2 Market Plaza Way, Mechanicsburg, Pennsylvania 17055

Telephone

717.795.8001

Facsimile

717.795.8280

November 4, 2002

Mr. Melvin N. Leach, Branch Chief
Fuel Cycle Licensing Branch, FCSS
c/o Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Mr. Mark Purcell
U.S. Environmental Protection Agency
Superfund Division (6SF-LP)
1445 Ross Avenue
Dallas, TX 75202-2733

Subject: **Southwest Alluvium Natural Attenuation Test, Final Report and TI Evaluation, and Request for Action**
United Nuclear Church Rock Site, Gallup, New Mexico

Dear Messrs. Leach and Purcell:

Enclosed is the above-referenced document that was requested during the meeting held in Santa Fe, New Mexico, on March 7, 2002. As recommended, the report includes a technical impracticability (TI) evaluation to support a request for a TI waiver for sulfate and total dissolved solids (TDS).

Based on the results of the test, United Nuclear Corporation (United Nuclear) believes that sufficient data have been collected to demonstrate that natural attenuation mechanisms are more beneficial than the current corrective action at controlling the quality of groundwater for all key constituents of concern. Therefore, United Nuclear requests a decision from the agencies that the Southwest Alluvium system can be shut down permanently.

If the agencies agree that the system can be shut down, the following activities will be implemented for the Southwest Alluvium corrective action system:

1. Decommission the pumping wells.

2. Continue monitoring the system on an annual basis.

3. Proceed to closure of the Southwest Alluvium remedial action system using a combination of:

   - Monitored Natural Attenuation (MNA) – for chloride, chloroform, metals and radionuclides

   - TI Waiver – for sulfate and TDS

Please contact Roy Blickwedel (General Electric Company) at (610) 992-7935 or me at (570) 925-5063 if you have any questions or need additional information.

Very truly yours,
Earth Tech, Inc.

Suzie du Pont

Suzie du Pont
Project Manager

Enclosure

cc: Roy Blickwedel, General Electric Corporation
Larry Bush, United Nuclear
Robin Brown, New Mexico Environment Department
Diana Malone, Navajo Superfund
George Padilla, Navajo Superfund
Bill von Till, Nuclear Regulatory Commission

L:\WORK\32114\PROJ\Submittals\SWA NA Test\Final Report & TI\Final SWA Rpt & TI transmittal Ltr

FINAL
REPORT AND TECHNICAL IMPRACTICABILITY EVALUATION

SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST CHURCH ROCK SITE

November 2002

Prepared for:

United Nuclear Corporation
Gallup, New Mexico

Prepared by:

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg, PA 17055

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

ANP	acid neutralization potential
Canonie	Canonie Environmental Services Corp.
Earth Tech	Earth Tech, Inc.
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
Kendall	Mann-Kendall
mg/L	milligrams per liter
NA	natural attenuation
NMED	New Mexico Environment Department
NRC	Nuclear Regulatory Commission
ROD	Record of Decision
TDS	total dissolved solids
TI	Technical Impracticability
United Nuclear	United Nuclear Corporation

1.0 INTRODUCTION

On behalf of United Nuclear Corporation (United Nuclear), Earth Tech, Inc. (Earth Tech) is providing this report, which presents:

1. Natural Attenuation Test Results
   The results of the completed natural attenuation (NA) test performed in the Southwest Alluvium at United Nuclear's Church Rock site near Gallup, New Mexico, are presented in Section 2.0. The NA test consisted of temporarily turning off the pumping wells in the Southwest Alluvium and monitoring water level and water quality monthly for a period of 18 months, from February 2001 through July 2002. The NA test was designed to demonstrate whether turning off the pump-back wells would have an adverse effect on water quality (i.e., whether there is a statistically significant difference in groundwater quality between the time before the temporary cessation of pumping and the time after the groundwater quality re-stabilized following the cessation period). United Nuclear followed the NA test procedures agreed to during the November 14, 2000, meeting in Santa Fe, New Mexico, as documented in the U.S. Environmental Protection Agency's (EPA's) e-mail letter from Greg Lyssy dated November 15, 2000 (Lyssy 2000).

2. Technical Impracticability Evaluation
   A technical impracticability (TI) evaluation for two of the monitored constituents, sulfate and total dissolved solids (TDS) is presented in Section 3.0. These two constituents exceed the site standards inside and outside the property boundary and also in the background water that has not been impacted by tailings seepage. Active remediation has not been effective in reducing concentrations because the concentrations are controlled by natural geochemical conditions. Therefore United Nuclear has proposed that closure of the Southwest Alluvium remedial action include a TI waiver for sulfate and TDS. This approach was discussed with the agencies in the meeting on March 7, 2002 (Earth Tech, 2002b). To implement the TI waiver process, the EPA recommended that a TI evaluation be included in this final NA test report. The format of the evaluation is based on Section 4.0 of the EPA's *Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration* (1993).

2.0 NATURAL ATTENUATION EVALUATION

2.1 NA TEST DATA SET

Water quality and water level data were collected from the four pumping and 10 monitoring wells listed in Table 2.1 and shown on Figure 2-1. Two data sets were used, including:

- Baseline data – samples collected quarterly between July 1995 and January 2001. Water quality data from the three pumping wells (Wells 801, 802 and 803) that are monitored as part of the Performance Monitoring Program revealed that constituent concentrations were changing in the first few years of operation, but stabilized after about July 1995. The January 2001 data provided a common end point for the baseline data and also allowed collection of a baseline sample from Well 808, which was not included in the Performance Monitoring Program and had no water quality data prior to that time.

- Test data – samples collected monthly after the pumping wells were turned off. This report presents the data collected for all 18 months of the NA test, from February 2001 through July 2002.

  Well 808 was included in the NA test, but the evaluation of the water quality is not as comprehensive as for the other wells because only one baseline sample was collected. This well was not included in the Performance Monitoring Program, and therefore no water quality data were collected prior to January 2001. A review of the Well 808 data reveals that, other than the January 2001 data, the water quality at this well is similar to that at the other pumping wells. TDS, sulfate, chloroform and manganese are the only constituents exceeding the standards.

  The January 2001 (baseline sample) from Well 808 is not considered representative of water quality in the well because of the sampling techniques used (high velocity pump causing turbulent flow and no filtration). The second quarter report (Earth Tech 2001) contains a detailed evaluation of the January data that supports this conclusion. Therefore the January data are not used in the trend analyses presented later in this report.

2.2 WATER LEVEL EVALUATION

Water levels were measured in all the wells on a monthly basis. Figure 2-2 presents the water level elevations for July 2002. As shown, water flows from northeast to southwest along the alignment of Pipeline Arroyo.

Figure 2-3A is a graph of water levels over time in the pumping and monitoring wells. This figure illustrates that the overall long-term trend of decreasing water levels as water drains from the Southwest Alluvium is continuing in wells not in the vicinity of the pumping wells. As shown, water levels in the vicinity of the pumping wells increased after the pumping wells were turned off in January 2001. Water levels in the former pumping wells are stabilizing at elevations similar to those measured in nearby monitoring wells. For example, in January 2001 the water levels in Wells 803 and 805 differed by 21 feet at 6,839.9 and 6,860.9 feet, respectively. By July 2001, the water levels in the two wells differed by only 1.3 feet. To illustrate this process, Figure 2-3B shows the water levels for only the pumping and adjacent monitoring wells. As of July 2002, water levels in both the pumping and monitoring wells have reached an asymptote and are beginning to return to the long-term pattern of groundwater decline. The stable to declining water levels in these wells indicate that the system has fully recovered from the effects of pumping.

The hydraulic effect of turning off the pumping wells is also evident in the nearest downgradient monitoring wells. As shown on Figure 2-3C, water levels began rising in Wells GW 1, GW 2, GW 3 and EPA 28 after the pumps were turned off. In contrast, the other monitoring wells, which are located either upgradient (Wells 509 D and EPA 23) or further downgradient (Wells EPA 25, 624, and 627), continued to exhibit the same trend in water levels that they had before the pumping wells were turned off. This change in water level trends at the nearest downgradient wells indicates that they were located within the hydraulic influence of the pumping wells. Now that the water levels in the pumped area have recovered, water levels throughout the system will continue to naturally decline until the artificial saturation in the alluvium drains out.

2.3 WATER QUALITY EVALUATION

Water quality data collected from January 2001 though July 2002 are presented in Table 2.2 Concentrations exceeding the site standards are shaded in the table. The water quality of the test data is similar to that of the baseline data (Appendix A), with sulfate and TDS being the primary constituents that exceed the site standards. Sulfate and TDS are the subject of a TI waiver request as discussed in Section 3.0. Figure 2-4 shows that sulfate concentrations are variable above and below the site standard both inside and outside the seepage-impacted area.

The approximate extent of seepage impacts (light blue shading) is delineated by:

- **Bicarbonate** – which is released during the neutralization of acidic tailings solutions. Bicarbonate concentrations exceed 1,000 milligrams per liter (mg/L) in seepage-impacted water as naturally occurring calcite dissolves into the tailings solution.

- **Chloride** – which is associated with the milling process, is present in higher concentrations in the seepage compared to the background water, and is a chemically non-reactive ion in solution. Chloride concentrations greater than 150 mg/L indicate seepage impacts.

The justification for using these two indicator parameters to delineate seepage impacts was made previously (Earth Tech 2000a).

Other constituent concentrations exceeding the site standards include:

- **Chloride** – Chloride concentrations continue to exceed the standard at Well 509 D. Previously chloride concentrations also exceeded the standards in Wells 632 and 801, but the recent concentrations are below the standards and concentrations in all three wells indicate a declining trend. Figure 2-5 illustrates the trend in chloride concentrations for these wells. Chloride has exceeded the standard at these wells throughout the baseline period and since the beginning of corrective action in the Southwest Alluvium. Chloride has not exceeded the standard at any other wells, other than three isolated exceedances in Well 802, since monitoring began in the Southwest Alluvium.

- **Metals** – In this final reporting period, as was the case throughout the test and prior to cessation of pumping, the only metal that exceeds its standard is manganese. Figure 2-6 shows that the exceedances occur only within the property boundary at Wells 801 and EPA 23. An improvement in water quality is evident from the fact that manganese is no longer present in concentrations exceeding the standard at Wells 509 D, 802, 803, or 808.

- **Chloroform** – Figure 2-7 shows that chloroform exceeds the standard in four wells, as previously observed; however, as discussed in the *Geochemistry Report* (Earth Tech 2000a) and at the November 2000 meeting, these exceedances are two orders of magnitude below EPA's drinking water standards (EPA 1995) and only occur on-site. Like manganese and chloride, chloroform concentrations have exceeded the standards at these wells throughout the baseline period and since the beginning of corrective action in the Southwest Alluvium.

No radionuclides exceed the site standards. The occurrence of radionuclides is illustrated using uranium concentrations as an example (Figure 2-8). The concentrations are below the site standard both inside and outside the seepage-impacted area.

2.4 STATISTICAL EVALUATION

The statistical evaluation used nonparametric trend analysis to verify whether changes in concentration, specifically increases in concentration, are occurring and whether the changes are significant. The statistical analysis consisted of an analysis of trend using linear regression supported by the statistical methods of Sen's Estimate of Slope and Mann-Kendall's (Kendall's) Test for Trend. The baseline and test data have a combination of normal, lognormal and unknown distributions, so application of Sen's Estimate and Kendall's test is appropriate.

Appendix A provides graphs of constituent concentrations over time for each well with regression lines plotted for the background and test data sets. Figures A.1 through A.14 graph the constituents that are reported in concentrations exceeding the standards (sulfate, TDS, manganese and chloroform) and the parameters that indicate seepage impacts (bicarbonate and chloride). Chloroform graphs are not included for wells where the chloroform concentrations were all nondetectable. Although none of the radionuclides exceeds the site standards in the Southwest Alluvium (Table 2.2), uranium is graphed as an example radionuclide.

The majority of the test data exhibits a trend that is similar to that evident in the baseline data. A few constituents exhibit an apparent change in trend compared to the baseline data, but most of these trends indicate an improvement in water quality (decrease in constituent concentrations). Where upward trends in the test data are evident, the concentrations of most of the constituents remain within in the range of concentrations that is observed in the baseline data.

To assess the reliability of the linear regression as an indication of water quality trends, two tests were applied to the data. First, Sen's estimate of the slope was applied to the data to determine whether the direction and magnitude of the regression line slope was a reasonable qualitative representation of the data. Sen's estimate was used because it is a nonparametric procedure that is not greatly affected by gross data errors or outliers (Gilbert 1987). Appendix B includes a description of how Sen's estimate is calculated and includes an example calculation. The results of the calculations are presented in Table B.5 along with the slope calculated for the linear regression. For the majority of the data, the slopes calculated by simple linear regression are very similar both in direction and magnitude to the slope calculated using Sen's estimate. Therefore the linear regression lines provide an acceptable representation of water quality trends.

To further verify the significance of the trends indicated by the regression lines, Kendall's test for trend was used. Kendall's test is used because the data do not need to conform to any particular distribution (Gilbert 1987). The results of these statistical tests are summarized in Table B.6 of Appendix B. For each well, the results of Kendall's test are listed for both the baseline and test data. If a statistically significant trend is identified, the median slope of the trend calculated using Sen's estimate is also listed. Comparison of Table B.6 with Figures A.1 through A.14 shows that the regression line trends are confirmed by the Kendall's and Sen's analyses where statistically significant trends are present.

A comparison of trends by constituent is presented in Table B.7. The data from the final quarter demonstrate three main features in the trends:

1. Increase in Upward Trends for Bicarbonate, Chloride and TDS
During the NA test, seepage-impacted water was not partially captured as it had been before the groundwater recovery wells were turned off. The increasing number of upward trends in the test data for the seepage indicator constituents (bicarbonate and chloride) was therefore both an expected and observed result. The figures in Appendix A show that since the extraction wells were turned off the greatest increase in upward trend has occurred at the extraction and adjacent monitoring wells (Wells 801, 802, 803 and 632) that experienced the greatest change in hydraulic conditions (e.g., water levels rising 30 feet from the levels maintained when the wells were pumping). A large-magnitude upward trend is also evident at the nearest downgradient wells (GW 1, GW 2 and GW 3), which, as discussed in Section 2.2, were located within the hydraulic influence of the pumping wells. Bicarbonate and chloride concentrations in these wells have returned to their 1995 levels.

   Table B.7 and the graphs in Appendix A show that the upward trend in chloride concentrations has stable or declining over the recent quarter of the test. This reversal in the trend is evident primarily in the extraction and nearby monitoring wells and the three downgradient wells (GW 1, GW 2 and GW 3) and corresponds to the stabilization of water levels since the pumps were turned off. The reversal in the chloride trend may indicate that the seepage front that was moving in response to shutting off the pumps has begun to stabilize.

TDS exhibits an increased upward trend in response to the increasing bicarbonate and chloride concentrations.

2. No Change in Trend for Sulfate
Eleven of 13 wells have had no statistically significant trend during the NA test. Sulfate is discussed further in the TI Evaluation (Section 3.0).

3. No Change in the Trends for Manganese, Chloroform or Uranium
The patterns of trends for manganese, chloroform and uranium in the test data are similar to those in the baseline data and have remained unchanged throughout the test period. The lack of change in trends for these constituents confirms that natural attenuation mechanisms rather than pumping from the extraction wells are controlling the concentrations of the remaining constituents of concern. This is especially true since the trends for chloride and bicarbonate confirm that seepage-impacted water is migrating through the formerly pumped area. A corresponding change in the trends for the constituents of concern (i.e., increased number of upward trends) would be expected if pumping had been the mechanism controlling concentrations.

2.5 CONCLUSIONS

The results of the NA test confirm that natural attenuation is at least as effective as active remediation in attenuating most of the site constituents and reducing their concentrations to below the site standards within the property boundary. With the exception of the five constituents that exceed the site standards (chloride, sulfate, TDS, manganese and chloroform), the remaining constituent concentrations remained below the site standards throughout the test. Also, although the indicator parameters clearly showed that seepage continued to migrate, only sulfate and TDS concentrations exceeded the site standards off the property, and these two constituent concentrations are shown to be independent of seepage impacts as discussed in the TI evaluation (Section 3.0). The other three constituents exceeding site standards showed either a recent decreasing concentration trend (chloride) or no change in concentration trends (manganese and chloroform) during the test and continue to be present in concentrations exceeding the site standards only within the property boundary.

Based on the data collected through 11 years of active remediation and these NA test results, United Nuclear proposes that closure for the Southwest Alluvium remedial action proceed using monitored natural attenuation for chloride, manganese and chloroform.

3.0 TECHNICAL IMPRACTICABILITY EVALUATION

3.1 SPECIFIC ARARS OR MEDIA CLEANUP STANDARDS

A TI waiver is requested for sulfate and TDS because, as demonstrated in the various reports and presentations provided over the years, the concentrations of these constituents are controlled by natural geochemical mechanisms. As a result, continued active remediation has not and will not have the effect of reducing concentrations to or maintaining them below the site standards. Currently the standards are exceeded in both the unimpacted background water as well as in the seepage-impacted water.

The current standards for sulfate and TDS are 2,125 mg/L and 4,800 mg/L, respectively. The original standards for these constituents (2,160 mg/L for sulfate and 3,170 mg/L for TDS) were developed in the Feasibility Study (FS) (EPA 1988a; page 3-16; Table 3-5) and used in the Record of Decision (ROD) (EPA 1988b; page 10, Table 2). However, at the request of United Nuclear, the Nuclear Regulatory Commission (NRC) reevaluated background water quality at the site and proposed new background concentrations in its 1996 report (NRC 1996; page 17, Table 3). The NRC recommended that different remediation standards be set for sulfate and TDS, but also recommended "that EPA consider dropping the standards for these constituents ... because of the difficulty of establishing appropriate standards given the physical and geochemical factors that control the concentrations" (NRC 1996; page 17). The revised background levels were agreed to as revised remediation standards as documented in the letter dated January 6, 1998, from the New Mexico Environment Department (NMED) to the EPA (NMED 1998).

TDS is included in the TI evaluation with sulfate because it also exceeds the standards outside the property boundary. TDS concentrations are made up primarily of sulfate, which contributes more than 50 percent of the TDS (Earth Tech 2000a; Section 3.2, page 3-3 and Figure 19). Figure 3-1 is a copy of Figure 19 and is included herein for reference. Because sulfate contributes more to TDS than all other ions combined, changes in TDS concentrations and concentration trends will depend primarily on the concentrations of sulfate in the water. This TI evaluation is focused primarily on sulfate rather than on TDS because sulfate concentrations are the controlling factor in determining whether TDS concentrations exceed the standard.

3.2 SPATIAL EXTENT OF TI DECISION

The extent of the area for which the TI determination is sought, shown as the TI zone on Figure 3-2, is as follows:

- **Vertical Extent** – The vertical extent of the TI zone is the entire saturated thickness of the alluvium from the water table to the base of the alluvial formation. The extent of the saturated thickness is expected to reduce over time as the water originating from mine water discharge continues to drain out.

- **Horizontal Extent** – The horizontal extent of the TI zone is the area of seepage-impacted water extending from approximately 1,280 feet northeast of Well EPA 23 downgradient to the property boundary. In the cross-gradient direction, the TI zone covers the full extent of the saturated alluvium within this area. This area was selected for the TI zone in accordance with the guidance which states that "... [the 'TI zone'] generally will include all portions of the contaminated groundwater that do not meet the required cleanup levels" (EPA 1993, Section 4.4.2, page 12). Isolated sulfate concentrations within the TI zone exceed both the site standards and the concentrations reported in unimpacted background water. Outside the TI zone, sulfate and TDS are within the range of the concentrations reported for the unimpacted background water (see Sections 3.3.2 and 3.3.3). Also, the TI zone is comparable to the "containment area" described in the guidance as the area where further contaminant migration is controlled. In this case, migration is controlled by natural geochemical processes (see Sections 3.3.3 and 3.4.3).

3.3 CONCEPTUAL MODEL

3.3.1 Hydrogeology

The hydrogeological portion of the conceptual model for the Southwest Alluvium has been reported previously (Canonie Environmental Services Corp. [Canonie] 1987; Section 3.0, pages 13 to 25) and (Canonie 1988; Section 1.1, pages 1 to 2 and Figures 1-1 and 1-2) and is summarized herein. Figure 3-3 shows the development of the alluvial saturation. The picture at the top is the plan view layout of the site with the mine to the north (source of mine water discharge) and the Southwest Alluvium seepage-impacted area shown to the south in light blue. The red line (labeled A-A′) extending from southwest to northeast on the plan view shows the location of the cross sections presented in the lower two details. Detail A illustrates the initial conditions prior to mine water discharge when the alluvium was unsaturated except for some minor base flow from natural recharge. Beginning in 1968, water from the mines to the north was discharged to Pipeline Arroyo where it flowed toward the southwest and percolated into and began to saturate the underlying alluvium. Detail B illustrates this process.

In October 1989, when the remedial action system wells were installed, the saturated thickness in this portion of the alluvium ranged from 78 feet at Well 509D to 52 feet at Well 802 to 50 feet at Well GW 2 at the southern property boundary, and 37 feet at Well 624. The hydraulic parameters for the alluvial system are summarized below:

Summary of Hydraulic Parameters in the Southwest Alluvium

Parameter	Value	Source of data
Hydraulic Conductivity (K)	Range: 8.7×10^{-4} to 2.0×10^{-2} cm/s Geometric Mean: 3.69×10^{-3} cm/s	Aquifer test data (Canonie 1987, Table 2.1, Wells EPA 28, 625 and EPA 23), (Canonie 1989b, Section 2.2.2, page 26 and Appendix D).
Effective Porosity (n_e)	27% to 35%	Laboratory-measured total porosity of alluvial sediments = 39%. Assume effective porosity is 10 to 30 percent lower than total porosity (Canonie 1989a, Section 4.1.3, page 41, 2nd para).
Gradient (i)	0.009 ft/ft	Based on water levels reported for Wells 805, 624 and 627 in October 1989 and July 2002.
Seepage velocity ($V=Ki/n_e$)	98 ft/yr to 127 ft/yr	Calculated using the geometric mean hydraulic conductivity and range of effective porosity listed herein.

The mine water reacted with the previously dry alluvial material and dissolved naturally occurring evaporite minerals. This process resulted in the postmining-pretailings water quality that exceeds New Mexico water quality standards for sulfate and TDS but, nevertheless, is the natural background water for the Southwest Alluvium (EPA 1988a; Chapter 2.0, pages 2 to 7, Background Levels of Contaminants, 2nd paragraph, 1st sentence; EPA 1988b; Section 3.2, page 8, 2nd paragraph, 1st sentence).

3.3.2 Formation and Extent of Seepage-Impacted Groundwater

The understanding of seepage impacts and the geochemical portion of the conceptual model have also been reported previously (Canonie 1988, Section 2.2, pages 11 to 18, Tables 2.4 to 2.8) and (Earth Tech 2000a; Section 2.1, pages 2-1 and 2-2, Table 2, and Figures 2 and 7) and are summarized herein. Acidic tailings seepage percolated into the alluvium from the unlined tailings impoundments. Figure 3-4 illustrates the evolution of the seepage in the alluvium. Detail A shows the neutralization capacity with depth in the unsaturated part of the alluvium (Canonie 1988; Section 2.2, pages 11 to 18, Tables 2.4 to 2.8). The high acid neutralization potential (ANP) of the alluvial materials neutralized the acidic seepage at a distance of less than 10 feet beneath the tailings impoundment. As a result, the majority of the chemical constituents, particularly metals and radionuclides, were attenuated before the seepage reached the saturated zone.

The extent of seepage impacts over time is shown on Detail B of Figure 3-4 and is based on the concentrations of chloride and bicarbonate in the monitoring wells over time (as explained in Section 2.1). The pink shading shows that the seepage had migrated past the property boundary by 1982, five years after tailings discharge began and seven years prior to the start of active remediation. This extent was determined based on bicarbonate and chloride concentrations over time in Wells GW 1, GW 2 and GW 3. Graphs of these constituents in Wells GW 1 and GW 3 are shown on Figure 3-5. By 1989, when the active remediation began (orange shading), the seepage was well past the property boundary and by 1996 had migrated to Well 624. Figure 3-6 presents the chloride and bicarbonate concentrations in Wells 624 and EPA 25 and shows that seepage impacts had migrated to Well 624 but never fully extended laterally to Well EPA 25.

The current extent of seepage is shown in blue on Detail B of Figure 3-4. Based on the chloride and bicarbonate data from Well 624, the seepage is migrating at a rate of approximately 77 feet per year. At this rate, the seepage was projected to extend approximately 520 feet beyond Well 624 (see note 2 on Figure 2-4) as of July 2002. Although seepage impacts were already beyond the property boundary by 1982, the only constituents that have exceeded the site standards outside the property boundary are sulfate and TDS, as shown on Figure 3-4, Detail B, Figure 2-4 and listed in Table 2.2.

Well EPA 28 is not considered a seepage-impacted well as it was in the past. This change was made for two reasons. First, bicarbonate and chloride concentrations in this well have consistently been well below the seepage-impacted indicator concentrations of 1,000 mg/L bicarbonate and 150 mg/L chloride. Second, as discussed in Section 3.3.3 below, the other ion concentrations are also characteristic of unimpacted background water. Therefore Well EPA 28 is grouped with the other unimpacted Wells 627 and EPA 25.

3.3.3 Sulfate Geochemistry

Sulfate in the Southwest Alluvium groundwater comes from two sources:

1. Natural dissolution of sulfate-containing minerals in the alluvium, principally gypsum, due to discharge and infiltration of mine water and infiltration of rain and snow melt.
2. Sulfuric acid used in the milling process.

Sulfate concentrations are in equilibrium with gypsum everywhere in the Southwest Alluvium as well as the other two zones of groundwater corrective action (Southwest Alluvium – Earth Tech 2000a, Section 3.1, page 3-1 to 3-2, Figure 16, Appendix A) (Zone 1 - Earth Tech 2000b, Section 3.3, page 3-4 to 3-6, Figure 16, Appendix B) (Zone 3 - Earth Tech 2002c, Slide 37). The results of MINTEQA2 (Allison and others 1991) simulations are illustrated on Figure 3-7 by plotting the modeled gypsum saturation indices versus sulfate concentrations (July 2002 data) for groundwater at each well. The results of modeling using the median of data collected in 1998 and 1999, when the extraction wells were still pumping, is included for comparison. Details of the modeling, including input parameters, model runs and results, are provided in Appendix C.

The saturation indices all plot close to the solubility limit for gypsum whether the well is located inside or outside the extent of seepage-impacted groundwater. Equilibrium with gypsum throughout the alluvium has resulted from gypsum precipitation from tailings-derived water and dissolution of natural gypsum into groundwater as it is recharged. Without precipitation of gypsum, the saturation indices for seepage-impacted water would be well above gypsum equilibrium, and without dissolution of naturally occurring gypsum in the alluvial sediments, the saturation indices for background water would be well below gypsum equilibrium. Thus, sulfate concentrations are naturally regulated by the reaction:

$$CaSO_4 \bullet 2H_2O \rightleftharpoons Ca^{2+} + SO_4^{2-} + 2H_2O \qquad \text{(Reaction 1)}$$

Where:

$CaSO_4 \bullet 2H_2O$ = gypsum
Ca^{2+} = calcium
SO_4^{2-} = sulfate
H_2O = water

Calcium, which is also required for gypsum precipitation, derives in part from calcite dissolution. The dissolution of calcite, which results in neutralization of acidic tailings seepage, occurs according to the reaction:

$$CaCO_3 + H^+ \rightleftharpoons Ca^{2+} + HCO_3^- \qquad \text{(Reaction 2)}$$

where:

$CaCO_3$ = calcite
Ca^{2+} = calcium
HCO_3^- = bicarbonate
H^+ = proton (acidity)

Figure 3-8 presents the results of the MINTEQA2 simulations (Appendix C), which demonstrate that calcite saturation indices for all the wells, both background and seepage-impacted, plot close to the solubility limit for calcite. This indicates that the Southwest Alluvium water is also in equilibrium with calcite.

Figure 3-9 illustrates the long-term stability of calcium and bicarbonate concentrations at Wells 627 and EPA 28, which are examples of background wells that have not been impacted by tailings seepage. Well 624 had about the same concentrations of calcium and bicarbonate until

1995 when the bicarbonate concentrations rose rapidly. Reaction 2 was driven to the right in response to the introduction of the tailings seepage, which had a lower pH (higher proton activity) than the native water. Calcium, however, did not increase because of the combination of Reactions 1 and 2. The combined reaction after making the appropriate algebraic operations is:

$$CaCO_3 + H^+ + SO_4^{2-} + 2H_2O \rightleftharpoons CaSO_4 \bullet 2H_2O + HCO_3^- \quad \text{(Reaction 3)}$$

(Calcite + acidity + sulfate + water) (Gypsum + bicarbonate)

The presence of two calcium-bearing solid phases (gypsum and calcite - Figures 3-7 and 3-8, respectively) fixes the calcium in groundwater at a concentration in equilibrium with both minerals. Calcium concentrations in Wells 627, EPA 28, and 624 have been essentially the same through time; and in general, calcium concentrations do not vary appreciably anywhere in the groundwater flow system. For example, the median calcium concentration in the seepage-impacted water is 720 mg/L and in the unimpacted water is 595 mg/L for the data collected during the NA test (Table 2.2). In contrast, the median bicarbonate concentration has a much greater range, varying from 649 mg/L in the unimpacted water to 1,580 mg/L in the seepage-impacted water.

Reaction 3 sums up the evolution of seepage-impacted water chemistry in the Southwest Alluvium. In the tailings source where the low pH, high sulfate water originated, Reaction 3 proceeds spontaneously to the right because of the excess of protons. The result is dissolution of calcite, decreasing sulfate concentrations as gypsum precipitates and increasing bicarbonate concentration relative to the fixed aqueous component, calcium. This can be seen in plots of the ionic ratios between bicarbonate-to-calcium and sulfate-to-calcium for groundwater (Figures 3-10 and 3-11, respectively). Where acidity (protons) has been added, such as at Wells GW 1, GW 2, GW 3 and 624 (after 1995), bicarbonate-to-calcium ratios are relatively greater and sulfate-to-calcium ratios are relatively lower than for the background wells, such as Wells 627, EPA 28, and 624 (before 1995).

Decreases in sulfate concentrations due to gypsum precipitation were particularly dramatic in the early stages of seepage neutralization. Typical mill effluent had a sulfate concentration of about 57,000 mg/L (Science Applications, Inc. 1980; Table 2-3). As this water seeped through the tailings, sulfate concentrations decreased by over 70 percent to about 15,000 mg/L, as indicated by water sampled in Monitoring Well 634 and Lysimeter GC-6 located within the tailings (Canonie 1988; Tables 2.9 and 2.6). This sulfate concentration was further decreased as water moved through the underlying alluvium and became fully equilibrated with gypsum. As a result, the concentrations for sulfate and calcium are similar for both types of water; however, bicarbonate concentrations are elevated for seepage-impacted water. These relationships are illustrated by the median concentrations of sulfate, calcium and bicarbonate in the NA test data listed below:

Constituent	Seepage-Impacted Water Median Concentration	Unimpacted Water Median Concentration
Sulfate	2,480 mg/L	2,480 mg/L
Calcium	720 mg/L	595 mg/L
Bicarbonate	1,580 mg/L	649 mg/L

In summary, two sources contribute sulfate to seepage-impacted water:

1. Seepage, and
2. Background water.

However, these sources to the seepage-impacted water cannot be separated to define individual contributions. This is because natural attenuation removes sulfate from impacted water through gypsum precipitation and sulfate is added to the background water from the natural formation.

3.3.4 TDS in the Conceptual Model

TDS was not specifically discussed as part of the conceptual model because, as mentioned previously, sulfate is the primary constituent comprising TDS (see Figure 3-1) and therefore is the controlling factor determining whether TDS concentrations exceed the standard (Earth Tech 2000a; Section 3.2, page 3-3, Figure 19; and NRC 1996; page 12, 3rd paragraph, Figure 15). TDS concentrations exceed the standard both on and off-site at every well with sulfate concentrations exceeding the standard, including the unimpacted wells. The only exceptions are Well 509 D where TDS concentrations exceed the standard but sulfate does not, and EPA 23 where sulfate concentrations exceed the standard but TDS does not.

3.3.5 Potential Receptors

Currently there are no alluvial wells used for drinking water supply within the projected extent of the seepage-impacted water outside the property boundary (approximately 1,570 feet; see Figure 2-4, Note 2). This area is sparsely populated and, according to Figure 9 in EPA's *Five-Year Review Report* (EPA 1998), the closest downgradient alluvial well is located approximately 0.76 mile, or 4,000 feet, downgradient from the property boundary. The EPA figure has been reproduced as Figure 3-12 in this report for ease of reference. At the current projected rate of migration for the seepage-impacted water (approximately 77 feet per year), the impacted water would travel approximately 50 years before reaching this location.

The effect of the seepage-impacted water on potential receptors would be no different than that from the unimpacted water other than increased bicarbonate. Sulfate and TDS concentrations in the seepage-impacted water outside the property boundary are similar to and may be lower than background concentrations. Also, no constituents that pose a health risk because of chronic toxicity or cancer potential are present in concentrations exceeding the standards at or beyond the property boundary.

3.4 EVALUATION OF RESTORATION POTENTIAL

3.4.1 Source Control Measures

The source of the seepage-impacted water in the Southwest Alluvium is the tailings impoundment, shown on Figure 2-1, where waste from the uranium ore milling process was discharged. The South Cell of the tailings impoundment, the primary source of seepage to the Southwest Alluvium, was used for a period of only two years, from May 1977 through July 1979. After that time tailings were discharged only to the Central and North Cells. Beginning in 1980 the tailings were neutralized, thereby providing remediation of the source by chemical means. Final source control measures were implemented beginning in 1989 in accordance with the *Reclamation Plan* (Canonie 1991a; Section 1.9.2, pages 12 to 13, Sections 4.0 and 5.0) and the requirements of the NRC. These measures included:

- Grading the tailings to achieve positive drainage off the pile and minimize infiltration
- Placement of the interim compacted soil cover (completed in 1991)
- Placement of the final reclamation cover excluding the area covered by the evaporation ponds (completed in 1996)

The source remediation activities are documented in the as-built reports prepared at the end of each construction season. Also, NRC performed regular inspections to ensure that the reclamation activities were completed according to the approved plan.

A primary goal for the tailings reclamation design was to minimize infiltration into and seepage from the tailings. As noted in EPA's *Five-Year Review Report* this goal has been achieved:

> "Results of these calculations suggest that transient drainage is nearly complete, with present seepage rates from the tailings of 1×10^{-7} cm/s or less." (EPA 1998, Section 3.3, page 20, 2nd paragraph, 1st sentence).

> "NRC requires 90 percent compaction before final covers can be put on the tailings pile. To this effect United Nuclear was required to put in nine settlement markers to measure compaction in the covered tailings pile. According to a[n] inspection report by NRC in January 1995, settlement versus log time plots appear to indicate that 90 percent compaction has already been reached after 130 days of the placement of the interim cover. In addition, prior to placement of the interim cover, the moisture content of the tailings were very low. Thus it would be reasonable to estimate the leaching would not be significant, since the tailings were already dry at the time of placement of the cover, and the tailings under cover have been compacted in excess of 90%, and since the final cover has a permeability of 10^{-7} cm/s." (EPA 1998, Section 3.3, pages 20 to 21, 3rd paragraph).

3.4.2 Remedial Action Performance Analysis

Active remediation of the Southwest Alluvium was implemented concurrently with the source remediation activities. The remedial action system consists of four extraction wells (Wells 801, 802, 803 and 808), which are located, as required by the NRC and EPA, upgradient from the property boundary and downgradient from the source area (Figure 2-1) (United Nuclear 1989; Section 2.2.4, page 18). The purpose of the wells was to create a hydraulic barrier to groundwater flow while the source was being remediated (EPA 1988b; page 3, bullet No. 4). As noted in Section 3.3 above, seepage had already migrated past the property boundary by 1982, seven years before the active remediation system was installed. Therefore the wells served to intercept only the later stages of tailings seepage.

The remedial action system operated for 12 years, from November 1989 through January 2001, when the system was turned off to implement the NA test. The only modifications to the system during its operation were:

- Well 808 was added to the system in 1991 at the request of the NRC to enhance the performance of wells in creating a hydraulic barrier (Canonie 1991b; Section 1.2.3, page 7, 2nd paragraph and Section 4.2, page 62, 1st paragraph).
- Well 801 was decommissioned in 1999 because it met the decommissioning criteria (pumping rate less than 1.0 gpm [Earth Tech 1999; Extraction Systems – Southwest Alluvium, page 2, 2nd paragraph; and EPA 1998, Section 5.2, 3rd bullet]).

As required in the Administrative Order (EPA 1989) and the NRC Source Materials License SUA 1475, an annual evaluation of performance was submitted at the end of each year of operation. As documented in the Annual Reports (Canonie 1989b through 1995; Smith Technology Corporation 1995 and 1996; Rust Environment and Infrastructure 1997; Earth Tech 1998 through 2002a) and the water level recovery documented in Section 2.0 of this report, the system was successful in capturing seepage, and removing contaminant mass. However, 99 percent of the total constituent mass removed was composed of sulfate and TDS and no change in constituent concentrations was evident (see Annual Reports for years 1991 through 2000, mass extraction calculations and discussions).

In September 1998 EPA issued its *Five-Year Review Report,* which recognized that the remedial action system had met As Low As Reasonably Achievable (ALARA) goals. As stated in Section 5.2 of the *Five-Year Review Report*:

> "The ground water recovery system in the Southwest Alluvium is providing an adequate barrier to contaminant migration. However, little progress has been made toward reaching cleanup levels in the EPA ROD/NRC license for NO_3, SO_4, and TDS. The measured concentrations of these constituents have shown little change over time. It is therefore recommended that United Nuclear apply for alternate concentration levels for the Southwest Alluvium. However, if United Nuclear determines that a Technical Impracticability Waiver (TI Waiver) or ALARA demonstration is more appropriate, then United Nuclear may pursue these options as well."

and in Section 4.2 of the *Five-Year Review Report*:

> "It appears that the Southwest Alluvium is approaching one of the scenarios stated in the ROD. Specifically, that clean-up levels cannot be reached in a reasonable timeframe."

United Nuclear continued to operate the wells until January 2001 when they were shut off for the NA test. The test demonstrated that the tailings seepage is naturally attenuated by the alluvium and that active remediation is no more effective than the natural system in controlling migration of constituents of concern.

As discussed in Section 2.0, turning off the wells allowed additional seepage to migrate as indicated by the increasing trend in the indicator parameters (bicarbonate and chloride). This increase is most evident at the extraction and nearby downgradient monitoring wells indicating that the remedial action system was capturing some seepage-impacted water, but with no real benefit. Overall, sulfate concentrations actually exhibited a decreasing trend during the NA test. The other regulated constituents exhibited no change in trend.

