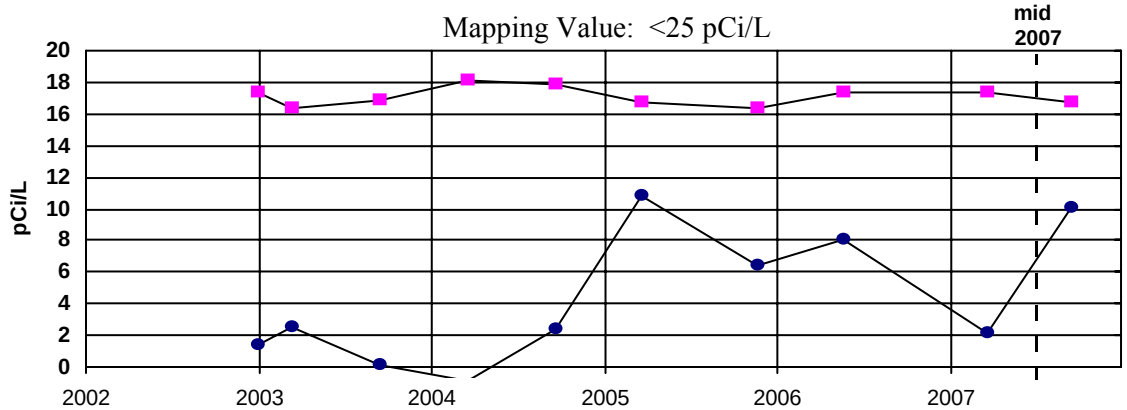
2007 Data: ug/L

03/22	1.6
09/18	2.5

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

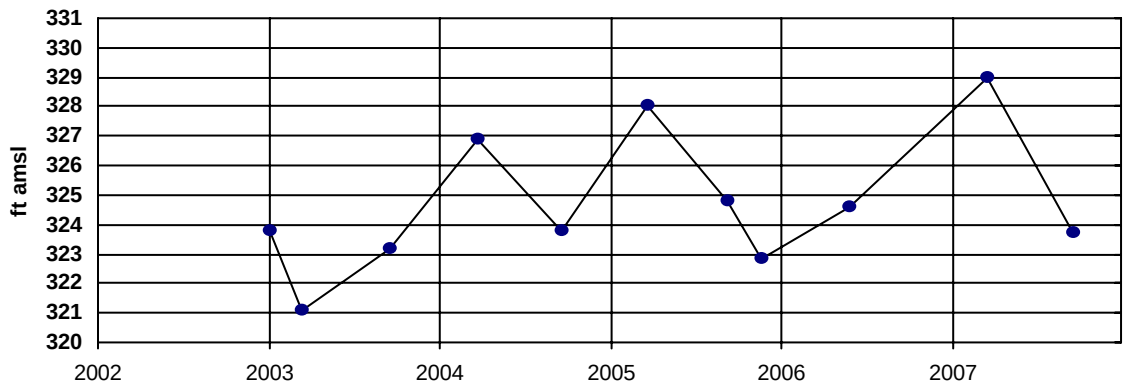
03/22	ND
09/18	ND

ND=not detected

MW253 LRGA

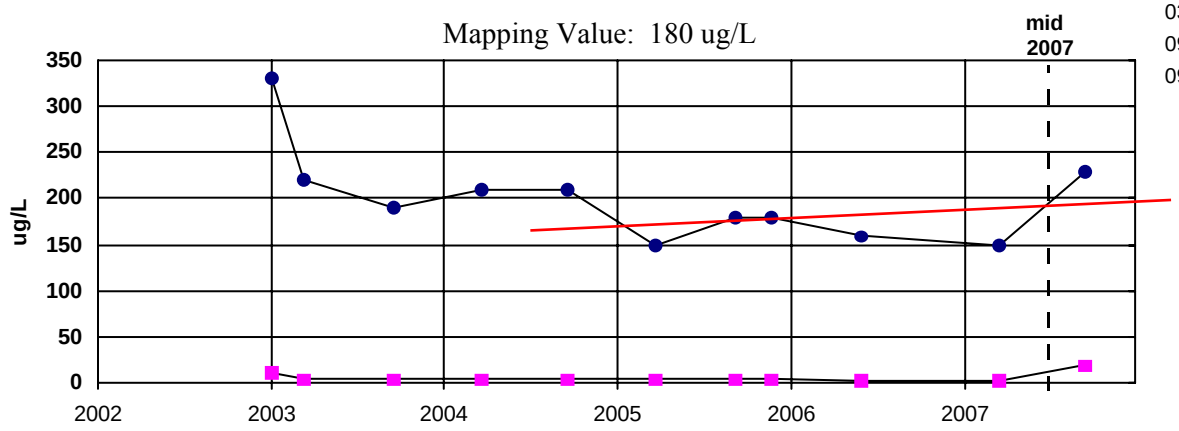
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 180 ug/L



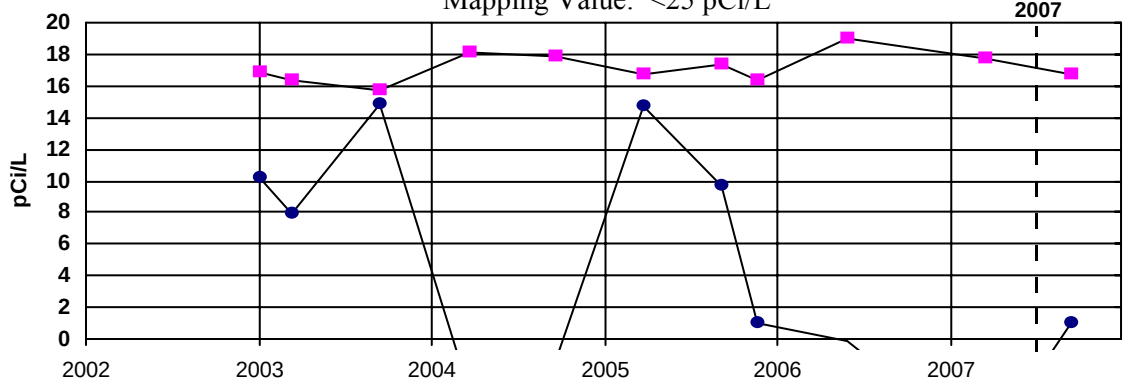
2007 Data: ug/L

03/19	150
09/18	230
09/18	150

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

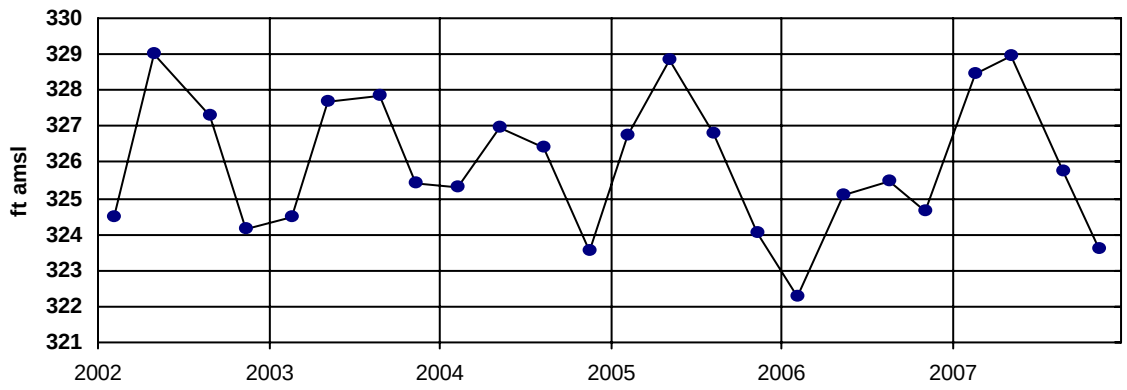
03/19	ND
09/18	ND
09/18	ND

ND=not detected

MW255 LRGA

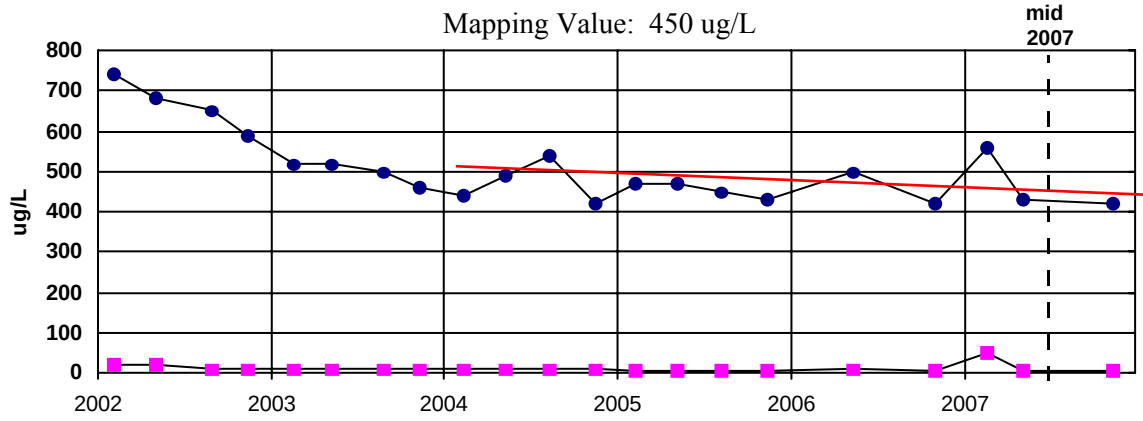
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 450 ug/L



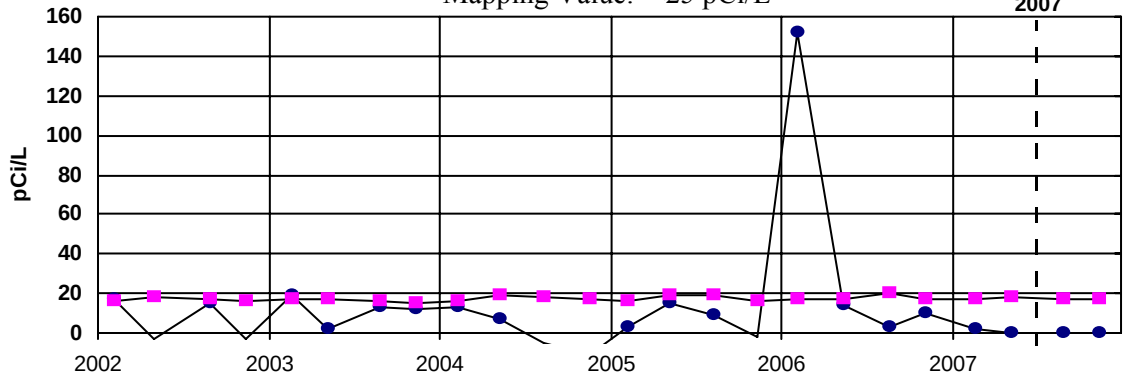
2007 Data: ug/L

02/22	560
05/10	430
11/13	420

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



Data not inluded on graphs: 2/7/2006 152 pCi/L Rejected by data assessment.

2007 Data: pCi/L

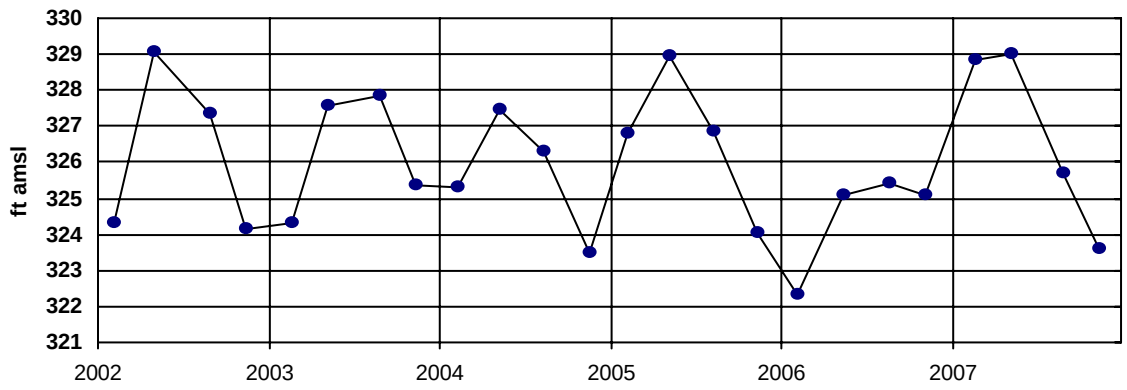
02/22	ND
02/22	ND
05/10	ND
08/29	ND
11/13	ND

ND=not detected

MW256 LRGA

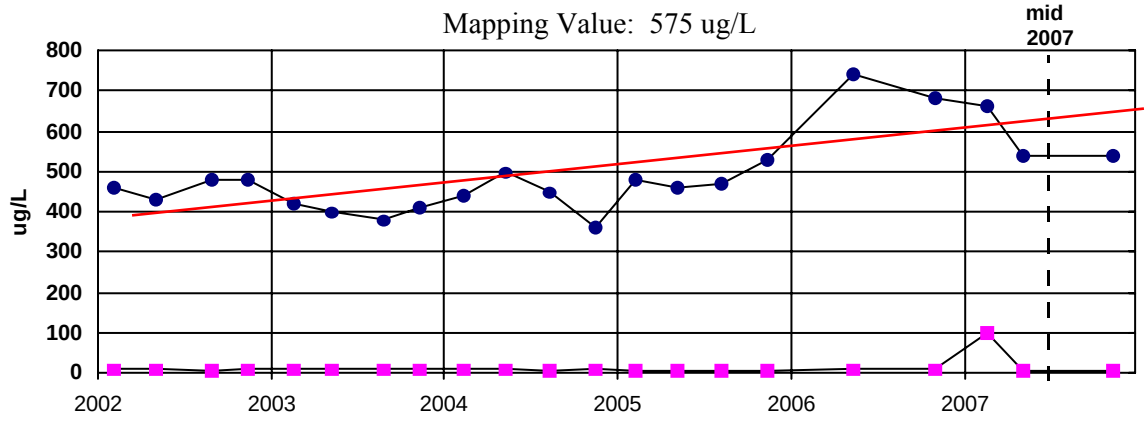
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 575 ug/L



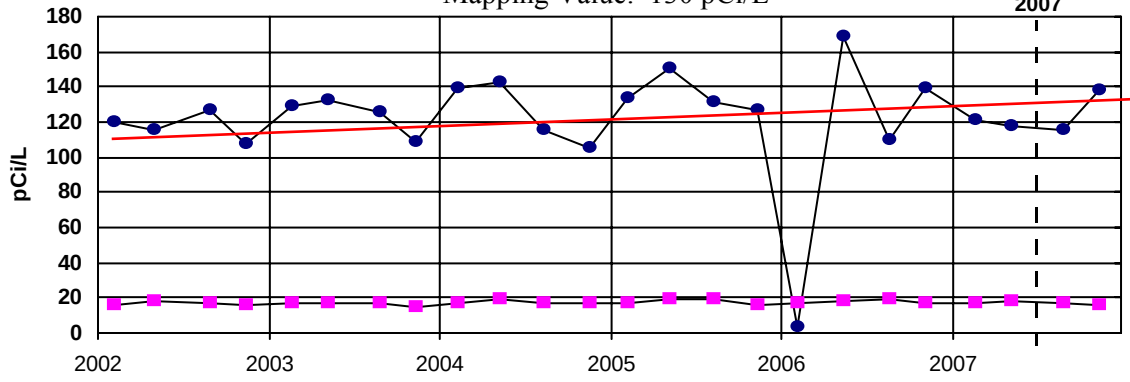
2007 Data: ug/L

02/21	660
05/10	540
11/13	540

ND=not detected

Technetium-99

Mapping Value: 130 pCi/L



Data not inluded on graphs: 2/7/2006 3.26 pCi/L Rejected by data assessment.

2007 Data: pCi/L

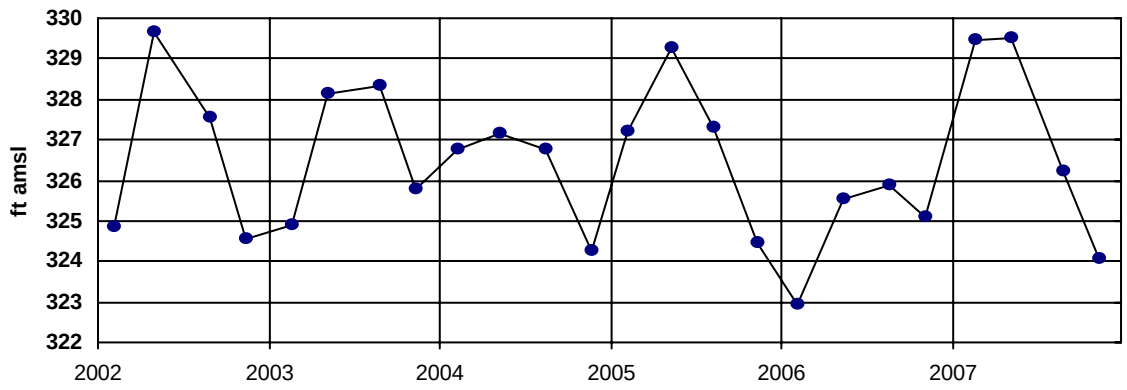
02/21	121
02/21	115
05/10	118
08/29	116
11/13	138

ND=not detected

MW258 LRGA

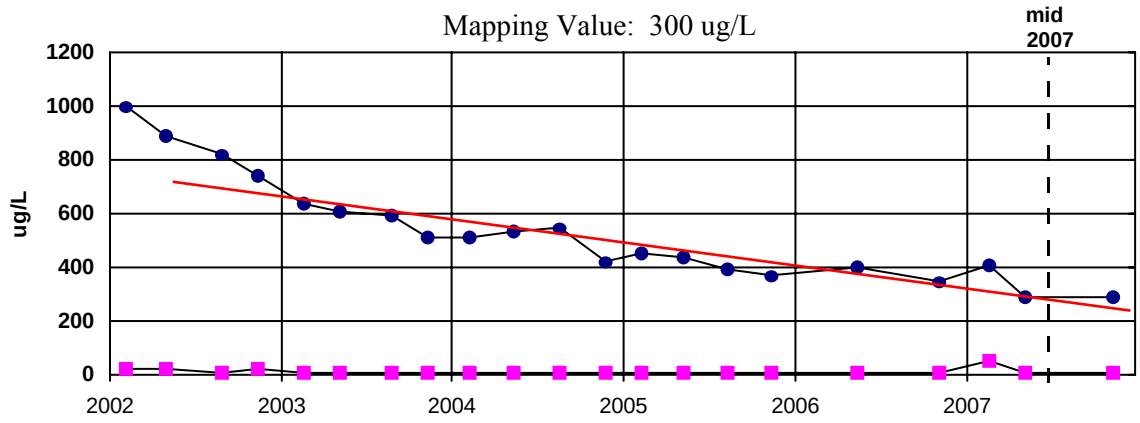
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 300 ug/L

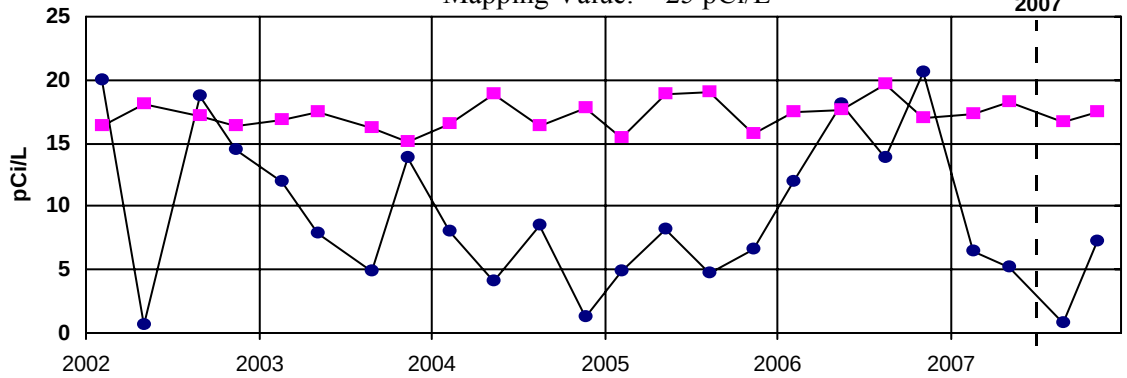


2007 Data:	ug/L
02/21	410
05/10	290
11/12	290

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



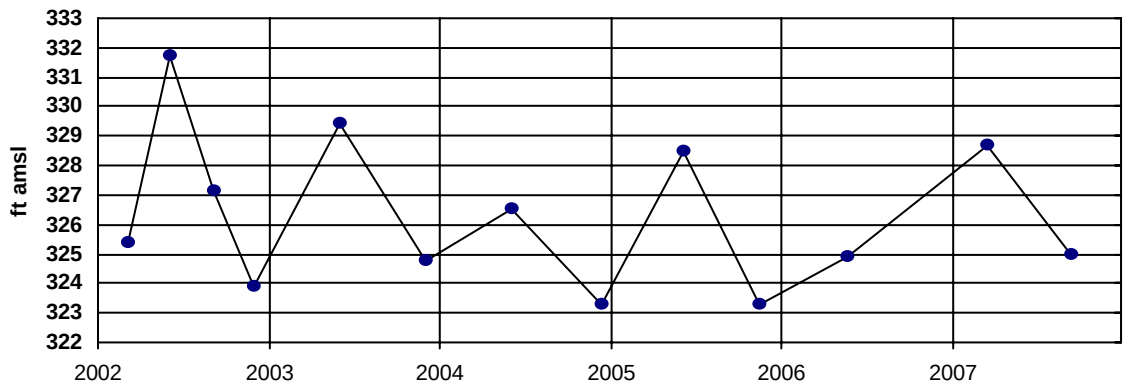
2007 Data:	pCi/L
02/21	6.4
02/21	ND
05/10	ND
08/29	ND
11/12	ND

ND=not detected

MW260 LRGA

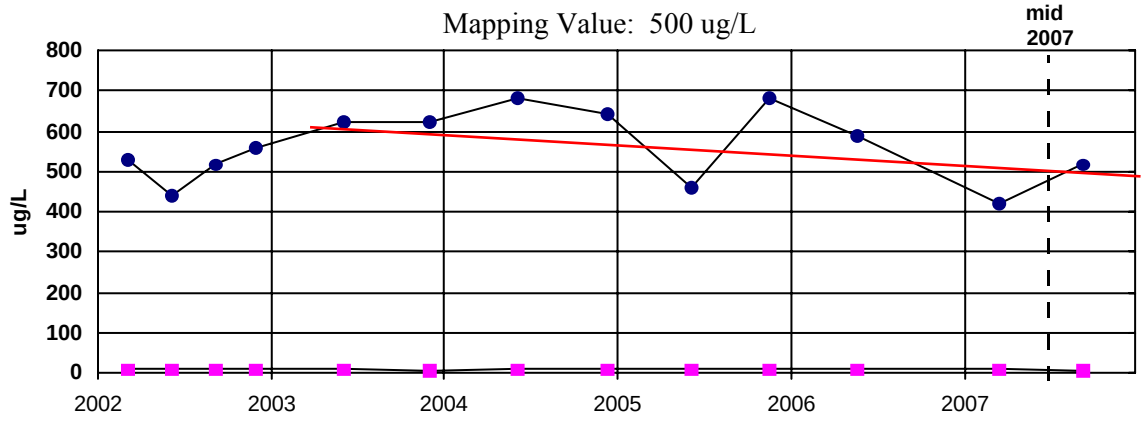
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 500 ug/L



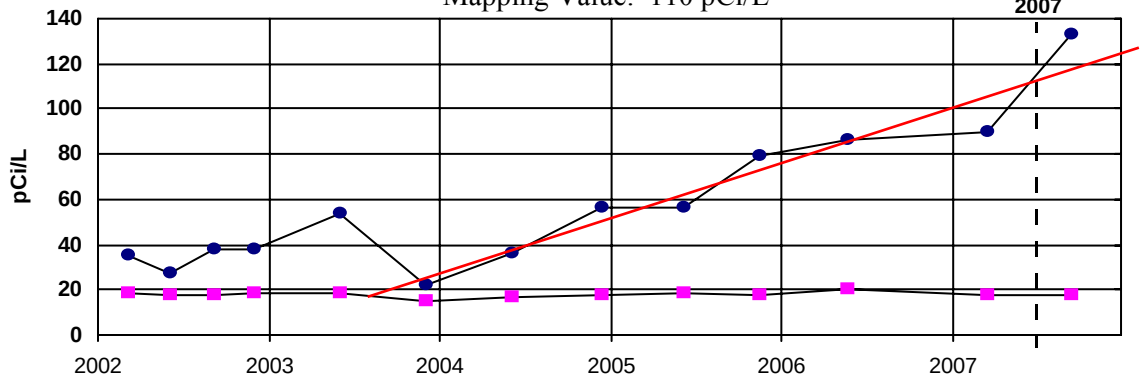
2007 Data: ug/L

03/20	420
09/13	520

ND=not detected

Technetium-99

Mapping Value: 110 pCi/L



2007 Data: pCi/L

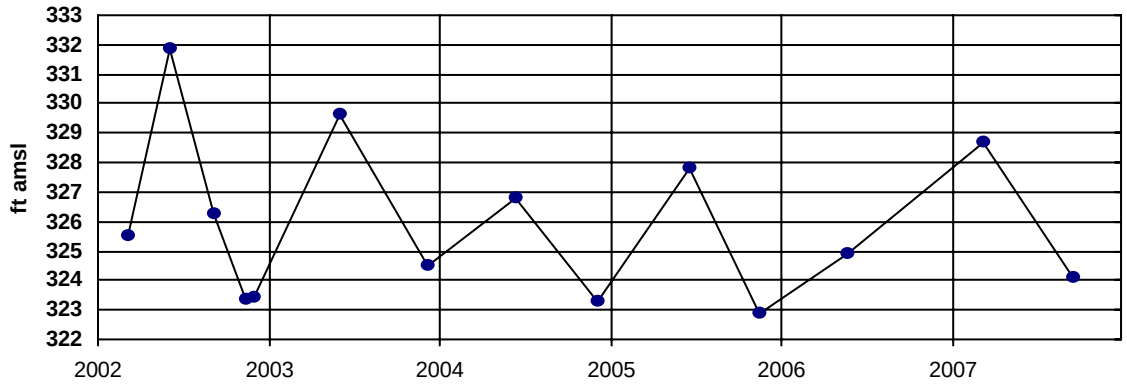
03/20	89.9
09/13	133

ND=not detected

MW261 LRGA

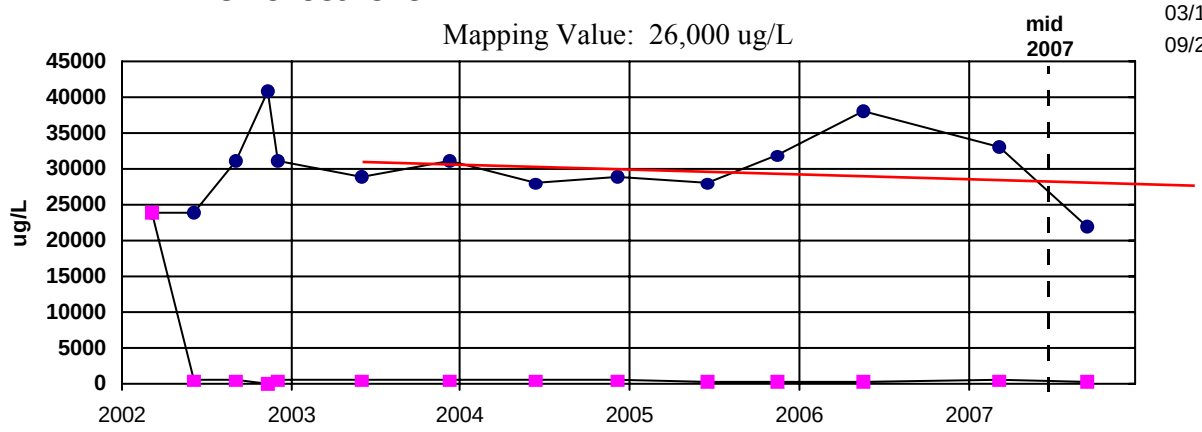
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 26,000 ug/L



2007 Data: ug/L

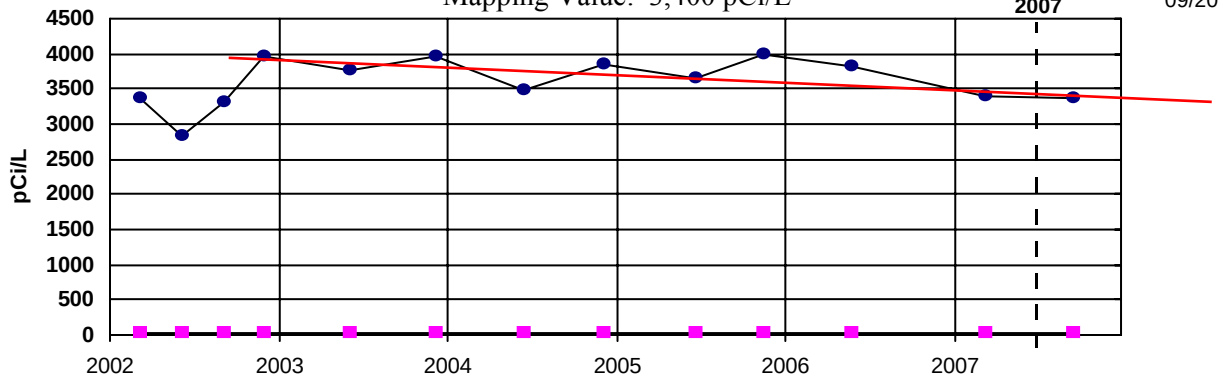
03/12	33000
09/20	22000

Data not inluded on graphs: 11/12/2002 40910 ug/L Rejected by validation.

ND=not detected

Technetium-99

Mapping Value: 3,400 pCi/L



2007 Data: pCi/L

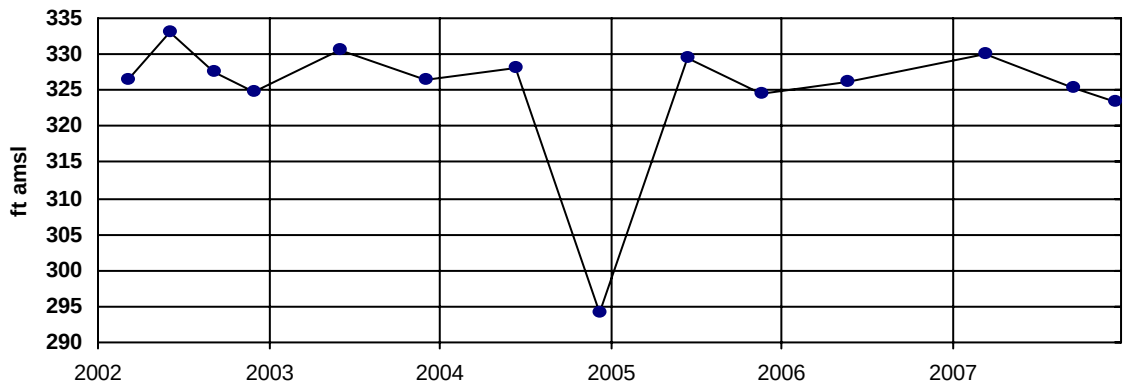
03/12	3400
09/20	3370

ND=not detected

MW262 LRGA

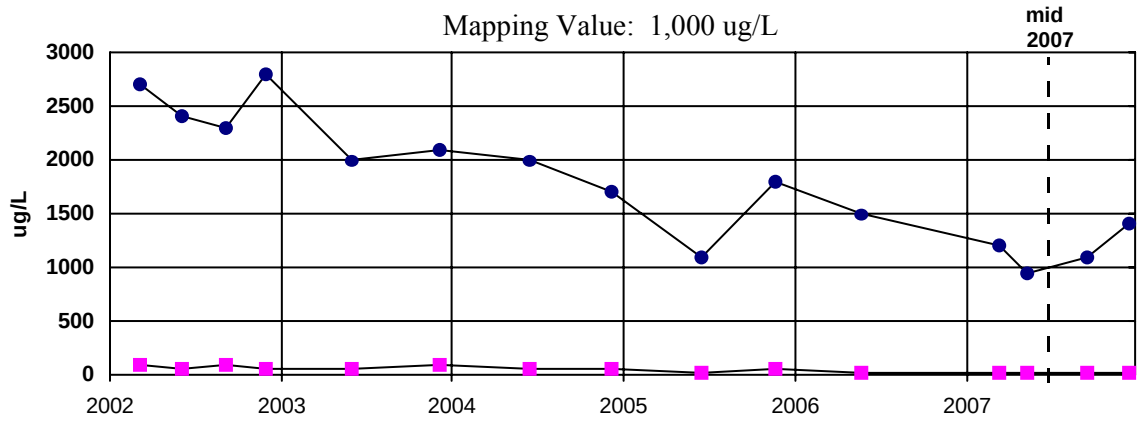
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1,000 ug/L



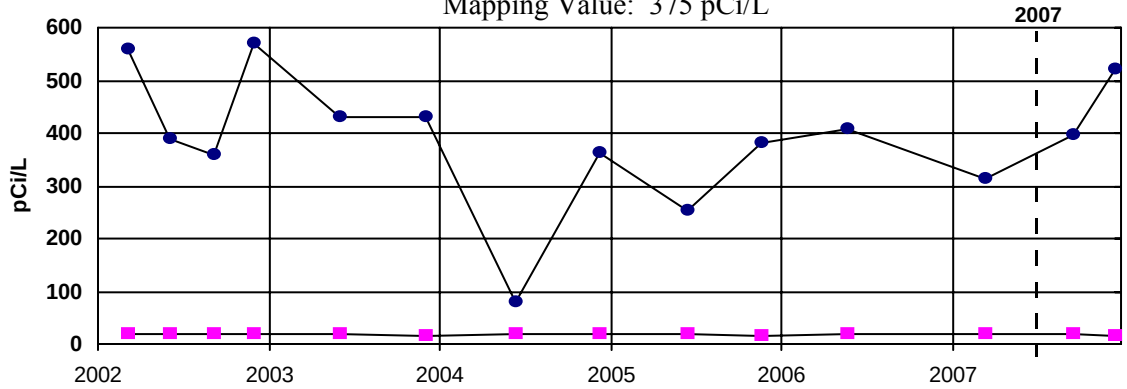
2007 Data: ug/L

03/15	1200
05/16	950
09/19	1100
12/19	1400

ND=not detected

Technetium-99

Mapping Value: 375 pCi/L



2007 Data: pCi/L

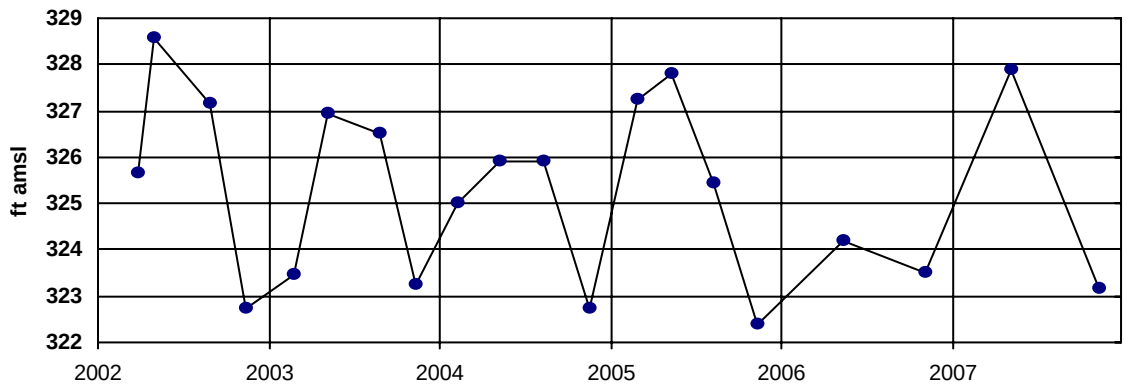
03/15	315
09/19	396
12/19	519

ND=not detected

MW283 LRGA

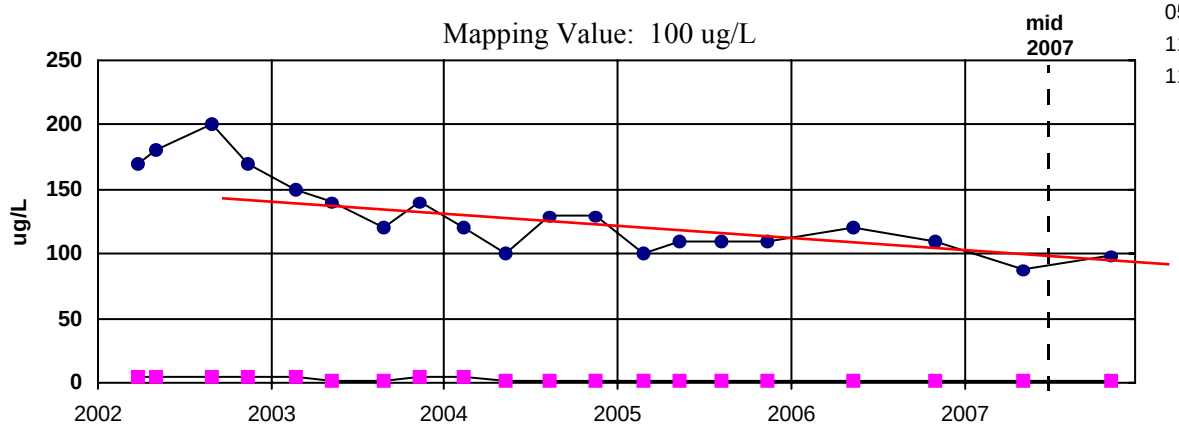
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 100 ug/L



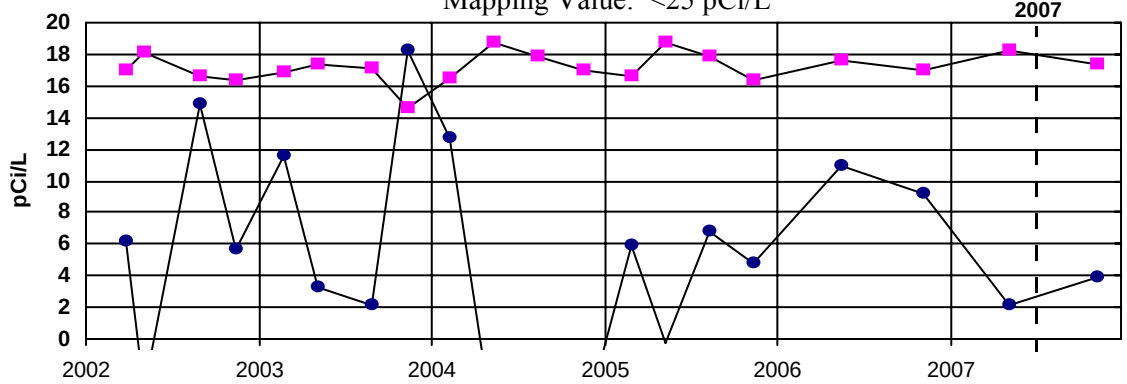
2007 Data: ug/L

05/10	88
11/12	99
11/12	90

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

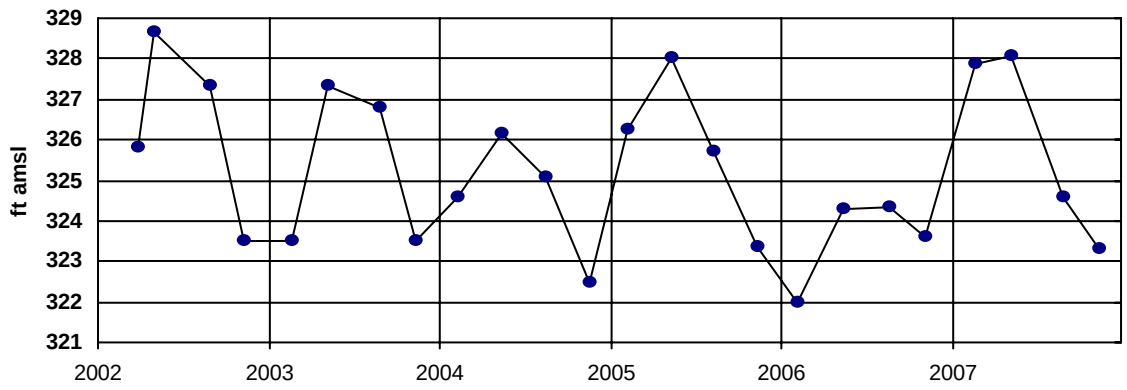
05/10	ND
11/12	ND
11/12	ND

ND=not detected

MW288 LRGA

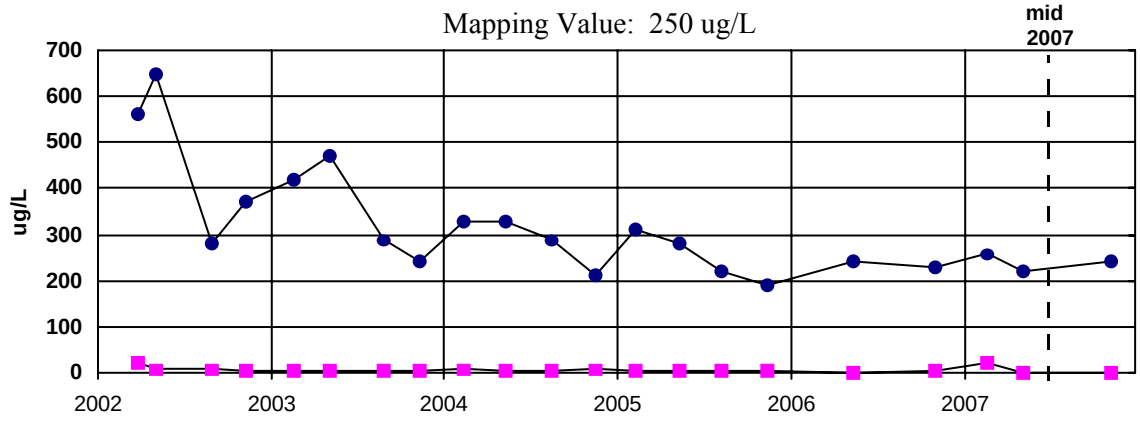
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 250 ug/L

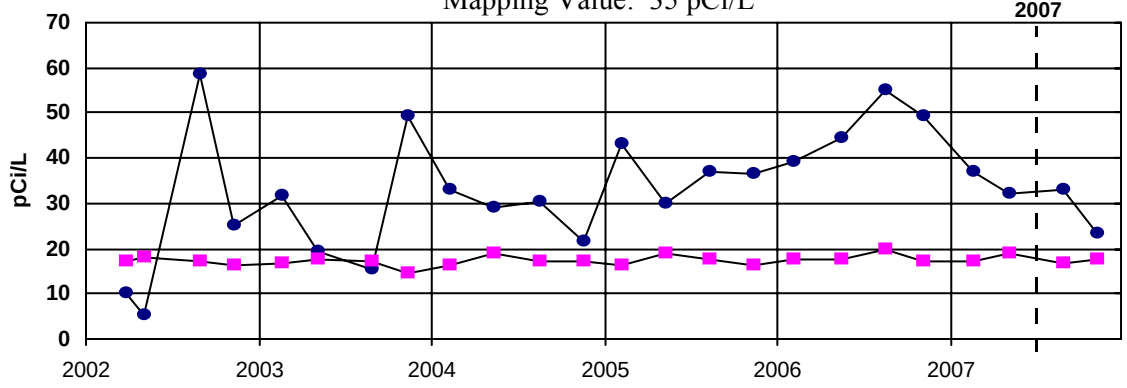


2007 Data:	ug/L
02/22	260
05/09	220
05/09	210
11/12	240

ND=not detected

Technetium-99

Mapping Value: 35 pCi/L



Data not inluded on graphs: 8/29/2002 58.7 pCi/L Rejected by data assessment.

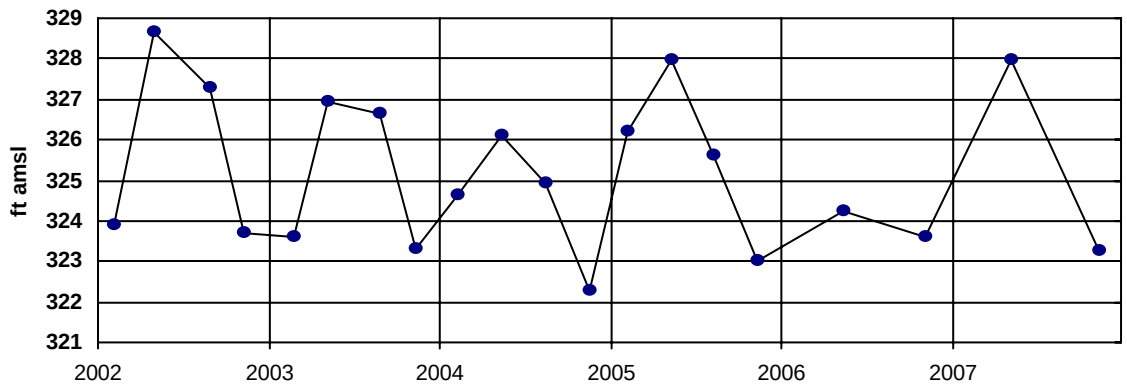
2007 Data:	pCi/L
02/22	37.1
02/22	26.1
05/09	32.1
05/09	25.5
08/29	33
11/12	23.5

ND=not detected

MW291 LRGA

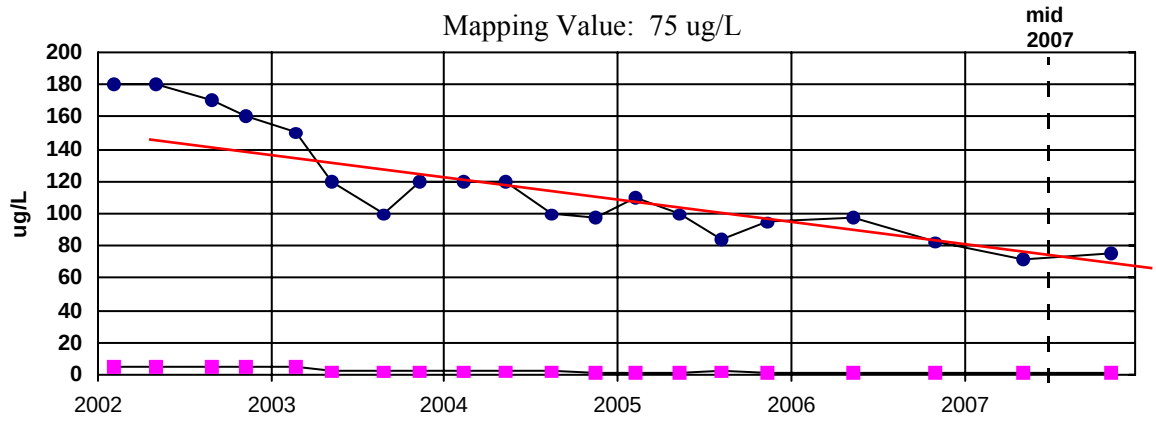
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 75 ug/L



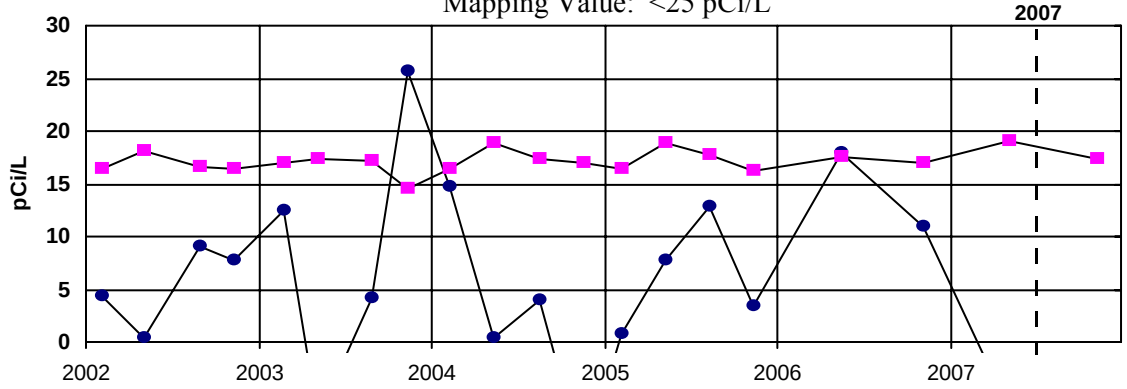
2007 Data: ug/L

05/10	72
11/12	75

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

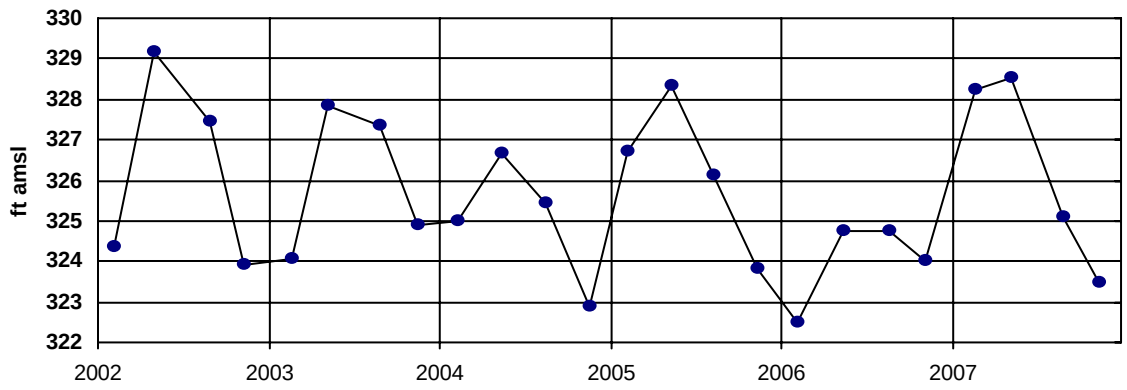
05/10	ND
11/12	ND

ND=not detected

MW292 LRGA

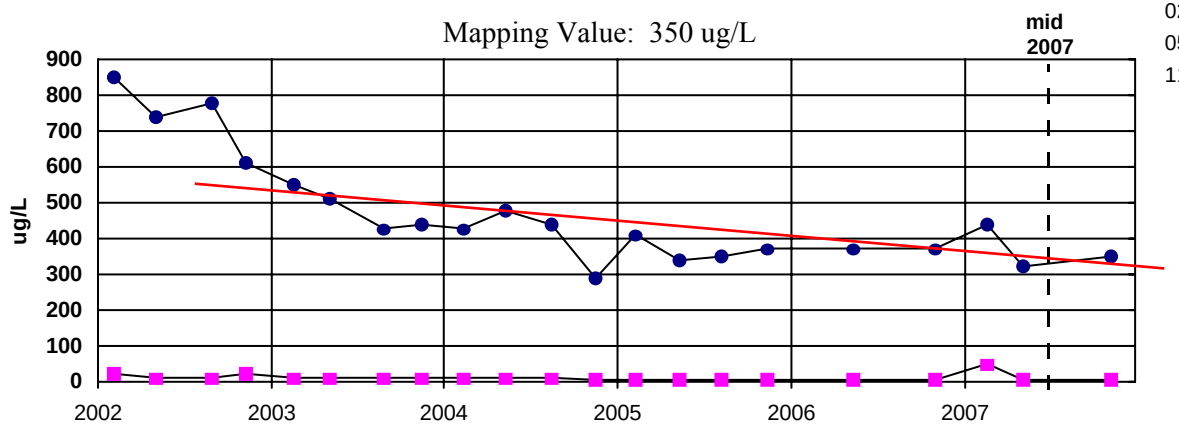
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 350 ug/L

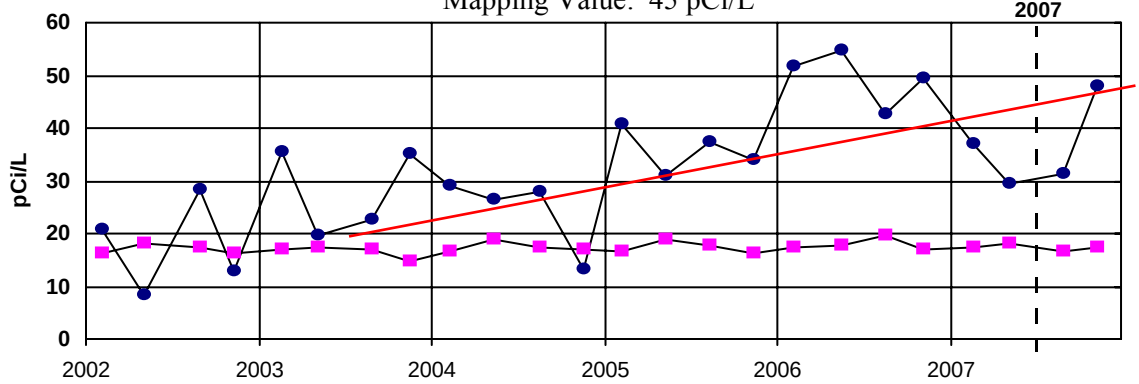


2007 Data:	ug/L
02/22	440
05/09	320
11/12	350

ND=not detected

Technetium-99

Mapping Value: 45 pCi/L



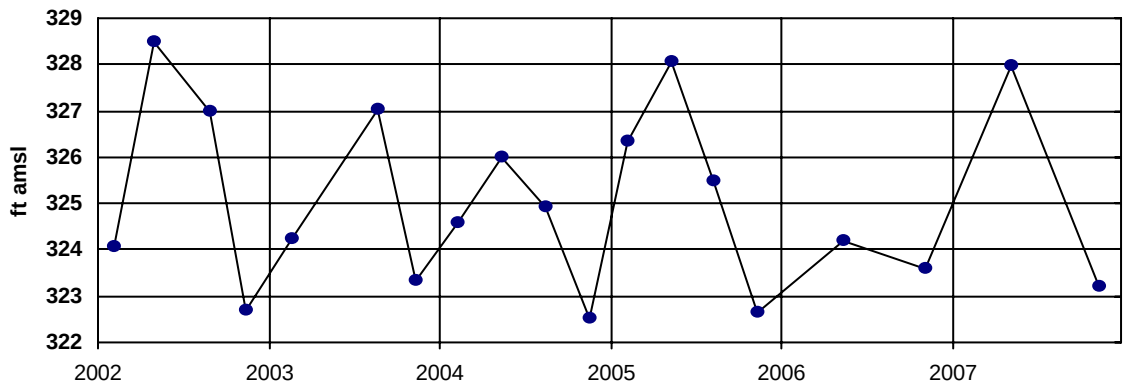
2007 Data:	pCi/L
02/22	36.9
02/22	24.9
05/09	29.5
08/29	31.2
08/29	29
11/12	48.1

ND=not detected

MW294/MW293A LRGA

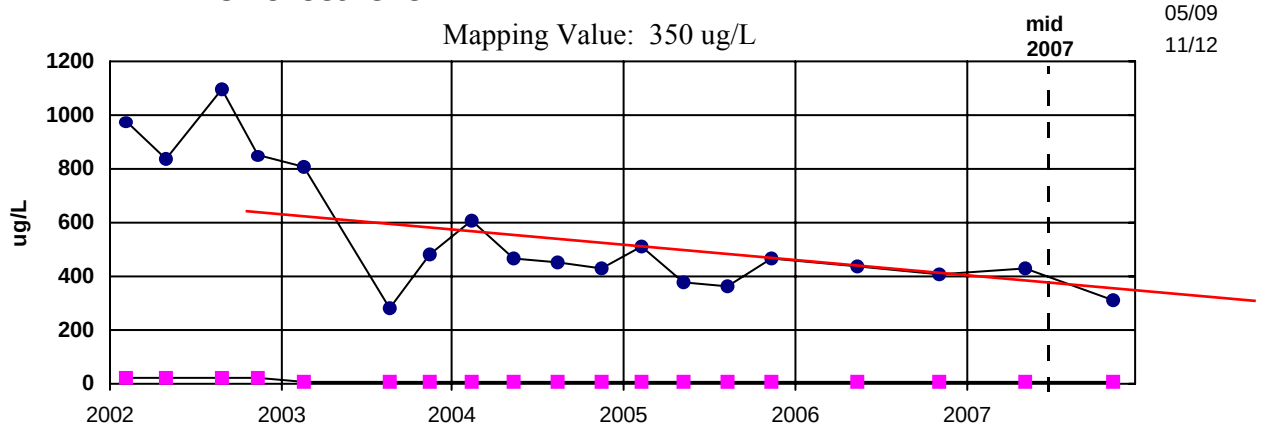
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 350 ug/L

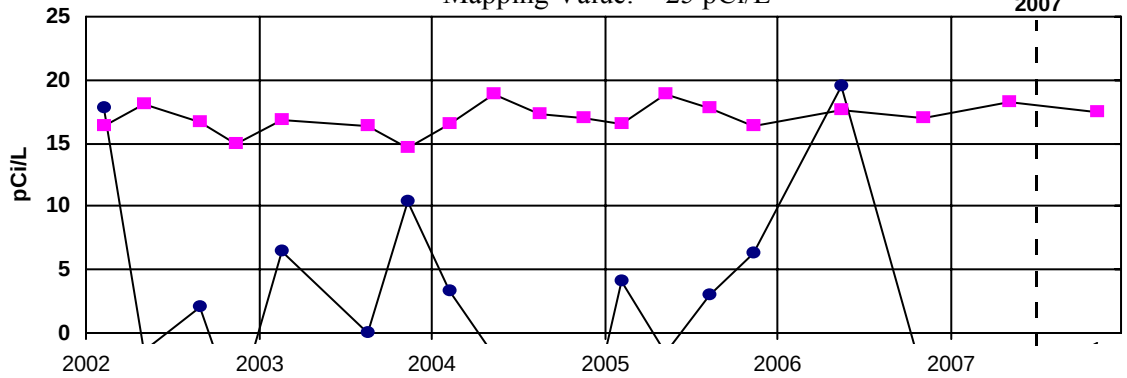


2007 Data:	ug/L
05/09	430
11/12	310

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



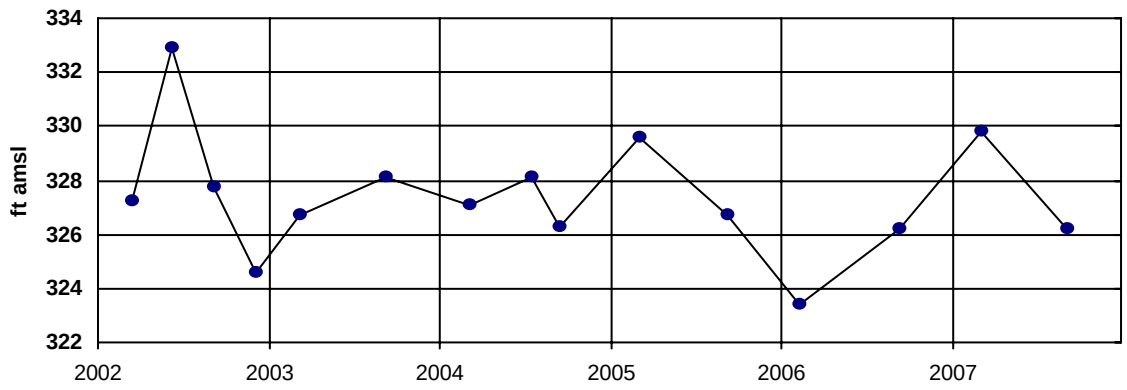
2007 Data:	pCi/L
05/09	ND
11/12	ND

ND=not detected

MW328 **MRGA**

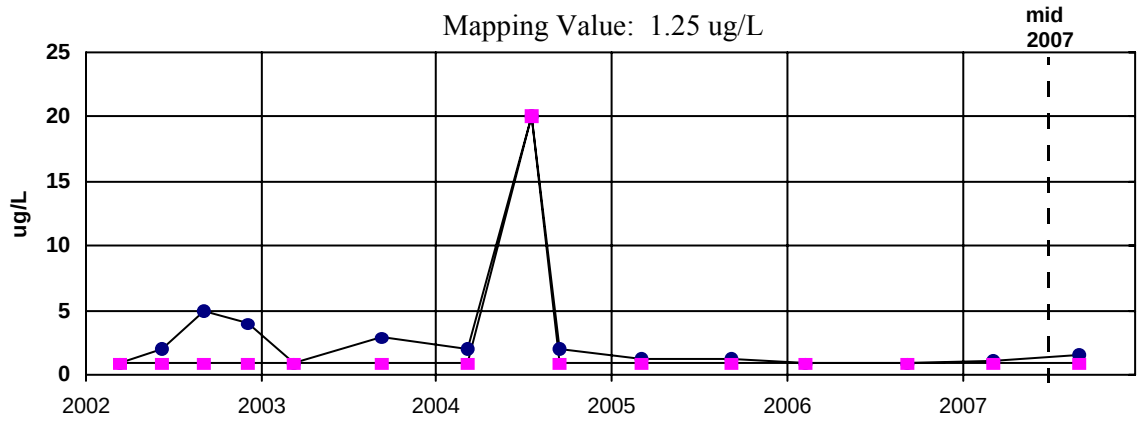
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1.25 ug/L