The pattern observed in the data from the extraction and nearby downgradient monitoring wells corresponds with the pattern in the data from the wells further downgradient (Wells GW 1, GW 2, GW 3 and 624) where the seepage had migrated before the remedial action was implemented. Chloride and bicarbonate increased, sulfate concentrations fluctuated, and metals, radionuclides and chloroform were either not detected or were at concentrations below the site standards. These patterns in constituent concentrations occurred before, during and after the remedial action wells were operated. The fact that water quality remained unchanged in the downgradient seepage-impacted area confirms that the natural system rather than the active remediation system has been the primary mechanism controlling the effects of seepage impacts.

3.4.3 Restoration Timeframe Analysis

The restoration timeframe for sulfate (and correspondingly TDS) concentrations to meet the site standards is controlled by the geochemical mechanisms discussed above. In its *Five-Year Review Report*, the EPA recognized that sulfate and TDS concentrations in the unimpacted background water exceed the site standards and that the concentrations will not change substantially in response to remediation efforts. Therefore restoration of the groundwater to meet the standards is clearly beyond the realm of active remediation.

However, if restoration timeframes are evaluated in terms of natural attenuation, it is clear that restoration occurred rapidly. As noted in Section 3.3, the tailings liquid typically had sulfate concentrations of about 57,000 mg/L. Concentrations as high as 144,000 mg/L were reported in the North Cell. As illustrated on Figure 3-13, neutralization within the tailings impoundment reduced concentrations by 73 percent to 15,200 mg/L (Lysimeter G-6 and Well 634 in the South Cell [Canonie 1988; Tables 2.6 and 2.9]).

By the time seepage contacted the Southwest Alluvium groundwater and migrated downgradient to Well 801, the neutralization process in the alluvial material and groundwater had reduced concentrations another 19 percent to about 4,600 mg/L (value reported for Well 801 in October 1989 prior to turning on the remedial action system). The data from Well 801 was used for this comparison because this well has consistently had the highest sulfate concentrations in the seepage-impacted area. An additional 5 percent decrease in the original sulfate concentrations occurs between Well 801 and the property boundary as represented by Well GW 1 (value reported for Well GW 1 in October 1989 prior to turning on the remedial action system). In total, the natural geochemical processes reduced the sulfate concentrations by as much as 97 percent by the time the seepage-impacted water reached the property boundary.

Figure 3-14 shows that a similar pattern is evident for TDS. TDS concentrations in typical tailings liquid were about 67,000 mg/L. Geochemical processes within the tailings material reduced these concentrations by 69 percent to about 11,100 mg/L (Canonie 1988; Tables 2.6 and 2.9). An additional reduction of about 17 percent resulted in a TDS concentration of about 9,200 mg/L in Well 801 (value reported in October 1989 prior to turning on the remedial action system). TDS concentrations at the property boundary (Well GW 1, October 1989 prior to turning on the remedial action system) were reduced another 6 percent to 5,400 mg/L. Total reduction of TDS concentrations by the time the seepage-impacted water reached the property boundary was about 92 percent.

The reduction in chloride concentrations was also evaluated to verify the contribution of chemical attenuation in reducing sulfate and TDS concentrations. Chloride is a non-reactive, conservative species that typically migrates coincident with groundwater. Reductions in chloride concentrations do occur but typically they are much smaller than decreases for more reactive constituents and result primarily from physical processes such as dilution and dispersion. The magnitude of the chloride concentration decrease can be applied to the other constituents (e.g., sulfate and TDS) to estimate the portion of concentration decrease that is attributable to physical processes and that portion attributable to chemical attenuation processes.

Chloride concentrations in the tailings were reported at 550 mg/L (Science Applications, Inc. 1980; Table 2-3) while chloride concentrations in Wells 801 and GW 1 in October 1989 were reported to be 246 mg/L and 236 mg/L, respectively. Therefore chloride concentrations reduced by 2.2 to 2.3 times between the tailings and the downgradient area prior to turning on the remedial action system wells. Applying this concentration reduction to sulfate, the concentration of sulfate at Wells 801 and GW 1 would be predicted to be 25,909 mg/L and 24,783 mg/L, respectively, if only the physical processes were reducing the constituent concentrations. However, these concentrations are 6 to 13 times greater than the concentrations that have been reported at these wells over time. Clearly, chemical attenuation processes are successfully reducing sulfate (and correspondingly TDS) concentrations to background levels before the seepage-impacted water migrates to the property boundary.

This analysis shows that in terms of the natural processes, the primary restoration was completed within the tailings and unsaturated alluvium before the seepage contacted the groundwater. More importantly, this restoration was completed with no expenditure of energy and without generation, or corresponding disposal, of waste materials. Mechanical treatment of water with the levels of sulfate and TDS reported in the tailings would require large amounts of energy and generate large amounts of waste solids that would require disposal. Essentially the restoration is already complete, and any further reductions in sulfate concentration will be determined by the chemical equilibrium within the saturated Southwest Alluvium.

3.4.4 Other Applicable Technologies

A detailed review of remedial options was documented in the FS (EPA 1988a). The FS selected groundwater extraction as the remedy of choice. Other technologies were considered less effective in reducing constituent concentrations and for protection of human health and the environment. However, as demonstrated by the results of the NA test and the remedial action to date, natural processes are the most efficient, cost effective, and protective technology available. The natural processes reduced source sulfate and TDS concentrations by at least 90 percent within a short distance from the source area. The natural system also reduced sulfate concentrations to near and below background levels inside and outside the property boundary before active remediation was implemented and will continue to do so as long as the alluvium remains saturated. Currently, all of the off-site wells have sulfate concentrations less than 3,000 mg/L and TDS concentrations less than 5,500 mg/L.

The alternatives evaluated in the FS included the following:

1. **No action** – No remedial action would be implemented.

2. **Limited Action** – No action plus use of institutional controls to limit access to seepage-impacted water.

3 **Containment and Surface Discharge** – Containment using a series of wells to create a hydraulic barrier at the downgradient edge of contamination, treating the water and then discharging the treated water into the Pipeline Arroyo downgradient of the containment wells.

4 **Containment, Selective Extraction, and Surface Discharge** – Same as Alternative 3 with the addition of wells within the seepage-impacted area with the highest constituent concentrations.

5 **Containment, Selective Extraction, High Flow-Rate Reinjection, and Surface Discharge** – Same as Alternative 4 with the addition of reinjection wells located within the seepage-impacted area to flush the contaminated area.

In the ROD (EPA 1988b; page 3, bullet No. 4), the EPA selected Alternative 3 with the modification that the extracted water would be disposed by evaporation. EPA's assessment eliminated Alternatives 1 and 2 as not being protective of human health because the predicted time frame for cleanup was too long. Alternatives 4 and 5 were eliminated because the costs for these systems were substantially greater than for Alternative 3, but the effectiveness (i.e., reducing constituent concentrations in a reasonable time frame) was not improved.

Two additional in-situ treatment technologies could be considered. A permeable reactive barrier could be installed across the alluvial valley or a substrate such as Hydrogen Release Compound® (HRC®) could be injected into the alluvium. The purpose of these technologies would be to decrease sulfate concentrations by creating locally reducing conditions. It is questionable whether either of these technologies would function, given the hydrologic and geochemical conditions. In addition, the empirical data show that the alluvial system is already attenuating sulfate as indicated by the fact that sulfate concentrations are at or below background concentrations before the impacted water exits the property boundary. Therefore adding another system would simply add unnecessary cost associated with installation, operation and maintenance with dubious results.

3.5 COST ESTIMATE

The cost estimate for this TI evaluation focuses on continued operation of the existing remedy. Alternative remedies were considered impracticable given that natural processes have been and will continue to be as effective in reducing the sulfate concentrations to background levels. The cost of operating the existing system is estimated in Table 3.1. If the remedial action system is decommissioned and remedial action converts to solely monitored natural attenuation, costs are only for quarterly sampling. These costs are also estimated in Table 3.1.

The cost of continuing active remediation should be considered in terms of the effectiveness of the system in reducing sulfate and TDS concentrations below the standards. Using this approach, the costs for active remediation are unreasonably high considering that there is no benefit gained from active remediation. Gypsum precipitation in the tailings and alluvial system rather than the active remedial system has reduced the concentrations of sulfate and TDS to natural levels both inside and outside the property boundary. This process has been ongoing since 1977 when tailings were first discharged, as is evident from the constituent concentrations in the downgradient wells.

4.0 SUMMARY AND RECOMMENDATIONS

The results of the natural attenuation test demonstrate that turning off the extraction wells does not have an adverse effect on water quality. The results also demonstrate that the natural system is as effective as, or even more effective than, pumping for controlling migration of constituents of concern.

The TI evaluation shows that natural attenuation reduces sulfate and TDS concentrations to unimpacted background levels. Physical and geochemical processes have been reducing these concentrations since tailings discharge began, as is evident from sulfate concentrations equivalent to the unimpacted background concentrations measured in wells located at the property boundary prior to turning on the remedial action system wells. Although the remediation system did remove sulfate and TDS mass, the concentrations remained similar to those previously achieved by the natural system.

Whether the sulfate and TDS concentrations reduce further to the site standard is dependent on natural geochemical processes, and not at all on continuing the current pumping/evaporation corrective action program. Also, under the federal drinking water standards, sulfate and TDS are listed under the secondary drinking water standards, which control contaminants in drinking water that primarily affect aesthetic qualities relating to public acceptance of drinking water. Unlike constituents such as metals, radionuclides, or some organic compounds, sulfate and TDS are not carcinogens and do not have an immediate adverse health effect. The secondary standards are not federally enforceable but are intended as guidelines. Therefore a TI waiver is requested for sulfate and TDS.

Based on the results of the NA test and the TI evaluation, the following recommendations are made for the Southwest Alluvium corrective action system:

1. Decommission the pumping wells.
2. Continue to perform monitoring on an annual basis because the water quality is stable.

3. Proceed to closure of the Southwest Alluvium remedial action system using a combination of:

   - **Monitored Natural Attenuation** – for chloride, chloroform, metals, and radionuclides

   - **Technical Impracticability Waiver** – for sulfate and TDS for the TI zone shown on Figure 3-2

5.0 REFERENCES

Allison, J.D., Brown, D. S., and Novo-Gradac, Kevin J. 1991. *MINTEQA2/PRODEFA2. A Geochemical Assessment Model for Environmental Systems: Version 3.0 User's Manual.* Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Athens, Georgia.

Canonie Environmental Services Corp. 1987. *Reclamation Engineering Services, Geohydrologic Report, Church Rock Site, Gallup, New Mexico.* May.

______. 1988. *Evolution of Ground Water Chemistry, Church Rock Site, Gallup, New Mexico.* July.

______. 1989a. *Remedial Design Report, Church Rock Site, Gallup, New Mexico.* April.

______. 1989b. *Ground Water Corrective Action, Annual Review - 1989, Church Rock Site, Gallup, New Mexico.* December.

______. 1990. *Ground Water Corrective Action, Annual Review - 1990, Church Rock Site, Gallup, New Mexico.* December.

______. 1991a. *Tailings Reclamation Plan as Approved by NRC March 1, 1991, License No. SUA-1475, Church Rock Site, Gallup, New Mexico.* August.

______. 1991b. *Ground Water Corrective Action, Annual Review - 1991, Church Rock Site, Gallup, New Mexico.* December.

______. 1992. *Ground Water Corrective Action, Annual Review - 1992, Church Rock Site, Gallup, New Mexico.* December.

______. 1993. *Ground Water Corrective Action, Annual Review - 1993, Church Rock Site, Gallup, New Mexico.* December.

______. 1995. *EPA Remedial Action and NRC Ground Water Corrective Action, Five-Year Review (1989-1994).* January.

Earth Tech, Inc. 1998. *Ground Water Corrective Action, Annual Review – 1998, Church Rock Site, Gallup, New Mexico.* December.

______. 1999. *Ground Water Corrective Action, Annual Review – 1999, Church Rock Site, Gallup, New Mexico.* December.

______. 2000a. *Southwest Alluvium Groundwater Geochemistry Report, Church Rock Site, Gallup, New Mexico.* Prepared for UNC Mining and Milling. June.

______. 2000b. *Zone 1 Groundwater Geochemistry Report, Church Rock Site, Gallup, New Mexico, Volume 1 of 2, Text, Tables and Figures.* Prepared for UNC Mining and Milling. May.

______. 2000c. *Ground Water Corrective Action, Annual Review – 2000, Church Rock Site, Gallup, New Mexico*. December.

______. 2001. *Second Quarter Report – Southwest Alluvium Natural Attenuation Test, Church Rock Site.* Prepared for United Nuclear Corporation. October.

______. 2002a. *Ground Water Corrective Action, Annual Review – 2001, Church Rock Site, Gallup, New Mexico.* Prepared for United Nuclear Corporation. January.

______. 2002b. *Fourth Quarter Report – Southwest Alluvium Natural Attenuation Test, Church Rock Site*. Prepared for United Nuclear Corporation. February.

______. 2002c. *Presentation – Status Update for Southwest Alluvium, Zone 1 and Zone 3 Remedial Action.* Presented to EPA, NRC, NMED and Navajo Superfund. Santa Fe, New Mexico. March 7.

Gilbert, Robert O. 1987. *Statistical Methods for Environmental Pollution Monitoring.* John Wiley & Sons, Inc.

Lyssy, Greg. 2000. *Letter to Meeting Attendees re: Meeting at Window Rock on the 15th.* U.S. Environmental Protection Agency. November 15.

New Mexico Environment Department. 1998. *Letter to Greg Lyssy from Maura Hanning, Subject: "Revision of Postmining, Pretailings Concentrations at the UNC Church Rock Site".* January 6.

Nuclear Regulatory Commission. 1996. *Evaluation of the Statistical Basis for Establishing Background Levels and Remediation Standards at the United Nuclear Corporation Church Rock Uranium Mill Tailings Disposal Facility, Gallup, New Mexico*. June.

Rust Environment and Infrastructure. 1997. *Ground Water Corrective Action, Annual Review - 1997, Church Rock Site, Gallup, New Mexico.* December.

Science Applications, Inc. 1980. *Ground Water Discharge Plan For United Nuclear Corporation, Volume I.* November.

Smith Technology Corporation (Smith Environmental Technologies Corporation). 1995. *Ground Water Corrective Action, Annual Review - 1995, Church Rock Site, Gallup, New Mexico*. December.

______. 1996. *Ground Water Corrective Action, Annual Review - 1996, Church Rock Site, Gallup, New Mexico*. December.

United Nuclear. 1989. *Remedial Action Plan, Church Rock Uranium Mill Tailings Facility.* April.

U.S. Environmental Protection Agency. 1988a. *United Nuclear Corporation, Church Rock Site, Operable Unit Feasibility Study, Gallup, New Mexico.* August..

______. 1988b. *Record of Decision, United Nuclear Corporation, Ground Water Operable Unit, McKinley County, New Mexico.* U.S. Environmental Protection Agency, Region VI, Dallas, Texas. September.

_______. 1989. *Administrative Order Docket Number CERCLA 6-11-89, Regarding the United Nuclear Corporation Site, Church Rock, New Mexico.* June.

_______. 1992. *Guidance for Data Useability in Risk Assessment (Part A)*

_______. 1993. *Guidance for Evaluating the Technical Impracticability of Ground-water Restoration.*

———. 1995. *Drinking Water Regulations and Health Advisories.* Office of Water, Washington, DC. May.

______. 1998. *Five-Year Review Report, United Nuclear Corporation Ground Water Operable unit, McKinley County, New Mexico.* U.S. Environmental Protection Agency Region VI. September.

TABLES

TABLE 2.1

WELLS INCLUDED IN THE SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well	Use[1]	Water Level	Water Quality	Time Period of Baseline Data
509 D	Monitor	X	X	7/95 to 1/01
624	Monitor	X	X	7/95 to 1/01
627	Monitor	X	X	7/95 to 1/01
632	Monitor	X	X	7/95 to 1/01
801[2]	Pumping	X	X	7/95 to 1/00 and 1/01
802	Pumping	X	X	7/95 to 1/01
803	Pumping	X	X	7/95 to 1/01
805	Monitor	X		7/95 to 1/01
807	Monitor	X		7/95 to 1/01
808[3]	Pumping	X	X	1/01
EPA 23	Monitor	X	X	7/95 to 1/01
EPA 25	Monitor	X	X	7/95 to 1/01
EPA 28	Monitor	X	X	7/95 to 1/01
GW 1	Monitor	X	X	7/95 to 1/01
GW 2	Monitor	X	X	7/95 to 1/01
GW 3	Monitor	X	X	7/95 to 1/01

Notes:

[1] Pumping wells turned off in January 2001 after final baseline samples were collected. Well 801 is the exception, see Note 2.

[2] Well 801 was turned off at the end of July 1999 because it met decommissioning criteria. Sample collection ceased after the first quarter 2000. Well 801 water quality is included in the test program, therefore sampling recommenced January 2001.

[3] Well 808 was not included in the Performance Monitoring Program, therefore no data are available prior to January 2001.

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
	NRC Standard	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.001
	EPA Standard	NA	NA	NA	4,800	NA	NA	NA	NA	NA	2,125	250	NA	190	NA
0509 D	1/8/01	6,882.70	6.46	7.47	5,010	924	331	220	11.1	2,200	1,610	317	0.94	30.6	-0.001
0509 D	2/5/01	6,882.35	6.5	7.03	5,090	1,000	384	265	13.5	2,090	1,860	365	1.75	29.5	-0.001
0509 D	3/5/01	6,882.10	6.65	7.41	5,110	901	347	310	13.9	2,100	1,850	279	0.91	28.4	-0.001
0509 D	4/3/01	6,882.30	6.42	6.76	5,120	984	366	211	11.8	2,080	1,800	311	0.82	31.8	-0.001
0509 D	5/7/01	6,881.90	6.46	7.01	5,240	864	338	221	12.5	2,060	1,700	322	1.56	27.3	-0.001
0509 D	6/4/01	6,882.10	6.46	6.97	4,860	848	336	232	12.7	2,070	1,760	318	1.92	30.2	-0.001
0509 D	7/9/01	6,881.80	6.36	6.84	5,210	956	369	293	12.6	2,180	1,730	326	0.8	29.2	-0.001
0509 D	8/6/01	6,881.60	6.36	7.3	5,210	890	340	230	13	2,130	1,500	370	0.61	26.6	-0.001
0509 D	9/10/01	6,881.40	6.38	7.2	5,130	940	340	246	11.4	2,210	1,600	297	0.42	26	-0.001
0509 D	10/1/01	6,881.35	6.43	7.2	5,190	920	320	234	12.1	2,250	1,570	411	0.37	25	-0.001
0509 D	11/5/01	6,881.30	6.47	7.4	5,300	930	348	258	13.6	2,300	1,770	401	1.37	26.4	-0.001
0509 D	12/3/01	6,881.20	6.44	7.3	5,370	875	338	237	12.3	2,280	1,590	357	2.14	29	-0.001
0509 D	1/7/02	6,881.00	6.41	6.8	5,220	1,040	354	229	11.8	2,290	1,840	383	1.1	23	-0.001
0509 D	2/4/02	6,880.80	6.48	7.1	5,290	994	358	274	13.1	2,170	1,760	362	1.11	23.9	-0.001
0509 D	3/4/02	6,880.70	6.45	6.9	5,220	934	342	262	12.6	2,240	1,790	376	0.9	24.4	-0.001
0509 D	4/1/02	6,880.68	6.36	7.69	5,260	974	337	262	13.3	2,250	1,750	380	0.4	23.5	-0.001
0509 D	5/6/02	6,880.55	6.38	7.74	5,390	916	361	279	14.5	2,120	1,850	344	2.76	27.3	-0.001
0509 D	6/3/02	6,880.50	6.36	7.87	5,200	949	331	244	11.1	2,240	1,500	318	0.32	24.5	-0.001
0509 D	7/8/02	6,880.17	6.57	7.83	5,470	925	381	306	13.4	2,160	1,900	308	4.08	25	-0.001

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		**NA**	**0.05**	**0.05**	**0.01**	**NA**	**0.05**	**NA**	**NA**	**0.05**	**0.01**	**0.1**	**0.3**	**5.0**	**5.0**	**1.0**	**15.0**
EPA Standard		**5.0**	**0.05**	**0.017**	**0.01**	**0.05**	**0.05**	**2.6**	**1.0**	**0.2**	**0.01**	**0.7**	**5.0**	**5.0**	**NA**	**NA**	**15.0**
0509 D	1/8/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.08	-0.1	-0.05	-0.001	-0.1	0.211	- 1.5	-0.2	-1	-1
0509 D	2/5/01	0.2	0.001	-0.01	-0.005	-0.01	-0.05	2.2	-0.1	-0.05	-0.001	-0.1	0.197	- 1.6	-0.2	-1	-1
0509 D	3/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.51	-0.1	-0.05	0.001	-0.1	0.186	- 2.5	-0.2	-1	-1
0509 D	4/3/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.53	-0.1	-0.05	-0.001	-0.1	0.183	- 1.5	-0.2	-1	-1
0509 D	5/7/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.5	-0.1	-0.05	-0.001	-0.1	0.188	- 1.4	-0.2	-1	-1
0509 D	6/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.42	-0.1	-0.05	-0.001	-0.1	0.186	- 1.9	-0.2	-1	-1
0509 D	7/9/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.71	-0.1	-0.05	-0.001	-0.1	0.217	- 1.2	-0.2	-1	-1
0509 D	8/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.8	-0.1	-0.05	-0.001	-0.1	0.22	- 1.7	-0.2	-1	-1
0509 D	9/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.7	-0.1	-0.05	-0.001	-0.1	0.222	- 1.5	-0.2	-1	-1
0509 D	10/1/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.46	-0.1	-0.05	-0.001	-0.1	0.225	- 1.5	-0.2	-1	-1
0509 D	11/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.41	-0.1	-0.05	-0.001	-0.1	0.197	- 4.1	-0.2	-1	-1
0509 D	12/3/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.33	-0.1	-0.05	0.001	-0.1	0.252	- 1.2	-0.2	-1	-1
0509 D	1/7/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.49	-0.1	-0.05	-0.001	-0.1	0.206	- 2.2	-0.2	-1	-1
0509 D	2/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.41	-0.1	-0.05	-0.001	-0.1	0.189	- 1.4	-0.2	-1	-1
0509 D	3/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.91	-0.1	-0.05	-0.001	-0.1	0.228	- 1.2	-0.2	-1	-1
0509 D	4/1/02	-0.1	-0.001	-0.01	0.007	-0.01	-0.05	2.95	-0.1	0.05	-0.001	-0.1	0.213	- 1.2	-0.2	-1	-1
0509 D	5/6/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.48	-0.1	-0.05	-0.001	-0.1	0.198	- 1.2	-0.2	-1	-1
0509 D	6/3/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.99	-0.1	0.05	-0.001	-0.1	0.192	- 2.9	-0.2	-1	-1
0509 D	7/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.34	0.3	-0.05	-0.001	-0.1	0.229	- 1.3	-0.2	-1	-1

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
NRC Standard		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.001
EPA Standard		NA	NA	NA	4,800	NA	NA	NA	NA	NA	2,125	250	NA	190	NA
0624	1/8/01	6,850.10	6.65	7.4	5,100	707	464	173	6.9	1,480	1,810	177	-0.05	104	-0.001
0624	2/5/01	6,850.10	6.72	7.31	5,110	801	510	171	7.6	1,480	2,320	170	0.21	93.9	-0.001
0624	3/5/01	6,850.10	7.03	7.47	4,740	690	457	148	8.1	1,450	2,190	154	-0.05	101	-0.001
0624	4/10/01	6,850.10	7.24	7.33	4,910	791	497	238	7.3	1,470	2,250	176	-0.05	103	-0.001
0624	5/8/01	6,849.90	6.62	7.54	5,150	677	444	181	6.7	1,450	1,880	187	0.08	99.3	-0.001
0624	6/5/01	6,849.90	6.62	7.02	5,050	683	454	182	6.5	1,470	2,000	182	0.11	101	-0.001
0624	7/10/01	6,849.90	6.62	7.4	5,290	726	488	198	6.1	1,480	2,050	172	-0.05	101	-0.001
0624	8/7/01	6,849.87	6.59	7.4	5,230	660	450	200	6	1,470	1,900	180	0.05	88	-0.001
0624	9/11/01	6,850.30	6.52	7.3	5,200	670	450	191	6.8	1,490	1,930	217	0.05	118	-0.001
0624	10/2/01	6,850.30	6.65	7.8	5,210	660	450	192	7	1,500	1,850	240	-0.05	100	-0.001
0624	11/6/01	6,850.15	6.6	7.2	5,210	731	475	196	7.4	1,490	2,100	232	0.05	104	-0.001
0624	12/4/01	6,850.20	6.62	7.3	5,250	673	433	172	6.4	1,500	1,750	197	-0.05	101	-0.001
0624	1/8/02	6,850.10	6.95	7.3	5,190	787	481	201	7	1,490	2,270	208	-0.05	91.5	-0.001
0624	2/5/02	6,850.10	6.78	7.3	5,190	762	461	193	7.8	1,470	2,120	219	0.06	90.5	-0.001
0624	3/5/02	6,850.10	6.61	7.2	5,170	726	463	228	6.8	1,530	2,190	207	0.06	95.1	-0.001
0624	4/2/02	6,850.16	6.54	7.45	5,270	748	464	225	8.3	1,500	2,180	203	0.06	95.5	-0.001
0624	5/7/02	6,850.08	6.59	7.61	5,220	719	448	226	7.4	1,480	2,100	186	0.13	104	-0.001
0624	6/4/02	6,850.10	6.52	7.66	5,220	720	450	201	6.4	1,480	1,830	181	-0.05	96.3	-0.001
0624	7/9/02	6,849.95	6.67	7.42	5,300	713	463	223	7.3	1,500	2,150	200	0.05	92.4	-0.001

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		**NA**	**0.05**	**0.05**	**0.01**	**NA**	**0.05**	**NA**	**NA**	**0.05**	**0.01**	**0.1**	**0.3**	**5.0**	**5.0**	**1.0**	**15.0**
EPA Standard		**5.0**	**0.05**	**0.017**	**0.01**	**0.05**	**0.05**	**2.6**	**1.0**	**0.2**	**0.01**	**0.7**	**5.0**	**5.0**	**NA**	**NA**	**15.0**
0624	1/8/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.02	-0.1	-0.05	-0.001	-0.1	0.032	- 1.4	-0.2	-1	-1
0624	2/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.02	-0.1	-0.05	-0.001	-0.1	0.033	- 1.3	-0.2	-1	-1
0624	3/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.02	-0.1	-0.05	-0.001	-0.1	0.0327	- 4.2	-0.2	-1	-1
0624	4/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.03	-0.1	-0.05	-0.001	-0.1	0.031	- 1.3	-0.2	-1	-1
0624	5/8/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.02	-0.1	-0.05	-0.001	-0.1	0.034	- 1.2	-0.2	-1	-1
0624	6/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.05	-0.1	-0.05	0.009	-0.1	0.065	- 1.2	-0.2	-1	-1
0624	7/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.03	-0.1	-0.05	-0.001	-0.1	0.0329	- 1.2	-0.2	-1	-1
0624	8/7/01	0.13	-0.001	-0.01	-0.005	-0.01	-0.05	0.03	-0.1	-0.05	-0.001	-0.1	0.04	2.7	-0.2	-1	-1
0624	9/11/01	0.11	-0.001	-0.01	-0.005	-0.01	-0.05	0.03	-0.1	-0.05	-0.001	-0.1	0.03	- 3.1	-0.2	-1	-1
0624	10/2/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.02	-0.1	-0.05	-0.001	-0.1	0.0319	- 1.2	-0.2	-1	-1
0624	11/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.03	-0.1	-0.05	-0.001	-0.1	0.0288	- 1.2	-0.2	-1	-1
0624	12/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.03	-0.1	-0.05	-0.001	-0.1	0.0295	- 1.2	-0.2	-1	-1
0624	1/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.03	-0.1	-0.05	-0.001	-0.1	0.0301	- 1.4	-0.2	-1	-1
0624	2/5/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.03	-0.1	-0.05	-0.001	-0.1	0.0212	2.4	-0.2	-1	-1
0624	3/5/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.03	-0.1	-0.05	-0.001	-0.1	0.0351	- 1.2	-0.2	-1	-1
0624	4/2/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.04	-0.1	-0.05	-0.001	-0.1	0.0326	- 1.2	-0.2	-1	-1
0624	5/7/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.03	-0.1	-0.05	-0.001	-0.1	0.0355	- 1.5	-0.2	-1	-1
0624	6/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.03	-0.1	-0.05	-0.001	-0.1	0.0333	- 1.2	-0.2	-1	-1
0624	7/9/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.03	-0.1	-0.05	-0.001	-0.1	0.036	- 1.3	-0.2	-1	-1

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
NRC Standard		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.001
EPA Standard		NA	NA	NA	4,800	NA	NA	NA	NA	NA	2,125	250	NA	190	NA
0627	1/9/01	6,838.55	7.23	8.03	5,170	583	303	454	5	595	2,460	57.9	-0.05	160	-0.001
0627	2/6/01	6,838.50	7.53	7.48	5,040	654	321	558	6.1	592	2,780	52.5	-0.05	158	-0.001
0627	3/6/01	6,838.30	7.31	7.69	4,770	553	286	552	6.5	586	2,680	53	-0.05	156	-0.001
0627	4/10/01	6,838.60	7.52	7.47	5,020	656	319	446	5.3	590	2,840	57.3	-0.05	149	-0.001
0627	5/8/01	6,838.10	7.08	7.68	5,190	557	289	530	4.9	577	2,320	60.2	0.09	154	-0.001
0627	6/5/01	6,838.30	7.14	7.67	4,950	576	304	521	3.8	580	2,660	55.1	0.09	142	-0.001
0627	7/10/01	6,838.05	7.48	7.45	5,270	585	313	585	4.4	600	2,450	55.9	0.06	149	-0.001
0627	8/8/01	6,838.00	7.09	7.6	5,220	540	290	460	4.1	596	2,300	64	0.11	140	-0.001
0627	9/11/01	6,838.00	6.99	7.8	4,190	550	290	540	4.9	600	2,380	64.4	0.08	158	-0.001
0627	10/2/01	6,838.05	7.08	7.7	5,230	540	290	540	5.6	609	2,300	74	-0.05	152	-0.001
0627	11/6/01	6,838.00	7.13	7.9	5,310	595	305	451	5.8	602	2,600	69	0.06	142	-0.001
0627	12/4/01	6,838.25	7.3	7.8	5,190	559	277	498	4.7	610	2,290	65.2	0.07	148	-0.001
0627	1/8/02	6,837.90	7.27	7.7	5,150	641	314	407	6.5	603	2,290	73.6	-0.05	134	-0.001
0627	2/5/02	6,837.80	7.34	7.7	5,190	625	298	436	6.1	601	2,560	70.8	-0.05	133	-0.001
0627	3/5/02	6,837.80	7.17	7.8	5,160	595	300	495	5.1	611	2,670	64.3	0.07	133	-0.001
0627	4/9/02	6,837.50	7.08	7.64	5,250	559	286	486	6.5	612	2,440	74.1	0.09	142	-0.001
0627	5/7/02	6,837.73	7.09	7.84	5,180	594	294	512	5.9	601	2,500	59.7	0.08	137	-0.001
0627	6/4/02	6,837.61	7.17	7.71	5,190	607	300	479	4.6	602	2,550	53.8	0.12	122	-0.001
0627	7/9/02	6,837.42	7.13	7.9	5,350	587	306	495	5.5	608	2,590	76	-0.05	133	-0.001

TABLE 2.2

WATER QUALITY DATA

SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		**NA**	**0.05**	**0.05**	**0.01**	**NA**	**0.05**	**NA**	**NA**	**0.05**	**0.01**	**0.1**	**0.3**	**5.0**	**5.0**	**1.0**	**15.0**
EPA Standard		**5.0**	**0.05**	**0.017**	**0.01**	**0.05**	**0.05**	**2.6**	**1.0**	**0.2**	**0.01**	**0.7**	**5.0**	**5.0**	**NA**	**NA**	**15.0**
0627	1/9/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.11	-0.1	-0.05	0.001	-0.1	0.023	2.9	-0.2	-1	-1
0627	2/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.11	-0.1	-0.05	0.002	-0.1	0.0239	2.0	-0.2	-1	-1
0627	3/6/01	-0.1	0.001	-0.01	-0.005	-0.01	-0.05	0.12	-0.1	-0.05	0.001	-0.1	0.024	- 1.4	-0.2	-1	-1
0627	4/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.14	-0.1	-0.05	0.001	-0.1	0.03	- 1.4	-0.2	-1	-1
0627	5/8/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.13	-0.1	-0.05	0.001	-0.1	0.024	- 1.2	-0.2	-1	-1
0627	6/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.12	-0.1	-0.05	0.003	-0.1	0.024	- 1.2	-0.2	-1	-1
0627	7/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.12	-0.1	-0.05	0.001	-0.1	0.024	- 1.2	-0.2	-1	-1
0627	8/8/01	-0.1	-0.001	-0.01	0.006	-0.01	-0.05	0.1	-0.1	-0.05	-0.001	-0.1	0.025	- 1.2	-0.2	-1	-1
0627	9/11/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.12	-0.1	-0.05	0.001	-0.1	0.023	- 1.6	-0.2	-1	-1
0627	10/2/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.1	-0.1	-0.05	0.001	-0.1	0.0235	- 1.7	-0.2	-1	-1
0627	11/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.11	-0.1	-0.05	0.002	-0.1	0.0224	- 1.6	-0.2	-1	-1
0627	12/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.08	-0.1	-0.05	-0.001	-0.1	0.0223	- 1.8	-0.2	-1	-1
0627	1/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.11	-0.1	-0.05	-0.001	-0.1	0.0228	- 1.8	-0.2	-1	-1
0627	2/5/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.11	-0.1	-0.05	-0.001	-0.1	0.014	- 1.5	-0.2	-1	-1
0627	3/5/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.12	-0.1	-0.05	-0.001	-0.1	0.0251	- 1.4	-0.2	-1	-1
0627	4/9/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.11	-0.1	-0.05	-0.001	-0.1	0.0244	- 1.2	-0.2	-1	-1
0627	5/7/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.13	-0.1	-0.05	0.001	-0.1	0.0249	- 1.2	-0.2	-1	-1
0627	6/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.13	-0.1	-0.05	-0.001	-0.1	0.0246	- 1.7	-0.2	-1	-1
0627	7/9/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.11	-0.1	-0.05	-0.001	-0.1	0.0228	- 1.3	-0.2	-1	-1

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
NRC Standard		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.001
EPA Standard		NA	NA	NA	4,800	NA	NA	NA	NA	NA	2,125	250	NA	190	NA
0632	1/8/01	6,858.50	6.38	7.38	6,180	624	612	347	8.7	1,740	3,020	223	0.17	2.69	0.0035
0632	2/5/01	6,859.80	6.55	7.04	6,410	729	701	428	10.3	1,660	3,420	233	0.35	5.9	0.0028
0632	3/6/01	6,860.20	6.51	7.31	6,100	630	653	450	10.3	1,640	3,400	199	0.34	12.7	0.0032
0632	4/3/01	6,860.70	6.45	7.17	6,800	710	713	359	8.1	1,600	3,370	228	0.33	21.6	0.00349
0632	5/7/01	6,860.90	6.3	7.41	6,860	625	650	410	8.7	1,600	3,000	244	0.36	26.5	0.0019
0632	6/4/01	6,861.20	6.36	7.22	6,620	622	663	316	8.9	1,580	3,180	246	0.38	32.7	0.0031
0632	7/9/01	6,861.43	6.84	7.08	6,990	682	742	348	8.5	1,680	3,260	253	0.33	35.9	0.0031
0632	8/6/01	6,861.39	6.27	7.2	7,000	620	680	340	9	1,670	3,000	300	0.31	34.2	0.0027
0632	9/10/01	6,861.60	6.25	7	7,020	630	700	355	9.4	1,700	3,100	273	0.32	45.3	0.00246
0632	10/1/01	6,861.65	6.35	7.4	7,080	610	690	336	10.1	1,730	2,900	311	0.28	40.2	0.00195
0632	11/5/01	6,861.80	6.34	7.5	7,060	669	732	360	10	1,680	3,390	293	0.3	43.2	0.0024
0632	12/3/01	6,861.90	6.37	6.8	7,100	613	671	309	8.7	1,740	3,000	272	0.33	46	0.0018
0632	1/8/02	6,862.00	6.45	7	7,020	719	748	289	10.5	1,700	3,530	294	0.33	40.2	0.0024
0632	2/4/02	6,862.10	6.37	7	7,070	690	717	332	10.1	1,720	3,330	292	0.37	41.1	0.00236
0632	3/4/02	6,862.05	6.36	7.1	7,080	649	721	376	9.4	1,690	3,460	278	0.32	44	0.0025
0632	4/2/02	6,862.31	6.32	7.04	7,140	674	733	378	11.8	1,730	3,530	280	0.34	42.5	0.0027
0632	5/6/02	6,862.32	6.22	7.16	7,130	649	715	388	10.7	1,720	3,270	260	0.34	43.7	0.0024
0632	6/3/02	6,862.41	6.24	7.3	7,150	645	717	349	8.9	1,710	3,290	240	0.34	45.1	0.0028
0632	7/8/02	6,862.21	6.47	7.75	7,200	645	761	292	11.4	1,710	3,490	229	0.36	43.3	0.0024

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		**NA**	**0.05**	**0.05**	**0.01**	**NA**	**0.05**	**NA**	**NA**	**0.05**	**0.01**	**0.1**	**0.3**	**5.0**	**5.0**	**1.0**	**15.0**
EPA Standard		**5.0**	**0.05**	**0.017**	**0.01**	**0.05**	**0.05**	**2.6**	**1.0**	**0.2**	**0.01**	**0.7**	**5.0**	**5.0**	**NA**	**NA**	**15.0**
0632	1/8/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.85	-0.1	-0.05	0.001	-0.1	0.064	2.6	-0.2	-1	-1
0632	2/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.85	-0.1	-0.05	-0.001	-0.1	0.066	3.6	-0.2	-1	-1
0632	3/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.92	-0.1	-0.05	-0.001	-0.1	0.0601	- 2.0	-0.2	-1	-1
0632	4/3/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.87	-0.1	-0.05	-0.001	-0.1	0.059	- 2.1	-0.2	-1	1.7
0632	5/7/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.95	-0.1	-0.05	-0.001	-0.1	0.062	- 1.2	-0.2	-1	-1
0632	6/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.98	-0.1	-0.05	0.004	-0.1	0.06	4.5	-0.2	-1	-1
0632	7/9/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.97	-0.1	-0.05	-0.001	-0.1	0.0632	- 2.1	-0.2	-1	-1
0632	8/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.1	-0.1	-0.05	-0.001	-0.1	0.072	2.9	-0.2	-1	-1
0632	9/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.91	-0.1	-0.05	-0.001	-0.1	0.0582	3.7	-0.2	-1	-1
0632	10/1/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.85	-0.1	-0.05	-0.001	-0.1	0.0608	- 2.1	-0.2	-1	-1
0632	11/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.97	-0.1	-0.05	-0.001	-0.1	0.0542	- 2.0	-0.2	-1	-1
0632	12/3/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.87	-0.1	-0.05	-0.001	-0.1	0.0577	4.3	-0.2	-1	-1
0632	1/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.95	-0.1	-0.05	-0.001	-0.1	0.0575	2.4	-0.2	-1	3.2
0632	2/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.92	-0.1	-0.05	-0.001	-0.1	0.051	3.1	-0.2	-1	-1
0632	3/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.08	-0.1	-0.05	-0.001	-0.1	0.066	- 1.6	-0.2	-1	1.8
0632	4/2/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.13	-0.1	-0.05	-0.001	-0.1	0.059	4.2	-0.2	-1	-1
0632	5/6/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.12	-0.1	-0.05	-0.001	-0.1	0.0636	3.0	-0.2	-1	2.1
0632	6/3/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1	-0.1	-0.05	-0.001	-0.1	0.058	- 1.6	-0.2	-1	-1
0632	7/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.96	-0.1	-0.05	-0.001	-0.1	0.0708	- 2.0	-0.2	-1	-1