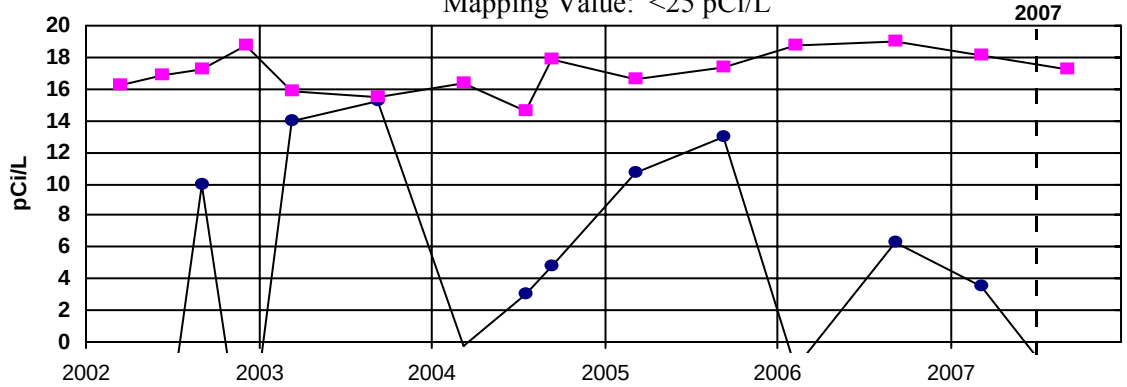
2007 Data: ug/L

03/08	1.1
09/06	1.6

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

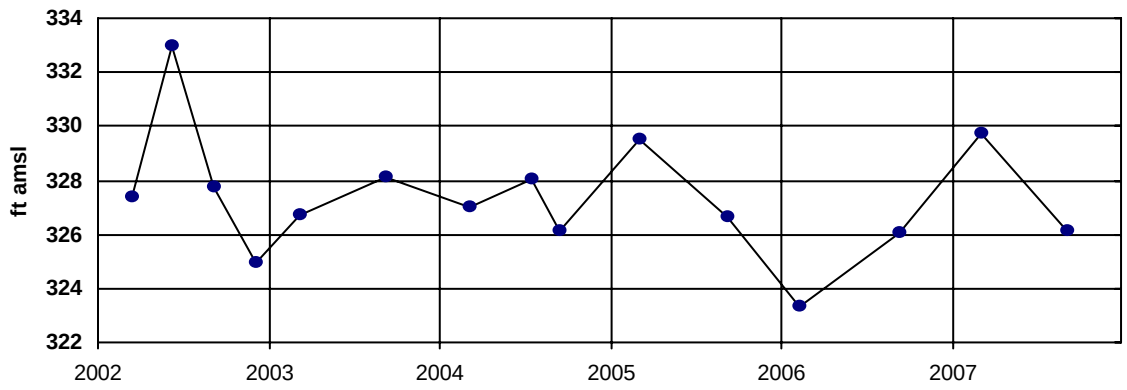
03/08	ND
09/06	ND

ND=not detected

MW329 URGA

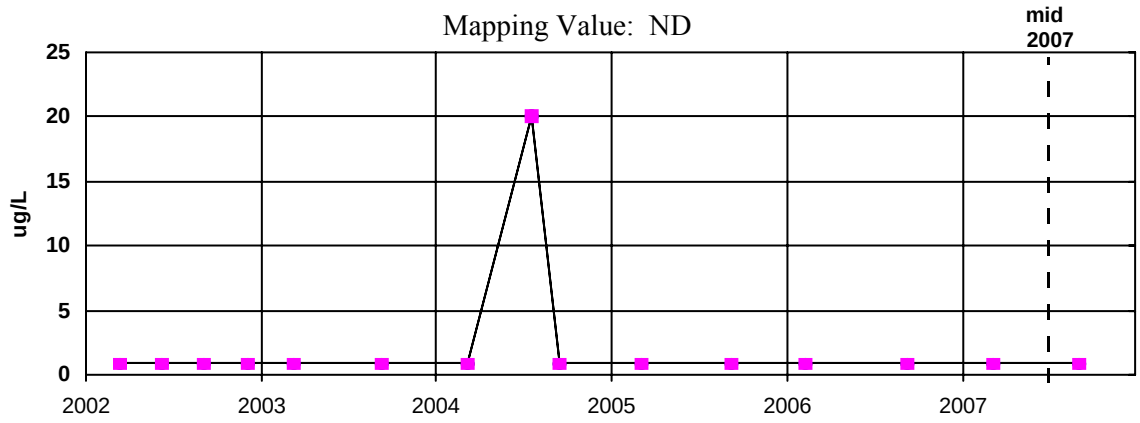
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND



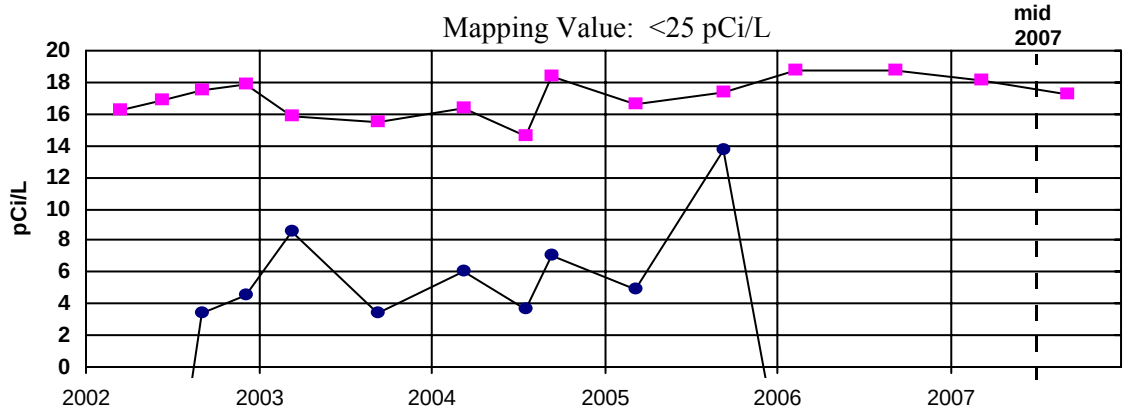
2007 Data: ug/L

03/08	ND
09/06	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

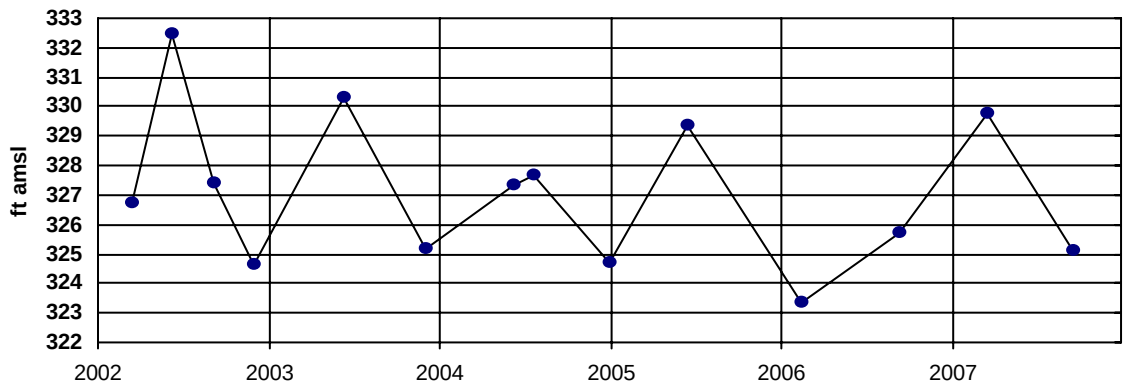
03/08	ND
09/06	ND

ND=not detected

MW333 MRGA

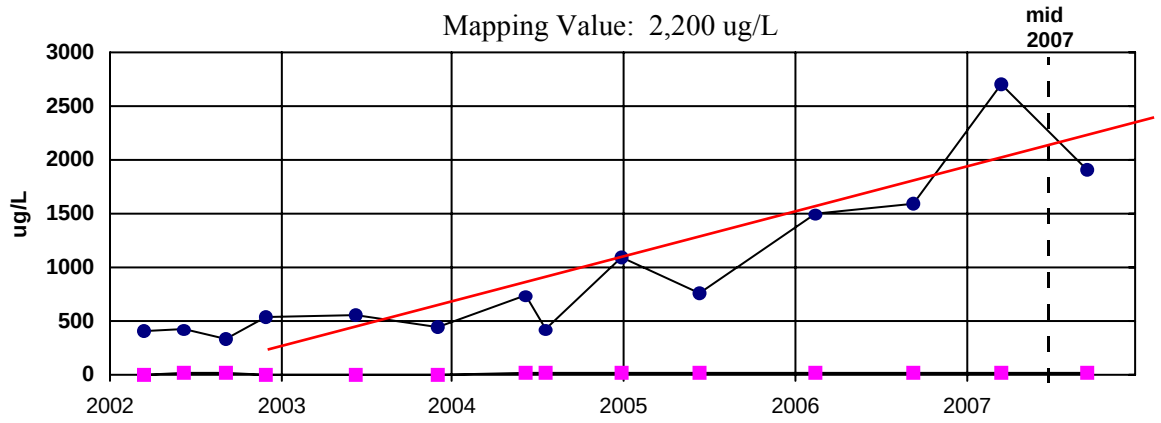
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 2,200 ug/L



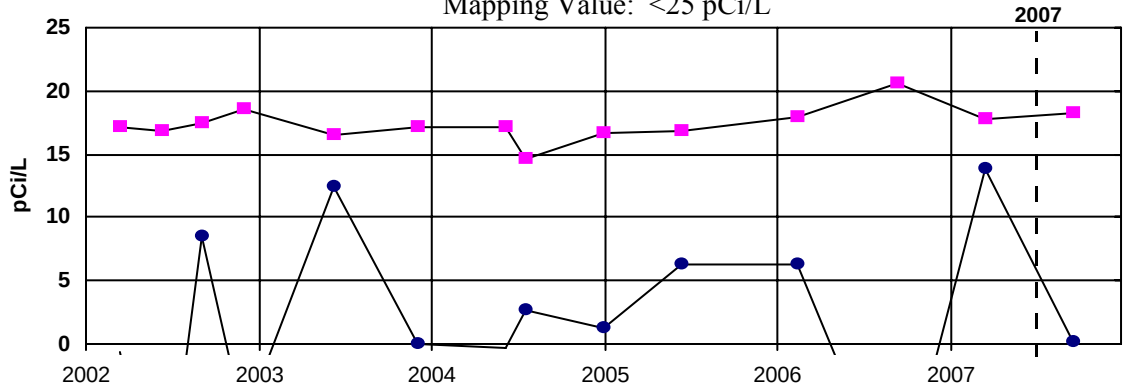
2007 Data: ug/L

03/19	2700
09/19	1900

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

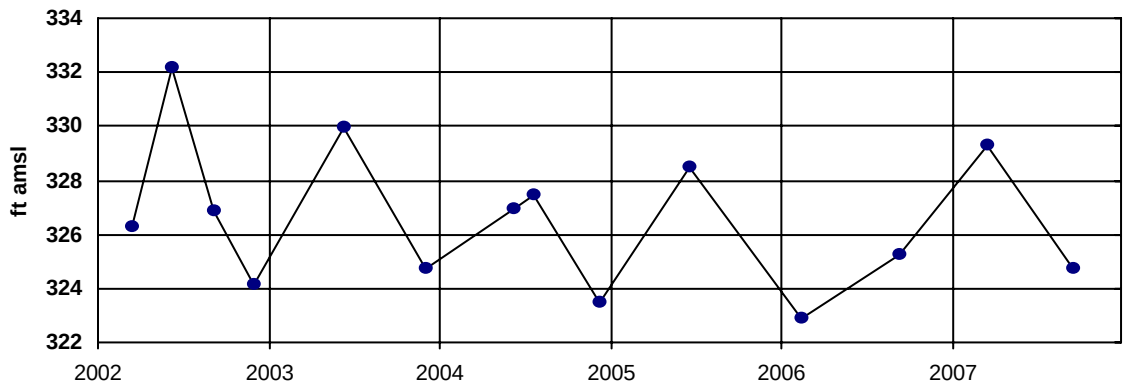
03/19	ND
09/19	ND

ND=not detected

MW337 MRGA

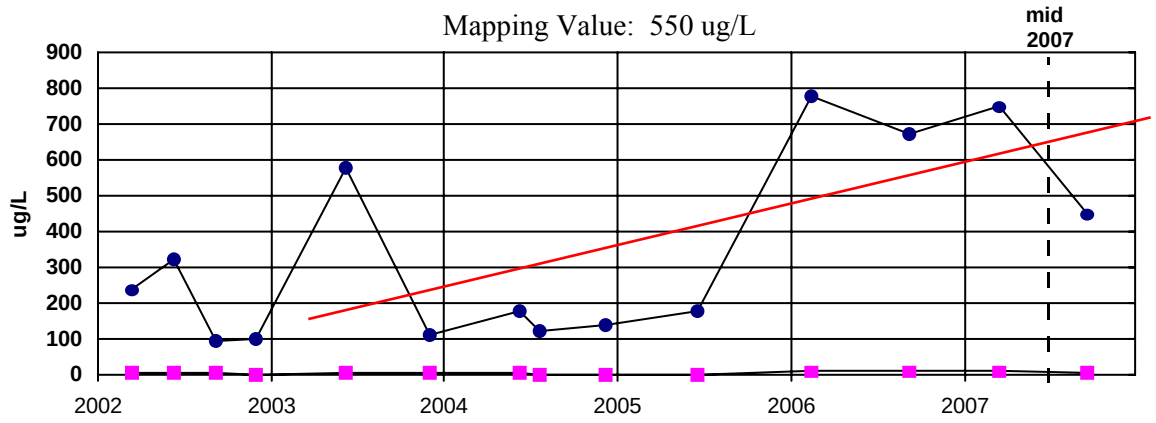
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 550 ug/L



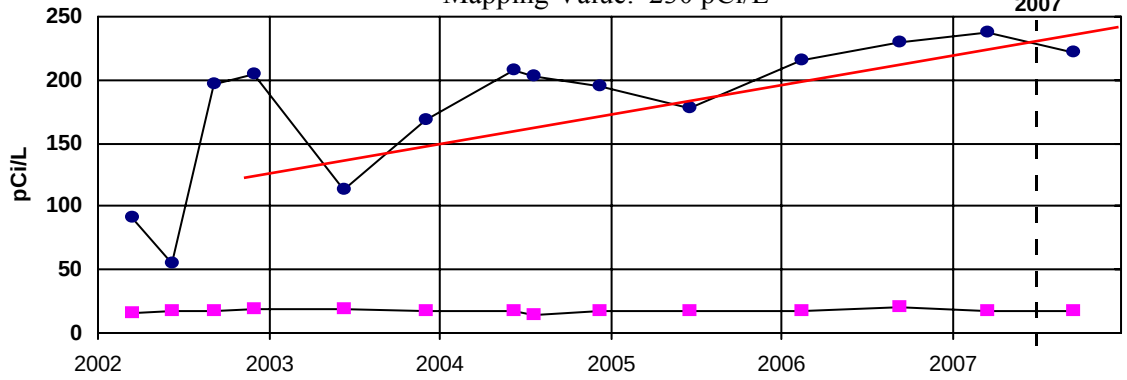
2007 Data: ug/L

03/19	750
09/19	450

ND=not detected

Technetium-99

Mapping Value: 230 pCi/L



2007 Data: pCi/L

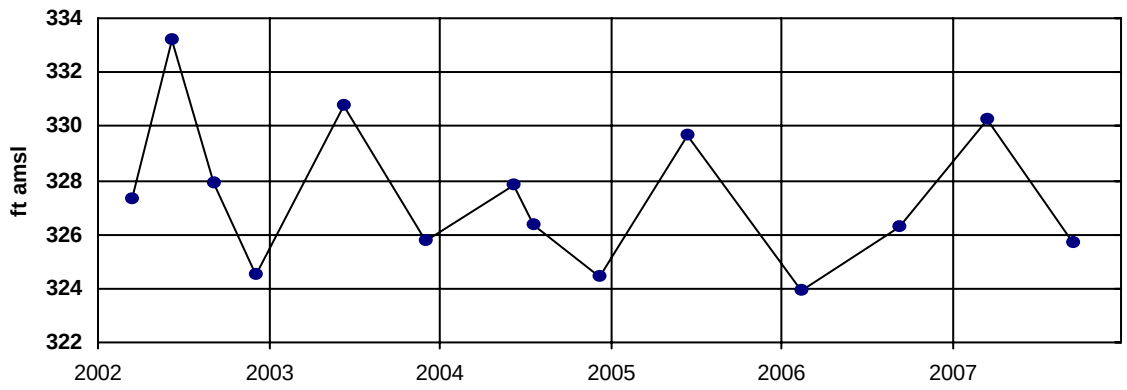
03/19	237
09/19	222

ND=not detected

MW338 URGA

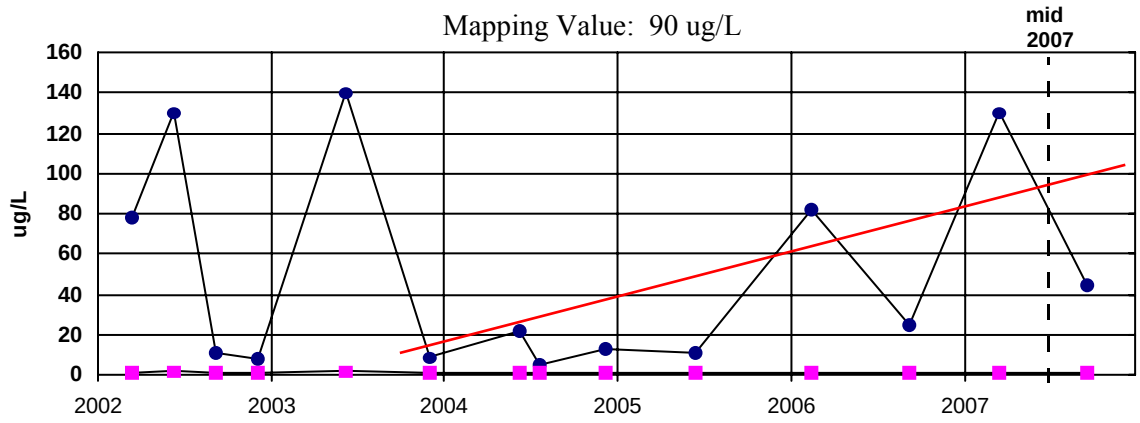
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 90 ug/L

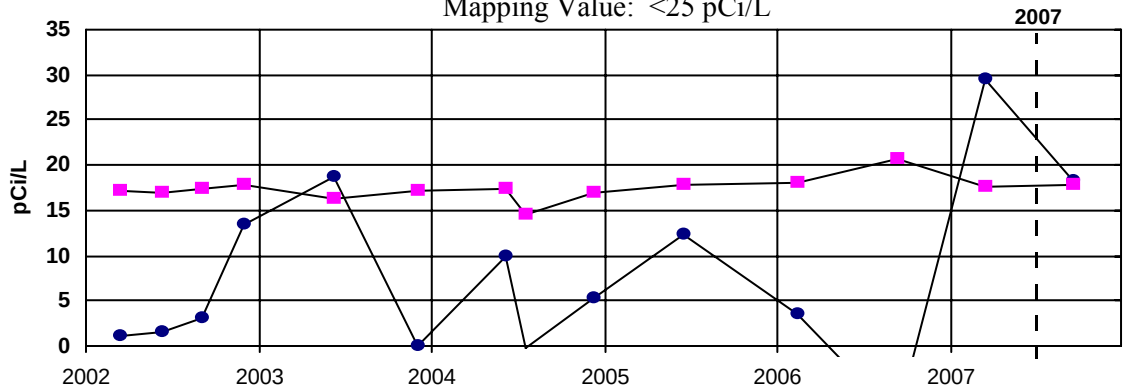


2007 Data:	ug/L
03/19	130
09/19	44
09/19	44

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



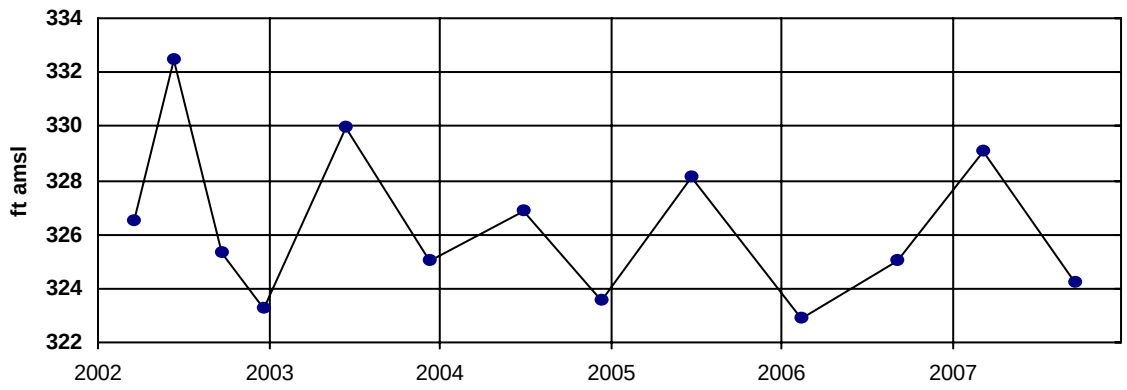
2007 Data:	pCi/L
03/19	29.4
09/19	18.2
09/19	ND

ND=not detected

MW339 LRGA

Result | Detection Limit | Trend Line

Water Level Elevation

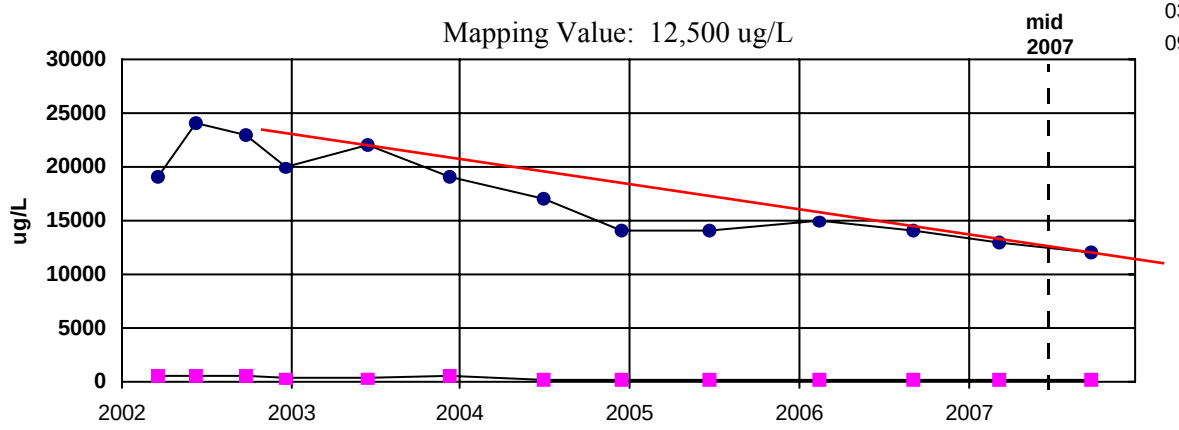


Trichloroethene

Mapping Value: 12,500 ug/L

2007 Data: ug/L

03/12	13000
09/25	12000



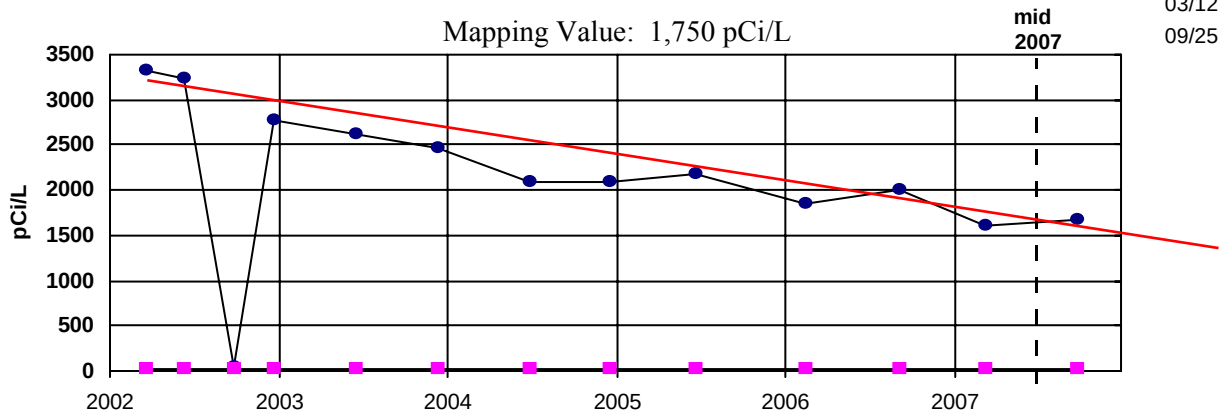
ND=not detected

Technetium-99

Mapping Value: 1,750 pCi/L

2007 Data: pCi/L

03/12	1610
09/25	1680

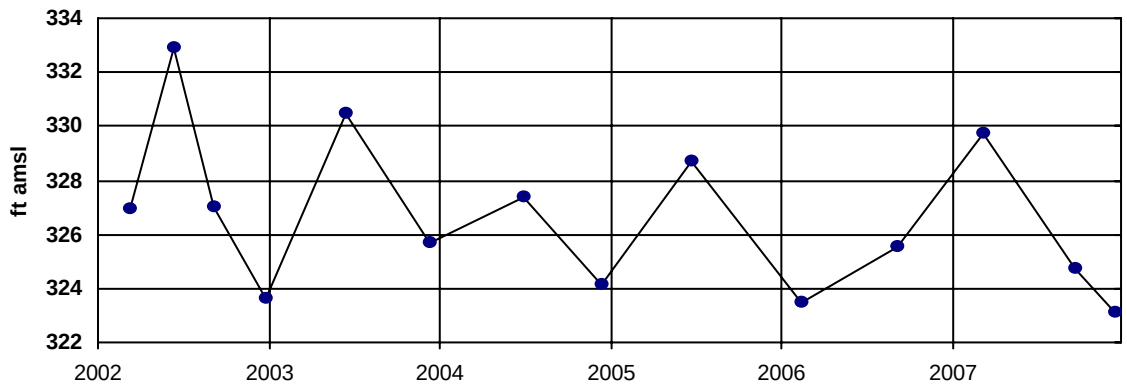


ND=not detected

MW340 LRGA

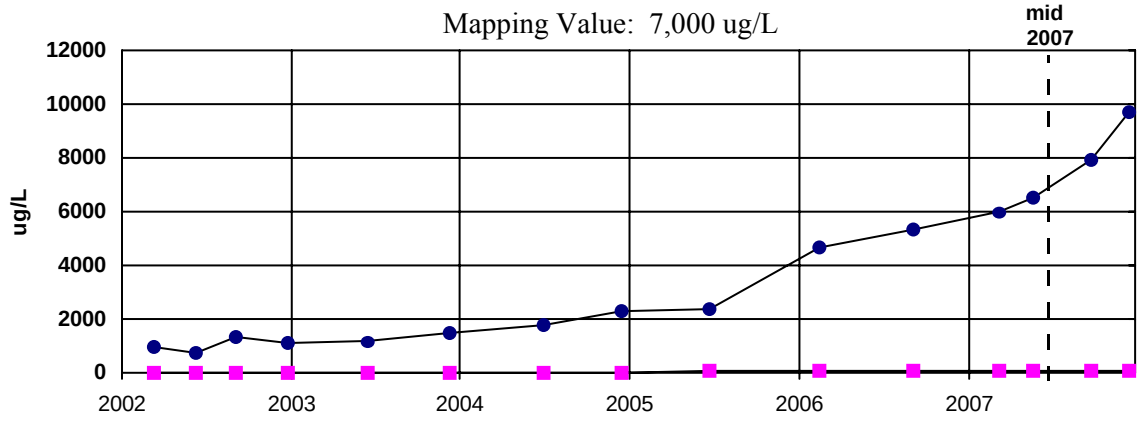
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 7,000 ug/L



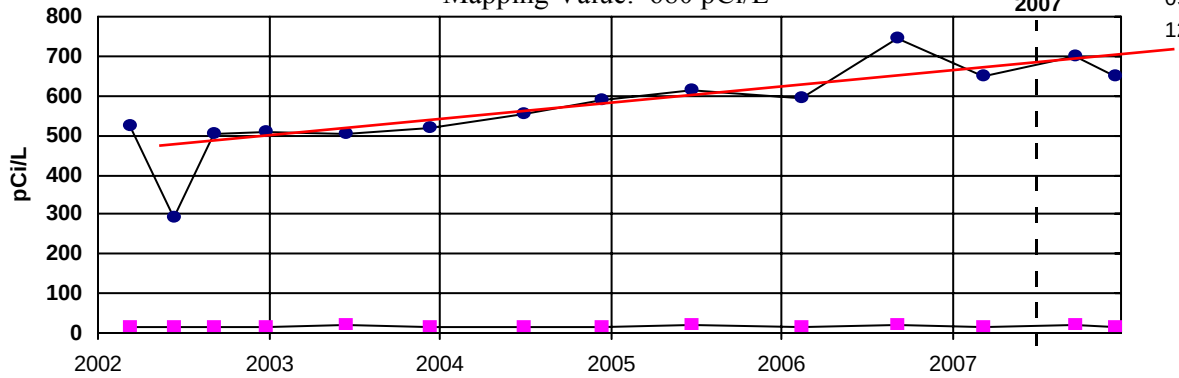
2007 Data: ug/L

03/12	6000
05/23	6500
09/25	7900
12/19	9700

ND=not detected

Technetium-99

Mapping Value: 680 pCi/L



2007 Data: pCi/L

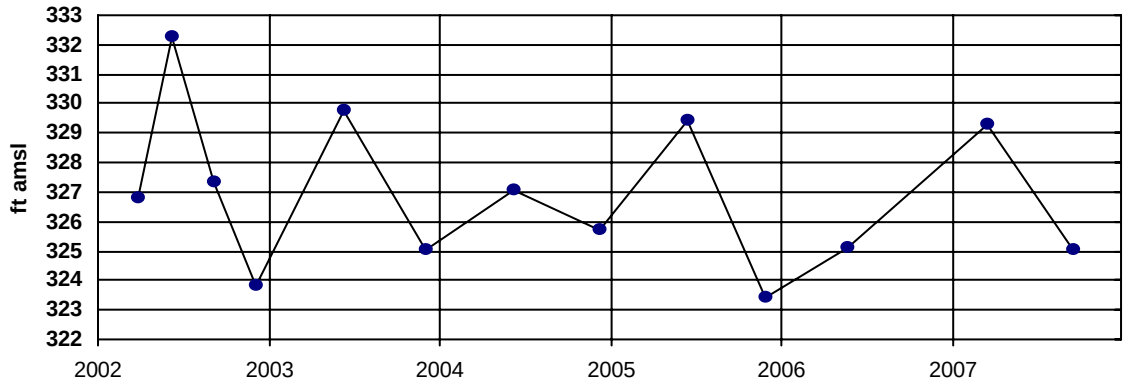
03/12	648
09/25	701
12/19	647

ND=not detected

MW341 MRGA

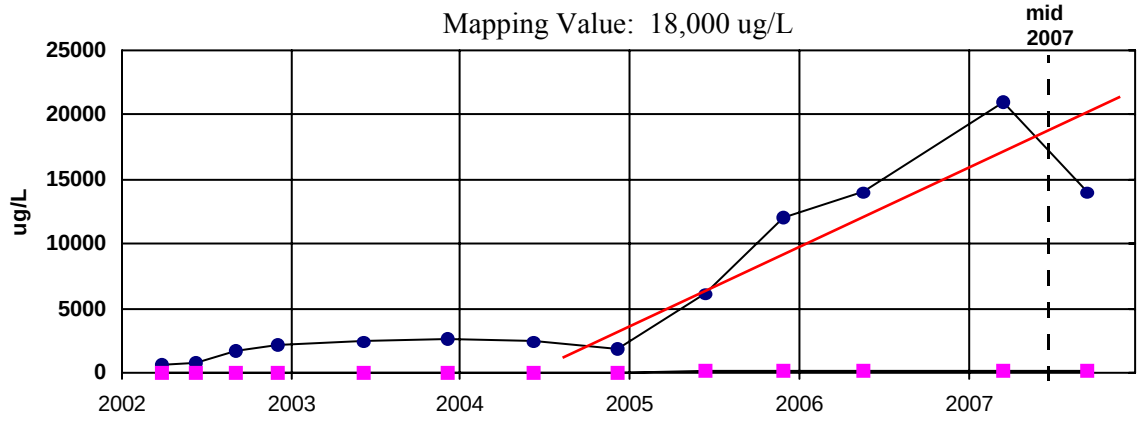
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 18,000 ug/L



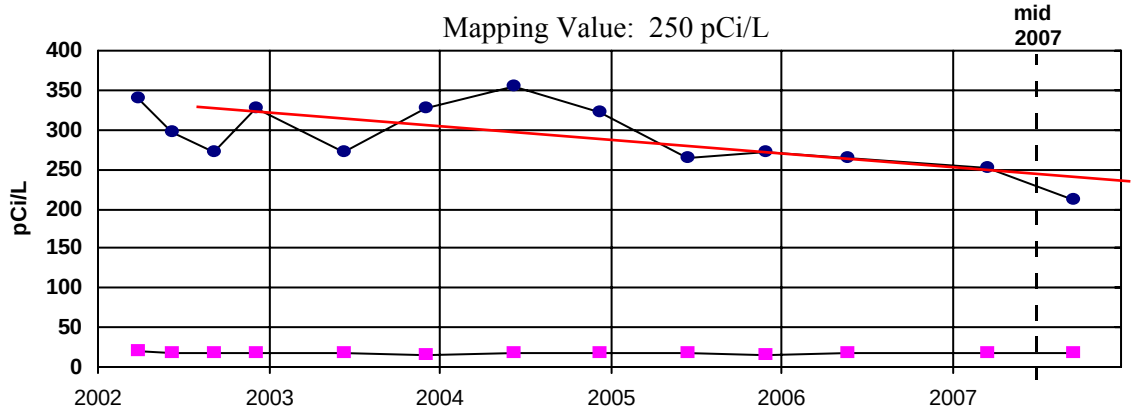
2007 Data: ug/L

03/19	21000
09/20	14000

ND=not detected

Technetium-99

Mapping Value: 250 pCi/L



2007 Data: pCi/L

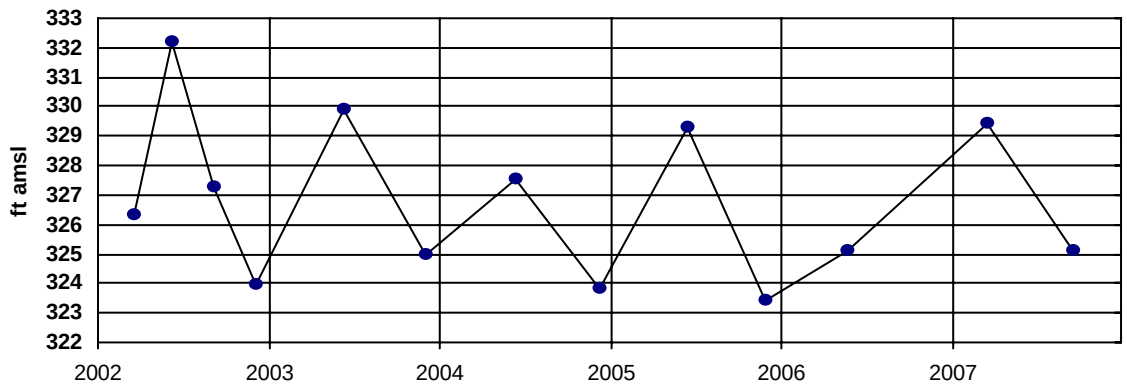
03/19	251
09/20	212

ND=not detected

MW343 LRGA

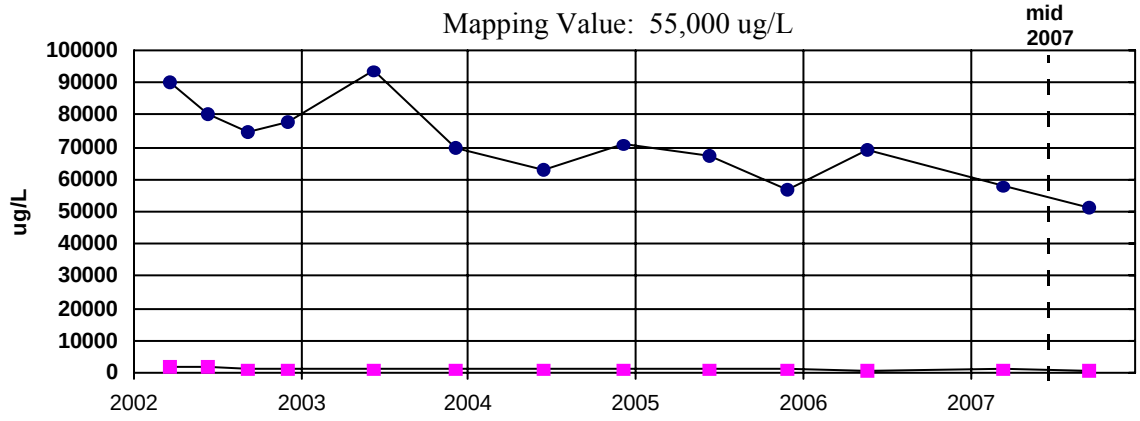
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 55,000 ug/L



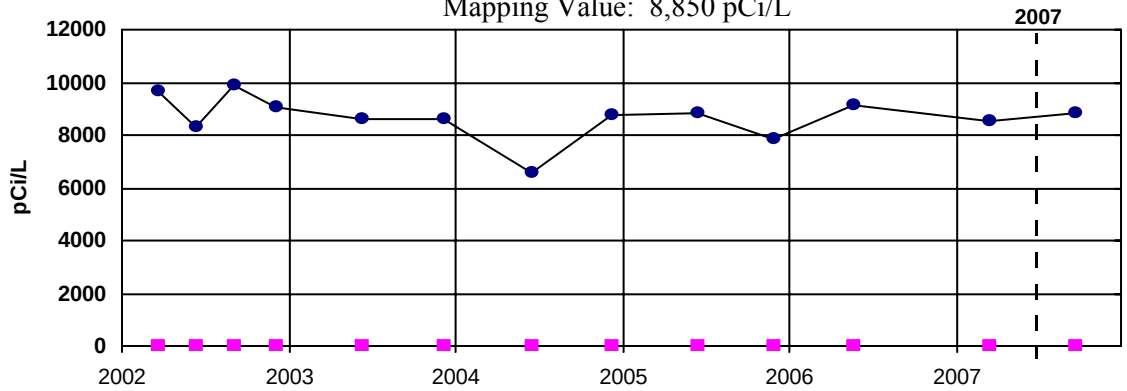
2007 Data: ug/L

03/19	58000
03/19	55000
09/20	51000

ND=not detected

Technetium-99

Mapping Value: 8,850 pCi/L



2007 Data: pCi/L

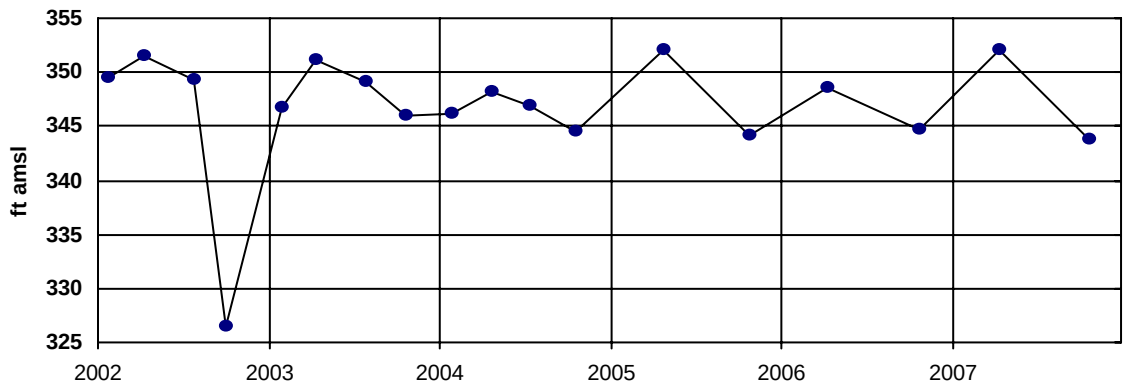
03/19	8480
03/19	8500
09/20	8850

ND=not detected

MW344 URGA

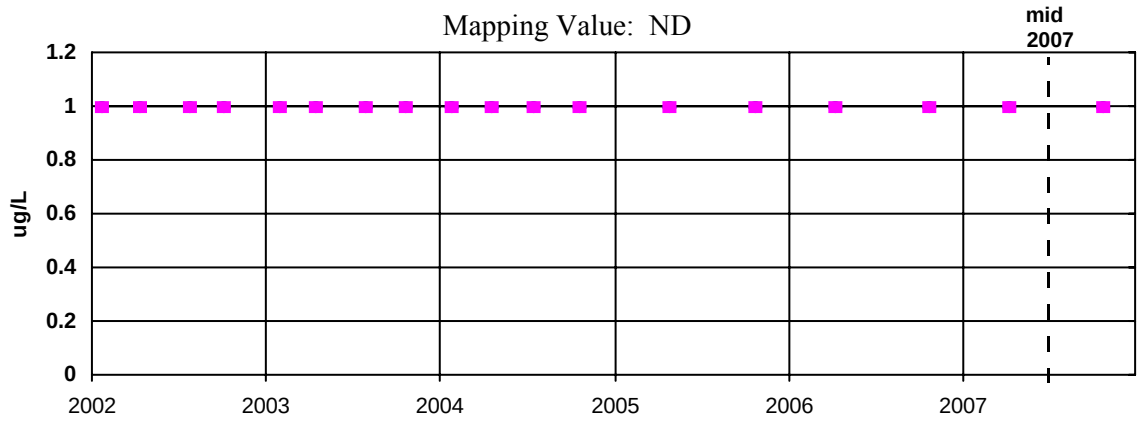
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

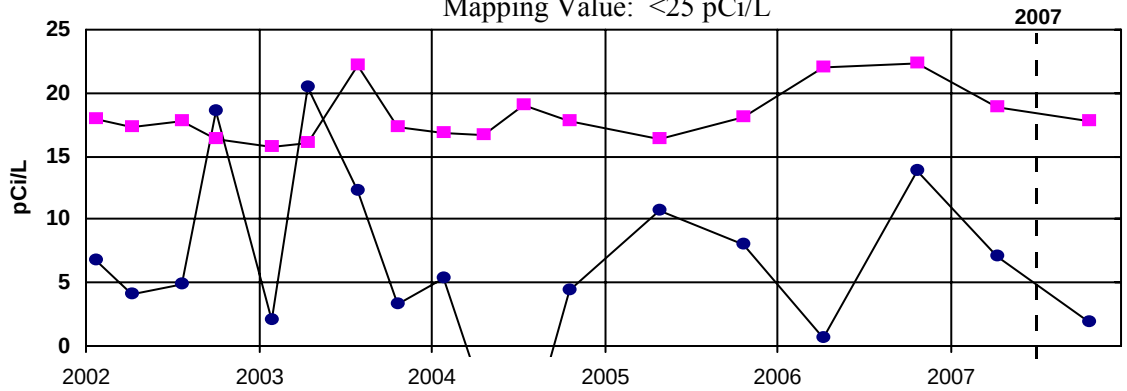


2007 Data:	ug/L
04/12	ND
04/12	ND
10/25	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



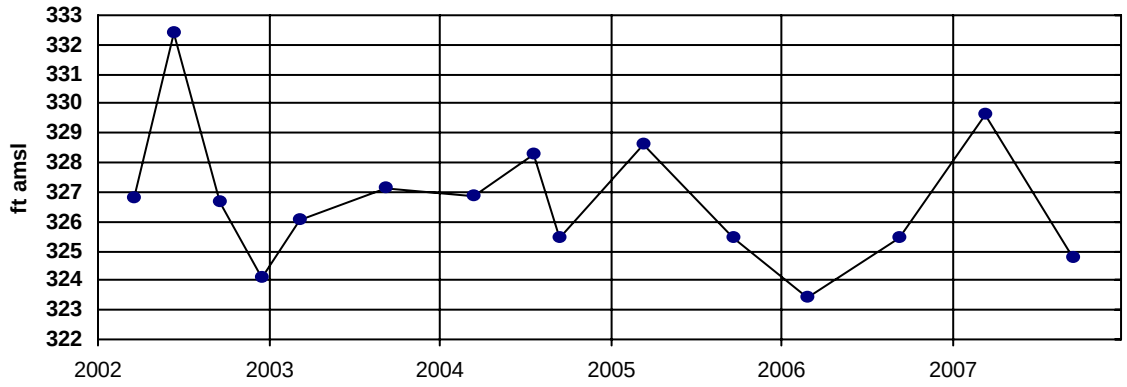
2007 Data:	pCi/L
04/12	ND
04/12	ND
10/25	ND

ND=not detected

MW354 **MRGA**

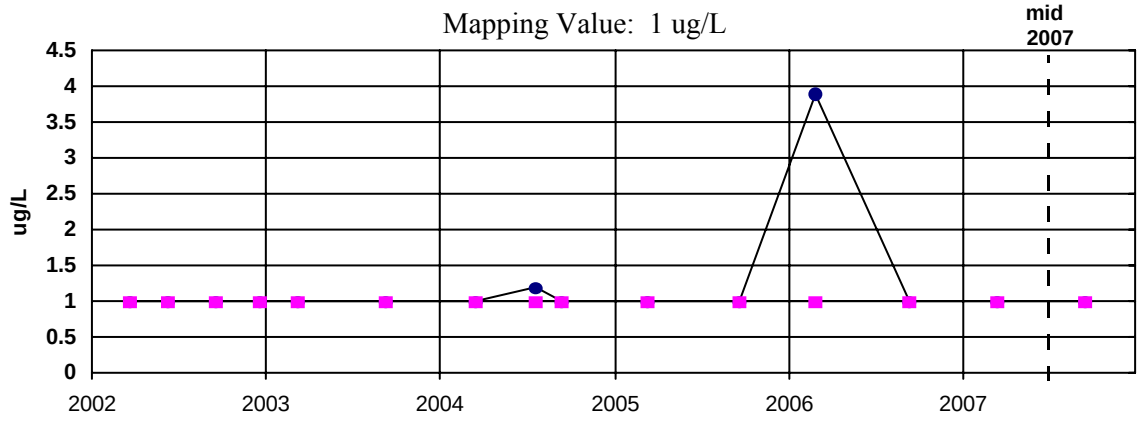
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1 ug/L



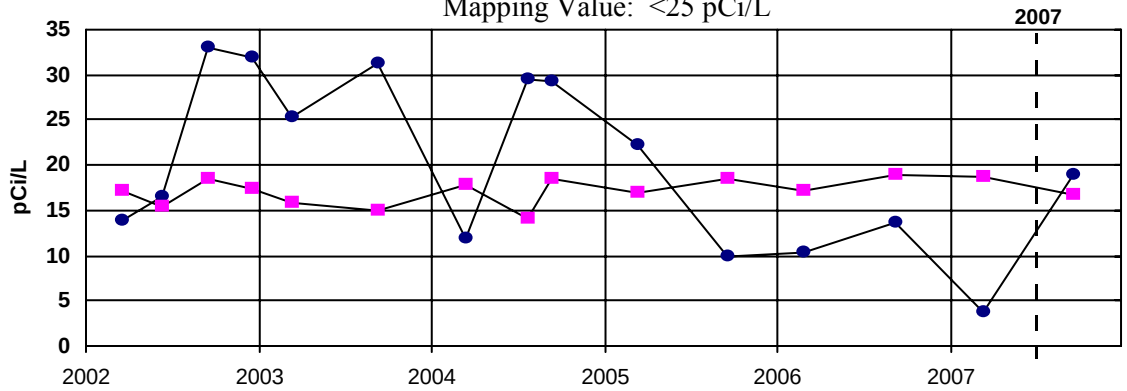
2007 Data: ug/L

03/15	1
09/19	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

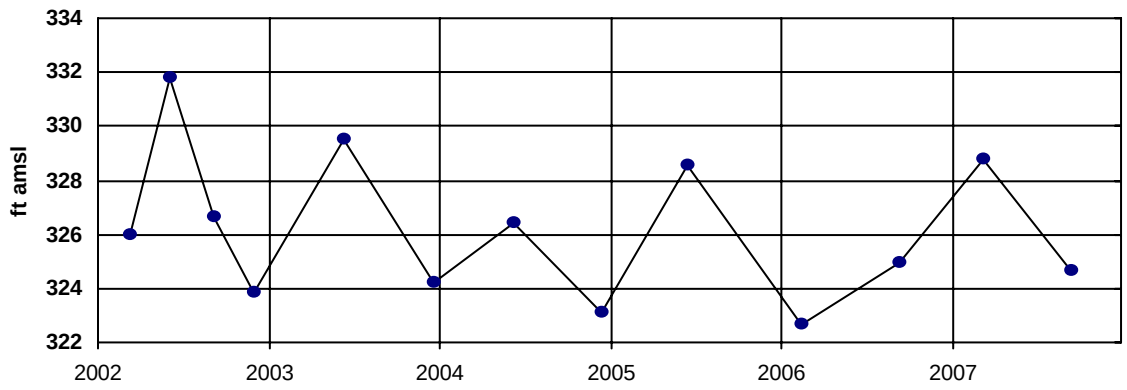
03/15	ND
09/19	18.9

ND=not detected

MW355 LRGA

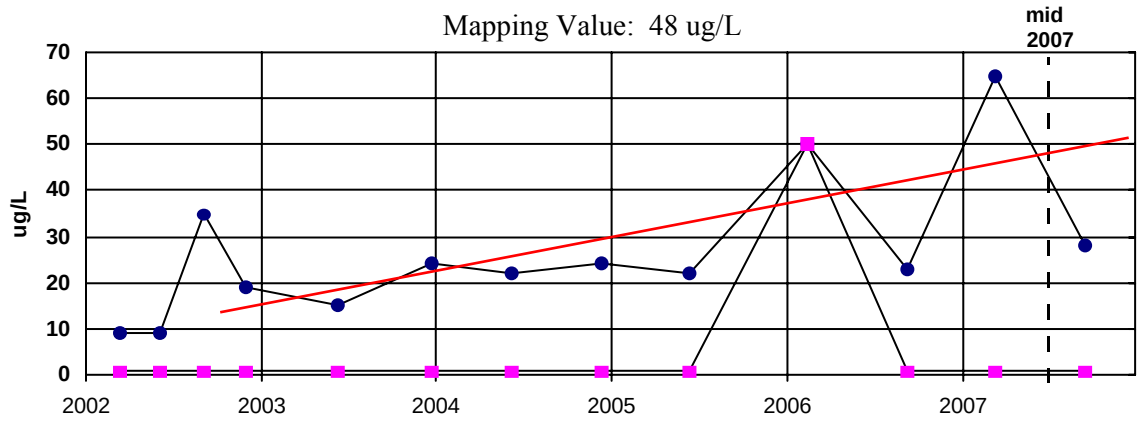
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 48 ug/L

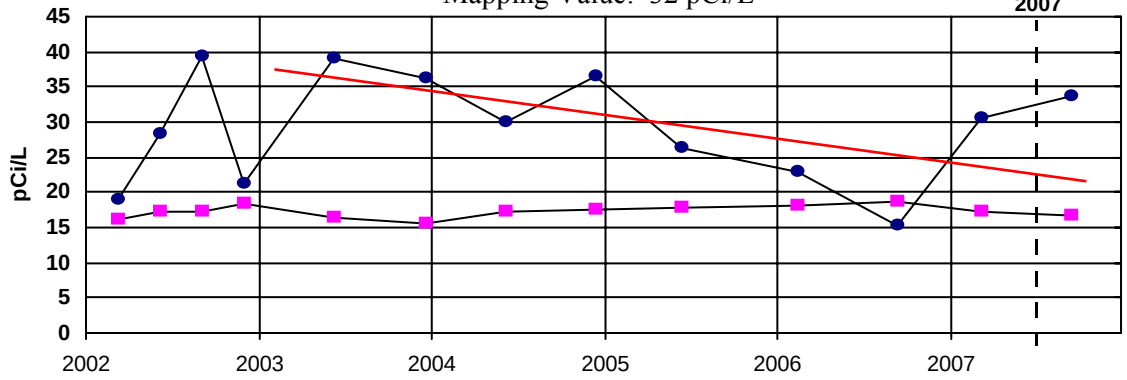


2007 Data:	ug/L
03/12	65
09/17	28

ND=not detected

Technetium-99

Mapping Value: 32 pCi/L



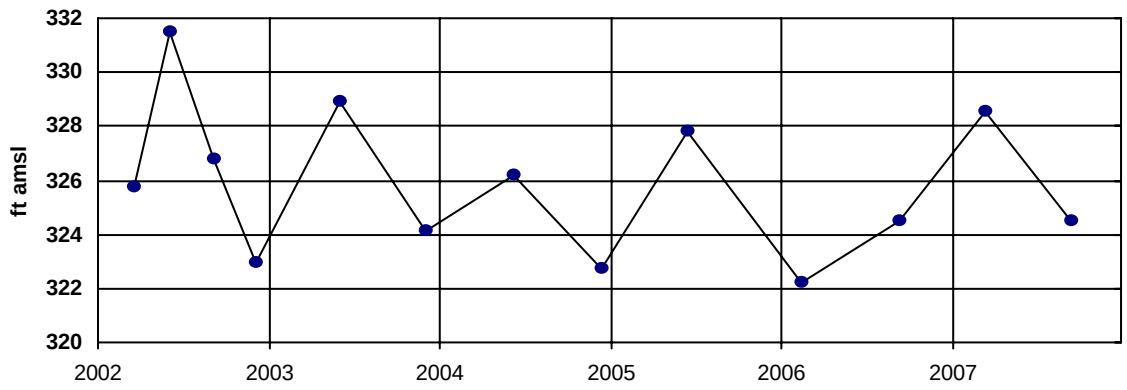
2007 Data:	pCi/L
03/12	30.7
09/17	33.8

ND=not detected

MW356 LRGA

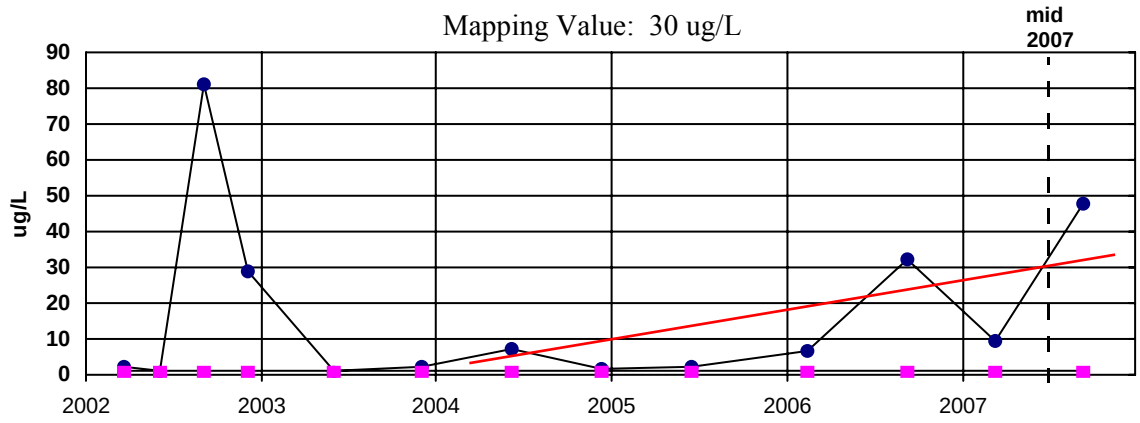
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 30 ug/L



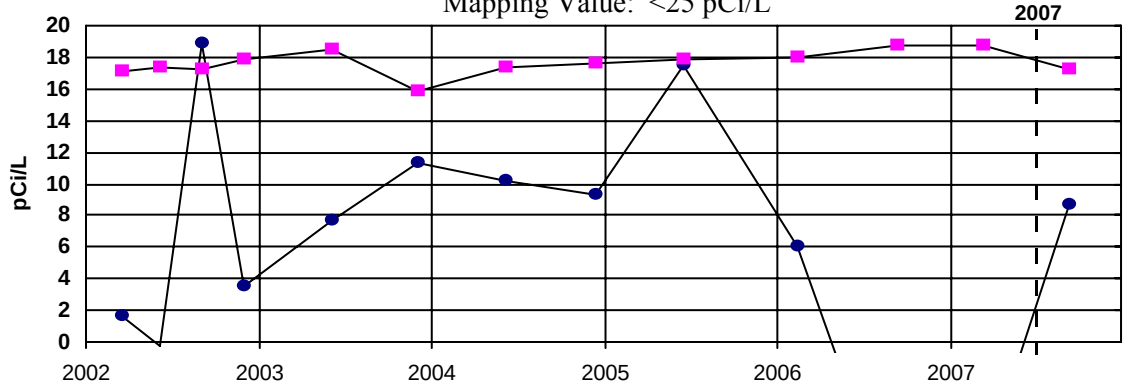
2007 Data: ug/L

03/15	9.4
09/13	48

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

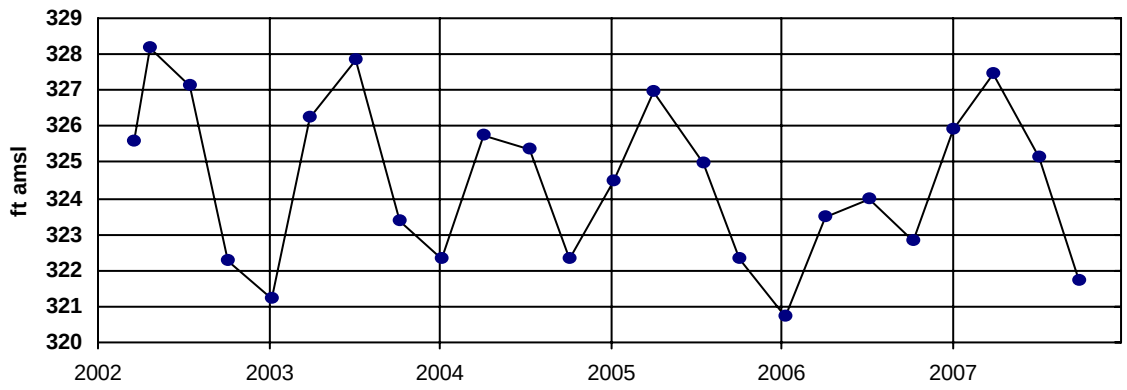
03/15	ND
09/13	ND

ND=not detected

MW357 URGA

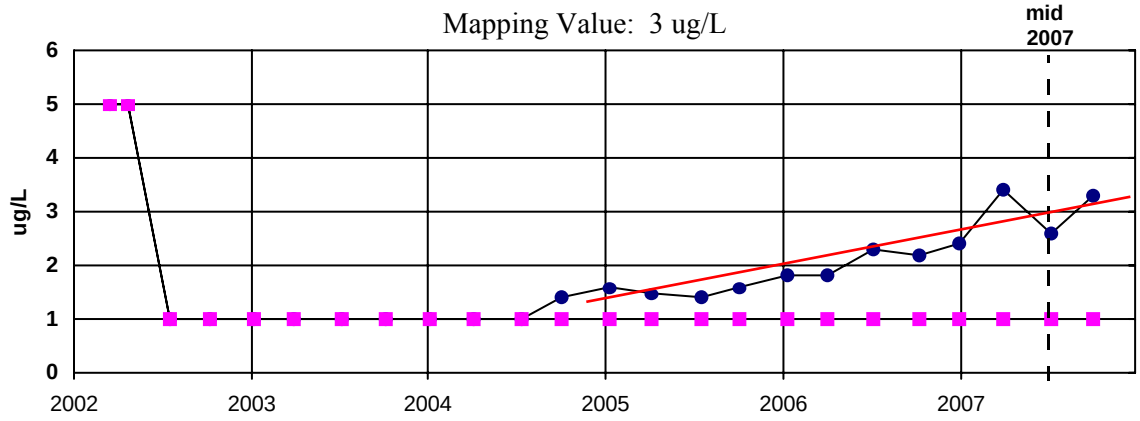
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 3 ug/L

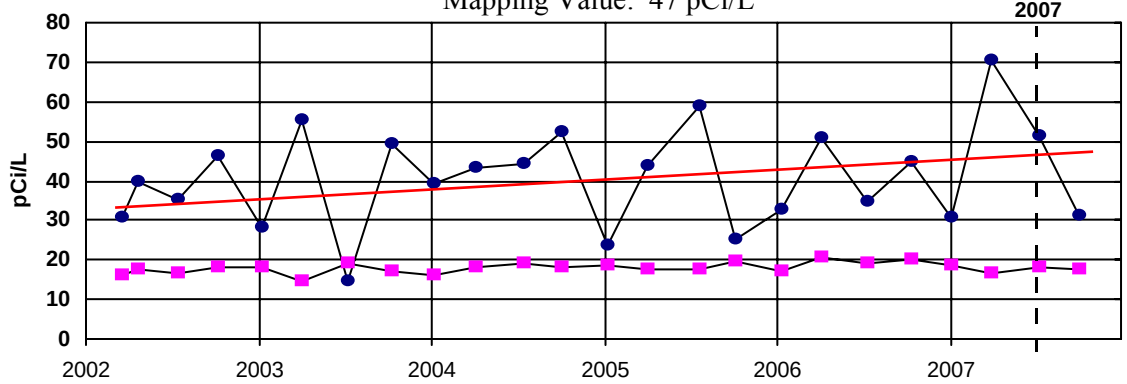


2007 Data:	ug/L
01/04	2.4
04/02	3.4
04/02	3.2
07/09	2.6
10/04	3.3

ND=not detected

Technetium-99

Mapping Value: 47 pCi/L



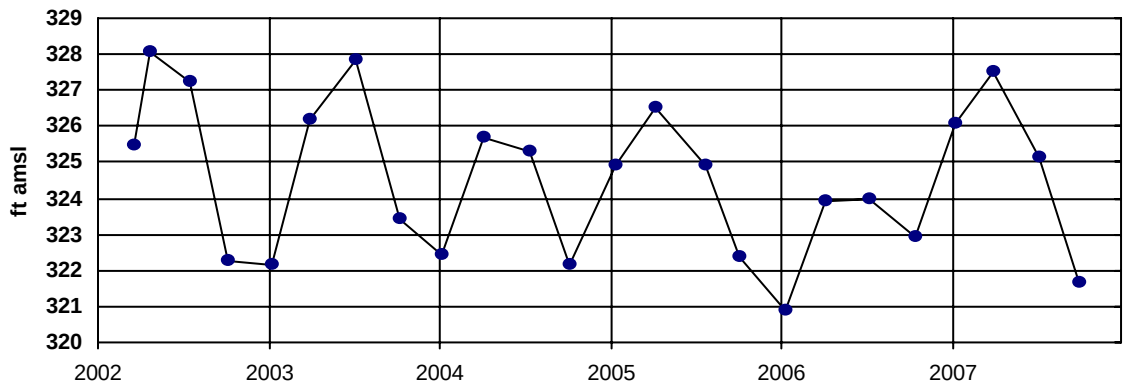
2007 Data:	pCi/L
01/04	30.7
04/02	61.2
04/02	70.5
07/09	51.1
10/04	31

ND=not detected

MW358 LRGA

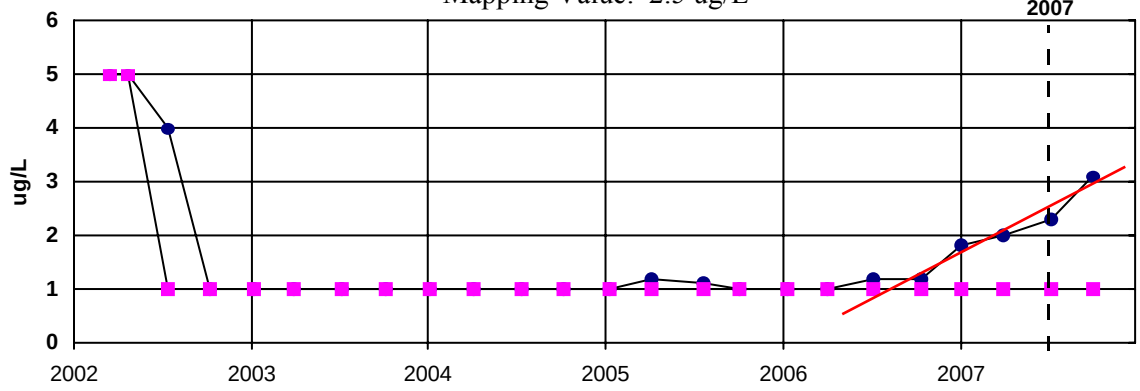
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 2.5 ug/L

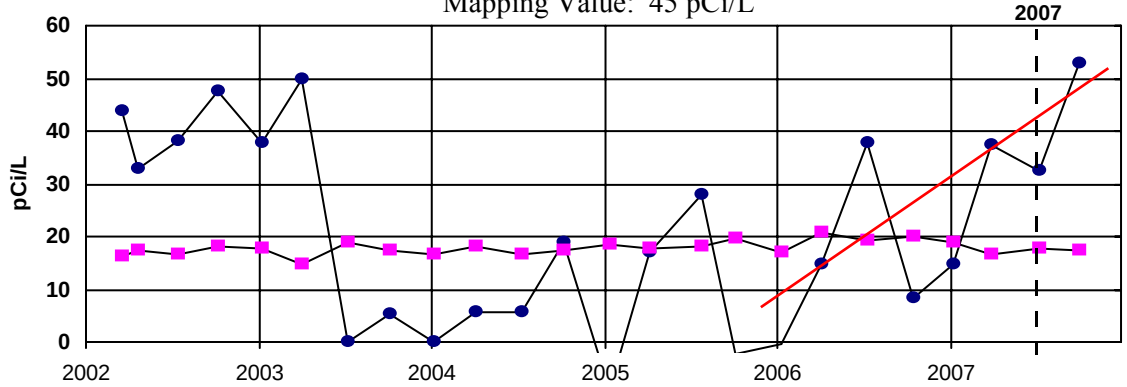


2007 Data:	ug/L
01/08	1.8
04/02	2
07/09	2.3
10/04	3.1
10/04	2.2

ND=not detected

Technetium-99

Mapping Value: 45 pCi/L



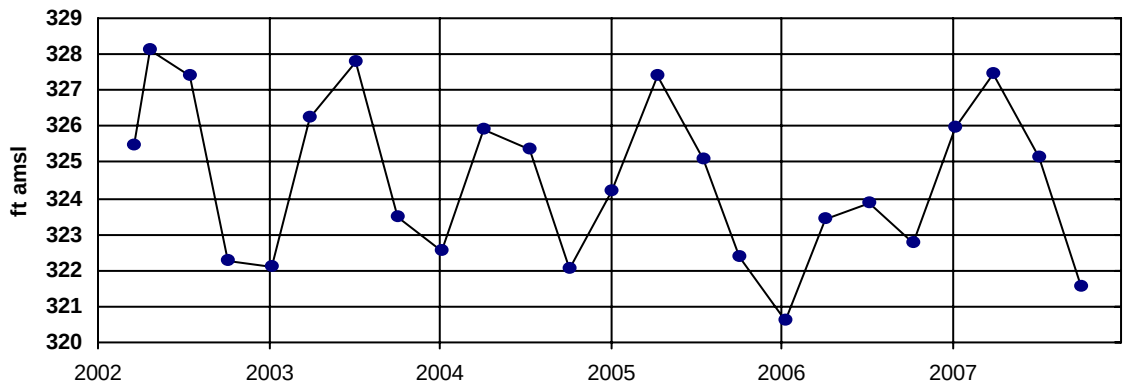
2007 Data:	pCi/L
01/08	ND
04/02	37.5
07/09	32.3
10/04	52.8
10/04	41.7

ND=not detected

MW360 URGA

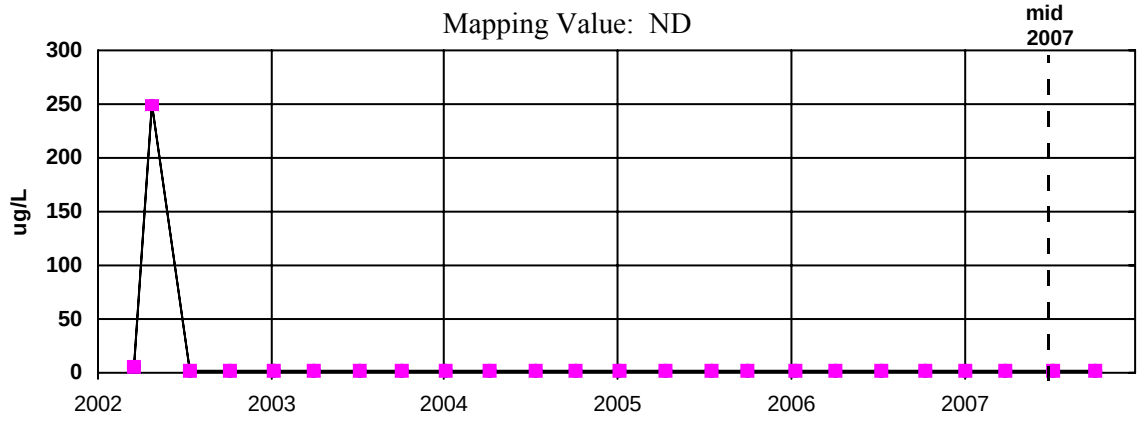
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

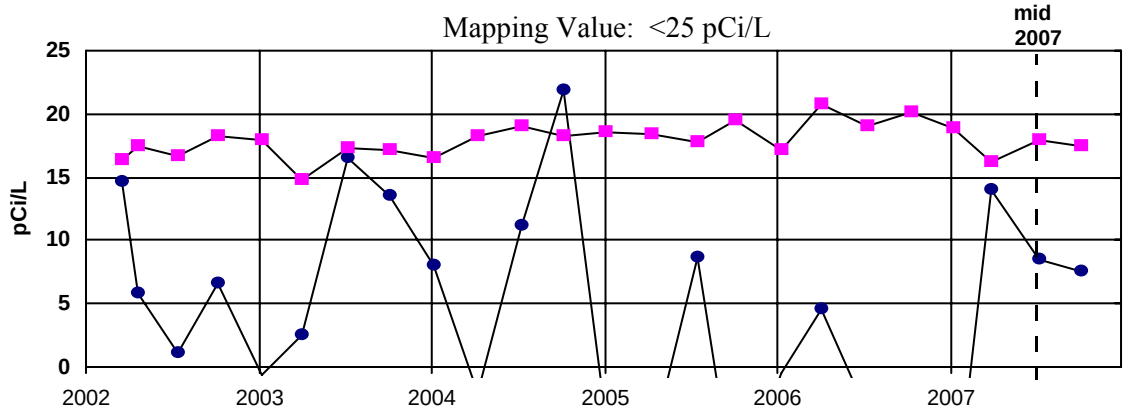


2007 Data:	ug/L
01/08	ND
04/02	ND
07/09	ND
10/08	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



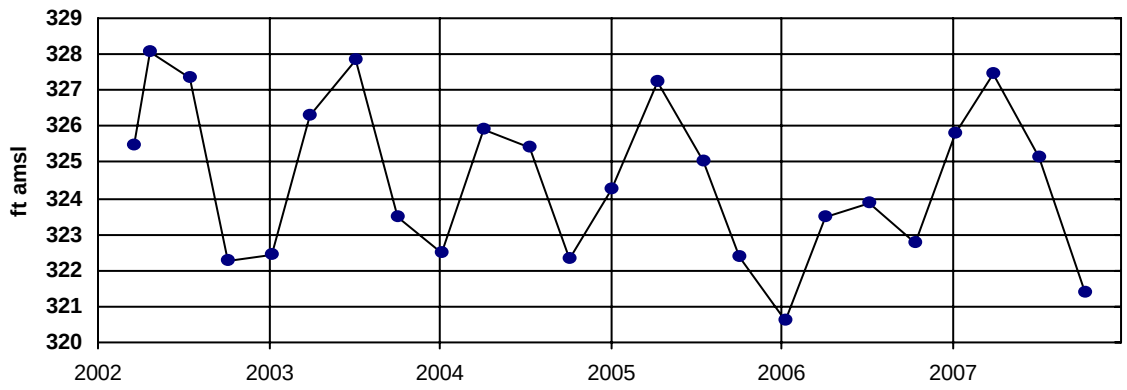
2007 Data:	pCi/L
01/08	ND
04/02	ND
07/09	ND
10/08	ND

ND=not detected

MW361 MRGA

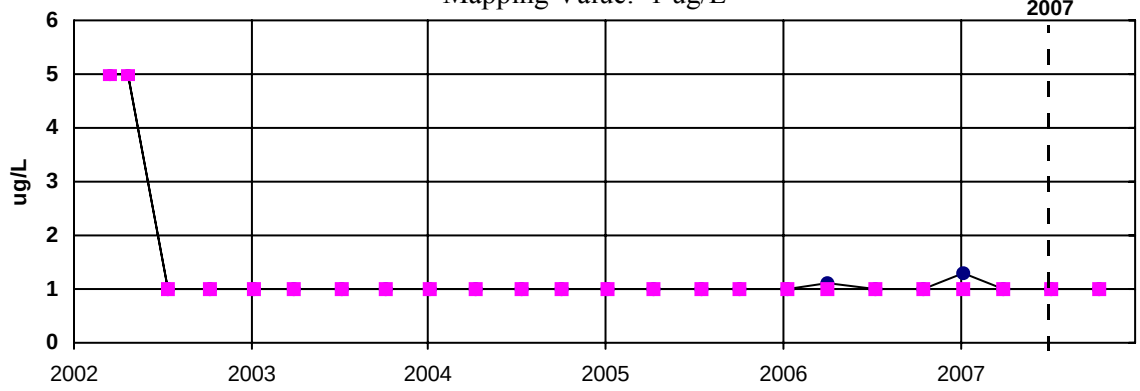
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1 ug/L

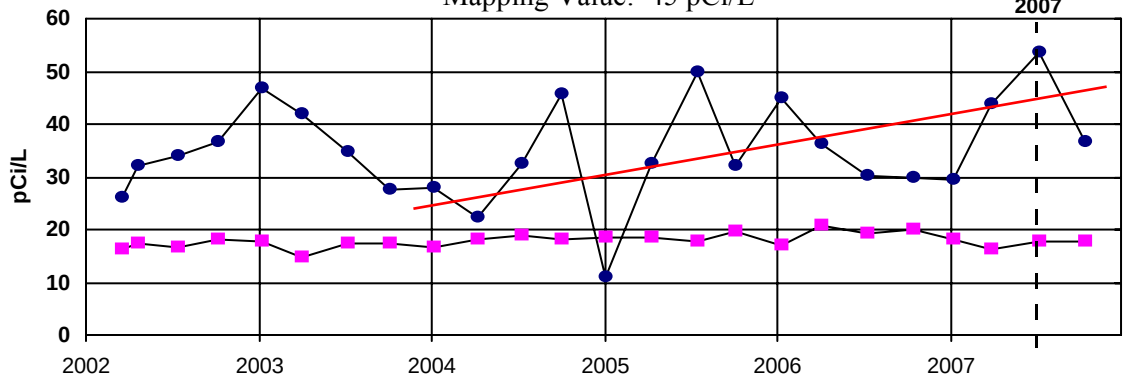


2007 Data:	ug/L
01/10	1.3
04/02	ND
07/09	1
10/16	ND
10/16	0.82

ND=not detected

Technetium-99

Mapping Value: 45 pCi/L



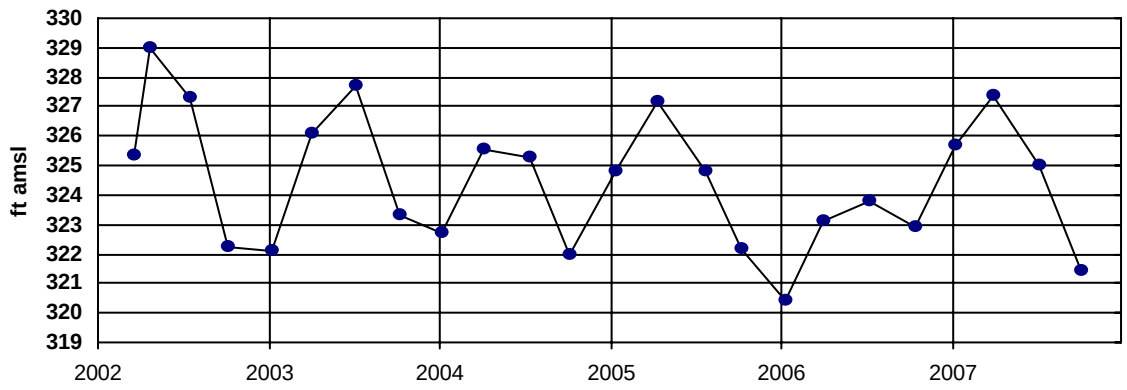
2007 Data:	pCi/L
01/10	29.4
04/02	43.6
07/09	53.6
10/16	36.7
10/16	34.5

ND=not detected

MW363 URGA

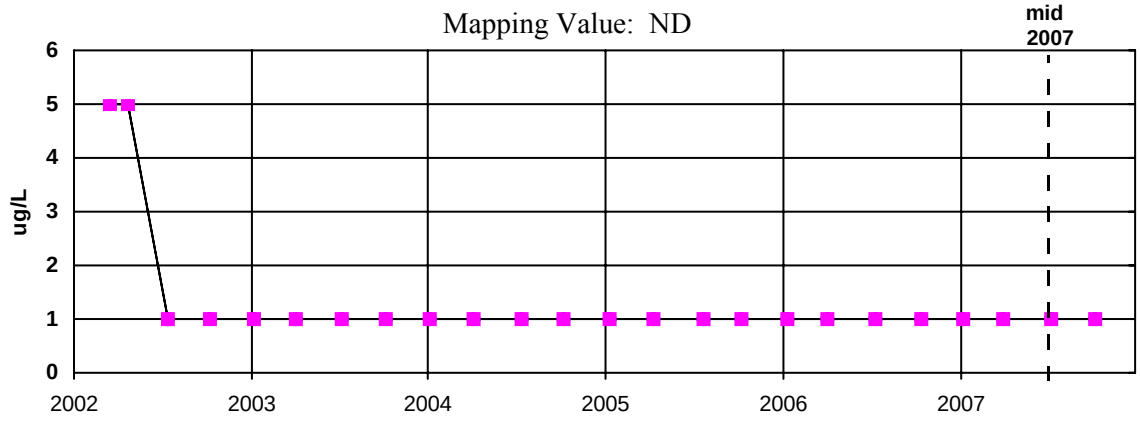
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

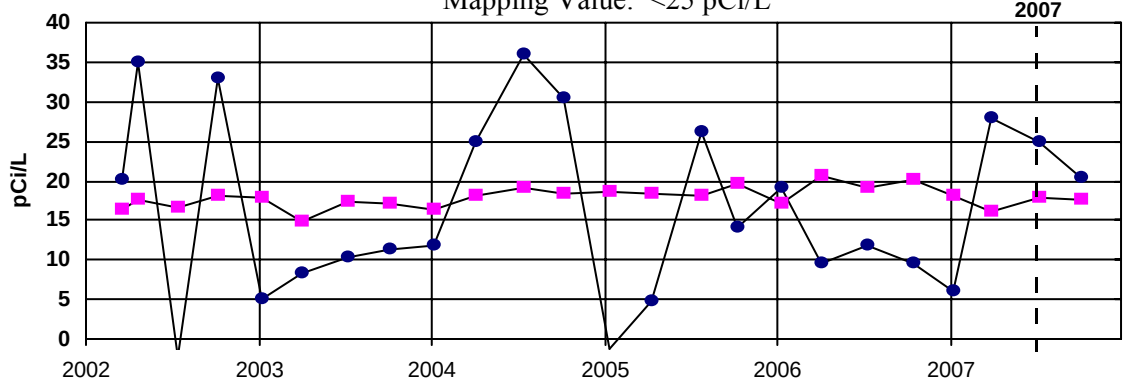


2007 Data:	ug/L
01/10	ND
04/02	ND
07/10	ND
10/08	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



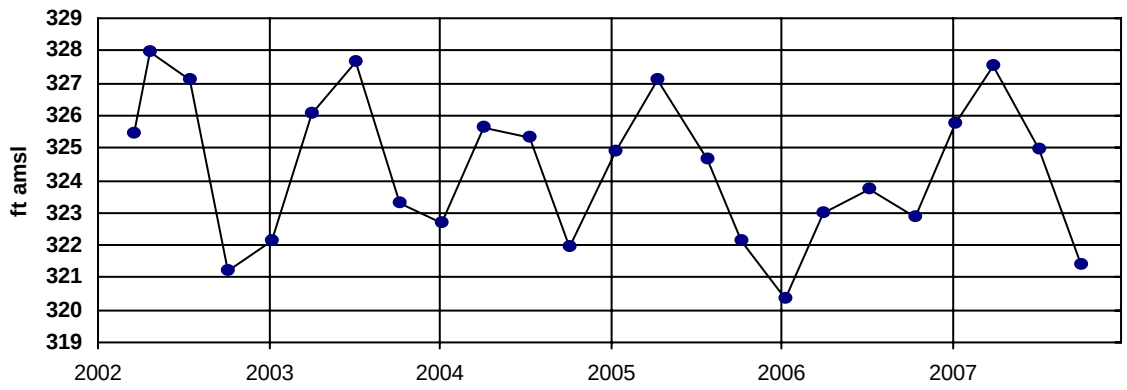
2007 Data:	pCi/L
01/10	ND
04/02	27.8
07/10	24.8
10/08	20.4

ND=not detected

MW364 LRGA

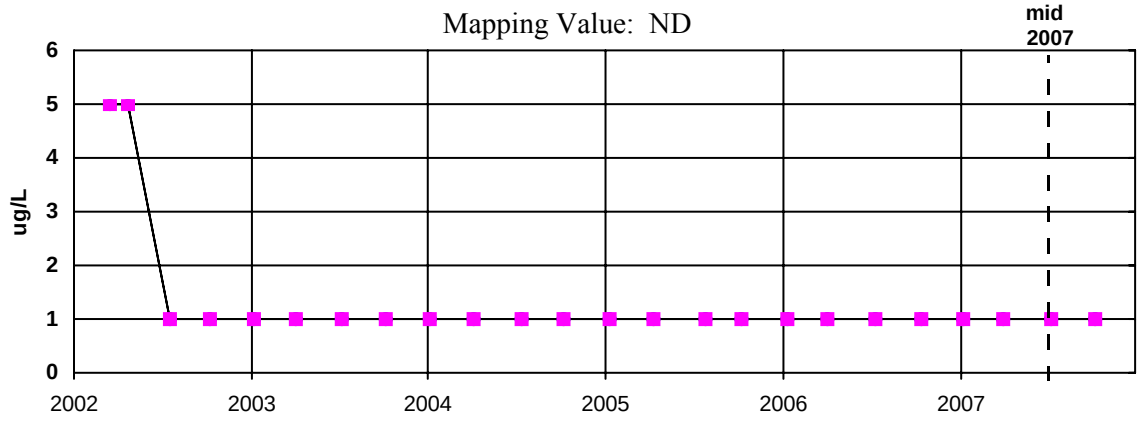
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

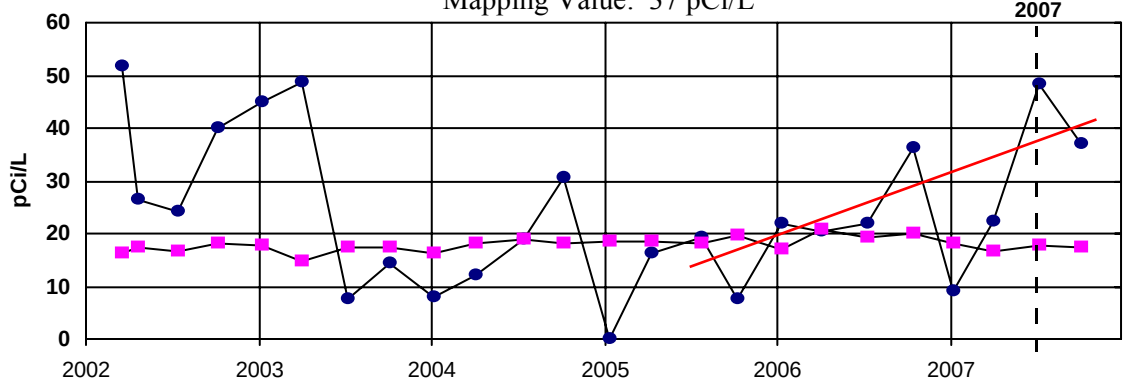


2007 Data:	ug/L
01/09	ND
04/03	ND
07/10	ND
10/08	ND

ND=not detected

Technetium-99

Mapping Value: 37 pCi/L



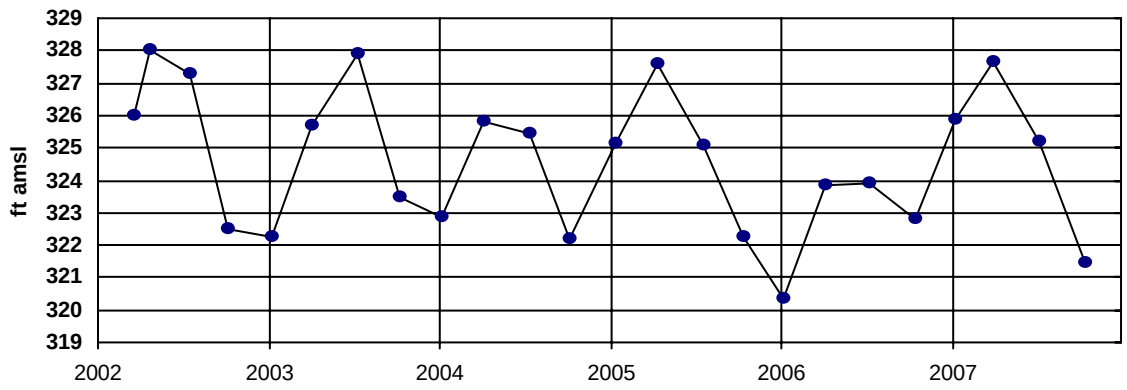
2007 Data:	pCi/L
01/09	ND
04/03	22.3
07/10	48.3
10/08	37.1

ND=not detected

MW366 URGA

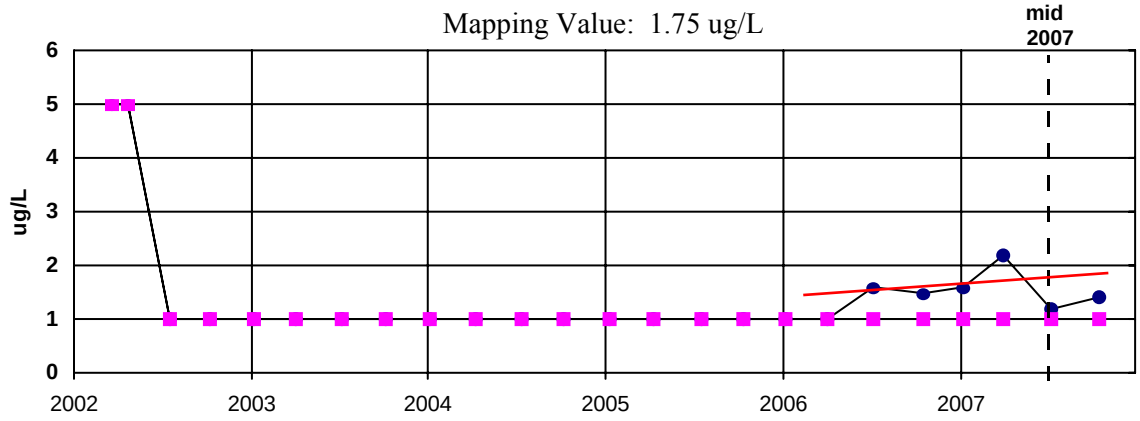
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1.75 ug/L

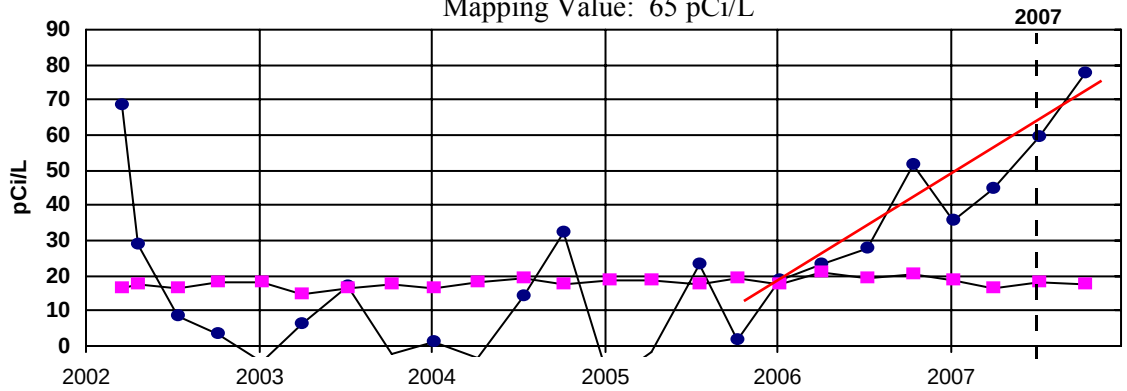


2007 Data:	ug/L
01/09	1.6
04/03	2.2
07/10	1.2
10/16	1.4
10/16	1.3

ND=not detected

Technetium-99

Mapping Value: 65 pCi/L



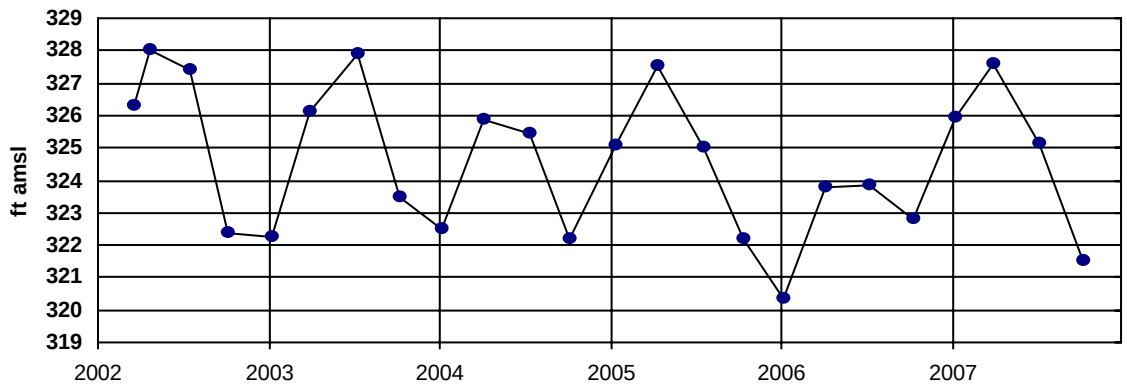
2007 Data:	pCi/L
01/09	35.9
04/03	45
07/10	59.3
10/16	77.5
10/16	60.7

ND=not detected

MW367 LRGA

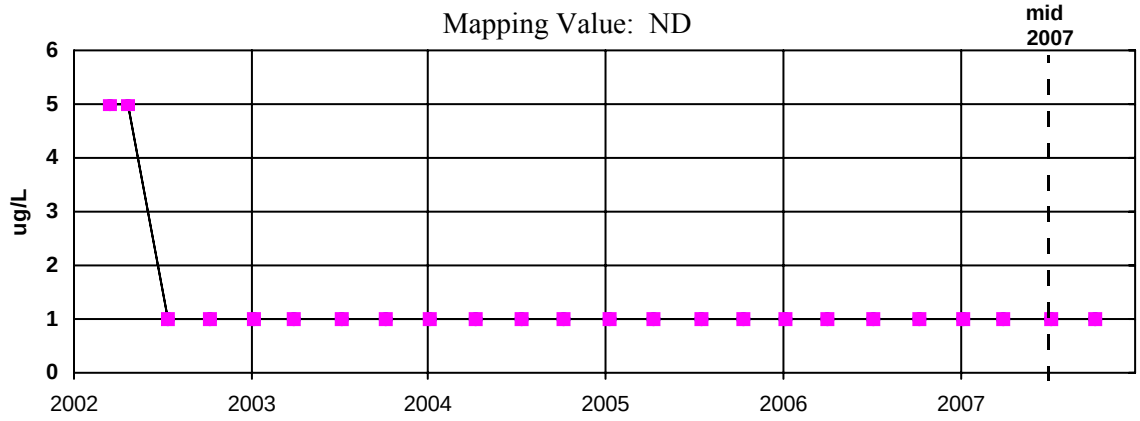
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

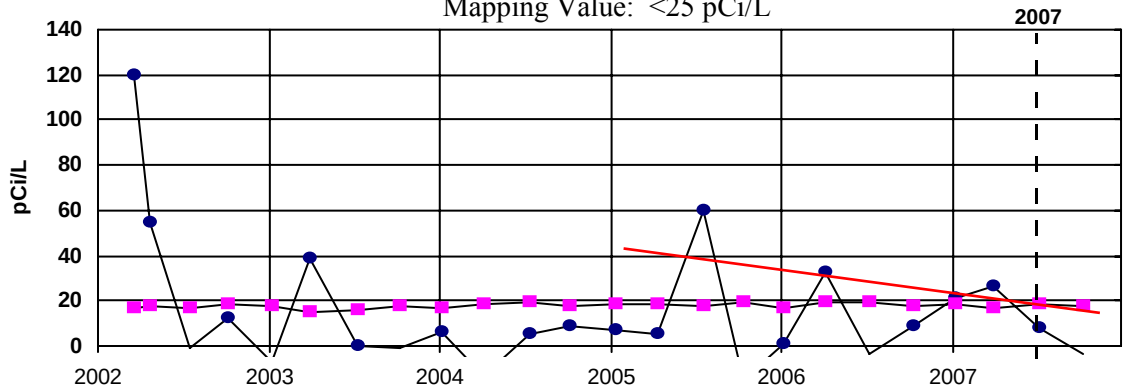


2007 Data:	ug/L
01/09	ND
04/03	ND
07/10	ND
10/09	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



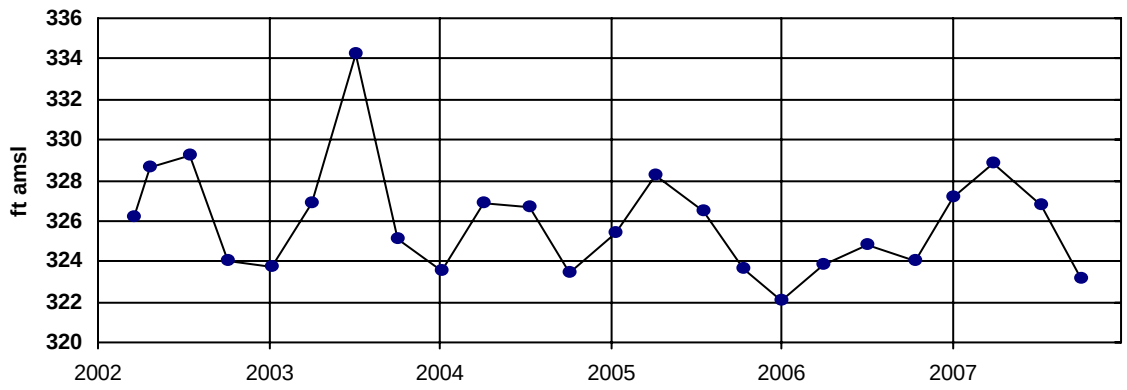
2007 Data:	pCi/L
01/09	21.1
04/03	26.7
07/10	ND
10/09	ND

ND=not detected

MW369 URGA

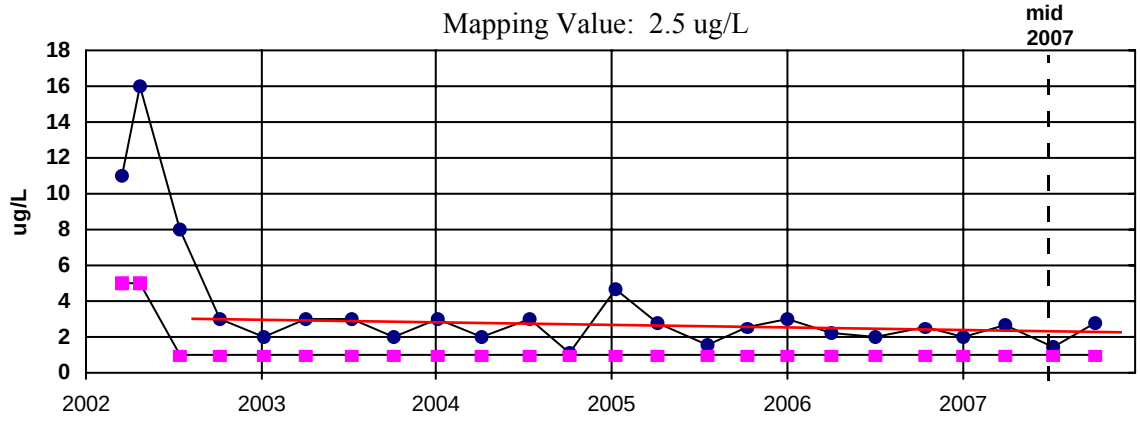
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 2.5 ug/L

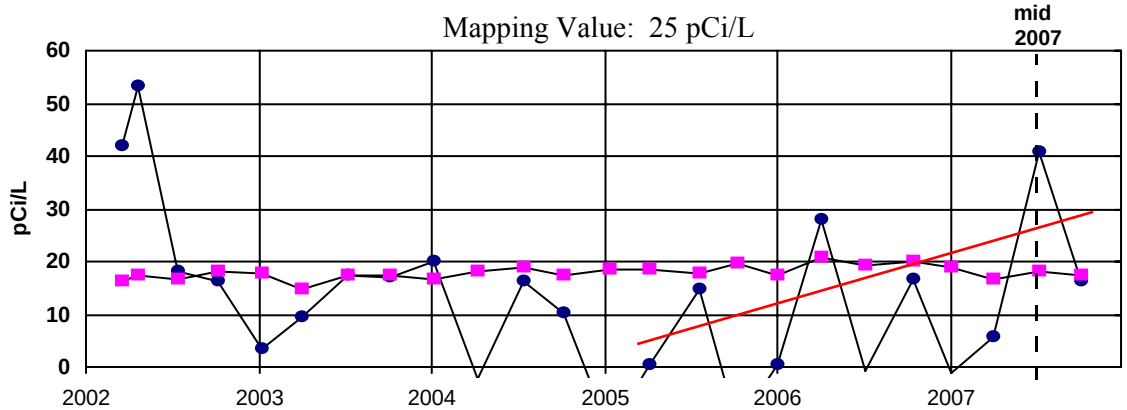


2007 Data:	ug/L
01/05	2
04/03	2.7
07/11	1.5
10/08	2.8

ND=not detected

Technetium-99

Mapping Value: 25 pCi/L



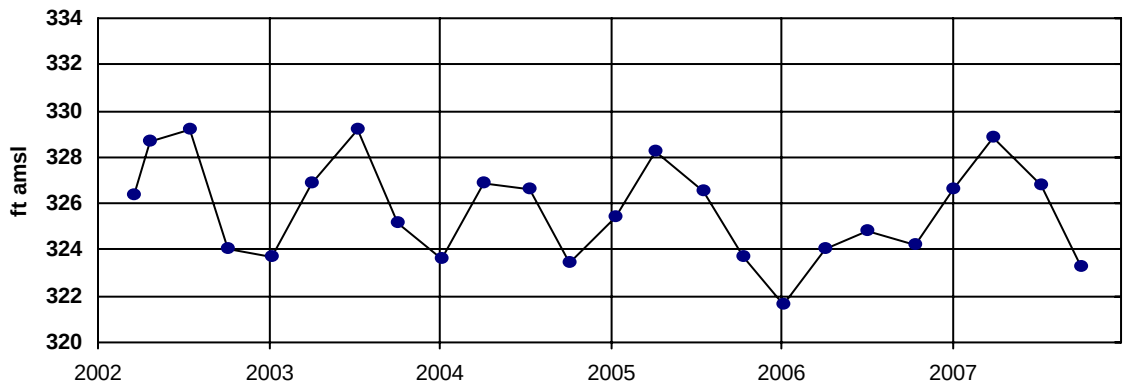
2007 Data:	pCi/L
01/05	ND
04/03	ND
07/11	40.6
10/08	ND

ND=not detected

MW370 **MRGA**

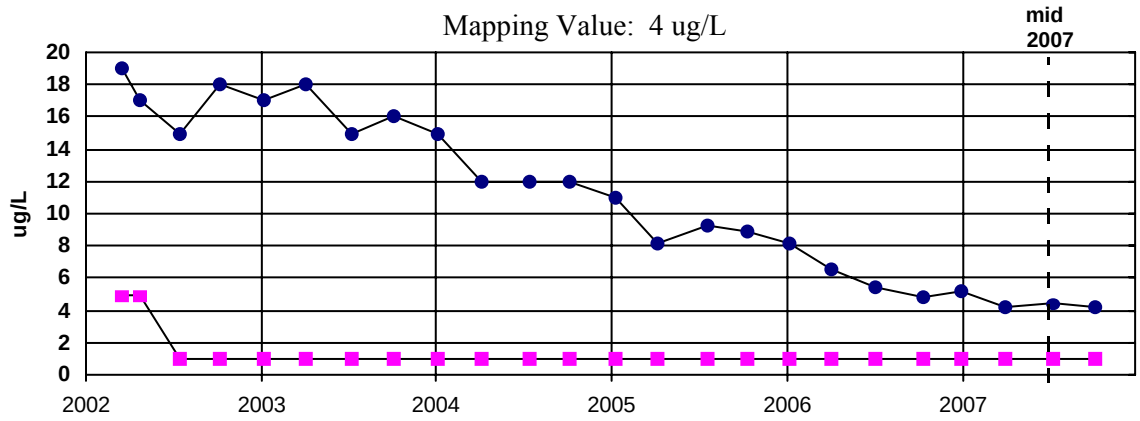
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 4 ug/L

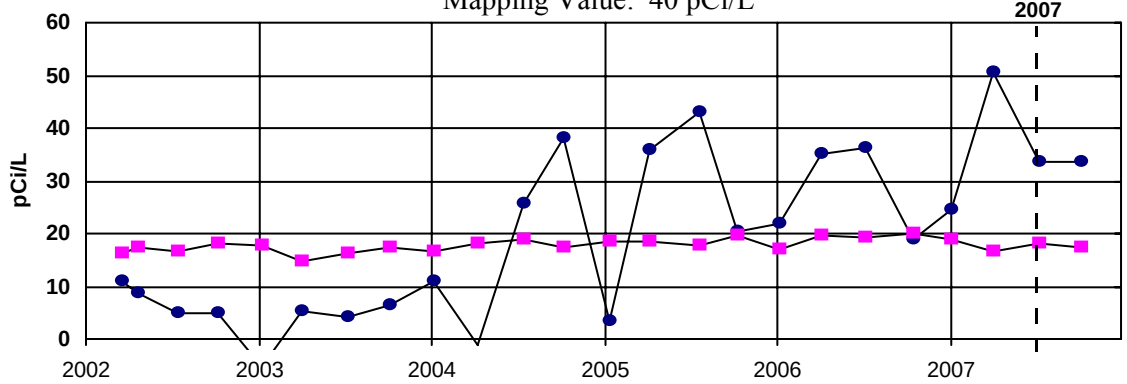


2007 Data:	ug/L
01/04	5.2
01/04	4.7
04/03	4.2
07/11	4.5
10/08	4.2

ND=not detected

Technetium-99

Mapping Value: 40 pCi/L



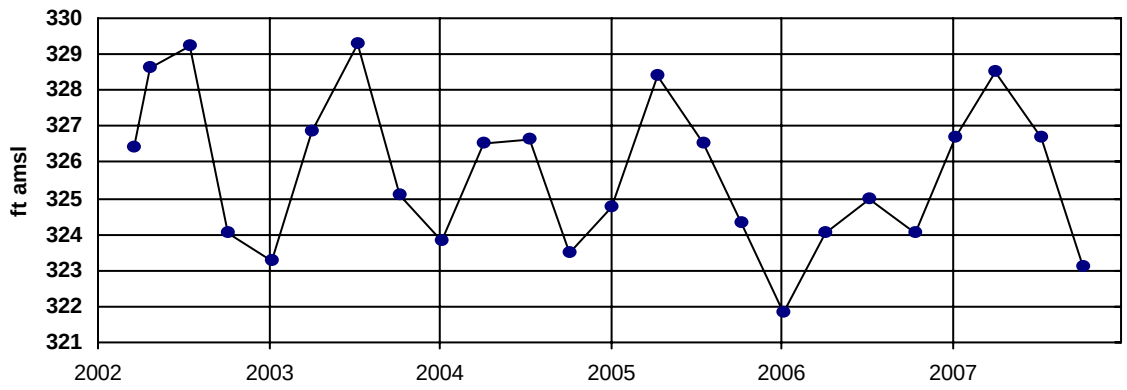
2007 Data:	pCi/L
01/04	24.5
01/04	ND
04/03	50.6
07/11	33.4
10/08	33.5

ND=not detected

MW372 URGA

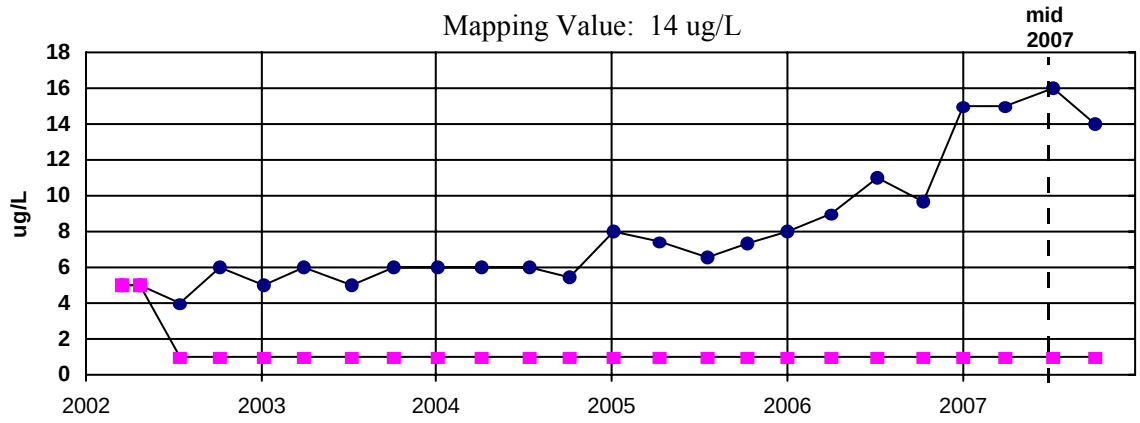
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 14 ug/L

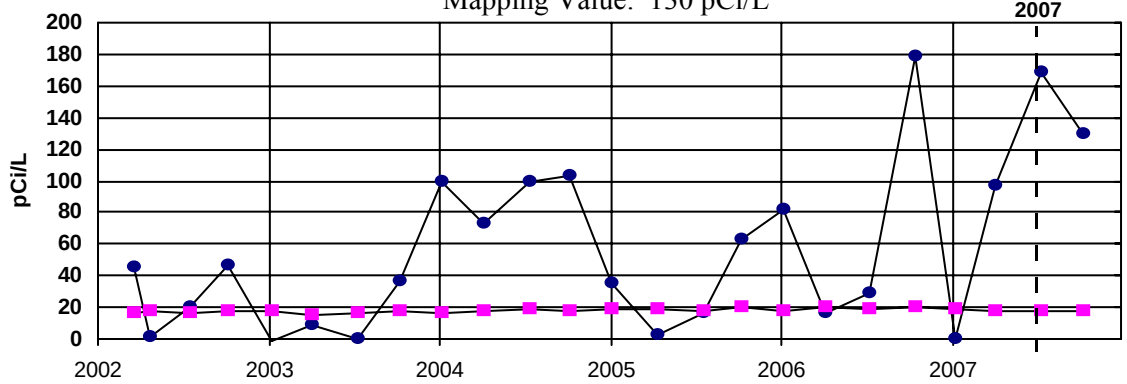


2007 Data:	ug/L
01/08	15
04/04	15
07/12	16
10/09	14

ND=not detected

Technetium-99

Mapping Value: 130 pCi/L



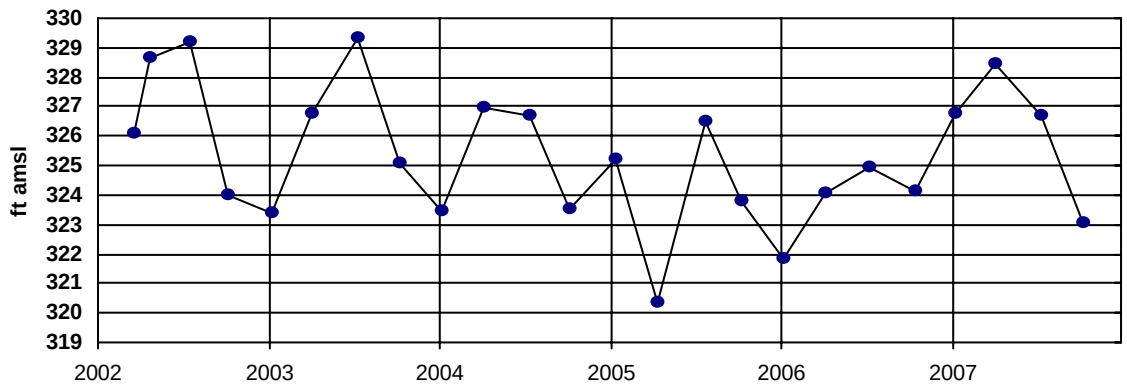
2007 Data:	pCi/L
01/08	ND
04/04	97
07/12	169
10/09	129

ND=not detected

MW373 LRGA

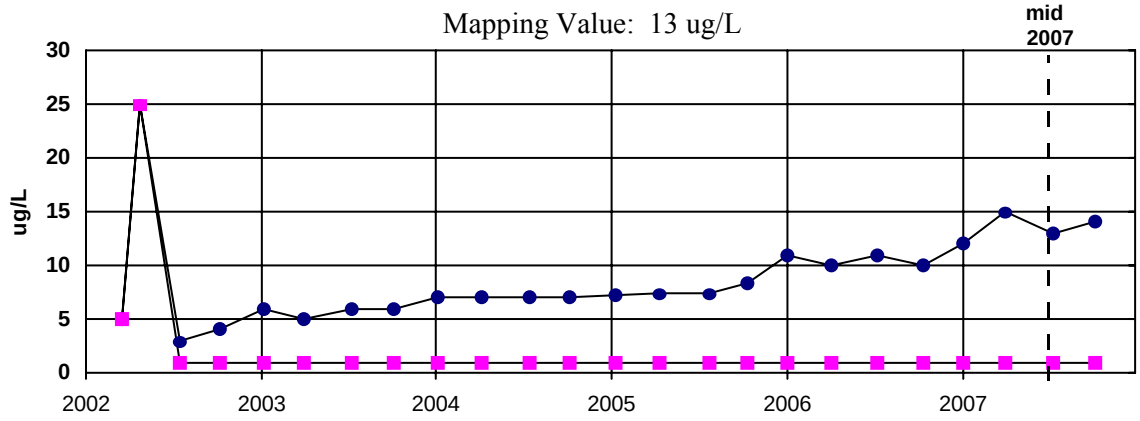
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 13 ug/L

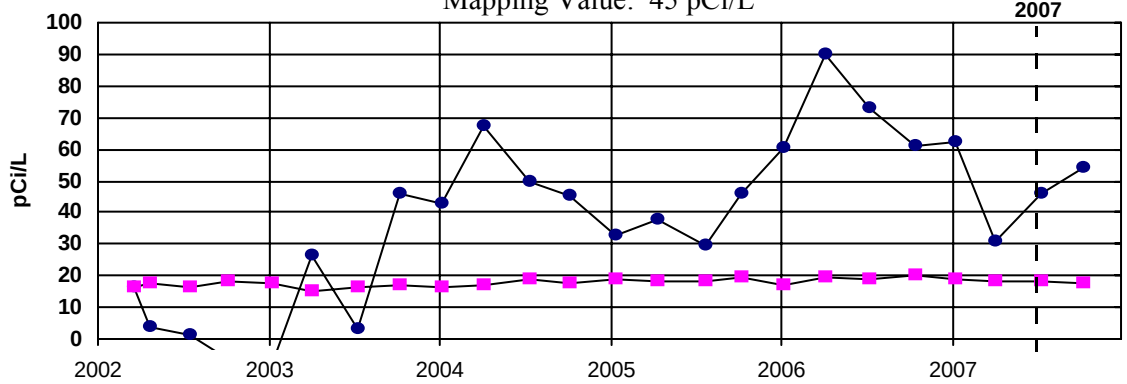


2007 Data:	ug/L
01/08	12
04/04	15
07/12	13
07/12	13
10/09	14

ND=not detected

Technetium-99

Mapping Value: 45 pCi/L



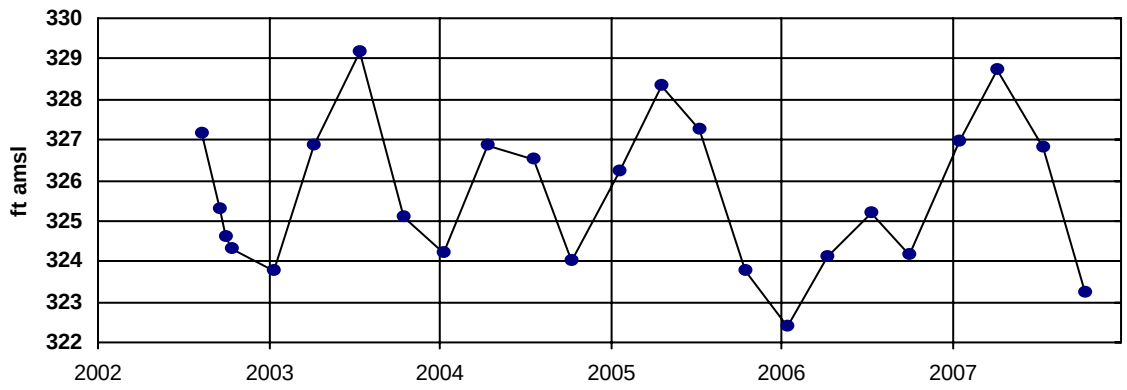
2007 Data:	pCi/L
01/08	62.2
04/04	30.8
07/12	46.2
07/12	39.6
10/09	54.4

ND=not detected

MW384 URGA

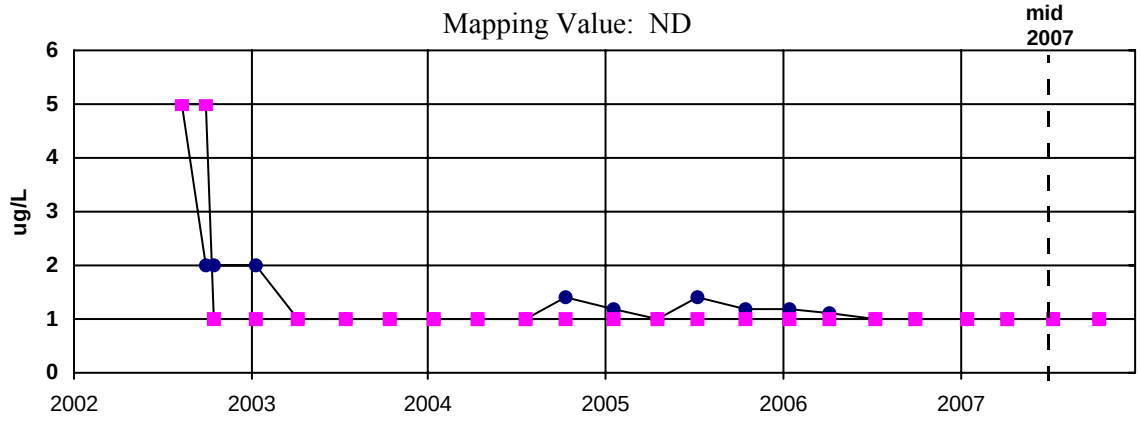
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

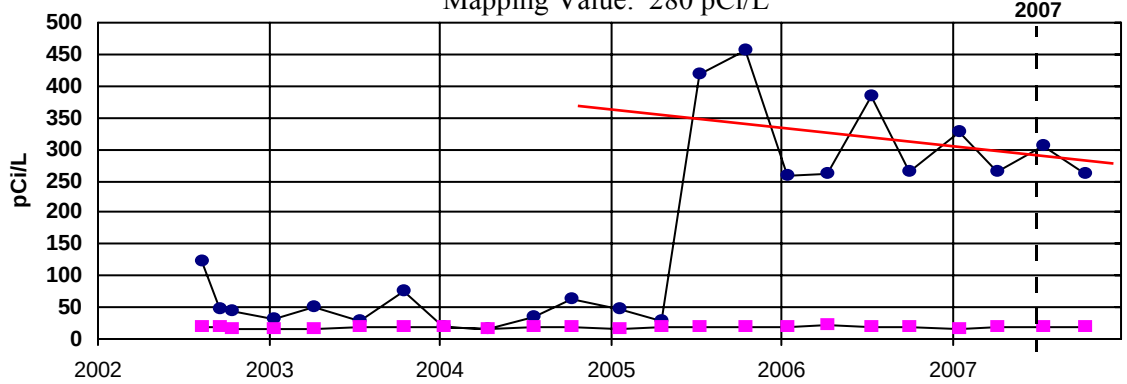


2007 Data:	ug/L
01/17	ND
04/09	ND
07/16	ND
10/17	ND

ND=not detected

Technetium-99

Mapping Value: 280 pCi/L



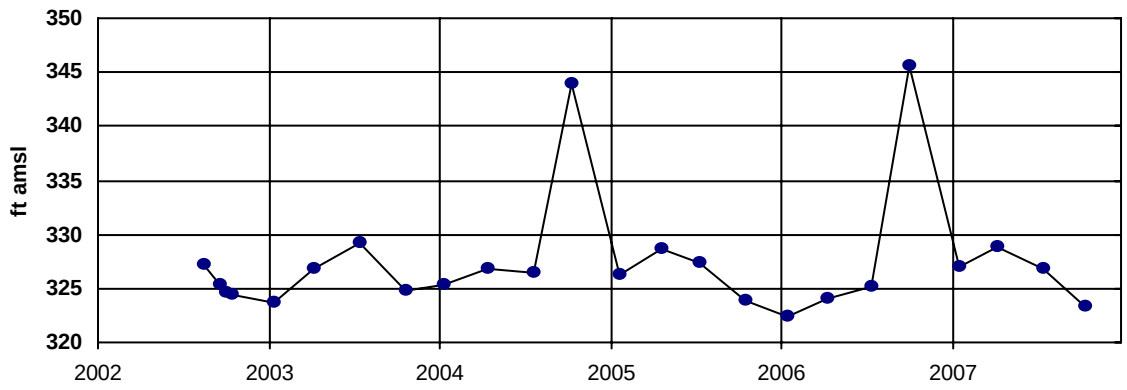
2007 Data:	pCi/L
01/17	327
04/09	263
07/16	304
10/17	262

ND=not detected

MW385 LRGA

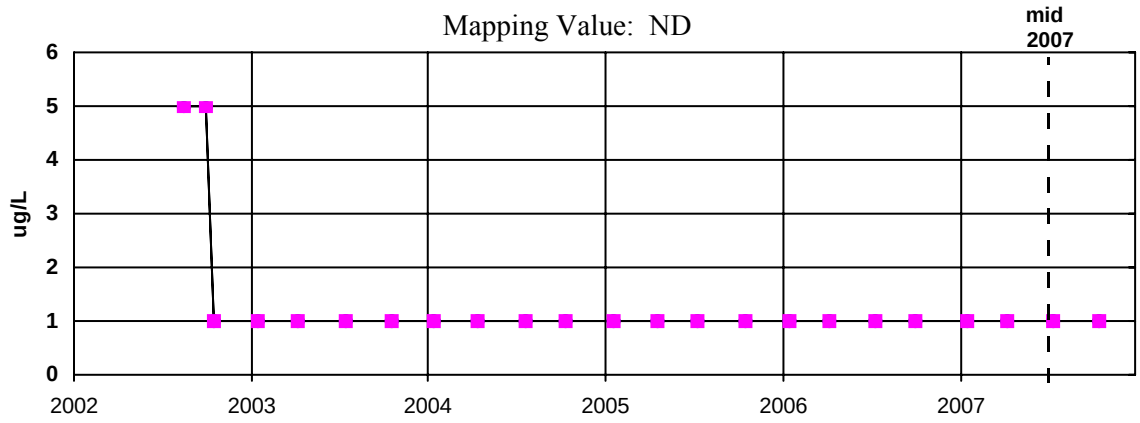
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

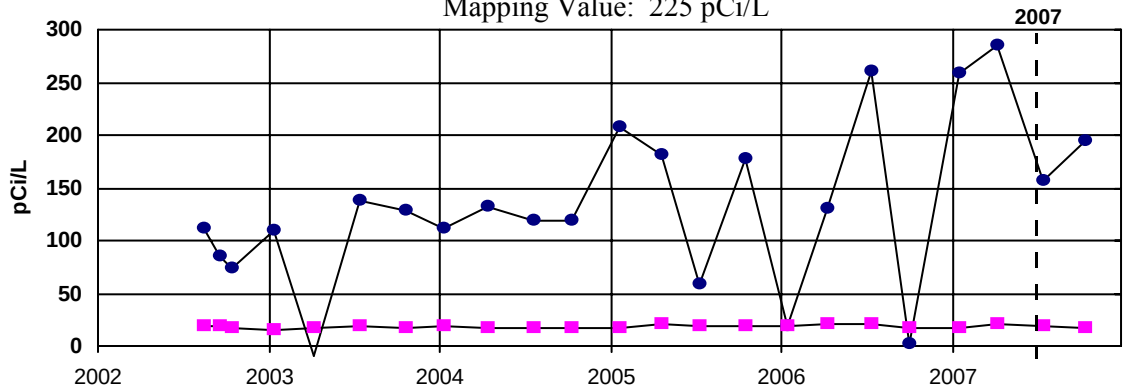


2007 Data:	ug/L
01/17	ND
04/09	ND
07/16	ND
10/17	ND

ND=not detected

Technetium-99

Mapping Value: 225 pCi/L



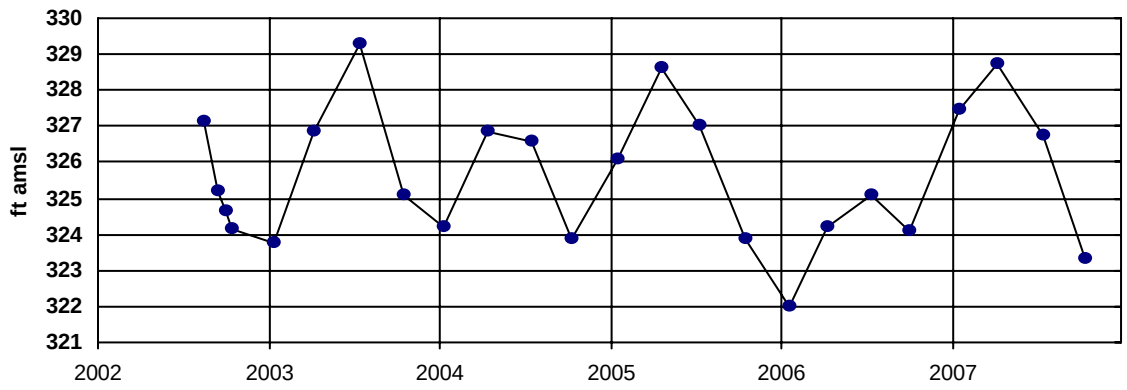
2007 Data:	pCi/L
01/17	259
04/09	285
07/16	157
10/17	194

ND=not detected

MW387 URGA

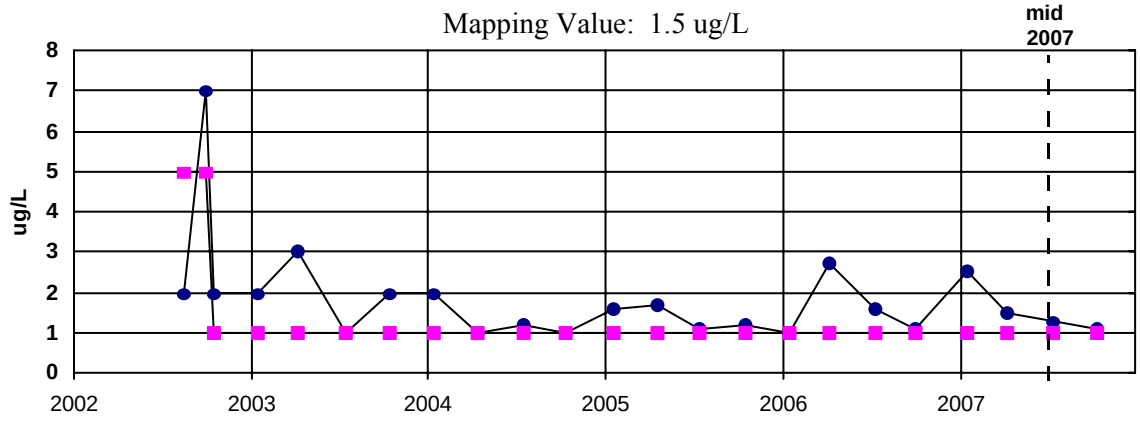
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1.5 ug/L