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
NRC Standard		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.001
EPA Standard		NA	NA	NA	4,800	NA	NA	NA	NA	NA	2,125	250	NA	190	NA
0801	1/8/01	6,852.90	6.67	7.7	7,330	578	820	359	16.6	1,570	3,700	240	9.07	48.9	0.0022
0801	2/6/01	6,853.85	6.9	7.42	7,200	642	882	397	15.8	1,570	3,970	226	9.46	29.9	0.0016
0801	3/5/01	6,854.30	6.92	7.19	6,610	550	785	273	15.1	1,580	3,660	203	8.34	21.9	0.0023
0801	4/3/01	6,854.80	6.59	7.37	6,930	615	825	320	12.8	1,570	3,580	214	7.88	17.5	0.00311
0801	5/7/01	6,855.20	6.47	7.53	7,090	541	723	282	12.6	1,560	3,120	229	7.71	13.3	0.0019
0801	6/4/01	6,855.20	6.47	7.33	6,680	549	745	294	12.7	1,560	3,380	225	8.12	8.45	0.0033
0801	7/9/01	6,855.38	7.02	7.11	6,900	585	800	312	12.7	1,610	3,320	237	7.07	6.25	0.0034
0801	8/6/01	6,855.43	6.76	7.4	6,890	550	760	310	13	1,580	3,300	240	7.5	4.4	0.003
0801	9/10/01	6,855.80	6.38	7	6,860	560	770	319	13.6	1,600	3,300	248	6.75	-0.1	0.00285
0801	10/1/01	6,855.75	6.45	7.5	7,060	530	750	330	14.1	1,600	3,200	253	7.2	2.9	0.0024
0801	11/5/01	6,855.90	6.46	7	7,070	583	805	318	14.3	1,590	3,670	272	7	3.3	0.00282
0801	12/4/01	6,856.10	6.56	7	7,090	531	734	293	12.3	1,590	3,240	229	7.4	3	0.00203
0801	1/8/02	6,856.10	6.58	7.2	7,100	620	817	261	13.9	1,570	3,840	274	6.8	2.34	0.0029
0801	2/4/02	6,856.20	6.45	7.1	7,120	603	790	290	13.6	1,600	3,640	264	6.8	2.08	0.0031
0801	3/4/02	6,856.15	6.41	7.2	7,070	563	780	354	13.8	1,590	3,720	259	3.6	2.41	0.0027
0801	4/1/02	6,856.32	6.36	7.33	7,120	583	782	351	15.2	1,600	3,730	249	7.07	2.35	0.0036
0801	5/6/02	6,856.41	6.35	7.38	7,030	564	762	341	14.4	1,570	3,520	242	6.4	2.34	0.003
0801	6/3/02	6,856.43	6.33	7.43	7,070	561	754	328	12.2	1,570	3,460	208	6.5	2.13	0.0037
0801	7/8/02	6,855.81	6.62	7.69	7,050	552	778	257	13.8	1,570	3,570	194	6.3	2.04	0.003

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		**NA**	**0.05**	**0.05**	**0.01**	**NA**	**0.05**	**NA**	**NA**	**0.05**	**0.01**	**0.1**	**0.3**	**5.0**	**5.0**	**1.0**	**15.0**
EPA Standard		**5.0**	**0.05**	**0.017**	**0.01**	**0.05**	**0.05**	**2.6**	**1.0**	**0.2**	**0.01**	**0.7**	**5.0**	**5.0**	**NA**	**NA**	**15.0**
0801	1/8/01	-0.1	0.002	-0.01	-0.005	-0.01	-0.05	6.52	-0.1	-0.05	0.001	-0.1	0.087	- 1.2	-0.2	-1	-1
0801	2/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	7.28	-0.1	-0.05	-0.001	-0.1	0.071	- 1.5	-0.2	-1	-1
0801	3/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	7.98	-0.1	-0.05	-0.001	-0.1	0.0582	- 1.2	-0.2	-1	-1
0801	4/3/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	7.02	-0.1	-0.05	-0.001	-0.1	0.053	- 1.4	-0.2	-1	-1
0801	5/7/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	8.7	-0.1	-0.05	-0.001	-0.1	0.049	- 1.4	-0.2	-1	-1
0801	6/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	8.24	-0.1	-0.05	-0.001	-0.1	0.046	- 1.2	-0.2	-1	-1
0801	7/9/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	8.34	-0.1	-0.05	-0.001	-0.1	0.0486	- 1.8	-0.2	-1	-1
0801	8/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	7.7	-0.1	-0.05	-0.001	-0.1	0.048	- 1.4	-0.2	-1	-1
0801	9/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	6.24	-0.1	-0.05	-0.001	-0.1	0.044	- 1.3	-0.2	-1	-1
0801	10/1/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	6.87	-0.1	-0.05	-0.001	-0.1	0.0373	- 1.7	-0.2	-1	-1
0801	11/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	7.36	-0.1	-0.05	-0.001	-0.1	0.0374	- 1.4	-0.2	-1	-1
0801	12/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	6.57	-0.1	-0.05	-0.001	-0.1	0.0407	- 1.2	-0.2	-1	-1
0801	1/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	6.61	-0.1	-0.05	-0.001	-0.1	0.0422	- 1.3	-0.2	-1	-1
0801	2/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	6.69	-0.1	-0.05	-0.001	-0.1	0.0336	- 1.7	-0.2	-1	-1
0801	3/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	7.89	-0.1	-0.05	-0.001	-0.1	0.0525	- 1.2	-0.2	-1	-1
0801	4/1/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	7.42	-0.1	-0.05	-0.001	-0.1	0.0423	- 1.2	-0.2	-1	-1
0801	5/6/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	6.84	-0.1	-0.05	-0.001	-0.1	0.0472	- 1.2	-0.2	-1	-1
0801	6/3/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	6.36	-0.1	-0.05	-0.001	-0.1	0.042	- 1.2	-0.2	-1	-1
0801	7/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	5.85	-0.1	-0.05	-0.001	-0.1	0.0488	- 1.3	-0.2	-1	-1

TABLE 2.2

WATER QUALITY DATA

SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
NRC Standard		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.001
EPA Standard		NA	NA	NA	4,800	NA	NA	NA	NA	NA	2,125	250	NA	190	NA
0802	1/8/01	6,857.50	6.43	7.69	7,360	751	758	300	8.2	2,180	3,190	203	1.2	89.3	0.0022
0802	2/5/01	6,860.50	6.49	7.1	6,910	739	834	348	8.2	2,050	3,160	200	1.02	93.8	0.0026
0802	3/5/01	6,861.00	6.64	7.17	6,120	737	661	370	8	2,000	2,850	158	0.12	103	0.0015
0802	4/9/01	6,861.60	6.86	7.24	6,400	847	671	263	6.6	2,050	2,840	180	0.06	111	-0.001
0802	5/7/01	6,861.65	6.42	7.23	6,660	737	608	257	6	2,020	2,420	193	0.08	102	-0.001
0802	6/4/01	6,861.95	6.46	7.16	6,200	729	591	231	6.3	1,960	2,520	190	0.1	101	0.0013
0802	7/9/01	6,862.10	7.07	7.06	6,580	794	651	274	5.4	2,060	2,520	216	0.07	114	0.001
0802	8/6/01	6,862.08	6.43	7.2	6,630	740	620	260	8	2,050	2,500	240	-0.05	97.5	-0.001
0802	9/10/01	6,862.30	6.37	6.9	6,400	770	600	284	5.6	2,100	2,400	216	-0.05	100	-0.001
0802	10/1/01	6,862.35	6.44	7.4	6,620	730	590	290	6.4	2,080	2,400	225	0.06	97.5	-0.001
0802	11/5/01	6,862.55	6.44	7.5	6,660	786	618	304	6.3	2,050	2,640	227	-0.05	114	-0.001
0802	12/3/01	6,862.65	6.56	7.5	6,710	750	587	256	5.9	2,060	2,450	214	0.09	121	-0.001
0802	1/7/02	6,862.70	6.56	7.1	6,750	874	646	226	8.2	2,030	2,850	232	0.05	98	0.0012
0802	2/4/02	6,862.80	6.5	7.2	6,820	849	626	284	7	2,070	2,750	239	0.13	100	0.0011
0802	3/4/02	6,862.75	6.48	7.1	6,800	806	633	323	6	2,030	2,880	217	0.08	108	0.0013
0802	4/1/02	6,862.98	6.38	7.08	6,900	840	648	326	7.7	2,080	2,980	212	0.06	98.1	0.0016
0802	5/6/02	6,862.02	6.36	7.24	7,050	815	643	302	7.8	2,090	2,790	215	0.05	107	0.0019
0802	6/3/02	6,863.05	6.34	7.94	7,430	859	705	299	6.6	2,160	3,090	196	0.08	103	0.003
0802	7/8/02	6,862.81	6.41	7.84	7,470	830	720	265	7.7	2,190	3,150	227	0.2	99.1	0.0026

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		NA	0.05	0.05	0.01	NA	0.05	NA	NA	0.05	0.01	0.1	0.3	5.0	5.0	1.0	15.0
EPA Standard		5.0	0.05	0.017	0.01	0.05	0.05	2.6	1.0	0.2	0.01	0.7	5.0	5.0	NA	NA	15.0
0802	1/8/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	2.73	-0.1	-0.05	0.004	-0.1	0.193	- 3.8	-0.2	-1	-1
0802	2/5/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	3.34	-0.1	-0.05	0.001	-0.1	0.159	- 1.4	-0.2	-1	-1
0802	3/5/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	0.96	-0.1	-0.05	0.001	-0.1	0.165	- 3.1	-0.2	-1	-1
0802	4/9/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	0.64	-0.1	-0.05	-0.001	-0.1	0.17	- 1.2	-0.2	-1	-1
0802	5/7/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.6	-0.1	-0.05	0.001	-0.1	0.181	- 1.2	-0.2	-1	-1
0802	6/4/01	-0.1	0.001	-0.01	-0.005	-0.01	-0.05	0.62	-0.1	-0.05	0.011	-0.1	0.214	- 1.2	-0.2	-1	-1
0802	7/9/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.6	-0.1	-0.05	0.001	-0.1	0.221	- 1.2	-0.2	-1	-1
0802	8/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.65	-0.1	-0.05	-0.001	-0.1	0.23	- 1.2	-0.2	-1	-1
0802	9/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.68	-0.1	-0.05	-0.001	-0.1	0.25	3.0	-0.2	-1	-1
0802	10/1/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.57	-0.1	-0.05	-0.001	-0.1	0.244	1.8	-0.2	-1	-1
0802	11/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.62	-0.1	-0.05	-0.001	-0.1	0.219	- 1.3	-0.2	-1	-1
0802	12/3/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.55	-0.1	-0.05	-0.001	-0.1	0.222	- 1.8	-0.2	-1	-1
0802	1/7/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.58	-0.1	-0.05	-0.001	-0.1	0.225	- 1.4	-0.2	-1	-1
0802	2/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.63	-0.1	-0.05	-0.001	-0.1	0.222	- 1.2	-0.2	-1	-1
0802	3/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.71	-0.1	-0.05	-0.001	-0.1	0.249	- 1.9	-0.2	-1	-1
0802	4/1/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.7	-0.1	-0.05	-0.001	-0.1	0.223	- 1.2	-0.2	-1	-1
0802	5/6/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.7	-0.1	-0.05	-0.001	-0.1	0.227	- 1.2	-0.2	-1	-1
0802	6/3/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.53	-0.1	-0.05	-0.001	-0.1	0.199	- 1.2	-0.2	-1	-1
0802	7/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.55	-0.1	-0.05	-0.001	-0.1	0.248	- 1.5	-0.2	-1	-1

TABLE 2.2

WATER QUALITY DATA

SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
NRC Standard		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.001
EPA Standard		NA	NA	NA	4,800	NA	NA	NA	NA	NA	2,125	250	NA	190	NA
0803	1/8/01	6,839.90	6.5	7.78	7,010	739	730	277	12.5	1,970	3,240	178	1.06	46.3	-0.001
0803	2/5/01	6,863.35	6.38	7.11	6,820	826	784	268	13	1,830	3,380	163	0.67	40.7	-0.001
0803	3/5/01	6,863.60	6.67	7.14	6,810	726	716	320	12.4	1,770	3,320	129	0.73	39.1	-0.001
0803	4/9/01	6,864.10	6.4	7.01	6,630	798	768	222	12.1	1,790	3,460	149	0.81	43.9	-0.001
0803	5/7/01	6,863.95	6.43	7.3	7,040	696	713	217	11.5	1,760	2,980	159	0.74	46.9	-0.001
0803	6/4/01	6,864.40	6.45	7.17	6,750	700	723	202	11.6	1,790	3,280	164	0.84	47.8	-0.001
0803	7/9/01	6,864.30	6.95	6.96	6,980	751	793	217	11.5	1,820	3,160	190	0.49	66	-0.001
0803	8/6/01	6,864.25	6.38	7.2	6,950	690	730	220	12	1,820	3,000	200	0.4	57.6	-0.001
0803	9/10/01	6,864.40	6.49	7.3	6,910	700	750	241	11.6	1,900	3,100	186	0.39	57.4	-0.001
0803	10/1/01	6,864.45	6.4	7.2	6,940	670	710	231	12	1,880	2,800	215	0.45	56.4	-0.001
0803	11/5/01	6,864.75	6.4	7.4	7,030	730	765	236	12.7	1,830	3,310	218	0.54	64	-0.001
0803	12/3/01	6,864.75	6.41	7.4	7,120	688	726	221	11.9	1,870	3,020	191	0.65	62	-0.001
0803	1/7/02	6,864.75	6.46	7	6,920	799	744	170	11.8	1,830	3,350	181	0.56	53.5	-0.001
0803	2/4/02	6,864.80	6.46	7.3	7,000	775	738	246	11.9	1,900	3,250	191	0.7	51.1	-0.001
0803	3/4/02	6,864.70	6.42	7.2	7,030	734	745	271	11.9	1,880	3,390	190	0.64	55.3	-0.001
0803	4/1/02	6,864.92	6.34	7.85	7,070	770	761	274	13.7	1,880	3,480	197	0.73	51.2	0.001
0803	5/6/02	6,864.95	6.37	7.13	7,010	734	718	259	12.5	1,890	3,140	182	0.72	55.4	-0.001
0803	6/3/02	6,865.10	6.32	7.44	7,130	749	743	240	11	1,910	3,250	165	0.86	52.7	0.0012
0803	7/8/02	6,864.68	6.38	7.6	7,110	711	725	214	10.9	1,890	3,150	148	0.78	51.3	-0.001

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		**NA**	**0.05**	**0.05**	**0.01**	**NA**	**0.05**	**NA**	**NA**	**0.05**	**0.01**	**0.1**	**0.3**	**5.0**	**5.0**	**1.0**	**15.0**
EPA Standard		**5.0**	**0.05**	**0.017**	**0.01**	**0.05**	**0.05**	**2.6**	**1.0**	**0.2**	**0.01**	**0.7**	**5.0**	**5.0**	**NA**	**NA**	**15.0**
0803	1/8/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.91	-0.1	-0.05	0.001	-0.1	0.09	- 3.0	-0.2	-1	-1
0803	2/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.37	-0.1	-0.05	0.001	-0.1	0.1	- 1.6	-0.2		-1
0803	3/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.75	-0.1	0.05	0.001	-0.1	0.0874	- 2.4	-0.2	-1	-1
0803	4/9/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.29	-0.1	-0.05	-0.001	-0.1	0.1	- 1.2	-0.2	-1	-1
0803	5/7/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.13	-0.1	-0.05	-0.001	-0.1	0.093	- 1.2	-0.2	-1	-1
0803	6/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.34	-0.1	-0.05	0.004	-0.1	0.086	- 1.4	-0.2	-1	-1
0803	7/9/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.69	-0.1	-0.05	-0.001	-0.1	0.136	- 1.2	-0.2	-1	-1
0803	8/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.1	-0.1	-0.05	-0.001	-0.1	0.16	- 1.2	-0.2	-1	-1
0803	9/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.8	-0.1	-0.05	-0.001	-0.1	0.125	- 1.3	-0.2	-1	-1
0803	10/1/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.6	-0.1	-0.05	-0.001	-0.1	0.148	- 1.8	-0.2	-1	-1
0803	11/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.61	-0.1	-0.05	-0.001	-0.1	0.134	- 1.2	-0.2	-1	-1
0803	12/3/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.4	-0.1	-0.05	-0.001	-0.1	0.128	- 1.2	-0.2	-1	-1
0803	1/7/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.57	-0.1	-0.05	-0.001	-0.1	0.167	- 2.0	-0.2	-1	-1
0803	2/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.63	-0.1	-0.05	-0.001	-0.1	0.149	- 1.2	-0.2	-1	-1
0803	3/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.97	-0.1	-0.05	-0.001	-0.1	0.166	- 2.7	-0.2	-1	-1
0803	4/1/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.77	-0.1	-0.05	-0.001	-0.1	0.152	- 2.4	-0.2	-1	-1
0803	5/6/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.87	-0.1	-0.05	-0.001	-0.1	0.174	- 1.2	-0.2	-1	-1
0803	6/3/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.8	-0.1	-0.05	-0.001	-0.1	0.153	- 1.2	-0.2	-1	-1
0803	7/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.77	-0.1	-0.05	-0.001	-0.1	0.201	- 1.4	-0.2	-1	-1

TABLE 2.2

WATER QUALITY DATA

SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
NRC Standard		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.001
EPA Standard		NA	NA	NA	4,800	NA	NA	NA	NA	NA	2,125	250	NA	190	NA
0808	1/8/01	6,853.00	6.34	7.14	7,470	720	721	382	14.5	2,080	3,400	233	16	26	0.0014
0808	2/5/01	6,863.60	6.46	7.04	5,820	879	489	295	13.2	2,040	2,740	185	4.99	-0.1	-0.001
0808	3/5/01	6,863.85	6.65	7.43	5,480	879	482	377	12.1	2,100	2,580	213	5.01	-0.1	-0.001
0808	4/9/01	6,864.40	6.65	7.04	6,030	841	468	312	11.6	2,130	2,480	247	6.39	-0.1	-0.001
0808	5/7/01	6,864.20	6.44	7.4	6,600	797	577	359	8.6	2,210	2,540	216	1.66	60.2	-0.001
0808	6/5/01	6,864.50	6.54	6.95	6,680	843	582	361	9.2	2,280	2,790	238	2.11	32.4	0.0018
0808	7/9/01	6,864.70	7.05	7.17	6,870	830	710	320	6.3	1,940	2,800	246	0.16	119	0.0033
0808	8/6/01	6,864.55	6.4	7.2	6,860	700	620	290	7.5	1,950	2,500	210	0.09	116	0.0029
0808	9/10/01	6,864.75	6.4	7.2	6,750	720	610	300	6.1	1,960	2,500	150	0.41	140	0.0029
0808	10/1/01	6,864.80	6.47	7.4	6,780	720	630	214	6.5	1,970	2,400	165	0.08	122	0.0024
0808	11/5/01	6,865.00	6.48	7.5	6,800	782	656	280	7.6	1,900	2,750	237	0.06	142	0.0031
0808	12/3/01	6,865.10	6.53	7.5	6,780	726	605	244	6.7	1,940	2,460	212	0.11	147	0.0024
0808	1/7/02	6,865.05	6.53	7.2	6,810	854	670	232	8.7	1,910	2,870	230	0.05	117	0.0034
0808	2/4/02	6,865.10	6.52	7.3	6,830	829	649	265	7.7	1,960	2,750	226	0.08	118	0.0033
0808	3/4/02	6,865.05	6.49	7.3	6,710	788	652	308	6.4	1,920	2,890	207	0.08	122	0.0036
0808	4/1/02	6,865.31	6.36	7.84	6,820	810	663	310	7.4	1,930	2,930	207	0.07	117	0.0041
0808	5/6/02	6,865.34	6.39	7.15	6,900	773	644	287	7.6	1,950	2,690	208	0.16	125	0.004
0808	6/3/02	6,865.45	6.35	7.36	6,810	781	655	270	5.9	1,960	2,750	173	0.09	120	0.0048
0808	7/8/02	6,865.08	6.46	7.63	6,950	782	682	230	7.3	1,960	2,850	173	0.15	115	0.0042

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		NA	0.05	0.05	0.01	NA	0.05	NA	NA	0.05	0.01	0.1	0.3	5.0	5.0	1.0	15.0
EPA Standard		5.0	0.05	0.017	0.01	0.05	0.05	2.6	1.0	0.2	0.01	0.7	5.0	5.0	NA	NA	15.0
0808	1/8/01	6.02	0.001	-0.01	-0.005	0.13	-0.05	18.1	-0.1	0.09	0.001	-0.1	0.082	- 1.2	-0.2	-1	-1
0808	2/5/01	0.11	-0.001	-0.01	-0.005	0.02	-0.05	2.61	-0.1	-0.05	-0.001	-0.1	0.0338	2.5	-0.2	-1	-1
0808	3/5/01	-0.1	-0.001	-0.01	-0.005	0.02	-0.05	3.18	-0.1	-0.05	-0.001	-0.1	0.0338	- 1.2	-0.2	-1	-1
0808	4/9/01	0.11	-0.001	-0.01	-0.005	0.03	-0.05	4	-0.1	-0.05	-0.001	-0.1	0.034	- 1.4	-0.2	-1	-1
0808	5/7/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	1.91	-0.1	-0.05	-0.001	-0.1	0.074	- 1.2	-0.2	-1	-1
0808	6/5/01	0.2	-0.001	-0.01	-0.005	-0.01	-0.05	1.47	-0.1	-0.05	-0.001	-0.1	0.059	- 1.2	-0.2	-1	-1
0808	7/9/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.69	-0.1	-0.05	0.001	-0.1	0.165	- 1.2	-0.2	-1	-1
0808	8/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.71	-0.1	-0.05	-0.001	-0.1	0.194	- 1.2	-0.2	-1	-1
0808	9/10/01	0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.97	-0.1	-0.05	-0.001	-0.1	0.253	3.7	-0.2	-1	-1
0808	10/1/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.55	-0.1	-0.05	-0.001	-0.1	0.157	- 1.3	-0.2	-1	-1
0808	11/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.61	-0.1	-0.05	-0.001	-0.1	0.14	- 1.2	-0.2	-1	-1
0808	12/3/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.56	-0.1	-0.05	-0.001	-0.1	0.147	- 1.2	-0.2	-1	-1
0808	1/7/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.59	-0.1	-0.05	-0.001	-0.1	0.138	- 1.2	-0.2	-1	-1
0808	2/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.64	-0.1	-0.05	-0.001	-0.1	0.145	- 1.2	-0.2	-1	-1
0808	3/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.69	-0.1	-0.05	-0.001	-0.1	0.162	- 1.2	-0.2	-1	-1
0808	4/1/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.7	-0.1	-0.05	-0.001	-0.1	0.15	- 1.2	-0.2	-1	-1
0808	5/6/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.71	-0.1	-0.05	-0.001	-0.1	0.148	- 1.2	-0.2	-1	-1
0808	6/3/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.65	-0.1	-0.05	-0.001	-0.1	0.142	- 1.2	-0.2	-1	-1
0808	7/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.64	-0.1	-0.05	-0.001	-0.1	0.169	- 1.3	-0.2	-1	-1

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
	NRC Standard	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.001
	EPA Standard	NA	NA	NA	4,800	NA	NA	NA	NA	NA	2,125	250	NA	190	NA
0808 filtr	6/5/01	6,864.50	6.46	6.9	6,900	841	580	361	9.4	2,270	2,780	244	2.13	34.6	-0.001

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		**NA**	**0.05**	**0.05**	**0.01**	**NA**	**0.05**	**NA**	**NA**	**0.05**	**0.01**	**0.1**	**0.3**	**5.0**	**5.0**	**1.0**	**15.0**
EPA Standard		**5.0**	**0.05**	**0.017**	**0.01**	**0.05**	**0.05**	**2.6**	**1.0**	**0.2**	**0.01**	**0.7**	**5.0**	**5.0**	**NA**	**NA**	**15.0**
0808 filtr	6/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.49	-0.1	-0.05	-0.001	-0.1	0.06	- 1.4	-0.2	-1	-1

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
NRC Standard		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.001
EPA Standard		NA	NA	NA	4,800	NA	NA	NA	NA	NA	2,125	250	NA	190	NA
EPA 23	1/9/01	6,878.70	6.75	7.68	4,340	648	391	114	9.2	1,050	2,150	67.7	0.97	1.14	-0.001
EPA 23	2/6/01	6,878.60	6.8	7.56	4,380	737	429	118	10.6	1,060	2,510	68.5	1.08	1.25	-0.001
EPA 23	3/6/01	6,878.50	6.93	7.61	4,070	636	389	150	10.2	1,030	2,410	65.6	1.09	1.25	-0.001
EPA 23	4/4/01	6,878.50	6.87	7.49	4,400	702	410	118	9.3	1,040	2,310	71	1.16	1.41	-0.001
EPA 23	5/7/01	6,878.40	6.97	7.14	4,460	622	371	113	10	1,040	2,070	78.6	1.28	1.25	-0.001
EPA 23	6/4/01	6,878.80	6.67	7.22	4,360	618	371	107	9.5	1,040	2,210	75.4	1.29	1.67	-0.001
EPA 23	7/9/01	6,878.40	6.6	7.12	4,470	684	418	116	9.7	1,060	2,250	86	1.07	1.36	-0.001
EPA 23	8/6/01	6,878.25	6.58	7.2	4,500	640	390	110	10	1,060	2,300	86	1.1	1.28	-0.001
EPA 23	9/10/01	6,878.49	6.56	7.5	4,490	650	390	122	9.9	1,100	2,200	75.6	1.02	1.2	-0.001
EPA 23	10/1/01	6,878.40	6.68	7.3	4,500	600	370	115	10.4	1,080	2,100	87.9	1.15	1	-0.001
EPA 23	11/5/01	6,878.50	6.74	7.6	4,540	670	401	123	10.8	1,050	2,360	87	0.95	1.2	-0.001
EPA 23	12/3/01	6,878.50	6.68	7.6	4,480	615	365	107	9.7	1,070	2,020	83.6	1.06	3.6	-0.001
EPA 23	1/7/02	6,878.20	6.7	7.1	4,500	715	403	101	10.7	1,070	2,430	94.4	1.01	1.02	-0.001
EPA 23	2/4/02	6,878.15	6.8	7.3	4,470	711	396	124	10.6	1,060	2,350	88.2	1.18	0.95	-0.001
EPA 23	3/4/02	6,878.05	6.73	7.2	4,430	650	383	132	10.3	1,080	2,340	82.7	1.07	1.16	-0.001
EPA 23	4/1/02	6,878.20	6.57	7.83	4,490	681	389	127	11.2	1,070	2,400	83	1.09	1.14	-0.001
EPA 23	5/6/02	6,878.16	6.62	7.17	4,500	661	380	127	11	1,080	2,240	77.7	1.11	1.09	-0.001
EPA 23	6/3/02	6,878.22	6.61	7.37	4,480	664	382	117	9.4	1,060	2,270	73.5	1.12	1.05	-0.001
EPA 23	7/8/02	6,877.87	6.62	7.55	4,520	656	395	119	10.2	1,070	2,320	78.2	1.34	0.91	-0.001

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		**NA**	**0.05**	**0.05**	**0.01**	**NA**	**0.05**	**NA**	**NA**	**0.05**	**0.01**	**0.1**	**0.3**	**5.0**	**5.0**	**1.0**	**15.0**
EPA Standard		**5.0**	**0.05**	**0.017**	**0.01**	**0.05**	**0.05**	**2.6**	**1.0**	**0.2**	**0.01**	**0.7**	**5.0**	**5.0**	**NA**	**NA**	**15.0**
EPA 23	1/9/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	4.77	-0.1	-0.05	0.001	-0.1	0.024	- 2.5	-0.2	-1	-1
EPA 23	2/6/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	4.77	-0.1	-0.05	-0.001	-0.1	0.025	2.5	-0.2	-1	-1
EPA 23	3/6/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	5	-0.1	-0.05	-0.001	-0.1	0.0245	- 1.2	-0.2	-1	-1
EPA 23	4/4/01	-0.1	0.001	-0.01	-0.005	-0.01	-0.05	4.29	-0.1	-0.05	-0.001	-0.1	0.024	- 1.3	-0.2	-1	-1
EPA 23	5/7/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	5.74	-0.1	-0.05	-0.001	-0.1	0.026	- 1.2	-0.2	-1	-1
EPA 23	6/4/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	5.11	-0.1	-0.05	-0.001	-0.1	0.025	- 1.2	-0.2	-1	-1
EPA 23	7/9/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	5.1	-0.1	-0.05	-0.001	-0.1	0.0276	- 1.2	-0.2	-1	-1
EPA 23	8/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	5.4	-0.1	-0.05	-0.001	-0.1	0.025	- 1.2	-0.2	-1	-1
EPA 23	9/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	4.68	-0.1	-0.05	-0.001	-0.1	0.0229	- 1.2	-0.2	-1	-1
EPA 23	10/1/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	4.38	-0.1	-0.05	-0.001	-0.1	0.0239	- 1.5	-0.2	-1	-1
EPA 23	11/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	4.79	-0.1	-0.05	-0.001	-0.1	0.0212	4.4	-0.2	-1	-1
EPA 23	12/3/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	4.48	-0.1	-0.05	0.003	-0.1	0.0243	- 1.2	-0.2	-1	-1
EPA 23	1/7/02	-0.1	-0.001	-0.01	-0.005	-0 01	-0.05	4.59	-0.1	-0.05	-0.001	-0.1	0.0211	- 1.5	-0.2	-1	-1
EPA 23	2/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	4.69	-0.1	-0.05	-0.001	-0.1	0.0164	- 1.4	-0.2	-1	-1
EPA 23	3/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	5.48	-0.1	-0.05	-0.001	-0.1	0.0259	- 1.2	-0.2	-1	-1
EPA 23	4/1/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	5.12	-0.1	-0.05	-0.001	-0.1	0.029	- 1.2	-0.2	-1	-1
EPA 23	5/6/02	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	5.41	-0.1	-0.05	-0.001	-0.1	0.0252	- 1.2	-0.2	-1	-1
EPA 23	6/3/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	5.43	-0.1	-0.05	-0.001	-0.1	0.0262	- 1.2	-0.2	-1	-1
EPA 23	7/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	4.62	0.1	-0.05	-0.001	-0.1	0.0291	- 1.6	-0.2	-1	-1

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
NRC Standard		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.001
EPA Standard		NA	NA	NA	4,800	NA	NA	NA	NA	NA	2,125	250	NA	190	NA
EPA 23Dup	1/9/01	6,878.40	6.76	7.63	4,370	650	392	119	9.3	1,060	2,380	69.7	1.05	1.14	-0.001
EPA 23Dup	2/6/01	6,878.35	6.68	7.56	4,380	729	424	111	10.5	1,060	2,500	67.1	1.08	1.3	-0.001
EPA 23Dup	3/6/01	6,878.20	7.08	7.78	4,110	637	389	150	10.1	1,030	2,420	64.7	1.12	1.2	-0.001
EPA 23Dup	4/4/01	6,778.30	6.87	7.51	4,410	711	414	114	9.2	1,040	2,350	73.9	1.2	1.42	-0.001
EPA 23Dup	5/7/01	6,878.35	6.88	7.21	4,450	620	371	109	10	1,030	2,060	79.4	1.21	1.27	-0.001
EPA 23Dup	6/4/01	6,878.14	6.67	7.24	4,020	617	372	102	9.8	1,020	2,240	76.2	1.33	1.6	-0.001
EPA 23Dup	7/9/01	6,878.14	6.59	7.05	4,480	682	418	113	9.6	1,070	2,240	90	1.12	1.51	-0.001
EPA 23Dup	8/6/01	6,878.01	6.59	7.2	4,480	630	390	110	10	1,060	2,100	91	1.1	1.29	-0.001
EPA 23Dup	9/10/01	6,878.10	6.56	7.5	4,460	650	390	118	10	1,100	2,200	76.2	1.03	1.2	-0.001
EPA 23Dup	10/1/01	6,878.15	6.67	7.4	4,510	610	370	113	10.6	1,090	2,200	97.7	1.06	1	-0.001
EPA 23Dup	11/5/01	6,878.15	6.71	7.6	4,540	664	397	117	10.8	1,050	2,320	95	0.94	1.1	-0.001

TABLE 2.2

WATER QUALITY DATA

SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		**NA**	**0.05**	**0.05**	**0.01**	**NA**	**0.05**	**NA**	**NA**	**0.05**	**0.01**	**0.1**	**0.3**	**5.0**	**5.0**	**1.0**	**15.0**
EPA Standard		**5.0**	**0.05**	**0.017**	**0.01**	**0.05**	**0.05**	**2.6**	**1.0**	**0.2**	**0.01**	**0.7**	**5.0**	**5.0**	**NA**	**NA**	**15.0**
EPA 23Dup	1/9/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	4.65	-0.1	-0.05	-0.001	-0.1	0.024	- 1.2	-0.2	-1	-1
EPA 23Dup	2/6/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	4.85	-0.1	-0.05	-0.001	-0.1	0.025	2.6	-0.2	-1	-1
EPA 23Dup	3/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	5.03	-0.1	0.07	-0.001	-0.1	0.0252	- 1.4	-0.2	-1	-1
EPA 23Dup	4/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	4.19	-0.1	-0.05	-0.001	-0.1	0.023	- 1.2	-0.2	-1	-1
EPA 23Dup	5/7/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	5.75	-0.1	-0.05	-0.001	-0.1	0.025	- 1.2	-0.2	-1	-1
EPA 23Dup	6/4/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	5.15	-0.1	-0.05	-0.001	-0.1	0.024	- 1.2	-0.2	-1	-1
EPA 23Dup	7/9/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	5.19	-0.1	-0.05	-0.001	-0.1	0.0263	- 1.2	-0.2	-1	-1
EPA 23Dup	8/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	5.5	-0.1	-0.05	-0.001	-0.1	0.027	- 1.2	-0.2	-1	-1
EPA 23Dup	9/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	4.96	-0.1	-0.05	-0.001	-0.1	0.0245	- 1.2	-0.2	-1	-1
EPA 23Dup	10/1/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	4.39	-0.1	-0.05	-0.001	-0.1	0.0235	- 1.2	-0.2	-1	-1
EPA 23Dup	11/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	4.74	-0.1	-0.05	-0.001	-0.1	0.0223	2.2	-0.2	-1	-1

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
NRC Standard		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.001
EPA Standard		NA	NA	NA	4,800	NA	NA	NA	NA	NA	2,125	250	NA	190	NA
EPA 25	1/9/01	6,852.10	7.12	7.89	3,910	699	234	155	7	761	1,760	63.4	-0.05	106	-0.001
EPA 25	2/6/01	6,852.10	7.33	7.34	3,970	792	251	135	8.3	783	1,930	64.3	0.06	106	-0.001
EPA 25	3/6/01	6,852.15	7.27	7.87	3,710	676	224	186	8.2	757	1,840	58.7	-0.05	105	-0.001
EPA 25	4/10/01	6,852.25	7.41	7.34	3,940	778	241	143	7.9	782	1,910	71.7	0.08	101	-0.001
EPA 25	5/8/01	6,852.00	7.02	7.67	3,990	668	222	148	7.6	715	1,570	74.2	0.13	108	-0.001
EPA 25	6/5/01	6,852.10	7.03	7.57	3,920	705	236	132	7.3	785	1,780	71.2	0.12	94.7	-0.001
EPA 25	7/10/01	6,852.10	7.29	7.39	4,060	730	244	159	7.3	817	1,720	75.8	0.1	103	-0.001
EPA 25	8/7/01	6,852.02	7.26	7.5	4,060	650	220	150	7.6	819	1,600	82	0.13	94	-0.001
EPA 25	9/11/01	6,852.30	6.81	7.8	4,130	680	220	154	7.8	841	1,630	85.9	0.08	111	-0.001
EPA 25	10/2/01	6,852.40	6.96	7.6	4,090	670	220	142	7.9	883	1,700	100	0.11	97	-0.001
EPA 25	11/6/01	6,852.40	6.95	7.7	4,040	719	232	149	8.5	841	1,800	96	0.06	92	-0.001
EPA 25	12/4/01	6,852.55	7.09	7.7	4,020	675	215	138	7.4	852	1,580	86.6	0.07	93	-0.001
EPA 25	1/8/02	6,852.40	7.09	7.7	4,030	774	239	136	9	783	1,870	97.5	0.06	91.5	-0.001
EPA 25	2/5/02	6,852.30	7.08	7.6	4,010	761	228	149	8.7	778	1,760	92.4	0.07	92.4	-0.001
EPA 25	3/5/02	6,852.30	6.98	7.7	3,980	731	230	158	8.2	827	1,800	89.3	0.07	91.6	-0.001
EPA 25	4/2/02	6,852.20	6.89	7.84	4,070	760	226	161	9	854	1,800	87.3	0.08	91.8	-0.001
EPA 25	5/7/02	6,852.40	6.95	7.68	4,030	733	222	158	9.1	828	1,720	88.3	0.07	91.5	-0.001
EPA 25	6/4/02	6,852.35	6.9	7.7	4,050	745	230	149	7.6	831	1,780	79.9	0.07	85.6	-0.001
EPA 25	7/9/02	6,852.25	6.9	7.84	4,130	719	230	165	6.6	850	1,760	106	0.2	92.5	-0.001