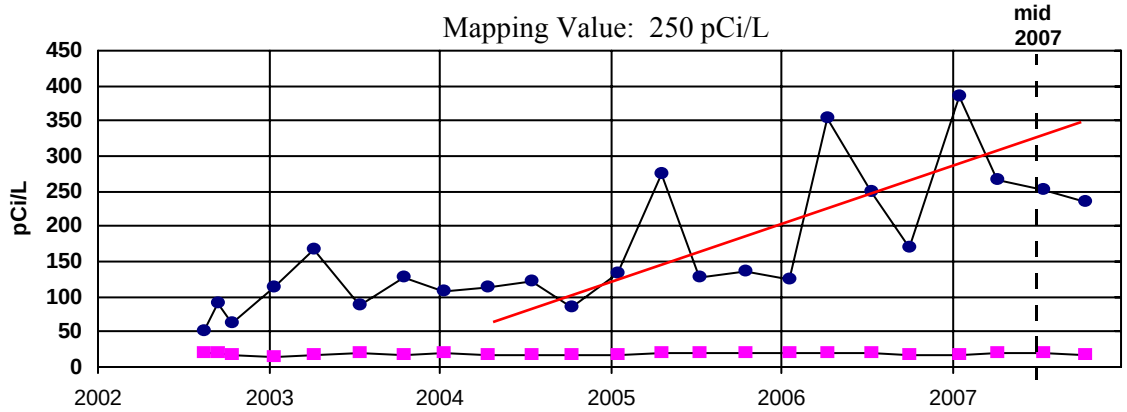


2007 Data:	ug/L
01/18	2.5
04/09	1.5
07/16	1.3
10/15	1.1

ND=not detected

Technetium-99

Mapping Value: 250 pCi/L



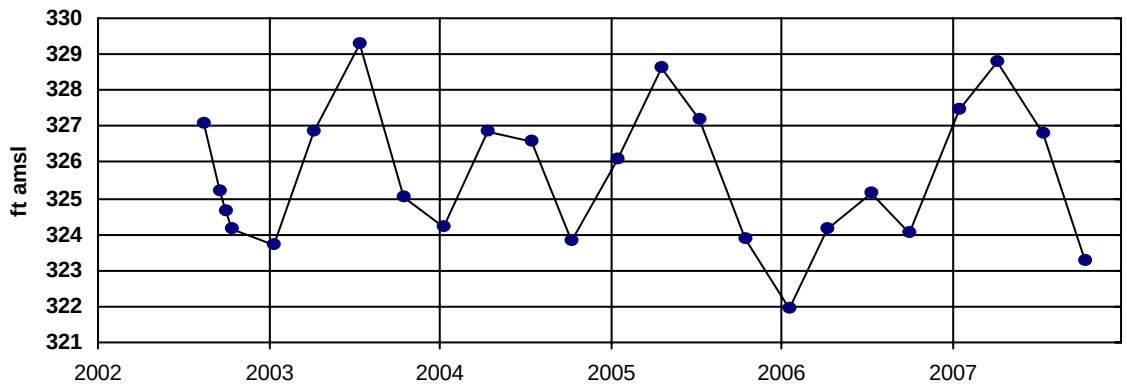
2007 Data:	pCi/L
01/18	384
04/09	265
07/16	253
10/15	234

ND=not detected

MW388 **MRGA**

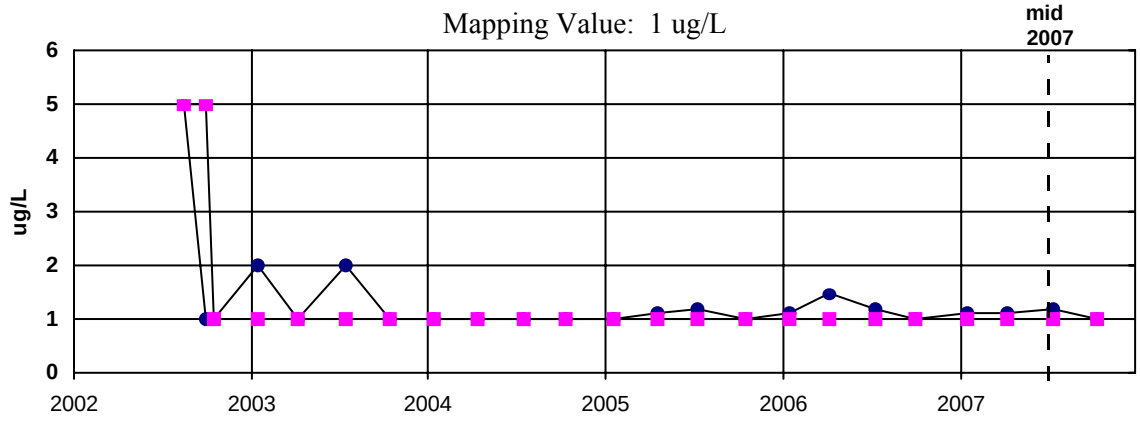
Result Detection Limit Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1 ug/L

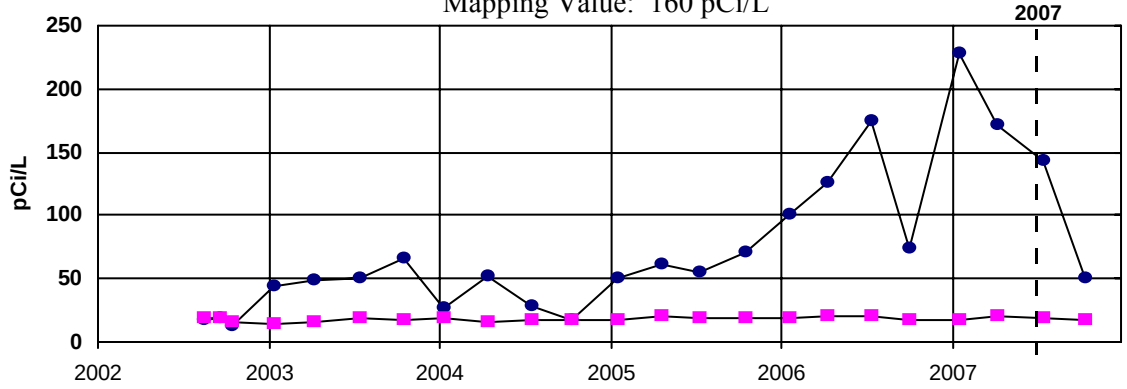


2007 Data:	ug/L
01/18	1.1
04/09	1.1
07/16	1.2
10/15	ND

ND=not detected

Technetium-99

Mapping Value: 160 pCi/L



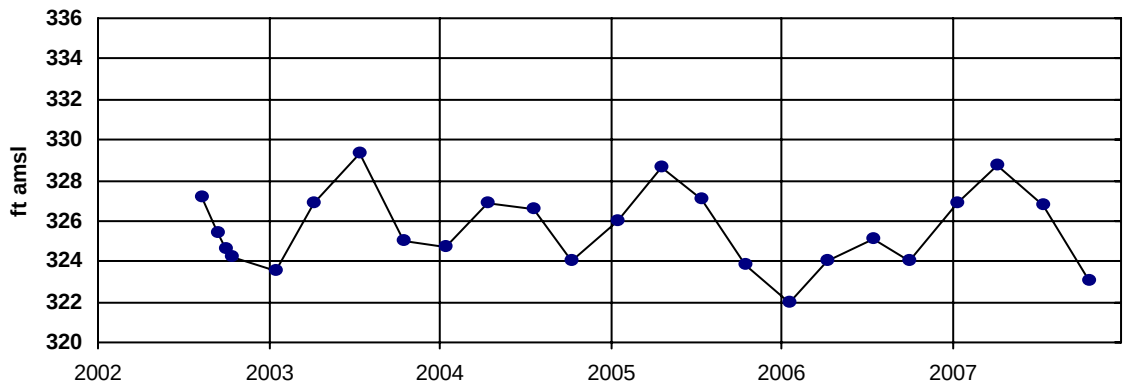
2007 Data:	pCi/L
01/18	228
04/09	172
07/16	143
10/15	51.1

ND=not detected

MW391 MRGA

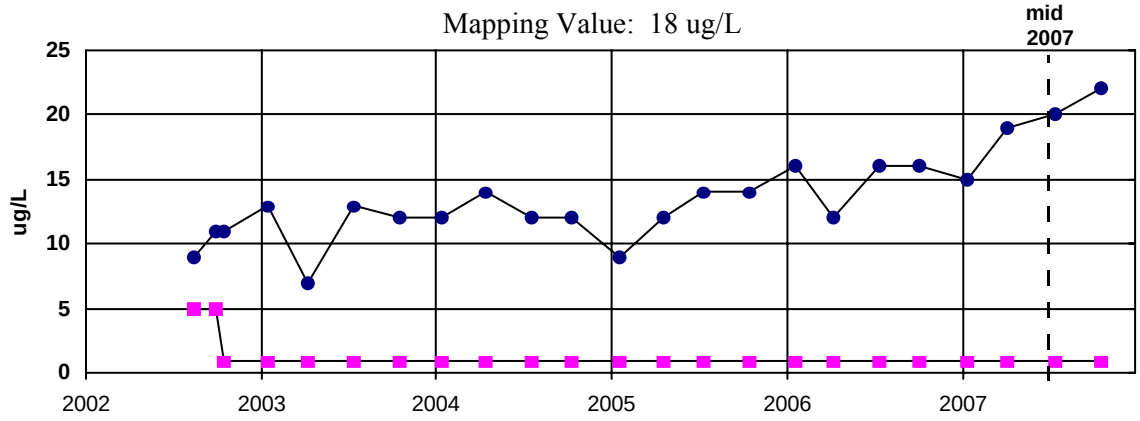
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 18 ug/L



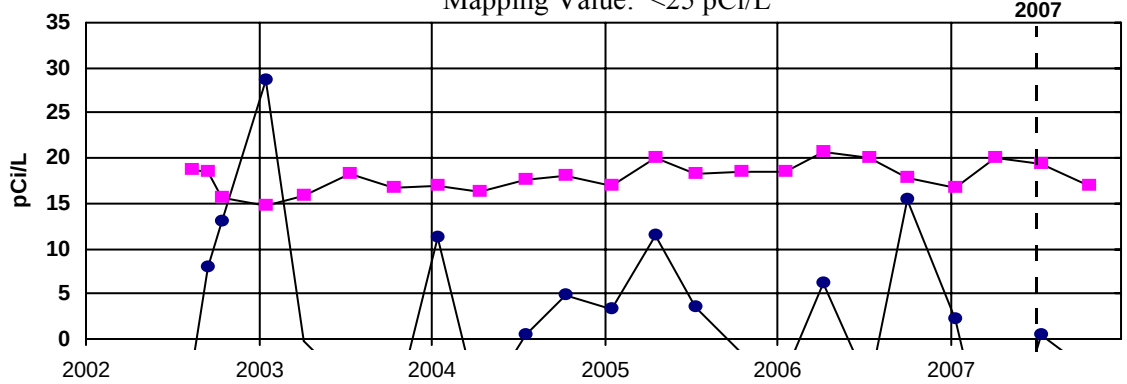
2007 Data: ug/L

01/16	ND
04/09	19
07/17	20
10/23	22

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

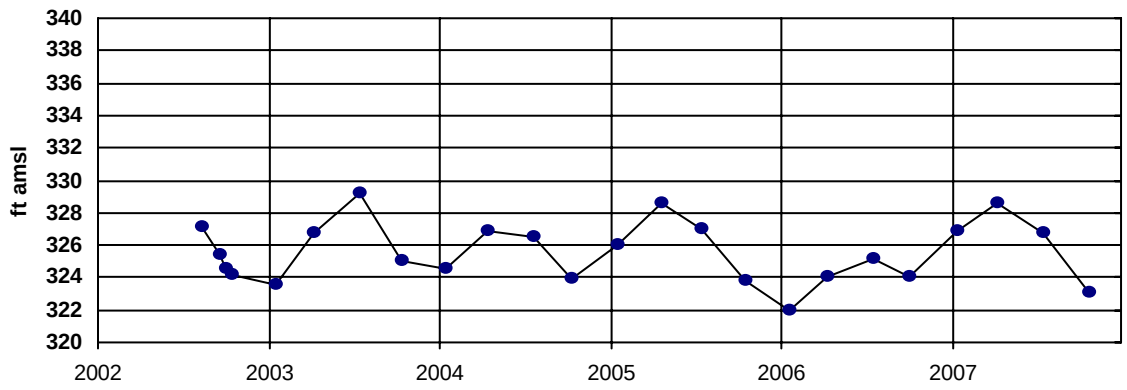
01/16	ND
04/09	ND
07/17	ND
10/23	ND

ND=not detected

MW392 LRGA

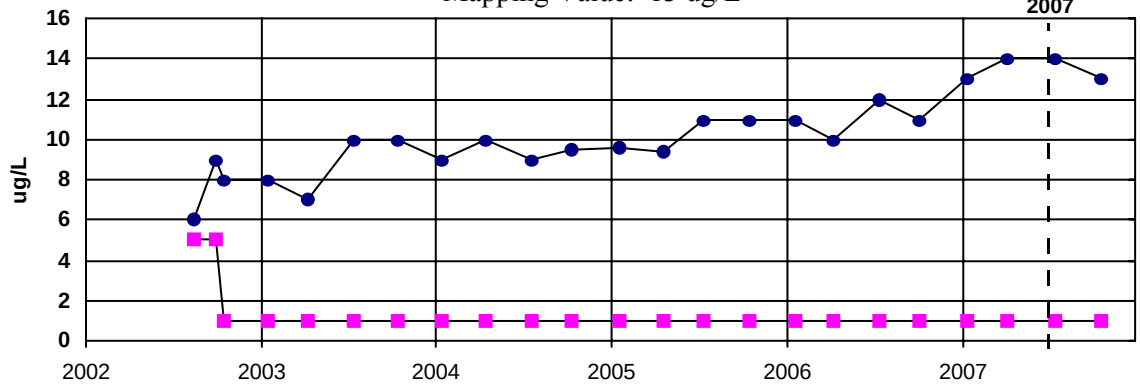
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 13 ug/L

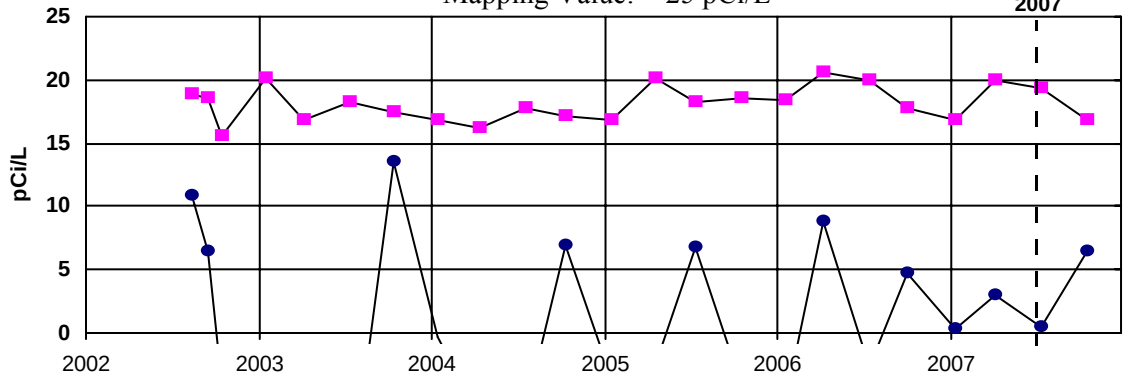


2007 Data:	ug/L
01/16	ND
04/09	14
04/09	14
07/17	14
10/22	13

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



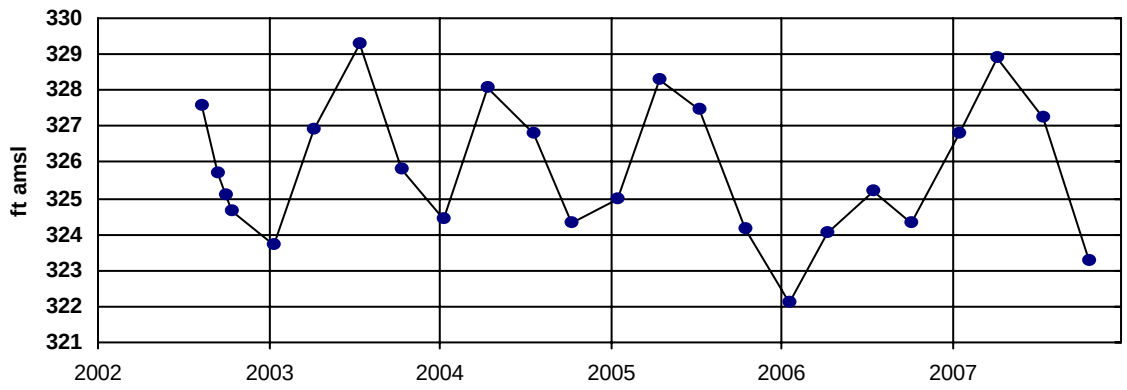
2007 Data:	pCi/L
01/16	ND
04/09	ND
04/09	ND
07/17	ND
10/22	ND

ND=not detected

MW394 URGA

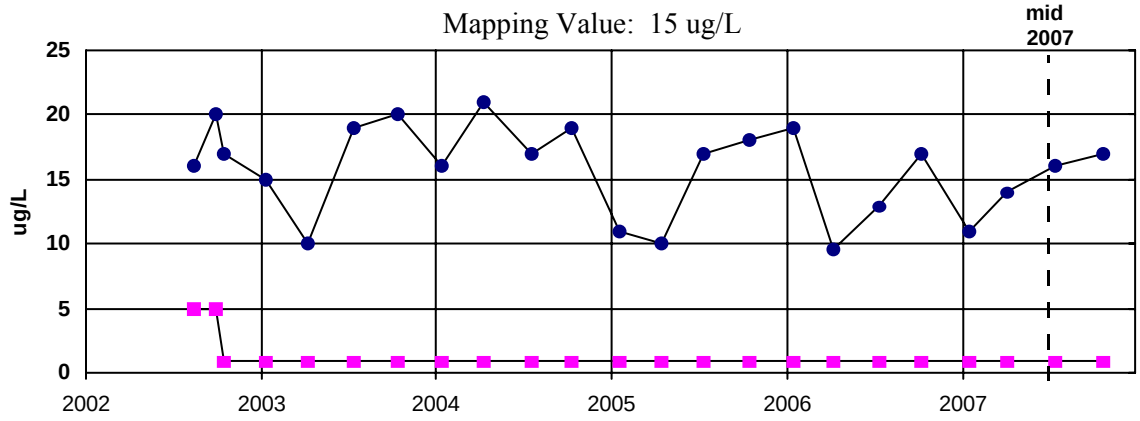
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 15 ug/L

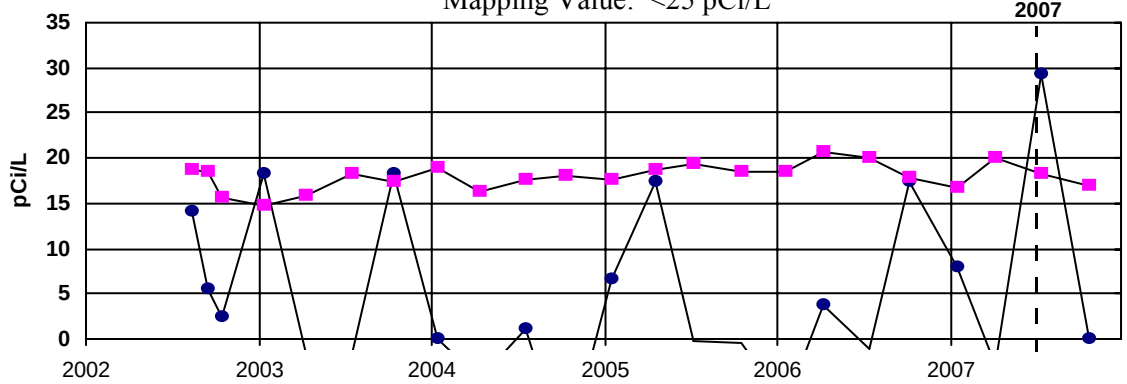


2007 Data:	ug/L
01/17	11
04/10	14
07/17	16
10/24	17

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



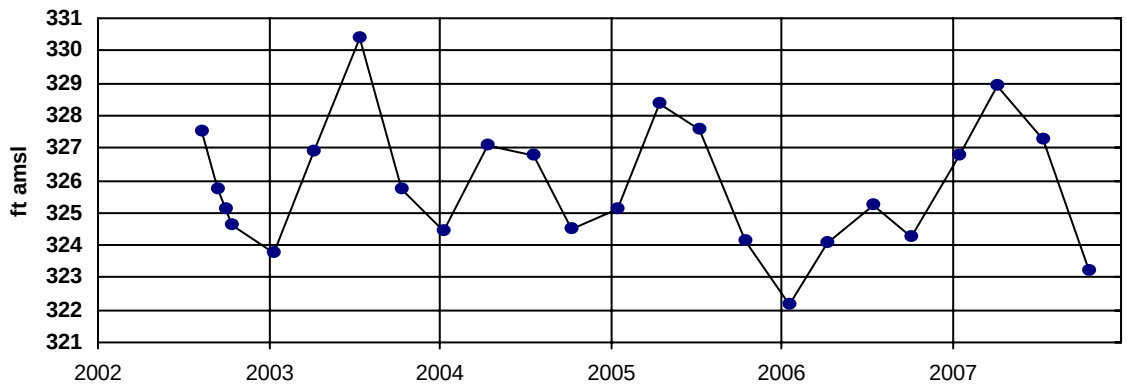
2007 Data:	pCi/L
01/17	ND
04/10	ND
07/17	29.2
10/24	ND

ND=not detected

MW395 MRGA

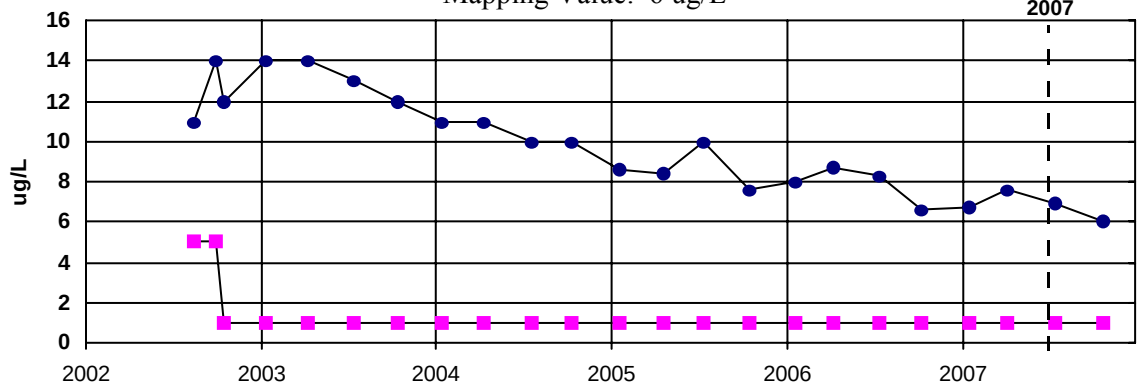
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 6 ug/L

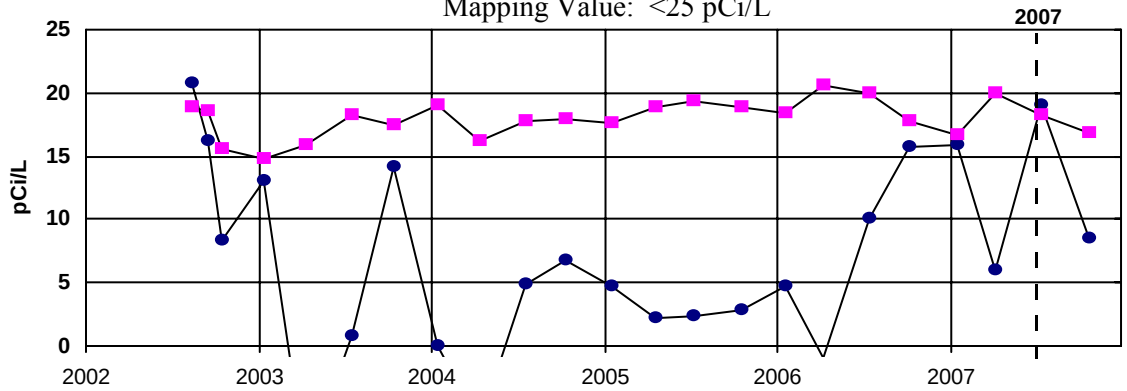


2007 Data:	ug/L
01/17	6.7
04/10	7.6
07/17	6.9
10/24	6

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



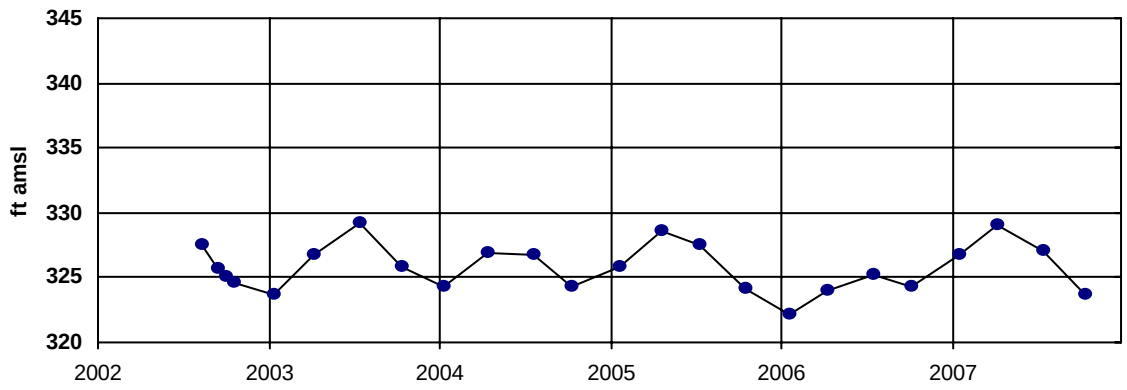
2007 Data:	pCi/L
01/17	ND
04/10	ND
07/17	19
10/24	ND

ND=not detected

MW397 LRGA

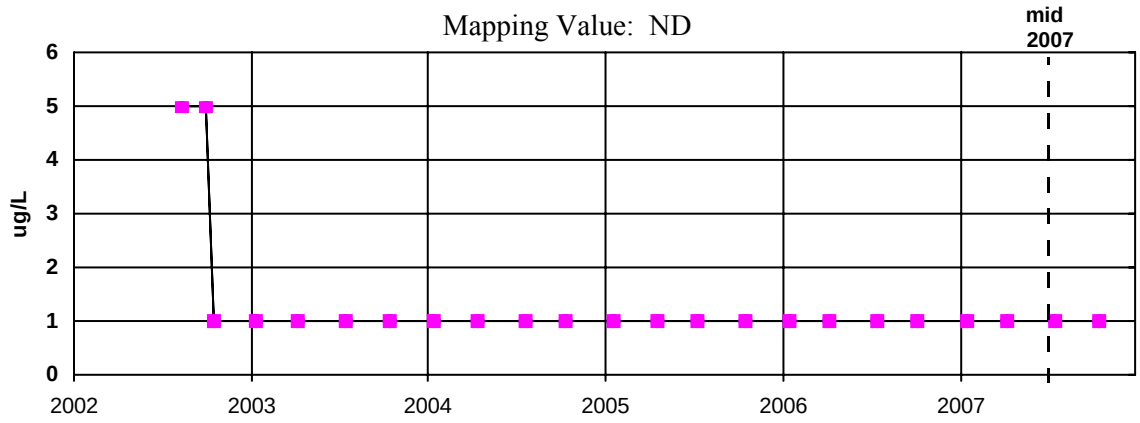
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

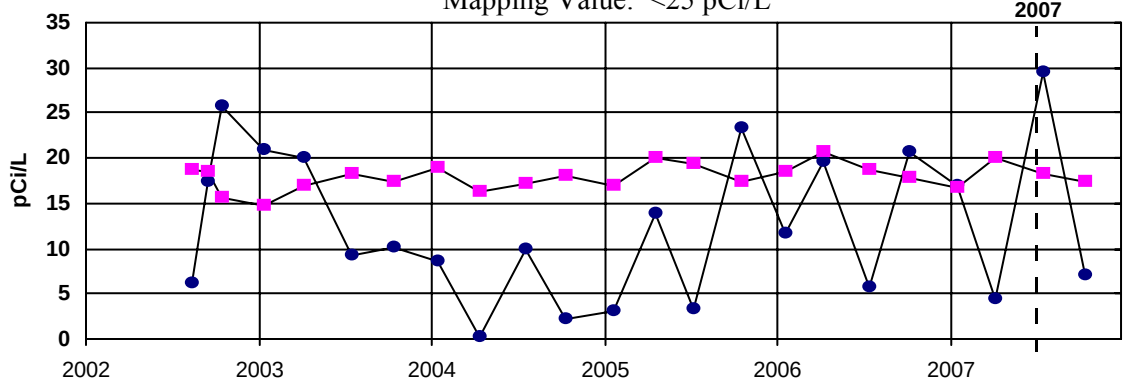


2007 Data:	ug/L
01/17	ND
04/10	ND
07/18	ND
10/16	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data:	pCi/L
01/17	17
04/10	ND
07/18	29.6
10/16	ND

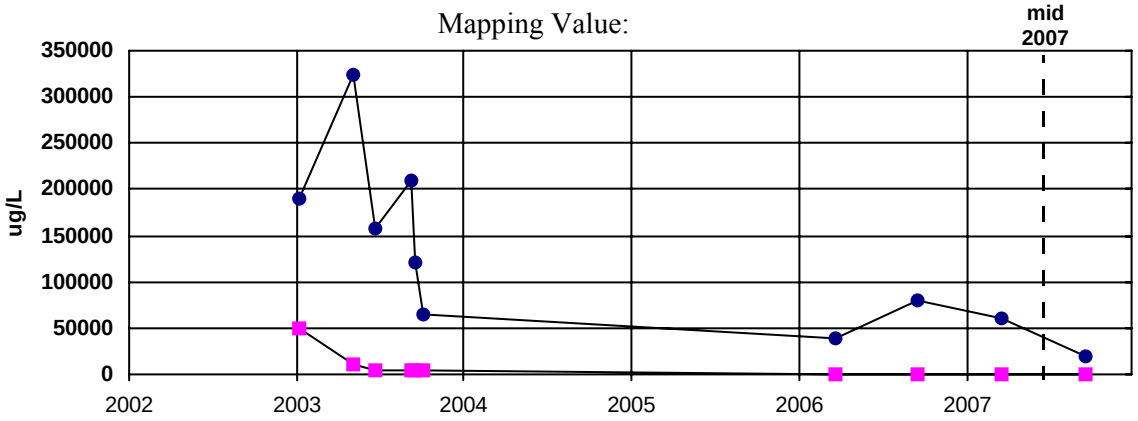
ND=not detected

MW405-PRT5

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

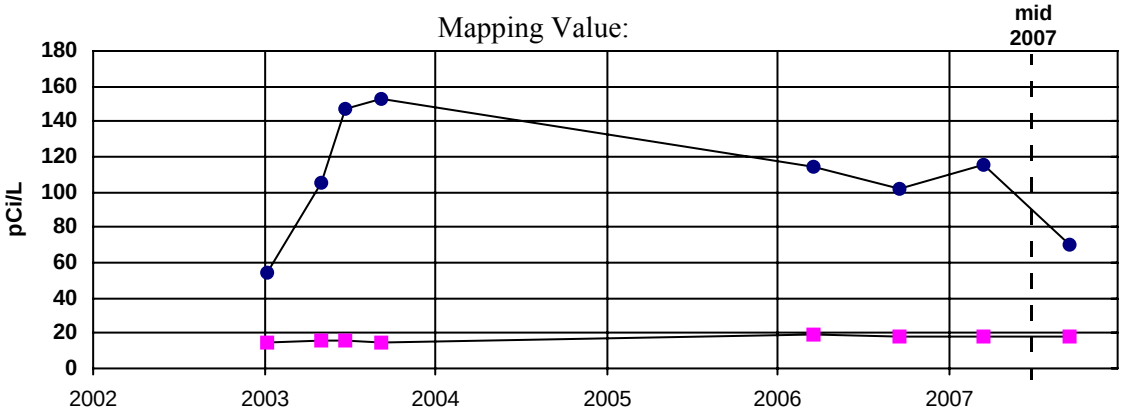


2007 Data: ug/L

03/21	60000
09/20	20000

ND=not detected

Technetium-99



2007 Data: pCi/L

03/21	116
09/20	70.2

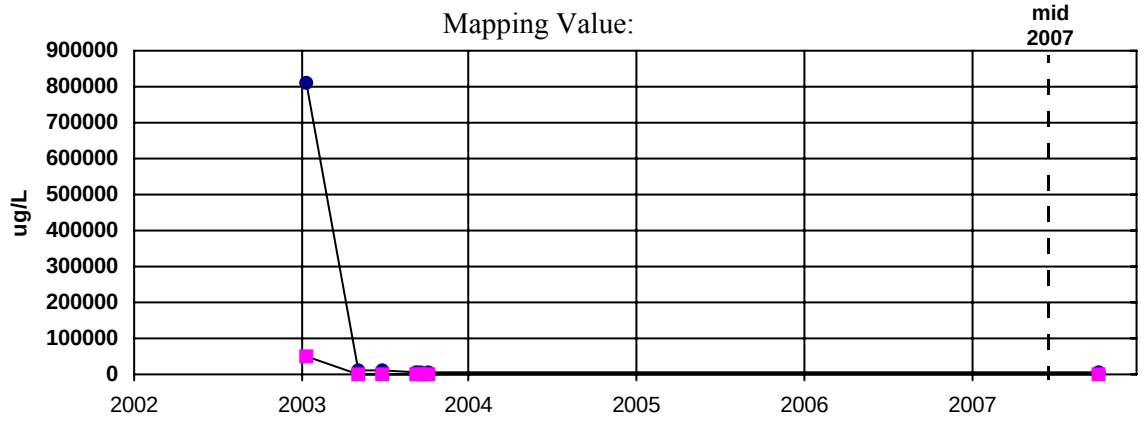
ND=not detected

MW406-PRT2

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

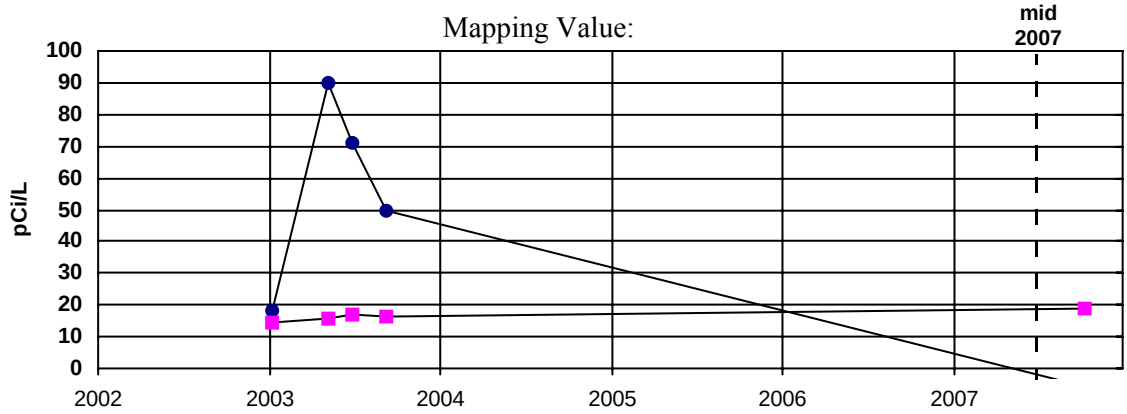


2007 Data: ug/L

10/11 3700

ND=not detected

Technetium-99



2007 Data: pCi/L

10/11 ND

ND=not detected

MW406-PRT3

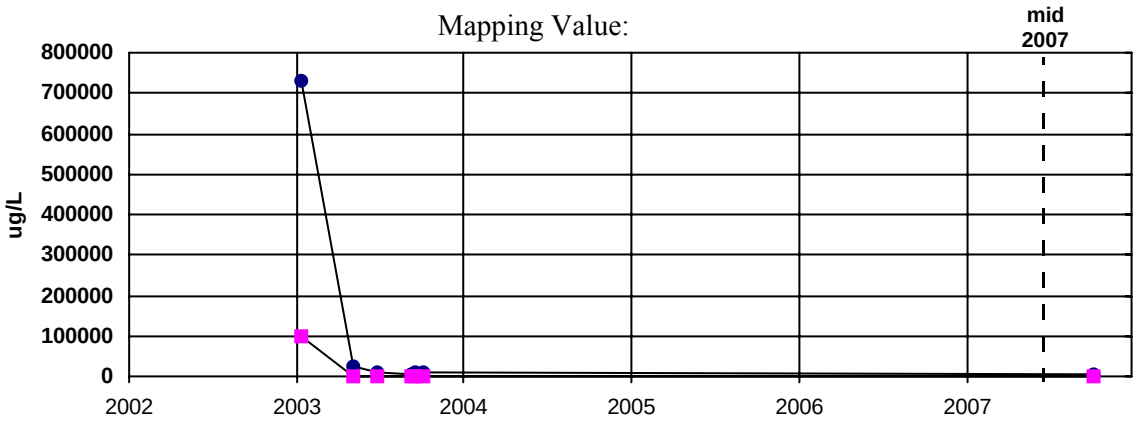
Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

2007 Data: ug/L

10/11 7400

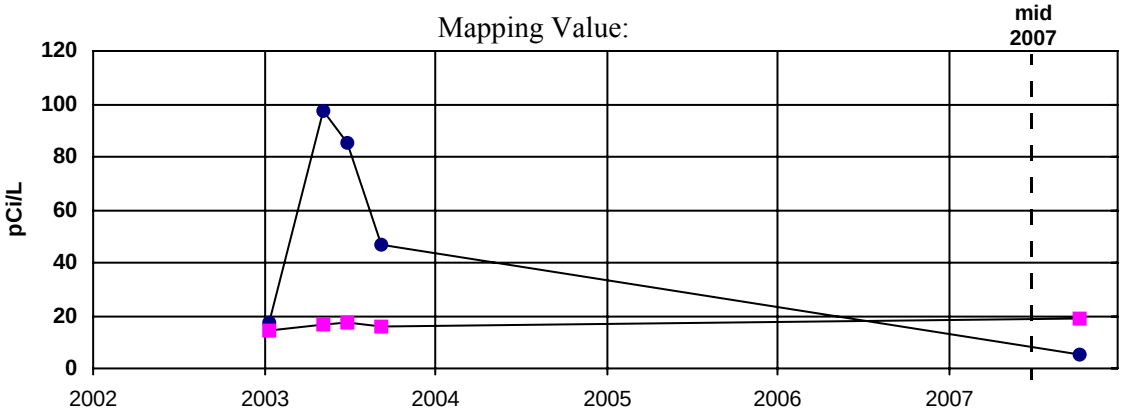


ND=not detected

Technetium-99

2007 Data: pCi/L

10/11 ND



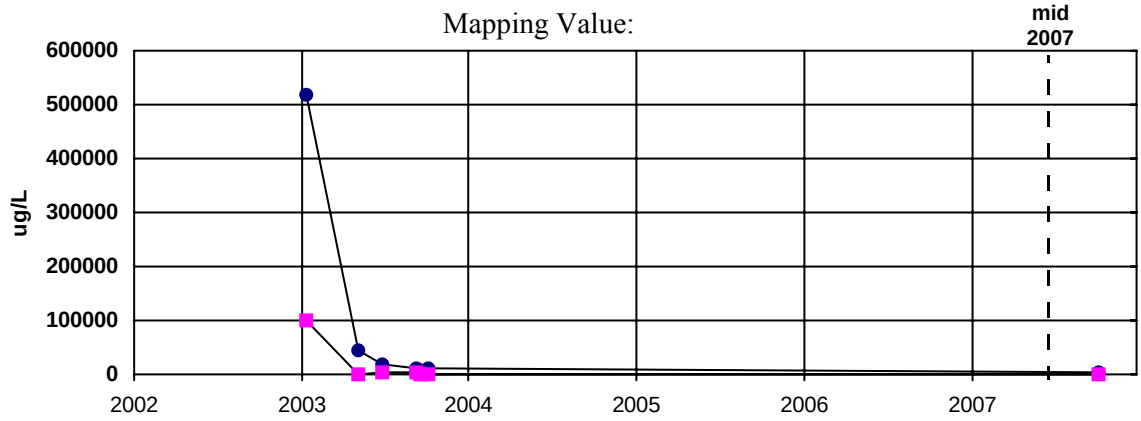
ND=not detected

MW406-PRT4

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

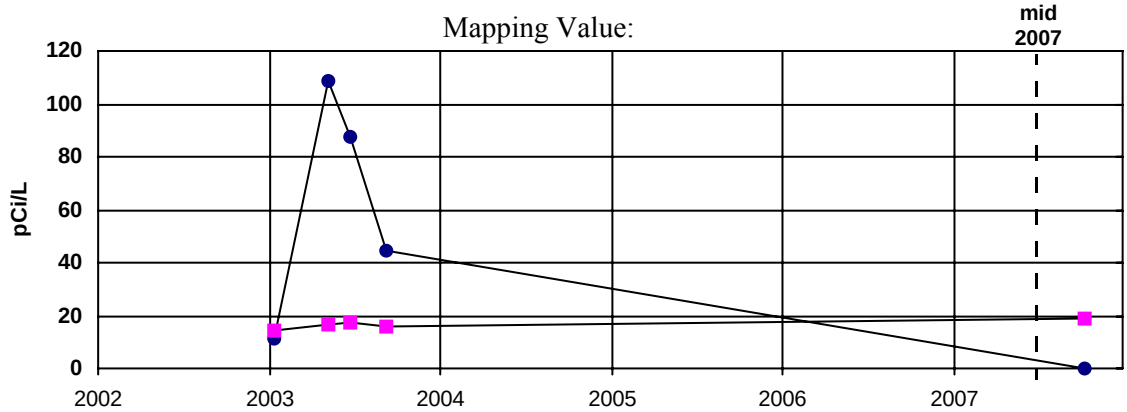


2007 Data: ug/L

10/11	4900

ND=not detected

Technetium-99



2007 Data: pCi/L

10/11	ND

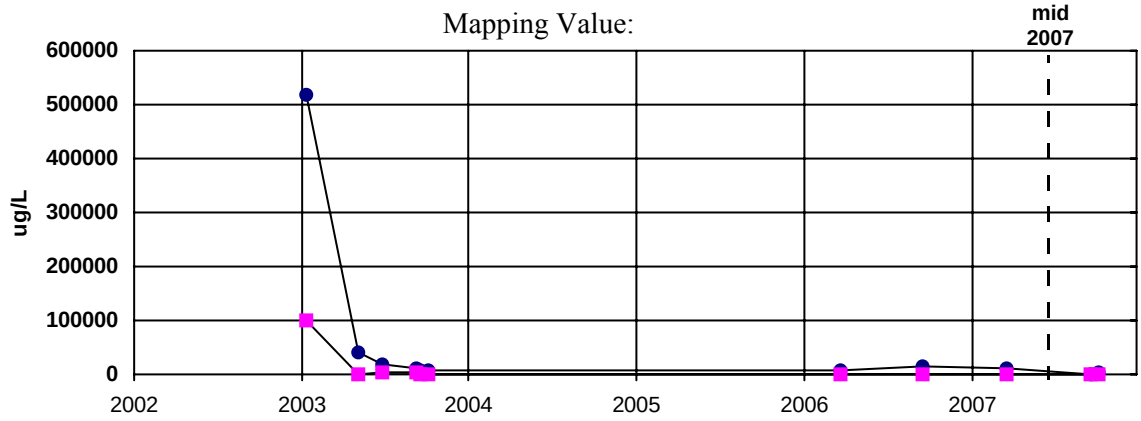
ND=not detected

MW406-PRT5

Result Detection Limit Trend Line

Water Level Elevation

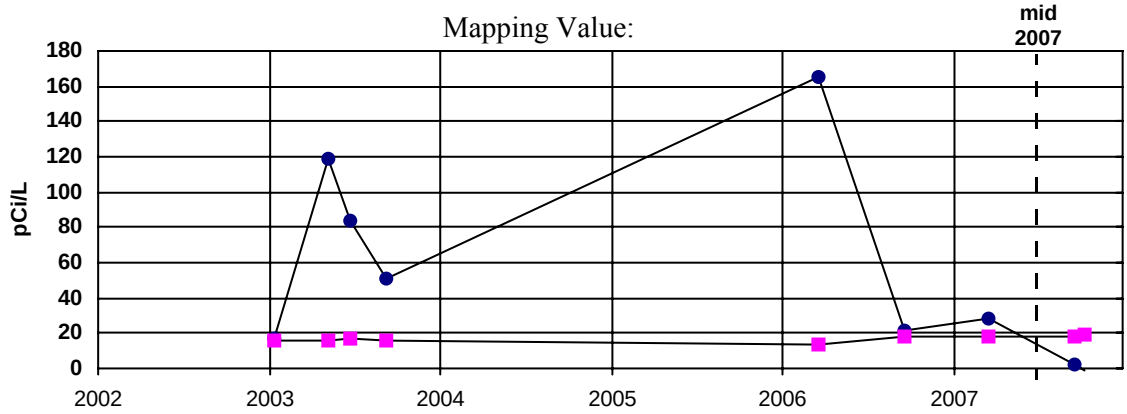
Trichloroethene



2007 Data:	ug/L
03/21	9800
09/20	1500
10/11	4500

ND=not detected

Technetium-99



2007 Data:	pCi/L
03/21	28.5
09/20	ND
10/11	ND

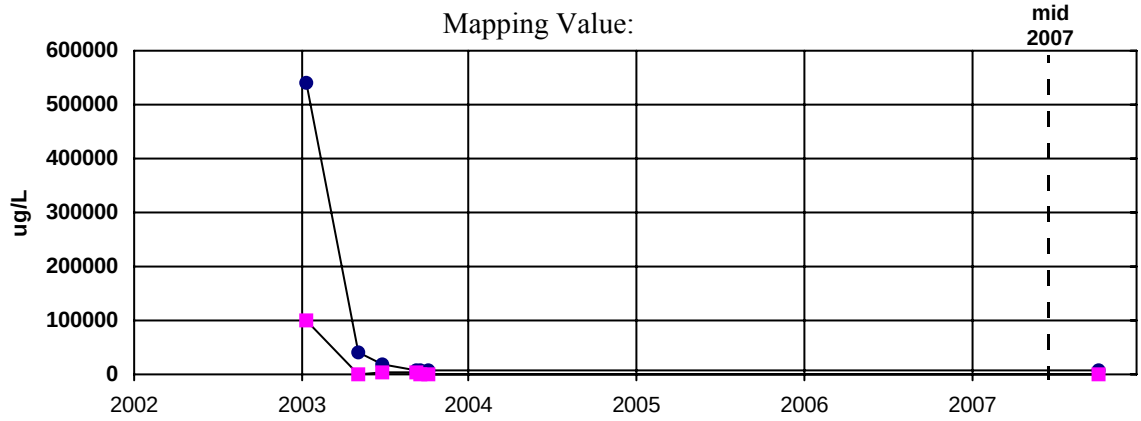
ND=not detected

MW406-PRT6

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

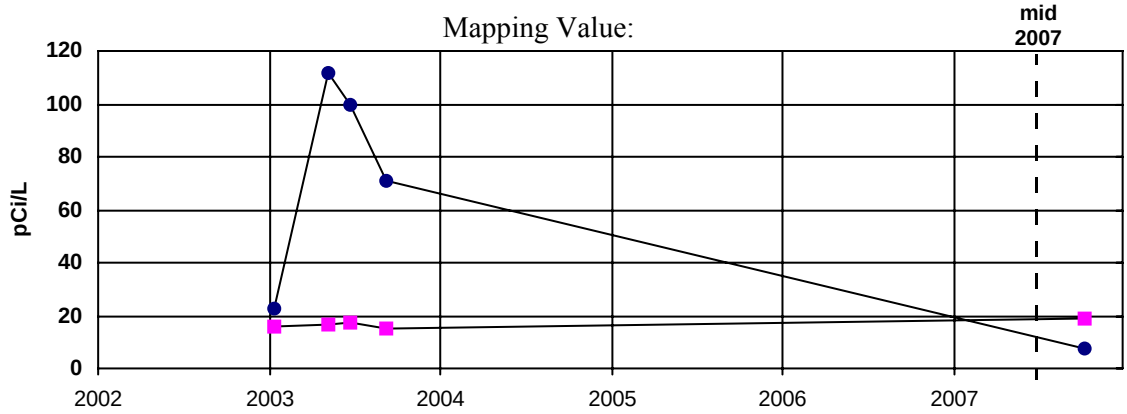


2007 Data: ug/L

10/11 7600

ND=not detected

Technetium-99



2007 Data: pCi/L

10/11 ND

ND=not detected

MW406-PRT7

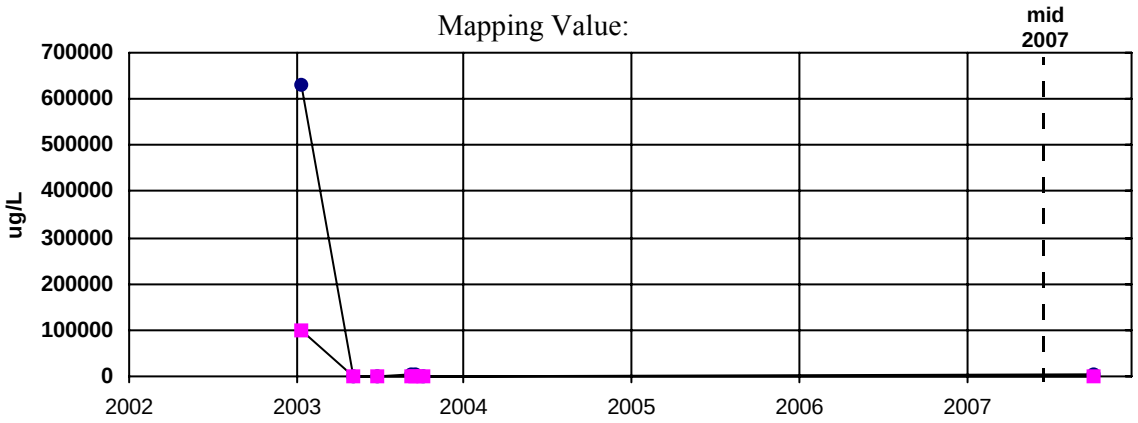
Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

2007 Data: ug/L

10/11 6300

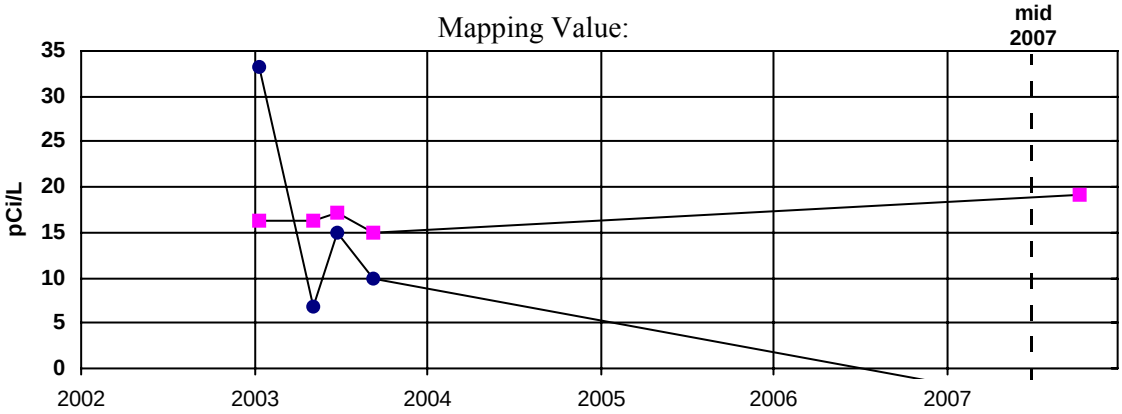


ND=not detected

Technetium-99

2007 Data: pCi/L

10/11 ND



ND=not detected

MW407-PRT2

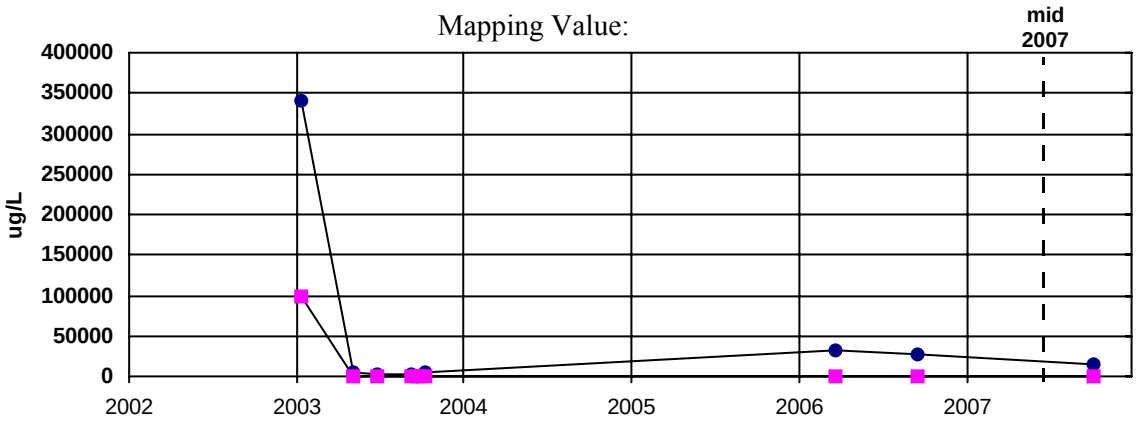
Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

2007 Data: ug/L

10/11 16000

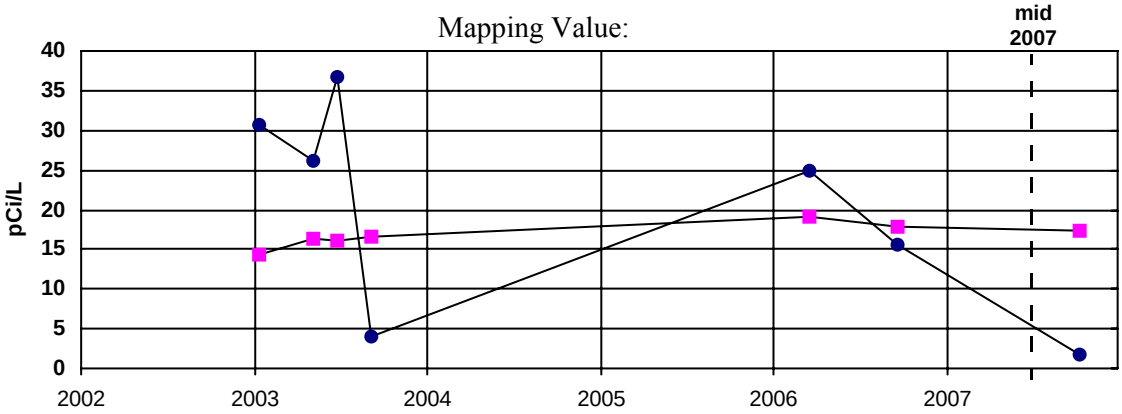


ND=not detected

Technetium-99

2007 Data: pCi/L

10/11 ND



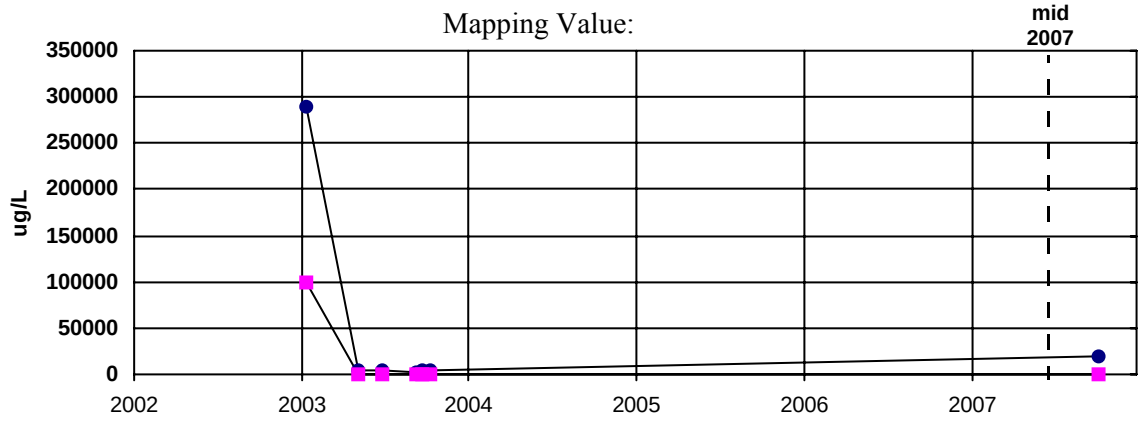
ND=not detected

MW407-PRT3

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

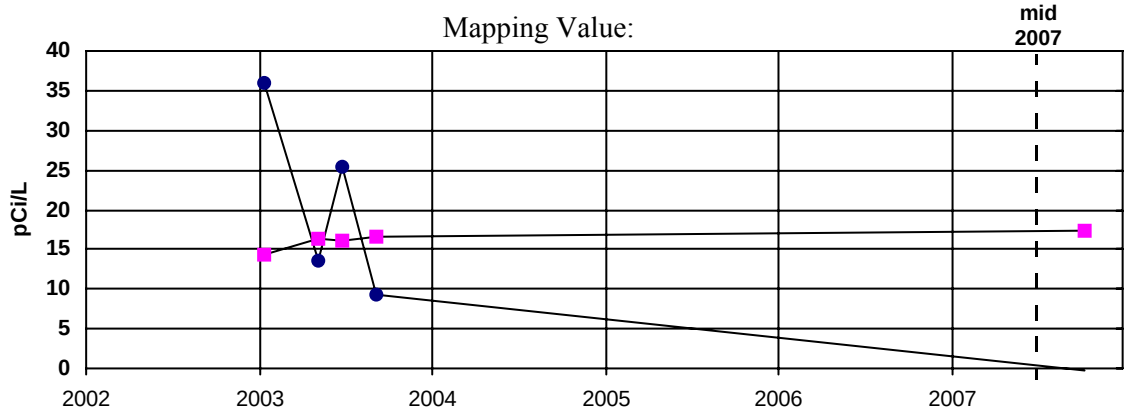


2007 Data: ug/L

10/11	17000
10/11	19000

ND=not detected

Technetium-99



2007 Data: pCi/L

10/11	ND
10/11	ND

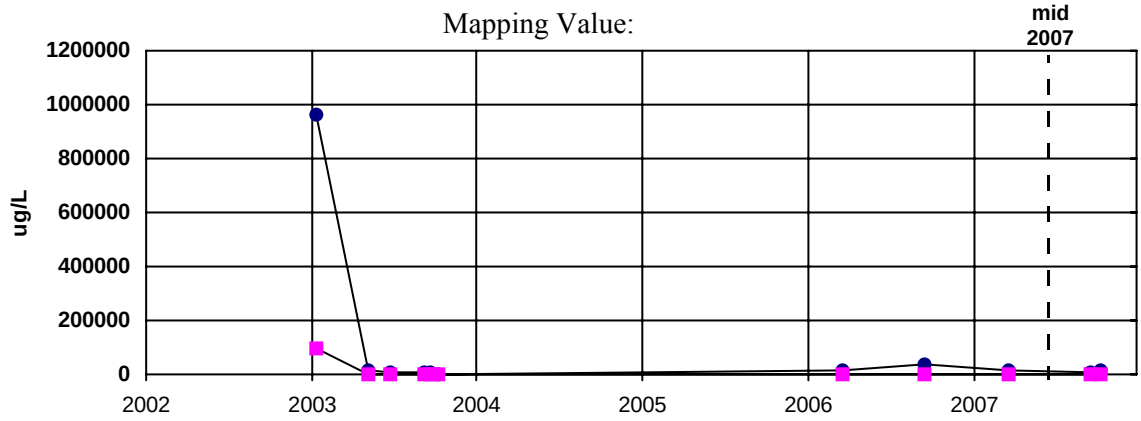
ND=not detected

MW407-PRT4

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

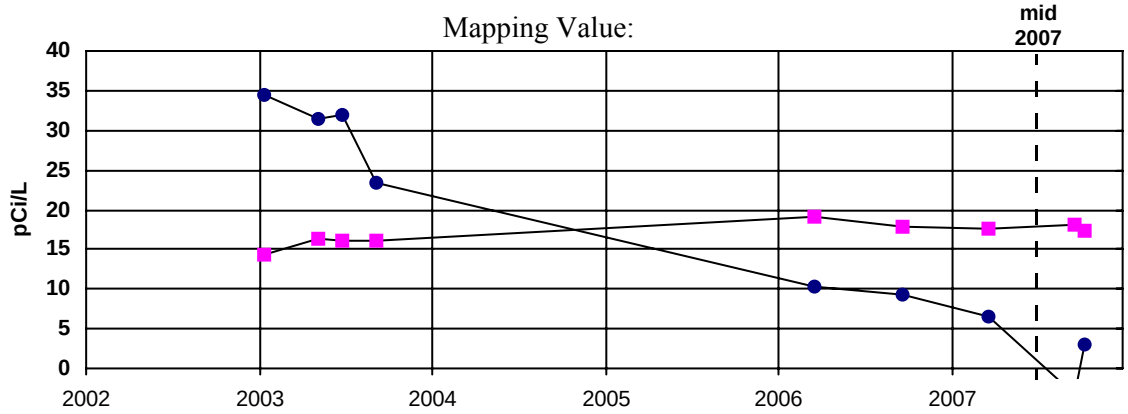


2007 Data: ug/L

03/21	16000
09/20	6900
10/11	15000

ND=not detected

Technetium-99



2007 Data: pCi/L

03/21	ND
09/20	ND
10/11	ND

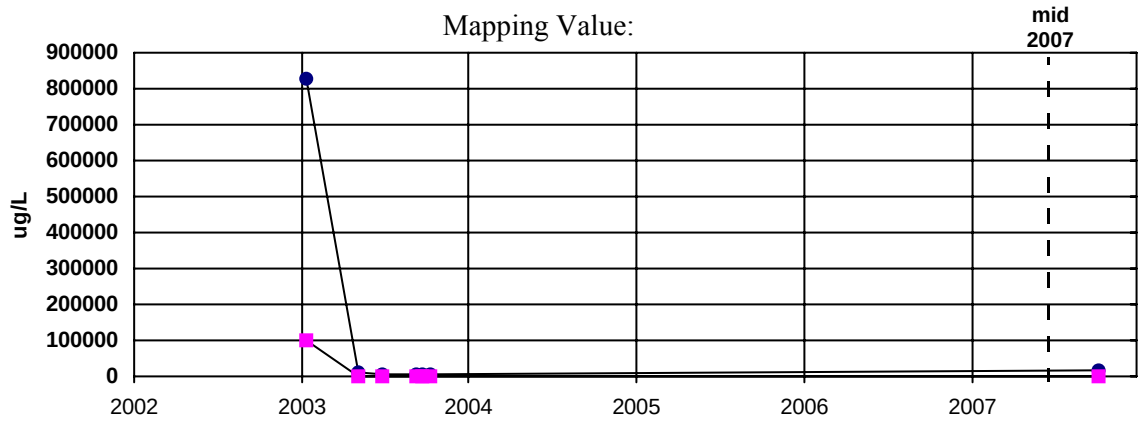
ND=not detected

MW407-PRT5

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

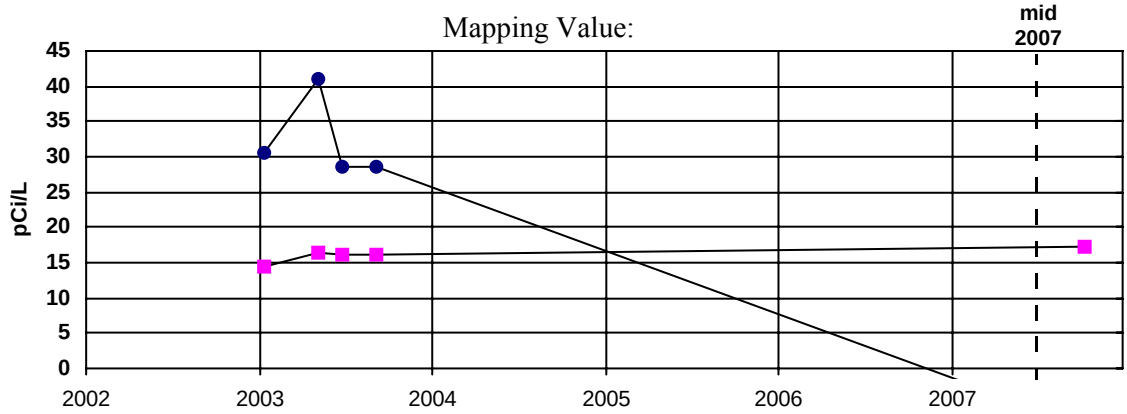


2007 Data: ug/L

10/11 14000

ND=not detected

Technetium-99



2007 Data: pCi/L

10/11 ND

ND=not detected

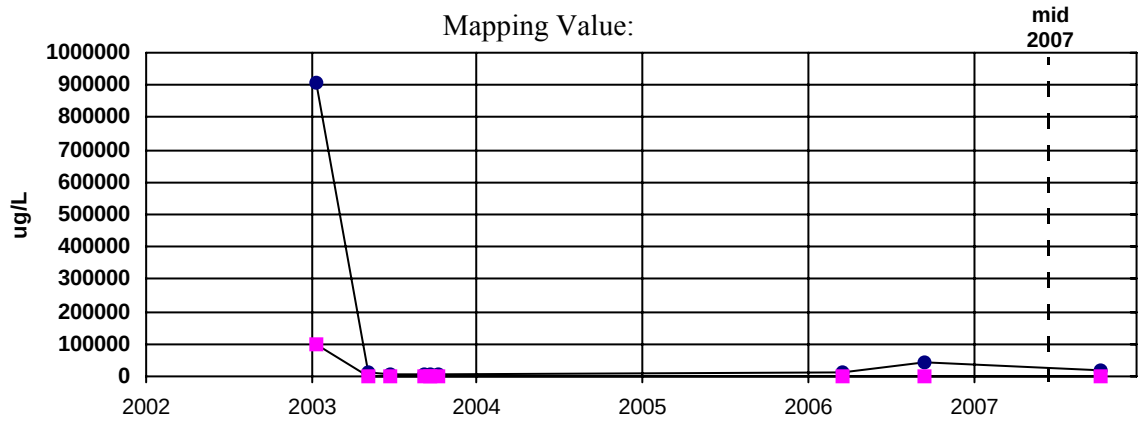
MW407-PRT6

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

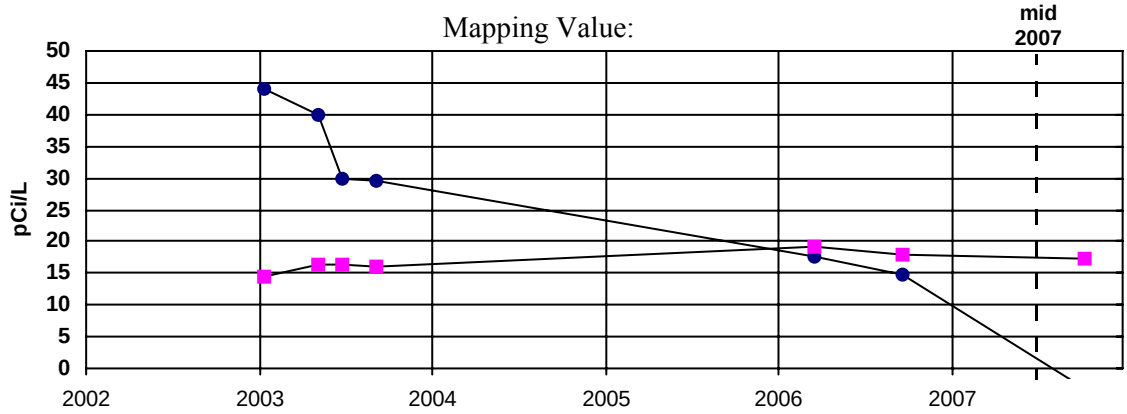
2007 Data: ug/L
10/11 18000



ND=not detected

Technetium-99

2007 Data: pCi/L
10/11 ND



ND=not detected

MW407-PRT7

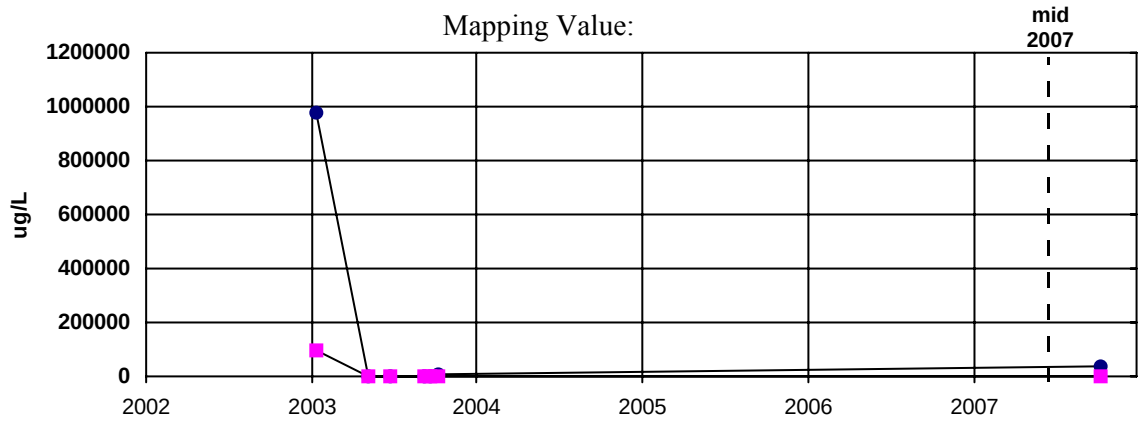
Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