TABLE 2.2

WATER QUALITY DATA

SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		**NA**	**0.05**	**0.05**	**0.01**	**NA**	**0.05**	**NA**	**NA**	**0.05**	**0.01**	**0.1**	**0.3**	**5.0**	**5.0**	**1.0**	**15.0**
EPA Standard		**5.0**	**0.05**	**0.017**	**0.01**	**0.05**	**0.05**	**2.6**	**1.0**	**0.2**	**0.01**	**0.7**	**5.0**	**5.0**	**NA**	**NA**	**15.0**
EPA 25	1/9/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.25	-0.1	-0.05	0.002	-0.1	0.086	- 2.9	-0.2	-1	-1
EPA 25	2/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.33	-0.1	-0.05	0.002	-0.1	0.094	- 1.2	-0.2	-1	-1
EPA 25	3/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.35	-0.1	-0.05	0.001	-0.1	0.0911	- 2.6	-0.2	-1	-1
EPA 25	4/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.45	-0.1	-0.05	0.001	-0.1	0.091	- 1.2	-0.2	-1	-1
EPA 25	5/8/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.42	-0.1	-0.05	0.001	-0.1	0.091	- 1.2	-0.2	-1	-1
EPA 25	6/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.53	-0.1	-0.05	0.001	-0.1	0.09	- 1.2	-0.2	-1	-1
EPA 25	7/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.58	-0.1	-0.05	0.001	-0.1	0.0981	- 1.2	-0.2	-1	-1
EPA 25	8/7/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.4	-0.1	-0.05	-0.001	-0.1	0.1	- 1.2	-0.2	-1	-1
EPA 25	9/11/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.5	-0.1	-0.05	-0.001	-0.1	0.0904	- 1.2	-0.2	-1	-1
EPA 25	10/2/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.42	-0.1	-0.05	-0.001	-0.1	0.0949	- 1.2	-0.2	-1	-1
EPA 25	11/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.46	-0.1	-0.05	-0.001	-0.1	0.0852	- 1.3	-0.2	-1	-1
EPA 25	12/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.21	-0.1	-0.05	-0.001	-0.1	0.0877	- 1.2	-0.2	-1	-1
EPA 25	1/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.45	-0.1	-0.05	-0.001	-0.1	0.0872	- 1.2	-0.2	-1	-1
EPA 25	2/5/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.61	-0.1	-0.05	-0.001	-0.1	0.0814	2.8	-0.2	-1	-1
EPA 25	3/5/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.69	-0.1	-0.05	-0.001	-0.1	0.0975	- 2.1	-0.2	-1	-1
EPA 25	4/2/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.6	-0.1	-0.05	-0.001	-0.1	0.0939	- 1.2	-0.2	-1	-1
EPA 25	5/7/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.77	-0.1	-0.05	-0.001	-0.1	0.0994	- 1.2	-0.2	-1	-1
EPA 25	6/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.49	-0.1	-0.05	-0.001	-0.1	0.0864	- 1.2	-0.2	-1	-1
EPA 25	7/9/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.45	-0.1	-0.05	-0.001	-0.1	0.087	- 1.2	-0.2	-1	-1

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
NRC Standard		**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**0.001**
EPA Standard		**NA**	**NA**	**NA**	**4,800**	**NA**	**NA**	**NA**	**NA**	**NA**	**2,125**	**250**	**NA**	**190**	**NA**
EPA 28	1/8/01	6,856.15	6.88	7.66	5,110	538	512	179	11.4	633	2,850	116	-0.05	51	-0.001
EPA 28	2/5/01	6,856.40	7.01	7.56	5,090	615	567	178	12.2	636	3,060	107	-0.05	47.6	-0.001
EPA 28	3/5/01	6,856.35	7.56	7.53	4,670	535	515	155	12.3	644	2,910	103	-0.05	49.4	-0.001
EPA 28	4/10/01	6,856.70	7.13	7.42	4,950	596	546	188	12.1	650	3,010	117	-0.05	50.1	-0.001
EPA 28	5/8/01	6,856.70	6.81	7.62	5,120	520	489	190	11.5	647	2,480	118	0.09	53.6	-0.001
EPA 28	6/5/01	6,856.75	6.84	7.35	4,510	546	532	191	10.3	635	2,870	113	0.07	42.3	-0.001
EPA 28	7/10/01	6,856.90	6.94	7.33	5,220	554	542	208	11.6	628	2,690	97	0.05	48.3	-0.001
EPA 28	8/7/01	6,856.90	6.72	7.7	5,220	510	500	190	12	625	2,600	120	0.05	42	-0.001
EPA 28	9/11/01	6,857.05	6.74	7.5	5,100	520	500	186	12.1	649	2,600	143	0.05	55	-0.001
EPA 28	10/1/01	6,857.25	6.86	7.4	5,210	510	500	184	12.2	652	2,500	148	0.05	48.8	-0.001
EPA 28	11/6/01	6,857.25	6.75	7.6	5,190	554	525	193	12.8	644	2,820	143	0.05	50	-0.001
EPA 28	12/4/01	6,857.40	6.91	7.5	5,190	517	488	170	11	645	2,560	123	0.05	48	-0.001
EPA 28	1/8/02	6,857.40	6.96	7.5	5,170	603	538	182	12.3	658	3,010	150	-0.05	44.8	-0.001
EPA 28	2/5/02	6,857.60	7.01	7.5	5,230	586	515	193	12.2	652	2,830	136	0.1	43.1	-0.001
EPA 28	3/5/02	6,857.50	6.81	7.6	5,160	549	508	208	12.4	682	2,870	137	0.05	45.9	-0.001
EPA 28	4/2/02	6,857.70	6.74	7.65	5,140	572	520	206	13.6	675	2,960	134	0.06	42.1	-0.001
EPA 28	5/7/02	6,857.65	6.8	7.58	5,200	546	507	210	13.1	652	2,780	119	-0.05	43.9	-0.001
EPA 28	6/4/02	6,857.79	6.74	7.83	5,150	531	485	192	11.4	656	2,660	116	0.07	44.9	-0.001
EPA 28	7/9/02	6,857.60	6.8	7.58	5,250	549	524	202	13.1	683	2,850	120	-0.05	43.4	-0.001

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		NA	0.05	0.05	0.01	NA	0.05	NA	NA	0.05	0.01	0.1	0.3	5.0	5.0	1.0	15.0
EPA Standard		5.0	0.05	0.017	0.01	0.05	0.05	2.6	1.0	0.2	0.01	0.7	5.0	5.0	NA	NA	15.0
EPA 28	1/8/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.42	-0.1	-0.05	-0.001	-0.1	0.039	- 1.2	-0.2	-1	-1
EPA 28	2/5/01	0.6	-0.001	-0.01	-0.005	-0.01	-0.05	0.42	-0.1	-0.05	-0.001	-0.1	0.042	- 1.5	-0.2	-1	-1
EPA 28	3/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.45	-0.1	-0.05	-0.001	-0.1	0.0398	- 1.2	-0.2	-1	-1
EPA 28	4/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.43	-0.1	-0.05	-0.001	-0.1	0.037	2.5	-0.2	-1	-1
EPA 28	5/8/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.47	-0.1	-0.05	-0.001	-0.1	0.042	- 1.2	-0.2	-1	-1
EPA 28	6/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.47	-0.1	-0.05	0.001	-0.1	0.038	- 1.4	-0.2	-1	-1
EPA 28	7/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.48	-0.1	-0.05	-0.001	-0.1	0.0403	- 1.7	-0.2	-1	-1
EPA 28	8/7/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.48	-0.1	-0.05	-0.001	-0.1	0.043	2.8	-0.2	-1	-1
EPA 28	9/11/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.42	-0.1	-0.05	-0.001	-0.1	0.037	- 1.3	-0.2	-1	-1
EPA 28	10/1/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.4	-0.1	-0.05	-0.001	-0.1	0.0374	- 1.7	-0.2	-1	-1
EPA 28	11/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.44	-0.1	-0.05	-0.001	-0.1	0.0354	- 1.6	-0.2	-1	-1
EPA 28	12/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.42	-0.1	-0.05	-0.001	-0.1	0.0358	- 1.2	-0.2	-1	-1
EPA 28	1/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.43	-0.1	-0.05	-0.001	-0.1	0.036	- 1.6	-0.2	-1	-1
EPA 28	2/5/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.44	-0.1	-0.05	-0.001	-0.1	0.0291	- 1.7	-0.2	-1	-1
EPA 28	3/5/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.59	-0.1	-0.05	-0.001	-0.1	0.0519	- 1.2	-0.2	-1	-1
EPA 28	4/2/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.46	-0.1	-0.05	-0.001	-0.1	0.0397	2.9	-0.2	-1	-1
EPA 28	5/7/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.47	-0.1	-0.05	-0.001	-0.1	0.0388	- 1.9	-0.2	-1	-1
EPA 28	6/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.5	-0.1	-0.05	-0.001	-0.1	0.0378	- 2.7	-0.2	-1	-1
EPA 28	7/9/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.41	-0.1	-0.05	-0.001	-0.1	0.0464	- 1.8	-0.2	-1	-1

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
	NRC Standard	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.001
	EPA Standard	NA	NA	NA	4,800	NA	NA	NA	NA	NA	2,125	250	NA	190	NA
GW 1	1/8/01	6,856.00	6.73	7.75	4,290	628	316	196	5.2	944	1,830	112	0.76	79.9	-0.001
GW 1	2/5/01	6,856.20	6.91	7.44	4,270	721	352	184	6.1	960	2,110	114	0.77	73.7	-0.001
GW 1	3/5/01	6,856.50	7.15	7.4	4,080	635	323	166	6.1	975	2,070	104	0.79	74.2	-0.001
GW 1	4/4/01	6,856.70	7	7.5	4,360	713	347	201	4.1	946	2,070	116	0.79	84.7	-0.001
GW 1	5/8/01	6,856.80	6.72	7.51	4,500	628	314	201	4.7	944	1,830	124	0.79	78.2	-0.001
GW 1	6/4/01	6,857.05	6.67	6.98	4,420	635	322	187	4.7	944	1,980	119	0.83	76.4	-0.001
GW 1	7/10/01	6,857.10	7.12	7.47	4,680	694	353	197	4.1	892	2,110	134	0.8	86.7	-0.001
GW 1	8/7/01	6,857.12	6.61	7.5	4,910	650	340	210	4.5	878	2,100	140	0.69	84	-0.001
GW 1	9/11/01	6,857.25	6.64	7.4	4,960	690	350	214	4.6	899	2,200	140	0.68	101	-0.001
GW 1	10/1/01	6,857.40	6.73	7.8	5,190	690	350	206	5.3	913	2,200	170	0.63	91.5	-0.001
GW 1	11/5/01	6,857.50	6.68	7.2	5,260	775	386	219	5.1	950	2,540	150	0.59	95	-0.001
GW 1	12/4/01	6,857.65	6.83	7.3	5,300	722	361	197	4.4	984	2,270	145	0.64	96	-0.001
GW 1	1/8/02	6,857.70	6.89	7.2	5,310	841	408	173	6.9	991	2,650	157	0.59	82	-0.001
GW 1	2/4/02	6,857.75	6.87	7.4	5,360	808	398	206	6.2	1,010	2,530	167	0.59	80.5	-0.001
GW 1	3/4/02	6,857.75	6.7	7.3	5,360	764	408	260	4.4	1,080	2,630	151	0.6	92.2	-0.001
GW 1	4/1/02	6,857.90	6.65	7.38	5,470	791	419	240	6.2	1,100	2,620	162	0.58	83.2	-0.001
GW 1	5/6/02	6,857.95	6.63	7.56	5,490	763	418	245	5.8	1,110	2,450	160	0.56	91	-0.001
GW 1	6/3/02	6,857.97	6.58	7.61	5,530	755	423	230	4.3	1,150	2,400	150	0.57	96	-0.001
GW 1	7/8/02	6,857.75	6.65	7.8	5,630	753	454	190	6.6	1,200	2,500	140	0.54	99.9	-0.001

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		NA	0.05	0.05	0.01	NA	0.05	NA	NA	0.05	0.01	0.1	0.3	5.0	5.0	1.0	15.0
EPA Standard		5.0	0.05	0.017	0.01	0.05	0.05	2.6	1.0	0.2	0.01	0.7	5.0	5.0	NA	NA	15.0
GW 1	1/8/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.04	-0.1	-0.05	0.001	-0.1	0.063	- 5.3	-0.2	-1	-1
GW 1	2/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.05	-0.1	-0.05	-0.001	-0.1	0.068	- 1.3	-0.2	-1	-1
GW 1	3/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.05	-0.1	-0.05	-0.001	-0.1	0.0671	- 4.1	-0.2	-1	-1
GW 1	4/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.05	-0.1	-0.05	-0.001	-0.1	0.068	- 1.2	-0.2	-1	-1
GW 1	5/8/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.05	-0.1	-0.05	-0.001	-0.1	0.075	- 1.2	-0.2	-1	-1
GW 1	6/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.05	-0.1	-0.05	0.009	-0.1	0.065	- 1.2	-0.2	-1	-1
GW 1	7/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.05	-0.1	-0.05	-0.001	-0.1	0.0731	- 1.2	-0.2	-1	-1
GW 1	8/7/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.05	-0.1	-0.05	-0.001	-0.1	0.081	- 1.2	-0.2	-1	-1
GW 1	9/11/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.04	-0.1	-0.05	-0.001	-0.1	0.0764	- 1.2	-0.2	-1	-1
GW 1	10/1/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.04	-0.1	-0.05	-0.001	-0.1	0.0903	- 1.2	-0.2	-1	-1
GW 1	11/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.04	-0.1	-0.05	-0.001	-0.1	0.0872	- 1.4	-0.2	-1	-1
GW 1	12/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.04	-0.1	-0.05	-0.001	-0.1	0.0957	- 1.2	-0.2	-1	-1
GW 1	1/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.04	-0.1	-0.05	-0.001	-0.1	0.0976	- 1.3	-0.2	-1	-1
GW 1	2/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.04	-0.1	-0.05	-0.001	-0.1	0.0926	- 2.0	-0.2	-1	-1
GW 1	3/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.05	-0.1	-0.05	-0.001	-0.1	0.108	- 1.2	-0.2	-1	-1
GW 1	4/1/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.05	-0.1	-0.05	-0.001	-0.1	0.102	- 1.2	-0.2	-1	-1
GW 1	5/6/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.05	-0.1	0.05	-0.001	-0.1	0.114	- 1.2	-0.2	-1	-1
GW 1	6/3/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.05	-0.1	-0.05	-0.001	-0.1	0.108	- 1.2	-0.2	-1	-1
GW 1	7/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.04	-0.1	-0.05	-0.001	-0.1	0.128	- 1.2	-0.2	-1	-1

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
	NRC Standard	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.001
	EPA Standard	NA	NA	NA	4,800	NA	NA	NA	NA	NA	2,125	250	NA	190	NA
GW 1Dup	12/4/01	6,857.65	6.87	7.4	5,260	716	351	219	3.9	946	2,250	137	0.46	96	-0.001
GW 1Dup	1/8/02	6,857.65	6.9	7.3	5,260	844	401	176	6.8	978	2,660	159	0.51	81.5	-0.001
GW 1Dup	5/6/02	6,857.88	6.7	7.67	5,470	770	409	248	5.6	1,100	2,440	158	0.46	93.2	-0.001

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		**NA**	**0.05**	**0.05**	**0.01**	**NA**	**0.05**	**NA**	**NA**	**0.05**	**0.01**	**0.1**	**0.3**	**5.0**	**5.0**	**1.0**	**15.0**
EPA Standard		**5.0**	**0.05**	**0.017**	**0.01**	**0.05**	**0.05**	**2.6**	**1.0**	**0.2**	**0.01**	**0.7**	**5.0**	**5.0**	**NA**	**NA**	**15.0**
GW 1Dup	12/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.03	-0.1	-0.05	-0.001	-0.1	0.095	- 1.2	-0.2	-1	-1
GW 1Dup	1/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.04	-0.1	-0.05	-0.001	-0.1	0.102	- 1.2	-0.2	-1	-1
GW 1Dup	5/6/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.04	-0.1	0.05	-0.001	-0.1	0.102	- 1.2	-0.2	-1	-1

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
NRC Standard		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.001**
EPA Standard		NA	NA	NA	**4,800**	NA	NA	NA	NA	NA	**2,125**	**250**	NA	**190**	NA
GW 2	1/8/01	6,858.10	6.51	7.23	5,270	599	537	211	9.7	1,420	2,620	159	0.09	4.04	-0.001
GW 2	2/6/01	6,858.65	6.79	7.37	5,290	679	578	230	10.4	1,410	2,800	153	0.05	3.84	-0.001
GW 2	3/6/01	6,858.80	6.86	7.54	5,150	586	528	275	10.6	1,400	2,680	140	-0.05	3.36	-0.001
GW 2	4/9/01	6,859.30	6.92	7.26	5,200	668	568	220	10.1	1,420	2,730	152	-0.05	3.68	-0.001
GW 2	5/7/01	6,859.20	6.46	7.57	5,330	590	514	217	9.7	1,420	2,390	168	0.11	3.49	-0.001
GW 2	6/4/01	6,859.55	6.47	7.33	4,490	583	520	184	9.5	1,390	2,460	164	0.09	3.8	-0.001
GW 2	7/9/01	6,859.61	7.09	7.12	5,340	624	561	210	9.3	1,450	2,450	166	-0.05	4.4	-0.001
GW 2	8/7/01	6,859.45	6.43	7.2	5,320	570	520	220	9.8	1,460	2,300	170	-0.05	4.4	-0.001
GW 2	9/10/01	6,859.70	6.38	7.1	5,270	600	530	209	10.1	1,500	2,400	177	-0.05	6.3	-0.001
GW 2	10/1/01	6,859.80	6.48	7.6	5,330	570	510	222	10.7	1,480	2,200	202	0.07	6	-0.001
GW 2	11/5/01	6,860.10	6.5	7.1	5,340	619	532	212	10.8	1,460	2,550	200	0.05	7.6	-0.001
GW 2	12/3/01	6,860.20	6.47	7.1	5,320	582	494	195	9.5	1,480	2,270	182	0.06	8.6	-0.001
GW 2	1/8/02	6,860.10	6.54	7	5,300	683	543	186	11	1,460	2,640	199	-0.05	9	-0.001
GW 2	2/4/02	6,860.35	6.57	7.2	5,310	662	519	201	10.9	1,470	2,490	205	0.09	11.4	-0.001
GW 2	3/4/02	6,860.10	6.49	7.3	5,290	622	512	230	10.7	1,470	2,540	203	0.06	15.9	-0.001
GW 2	4/1/02	6,860.28	6.38	7.15	5,350	656	520	229	11.6	1,520	2,590	196	0.05	17	-0.001
GW 2	5/6/02	6,860.32	6.38	7.36	5,340	643	509	239	11.6	1,530	2,410	199	0.06	20.4	-0.001
GW 2	6/3/02	6,860.33	6.36	7.38	5,390	645	508	216	9.8	1,560	2,360	178	-0.05	22	-0.001
GW 2	7/8/02	6,859.98	6.25	7.67	5,470	648	530	178	11.3	1,600	2,430	208	0.16	22.5	-0.001

TABLE 2.2

WATER QUALITY DATA

SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		**NA**	**0.05**	**0.05**	**0.01**	**NA**	**0.05**	**NA**	**NA**	**0.05**	**0.01**	**0.1**	**0.3**	**5.0**	**5.0**	**1.0**	**15.0**
EPA Standard		**5.0**	**0.05**	**0.017**	**0.01**	**0.05**	**0.05**	**2.6**	**1.0**	**0.2**	**0.01**	**0.7**	**5.0**	**5.0**	**NA**	**NA**	**15.0**
GW 2	1/8/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.49	-0.1	-0.05	-0.001	-0.1	0.063	- 1.2	-0.2	-1	-1
GW 2	2/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.5	-0.1	-0.05	-0.001	-0.1	0.065	- 1.2	-0.2	-1	-1
GW 2	3/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.5	-0.1	-0.05	-0.001	-0.1	0.0626	- 1.2	-0.2	-1	-1
GW 2	4/9/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.54	-0.1	-0.05	-0.001	-0.1	0.074	- 1.2	-0.2	-1	-1
GW 2	5/7/01	0.15	-0.001	-0.01	-0.005	-0.01	-0.05	0.59	-0.1	-0.05	-0.001	-0.1	0.067	- 1.2	-0.2	-1	-1
GW 2	6/4/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	0.51	-0.1	-0.05	0.004	-0.1	0.061	- 1.2	-0.2	-1	-1
GW 2	7/9/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.53	-0.1	-0.05	-0.001	-0.1	0.0683	- 1.2	-0.2	-1	-1
GW 2	8/7/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.5	-0.1	-0.05	-0.001	-0.1	0.075	- 2.4	-0.2	-1	-1
GW 2	9/10/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.48	-0.1	-0.05	-0.001	-0.1	0.0627	- 1.2	-0.2	-1	-1
GW 2	10/1/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.45	-0.1	-0.05	-0.001	-0.1	0.0659	- 1.3	-0.2	-1	-1
GW 2	11/5/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.5	-0.1	-0.05	-0.001	-0.1	0.0584	- 1.4	-0.2	-1	-1
GW 2	12/3/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.45	-0.1	-0.05	-0.001	-0.1	0.0622	- 1.2	-0.2	-1	-1
GW 2	1/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.47	-0.1	-0.05	-0.001	-0.1	0.0609	1.6	-0.2	-1	-1
GW 2	2/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.48	-0.1	-0.05	-0.001	-0.1	0.0551	- 1.2	-0.2	-1	-1
GW 2	3/4/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.58	-0.1	-0.05	-0.001	-0.1	0.0833	- 1.4	-0.2	-1	-1
GW 2	4/1/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.52	-0.1	-0.05	-0.001	-0.1	0.0664	- 1.4	-0.2	-1	-1
GW 2	5/6/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.52	-0.1	-0.05	-0.001	-0.1	0.0738	- 1.2	-0.2	-1	-1
GW 2	6/3/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.52	-0.1	-0.05	-0.001	-0.1	0.0646	- 1.2	-0.2	-1	-1
GW 2	7/8/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	0.48	-0.1	-0.05	-0.001	-0.1	0.0821	- 1.2	-0.2	-1	-1

TABLE 2.2

WATER QUALITY DATA

SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Water Elevation (ft amsl)	Field pH (SU)	Lab pH (SU)	Lab TDS (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Cl (mg/L)	NH4 as N (mg/L)	NO3 as N (mg/L)	Chloroform (mg/L)
NRC Standard		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.001**
EPA Standard		NA	NA	NA	**4,800**	NA	NA	NA	NA	NA	**2,125**	**250**	NA	**190**	NA
GW 3	1/9/01	6,858.00	6.82	7.62	4,660	830	265	207	8.5	1,210	1,850	125	-0.05	115	-0.001
GW 3	2/6/01	6,858.30	6.99	7.12	4,720	943	290	183	9.7	1,220	2,120	123	-0.05	110	-0.001
GW 3	3/6/01	6,858.70	7	7.63	4,380	817	263	164	9.3	1,180	2,040	120	0.16	112	-0.001
GW 3	4/10/01	6,859.05	7.26	7.2	4,680	945	287	207	9.1	1,250	2,070	128	0.14	108	-0.001
GW 3	5/8/01	6,859.10	6.72	7.49	4,850	808	256	195	8.9	1,250	1,730	146	0.15	107	-0.001
GW 3	6/5/01	6,859.30	6.76	7.25	4,230	847	274	194	8.6	1,280	1,940	136	0.2	97.5	-0.001
GW 3	7/10/01	6,859.30	6.87	7.1	4,980	888	288	244	9	1,350	1,880	125	0.11	98	-0.001
GW 3	8/7/01	6,859.32	6.59	7.2	5,010	820	270	210	9.4	1,390	1,800	160	0.11	90.5	-0.001
GW 3	9/11/01	6,859.50	6.65	7.5	4,980	840	270	233	8.9	1,400	1,810	154	0.1	104	-0.001
GW 3	10/1/01	6,859.55	6.83	7.4	5,010	810	260	224	8.5	1,450	1,950	169	0.15	92	-0.001
GW 3	11/6/01	6,859.65	6.79	7.6	5,020	886	280	229	9.6	1,420	2,050	173	0.08	88	-0.001
GW 3	12/4/01	6,859.80	6.95	7.4	5,020	833	260	201	8.2	1,440	1,720	148	0.11	91	-0.001
GW 3	1/8/02	6,859.80	6.9	7.2	5,050	983	293	192	10.2	1,440	2,200	171	0.09	86.5	-0.001
GW 3	2/5/02	6,859.80	6.91	7.2	5,110	960	281	219	9.5	1,440	2,080	165	0.11	82.3	-0.001
GW 3	3/5/02	6,859.85	6.77	7.4	5,090	914	283	246	8.9	1,490	2,160	160	0.09	84.3	-0.001
GW 3	4/2/02	6,859.90	6.76	7.59	5,240	968	291	236	10.5	1,480	2,110	168	0.1	83.6	-0.001
GW 3	5/7/02	6,859.92	6.51	7.44	5,320	953	288	250	10.2	1,510	2,120	159	0.08	82.4	-0.001
GW 3	6/4/02	6,859.95	6.68	7.67	5,330	958	293	236	8	1,520	2,110	148	0.1	83.4	-0.001
GW 3	7/9/02	6,859.65	6.71	7.38	5,430	953	302	157	8.8	1,560	2,170	127	0.24	93.2	-0.001

TABLE 2.2
WATER QUALITY DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST

Well Number	Date	Al (mg/L)	As (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Pb (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	V (mg/L)	U (mg/L)	Ra-226+ Ra-228 (pCi/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Gross Alpha (pCi/L)
NRC Standard		**NA**	**0.05**	**0.05**	**0.01**	**NA**	**0.05**	**NA**	**NA**	**0.05**	**0.01**	**0.1**	**0.3**	**5.0**	**5.0**	**1.0**	**15.0**
EPA Standard		**5.0**	**0.05**	**0.017**	**0.01**	**0.05**	**0.05**	**2.6**	**1.0**	**0.2**	**0.01**	**0.7**	**5.0**	**5.0**	**NA**	**NA**	**15.0**
GW 3	1/9/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	1.9	-0.1	-0.05	0.001	-0.1	0.056	- 3.8	-0.2	-1	-1
GW 3	2/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.91	-0.1	-0.05	0.002	-0.1	0.059	- 1.2	-0.2	-1	-1
GW 3	3/6/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.87	-0.1	-0.05	0.001	-0.1	0.0569	- 1.2	-0.2	-1	-1
GW 3	4/10/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	1.91	-0.1	-0.05	0.001	-0.1	0.057	- 2.6	-0.2	-1	1.3
GW 3	5/8/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.96	-0.1	-0.05	0.001	-0.1	0.06	- 1.2	-0.2	-1	-1
GW 3	6/5/01	0.1	-0.001	-0.01	-0.005	0.01	-0.05	2.06	-0.1	-0.05	0.005	-0.1	0.058	- 1.2	-0.2	-1	-1
GW 3	7/10/01	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	2.22	-0.1	-0.05	0.001	-0.1	0.0676	- 1.2	-0.2	-1	-1
GW 3	8/7/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2	-0.1	-0.05	-0.001	-0.1	0.071	- 1.4	-0.2	-1	-1
GW 3	9/11/01	0.13	-0.001	-0.01	-0.005	0.01	-0.05	1.99	-0.1	-0.05	0.001	-0.1	0.0655	- 1.2	-0.2	-1	-1
GW 3	10/1/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.78	-0.1	-0.05	0.001	-0.1	0.0646	- 1.3	-0.2	-1	-1
GW 3	11/6/01	0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.91	-0.1	-0.05	-0.001	-0.1	0.0632	- 1.4	-0.2	-1	-1
GW 3	12/4/01	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.93	-0.1	-0.05	-0.001	-0.1	0.0726	- 1.2	-0.2	-1	-1
GW 3	1/8/02	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	1.79	-0.1	-0.05	-0.001	-0.1	0.0635	1.8	-0.2	-1	-1
GW 3	2/5/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.89	-0.1	-0.05	-0.001	-0.1	0.0586	- 1.2	-0.2	-1	-1
GW 3	3/5/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.34	-0.1	-0.05	-0.001	-0.1	0.0805	- 1.5	-0.2	-1	-1
GW 3	4/2/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	2.08	-0.1	-0.05	-0.001	0.1	0.0704	- 1.2	-0.2	-1	-1
GW 3	5/7/02	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	2.18	-0.1	-0.05	-0.001	-0.1	0.08	- 1.2	-0.2	-1	-1
GW 3	6/4/02	-0.1	-0.001	-0.01	-0.005	0.01	-0.05	1.97	-0.1	-0.05	-0.001	-0.1	0.0789	- 1.4	-0.2	-1	-1
GW 3	7/9/02	-0.1	-0.001	-0.01	-0.005	-0.01	-0.05	1.79	-0.1	-0.05	-0.001	-0.1	0.0934	- 1.2	-0.2	-1	-1

TABLE 3.1
COST ANALYSIS SUMMARY
SOUTHWEST ALLUVIUM FINAL REPORT AND TI EVALUATION

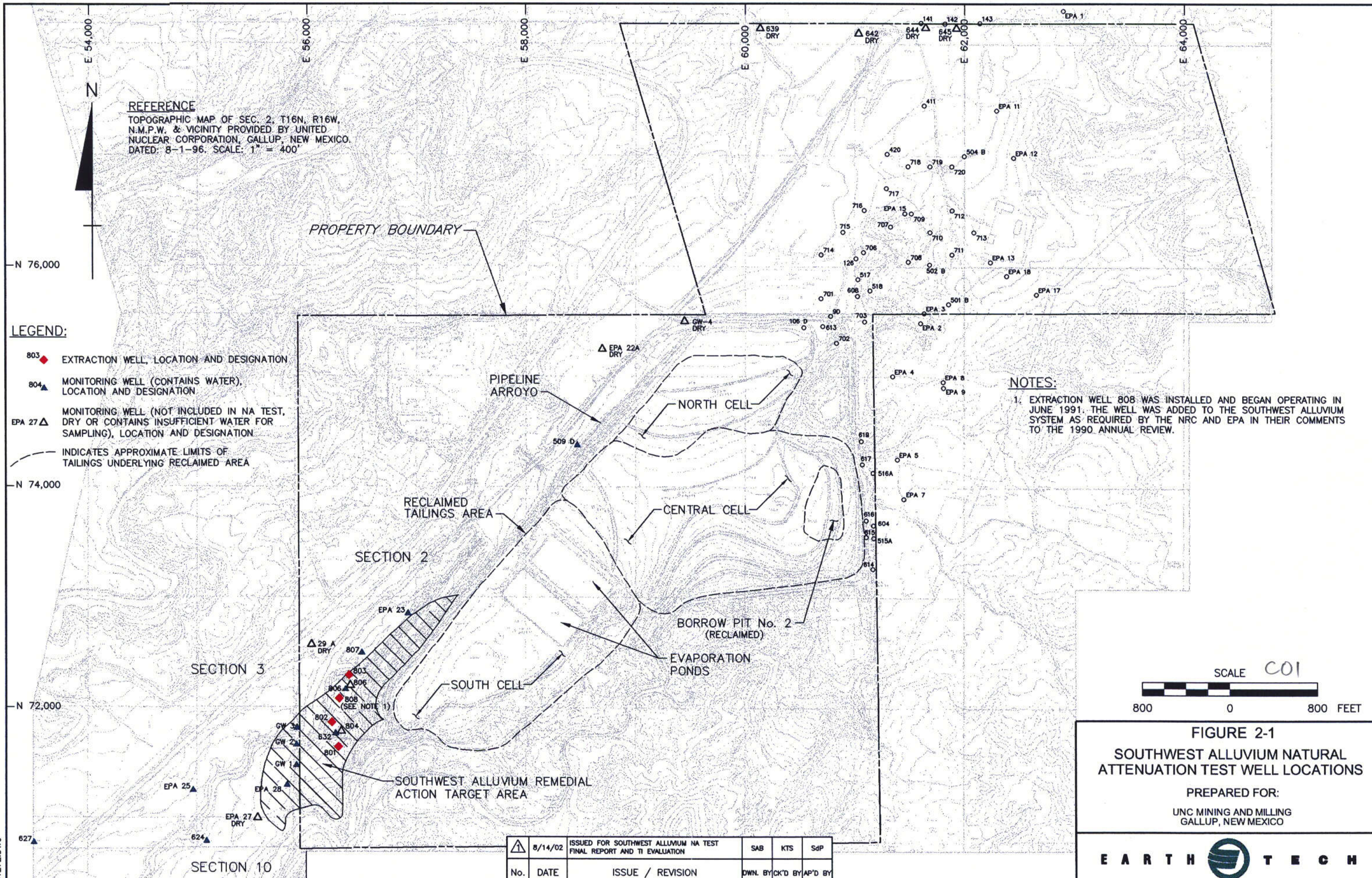
Existing Remedial Action System

Activity	Units	Unit Cost	Yearly Cost	10 Year Cost
Active Remediation				
Labor	1 full-time person	17.28/hr	$ 35,942	$ 359,424
Replace Pumps	6/yr	$ 1,000	$ 6,000	$ 60,000
Replace Collection Piping	300 ft/yr	$ 8	$ 2,400	$ 24,000
Electrical	7056 kwh/month	$ 0.09	$ 7,620	$ 76,205
Monitoring				
Labor	10 man-weeks/yr	17.28/hr	$ 6,912	$ 69,120
Laboratory & Sample Handling	14 wells - 4 times/yr	$450/sample	$ 25,200	$ 252,000
Replace/Repair Equipment	2/yr	$ 400	$ 800	$ 8,000
Misc. Equipment (gas, filters etc.)	1/event	$ 300	$ 1,200	$ 12,000
Total			$ 86,075	$ 860,749

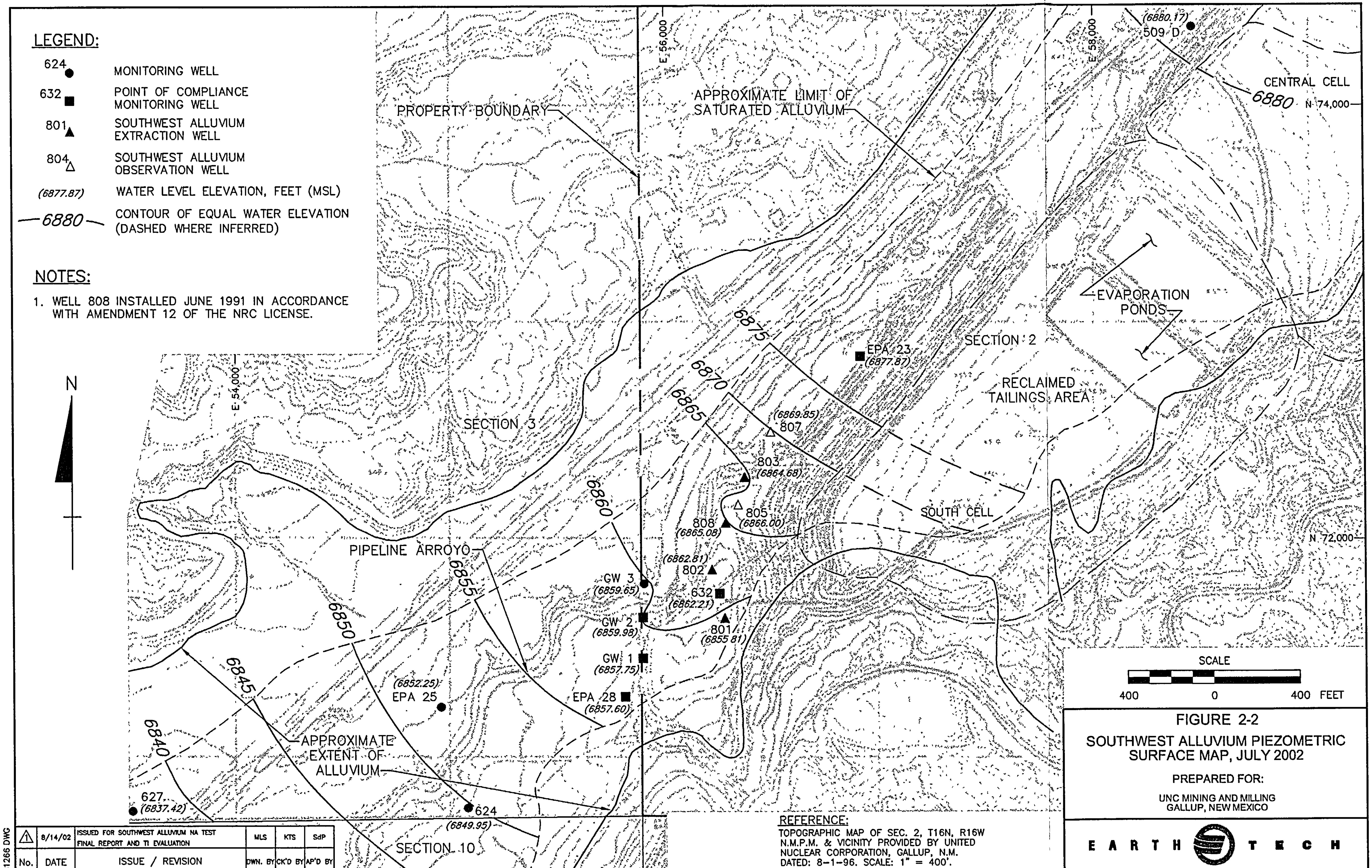
Natural Attenuation Monitoring

Activity	Units	Unit Cost	Yearly Cost	10 Year Cost
Monitored Natural Attenuation	none	none	$ -	$ -
Monitoring				
Labor	10 man-weeks/yr	17.28/hr	$ 6,912	$ 69,120
Laboratory & Sample Handling	14 wells - 4 times/yr	$450/sample	$ 25,200	$ 252,000
Replace/Repair Equipment	2/yr	$ 400	$ 800	$ 8,000
Misc. Equipment (gas, filters etc.)	1/event	$ 300	$ 1,200	$ 12,000
Total			$ 34,112	$ 341,120

FIGURES



REFERENCE
TOPOGRAPHIC MAP OF SEC. 2, T16N, R16W, N.M.P.W. & VICINITY PROVIDED BY UNITED NUCLEAR CORPORATION, GALLUP, NEW MEXICO. DATED: 8-1-96. SCALE: 1" = 400'
N
E 54,000
E 56,000
E 58,000
E 60,000
E 62,000
E 64,000
N 76,000
N 74,000
N 72,000
LEGEND:
803 EXTRACTION WELL, LOCATION AND DESIGNATION
804 MONITORING WELL (CONTAINS WATER), LOCATION AND DESIGNATION
EPA 27 MONITORING WELL (NOT INCLUDED IN NA TEST, DRY OR CONTAINS INSUFFICIENT WATER FOR SAMPLING), LOCATION AND DESIGNATION
INDICATES APPROXIMATE LIMITS OF TAILINGS UNDERLYING RECLAIMED AREA
PROPERTY BOUNDARY
PIPELINE ARROYO
NORTH CELL
CENTRAL CELL
SOUTH CELL
RECLAIMED TAILINGS AREA
SECTION 2
SECTION 3
SECTION 10
BORROW PIT No. 2 (RECLAIMED)
EVAPORATION PONDS
SOUTHWEST ALLUVIUM REMEDIAL ACTION TARGET AREA
808 (SEE NOTE 1)
GW-4 DRY
EPA 22A DRY
29 A DRY
EPA 27 DRY
639 DRY
642 DRY
644 DRY
645 DRY
NOTES:
1. EXTRACTION WELL 808 WAS INSTALLED AND BEGAN OPERATING IN JUNE 1991. THE WELL WAS ADDED TO THE SOUTHWEST ALLUVIUM SYSTEM AS REQUIRED BY THE NRC AND EPA IN THEIR COMMENTS TO THE 1990 ANNUAL REVIEW.
SCALE C01
800 0 800 FEET
FIGURE 2-1
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST WELL LOCATIONS
PREPARED FOR:
UNC MINING AND MILLING GALLUP, NEW MEXICO
EARTH TECH
1 8/14/02 ISSUED FOR SOUTHWEST ALLUVIUM NA TEST FINAL REPORT AND TI EVALUATION SAB KTS SdP
No. DATE ISSUE / REVISION DWN. BY CK'D BY AP'D BY
B1272.DWG


LEGEND:
624 MONITORING WELL
632 POINT OF COMPLIANCE MONITORING WELL
801 SOUTHWEST ALLUVIUM EXTRACTION WELL
804 SOUTHWEST ALLUVIUM OBSERVATION WELL
(6877.87) WATER LEVEL ELEVATION, FEET (MSL)
6880 CONTOUR OF EQUAL WATER ELEVATION (DASHED WHERE INFERRED)
NOTES:
1. WELL 808 INSTALLED JUNE 1991 IN ACCORDANCE WITH AMENDMENT 12 OF THE NRC LICENSE.
N
PROPERTY BOUNDARY
APPROXIMATE LIMIT OF SATURATED ALLUVIUM
E 56,000
E 58,000
E 54,000
(6880.17) 509 D
CENTRAL CELL
6880
N 74,000
EVAPORATION PONDS
SECTION 2
SECTION 3
SECTION 10
RECLAIMED TAILINGS AREA
SOUTH CELL
N 72,000
EPA 23 (6877.87)
(6869.85) 807
803 (6864.68)
805 (6866.00)
808 (6865.08)
(6862.81) 802
632 (6862.21)
801 (6855.81)
GW 3 (6859.65)
GW 2 (6859.98)
GW 1 (6857.75)
EPA 28 (6857.60)
(6852.25) EPA 25
624 (6849.95)
627 (6837.42)
PIPELINE ARROYO
APPROXIMATE EXTENT OF ALLUVIUM
6875
6870
6865
6860
6855
6850
6845
6840
SCALE
400 0 400 FEET
REFERENCE:
TOPOGRAPHIC MAP OF SEC. 2, T16N, R16W N.M.P.M. & VICINITY PROVIDED BY UNITED NUCLEAR CORPORATION, GALLUP, N.M. DATED: 8-1-96. SCALE: 1" = 400'.
FIGURE 2-2
SOUTHWEST ALLUVIUM PIEZOMETRIC SURFACE MAP, JULY 2002
PREPARED FOR:
UNC MINING AND MILLING GALLUP, NEW MEXICO
EARTH TECH
1 8/14/02 ISSUED FOR SOUTHWEST ALLUVIUM NA TEST FINAL REPORT AND TI EVALUATION MLS KTS SdP
No. DATE ISSUE / REVISION DWN. BY CK'D BY AP'D BY
B1266 DWG

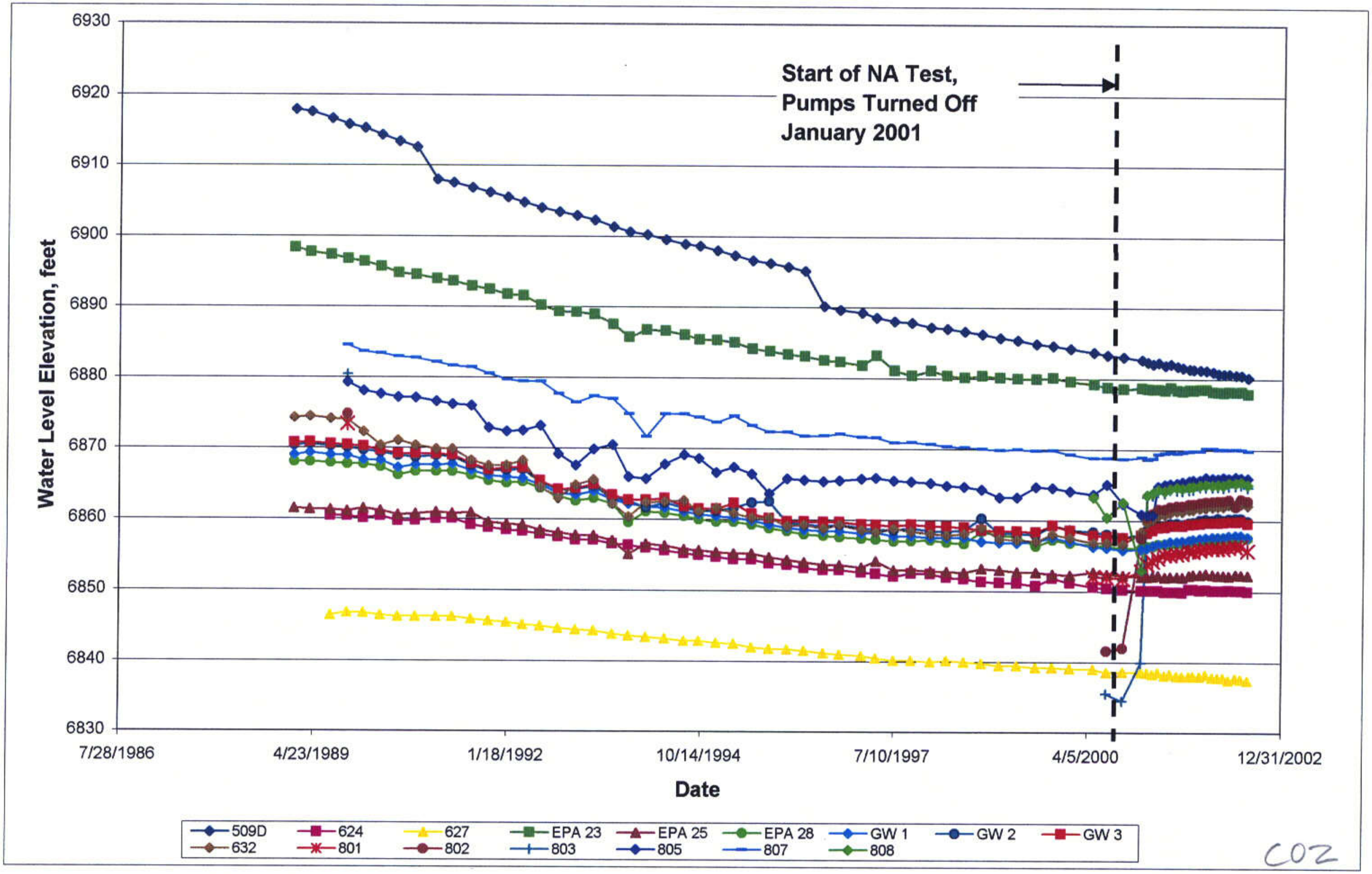


FIGURE 2-3A
SOUTHWEST ALLUVIUM WATER LEVELS OVER TIME

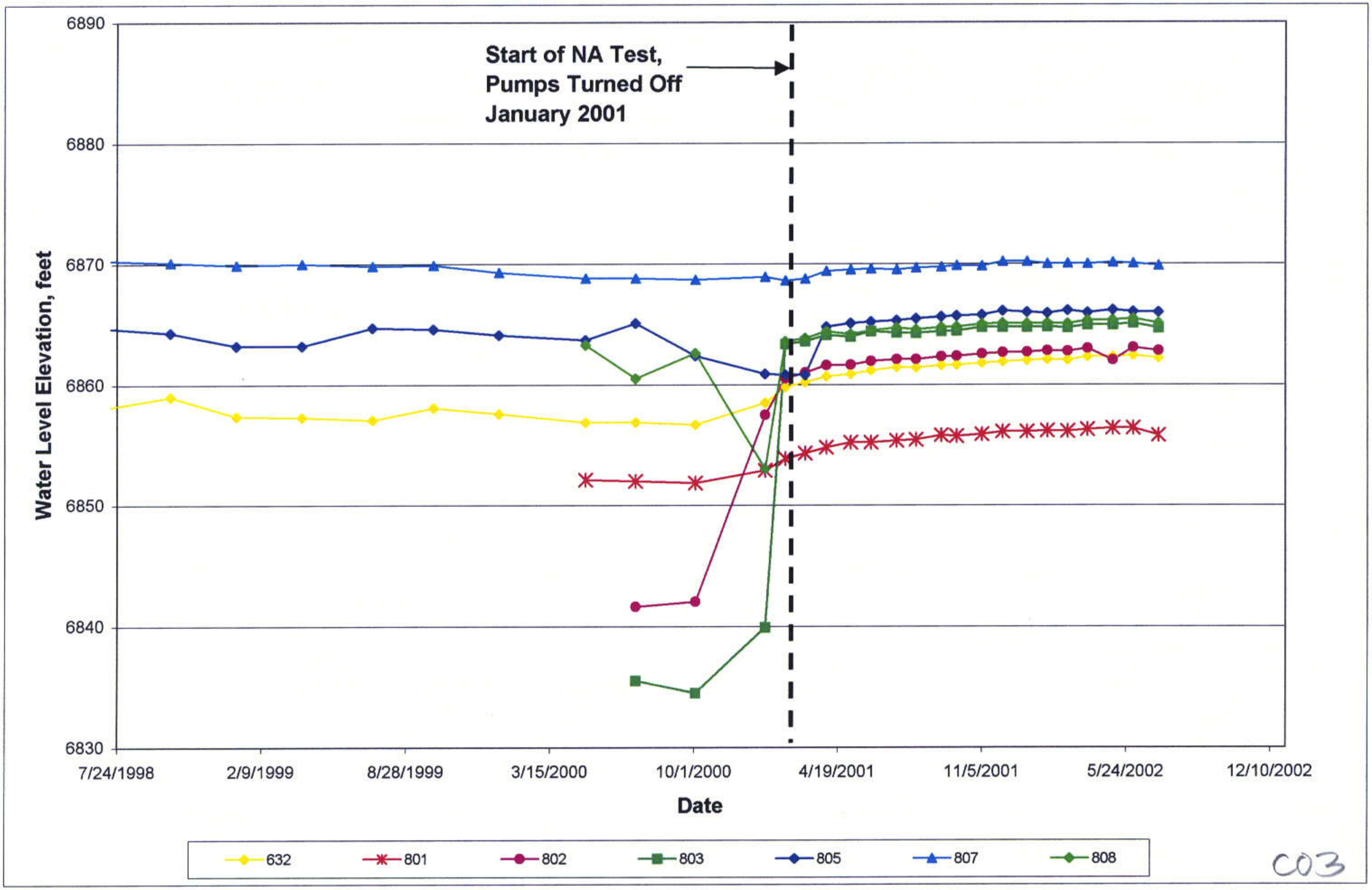
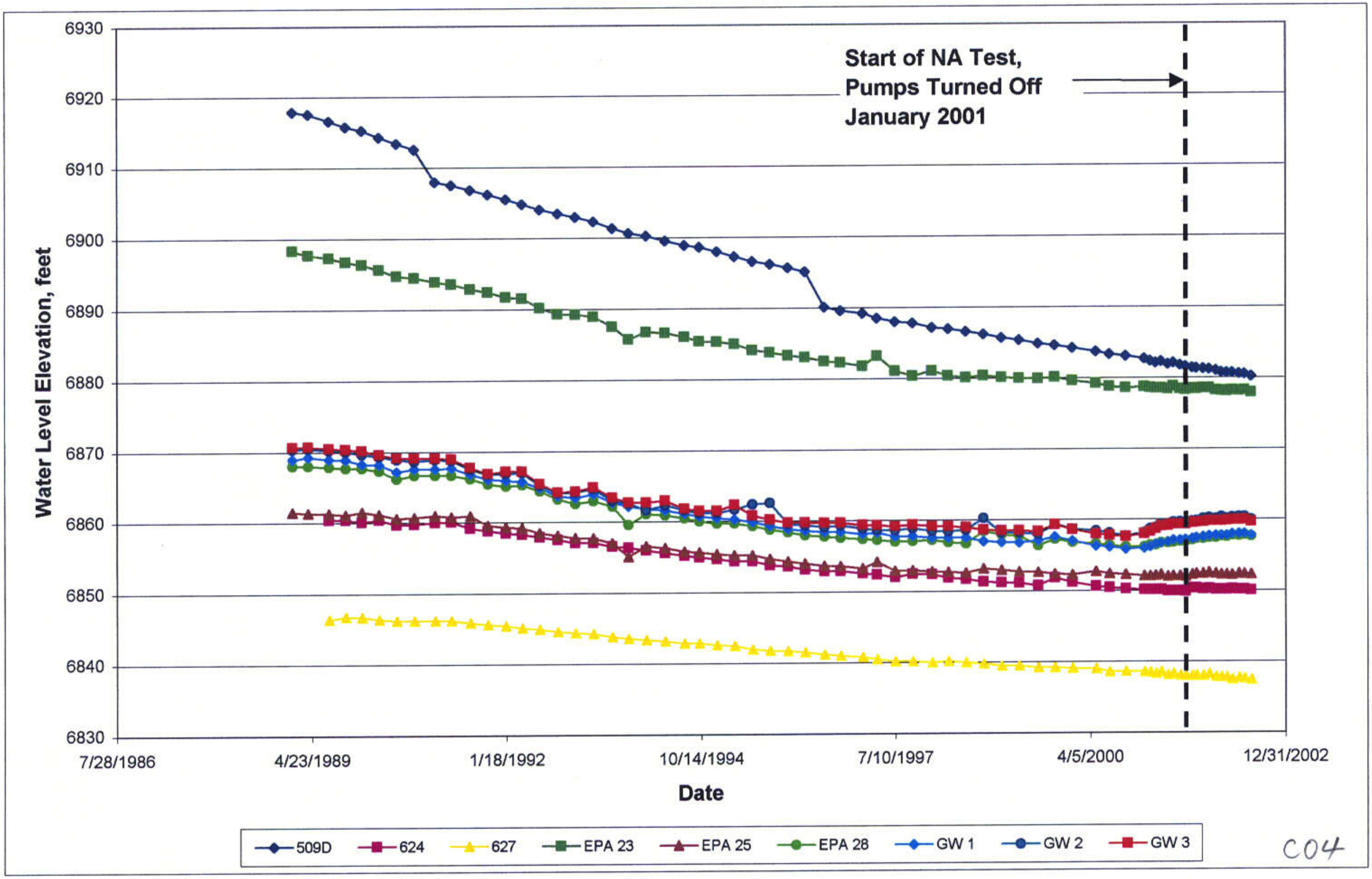


FIGURE 2-3B
SOUTHWEST ALLUVIUM
PUMPING WELL WATER LEVELS OVER TIME



C04

FIGURE 2-3C
SOUTHWEST ALLUVIUM
MONITORING WELL WATER LEVELS OVER TIME

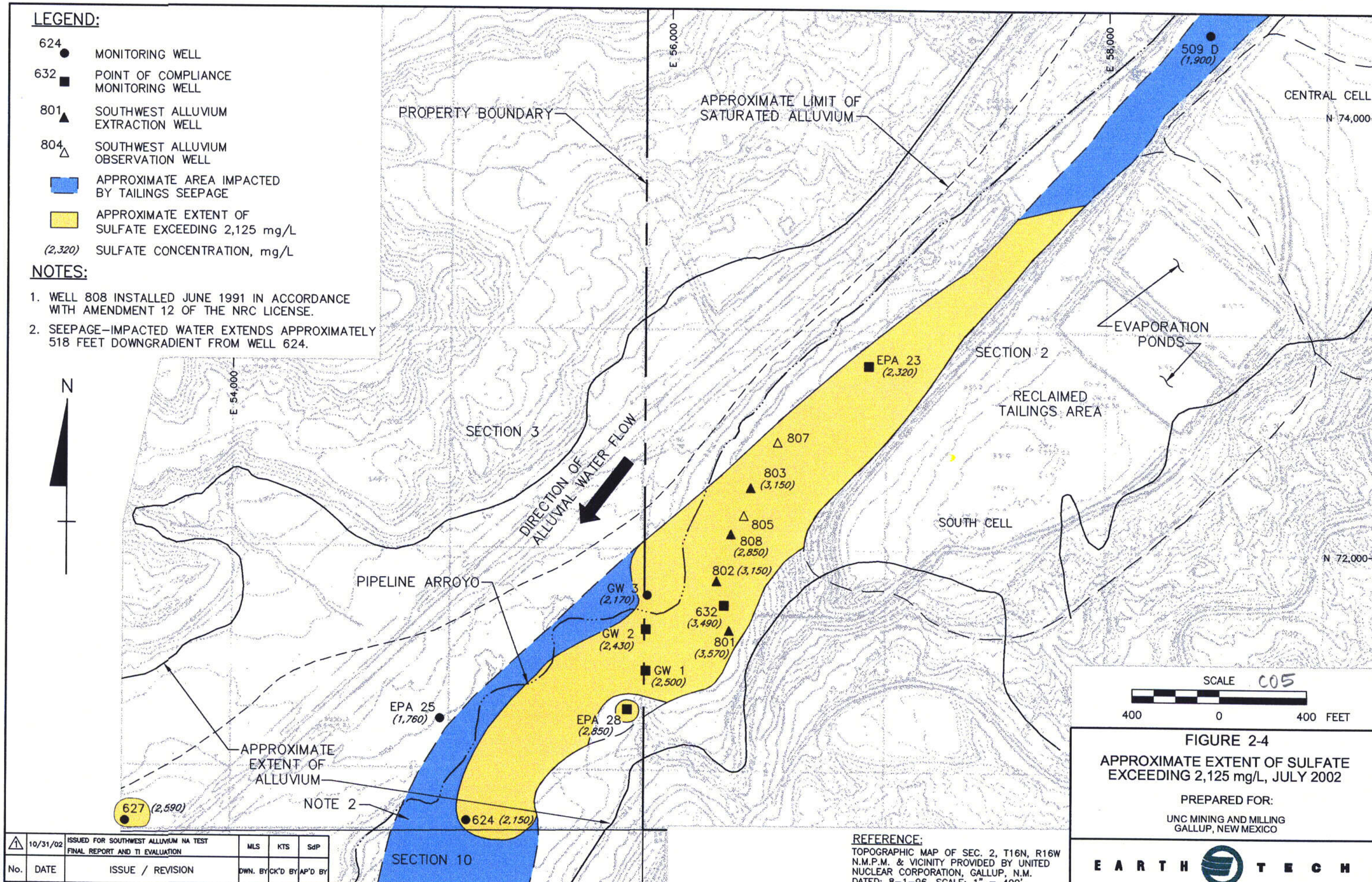


FIGURE 2-4
APPROXIMATE EXTENT OF SULFATE EXCEEDING 2,125 mg/L, JULY 2002

PREPARED FOR:
UNC MINING AND MILLING
GALLUP, NEW MEXICO

1

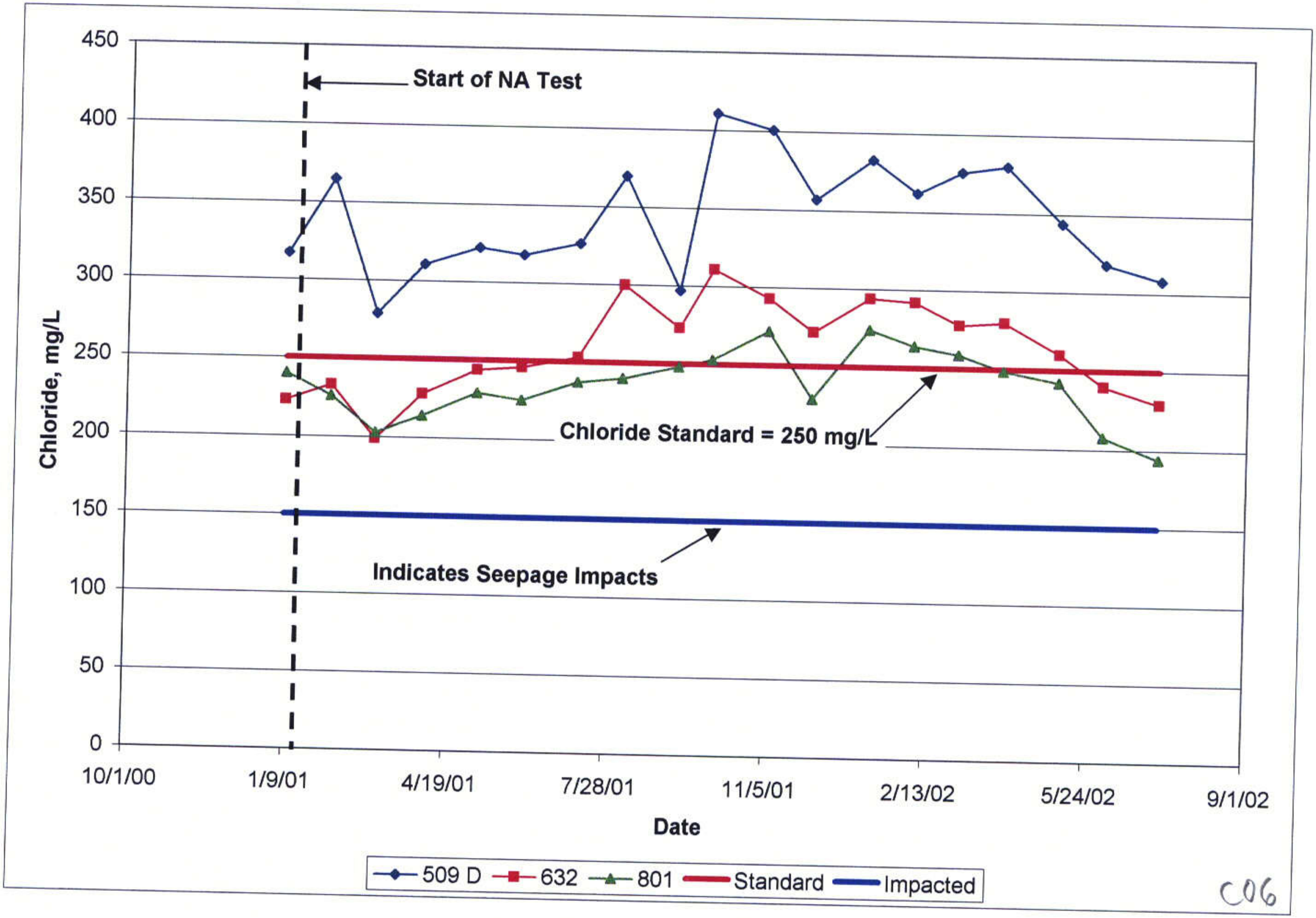


FIGURE 2-5
CHLORIDE CONCENTRATIONS OVER TIME

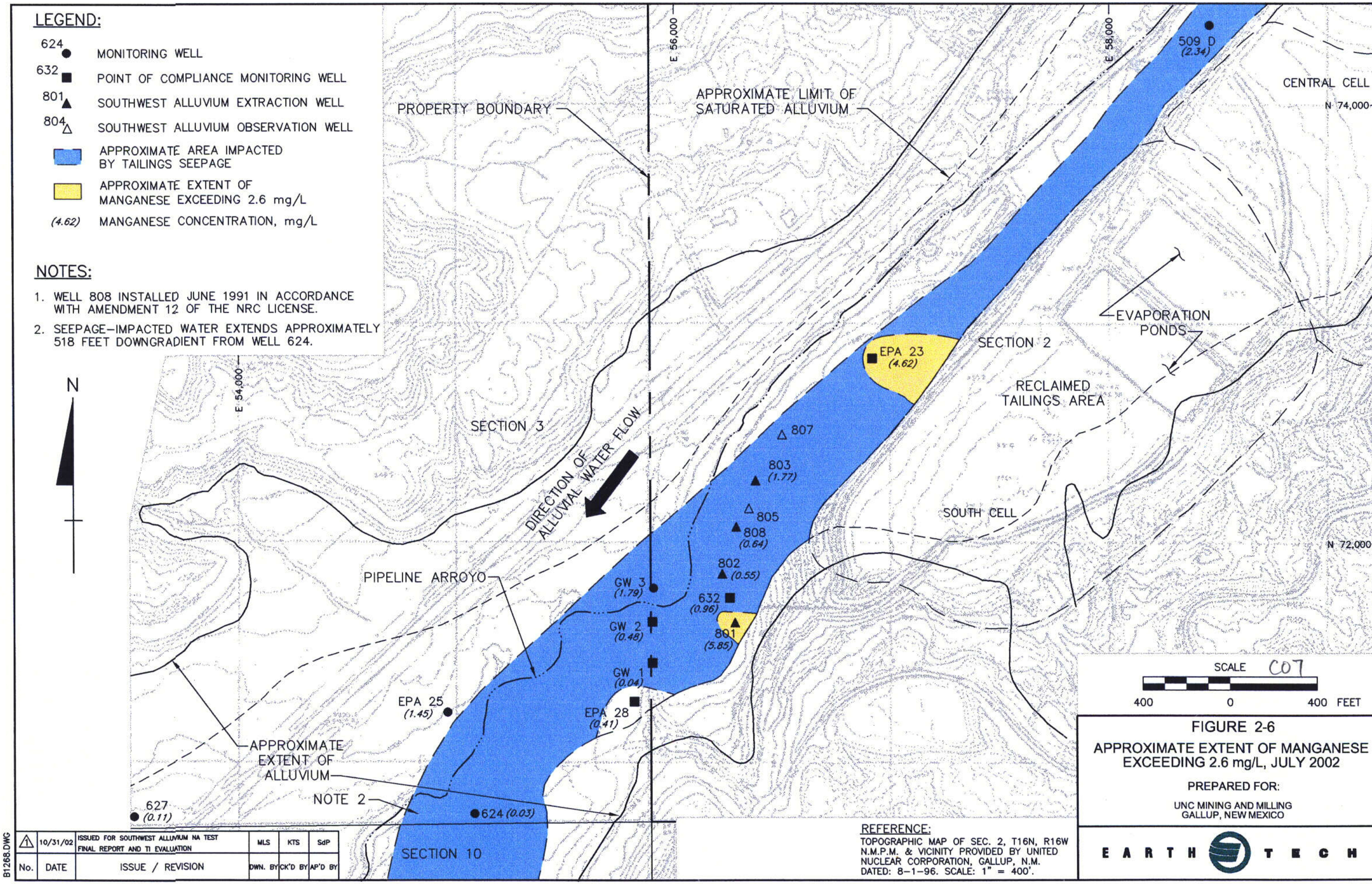


FIGURE 2-6
APPROXIMATE EXTENT OF MANGANESE EXCEEDING 2.6 mg/L, JULY 2002

1

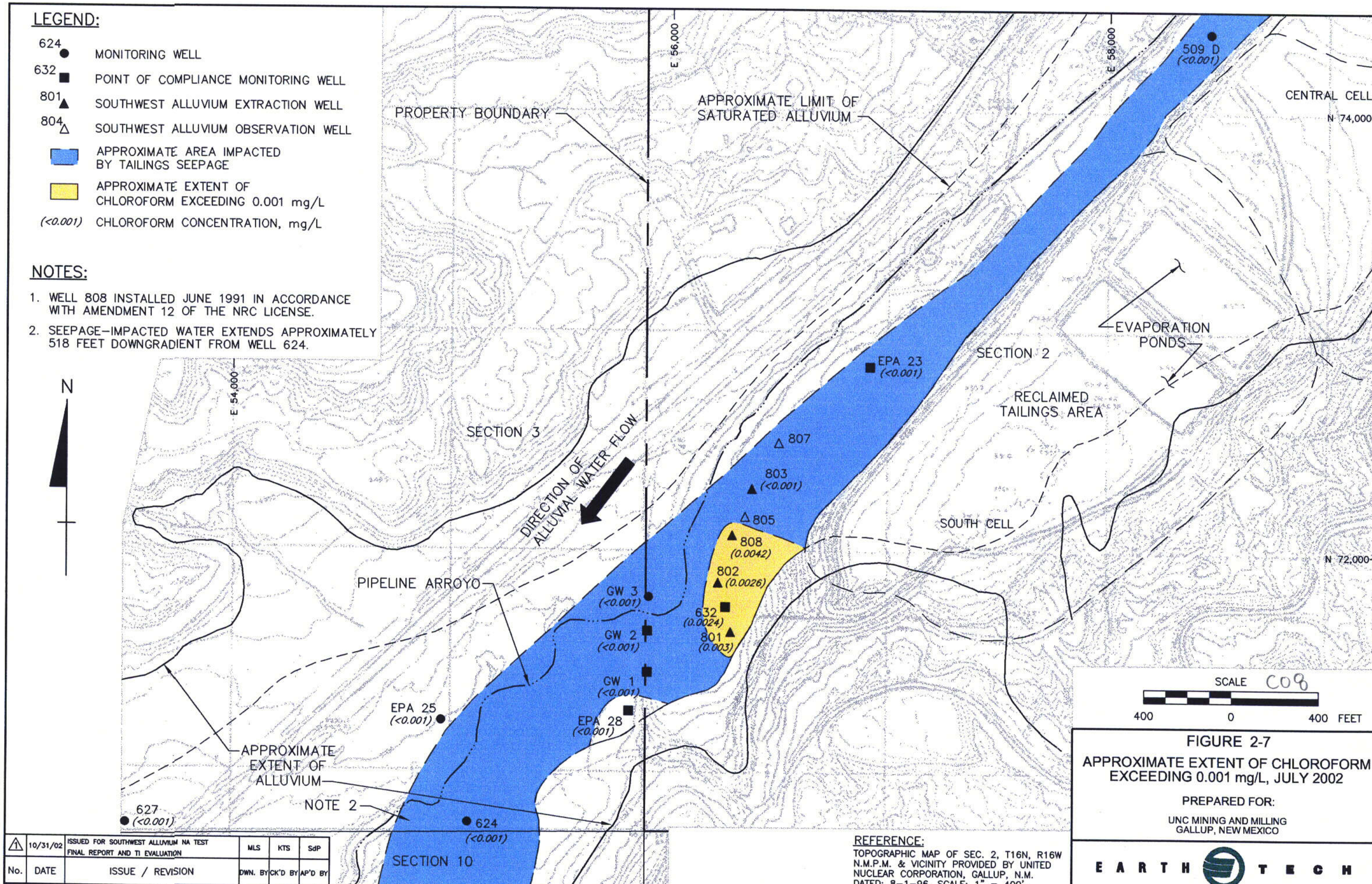


FIGURE 2-7
APPROXIMATE EXTENT OF CHLOROFORM EXCEEDING 0.001 mg/L, JULY 2002

PREPARED FOR:
UNC MINING AND MILLING
GALLUP, NEW MEXICO

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
1	10/31/02	ISSUED FOR SOUTHWEST ALLUVIUM NA TEST FINAL REPORT AND TI EVALUATION	MLS	KTS	SdP

B1269.DWG

C08

1

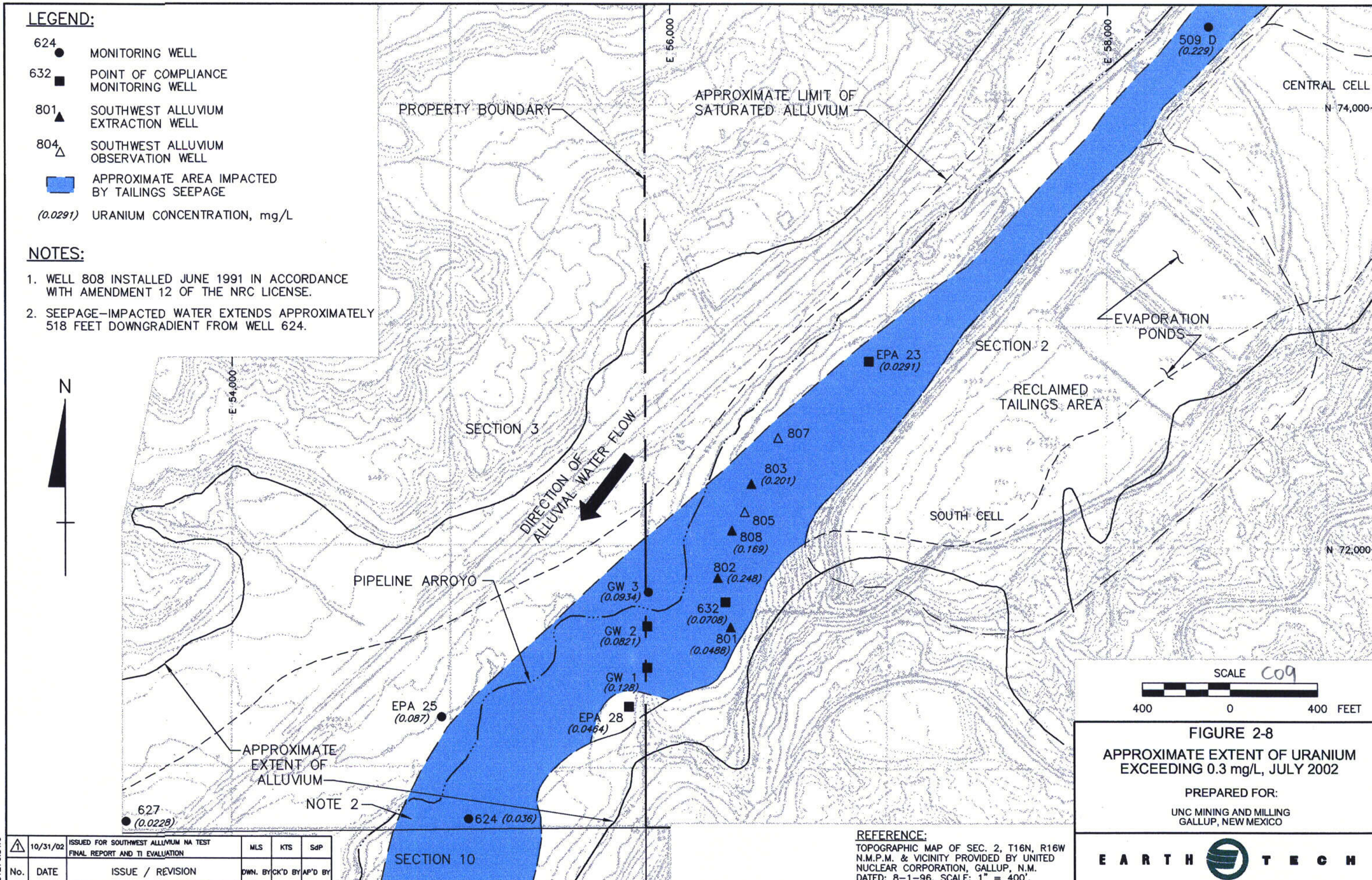
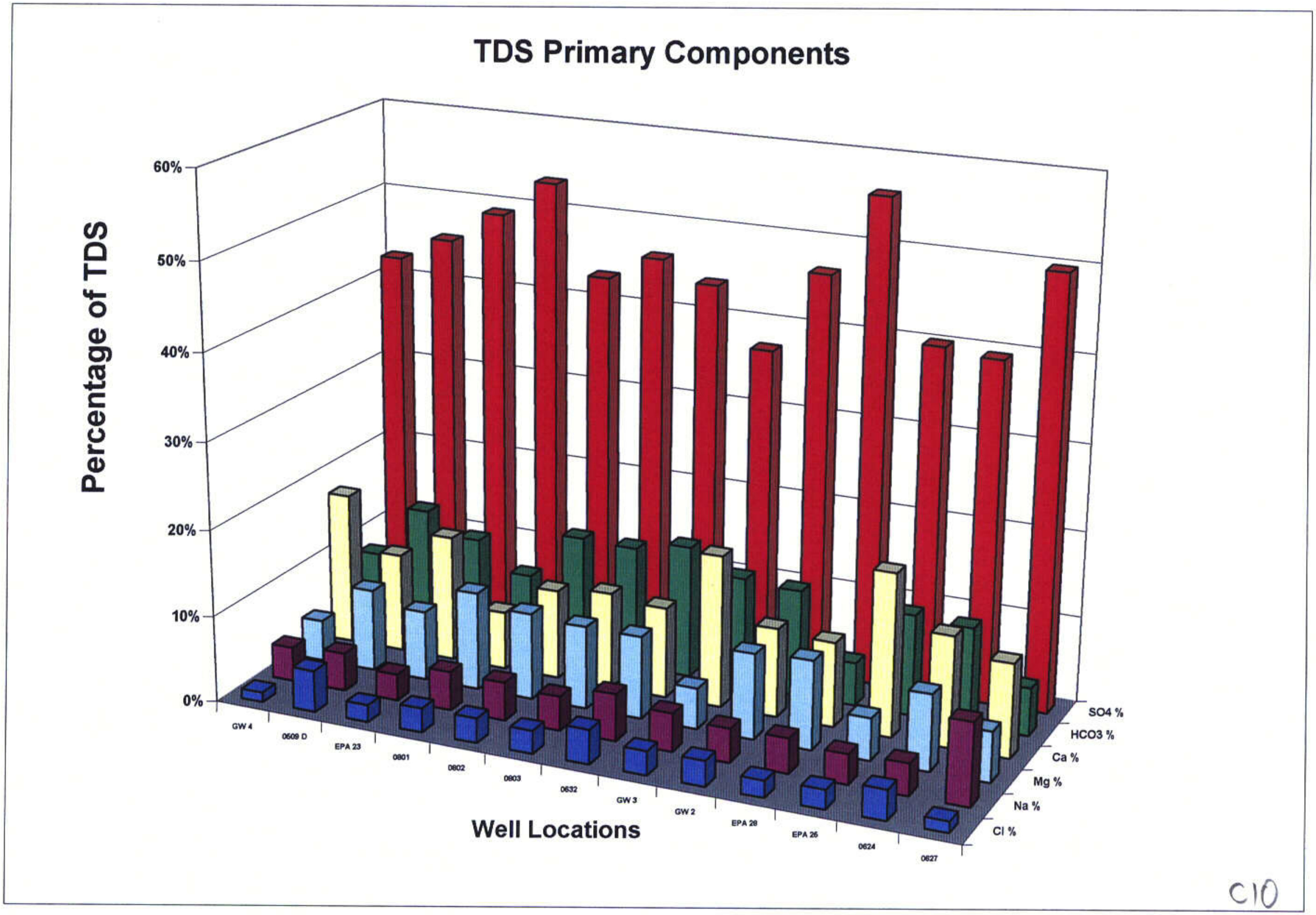