2007 Data: ug/L

10/11 37000

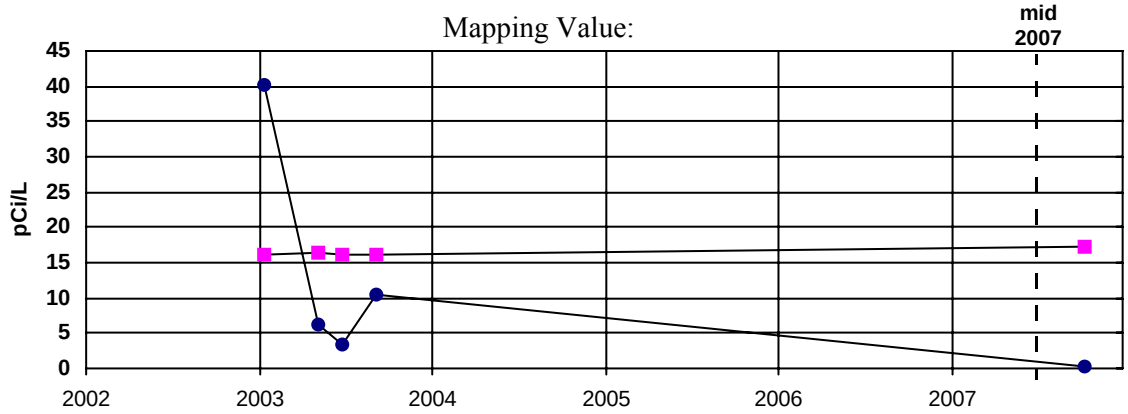


ND=not detected

Technetium-99

2007 Data: pCi/L

10/11 ND



ND=not detected

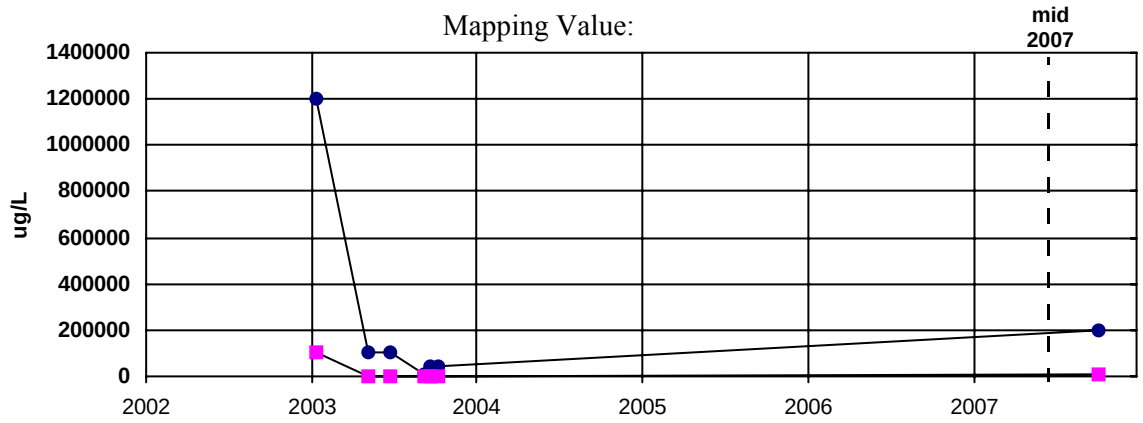
MW408-PRT2

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

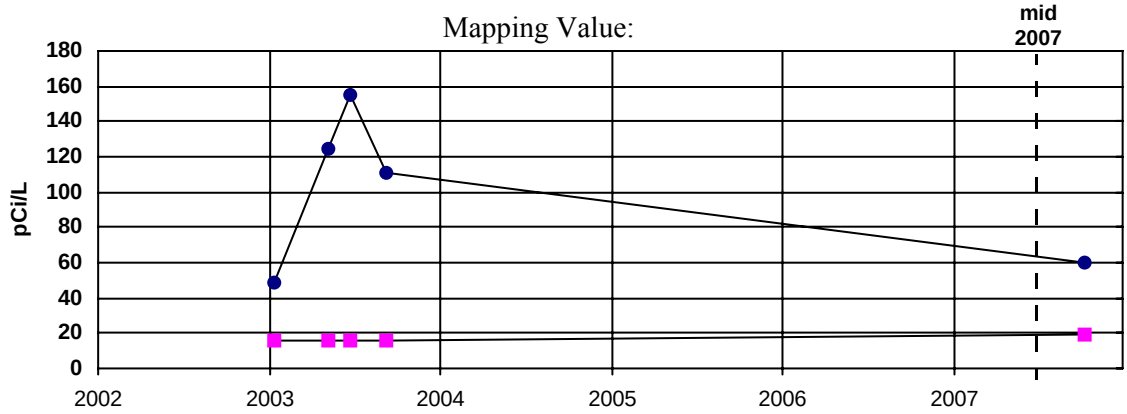
2007 Data: ug/L
10/10 200000



ND=not detected

Technetium-99

2007 Data: pCi/L
10/10 60.4



ND=not detected

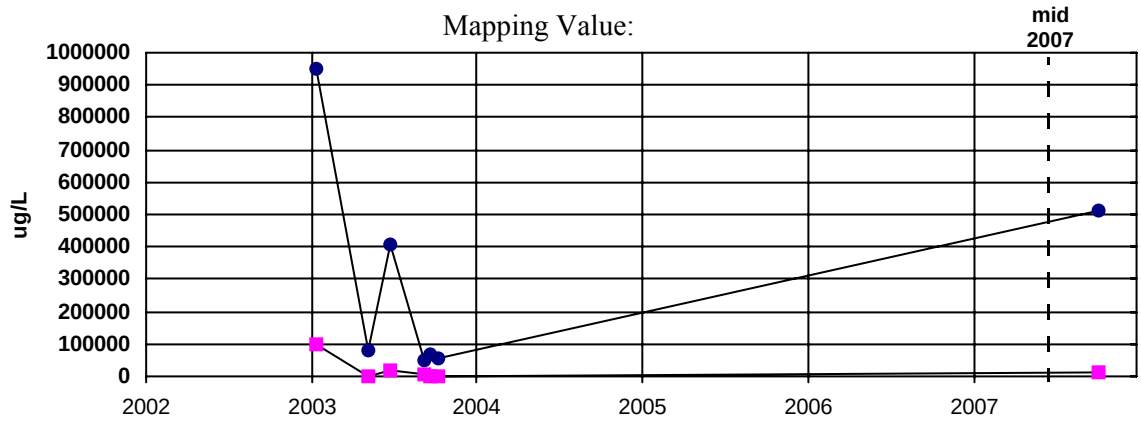
MW408-PRT3

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

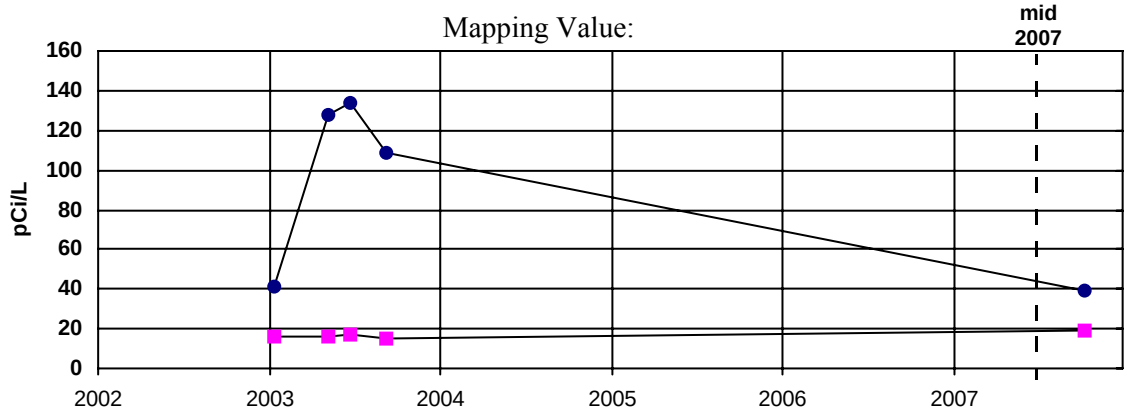
2007 Data: ug/L
10/10 510000



ND=not detected

Technetium-99

2007 Data: pCi/L
10/10 39.6



ND=not detected

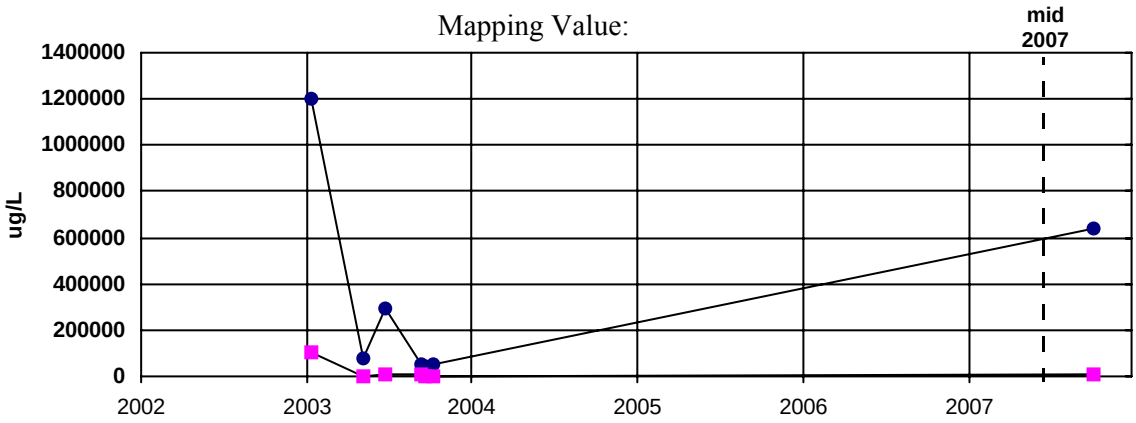
MW408-PRT4

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

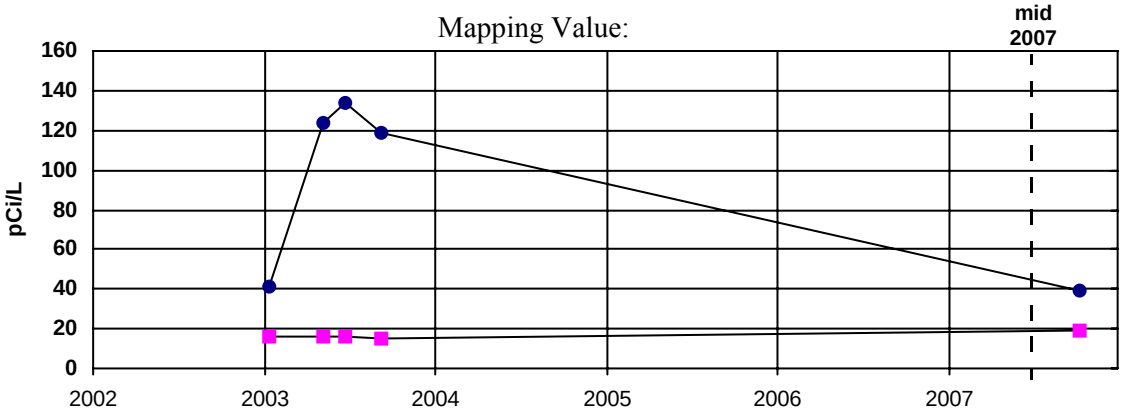
2007 Data: ug/L
10/10 640000



ND=not detected

Technetium-99

2007 Data: pCi/L
10/10 39.7



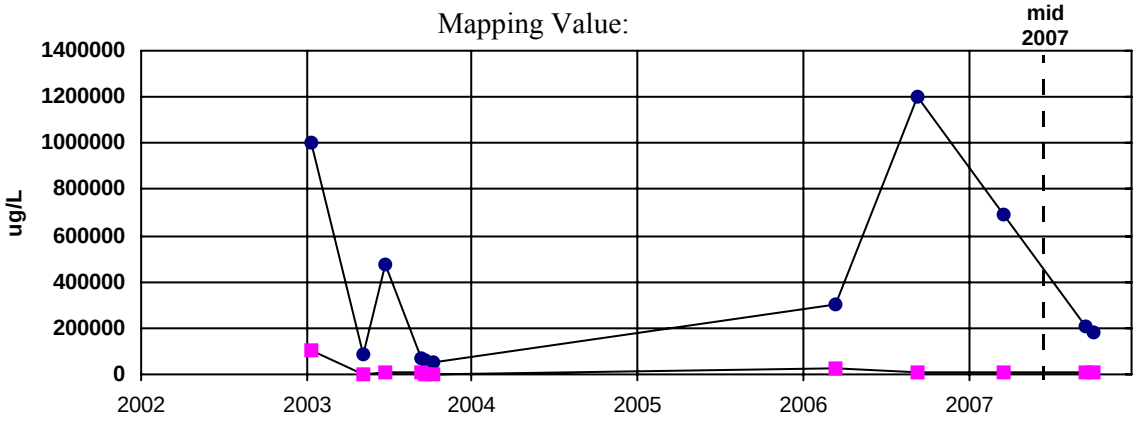
ND=not detected

MW408-PRT5

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

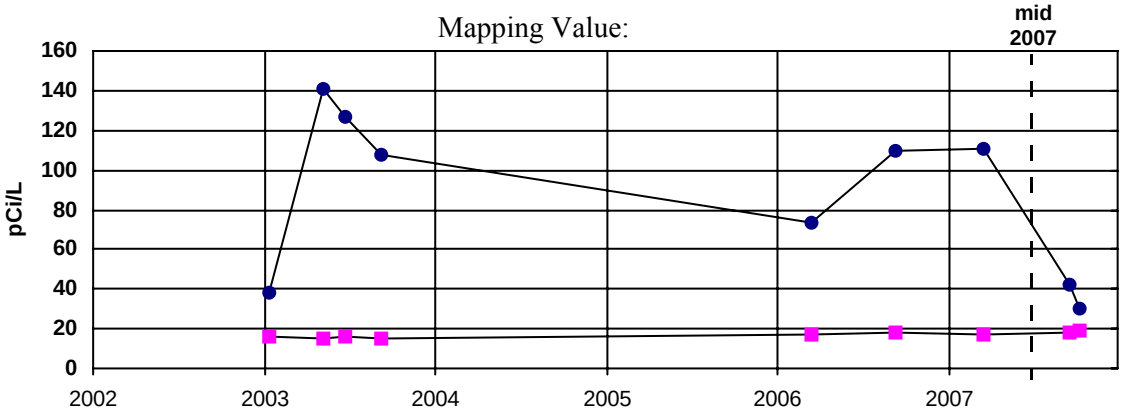


2007 Data: ug/L

03/21	690000
09/20	210000
10/10	180000

ND=not detected

Technetium-99



2007 Data: pCi/L

03/21	111
09/20	42.1
10/10	30.1

ND=not detected

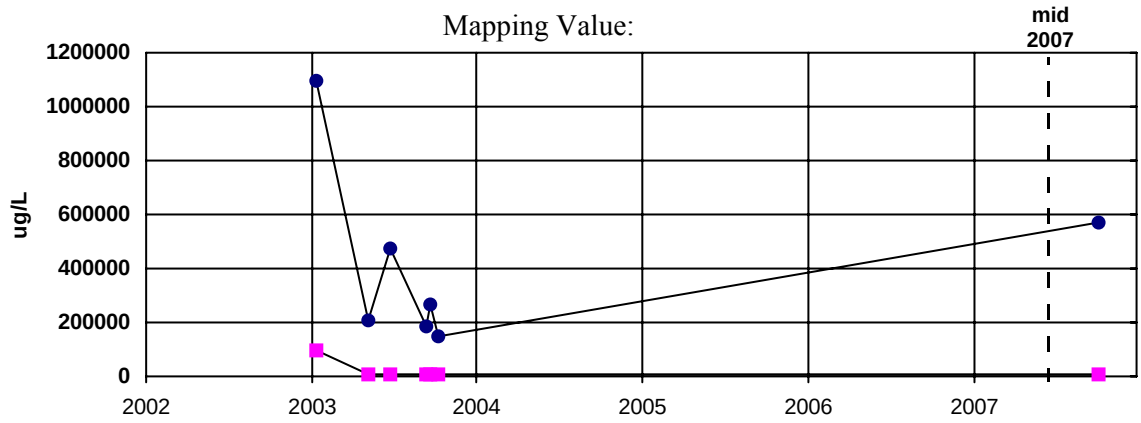
MW408-PRT6

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

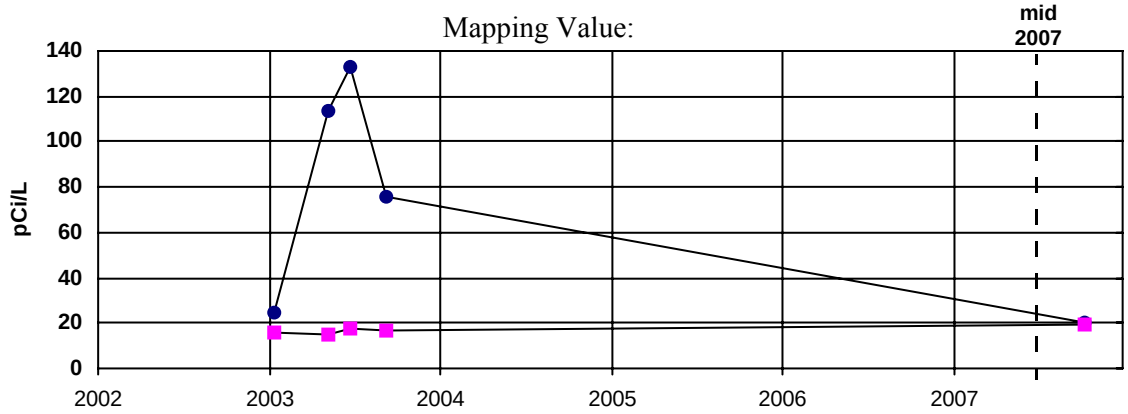
2007 Data: ug/L
10/10 570000



ND=not detected

Technetium-99

2007 Data: pCi/L
10/10 20.1



ND=not detected

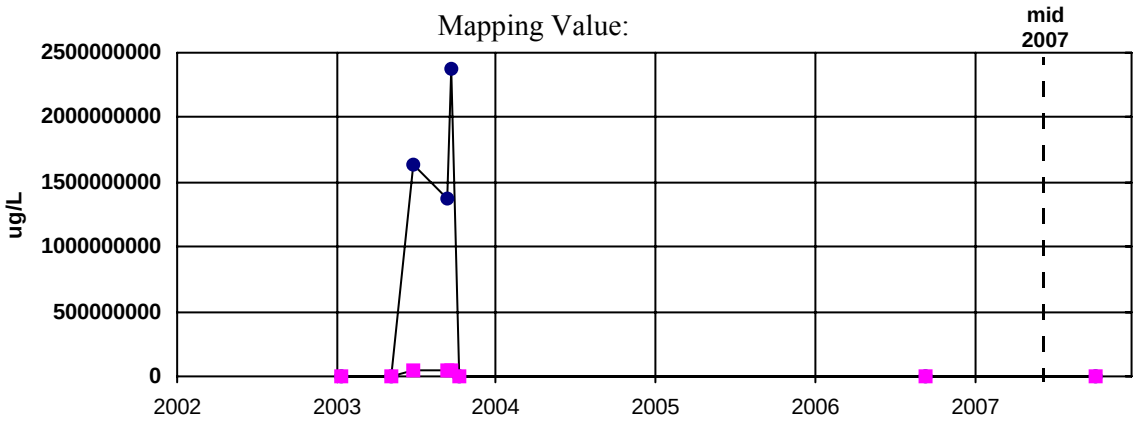
MW408-PRT7

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

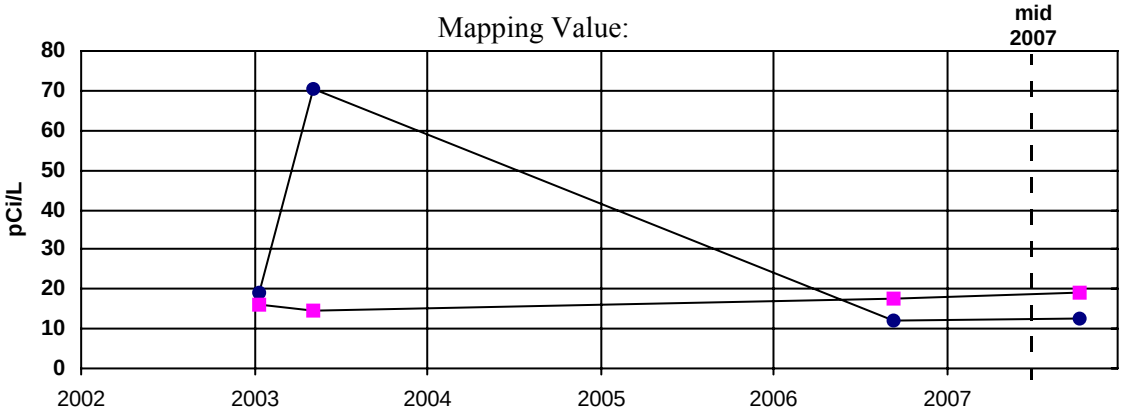
2007 Data: ug/L
10/10 200000



ND=not detected

Technetium-99

2007 Data: pCi/L
10/10 ND

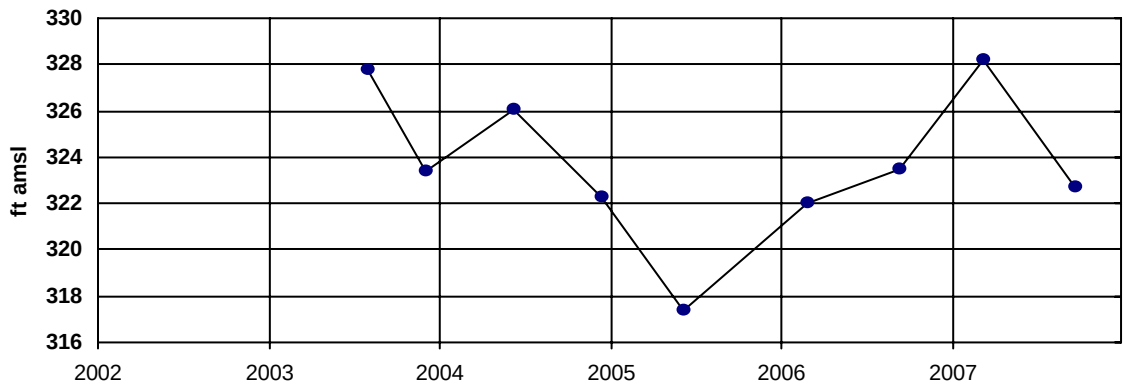


ND=not detected

MW409 LRGA

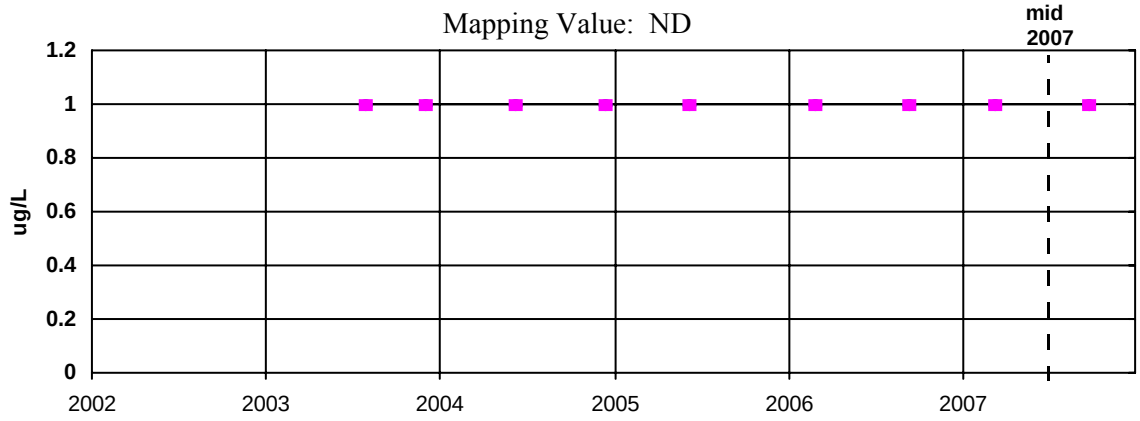
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

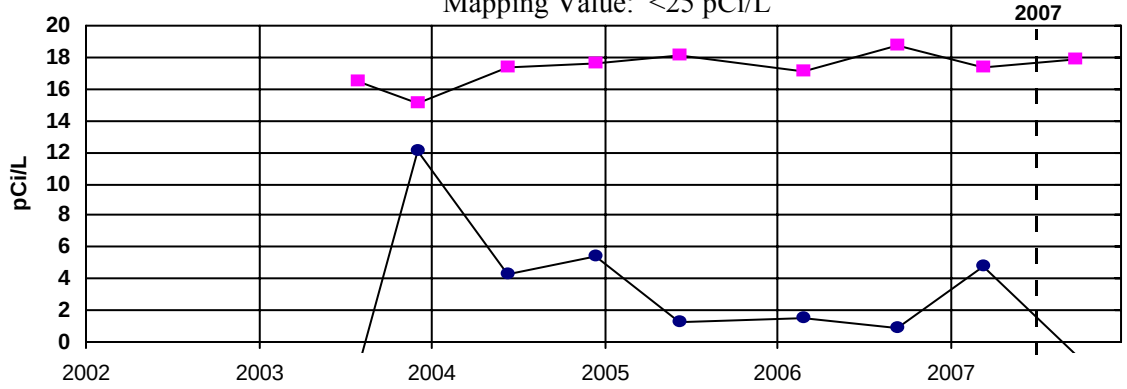


2007 Data:	ug/L
03/13	ND
03/13	ND
09/25	ND
09/25	0.55

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



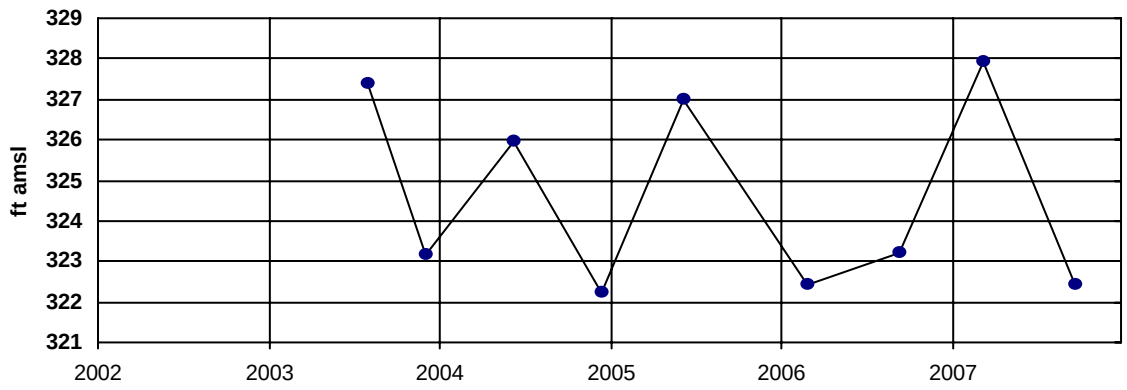
2007 Data:	pCi/L
03/13	ND
03/13	ND
09/25	ND
09/25	ND

ND=not detected

MW410 LRGA

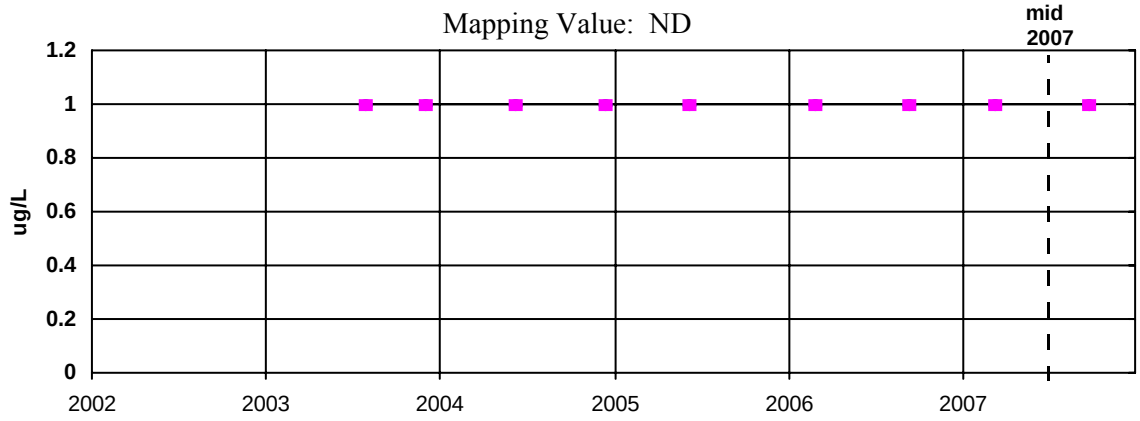
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: ND

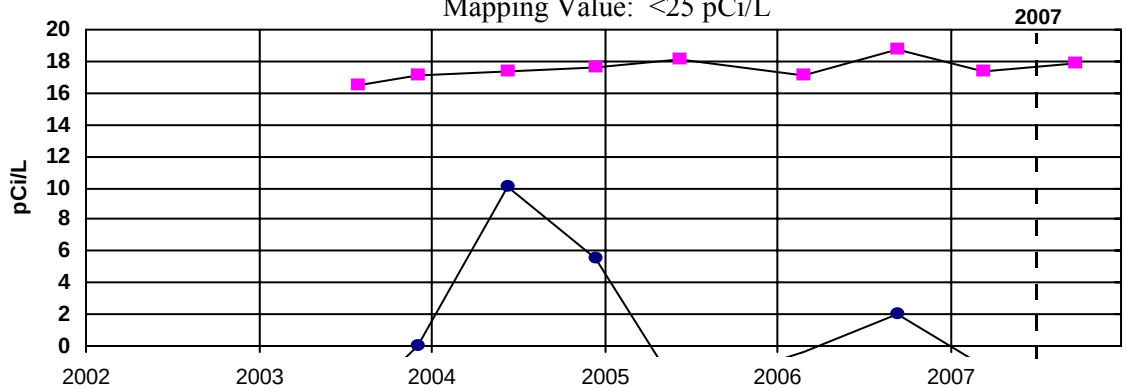


2007 Data:	ug/L
03/13	ND
09/25	ND
09/25	0.32

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



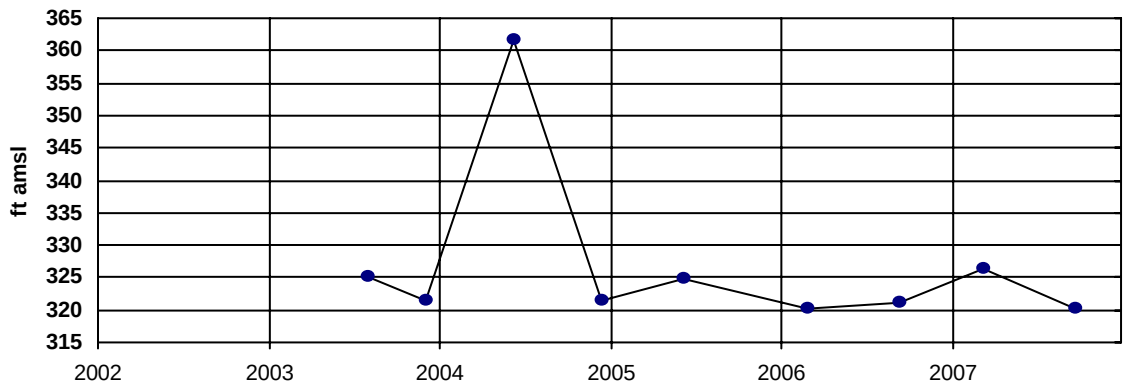
2007 Data:	pCi/L
03/13	ND
09/25	ND
09/25	ND

ND=not detected

MW411 LRGA

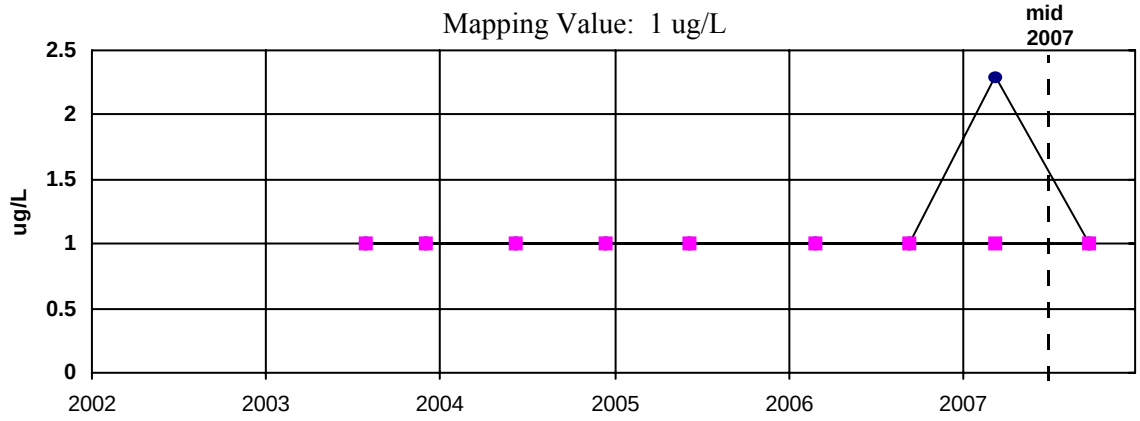
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 1 ug/L

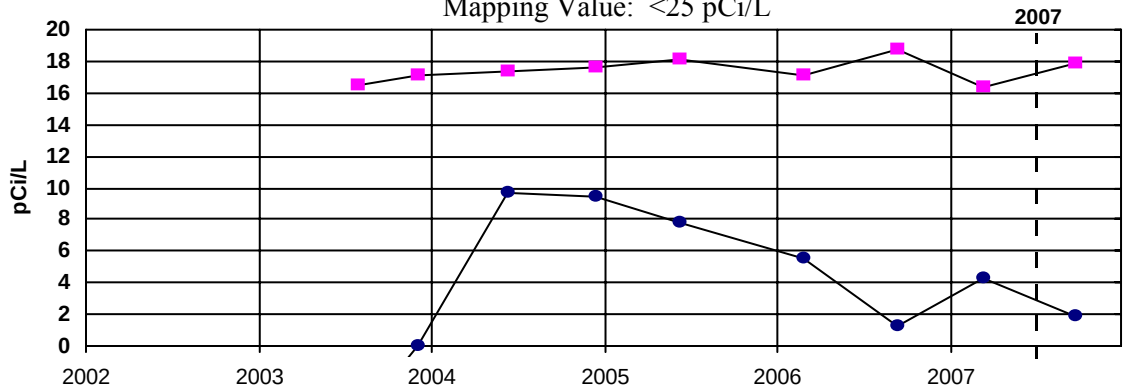


2007 Data:	ug/L
03/13	2.3
09/25	ND
09/25	0.25

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



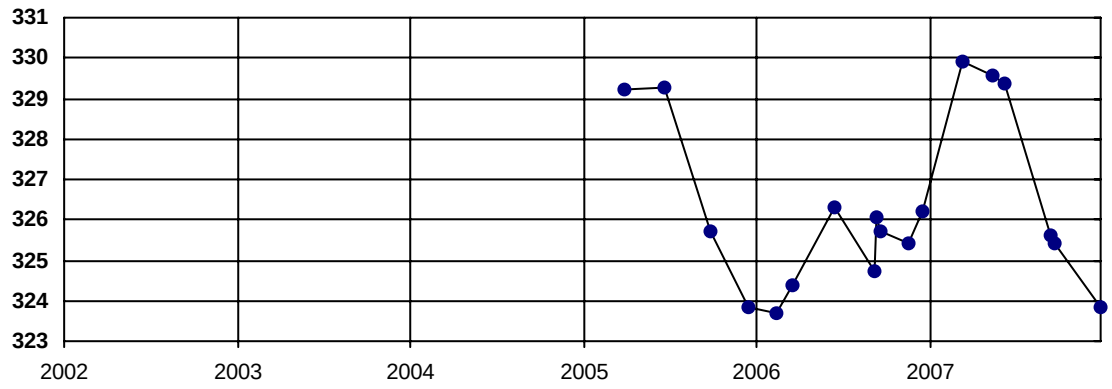
2007 Data:	pCi/L
03/13	ND
09/25	ND
09/25	ND

ND=not detected

MW414 URGA

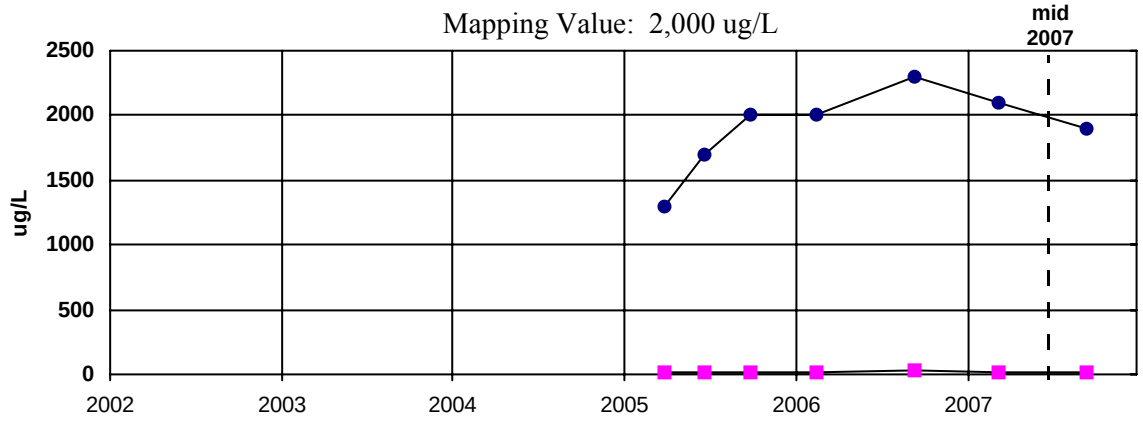
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 2,000 ug/L



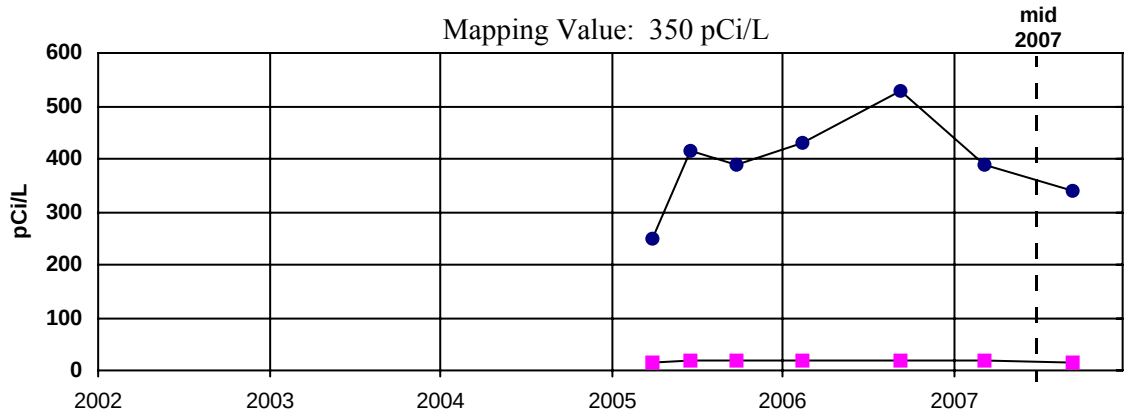
2007 Data: ug/L

03/13	2100
09/17	1900

ND=not detected

Technetium-99

Mapping Value: 350 pCi/L



2007 Data: pCi/L

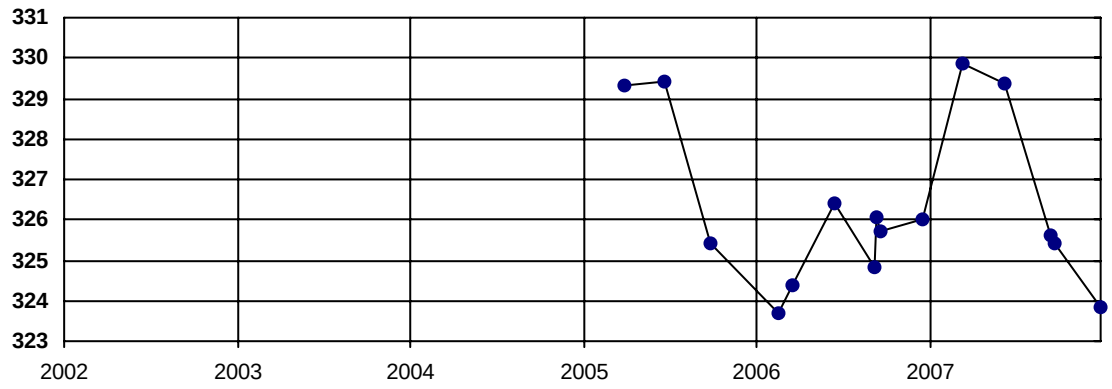
03/13	387
09/17	341

ND=not detected

MW415 LRGA

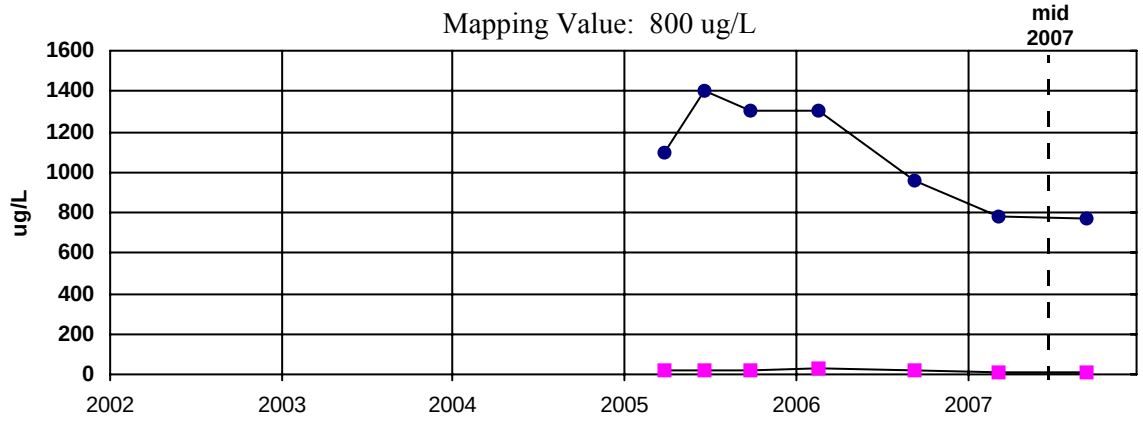
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 800 ug/L

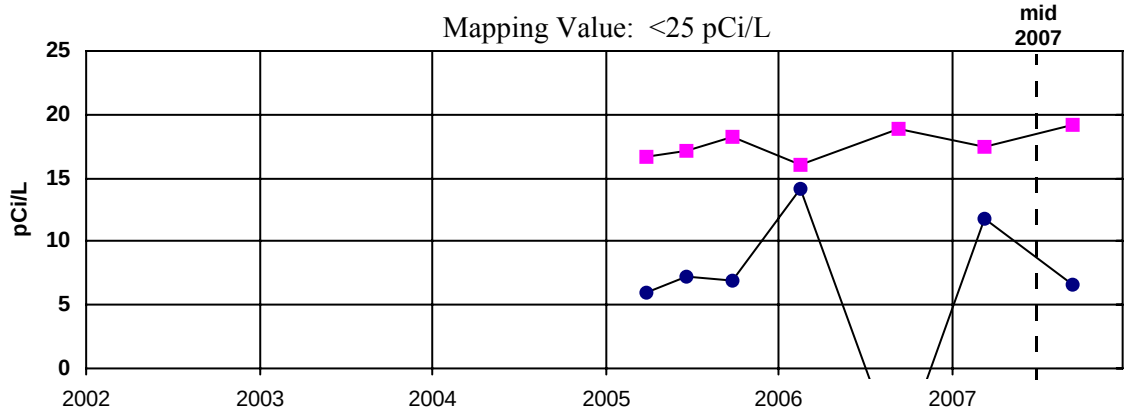


2007 Data:	ug/L
03/13	780
09/17	770
09/17	750

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



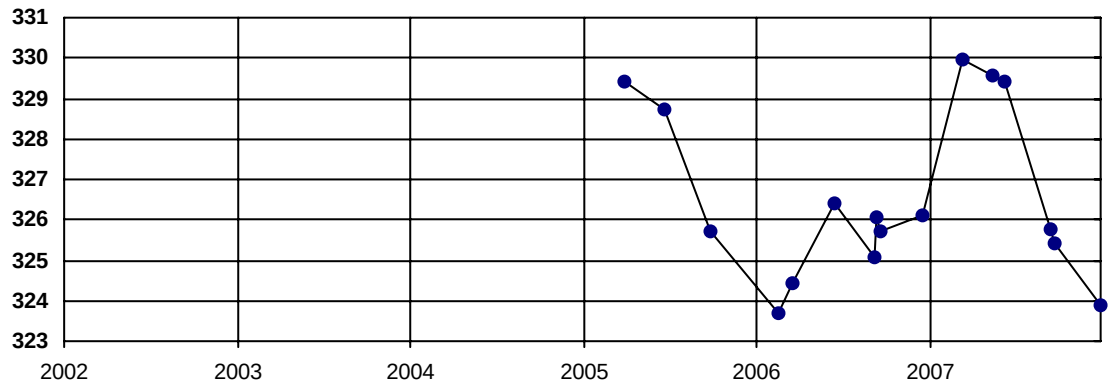
2007 Data:	pCi/L
03/13	ND
09/17	ND
09/17	ND

ND=not detected

MW416 URGA

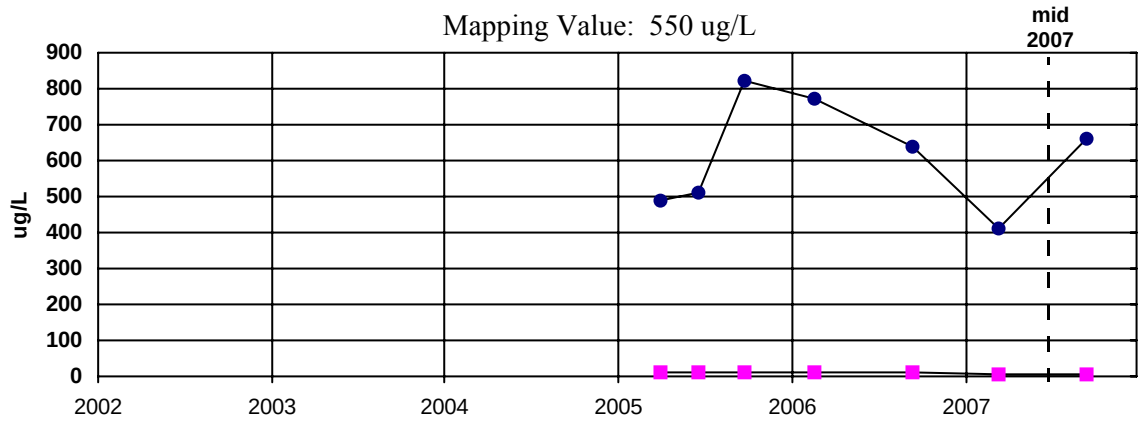
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 550 ug/L



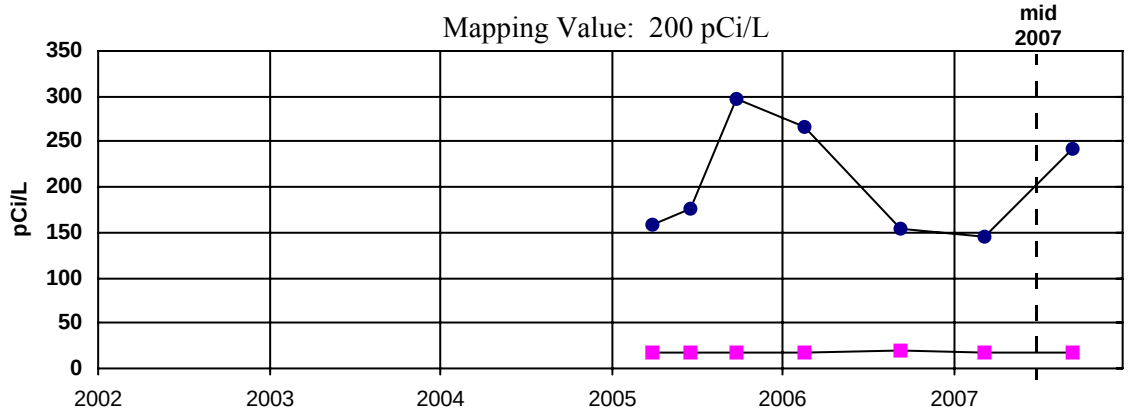
2007 Data: ug/L

03/13	410
09/17	660

ND=not detected

Technetium-99

Mapping Value: 200 pCi/L



2007 Data: pCi/L

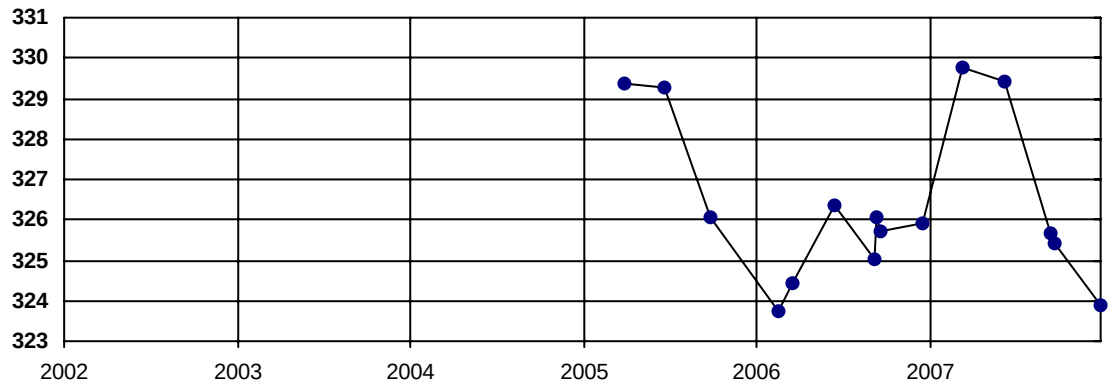
03/13	146
09/17	242

ND=not detected

MW417 LRGA

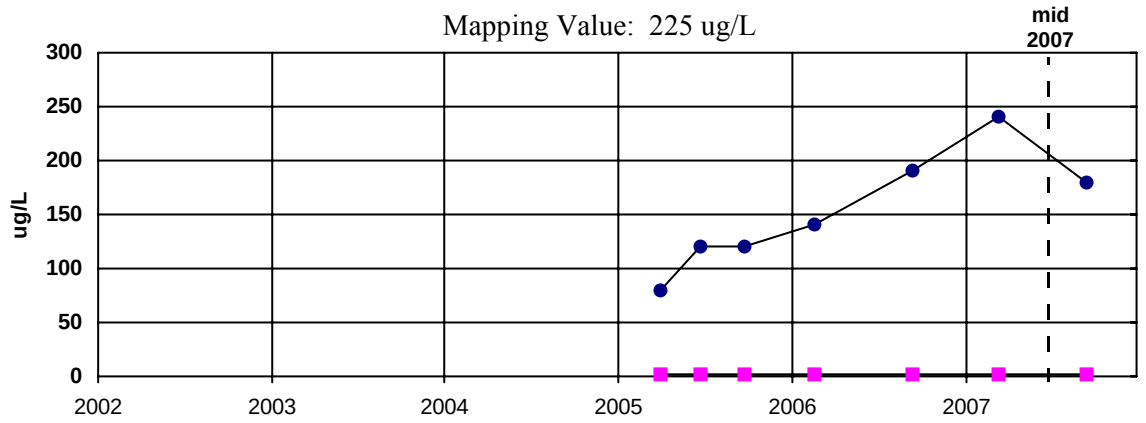
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 225 ug/L



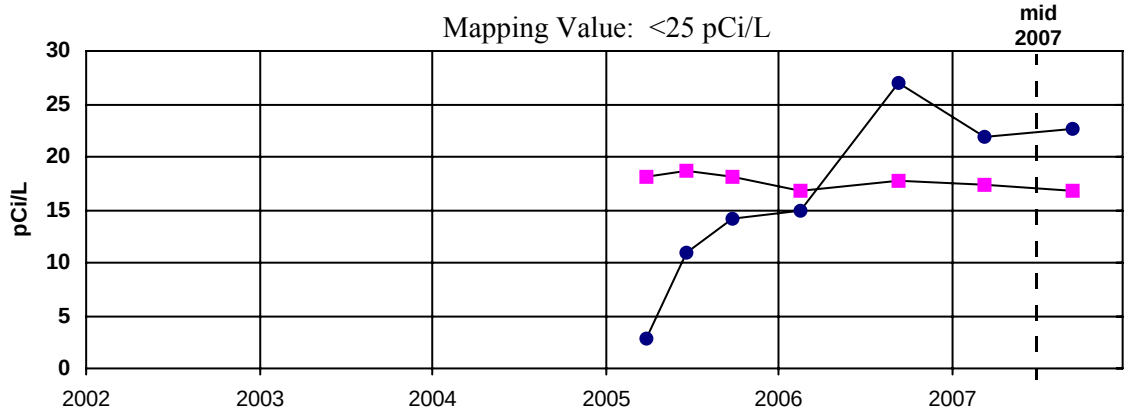
2007 Data: ug/L

03/13	240
09/17	180

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

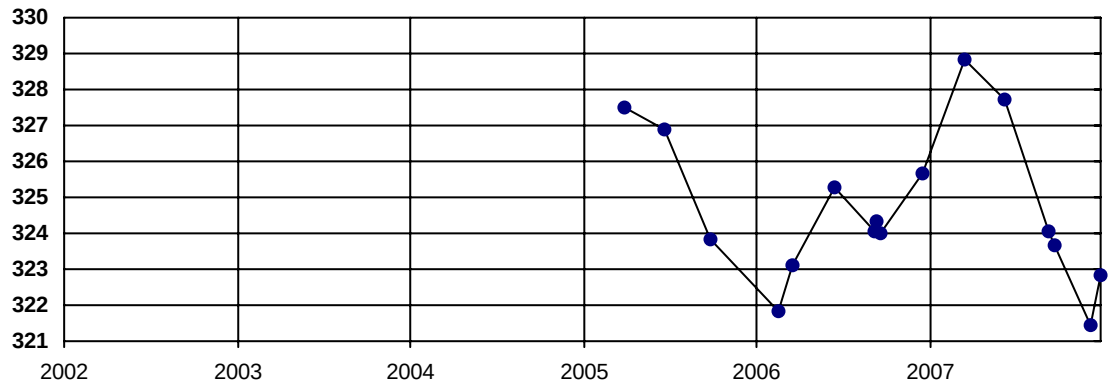
03/13	21.8
09/17	22.7

ND=not detected

MW418 URGA

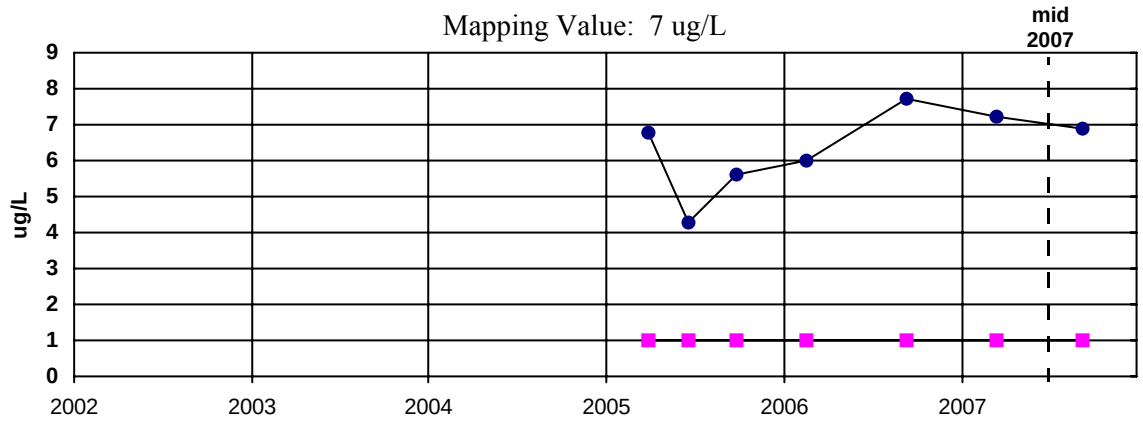
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 7 ug/L