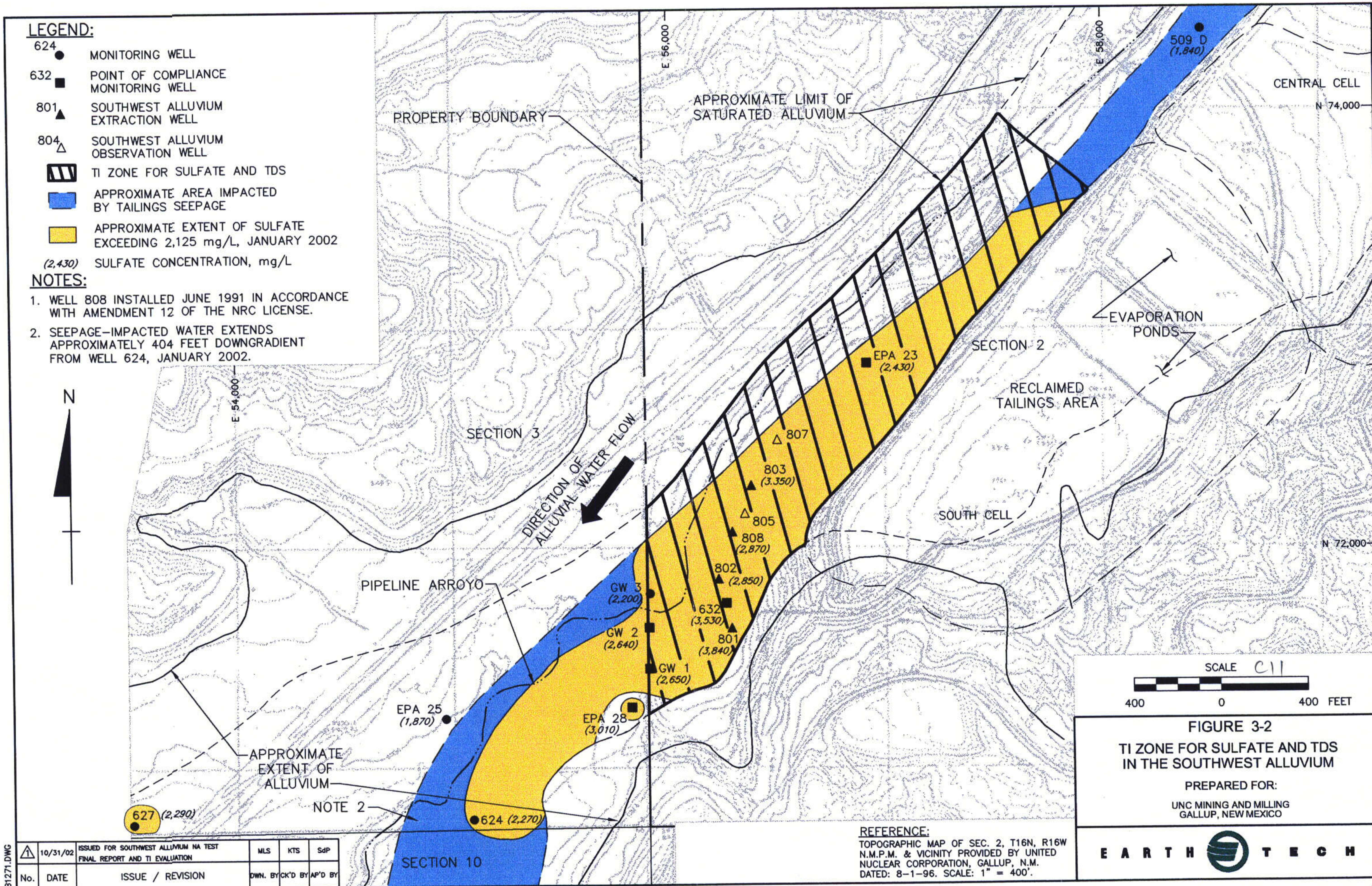
FIGURE 2-8
APPROXIMATE EXTENT OF URANIUM EXCEEDING 0.3 mg/L, JULY 2002

1

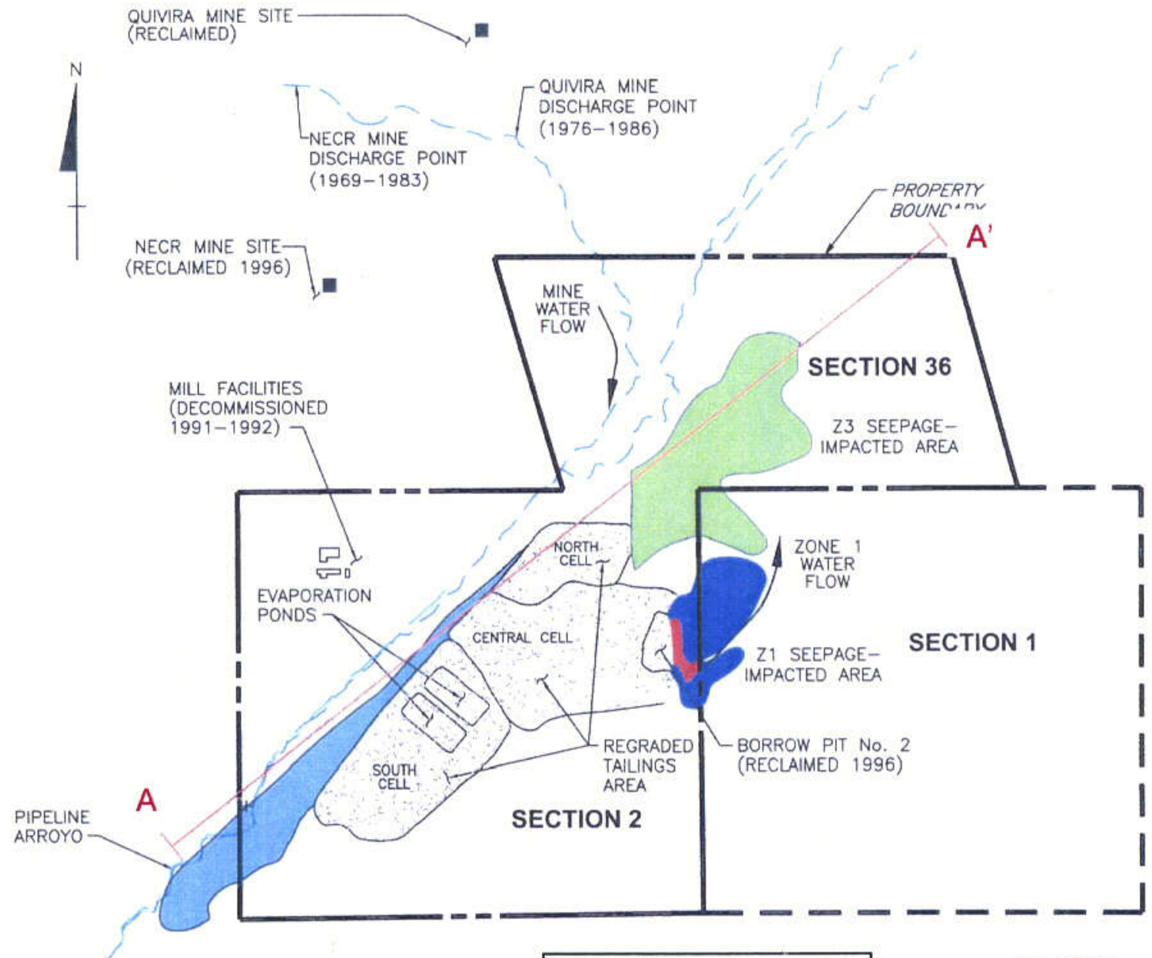


Source: Figure 19 of the Southwest Alluvium Geochemistry Report, Earth Tech, 2000a.

FIGURE 3-1
PRIMARY COMPONENTS OF TDS IN SOUTHWEST ALLUVIUM GROUNDWATER


LEGEND:
624 MONITORING WELL
632 POINT OF COMPLIANCE MONITORING WELL
801 SOUTHWEST ALLUVIUM EXTRACTION WELL
804 SOUTHWEST ALLUVIUM OBSERVATION WELL
TI ZONE FOR SULFATE AND TDS
APPROXIMATE AREA IMPACTED BY TAILINGS SEEPAGE
APPROXIMATE EXTENT OF SULFATE EXCEEDING 2,125 mg/L, JANUARY 2002
(2,430) SULFATE CONCENTRATION, mg/L
NOTES:
1. WELL 808 INSTALLED JUNE 1991 IN ACCORDANCE WITH AMENDMENT 12 OF THE NRC LICENSE.
2. SEEPAGE-IMPACTED WATER EXTENDS APPROXIMATELY 404 FEET DOWNGRADIENT FROM WELL 624, JANUARY 2002.
N
E 54,000
E 56,000
E 58,000
N 74,000
N 72,000
PROPERTY BOUNDARY
APPROXIMATE LIMIT OF SATURATED ALLUVIUM
509 D (1,840)
CENTRAL CELL
EVAPORATION PONDS
SECTION 2
SECTION 3
SECTION 10
RECLAIMED TAILINGS AREA
SOUTH CELL
EPA 23 (2,430)
807
803 (3,350)
805
808 (2,870)
802 (2,850)
632 (3,530)
801 (3,840)
GW 3 (2,200)
GW 2 (2,640)
GW 1 (2,650)
EPA 28 (3,010)
EPA 25 (1,870)
624 (2,270)
627 (2,290)
DIRECTION OF ALLUVIAL WATER FLOW
PIPELINE ARROYO
APPROXIMATE EXTENT OF ALLUVIUM
NOTE 2
SCALE C11
400 0 400 FEET
REFERENCE:
TOPOGRAPHIC MAP OF SEC. 2, T16N, R16W N.M.P.M. & VICINITY PROVIDED BY UNITED NUCLEAR CORPORATION, GALLUP, N.M. DATED: 8-1-96. SCALE: 1" = 400'.
FIGURE 3-2
TI ZONE FOR SULFATE AND TDS IN THE SOUTHWEST ALLUVIUM
PREPARED FOR:
UNC MINING AND MILLING GALLUP, NEW MEXICO
EARTH TECH
1 10/31/02 ISSUED FOR SOUTHWEST ALLUVIUM NA TEST FINAL REPORT AND TI EVALUATION MLS KTS SdP
No. DATE ISSUE / REVISION DWN. BY CK'D BY AP'D BY
B1271.DWG
1

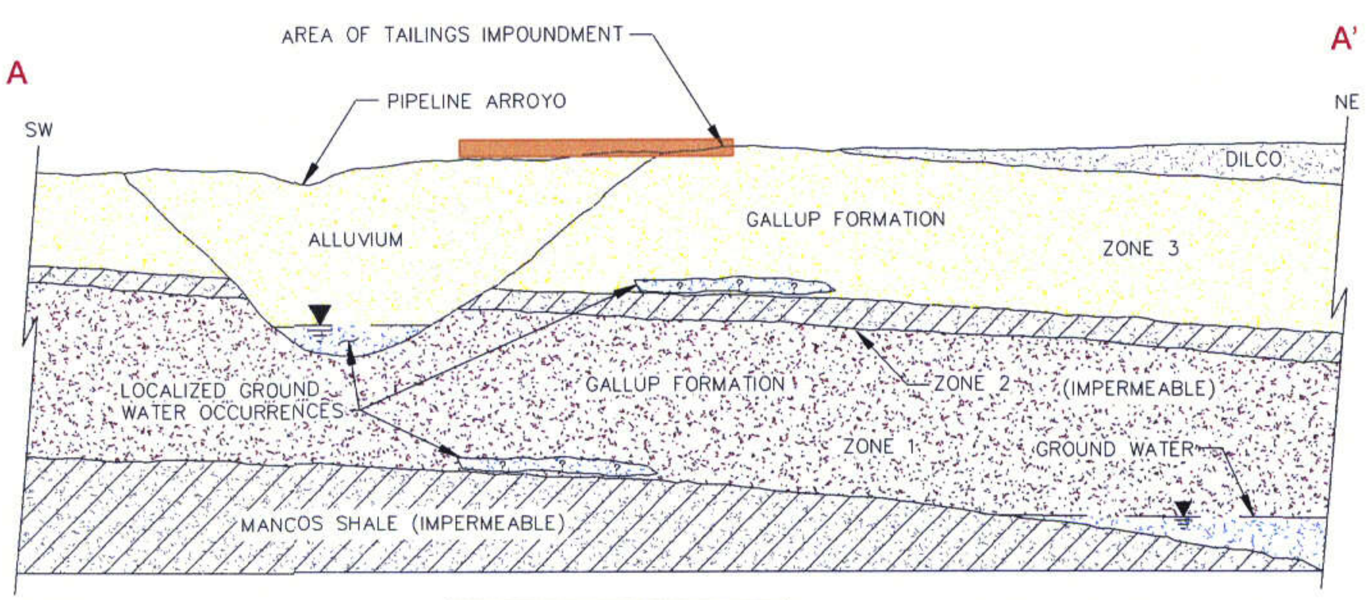
Church Rock Site



Plan View

FIG. A859J

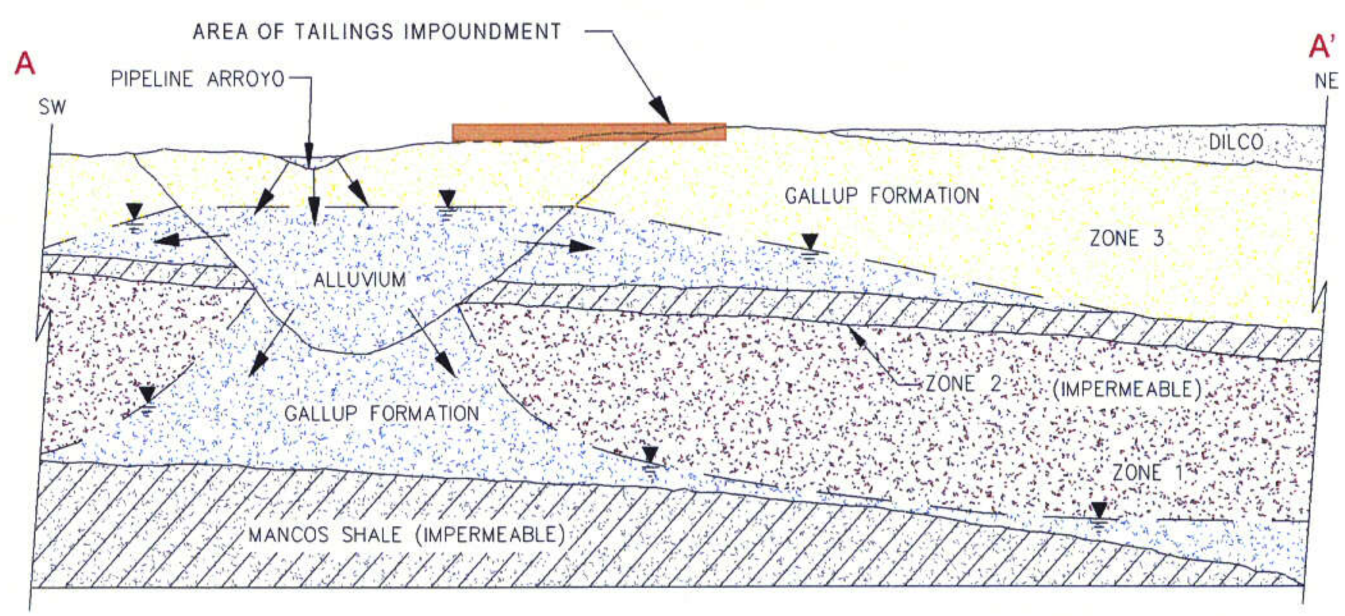
Conditions Prior To Mine Water Discharge (No Contiguous Groundwater System Present)



Detail A

FIG. A865A

Conditions During Mine Water Discharge Develop "Postmining-Pretailings" Background Water



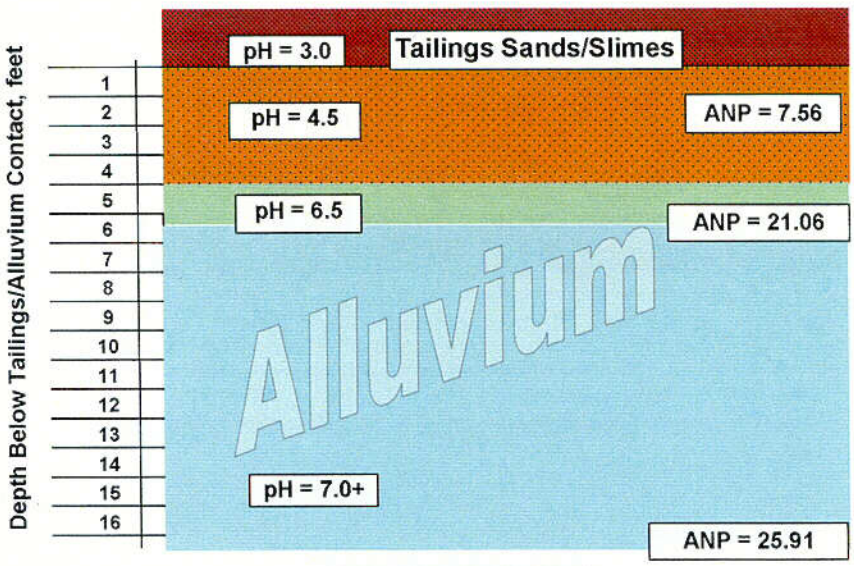
Detail B

FIG. A866A

C12

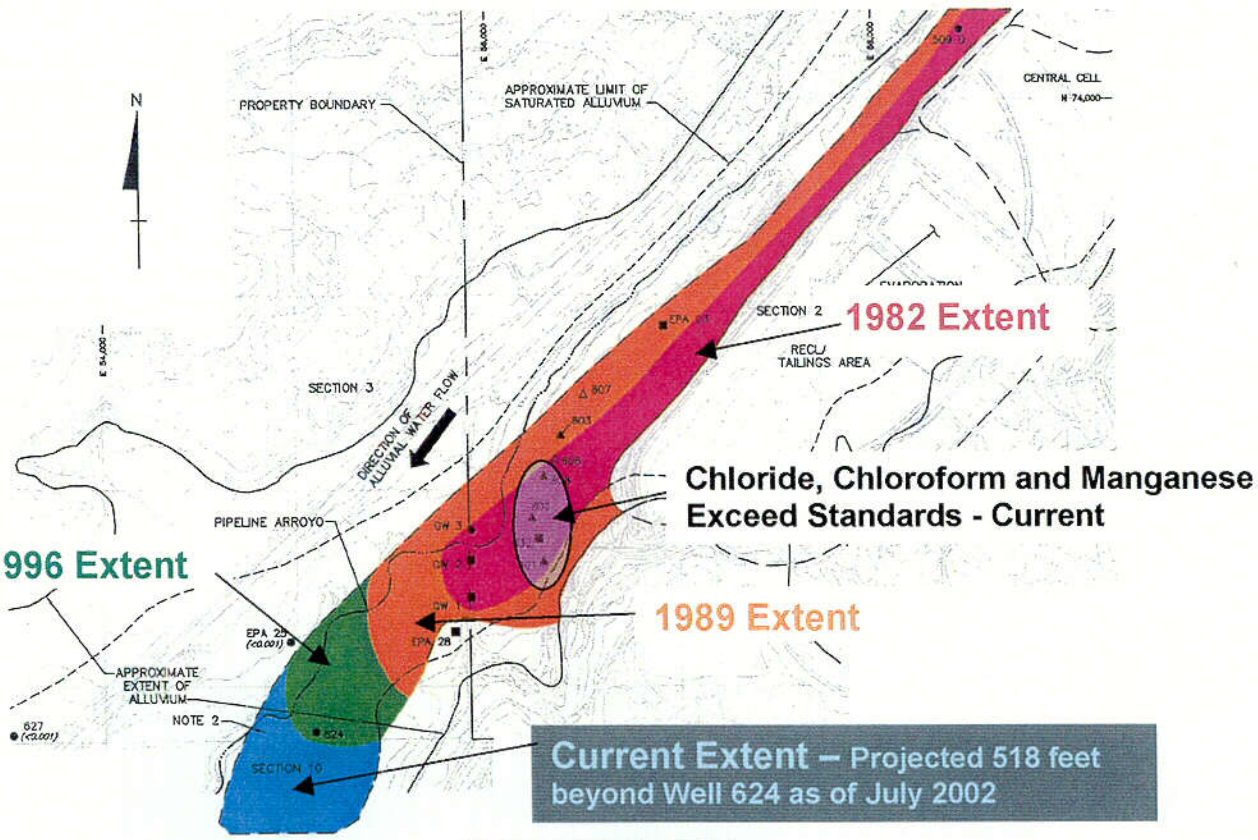
FIGURE 3-3
CONCEPTUAL MODEL
DEVELOPMENT OF ALLUVIAL SATURATION

Neutralization Capacity of Alluvium



Detail A

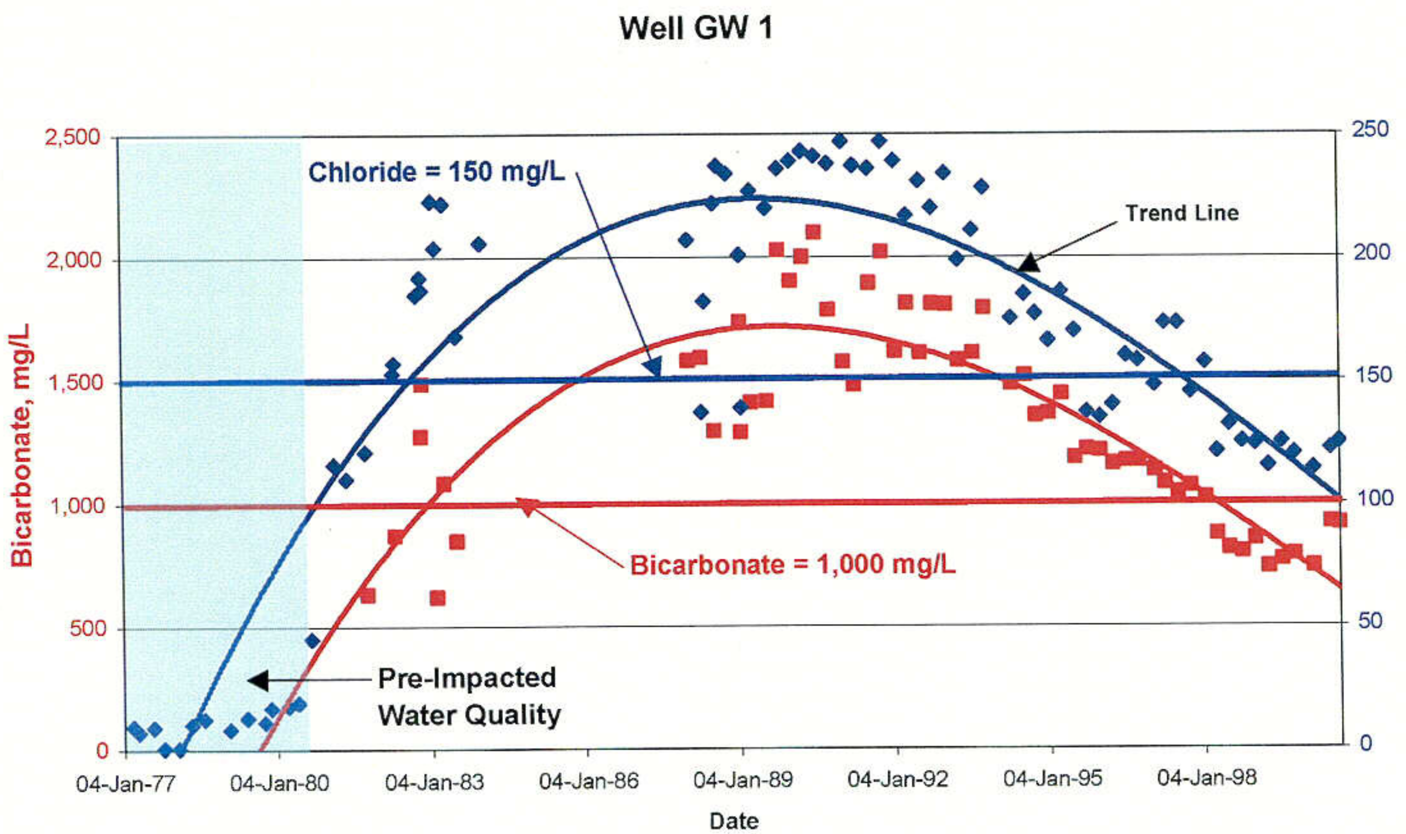
Southwest Alluvium
Seepage Impacts Over Time

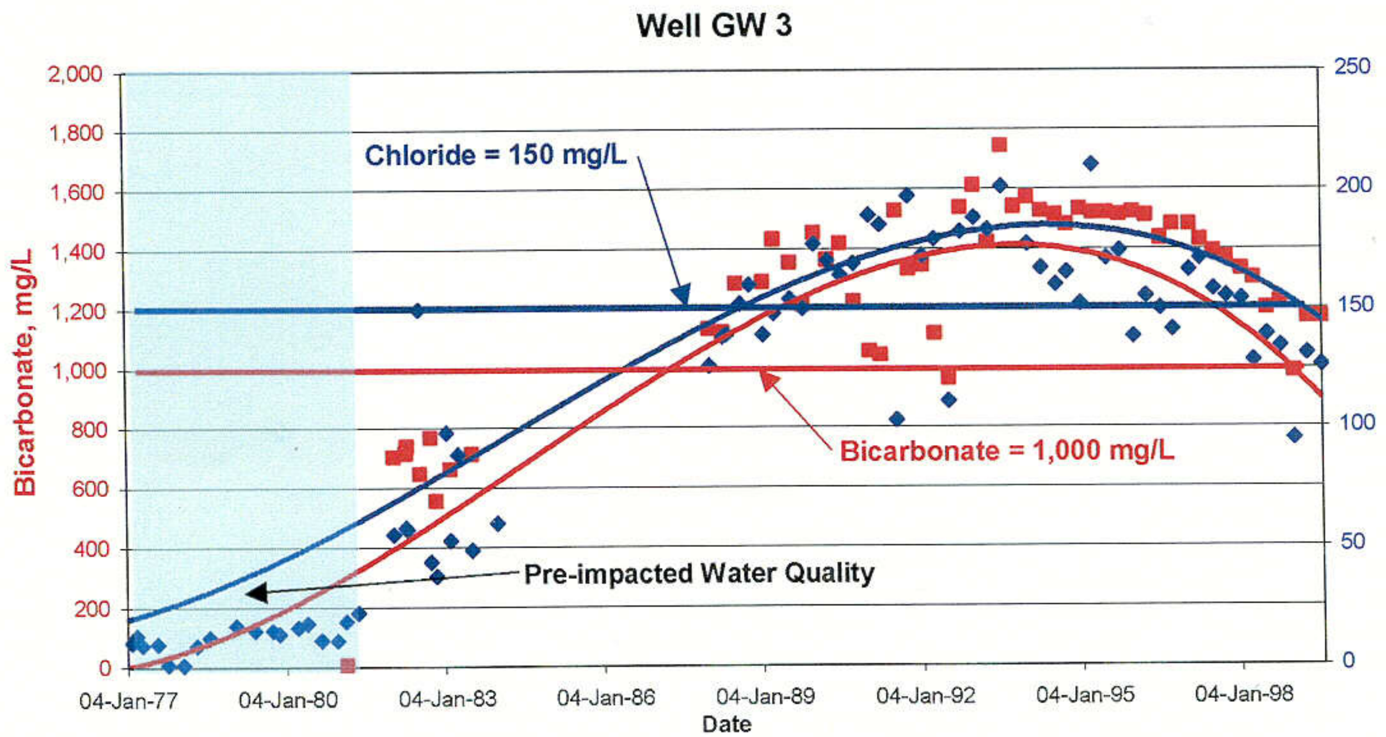


Detail B

C13

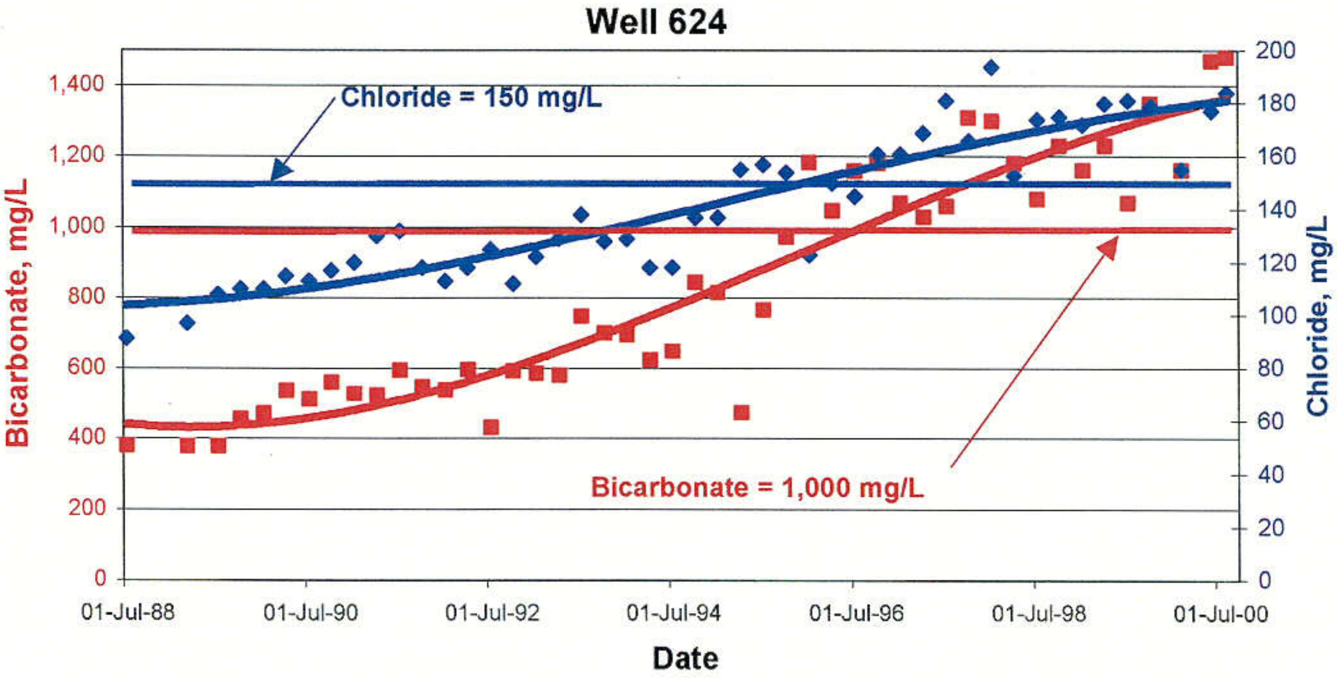
FIGURE 3-4
CONCEPTUAL MODEL
EVOLUTION OF SEEPAGE IMPACTS

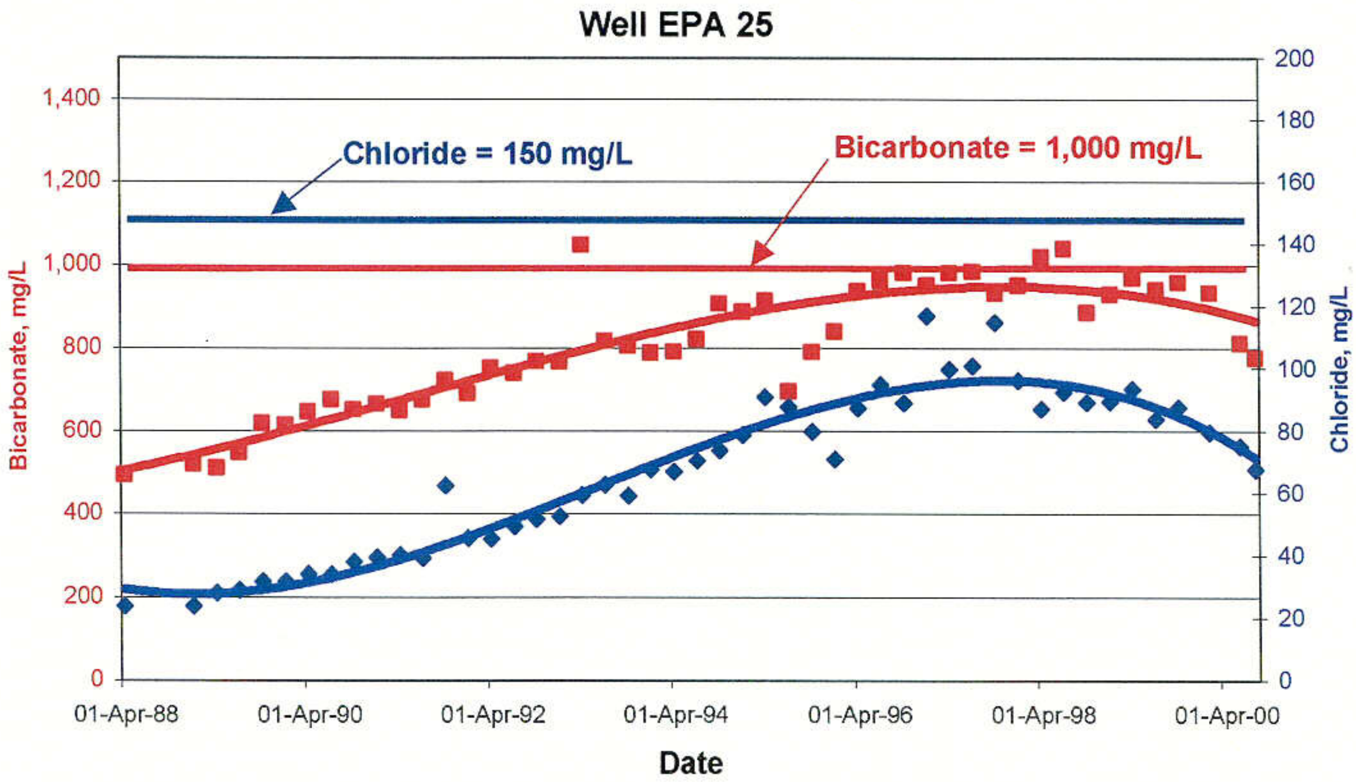




C14

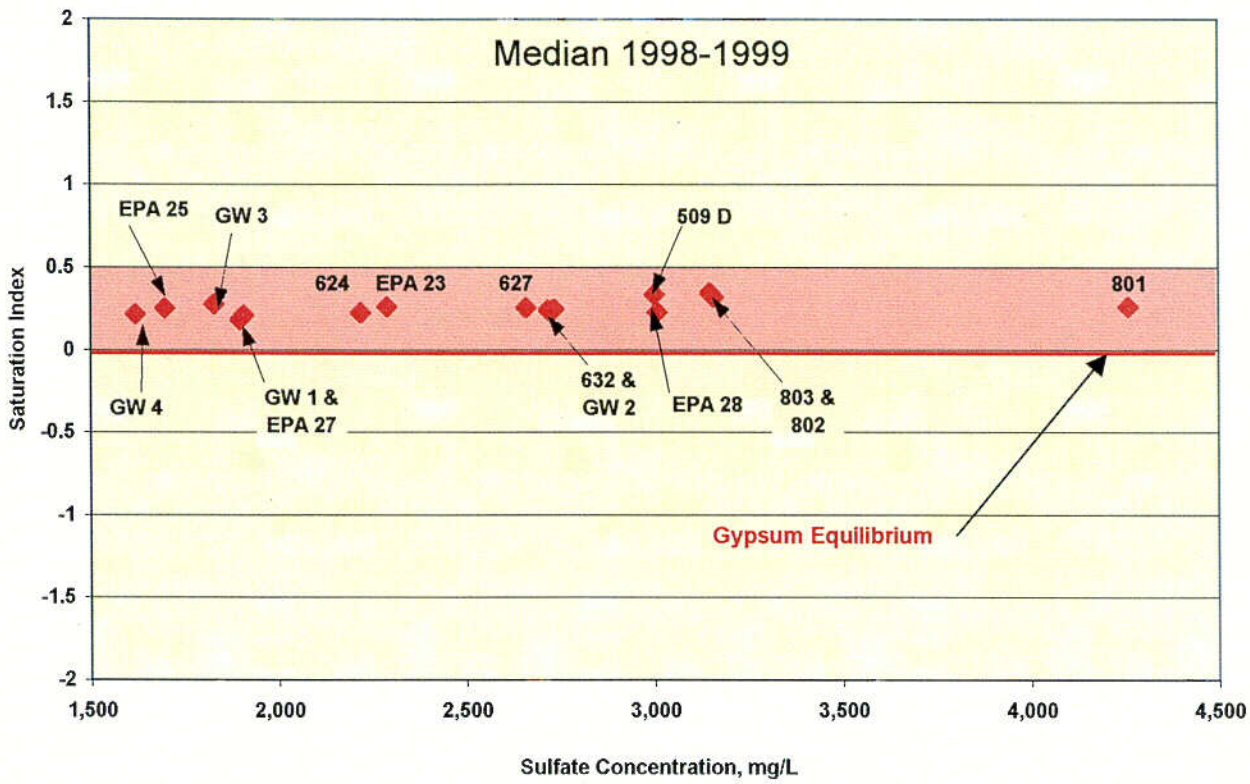
FIGURE 3-5
CHLORIDE AND BICARBONATE TRENDS IN WELLS GW 1 AND GW 3

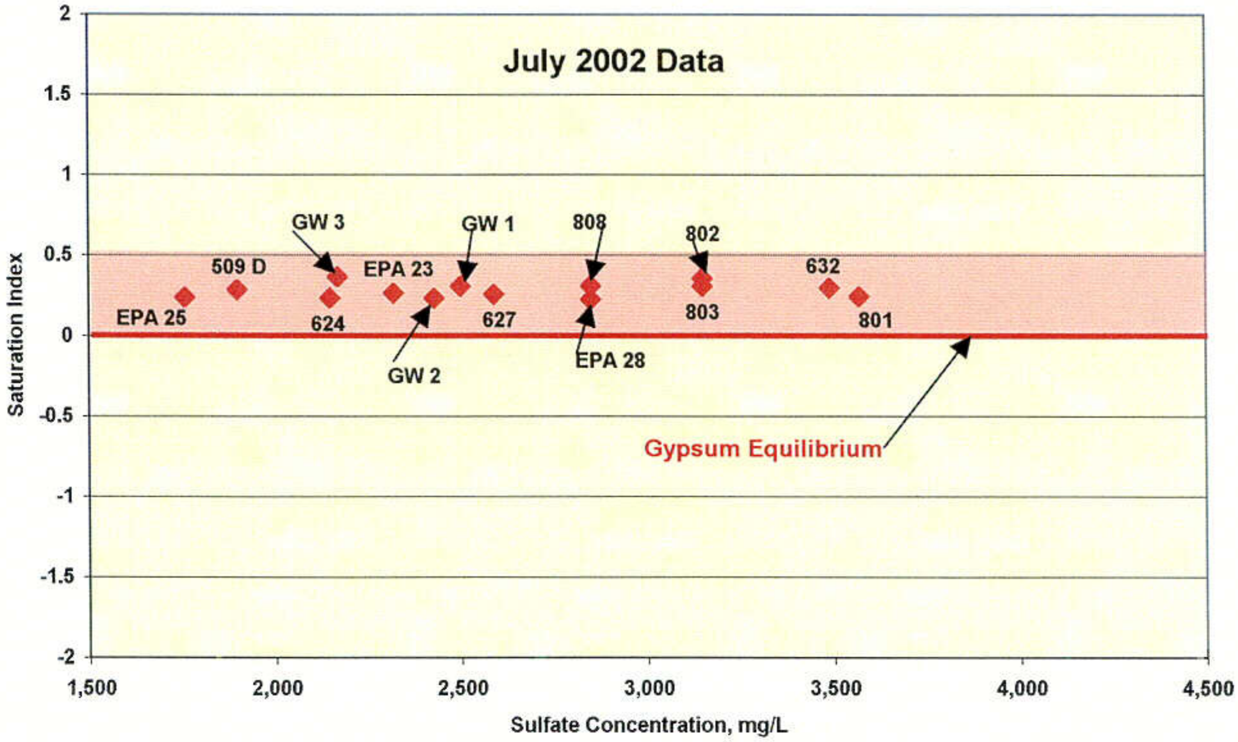




C15

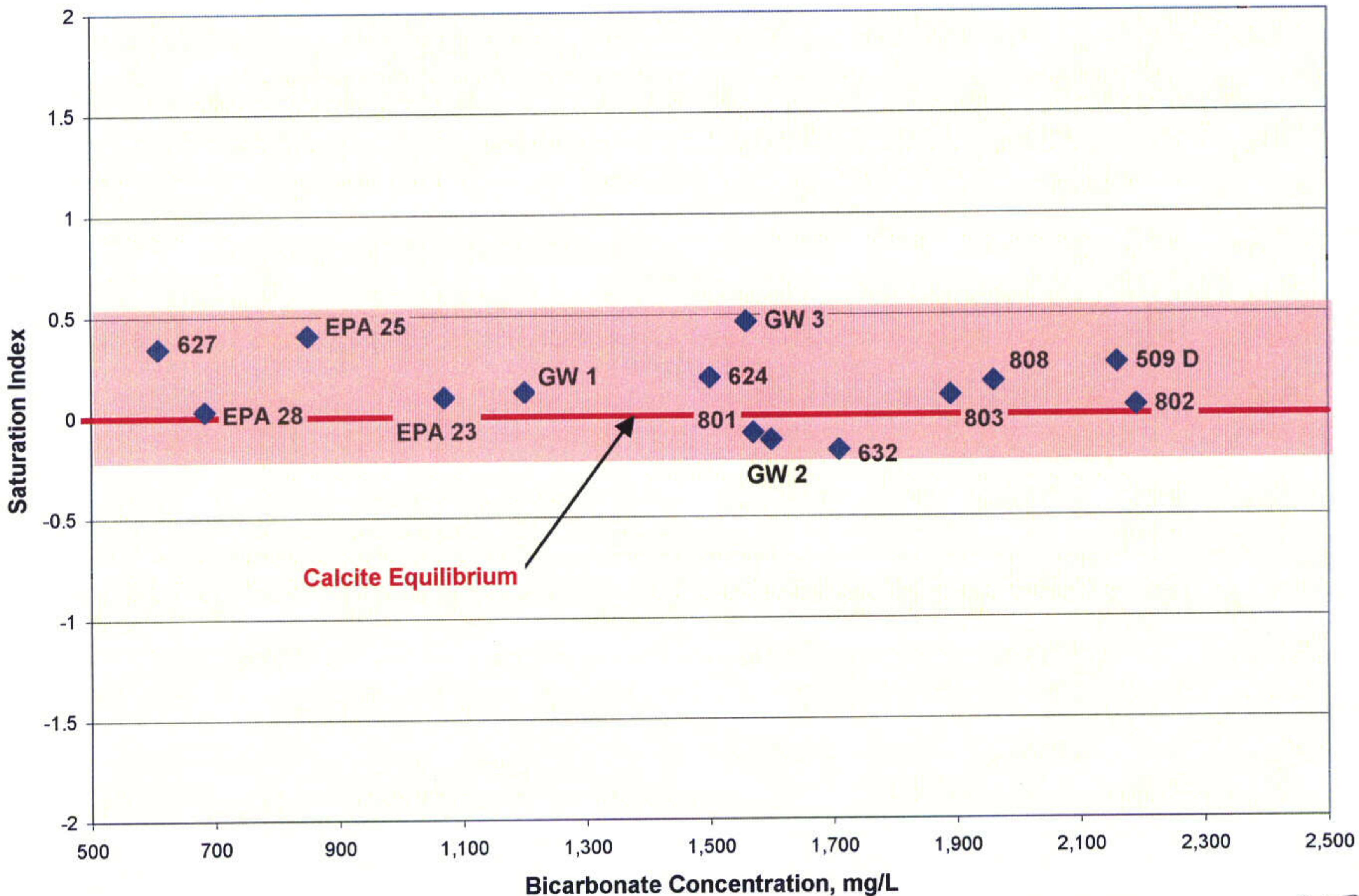
FIGURE 3-6
CHLORIDE AND BICARBONATE TRENDS IN WELLS 624 AND EPA 25





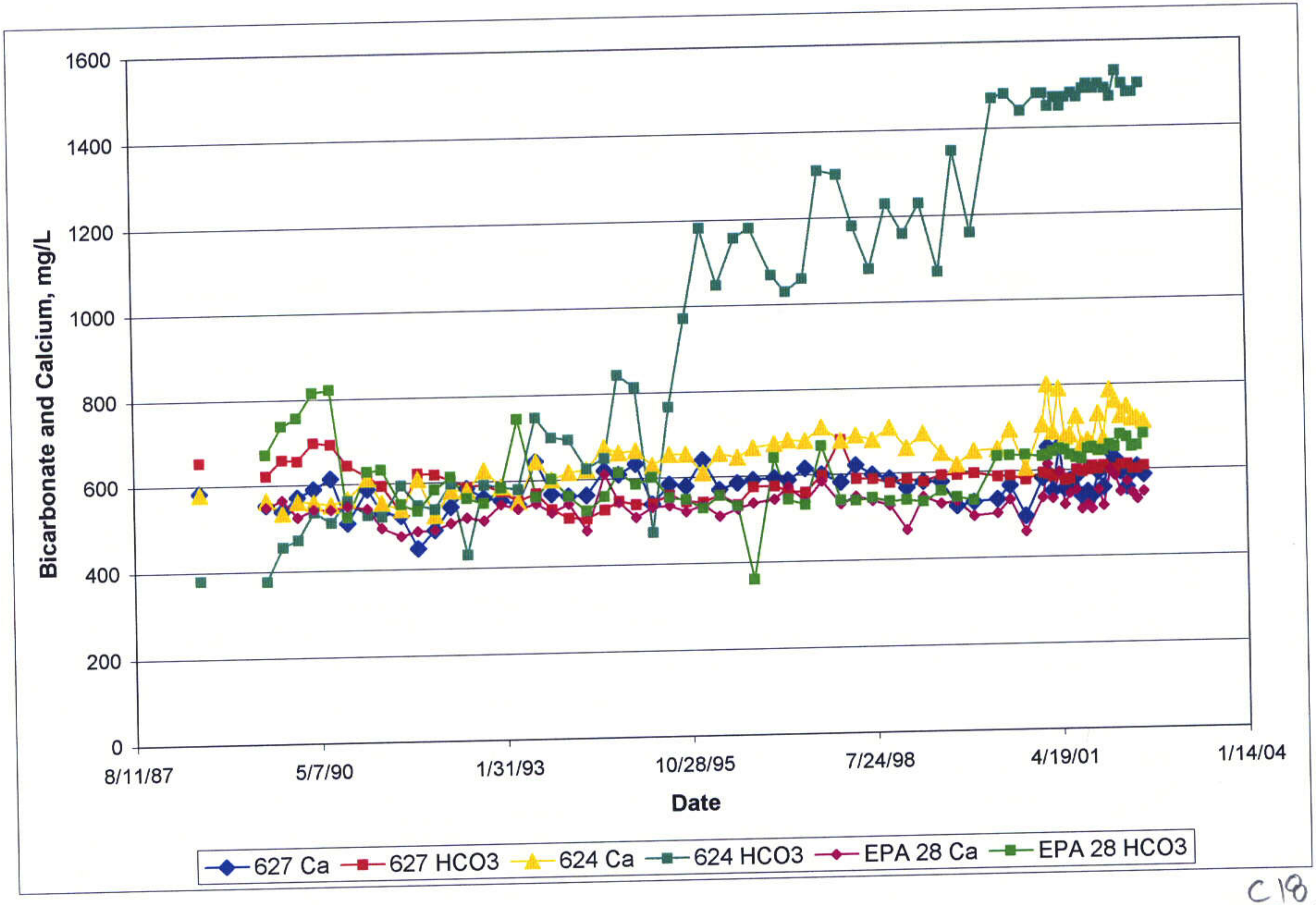
C16

FIGURE 3-7
SOUTHWEST ALLUVIUM
GYPSUM SATURATION INDICES



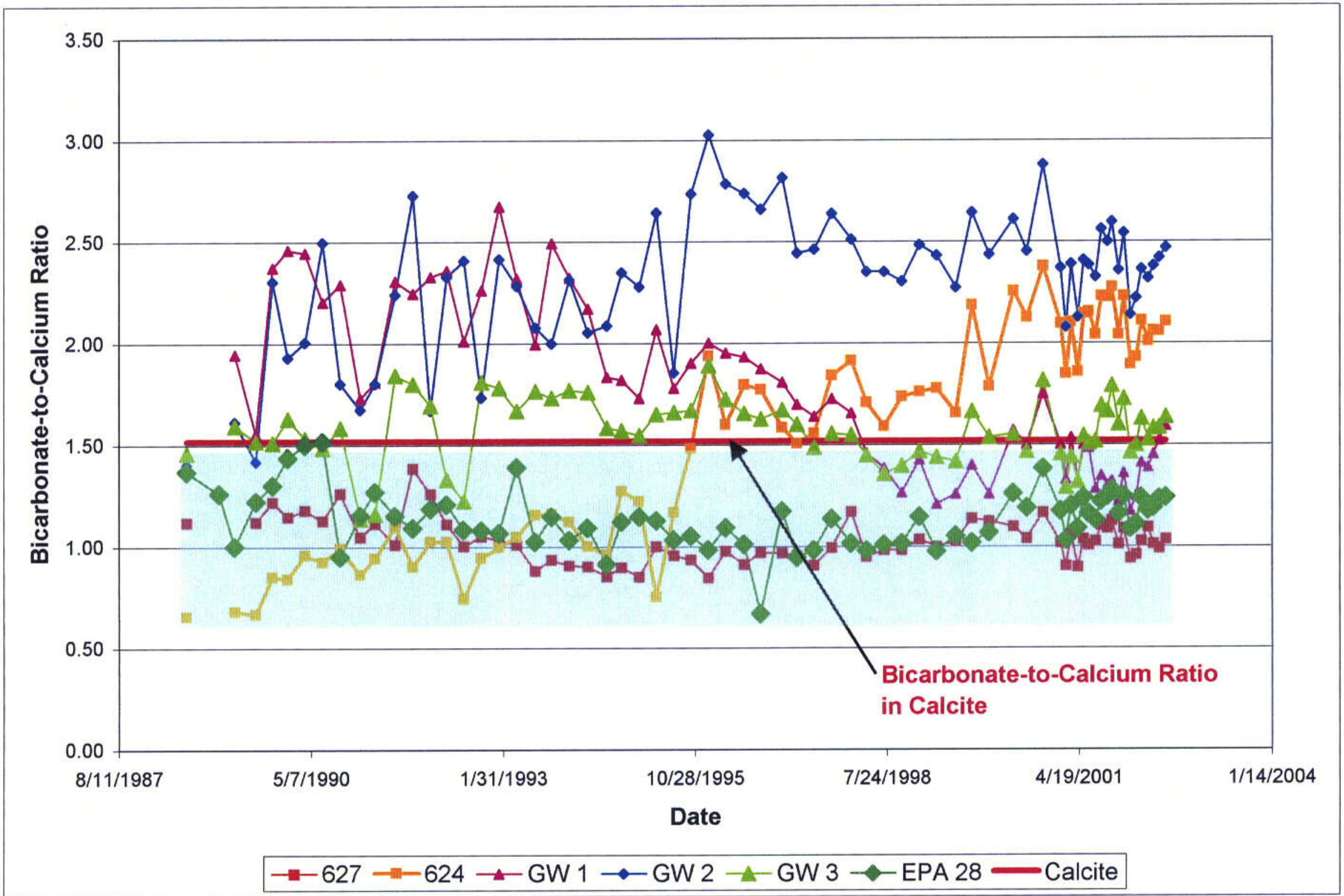
C17

FIGURE 3-8
SOUTHWEST ALLUVIUM
CALCITE SATURATION INDICES



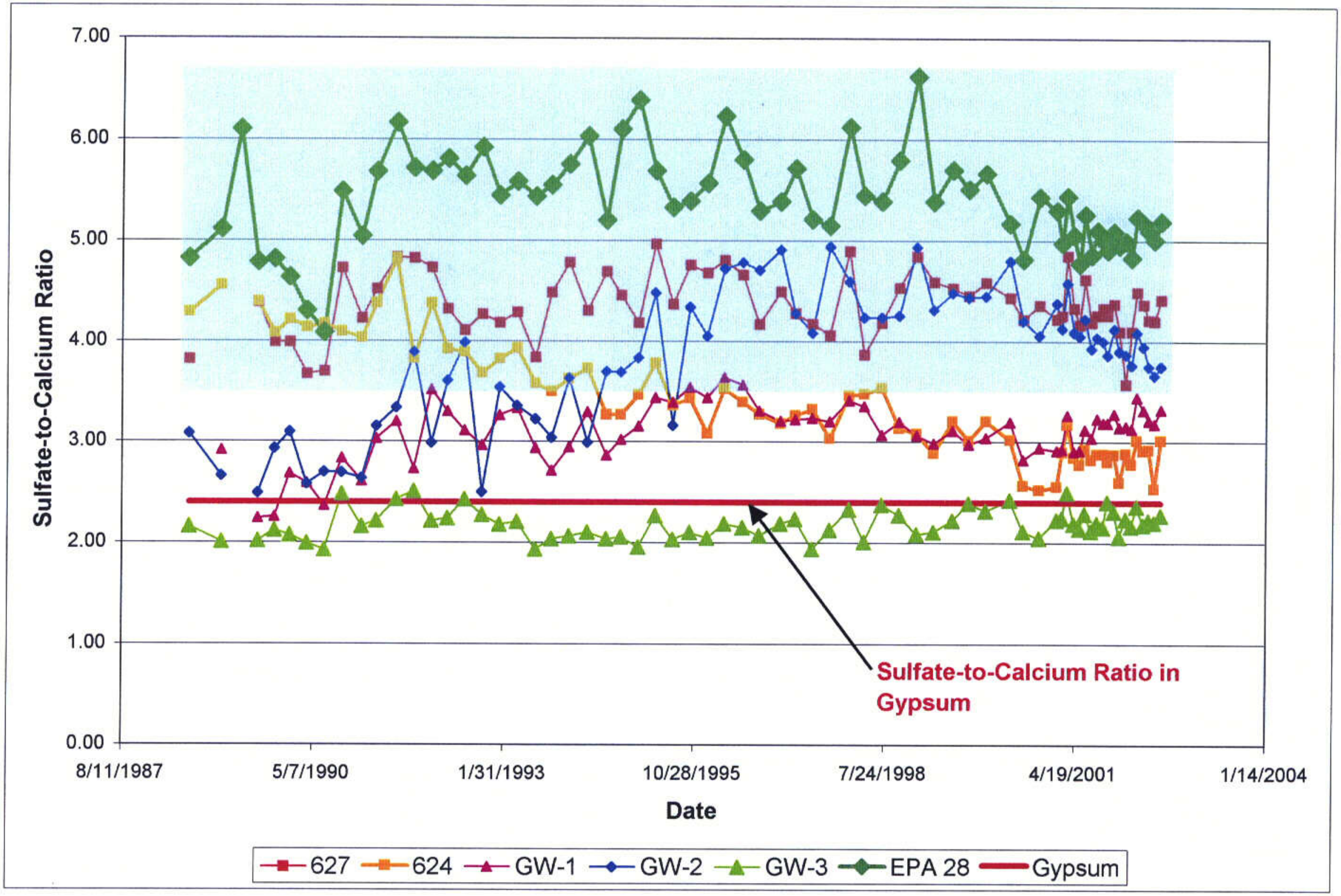
C18

FIGURE 3-9
CALCIUM AND BICARBONATE CONCENTRATIONS IN BACKGROUND AND SEEPAGE-IMPACTED WELLS



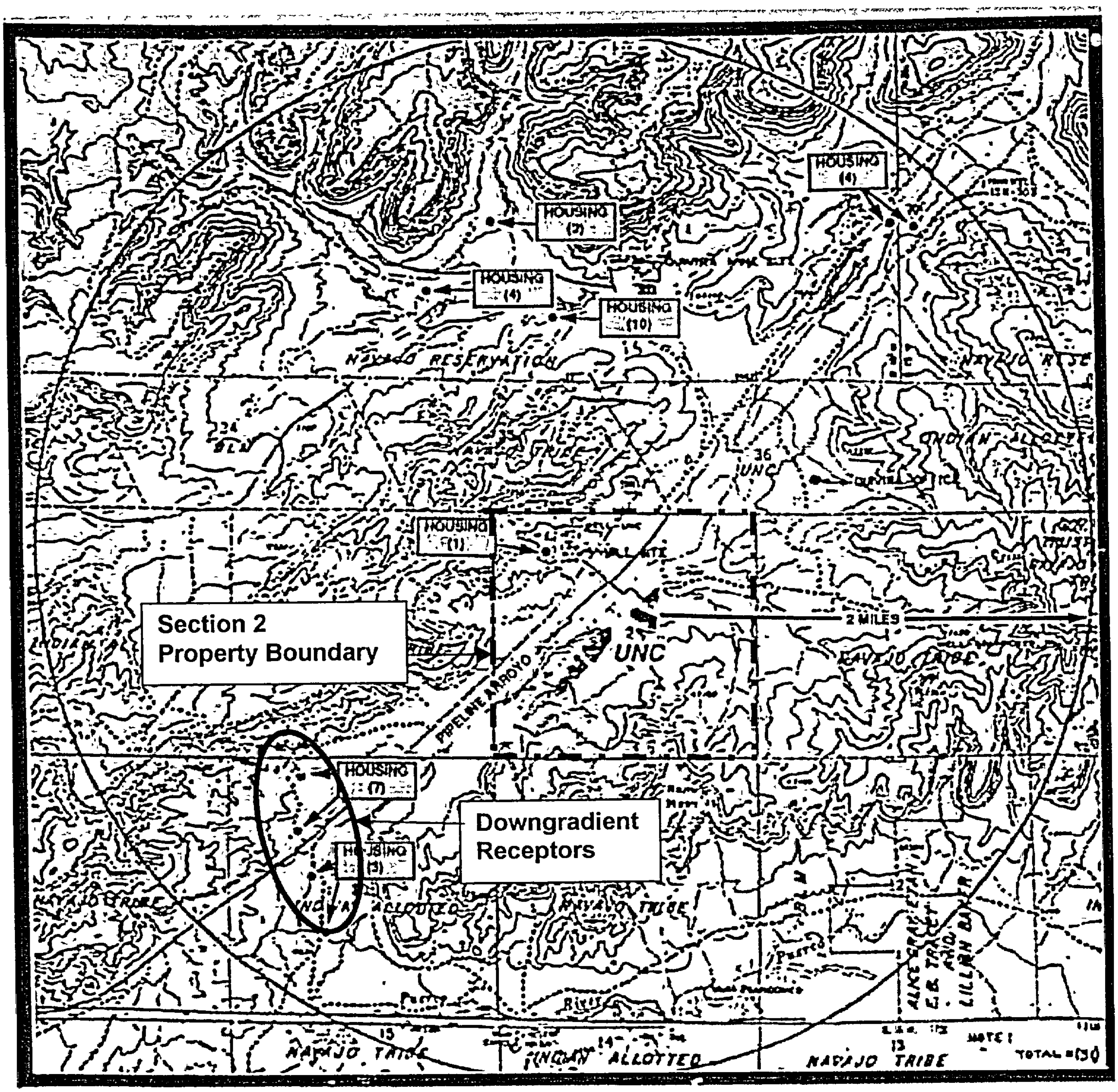
C19

FIGURE 3-10
BICARBONATE-TO-CALCIUM RATIOS IN
DOWNGRADIENT SOUTHWEST ALLUVIUM GROUNDWATER



C20

FIGURE 3-11
SULFATE-TO-CALCIUM RATIOS IN
DOWNGRADIENT SOUTHWEST ALLUVIUM GROUNDWATER



Source: Figure 9, EPA Five-Year Review Report

Figure 3-12
Downgradient Receptors

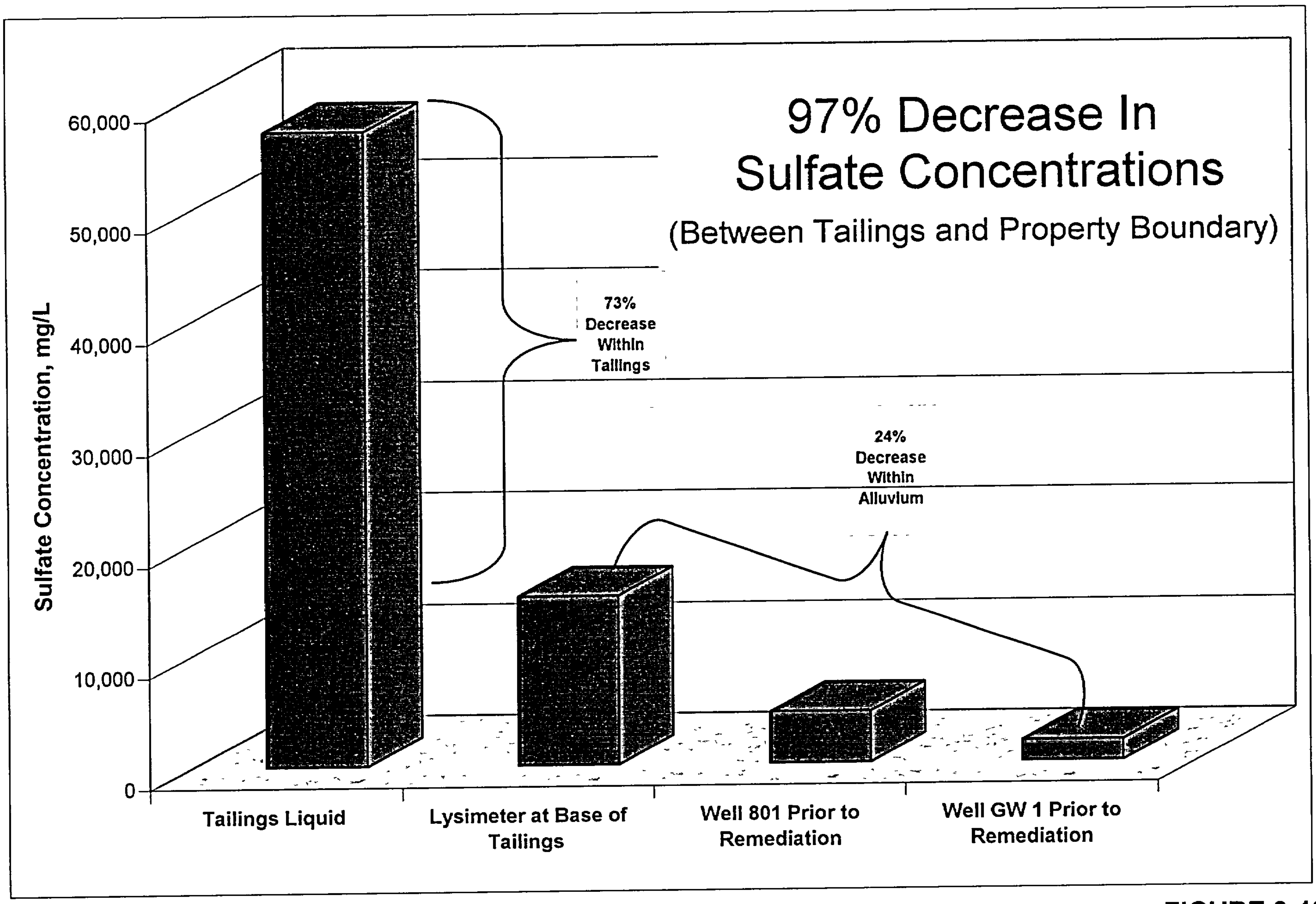


FIGURE 3-13
ATTENUATION OF SULFATE BY NATURAL PROCESSES

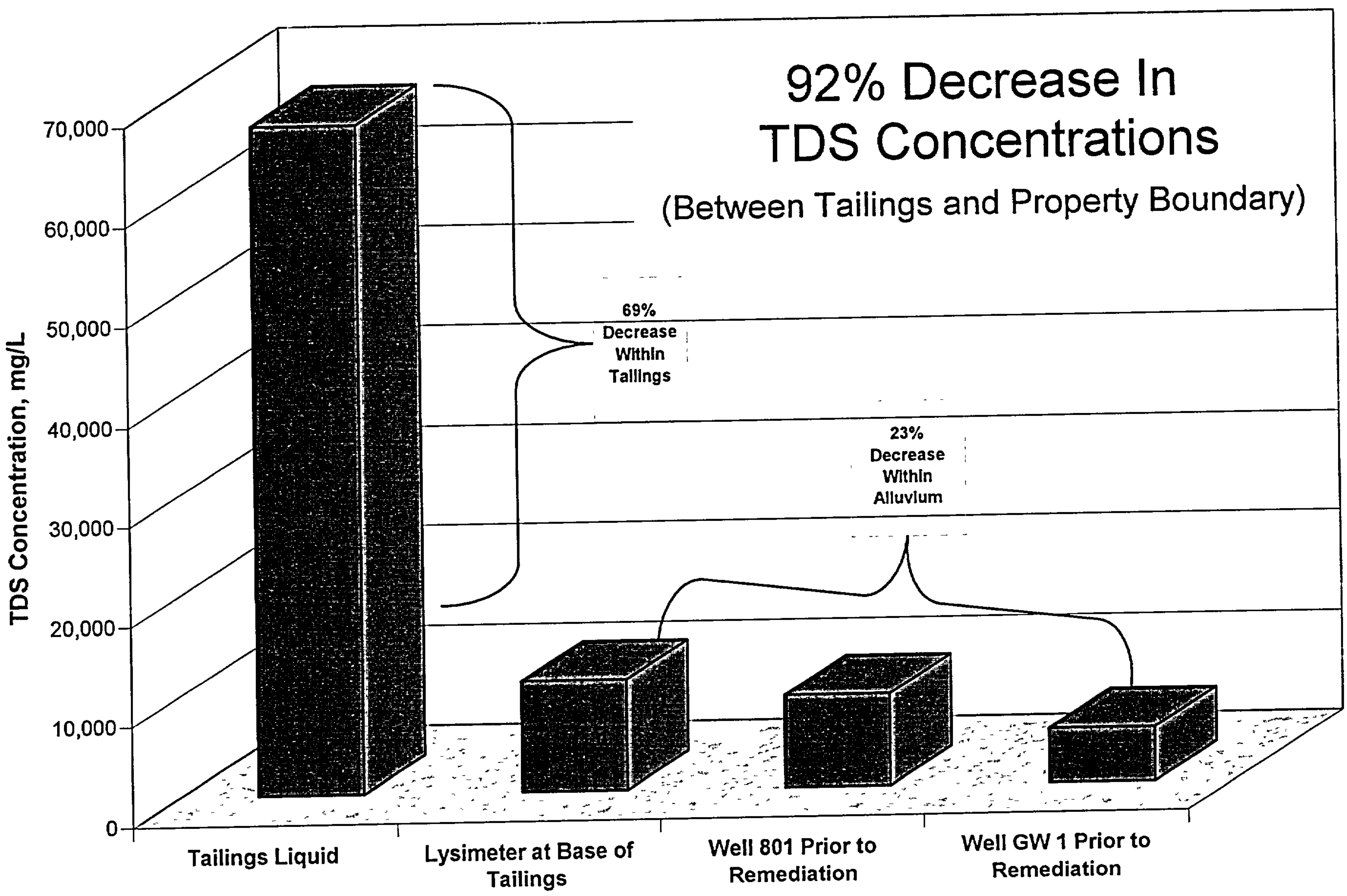


FIGURE 3-14
ATTENUATION OF TDS BY NATURAL PROCESSES

APPENDIX A

GRAPHS OF CONSTITUENT CONCENTRATIONS OVER TIME

FIGURE A.1
TREND ANALYSIS COMPARING BASELINE AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

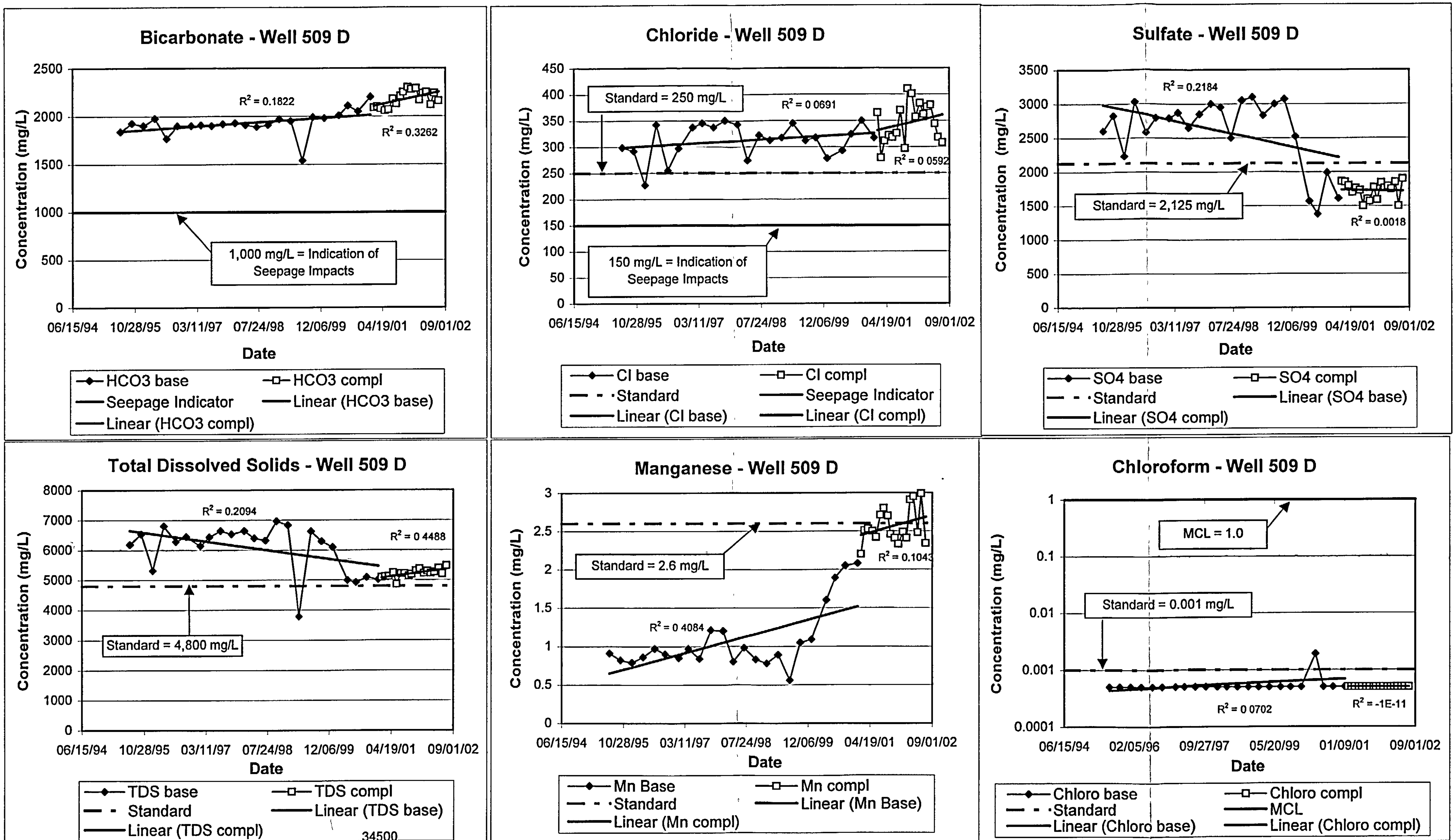


FIGURE A.1
TREND ANALYSIS COMPARING BASELINE AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

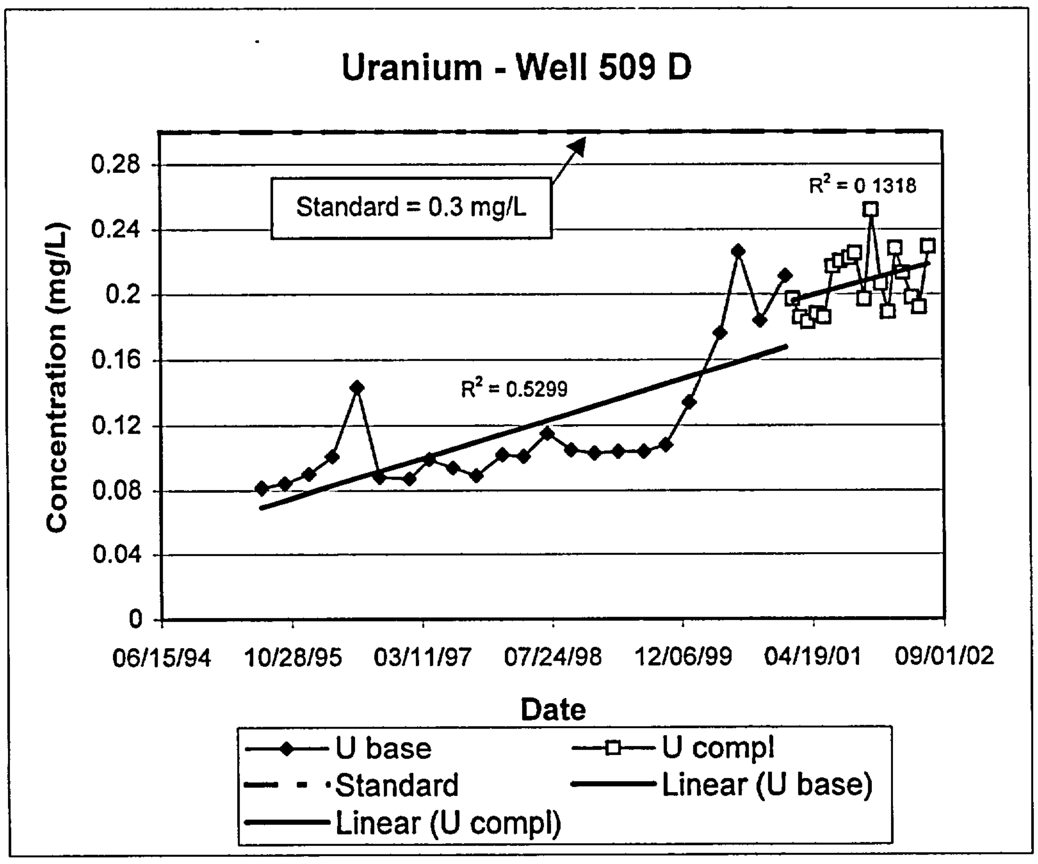


FIGURE A.2
TREND ANALYSIS COMPARING BASELINE AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

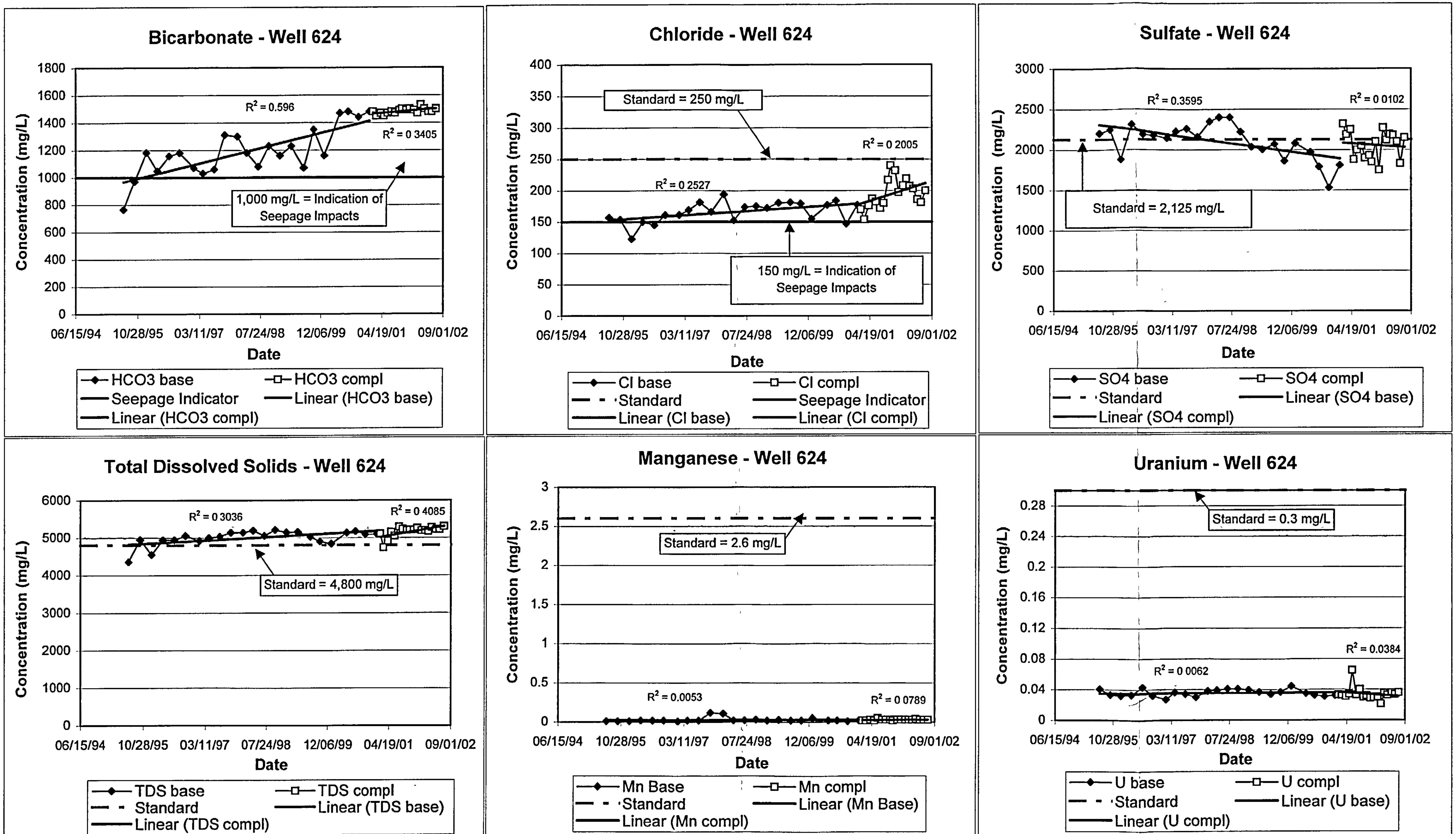


FIGURE A.3
TREND ANALYSIS COMPARING BASELINE AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

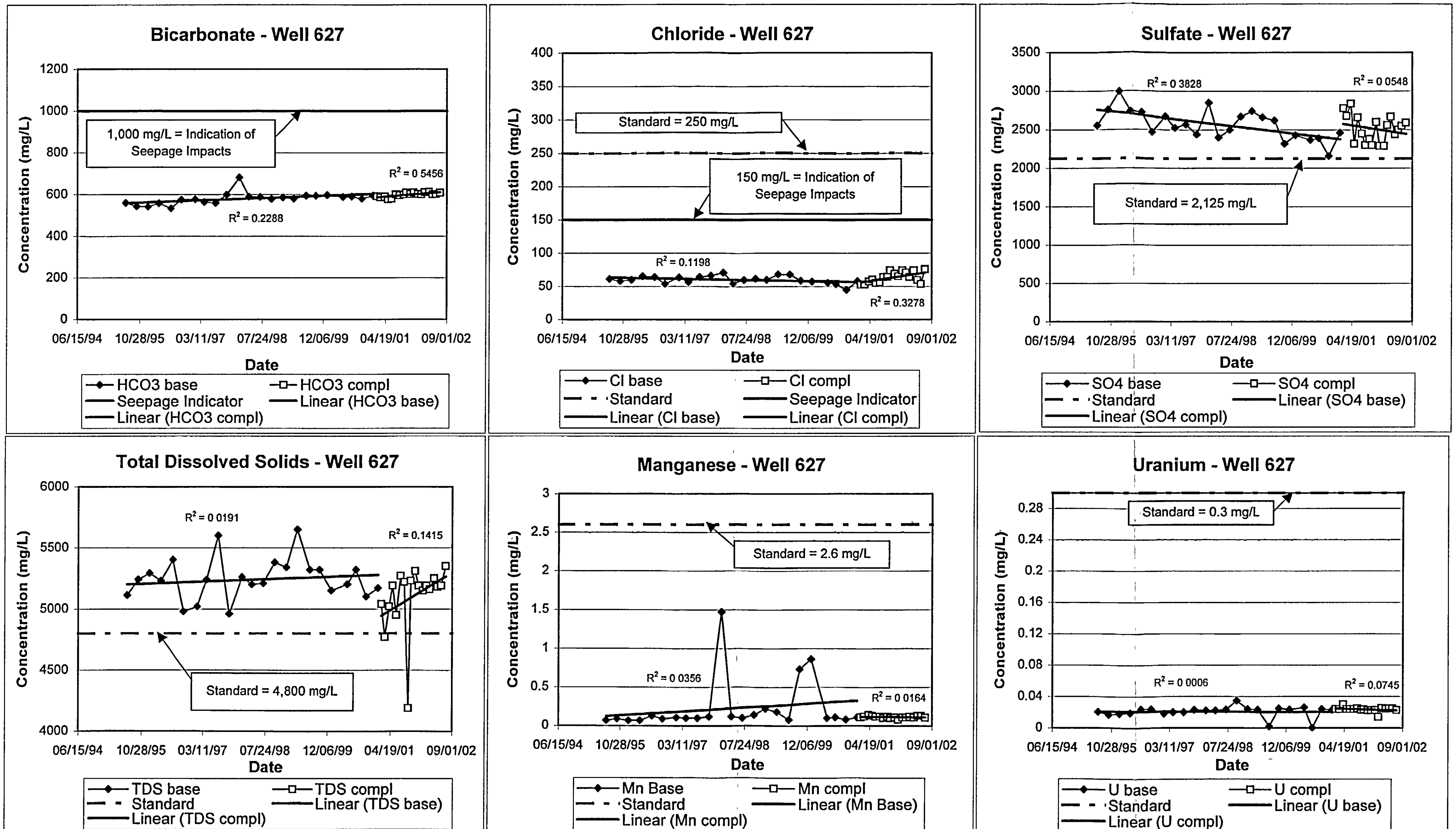


FIGURE A.4
TREND ANALYSIS COMPARING BASELINE AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