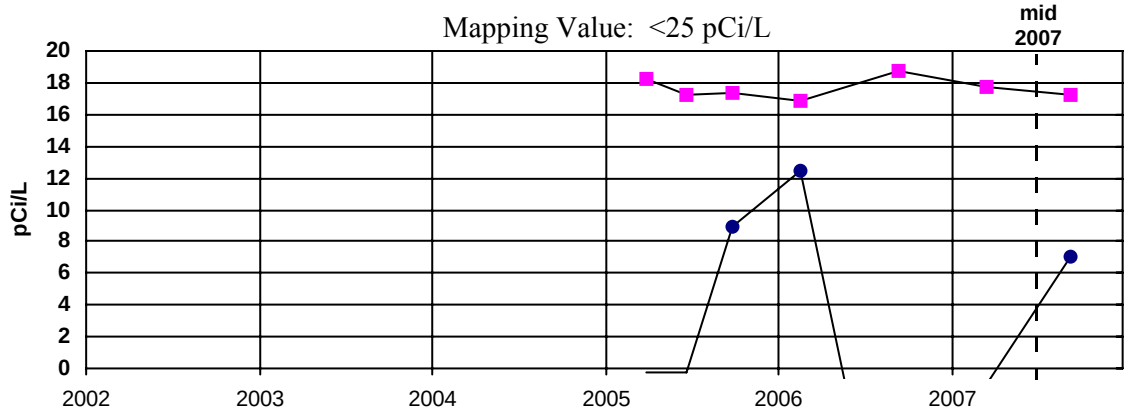
2007 Data: ug/L

03/19	7.2
09/12	6.9

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

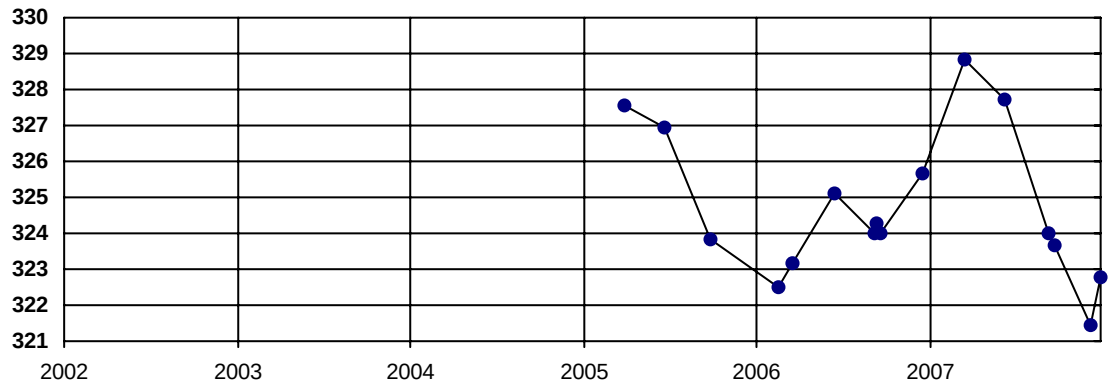
03/19	ND
09/12	ND

ND=not detected

MW419 LRGA

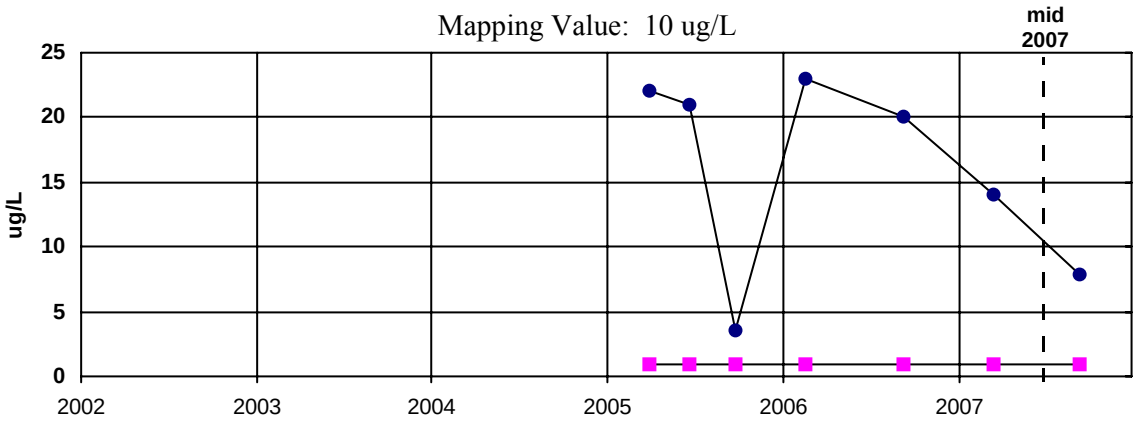
Result | Detection Limit | Trend Line

Water Level Elevation



Trichloroethene

Mapping Value: 10 ug/L



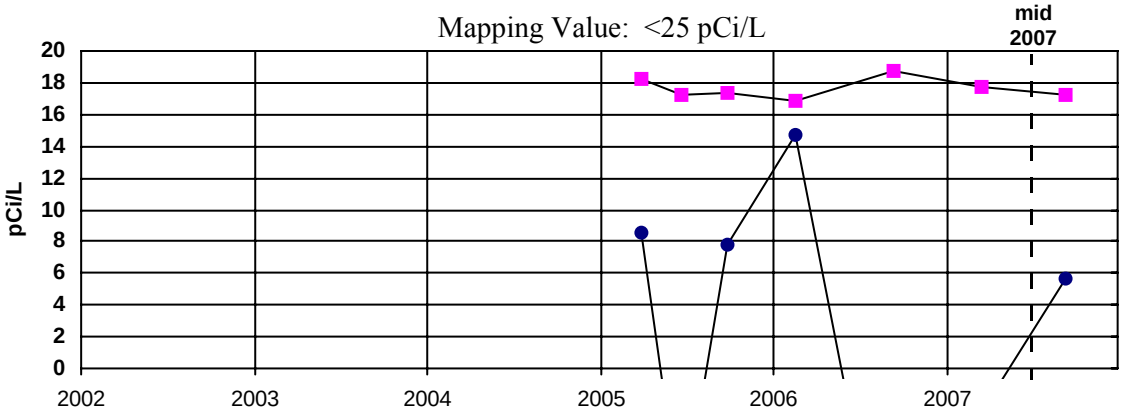
2007 Data: ug/L

03/19	14
09/12	7.8

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

03/19	ND
09/12	ND

ND=not detected

R2

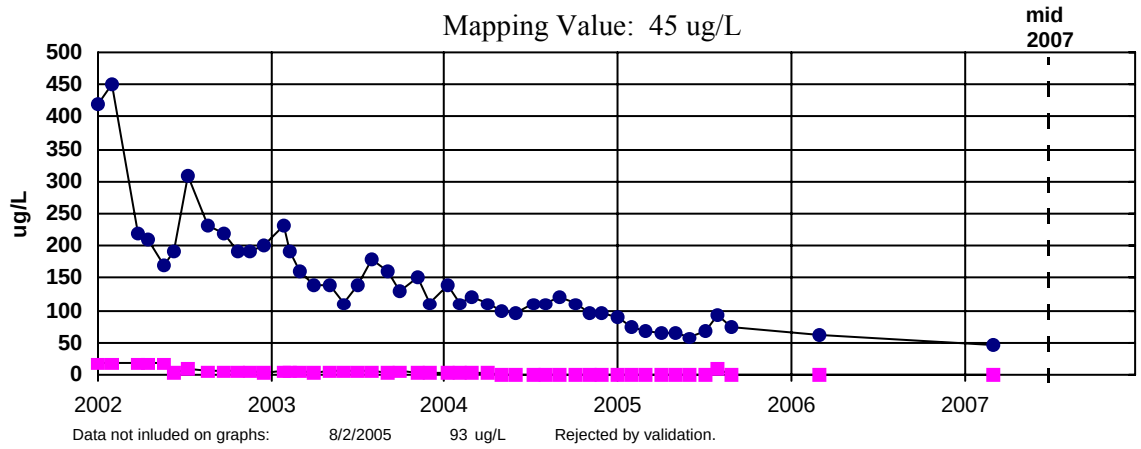
Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

2007 Data: ug/L

03/07 45



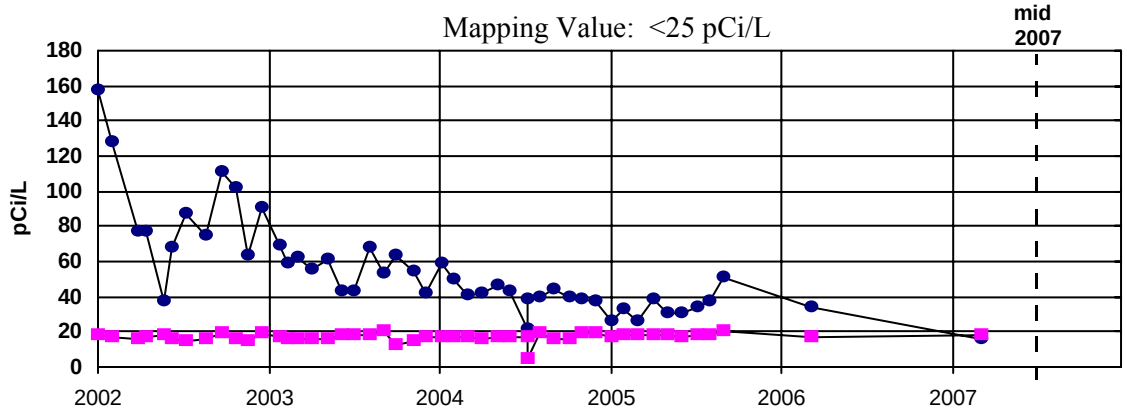
Data not inluded on graphs: 8/2/2005 93 ug/L Rejected by validation.

ND=not detected

Technetium-99

2007 Data: pCi/L

03/07 ND



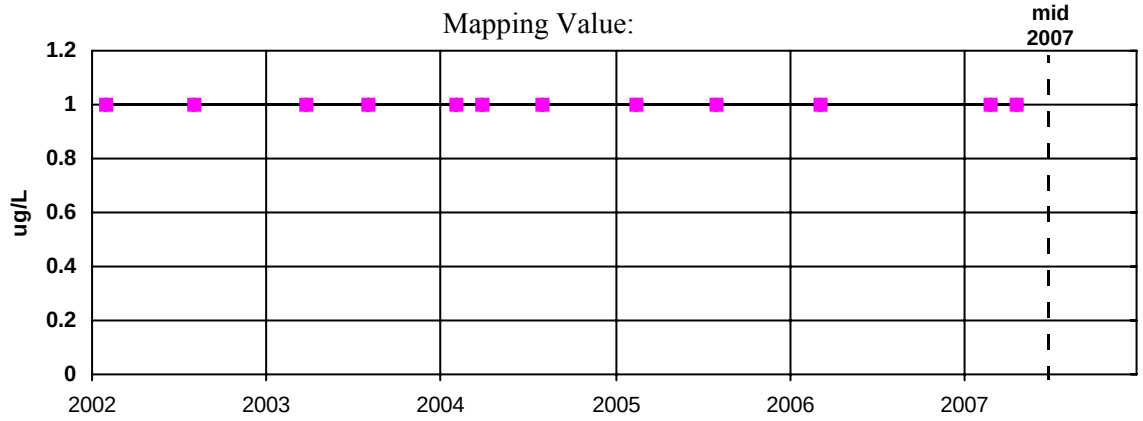
ND=not detected

R9

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

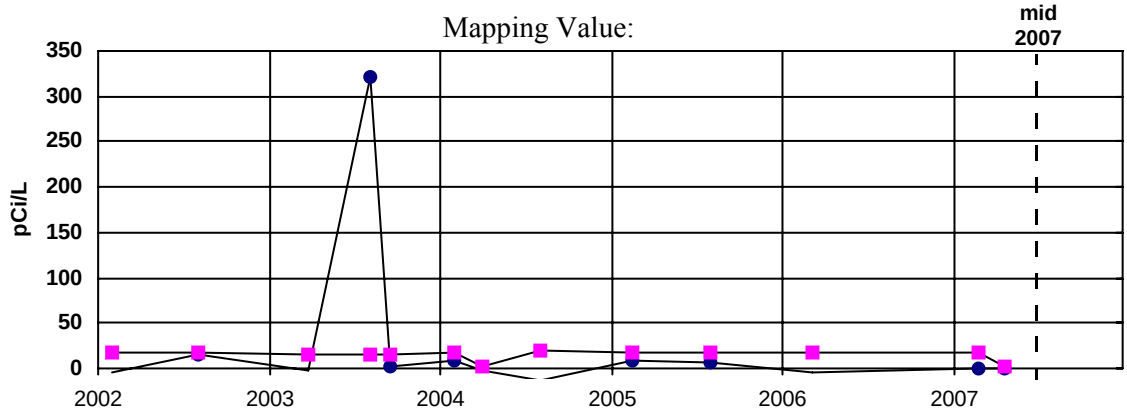


2007 Data: ug/L

02/28	ND
04/24	ND

ND=not detected

Technetium-99



2007 Data: pCi/L

02/28	ND
04/24	ND

ND=not detected

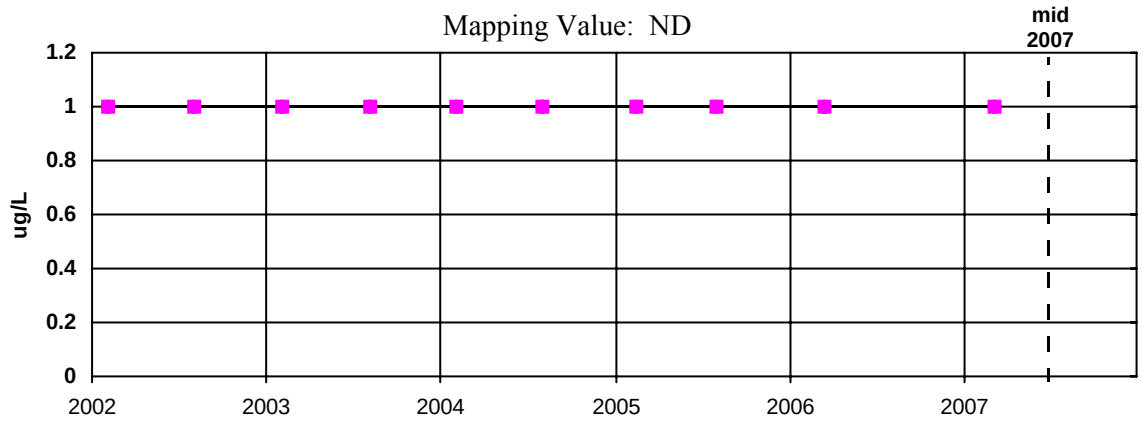
R12

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

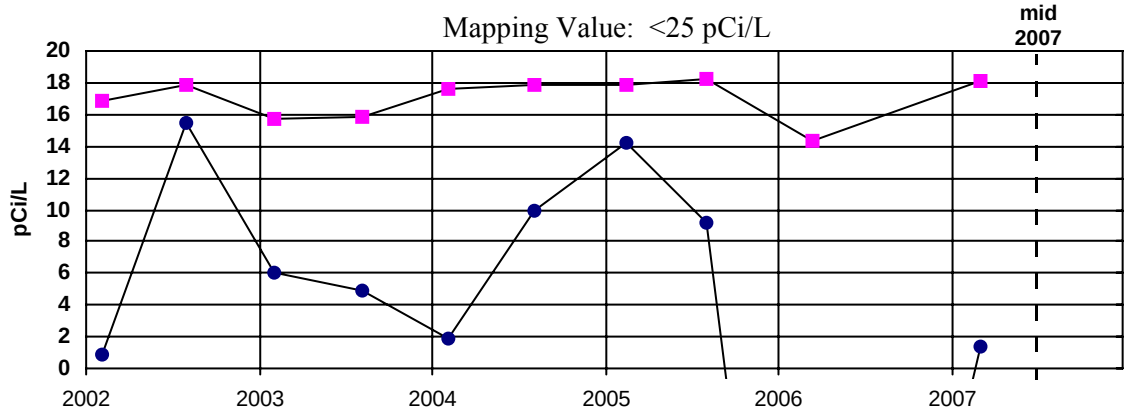
2007 Data: ug/L
03/07 ND



ND=not detected

Technetium-99

2007 Data: pCi/L
03/07 ND



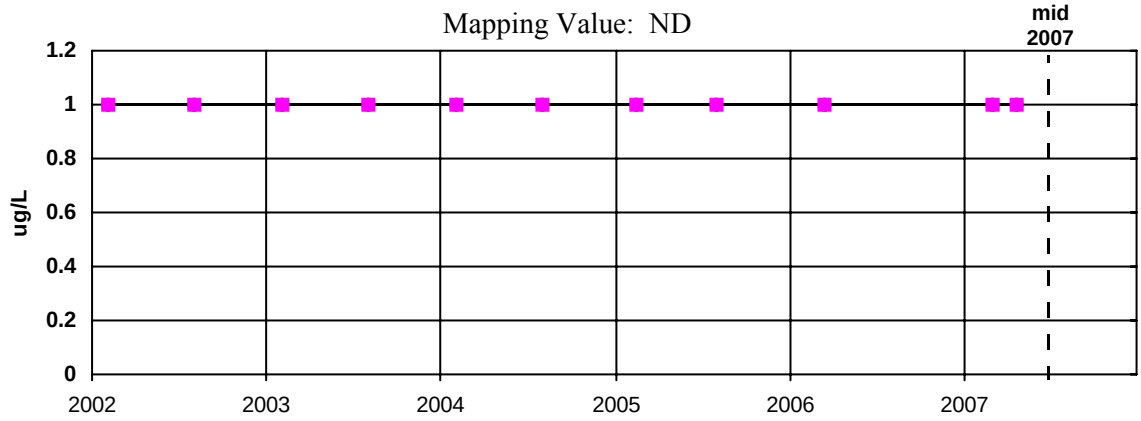
ND=not detected

R13

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

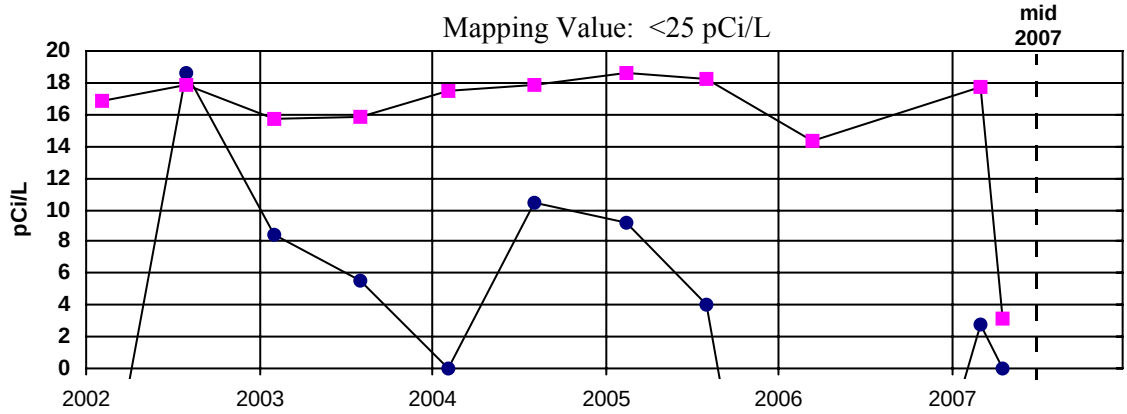


2007 Data: ug/L

03/06	ND
03/06	ND
04/23	ND

ND=not detected

Technetium-99



2007 Data: pCi/L

03/06	ND
03/06	ND
04/23	ND

ND=not detected

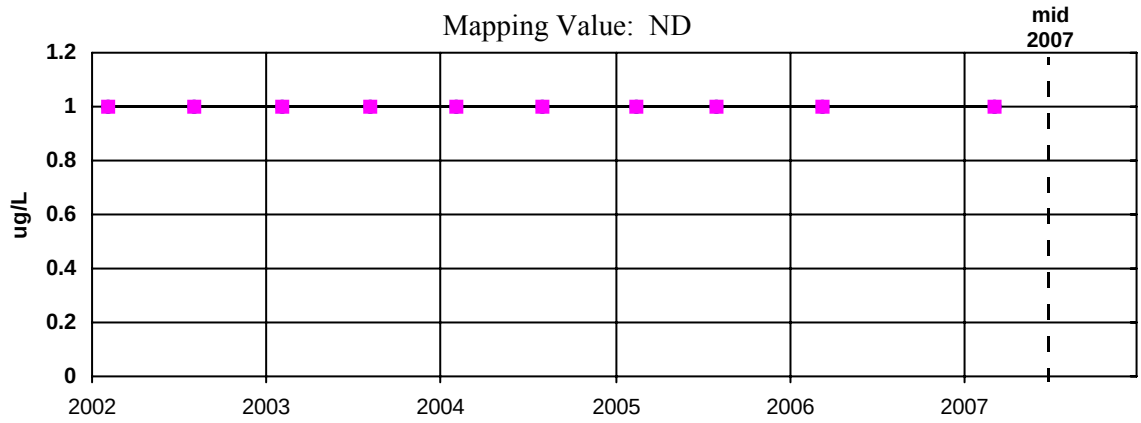
R14

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

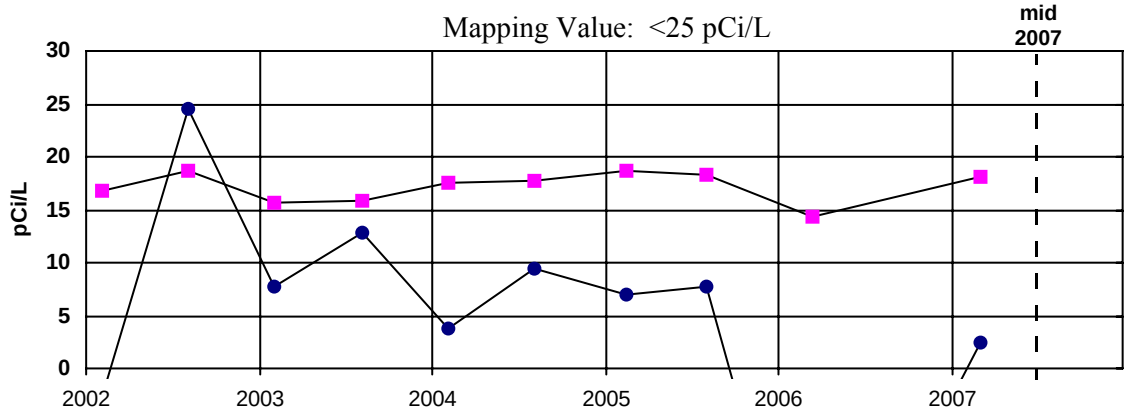
2007 Data: ug/L
03/07 ND



ND=not detected

Technetium-99

2007 Data: pCi/L
03/07 ND



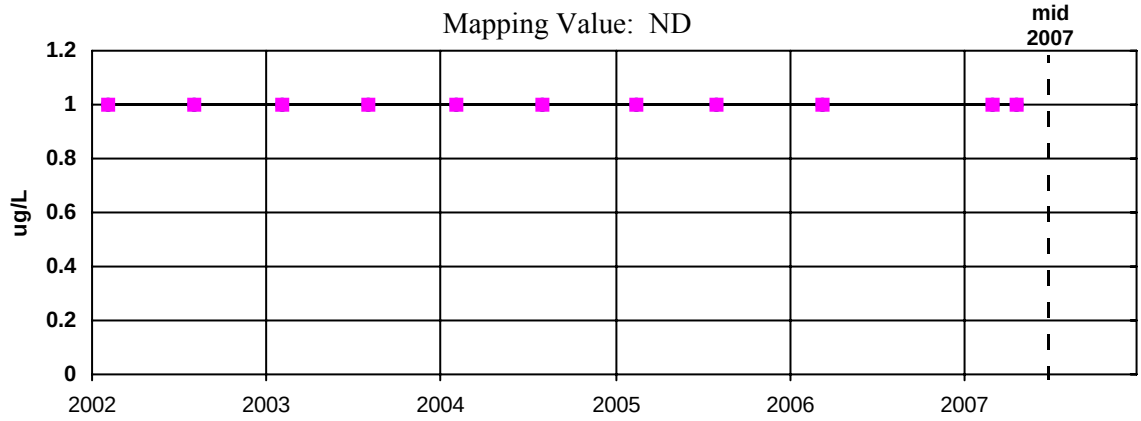
ND=not detected

R19

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

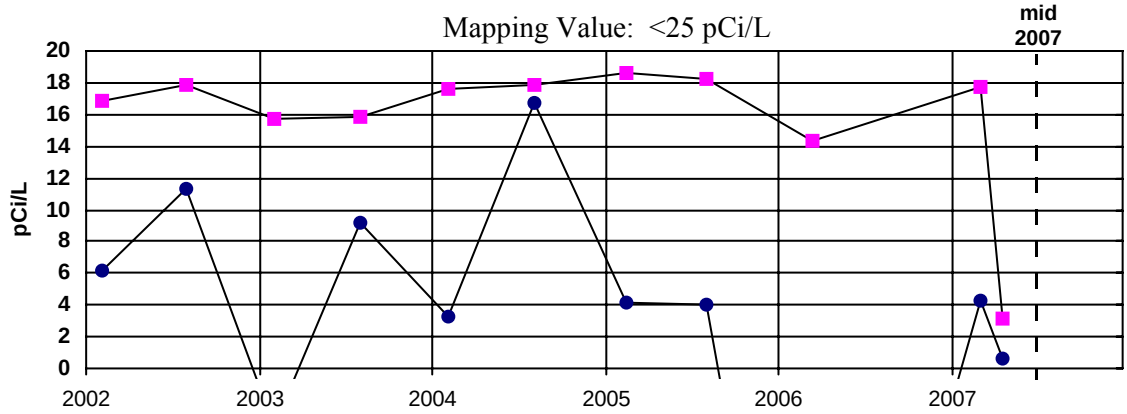


2007 Data: ug/L

03/06	ND
03/06	ND
04/23	ND

ND=not detected

Technetium-99



2007 Data: pCi/L

03/06	ND
03/06	ND
04/23	ND

ND=not detected

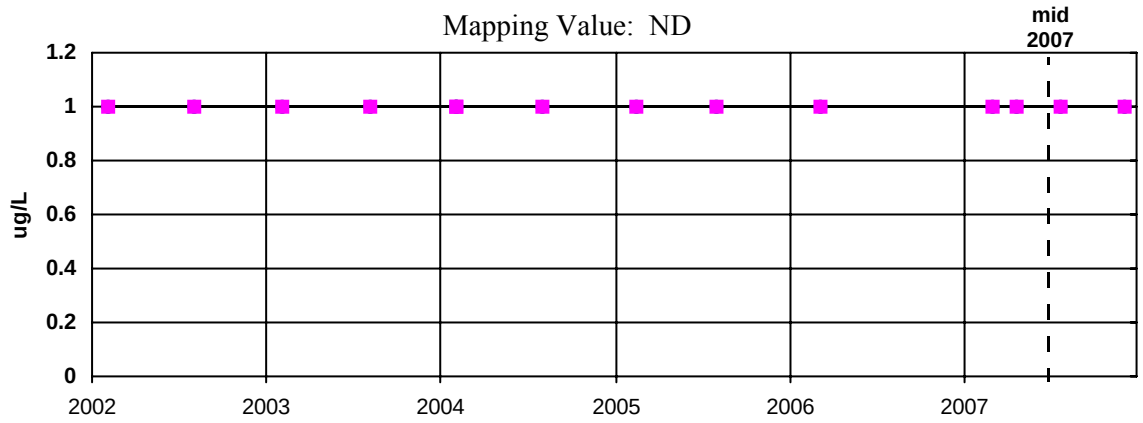
R20

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

Mapping Value: ND

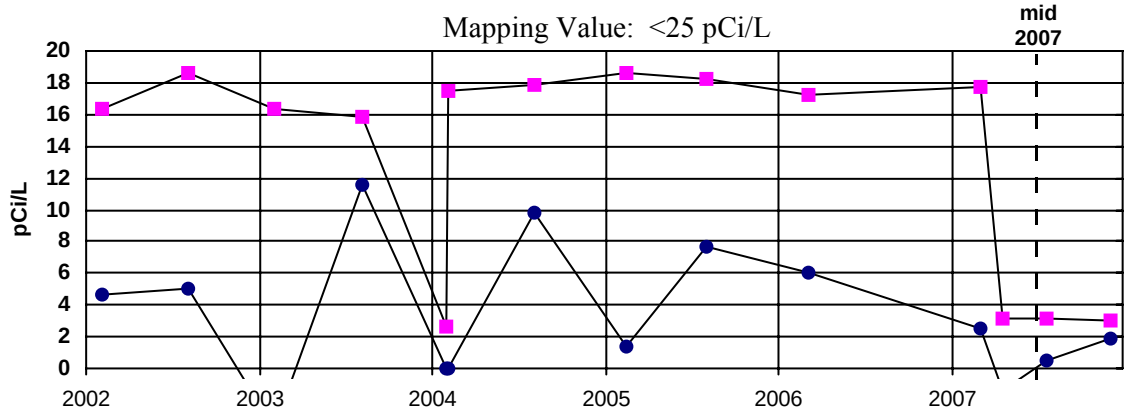


2007 Data:	ug/L
03/06	ND
03/06	ND
04/23	ND
07/24	ND
12/06	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data:	pCi/L
03/06	ND
03/06	ND
04/23	ND
07/24	ND
12/06	ND

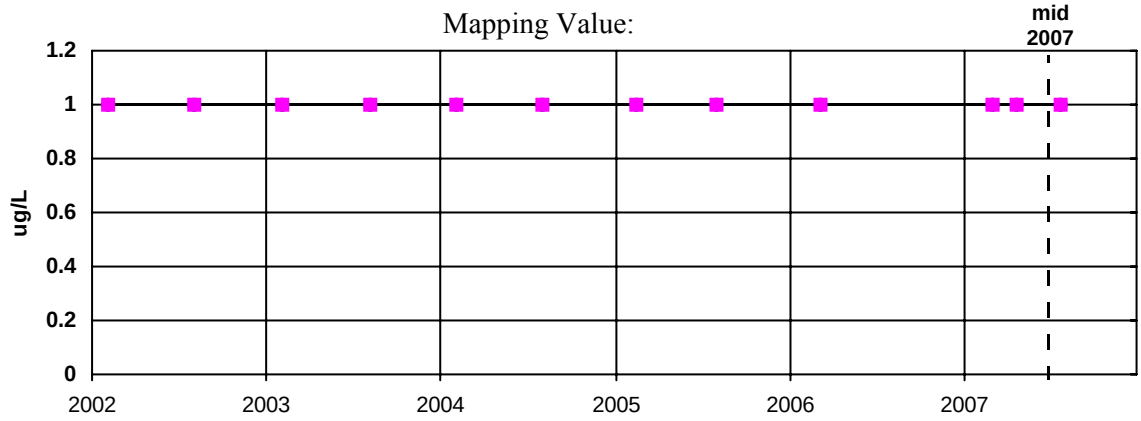
ND=not detected

R21

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

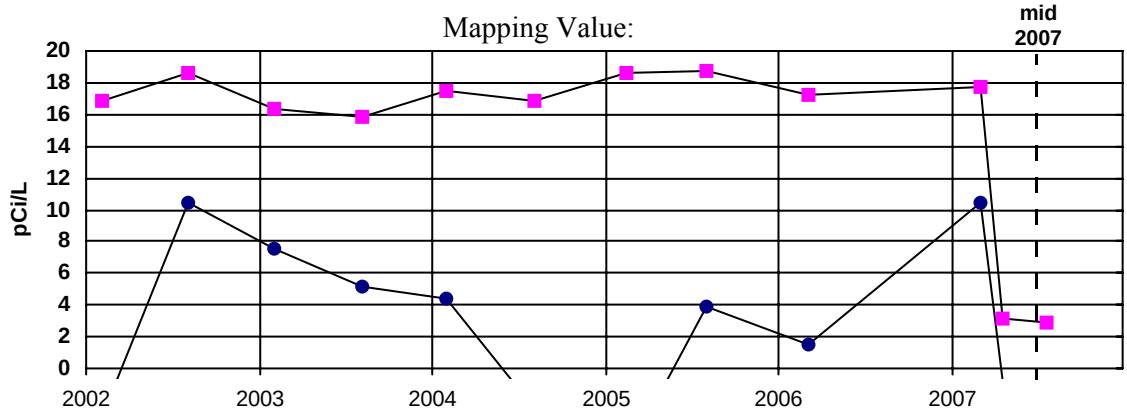


2007 Data: ug/L

03/06	ND
03/06	ND
04/23	ND
07/24	ND

ND=not detected

Technetium-99



2007 Data: pCi/L

03/06	ND
03/06	ND
04/23	ND
07/24	ND

ND=not detected

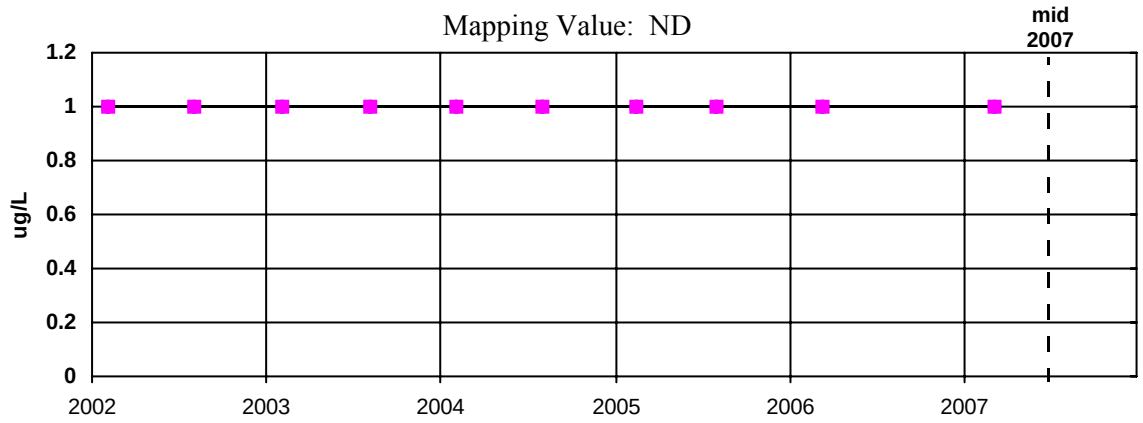
R23

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

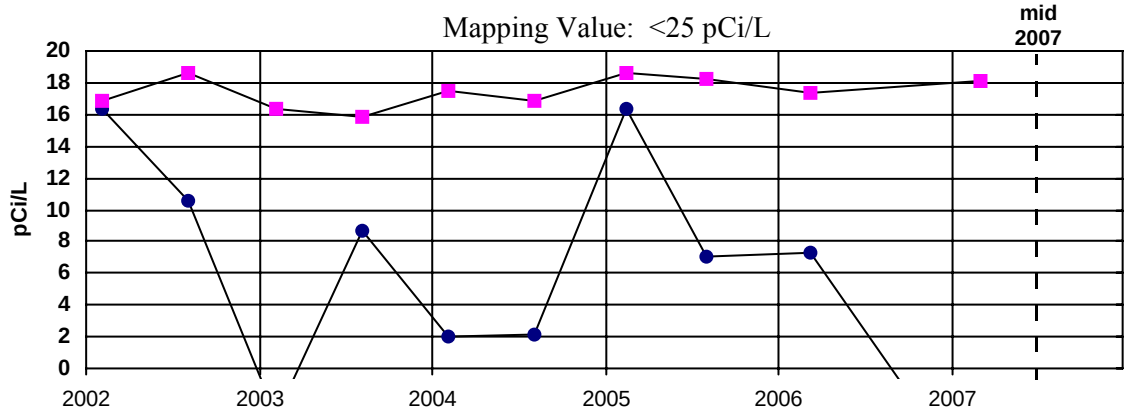
2007 Data: ug/L
03/07 ND



ND=not detected

Technetium-99

2007 Data: pCi/L
03/07 ND



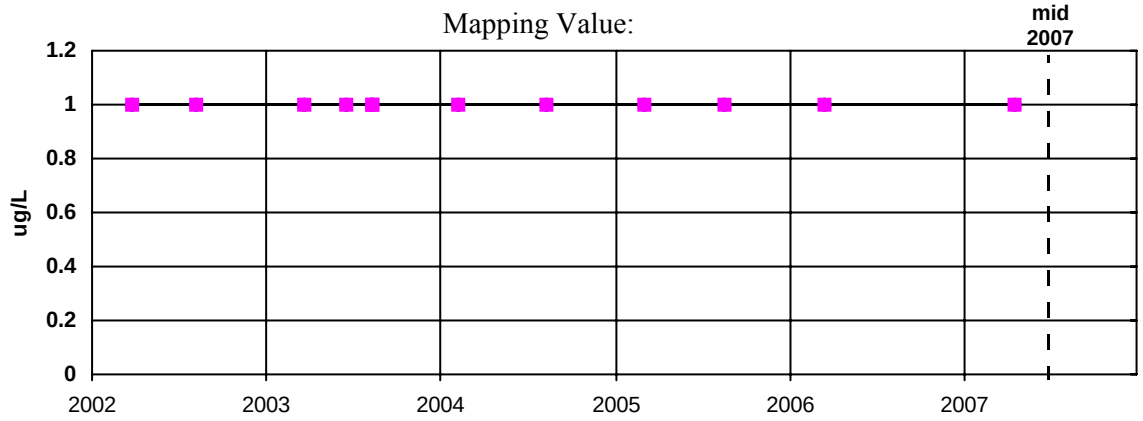
ND=not detected

R72

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

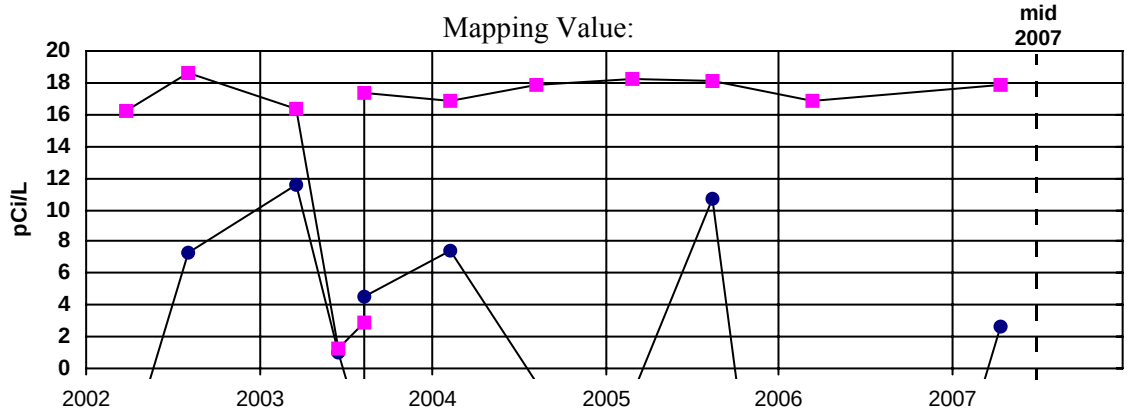


2007 Data: ug/L

04/18	ND
04/18	ND

ND=not detected

Technetium-99



2007 Data: pCi/L

04/18	ND
04/18	ND

ND=not detected

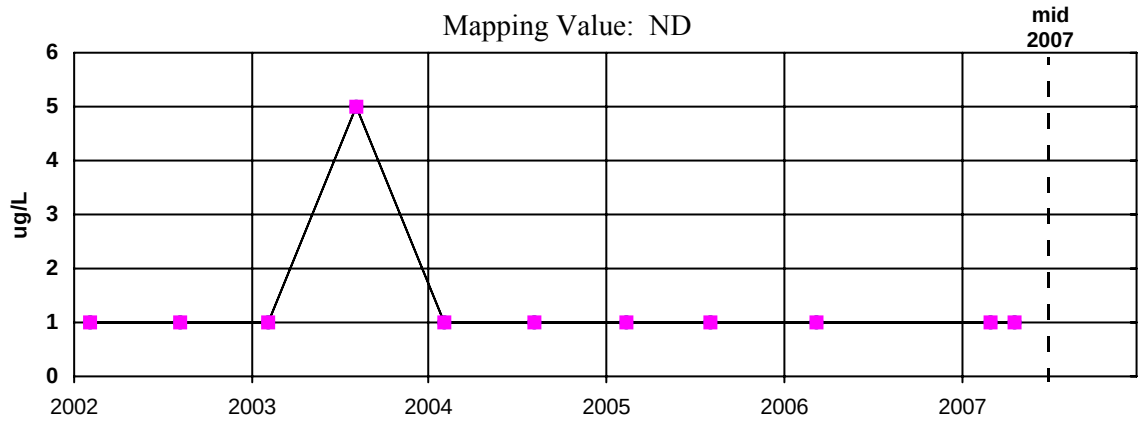
R82

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

Mapping Value: ND



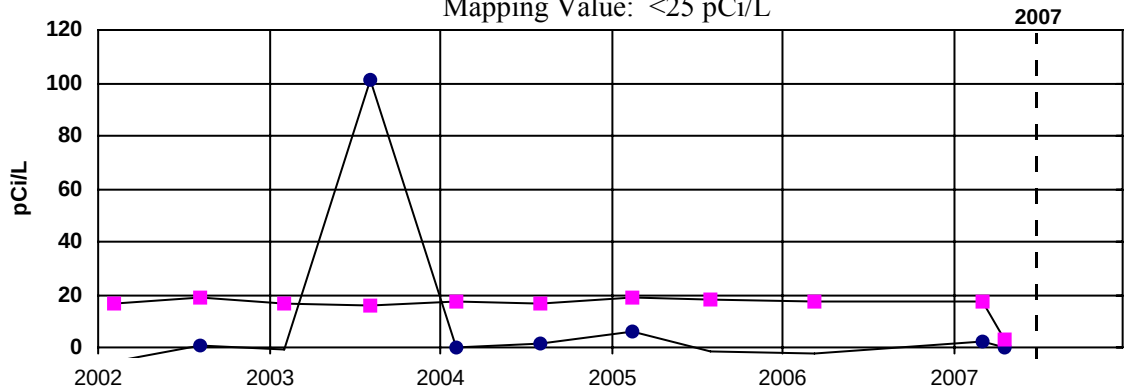
2007 Data: ug/L

03/06	ND
03/06	ND
04/23	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data: pCi/L

03/06	ND
03/06	ND
04/23	ND

ND=not detected

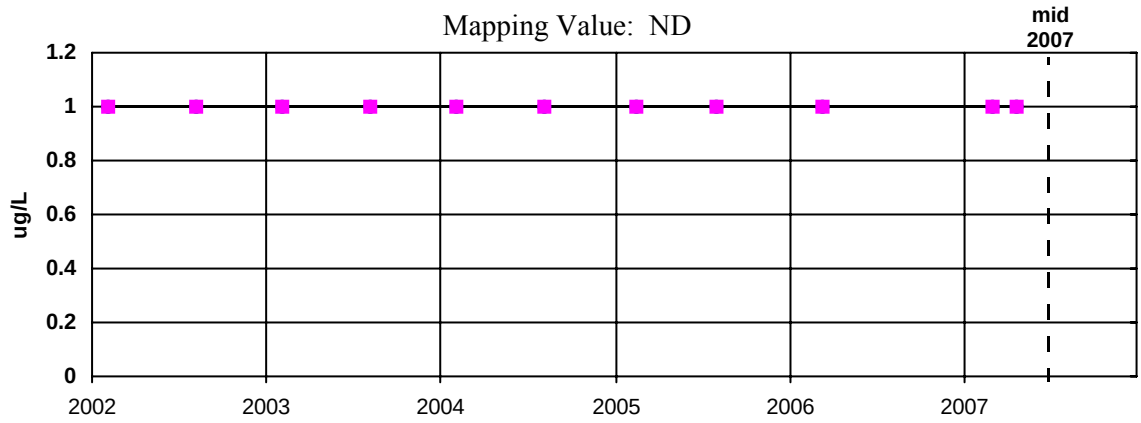
R83

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

Mapping Value: ND

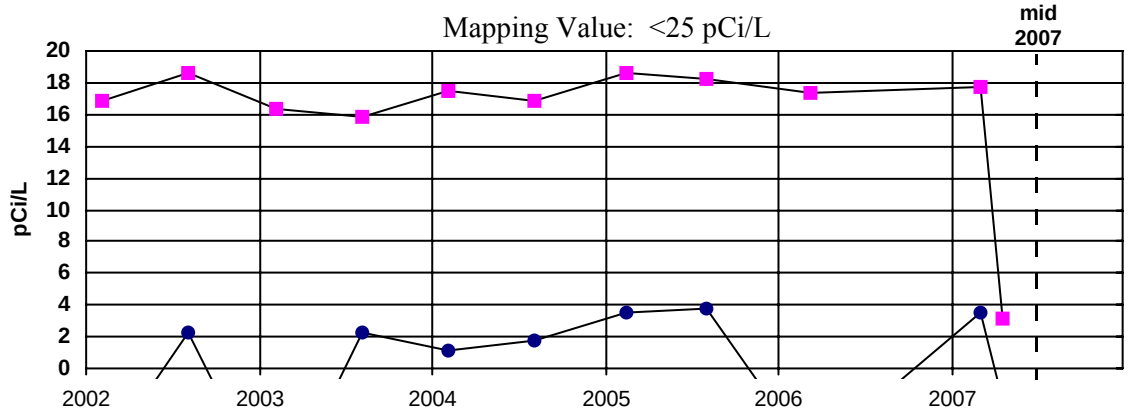


2007 Data:	ug/L
03/06	ND
03/06	ND
04/23	ND

ND=not detected

Technetium-99

Mapping Value: <25 pCi/L



2007 Data:	pCi/L
03/06	3.5
03/06	ND
04/23	ND

ND=not detected

R90

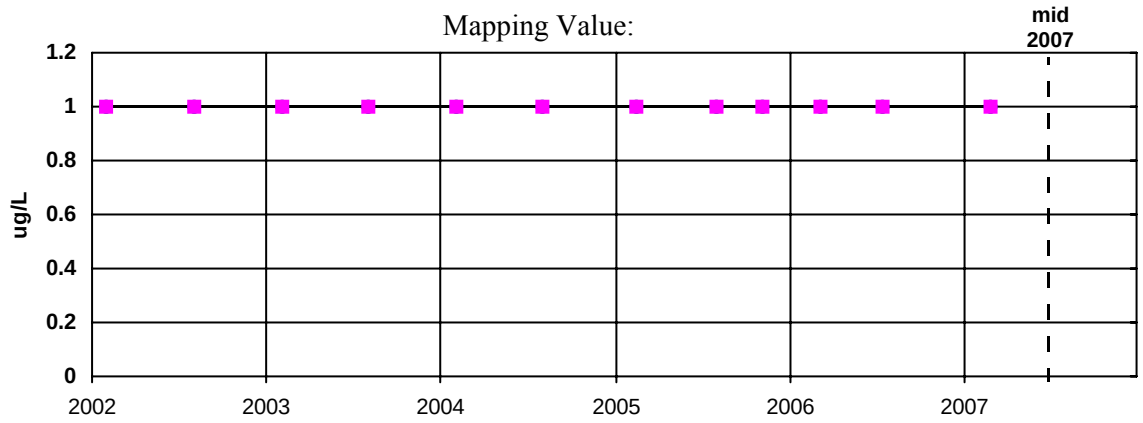
Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

2007 Data: ug/L

02/28 ND

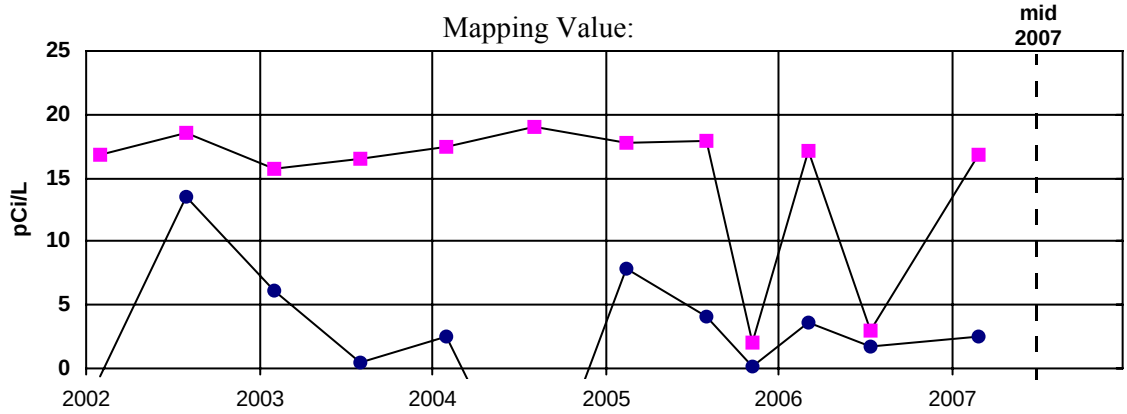


ND=not detected

Technetium-99

2007 Data: pCi/L

02/28 ND



ND=not detected

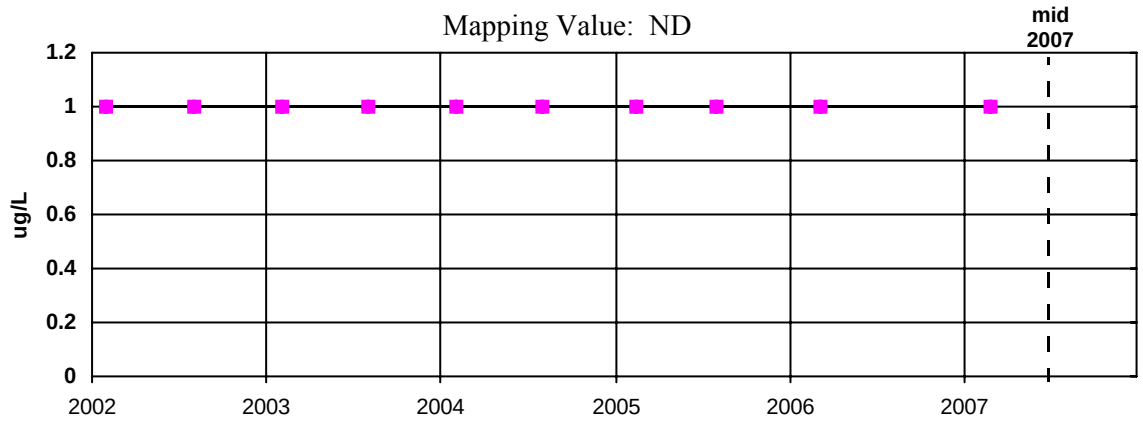
R114

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

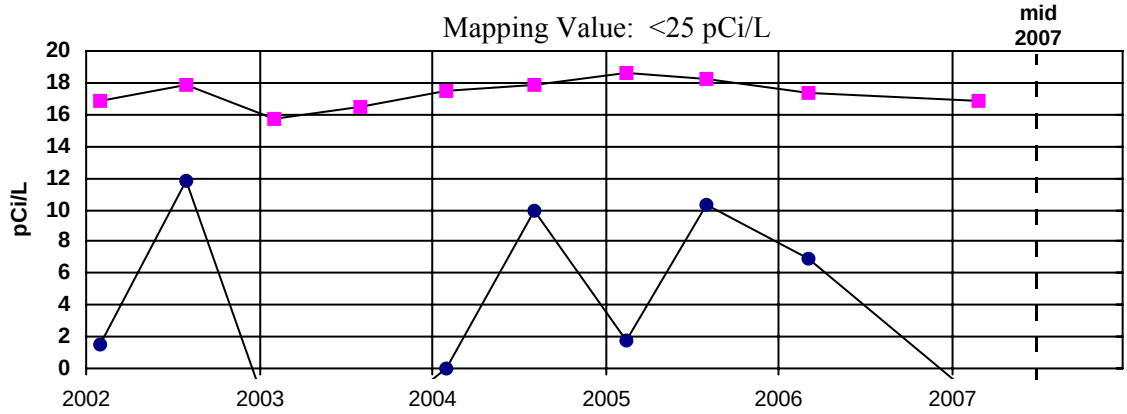
2007 Data: ug/L
02/28 ND



ND=not detected

Technetium-99

2007 Data: pCi/L
02/28 ND



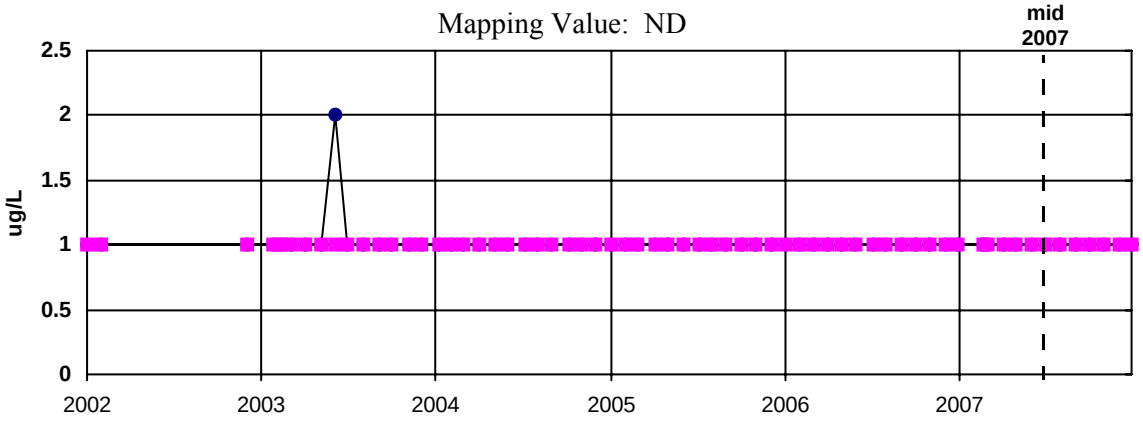
ND=not detected

R294

Result Detection Limit Trend Line

Water Level Elevation

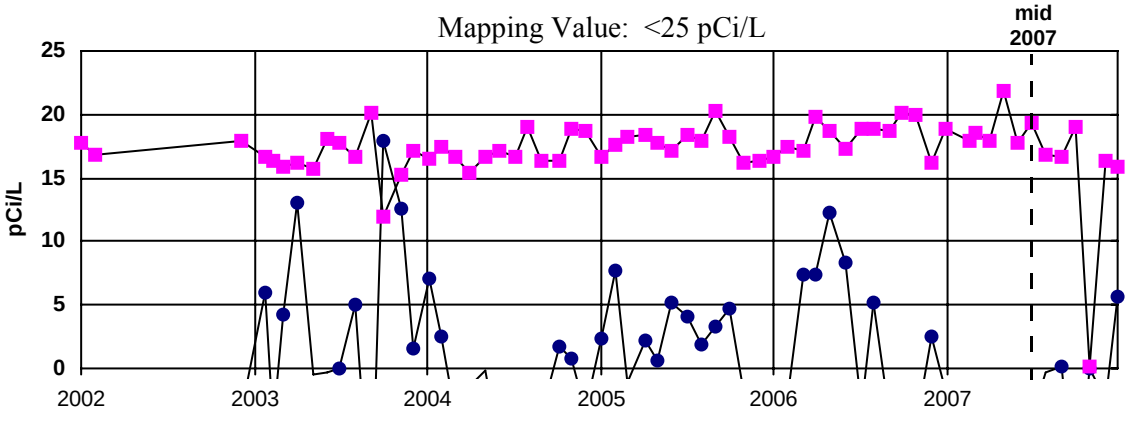
Trichloroethene



2007 Data:	ug/L
01/02	ND
02/22	ND
03/05	ND
04/05	ND
05/02	ND
06/04	ND
07/02	ND
08/01	ND
09/04	ND
09/04	ND
10/03	ND
11/01	ND
12/04	ND
01/02	ND

ND=not detected

Technetium-99



2007 Data:	pCi/L
01/02	ND
02/22	ND
03/05	ND
04/05	ND
05/02	ND
06/04	ND
07/02	ND
08/01	ND
09/04	ND
09/04	ND
10/03	ND
11/01	ND
12/04	ND
01/02	ND

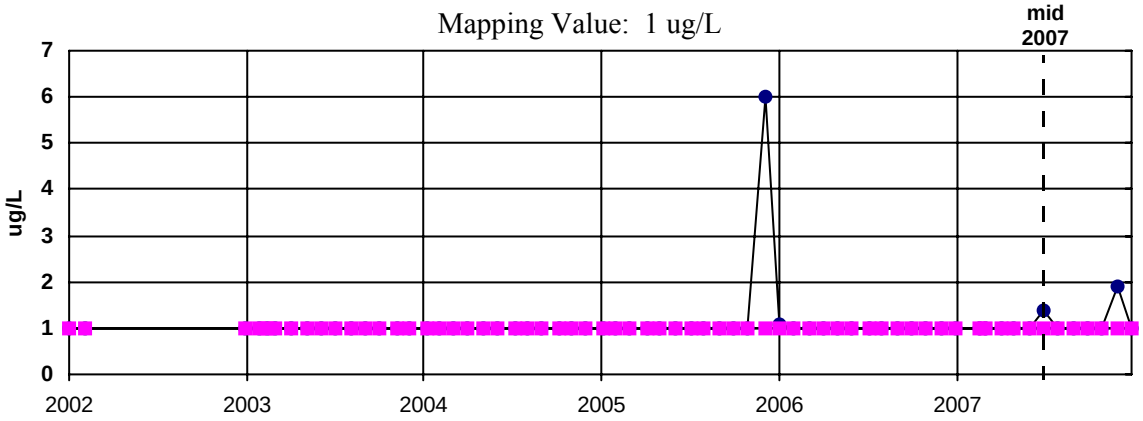
ND=not detected

R302

Result Detection Limit Trend Line

Water Level Elevation

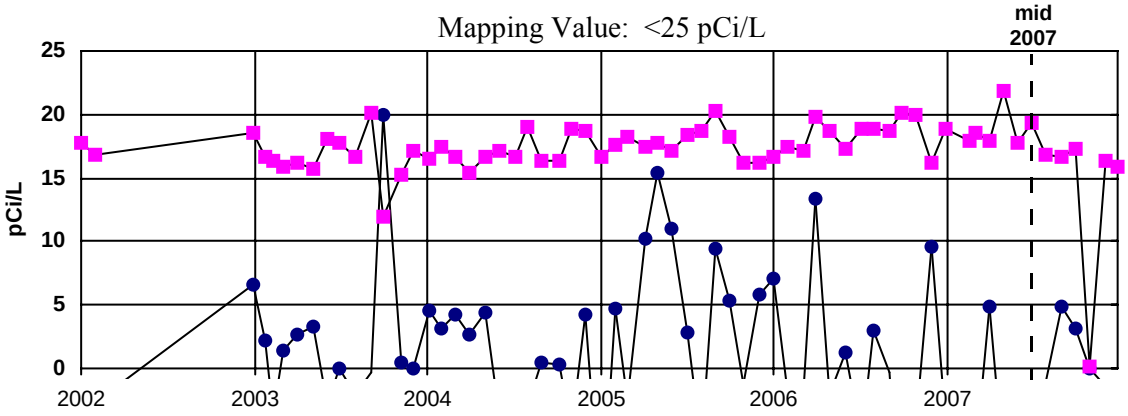
Trichloroethene



2007 Data:	ug/L
01/02	ND
02/22	ND
03/05	ND
04/05	ND
05/02	ND
06/04	ND
07/02	1.4
08/01	ND
09/04	ND
09/04	ND
10/03	ND
10/03	ND
11/01	ND
12/04	1.9
01/02	ND

ND=not detected

Technetium-99



2007 Data:	pCi/L
01/02	ND
02/22	ND
03/05	ND
04/05	ND
05/02	ND
06/04	ND
07/02	ND
08/01	ND
09/04	ND
09/04	ND
10/03	ND
10/03	ND
11/01	ND
12/04	ND
01/02	ND

ND=not detected

R384

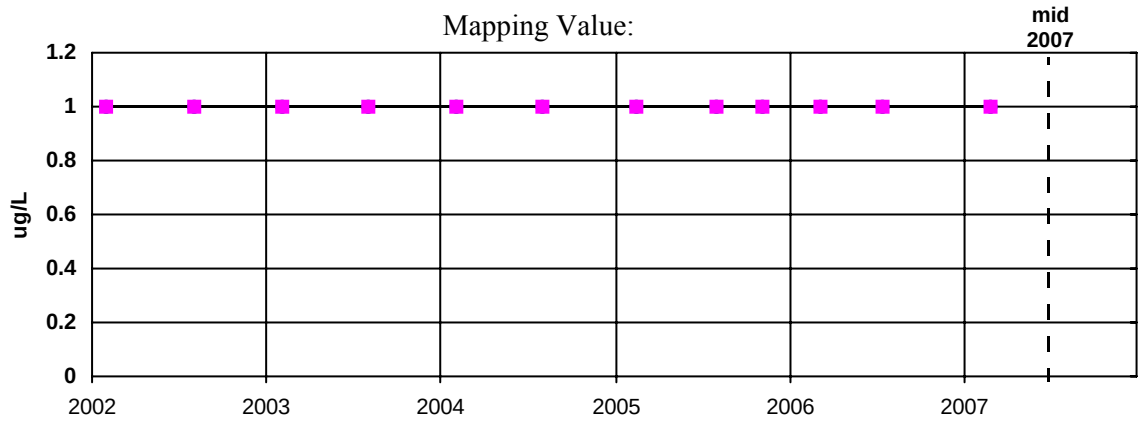
Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

2007 Data: ug/L

02/28 ND

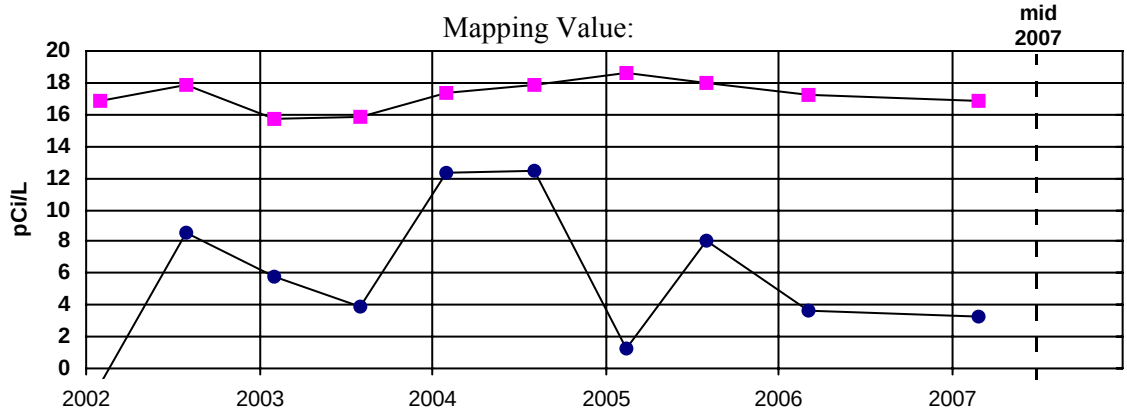


ND=not detected

Technetium-99

2007 Data: pCi/L

02/28 ND



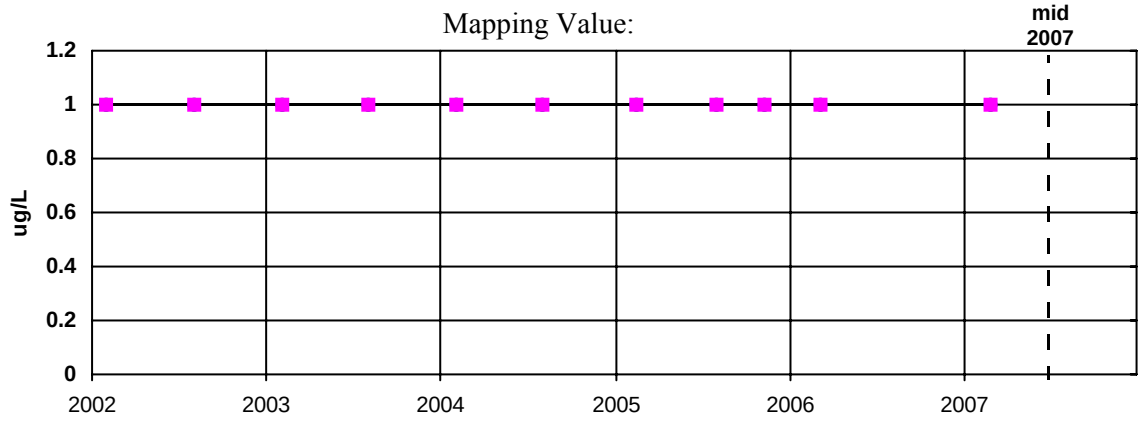
ND=not detected

R387

Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

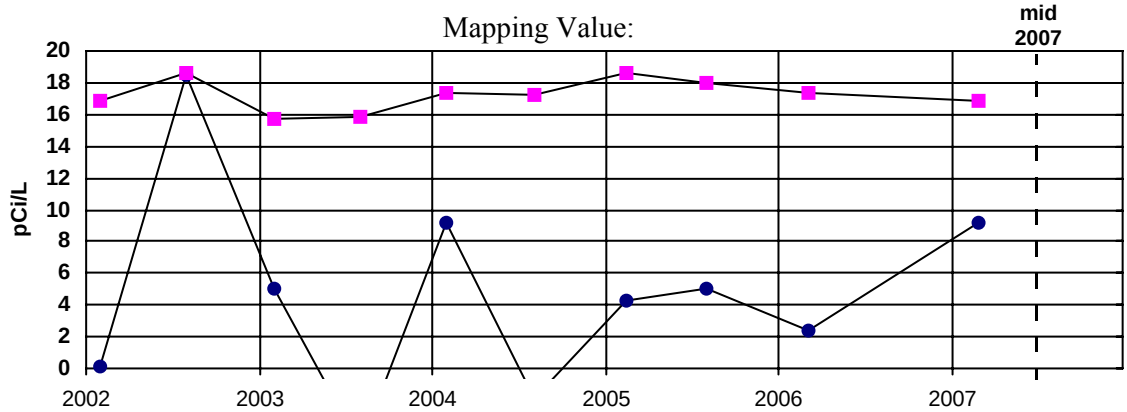


2007 Data: ug/L

02/28	ND
02/28	ND

ND=not detected

Technetium-99



2007 Data: pCi/L

02/28	ND
02/28	ND

ND=not detected

R392

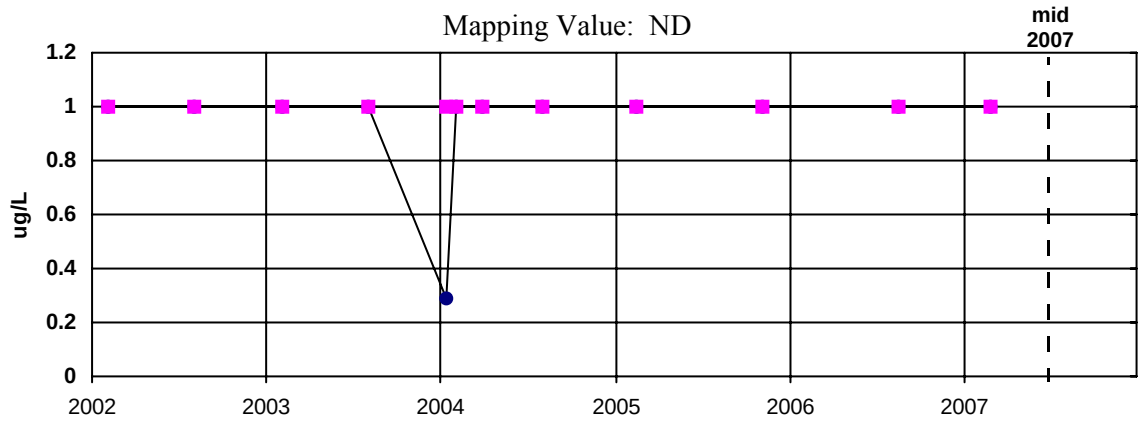
Result Detection Limit Trend Line

Water Level Elevation

Trichloroethene

2007 Data: ug/L

02/28 ND

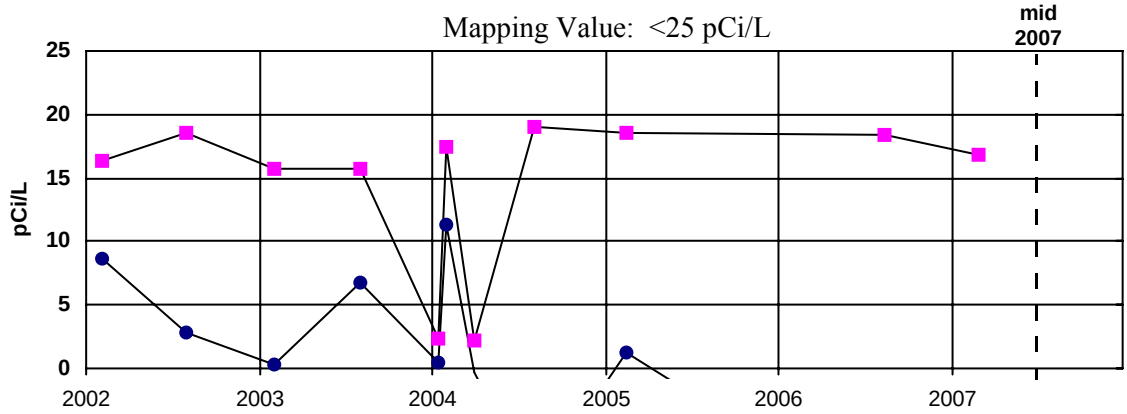


ND=not detected

Technetium-99

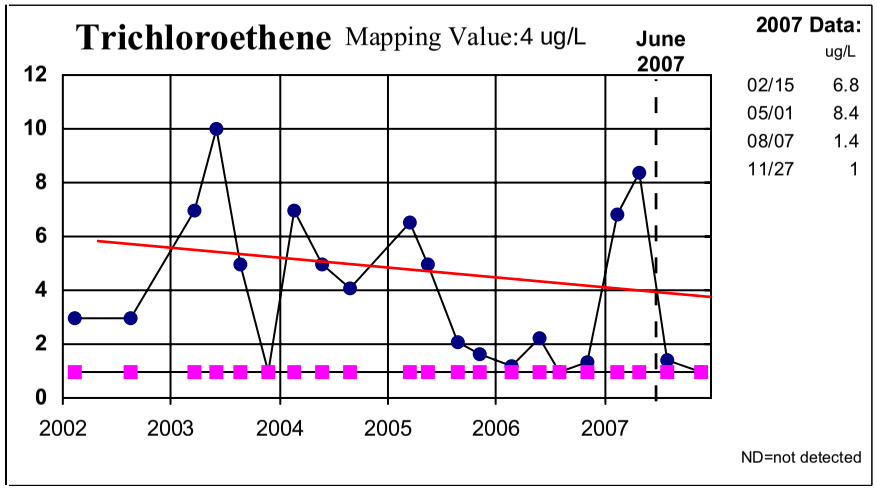
2007 Data: pCi/L

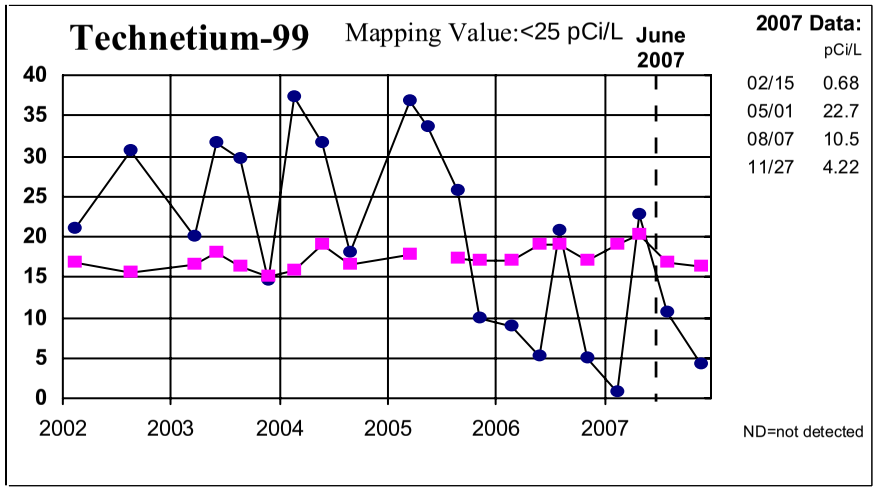
02/28 ND



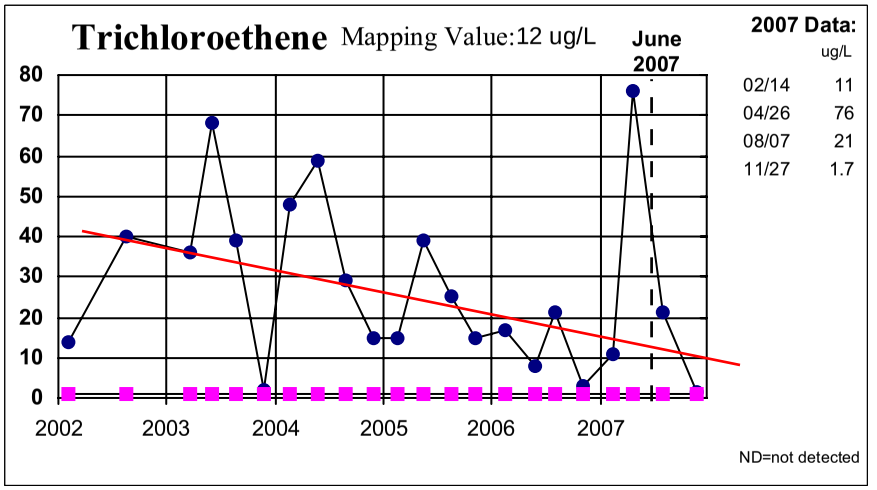
ND=not detected

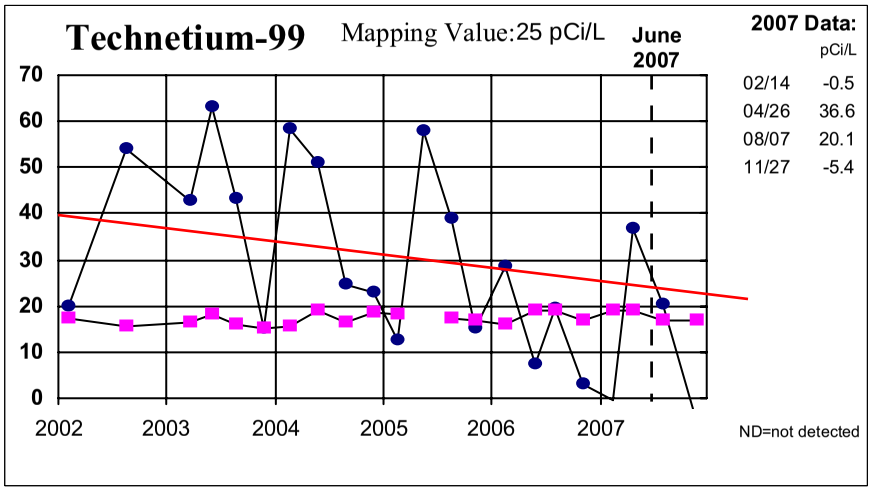
L12


Result
Detection Limit
Trend Line
Trichloroethene Mapping Value:4 ug/L
June 2007
2007 Data:
ug/L
02/15 6.8
05/01 8.4
08/07 1.4
11/27 1
ND=not detected
0 2 4 6 8 10 12
2002 2003 2004 2005 2006 2007

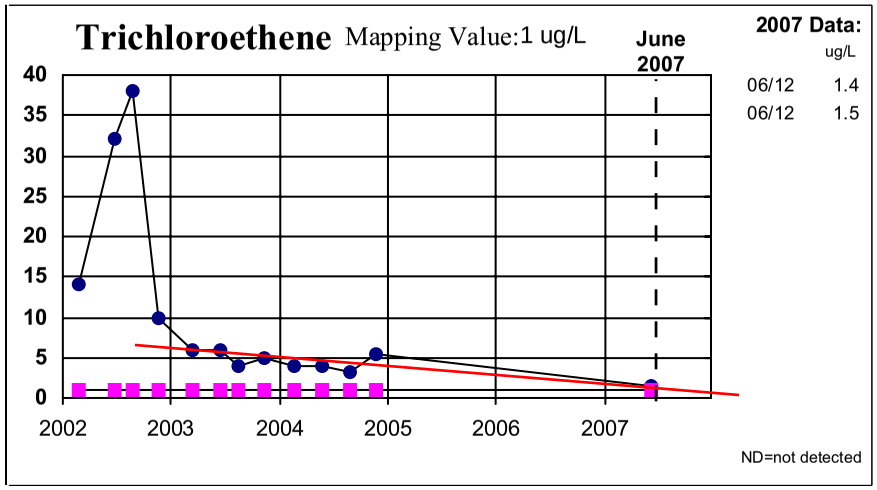

Technetium-99 Mapping Value:<25 pCi/L
June 2007
2007 Data:
pCi/L
02/15 0.68
05/01 22.7
08/07 10.5
11/27 4.22
ND=not detected
0 5 10 15 20 25 30 35 40
2002 2003 2004 2005 2006 2007

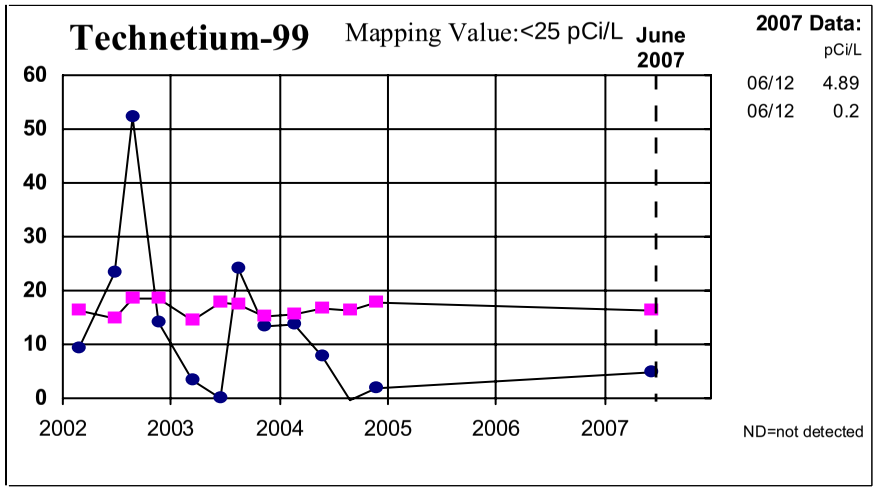
L241


Result
Detection Limit
Trend Line
Trichloroethene Mapping Value:12 ug/L
June 2007
2007 Data:
ug/L
02/14 11
04/26 76
08/07 21
11/27 1.7
ND=not detected
0 10 20 30 40 50 60 70 80
2002 2003 2004 2005 2006 2007

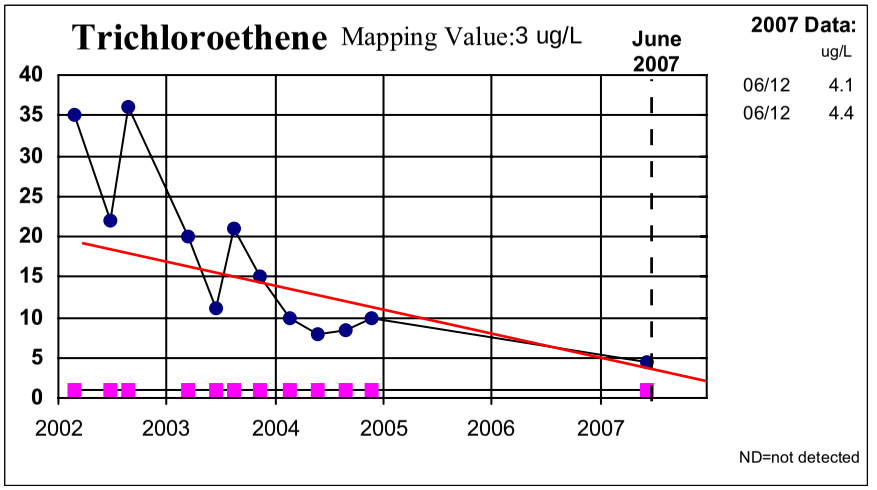

Technetium-99 Mapping Value:25 pCi/L
June 2007
2007 Data:
pCi/L
02/14 -0.5
04/26 36.6
08/07 20.1
11/27 -5.4
ND=not detected
0 10 20 30 40 50 60 70
2002 2003 2004 2005 2006 2007

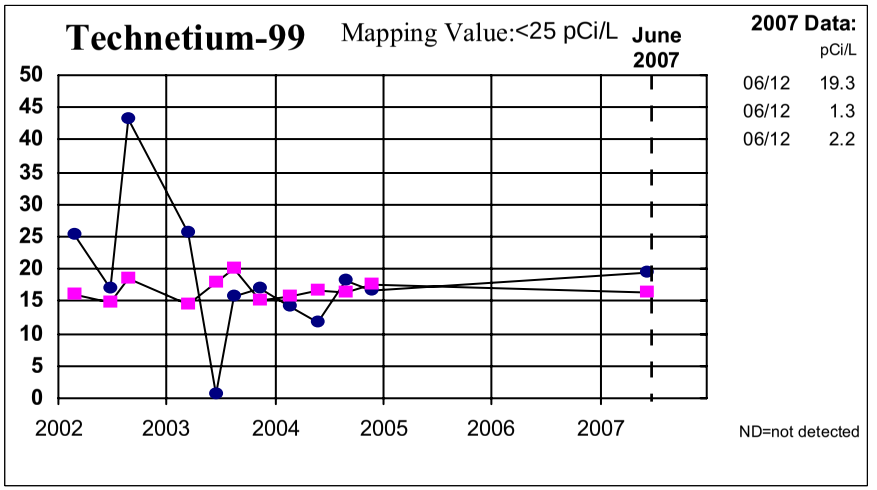
LBCSP1



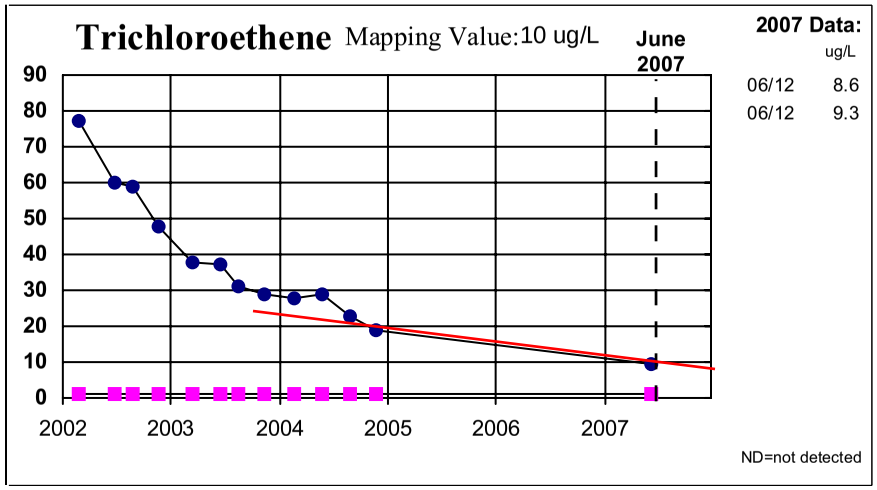


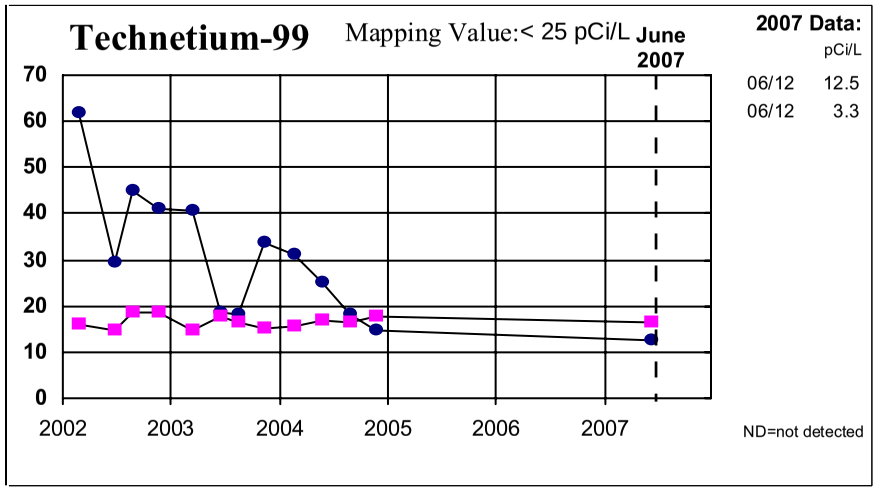
LBCSP2



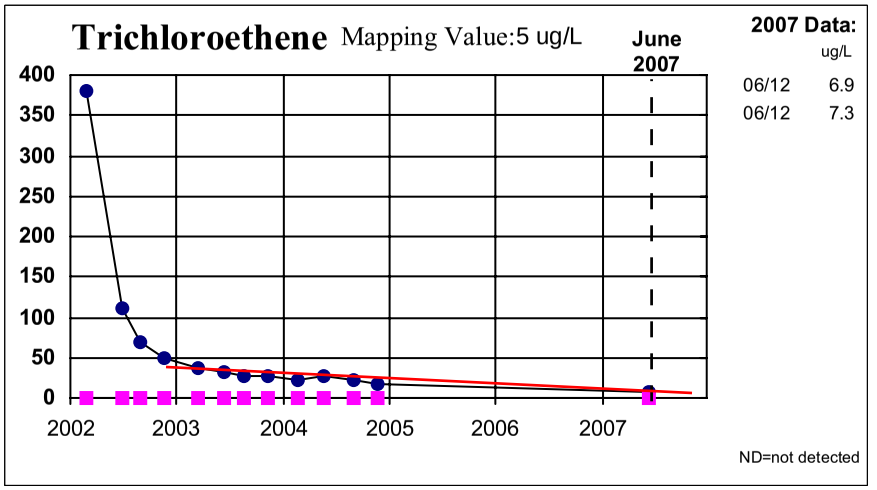


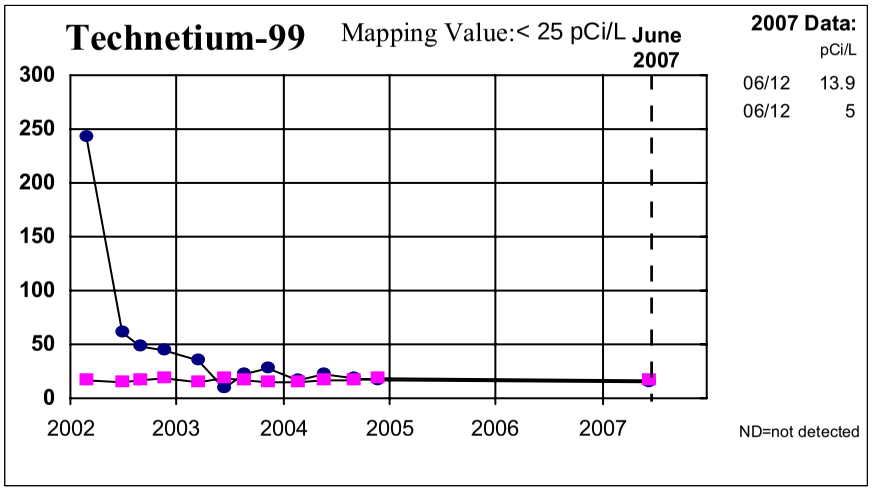
LBCSP3



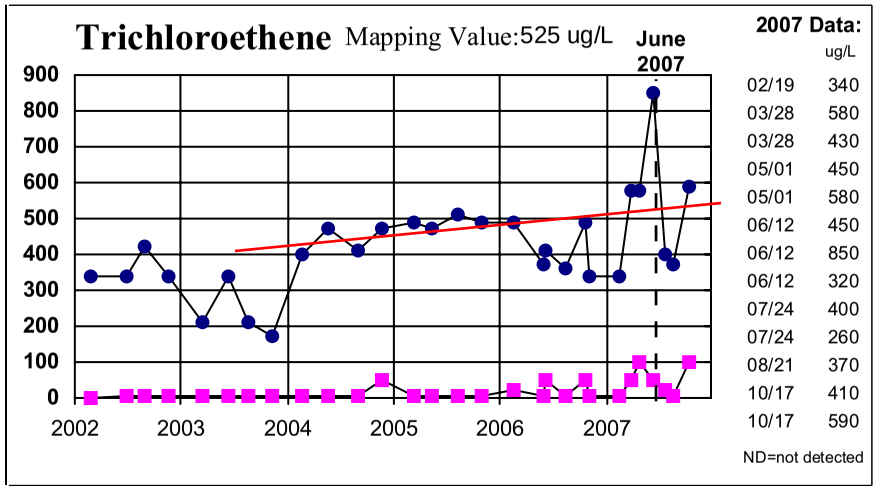


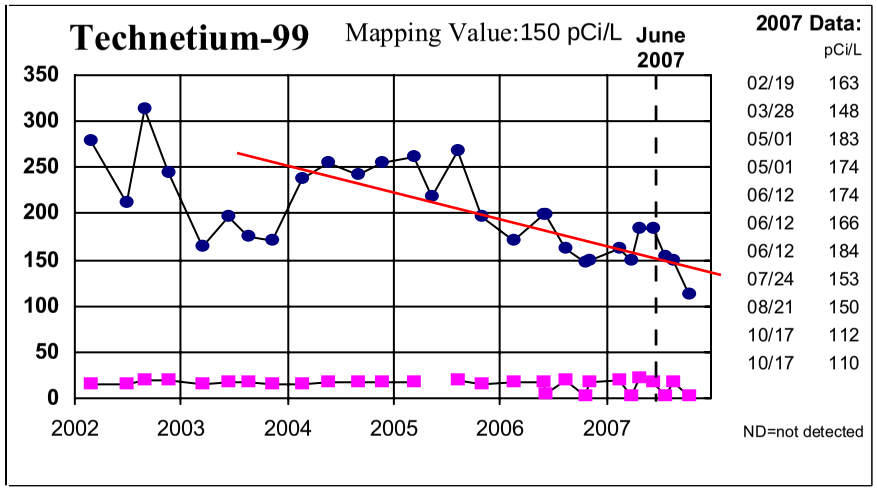
LBCSP4



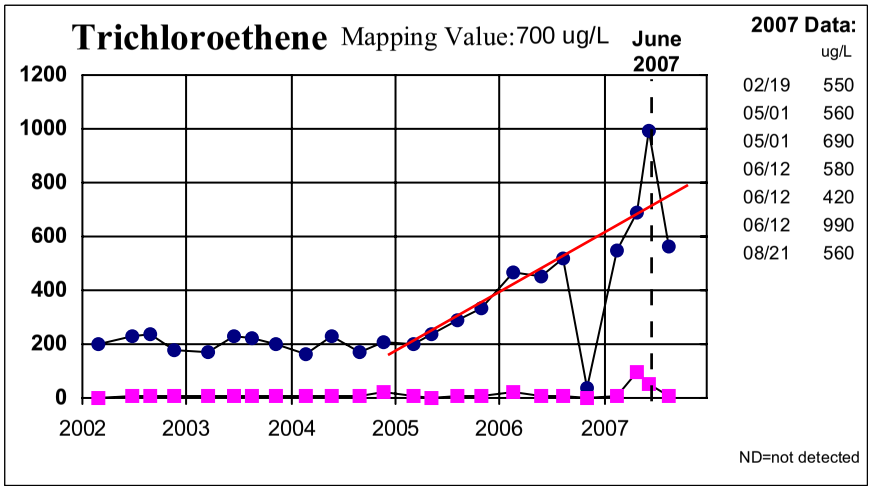


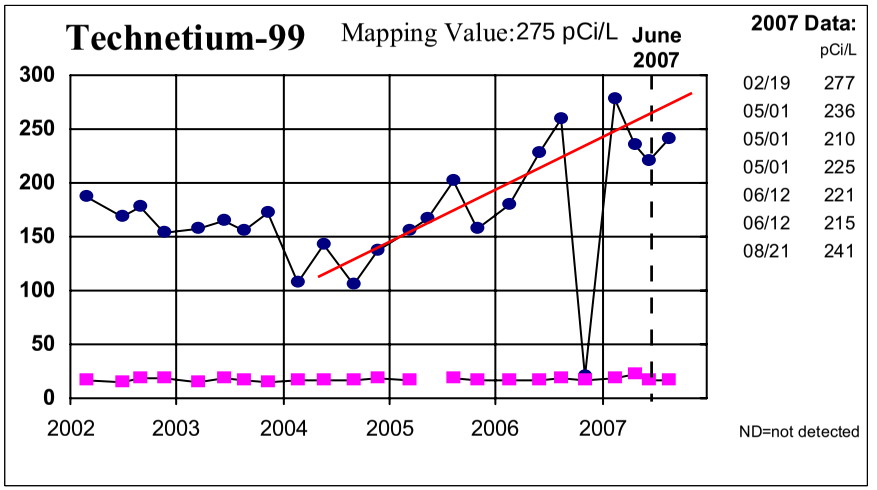
LBCSP5



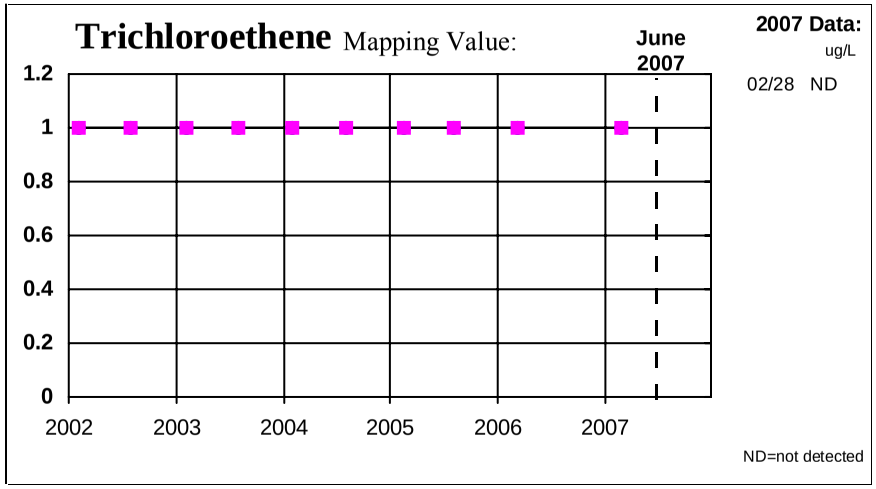


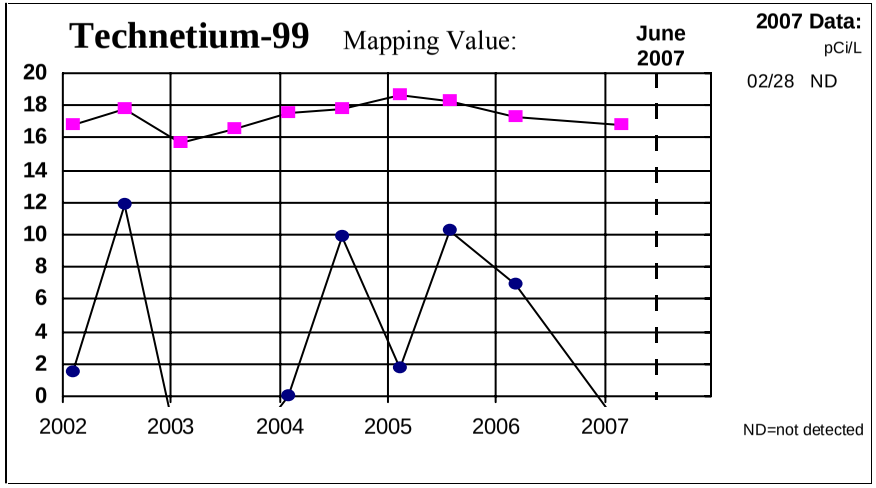
LBCSP6



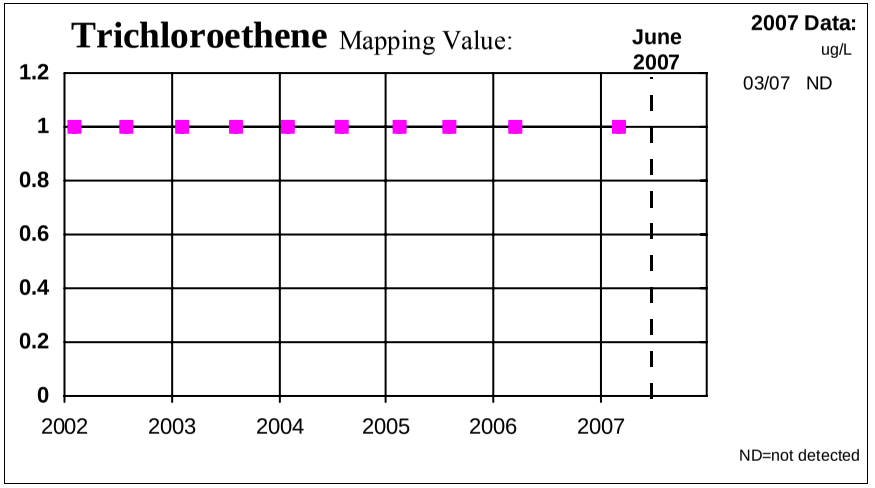


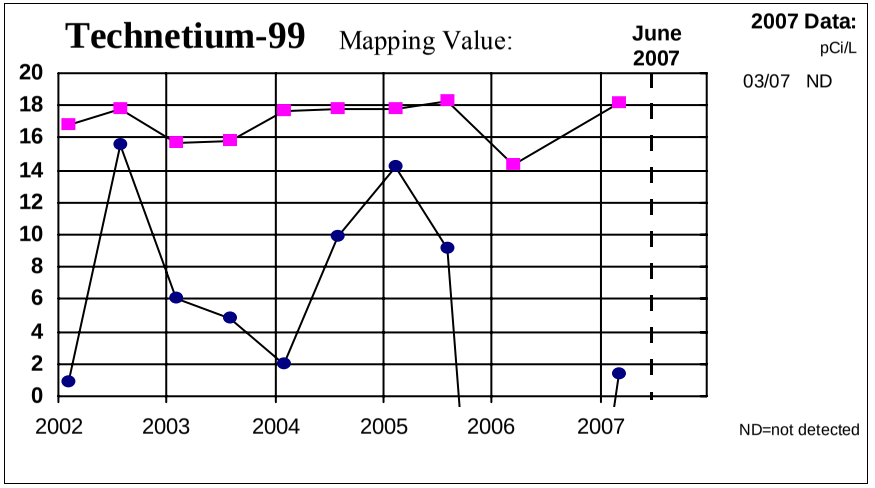
R114


Result
Detection Limit
Trend Line
Trichloroethene Mapping Value:
June 2007
2007 Data:
ug/L
02/28 ND
1.2
1
0.8
0.6
0.4
0.2
0
2002
2003
2004
2005
2006
2007
ND=not detected

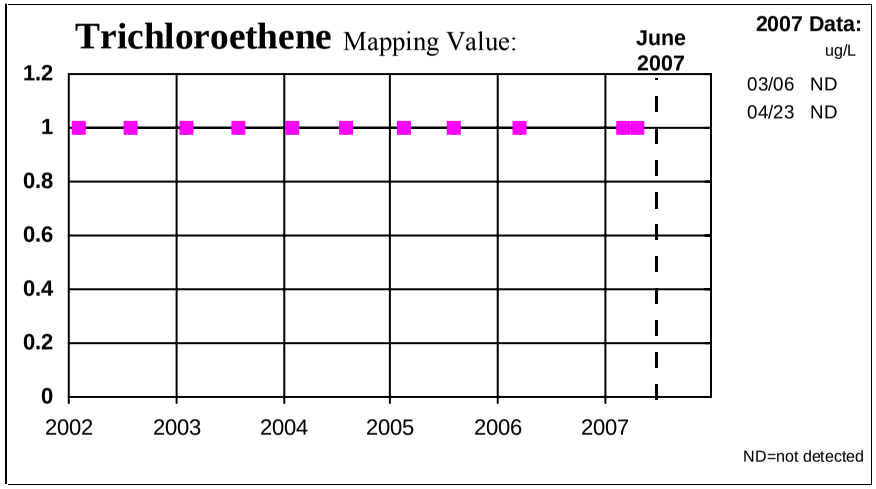

Technetium-99 Mapping Value:
June 2007
2007 Data:
pCi/L
02/28 ND
20
18
16
14
12
10
8
6
4
2
0
2002
2003
2004
2005
2006
2007
ND=not detected

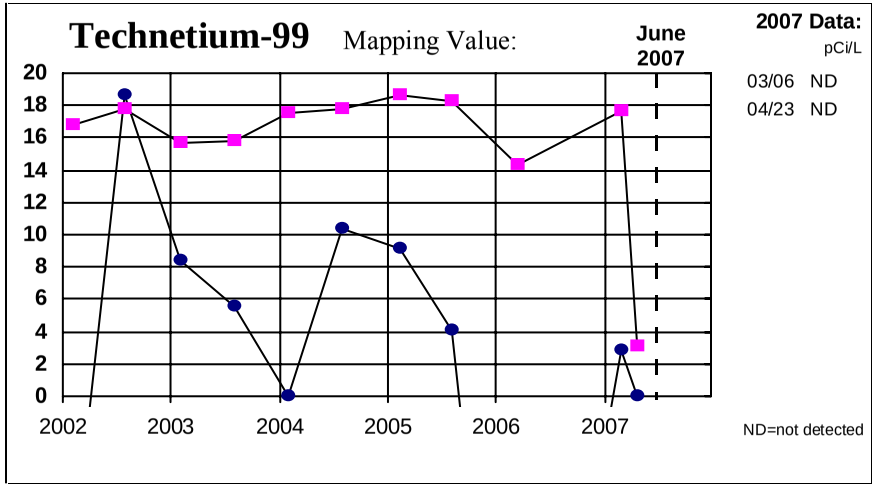
R12


Result
Detection Limit
Trend Line
Trichloroethene Mapping Value:
June 2007
2007 Data:
ug/L
03/07 ND
1.2
1
0.8
0.6
0.4
0.2
0
2002
2003
2004
2005
2006
2007
ND=not detected

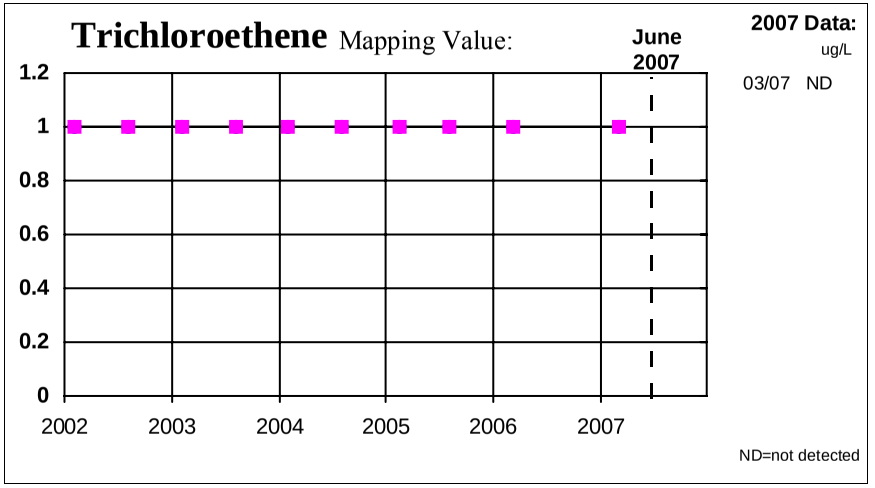

Technetium-99 Mapping Value:
June 2007
2007 Data:
pCi/L
03/07 ND
20
18
16
14
12
10
8
6
4
2
0
2002
2003
2004
2005
2006
2007
ND=not detected

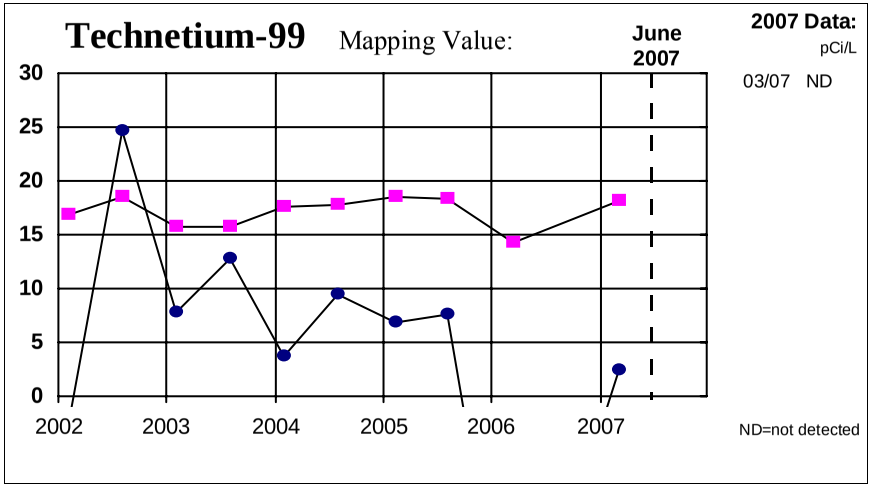
R13


Result
Detection Limit
Trend Line
Trichloroethene Mapping Value:
June 2007
2007 Data:
ug/L
03/06 ND
04/23 ND
1.2
1
0.8
0.6
0.4
0.2
0
2002
2003
2004
2005
2006
2007
ND=not detected

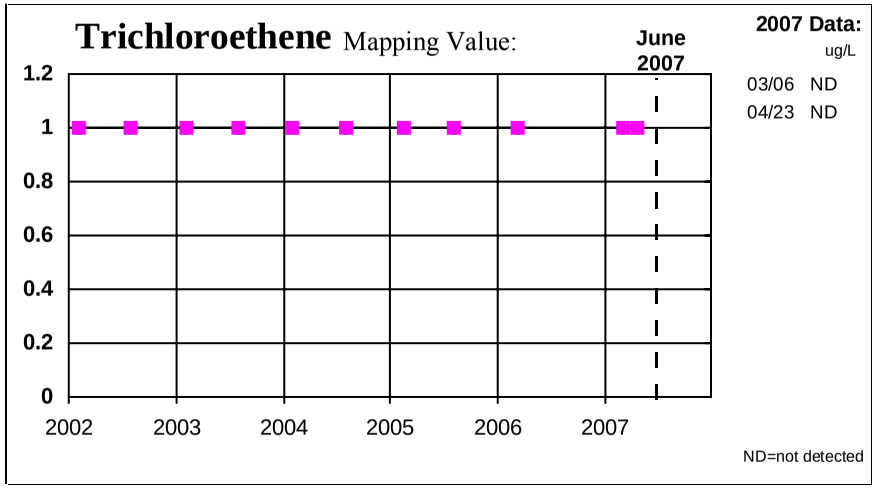

Technetium-99 Mapping Value:
June 2007
2007 Data:
pCi/L
03/06 ND
04/23 ND
20
18
16
14
12
10
8
6
4
2
0
2002
2003
2004
2005
2006
2007
ND=not detected

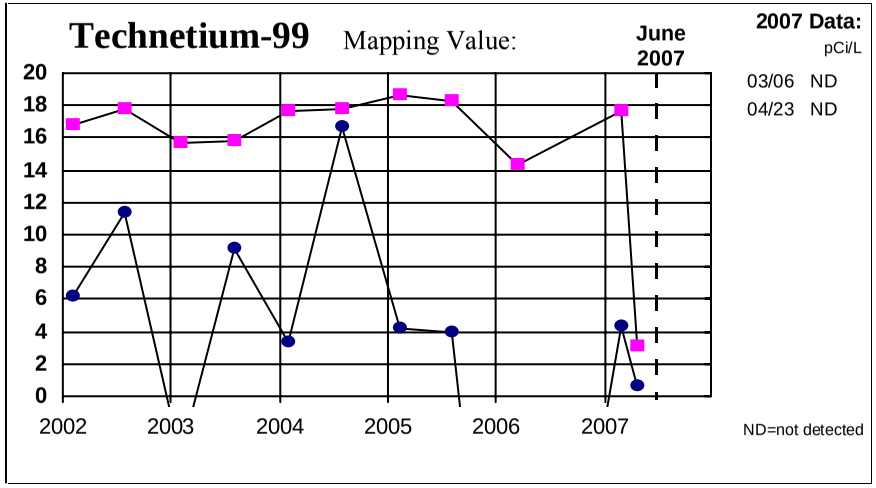
R14


Result
Detection Limit
Trend Line
Trichloroethene Mapping Value:
June 2007
2007 Data:
ug/L
03/07 ND
1.2
1
0.8
0.6
0.4
0.2
0
2002
2003
2004
2005
2006
2007
ND=not detected

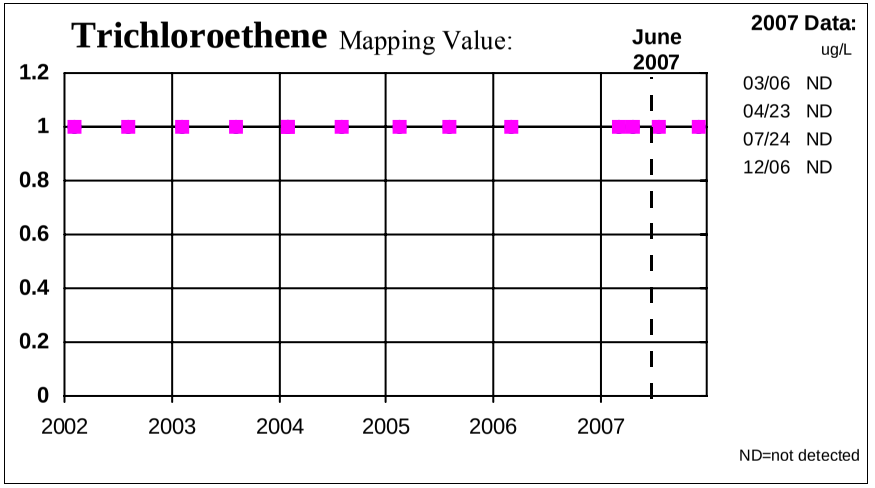

Technetium-99 Mapping Value:
June 2007
2007 Data:
pCi/L
03/07 ND
30
25
20
15
10
5
0
2002
2003
2004
2005
2006
2007
ND=not detected

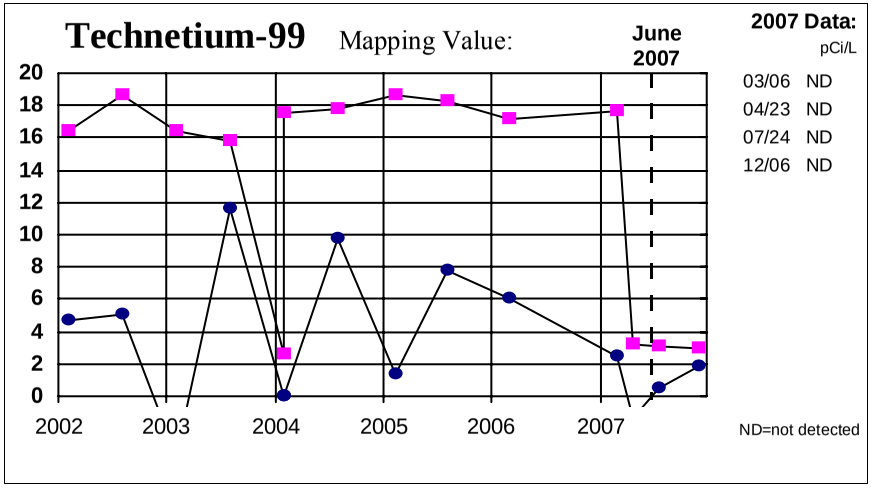
R19


Result
Detection Limit
Trend Line
Trichloroethene Mapping Value:
June 2007
2007 Data:
ug/L
03/06 ND
04/23 ND
1.2
1
0.8
0.6
0.4
0.2
0
2002
2003
2004
2005
2006
2007
ND=not detected

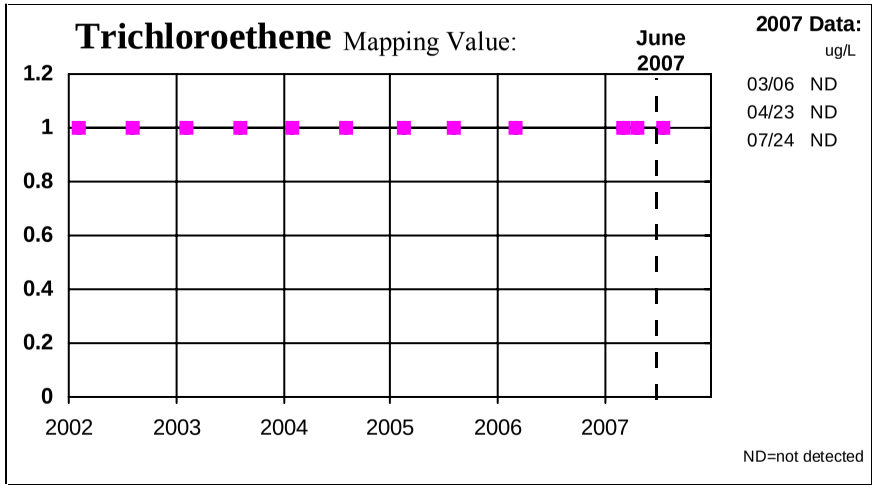

Technetium-99 Mapping Value:
June 2007
2007 Data:
pCi/L
03/06 ND
04/23 ND
20
18
16
14
12
10
8
6
4
2
0
2002
2003
2004
2005
2006
2007
ND=not detected

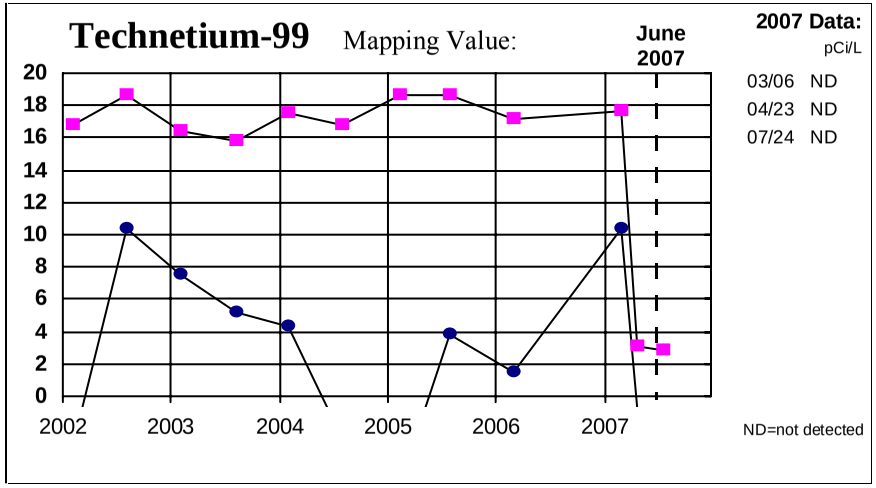
R20


Result
Detection Limit
Trend Line
Trichloroethene Mapping Value:
June 2007
2007 Data:
ug/L
03/06 ND
04/23 ND
07/24 ND
12/06 ND
1.2
1
0.8
0.6
0.4
0.2
0
2002
2003
2004
2005
2006
2007
ND=not detected

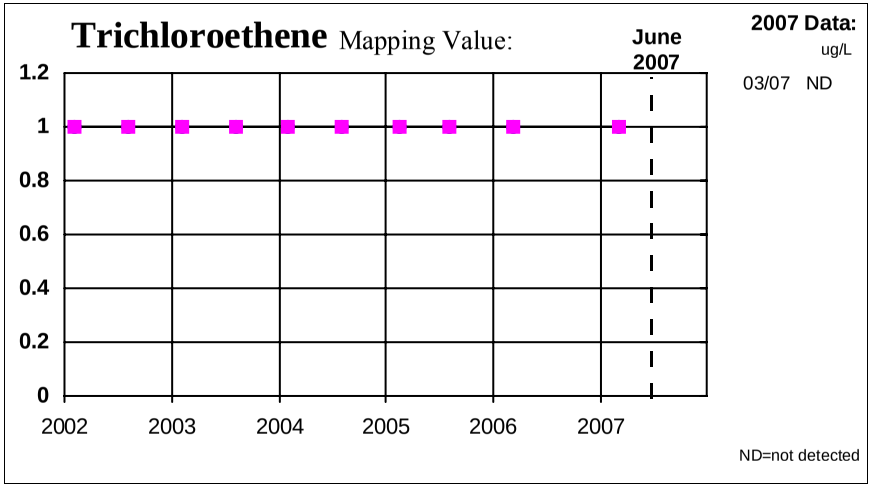

Technetium-99 Mapping Value:
June 2007
2007 Data:
pCi/L
03/06 ND
04/23 ND
07/24 ND
12/06 ND
20
18
16
14
12
10
8
6
4
2
0
2002
2003
2004
2005
2006
2007
ND=not detected

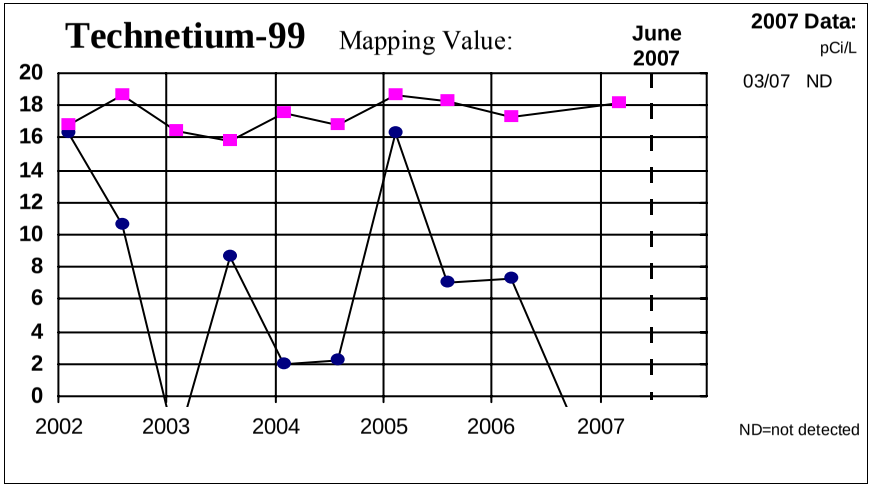
R21


Result
Detection Limit
Trend Line
Trichloroethene Mapping Value:
June 2007
2007 Data:
ug/L
03/06 ND
04/23 ND
07/24 ND
1.2
1
0.8
0.6
0.4
0.2
0
2002
2003
2004
2005
2006
2007
ND=not detected

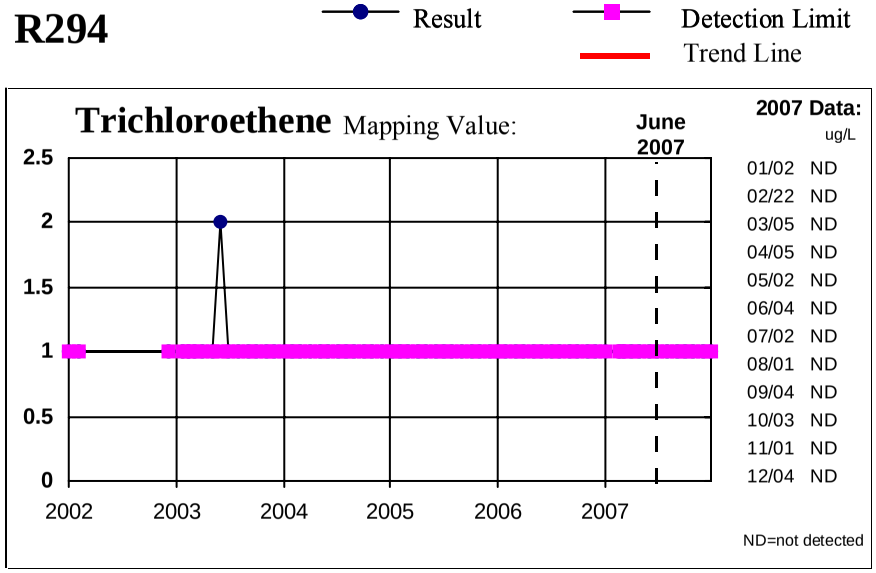

Technetium-99 Mapping Value:
June 2007
2007 Data:
pCi/L
03/06 ND
04/23 ND
07/24 ND
20
18
16
14
12
10
8
6
4
2
0
2002
2003
2004
2005
2006
2007
ND=not detected

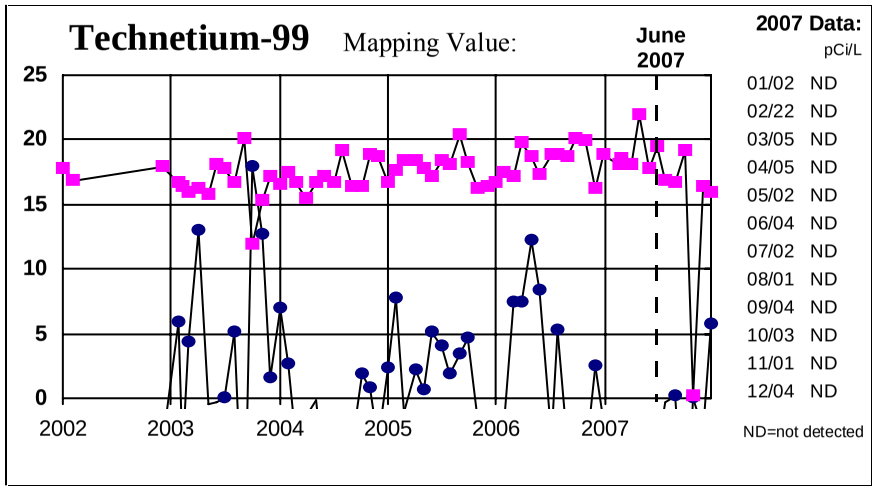
R23


Result
Detection Limit
Trend Line
Trichloroethene Mapping Value:
June 2007
2007 Data:
ug/L
03/07 ND
1.2
1
0.8
0.6
0.4
0.2
0
2002
2003
2004
2005
2006
2007
ND=not detected

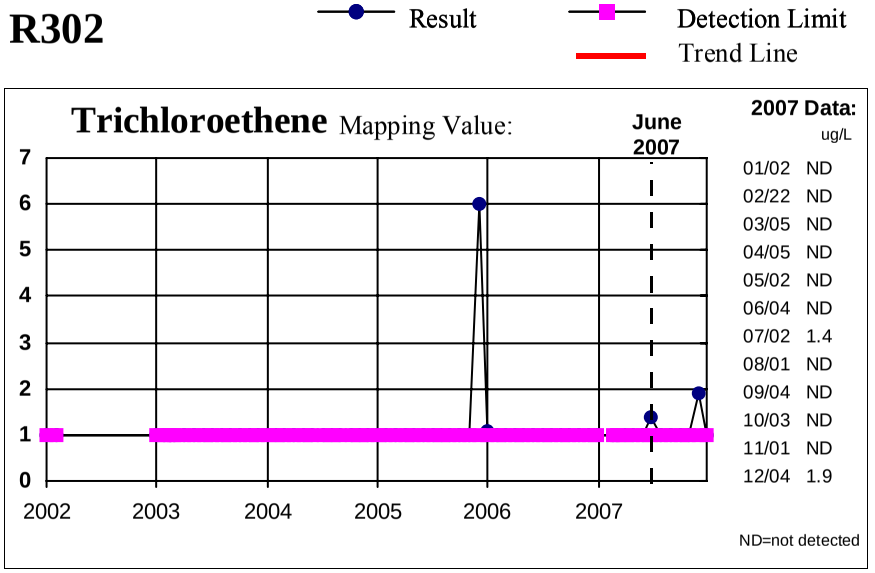

Technetium-99 Mapping Value:
June 2007
2007 Data:
pCi/L
03/07 ND
20
18
16
14
12
10
8
6
4
2
0
2002
2003
2004
2005
2006
2007
ND=not detected

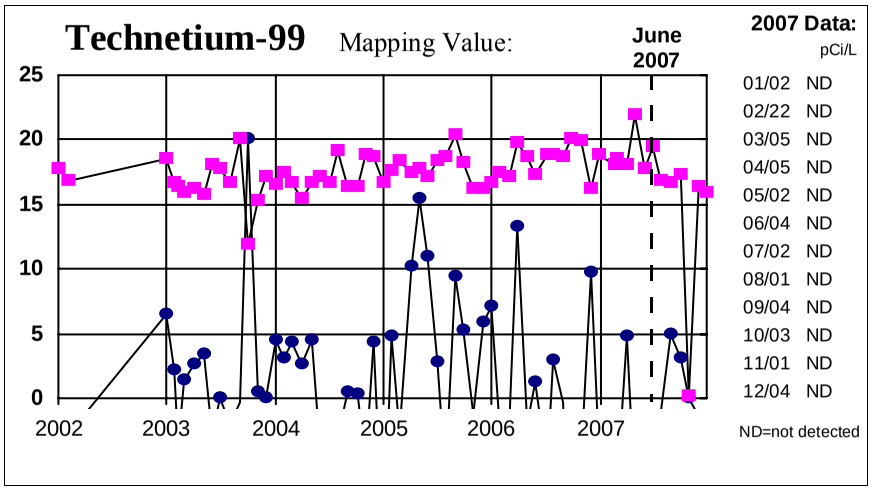
R294


Result
Detection Limit
Trend Line
Trichloroethene Mapping Value:
June 2007
2007 Data:
ug/L
2.5
2
1.5
1
0.5
0
2002
2003
2004
2005
2006
2007
01/02 ND
02/22 ND
03/05 ND
04/05 ND
05/02 ND
06/04 ND
07/02 ND
08/01 ND
09/04 ND
10/03 ND
11/01 ND
12/04 ND
ND=not detected

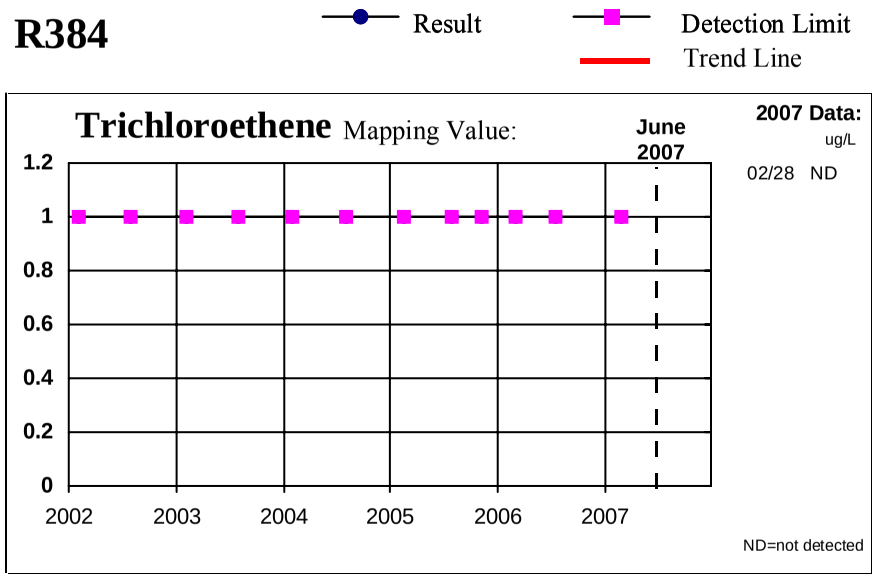

Technetium-99 Mapping Value:
June 2007
2007 Data:
pCi/L
25
20
15
10
5
0
2002
2003
2004
2005
2006
2007
01/02 ND
02/22 ND
03/05 ND
04/05 ND
05/02 ND
06/04 ND
07/02 ND
08/01 ND
09/04 ND
10/03 ND
11/01 ND
12/04 ND
ND=not detected

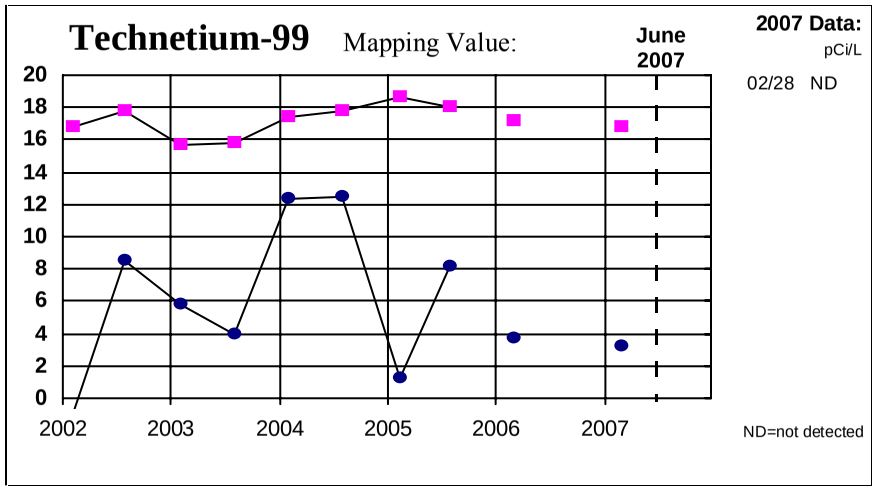
R302


Result
Detection Limit
Trend Line
Trichloroethene Mapping Value:
June 2007
2007 Data:
ug/L
7
6
5
4
3
2
1
0
2002
2003
2004
2005
2006
2007
01/02 ND
02/22 ND
03/05 ND
04/05 ND
05/02 ND
06/04 ND
07/02 1.4
08/01 ND
09/04 ND
10/03 ND
11/01 ND
12/04 1.9
ND=not detected

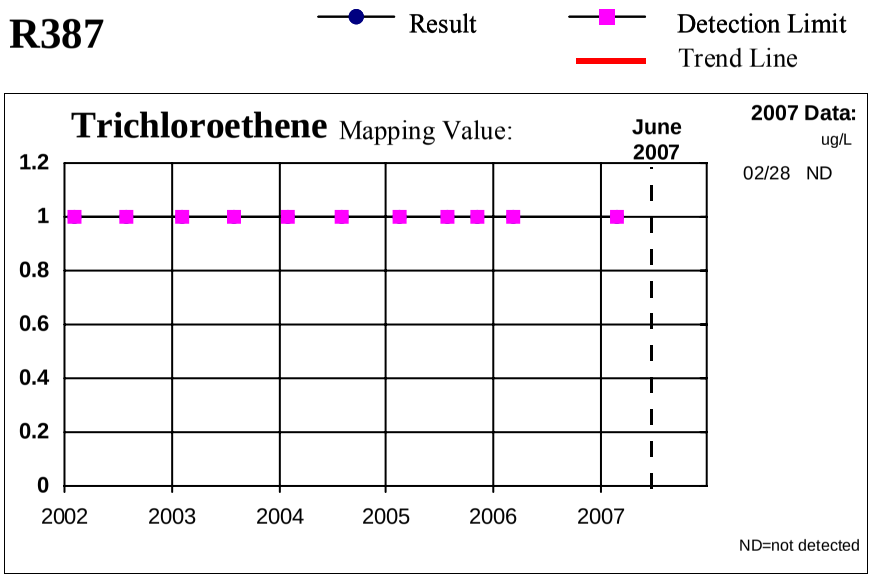

Technetium-99 Mapping Value:
June 2007
2007 Data:
pCi/L
25
20
15
10
5
0
2002
2003
2004
2005
2006
2007
01/02 ND
02/22 ND
03/05 ND
04/05 ND
05/02 ND
06/04 ND
07/02 ND
08/01 ND
09/04 ND
10/03 ND
11/01 ND
12/04 ND
ND=not detected

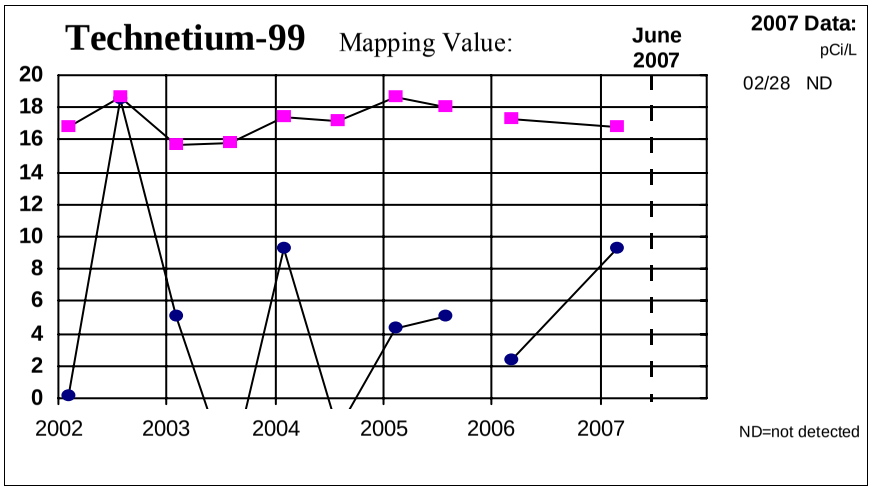
R384


Result
Detection Limit
Trend Line
Trichloroethene Mapping Value:
June 2007
2007 Data:
ug/L
02/28 ND
1.2
1
0.8
0.6
0.4
0.2
0
2002
2003
2004
2005
2006
2007
ND=not detected


Technetium-99 Mapping Value:
June 2007
2007 Data:
pCi/L
02/28 ND
20
18
16
14
12
10
8
6
4
2
0
2002
2003
2004
2005
2006
2007
ND=not detected

R387


Result
Detection Limit
Trend Line
Trichloroethene Mapping Value:
June 2007
2007 Data:
ug/L
02/28 ND
1.2
1
0.8
0.6
0.4
0.2
0
2002
2003
2004
2005
2006
2007
ND=not detected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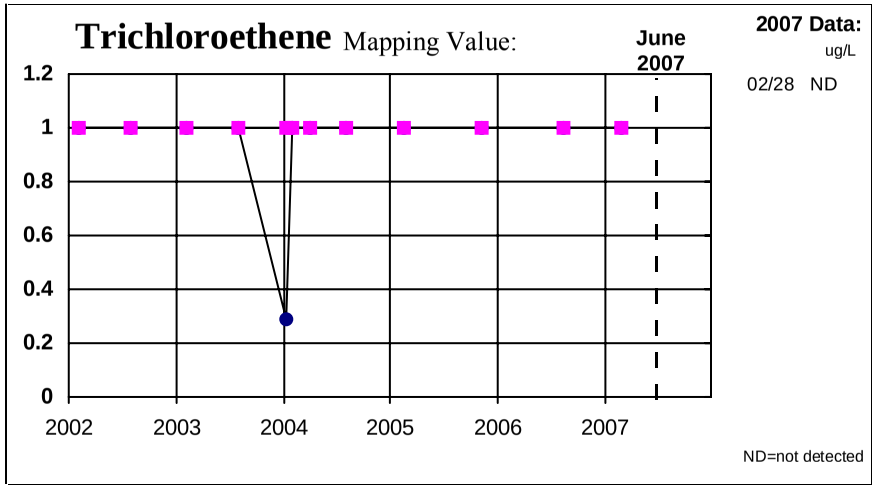
R392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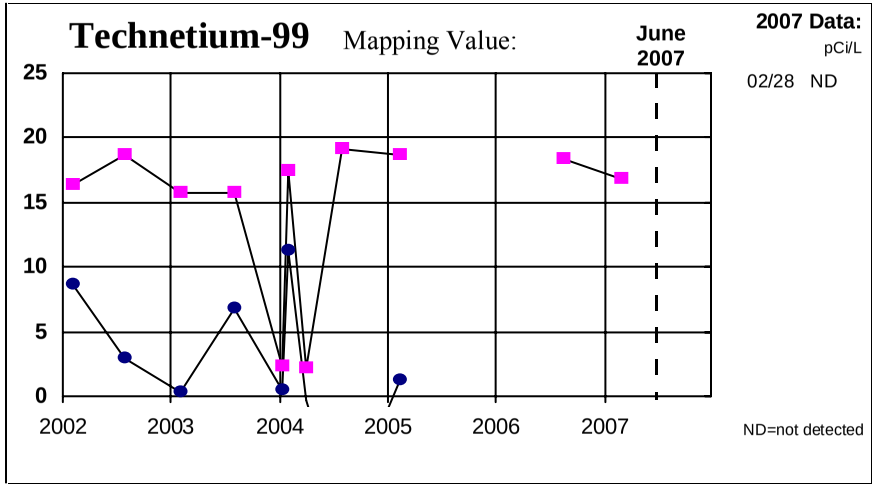
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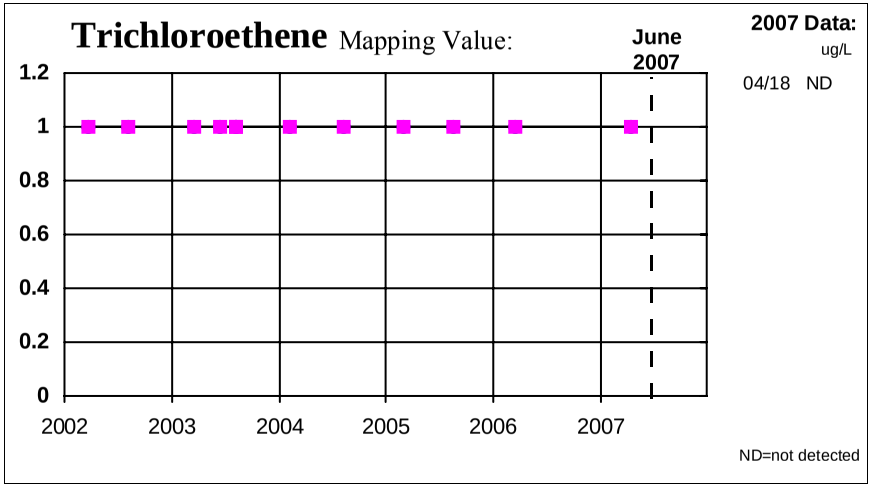
R72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Detection Limit
Trend Line
Trichloroethene Mapping Value:
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2007 Data:
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2006
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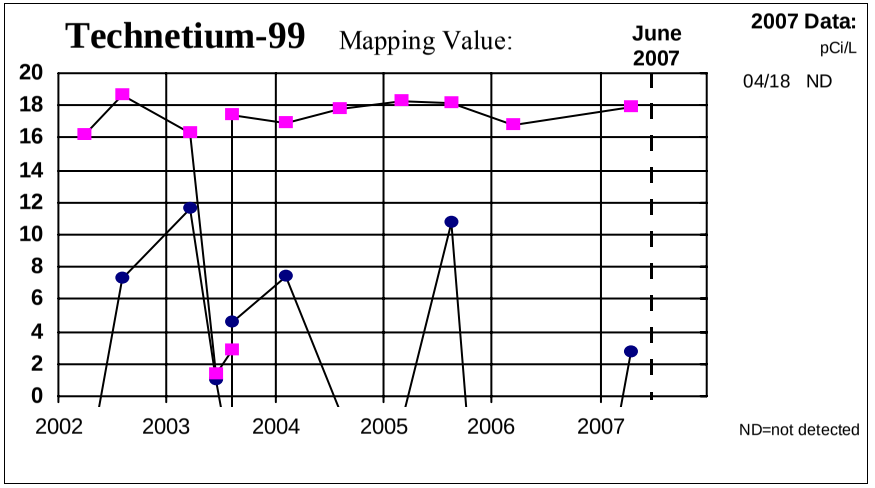
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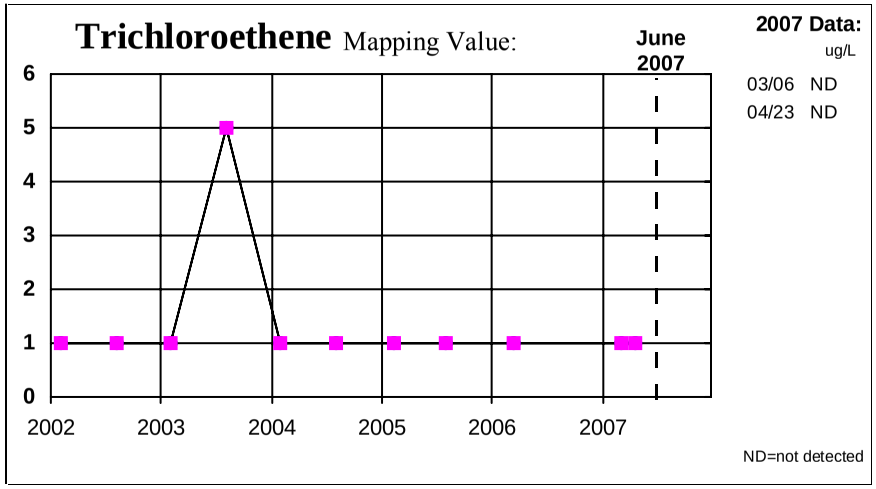
R82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Detection Limit
Trend Line
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04/23 ND
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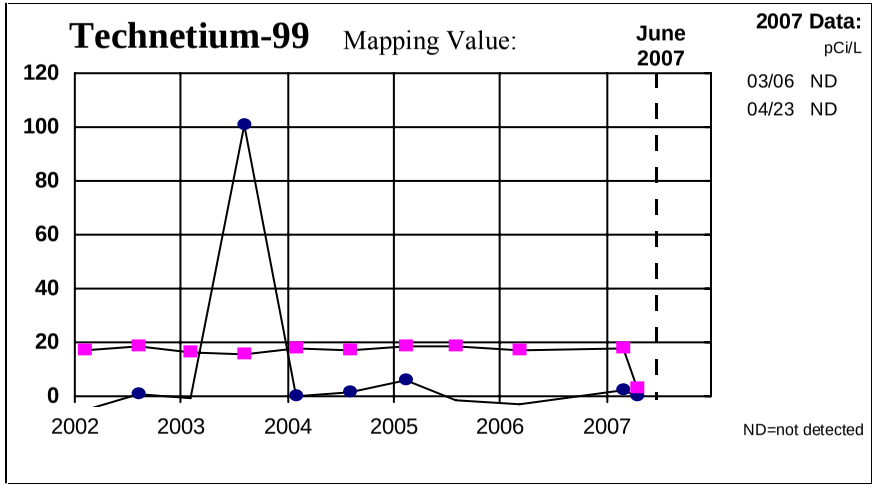
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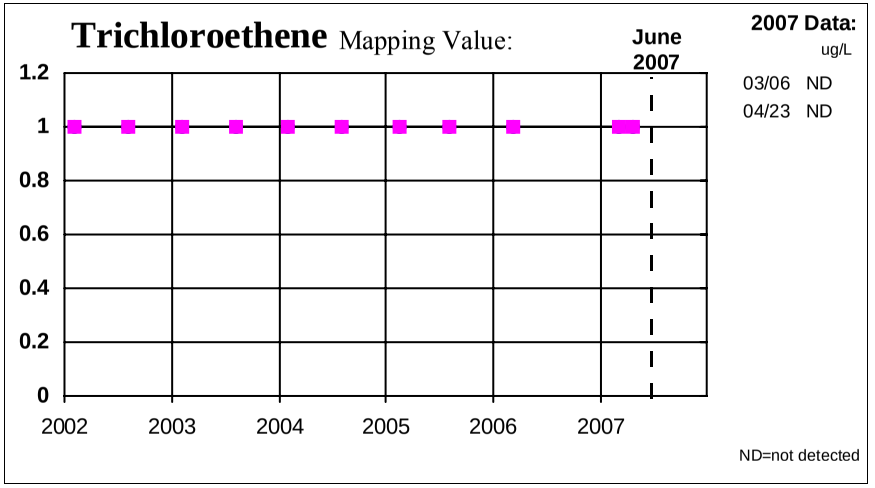
R83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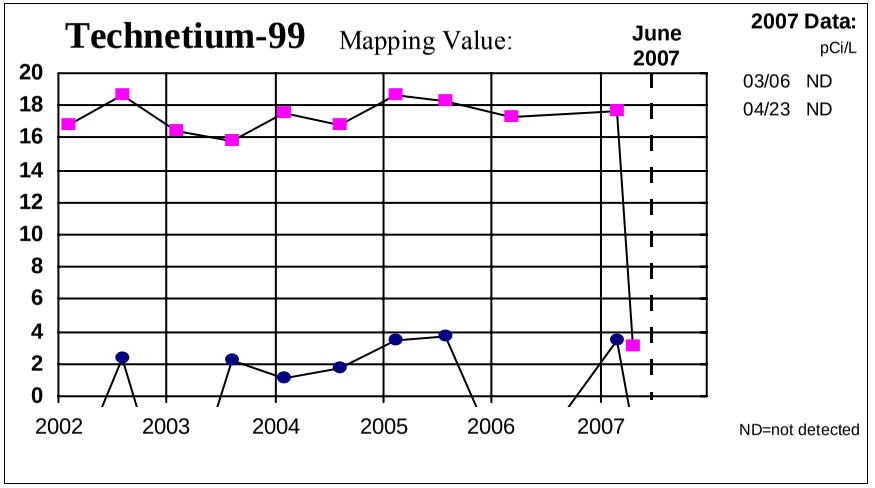
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04/23 ND
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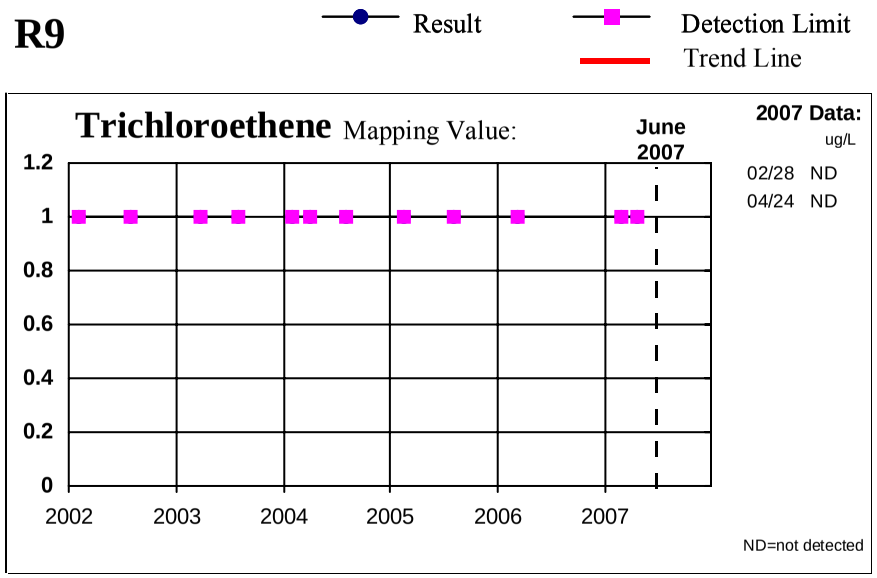
R9


Result
Detection Limit
Trend Line
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02/28 ND
04/24 ND
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0.4
0.2
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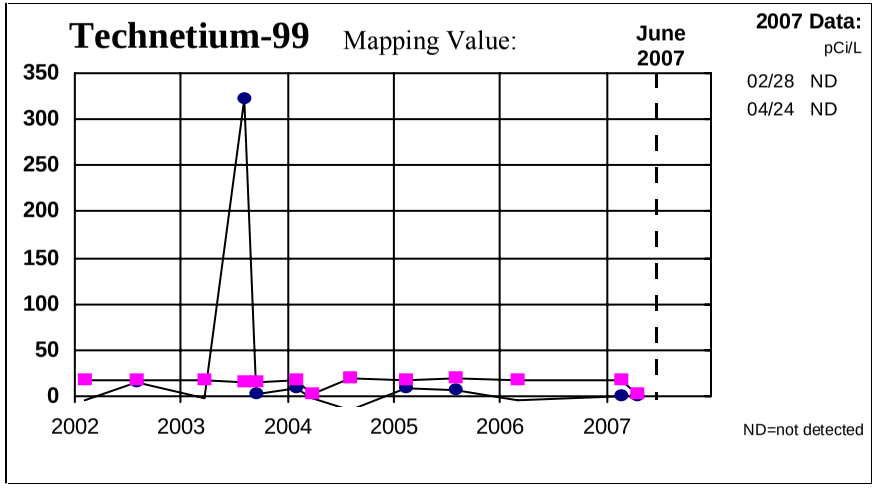
2004
2005
2006
2007
ND=not detected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2003
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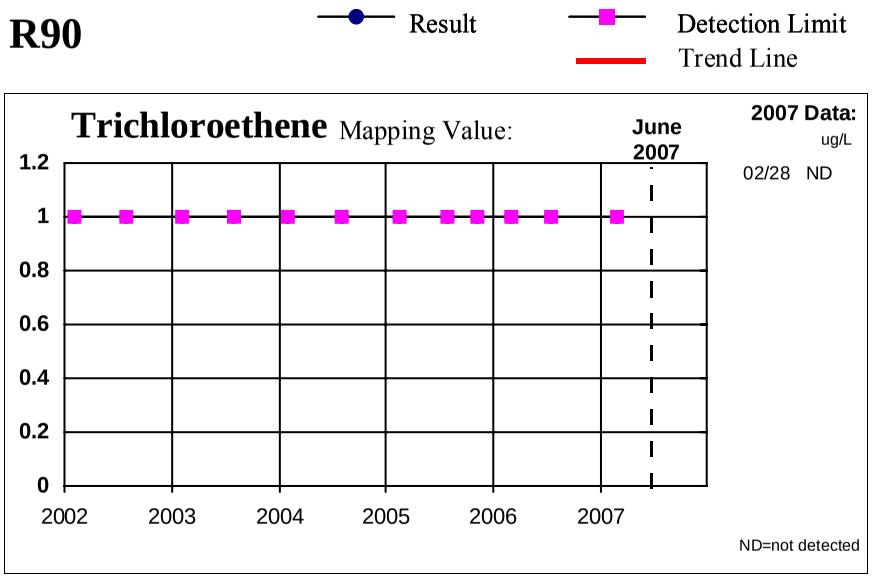
2006
2007
ND=not detected

R90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Trichloroethene Mapping Value:
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2007 Data:
ug/L
02/28 ND
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0.4
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2005
2006
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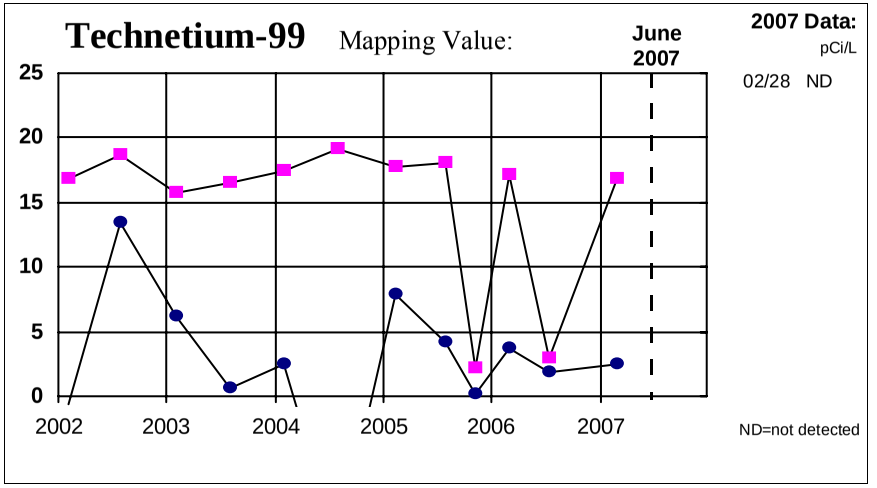
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June 2007
2007 Data:
pCi/L
02/28 ND
25
20
15
10
5
0
2002
2003
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2006
2007
ND=not detected

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APPENDIX C

C-746-K SANITARY LANDFILL
(SWMU 8)

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C.1 INTRODUCTION

This Appendix provides information for the C-746-K Sanitary Landfill [Solid Waste Management Unit (SWMU) 8], an inactive sanitary landfill located southwest of the Paducah Gaseous Diffusion Plant (PGDP) security area. The information includes a brief summary of historical operating practices, investigations, and remedial actions. Additionally, it also includes a discussion of CY2007 groundwater monitoring results and how those results impact the *Trichloroethene and Technetium-99 Groundwater Contamination in the Regional Gravel Aquifer for Calendar Year 2007 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, PRS/PROJ/0046.

Previous investigations at PGDP identified SWMU 8 as a possible source of contamination in off-site surface water and sediments. Based on this determination, SWMU 8 has been placed in the Surface Water Operable Unit (SWOU). Though not considered part of the Southwest, Northwest, or Northeast Plumes, elevated levels of contaminants have been observed in monitoring wells (MWs) installed at the landfill.

C.1.1. HISTORICAL OPERATING PRACTICES

The C-746-K Landfill is located south of the C-611 Water Treatment Plant, immediately west of Bayou Creek and north of an unnamed tributary of Bayou Creek (Figure C.1). It is roughly rectangular in shape (approximately 500 ft x 700 ft) and slopes in a radial fashion from a maximum elevation of 400 ft amsl near the center of the western half of the landfill, to a low of approximately 360 ft amsl at the eastern edge of the landfill. Drainage ditches located along the western and northern edges of the landfill flow to the south into the unnamed tributary and to the east into Bayou Creek, respectively. A portion of the 500-year floodplain of Bayou Creek and the unnamed tributary are located within the boundaries of SWMU 8.

The C-746-K Landfill was used from 1951 to 1981 for the disposal of steam-plant fly ash, uncontaminated combustible waste, and potentially radiologically contaminated rubbish. Trenches were cut in the ash and used for the burning of trash until 1967; after that time, waste was placed in the landfill without burning. The waste, containing primarily office trash and some construction debris and kitchen rubbish, was placed in the trenches and covered, when necessary, with additional fly ash or soil. In addition to these materials, sludge from the C-615 Sewage Treatment Plant may have been buried at the unit, as it reportedly was used as fill material. Available soil boring data indicate that up to 28 ft of fly ash and trash were placed in the landfill. In 1982, the landfill was closed and covered with a 6- to 12-inch clay cap and 18 inch of soil with vegetative cover.

A portion of the Kentucky Ordnance Works (KOW) Yellow Water Line (AOC 205) underlies the northern portion of the landfill site. The line was used from 1942 to 1945 to transport yellow water, an acidic- and trinitrotoluene (TNT)-contaminated wastewater, from the KOW TNT-manufacturing area to a discharge point on Bayou Creek. Based on drawings produced by Rust Engineering in 1942, the line was constructed of 12-inch diameter, segmented, vitrified-clay pipe and was situated within loess deposits at 364 to 371 ft amsl. Borings located in the immediate vicinity of the line did not encounter any evidence that the line still is present. The portions of the line crossing the area now occupied by the landfill may have been removed prior to landfill construction, but there is no documentation available to verify this hypothesis.

C.1.2. CURRENT OPERATIONS

The landfill has been closed since 1982, but the site is inspected annually. Surface water monitoring at the C-746-K Landfill has been discontinued in accordance with the Kentucky Pollutant Discharge Elimination System (KPDES) Permit. Groundwater monitoring continues under the PGDP Groundwater Monitoring Program.

C.1.3. PREVIOUS AND POTENTIAL FUTURE RESPONSE ACTIONS

Leachate was discovered in the ditch located southwest of the landfill on January 30, 1992. Sampling was immediately conducted at five leachate seep locations around the landfill. The leachate exhibited an acidic negative logarithm of the hydrogen-ion concentration (pH) (from 2.3 to 5.5) and was found to contain volatile organic compounds (VOCs) [TCE; 1,1-dichloroethene (DCE); 1,1-dichloroethane (DCA); and *trans*-1,2-DCE] and metals (aluminum, iron, manganese, and zinc) above background levels. Low levels of radionuclides [technetium-99 (^{99}Tc) and uranium] also were detected in some leachate samples (DOE 1998). The precipitation of dissolved metals from the leachate was thought to be causing orange to yellow staining observed at various points along the creek banks. The condition was deemed to be in noncompliance with the water quality provisions of 401 *KAR* 5:031, which prohibit discharges that produce "objectionable color" into waters of the Commonwealth of Kentucky. On September 15, 1992, the Kentucky Department for Environmental Protection (KDEP) Division of Water issued a Notice of Violation (NOV) to DOE for "unpermitted seepage areas from the C-746-K Sanitary Landfill into waters of the Commonwealth."

As a result of the NOV, DOE, with the approval of the U.S. Environmental Protection Agency (EPA) and KDEP, immediately undertook an interim corrective action to address the seeps. To prevent any further release of solids to the unnamed tributary, a sandbag dam with a liner was installed in CY1992 in the drainage ditch southwest of the landfill. (In February 1997, the Kentucky Division of Waste Management gave approval to remove the diversion dam because it was being flooded and breached during significant rainfall events.) The interim action also repaired the subsidence of the existing landfill cap by recontouring the cap to promote surface-water runoff. A surface water monitoring program was initiated at the landfill to monitor contaminant levels in the leachate and adjacent creeks.

On August 10, 1998, EPA, with concurrence from KDEP, approved the *Record of Decision for Waste Area Groups 1 and 7 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*. The remedy for SWMU 8 identified in the Record of Decision (ROD) included deed restrictions, installation of warning signs, continued surface water and groundwater monitoring, and placement of riprap over three leachate seep sites and along the Bayou Creek bank located on the east side of the C-746-K Sanitary Landfill. (Additional riprap was placed in the southwest portion of the west drainage swale at the request of an Agreement in Principle representative.) As part of the ROD, two shallow groundwater MWs (MW184 and MW303) were plugged and abandoned, and one new MW (MW344) was installed to replace MW303.

The remedial action for SWMU 8 recently has been reviewed as part of the five-year review of remedial actions at the PGDP. The *Five-Year Review for Remedial Actions at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,* DOE/LX/07-0117&D1, was issued to the Commonwealth of Kentucky and EPA in November 2008. The Five-Year Review concluded that the remedial action conducted at SWMU 8 is functioning as intended by the ROD. Applicable or relevant and appropriate requirements for leachate discharges and radionuclide exposures cited in the ROD continues to be met.

C.1.4. PRIOR STUDIES AND SUMMARY OF FINDINGS

Previous investigations at SWMU 8 include a hydrogeologic investigation conducted in 1980 by Wehran Engineering; installation of a boring and groundwater MW during the Comprehensive Environmental Response, Compensations, and Liability Act (CERCLA) Site Investigation; and the Remedial Facility Investigation/Remedial Investigation (RFI/RI) sampling for WAGs 1 and 7 conducted in CY1995**.** Additional sampling data is available from the groundwater, surface-water, and leachate monitoring programs initiated at the C-746-K Landfill in CY1992.

Sampling conducted for the 1980 Wehran field investigation of the C-746-K Landfill indicated that infiltration of precipitation was contributing to leachate production, resulting in shallow (Terrace Gravel) groundwater contamination and surface-water contamination (acidic pH, elevated iron, and manganese) in a discrete section of the unnamed tributary. During the CERCLA site investigation conducted in CY1990 and CY1991, low levels of organic compounds were detected in the shallow groundwater samples from wells at the landfill. The sampling results of the CY1995 RFI/RI confirmed that low levels of various VOCs, metals, and radionuclides likely are leaching from the wastes buried in the landfill into the nearby streams and shallow groundwater.

The source at SWMU 8 consists of fly ash, uncontaminated combustible waste, potentially contaminated rubbish, and trash. From the source, contamination has migrated to soil and shallow groundwater via infiltration, leaching, erosion, and runoff.

C.1.4.1. 2007 Groundwater Sampling Results

Groundwater monitoring currently is conducted semiannually from four wells at the site [MW300, MW301, MW302 (completed in the Terrace Gravel) and MW344 (completed in the RGA)]. The results of samples collected during CY2007 indicate that elevated levels of contaminants exist in all wells. Table C.1 lists contaminants that exceed maximum contaminant levels (MCLs) or other criteria. Elevated levels of manganese were found in all four wells; while elevated levels of iron were found in three wells and elevated levels of aluminum were found in two wells. Additional contaminant levels exceeded thresholds in the two southernmost wells (MW300 and 301), including beta activity (MW301 only) and TCE (MW300 only). Concentrations of associated TCE daughter products (1,1-DCE, *cis*-1,2-DCE, and vinyl chloride) were elevated in MW300. Vinyl chloride levels also were elevated in MW301. Trend graphs of these four wells for TCE and associated daughter products can be found in Figure C.2.

MW300 is the only well of the four Terrace Gravel wells that has consistently produced samples with detectable TCE. The records for both MW301 and MW302 include a single reported detection in CY2002. TCE concentrations in MW300 increased from the first sample in CY1994 until late CY1998 when the TCE level was just over 100 μg/L. Through CY2002, TCE levels decreased, with the level in CY2002 being about 35 μg/L, and then rebounded to approximately 60 μg/L in CY2003 and CY2004. During CY2007, however, the TCE levels have declined to 14 μg/L. As a result of these analyses, a small TCE plume is shown on Figure C.1 emanating from the area of the landfill and migrating south toward the creek. None of the wells have reported ^{99}Tc activities above 25 pCi/L. The trend plots for TCE and associated daughter products for these wells are located at the end of this appendix.

Table C.1. 2007 Groundwater Threshold Exceedances at the C-746-K Landfill

Well #	Contaminant	Concentration	Units	Threshold Exceeded
MW300	1,1-Dichloroethene	120	µg/L	MCL (7 µg/L)
MW300	*cis*-1,2-Dichloroethene	960	µg/L	SMCL (70 µg/L)
MW300	Iron	203	mg/L	SMCL (0.3 mg/L)
MW300	Manganese	20.2	mg/L	SMCL (0.05 mg/L)
MW300	Trichloroethene	14	µg/L	MCL (5 µg/L)
				ACO (1 µg/L)
MW300	Vinyl chloride	110	µg/L	MCL (2 µg/L)
MW301	Aluminum	2.42	mg/L	SMCL (0.2 mg/L)
MW301	Beta activity	60.8	pCi/L	ACO (50 pCi/L)
MW301	Iron	265	mg/L	SMCL (0.3 mg/L)
MW301	Manganese	15.8	mg/L	SMCL (0.05 mg/L)
MW301	Vinyl chloride	4.2	µg/L	MCL (2 µg/L)
MW302	Iron	0.317	mg/L	SMCL (0.3 mg/L)
MW302	Manganese	0.622	mg/L	SMCL (0.05 mg/L)
MW344	Aluminum	13.5	mg/L	SMCL (0.2 mg/L)
MW344	Iron	7.9	mg/L	SMCL (0.3 mg/L)
MW344	Manganese	0.286	mg/L	SMCL (0.05 mg/L)

SMCL = secondary MCL ACO = Administrative Consent Order

C.1.4.2 Impacts to the RGA and the Plume Maps

The C-746-K Landfill straddles the terrace slope (see Figure C.1). Groundwater beneath the southern and western portion of the site occurs under shallow, unconfined conditions in the Terrace Gravel overlying the Porters Creek Clay Terrace (MWs 300, 301, and 302). The RGA underlies the extreme northeast margin of the site, where the Porters Creek either is absent or greatly eroded (MW344). North of the terrace slope, the predominant groundwater flow direction within the RGA is north-northeast.

Groundwater within the Terrace Gravel at this site appears to flow in a radial pattern, away from the center of the landfill and discharging into the surface-water features adjacent to the landfill on the north and east sides. The contaminant profile in MW344 suggests that flow to the north contributes to groundwater flow across the terrace slope into the RGA.

MW344, which appears to be screened in the upper RGA at its contact with the terrace slope, allows observation of landfill leachate impacts on the RGA. CY2007 sampling results show that only metals (aluminum, iron, and manganese) are elevated above MCLs and secondary MCLs in this well; thresholds for TCE and ^{99}Tc were not exceeded; therefore, the C-746-K Landfill is not suspected as a source for the plumes that are the subject of the *Trichloroethene and Technetium-99 Groundwater Contamination in the Regional Gravel Aquifer for Calendar Year 2007 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, PRS/PROJ/0046.

It should be noted, however, that thresholds for aluminum, iron, manganese, TCE, and TCE daughter products (1,1-DCE; *cis*-1,2-DCE; and vinyl chloride) were exceeded in the area of MW300. The area groundwater discharges into the tributary along the southern boundary of the landfill. MW301, another well located south of the landfill, had vinyl chloride and beta activity that exceeded threshold values, as well as the same metals exceedances as in MW300.

In summary, it appears that leachate from the C-746-K Landfill does impact the RGA. Those impacts are limited to metals (aluminum, iron, and manganese) contamination. This landfill does appear to contain a source of radionuclides and TCE. These sources appear to be located in the south or southeastern area of

the landfill. Leachate from these sources migrates southward away from the RGA and, therefore, does not contribute to the TCE or ^{99}Tc plumes found in the RGA.

C.1.4. REFERENCES

DOE 1998. *Record of Decision for Waste Area Groups 1 and 7 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*. DOE/OR/06-1470&D3, Jacobs EM Team, February.

DOE 2008. *Five-Year Review for Remedial Actions at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,* DOE/LX/07-0117&D1, Paducah Remediation Services, LLC, November.

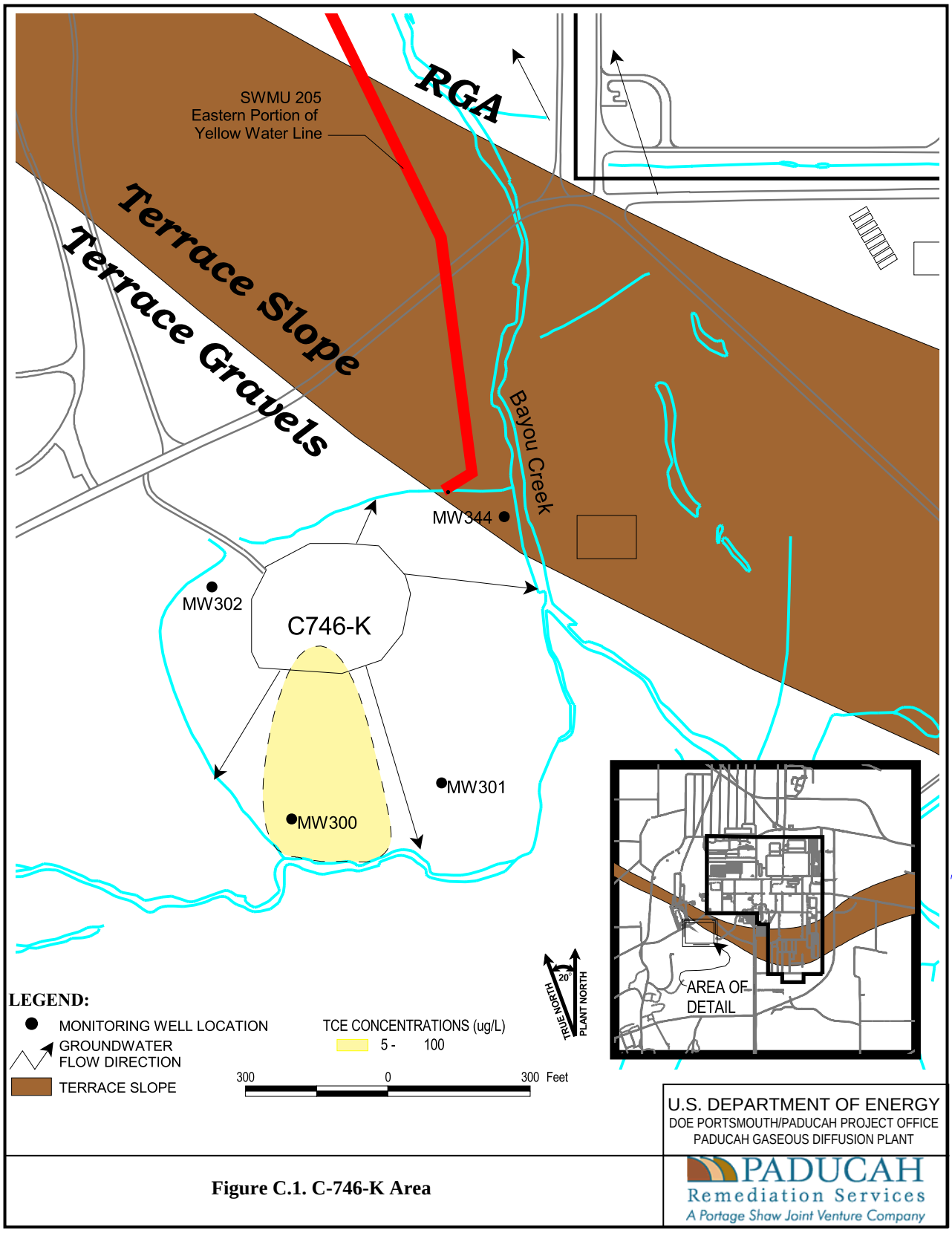


Figure C.1. C-746-K Area

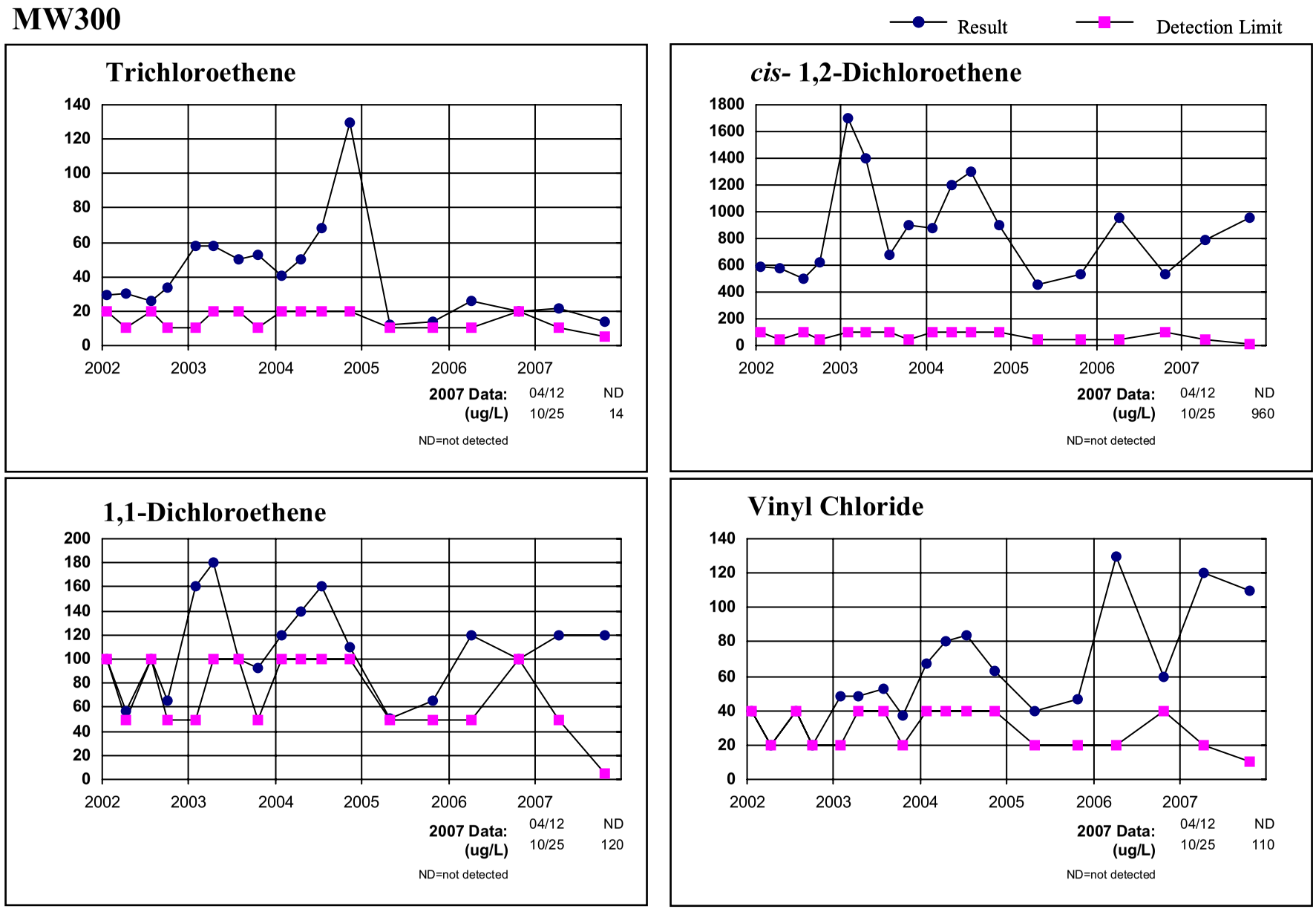
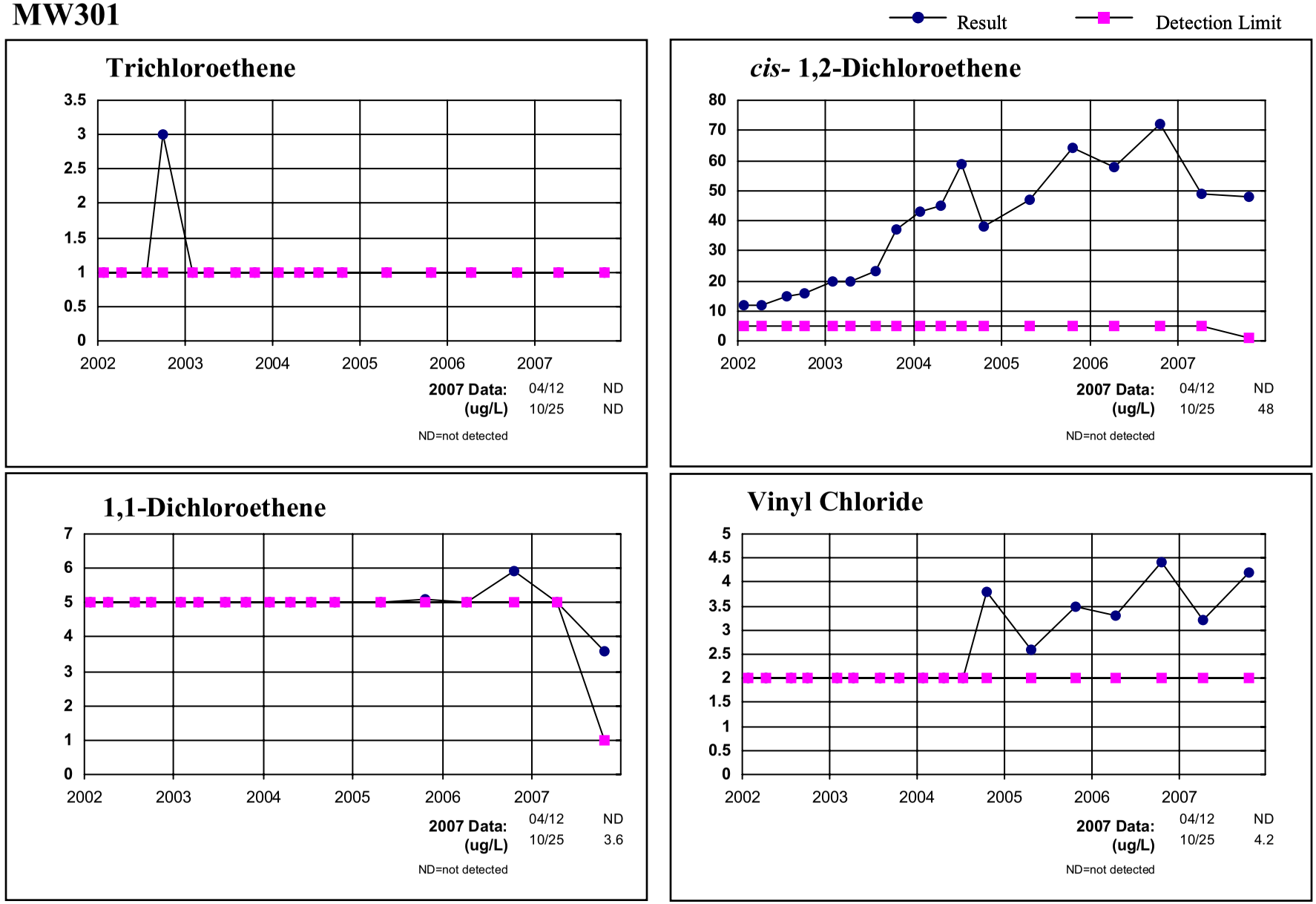


Figure C.2 C-746-K Trends



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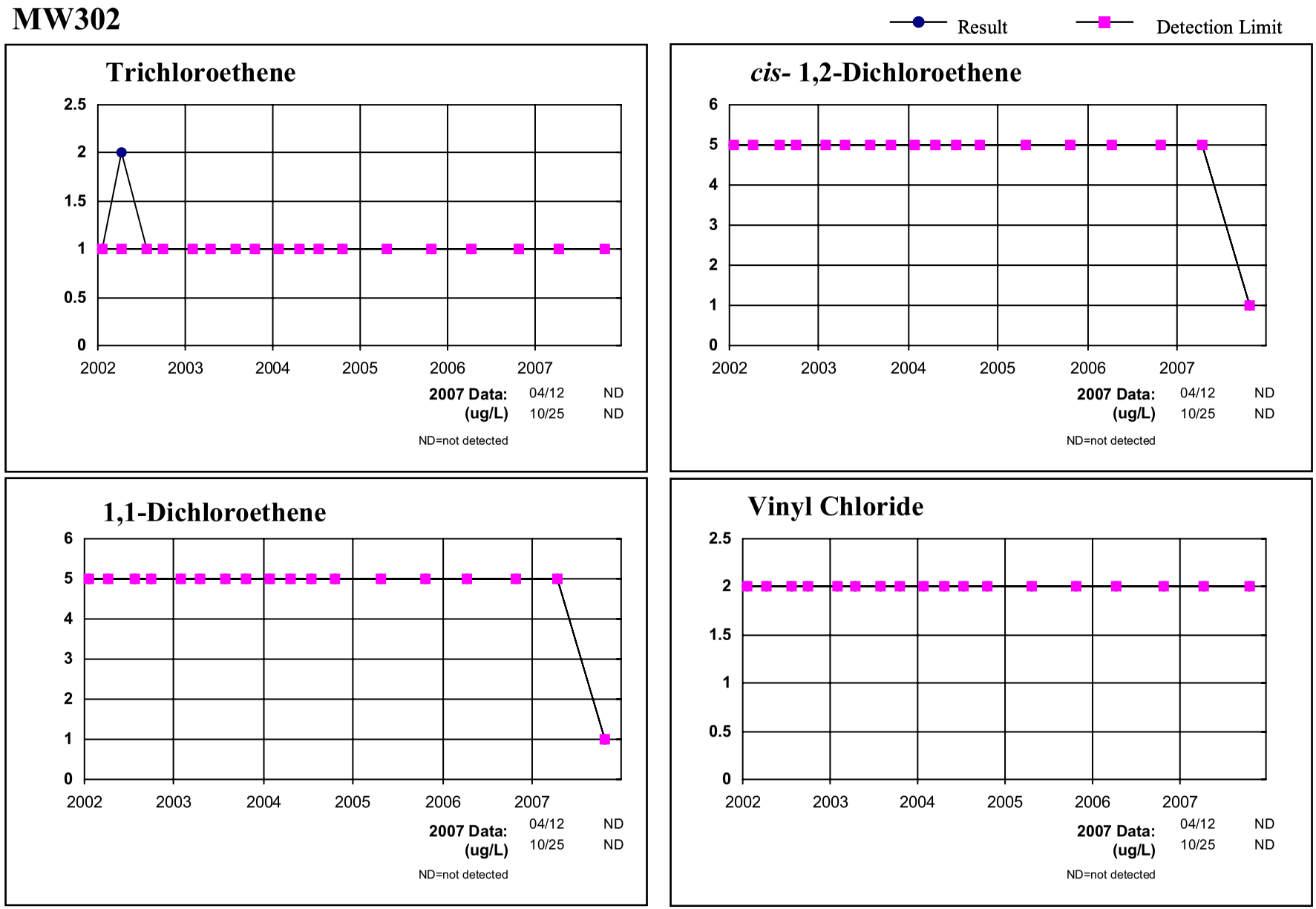

Figure C.2 (Continued)

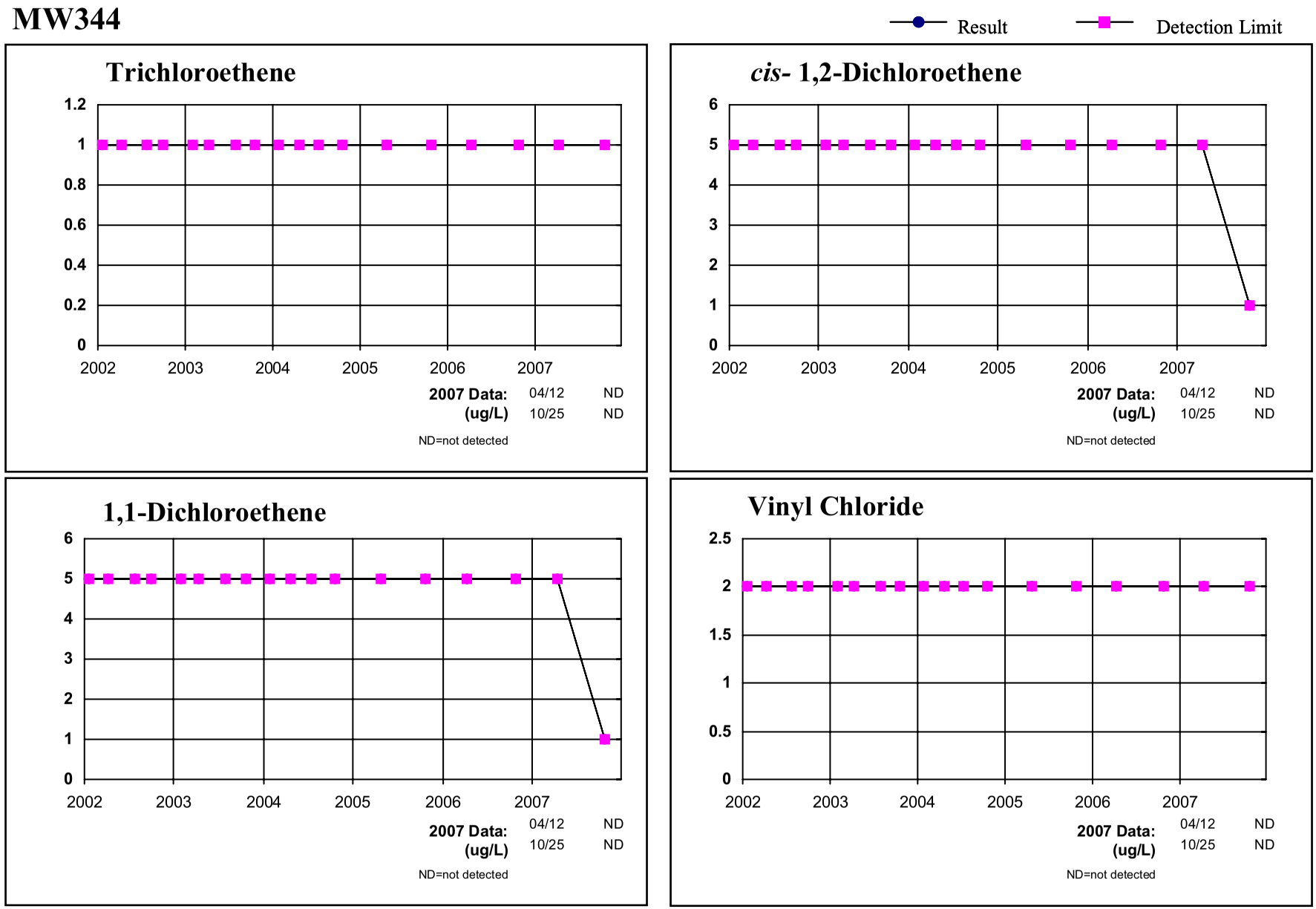

Figure C.2 (Continued)

OHIO RIVER

L12
MW146
MW152
L241
LBCSP2
LBCSP3
LBCSP1
LBCSP4
LBCSP5
LBCSP6
R72
R82
R83
R21
MW199
MW201
MW135
MW411
R14
EW228
EW229
MW236
MW381
MW202
MW238
MW240A
MW233
MW380
MW98
DOE BOUNDARY
MW100
MW99
R13
R12
R19
MW125
MW361
MW360
MW357
MW358
MW364
MW363
MW139
MW367
MW366
R20
MW252
MW149
MW148
MW410
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MW372
MW392
MW391
MW370
MW369
MW418
MW419
MW388
MW387
MW200
R2
MW221
MW384
MW385
MW222
MW223
MW224
MW395
MW394
MW409
MW253
MW134
MW220
MW397
MW193
MW197
R302
MW150
MW194
MW243
MW242
MW244
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MW248
MW185
EW231
EW230
MW66
MW245
MW173
MW106
MW63
007-010
007-009
007-011
MW355
MW165
MW356
MW291
MW283
MW293A
MW288
MW126
MW124
MW191
R294
R23
MW339
MW340
MW261
MW145
EW332
EW331
MW292
MW354
MW169
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MW329
MW417
MW416
MW206
MW163
MW155
MW156
MW258
MW161
MW405
MW408
MW256
MW328
MW203
MW255
R9
MW103
MW344

TRUE NORTH
20
PLANT NORTH

- BGOU RI Sample Location
- MW Location for Lower RGA
- MW Location for Middle RGA
- MW/Seep (or Surface Water) Location for Upper RGA
- Extraction Well Location
- Water Policy Boundary

1000 0 1000 Feet

2007 TCE Contours

- >100,000 ug/L
- 10,000 - 100,000 ug/L
- 1,000 - 10,000 ug/L
- 100-1,000 ug/L
- 5-100 ug/L

Composite TCE Contours for the RGA

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

COORDINATE SYSTEM: PGDP

FILE NAME: \plumes\2007\tce.apr
DATE: 12/29/08

AUTHOR: Paducah Remediation Services, Inc.

SOURCES: Paducah OREIS

OHIO RIVER

L12
MW146
MW152
L241
LBCSP1
LBCSP2
LBCSP3
LBCSP4
LBCSP5
LBCSP6
R72
R82
R83
R21
MW199
MW201
MW135
MW411
R14
EW228
EW229
MW236
MW381
MW202
MW238
MW240A
MW233
MW380
MW98
DOE BOUNDARY
MW99
MW100
R13
R12
R19
MW125
MW361
MW360
MW357
MW358
MW364
MW363
MW367
MW366
MW139
R20
MW252
MW149
MW148
MW410
MW373
MW372
MW370
MW369
MW392
MW391
MW418
MW419
MW200
MW388
MW387
MW221
MW384
MW385
MW223
MW222
MW224
MW395
MW394
MW220
MW397
MW409
MW253
MW193
R2
MW134
MW197
R302
MW150
MW194
MW243
MW242
MW244
MW250
MW248
MW185
EW231
EW230
MW245
MW66
MW173
MW106
MW63
007-010
007-009
007-011
MW339
MW340
MW261
MW355
MW165
MW356
MW145
MW291
MW283
MW293A
MW288
MW126
MW124
MW191
EW332
EW331
R294
R23
MW292
MW354
MW169
MW262
MW205
MW85
MW86
MW87
MW84
MW338
MW337
MW92
MW90A
MW168
MW260
MW341
MW333
MW93
MW95A
MW343
MW415
MW414
MW226
MW227
MW329
MW417
MW416
MW206
MW163
MW258
MW161
MW155
MW156
MW405
MW408
MW256
MW328
MW203
MW255
R9
MW103
MW344

TRUE NORTH 20 PLANT NORTH

- BGOU RI Sample Location
- MW Location for Lower RGA
- MW Location for Middle RGA
- MW/Seep (or Surface Water) Location for Upper RGA
- Extraction Well Location
- Water Policy Boundary

1000 0 1000 Feet

2007 Tc-99 Contours

- >3,790 pCi/L
- 900 - 3,790 pCi/L
- 100 - 900 pCi/L
- 25 - 100 pCi/L

Composite ^{99}Tc Contours for the RGA

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

COORDINATE SYSTEM: PGDP

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