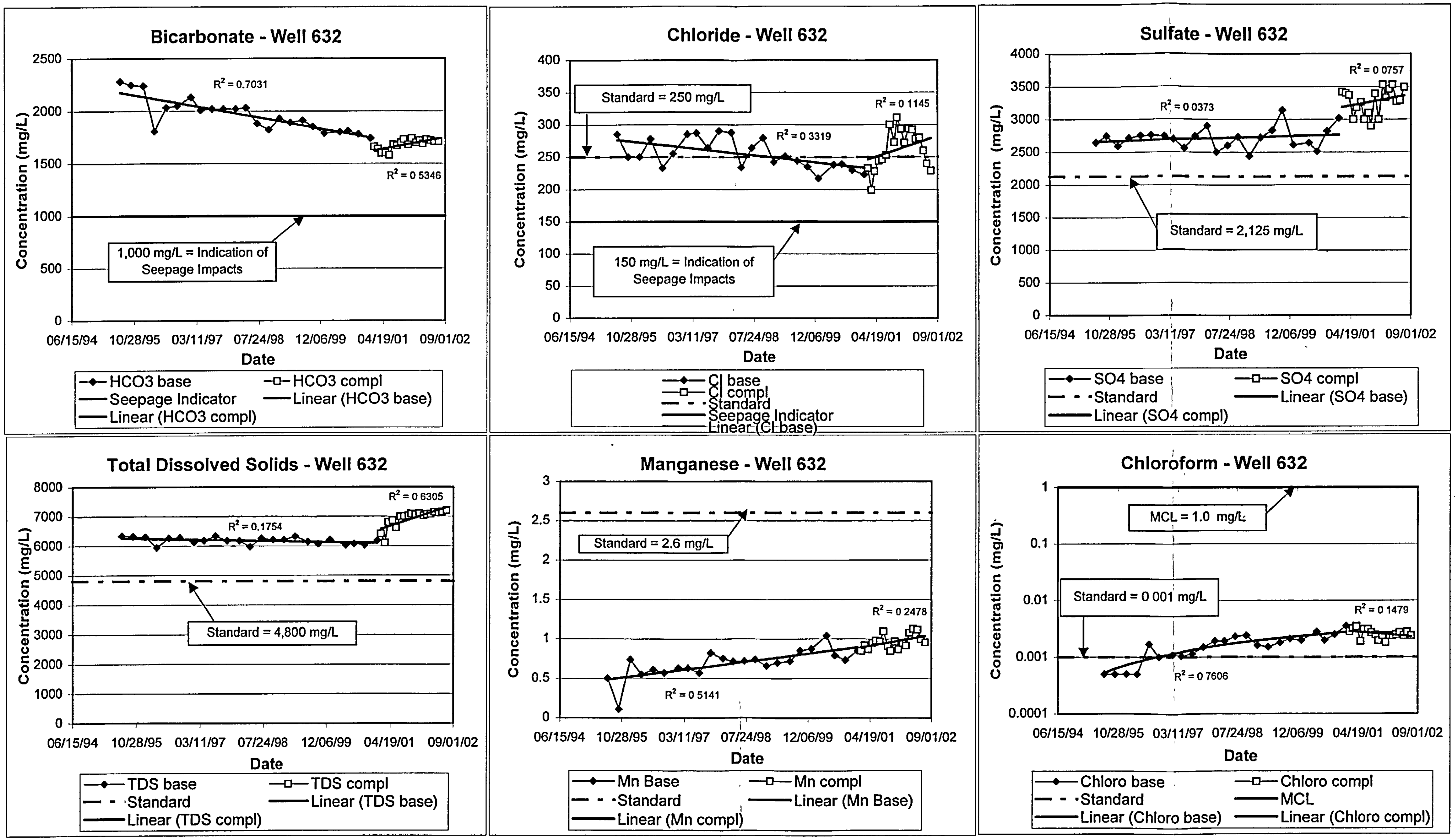


FIGURE A.4
TREND ANALYSIS COMPARING BASELINE AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

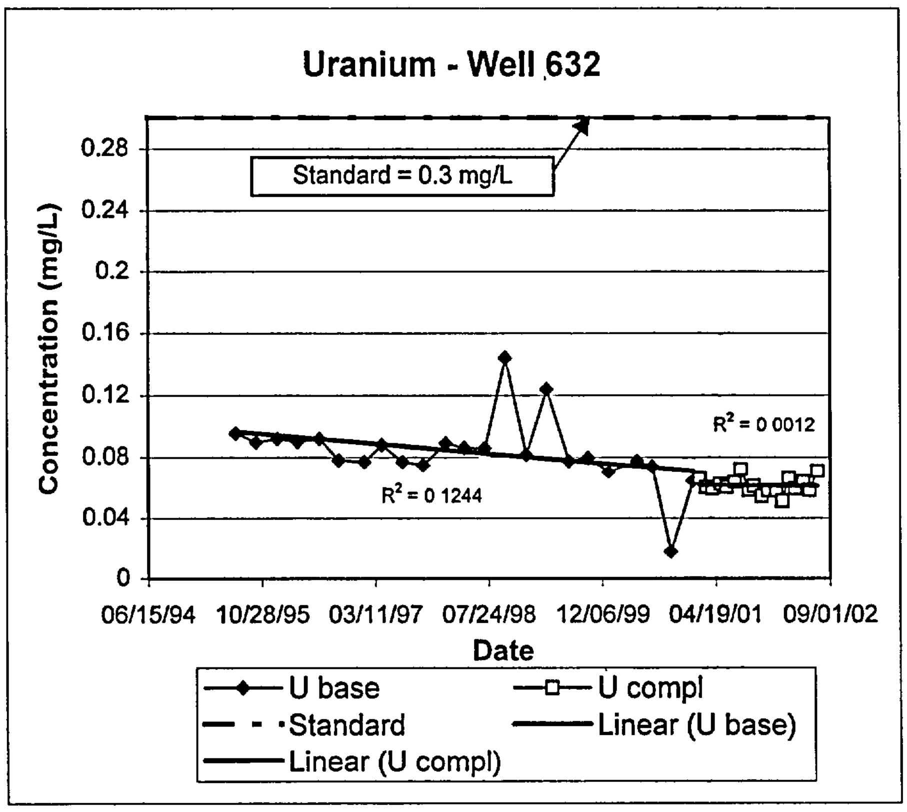


FIGURE A.5
TREND ANALYSIS COMPARING BASELINE AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

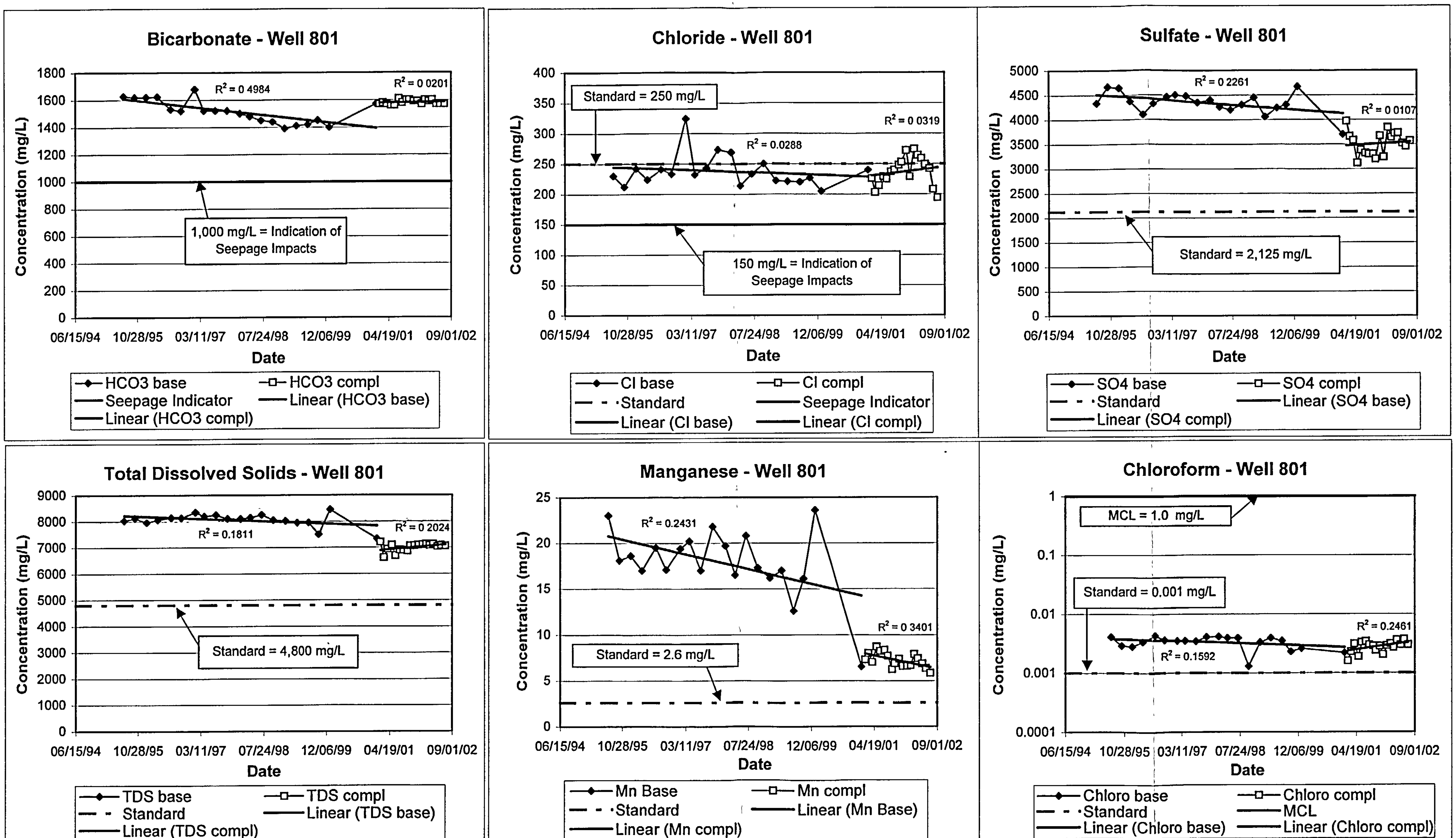


FIGURE A.5
TREND ANALYSIS COMPARING BASELINE AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

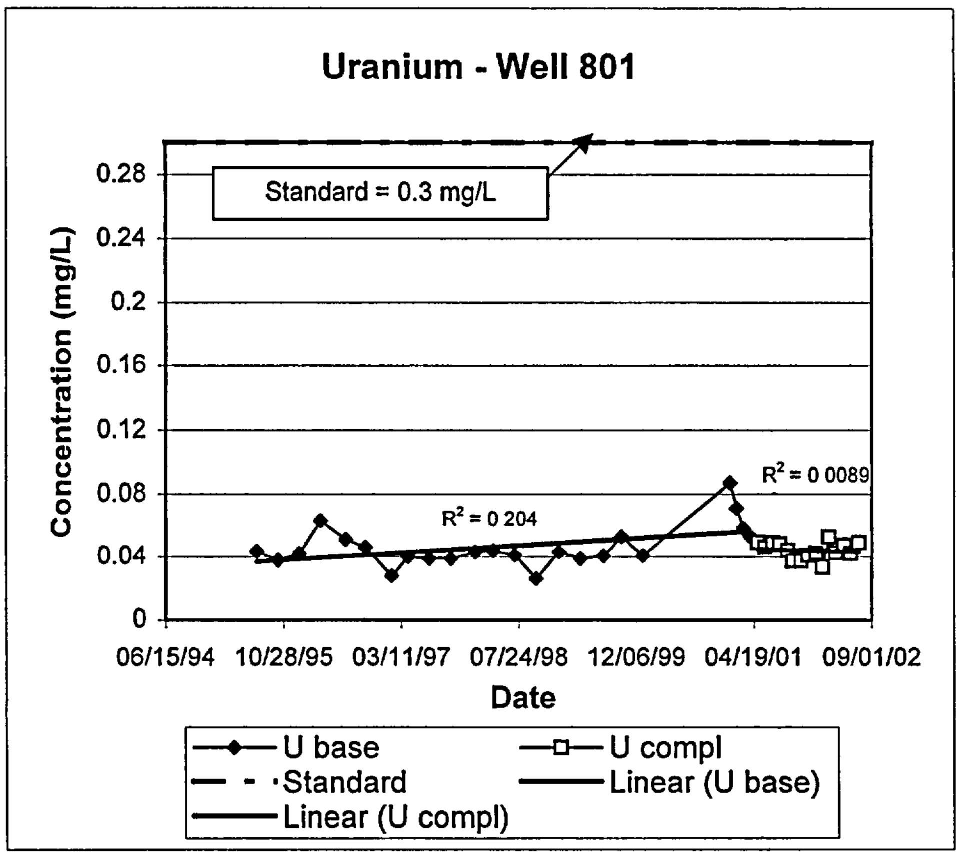


FIGURE A.6
TREND ANALYSIS COMPARING BASELINE AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

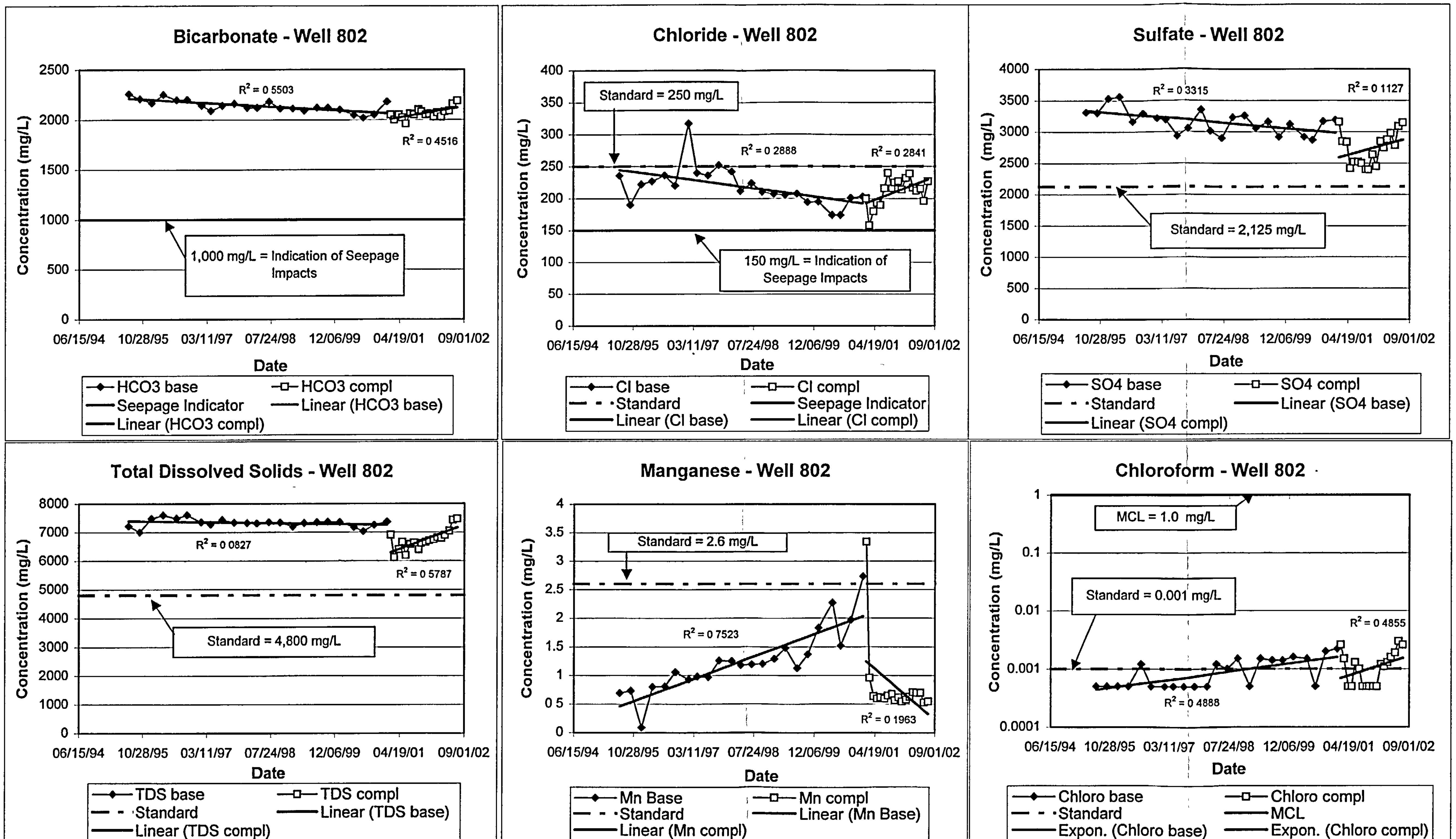


FIGURE A.6
TREND ANALYSIS COMPARING BASELINE AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

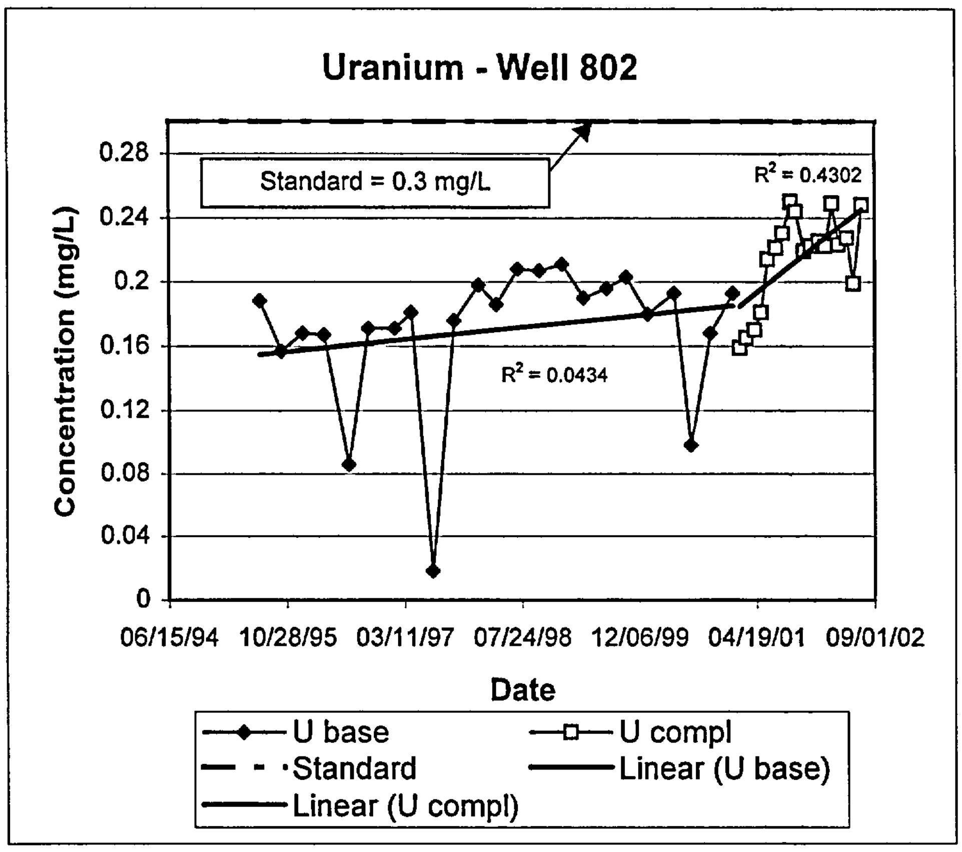


FIGURE A.7
TREND ANALYSIS COMPARING BASELINE AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

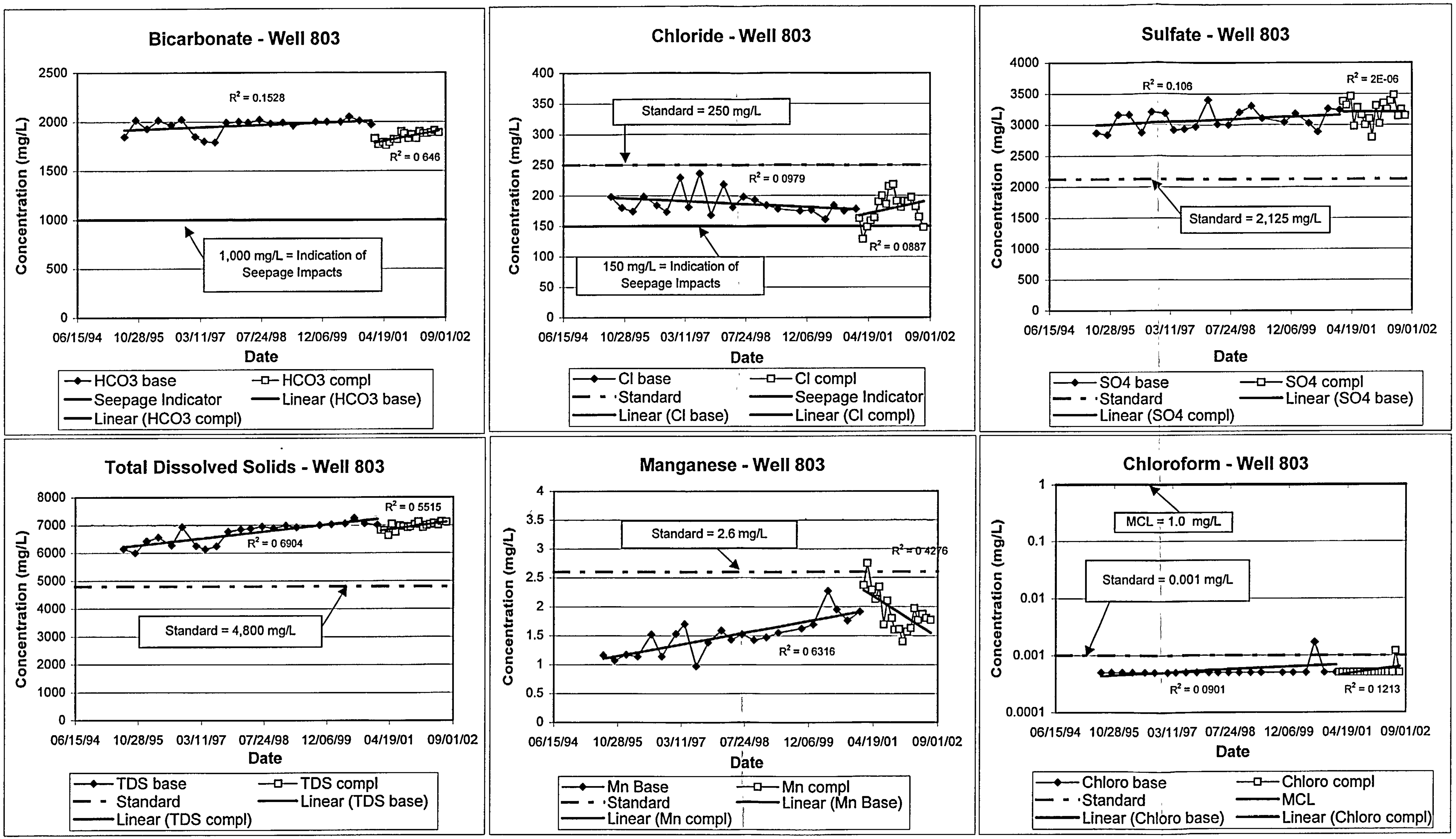


FIGURE A.7
TREND ANALYSIS COMPARING BASELINE AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

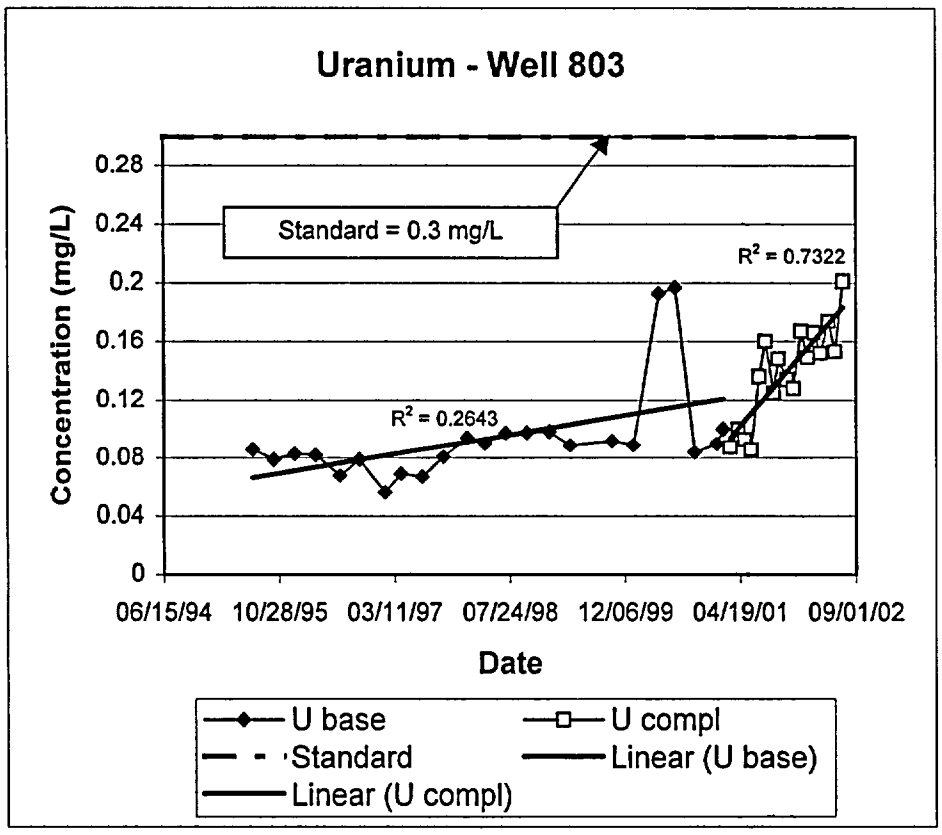


FIGURE A.8
TREND ANALYSIS COMPARING BACKGROUND AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

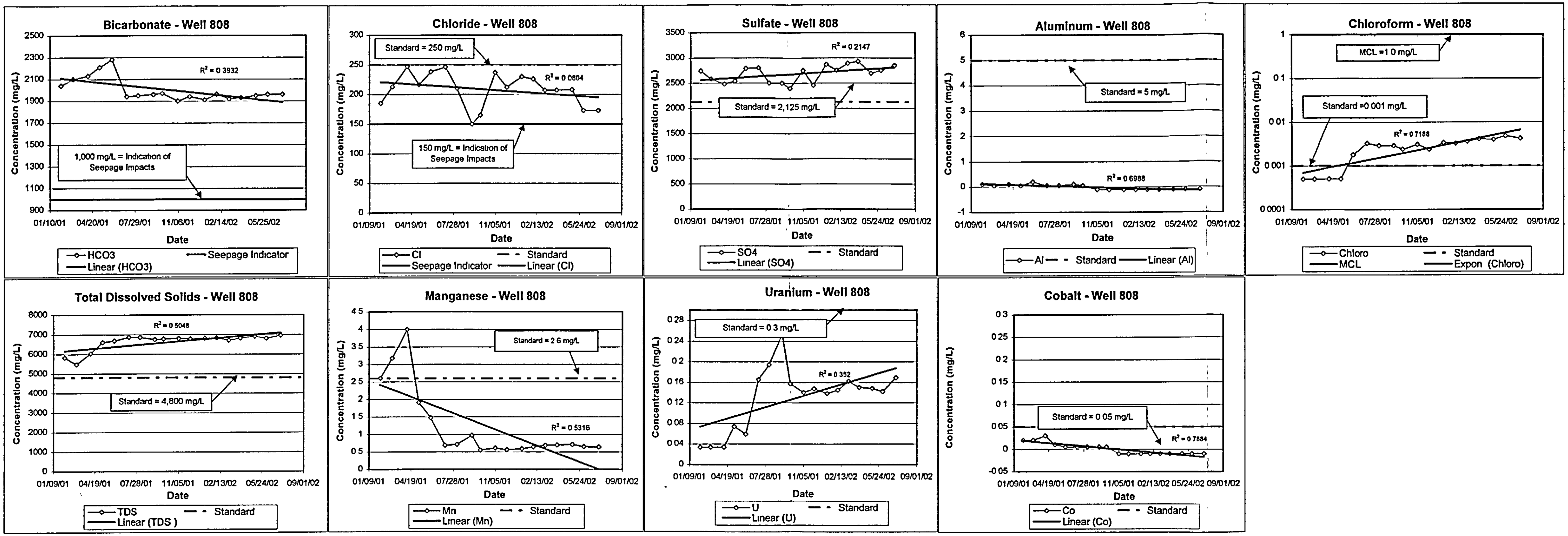


FIGURE A.9
TREND ANALYSIS COMPARING BACKGROUND AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

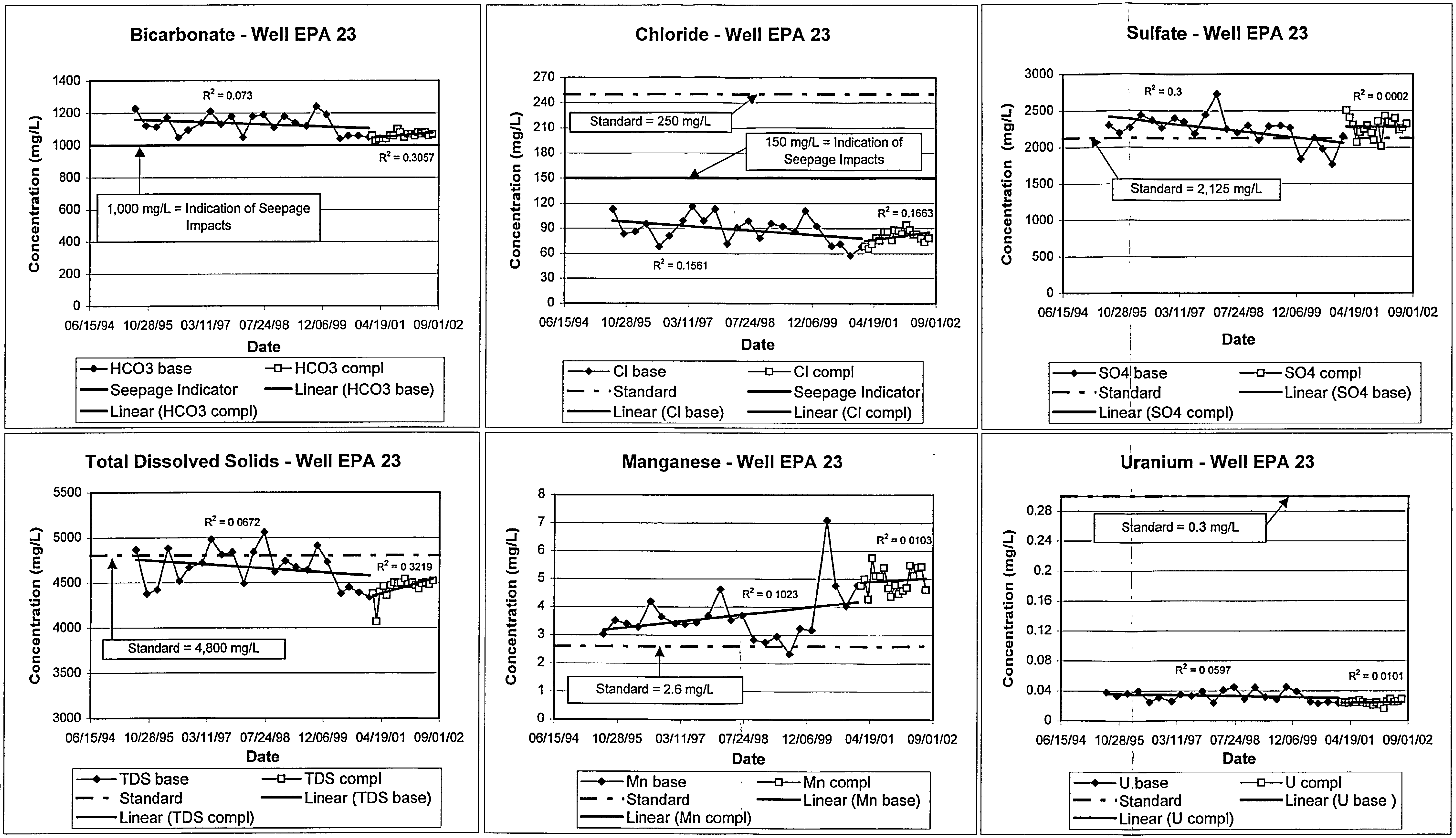


FIGURE A.10
TREND ANALYSIS COMPARING BACKGROUND AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

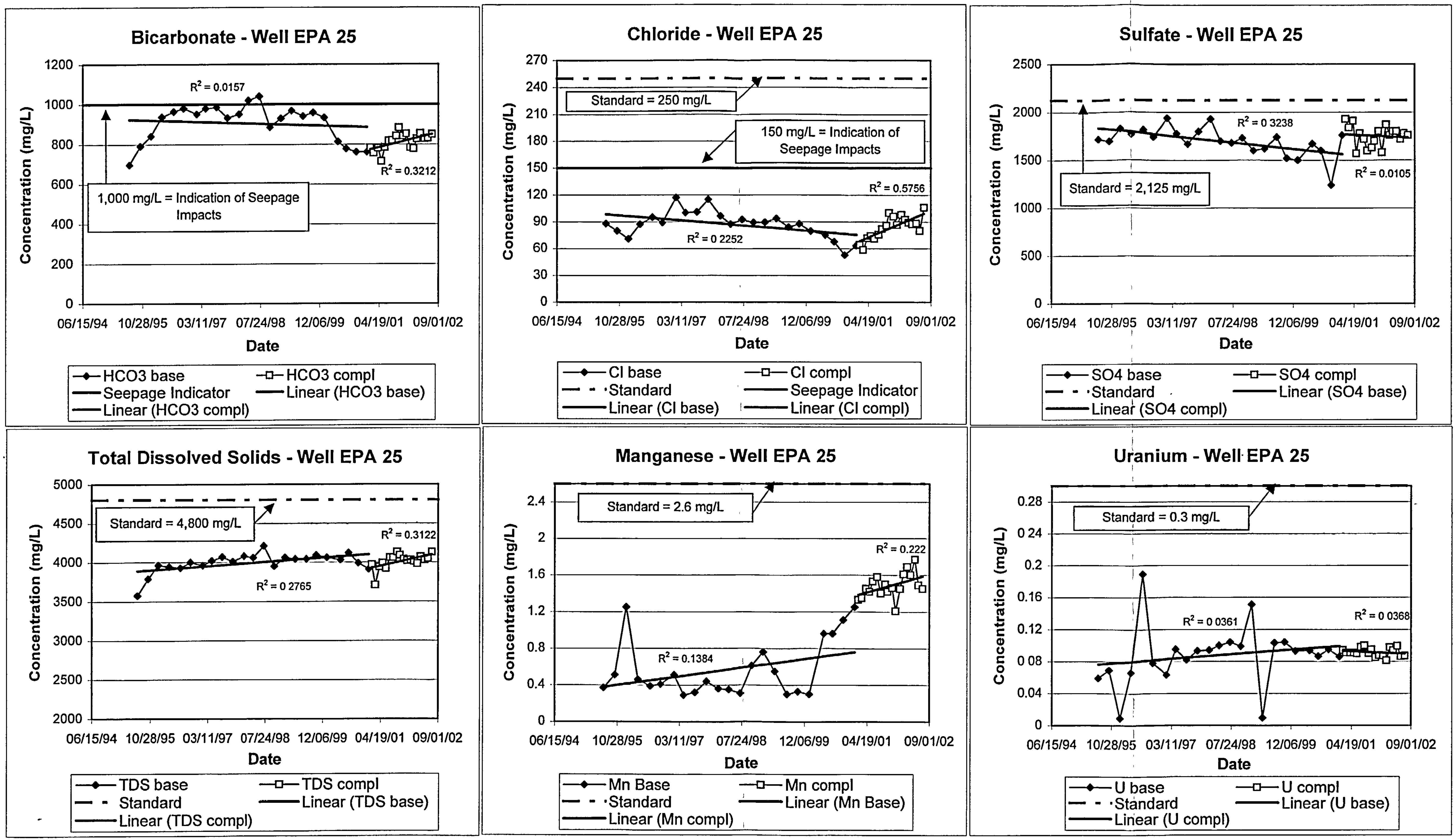


FIGURE A.11
TREND ANALYSIS COMPARING BACKGROUND AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

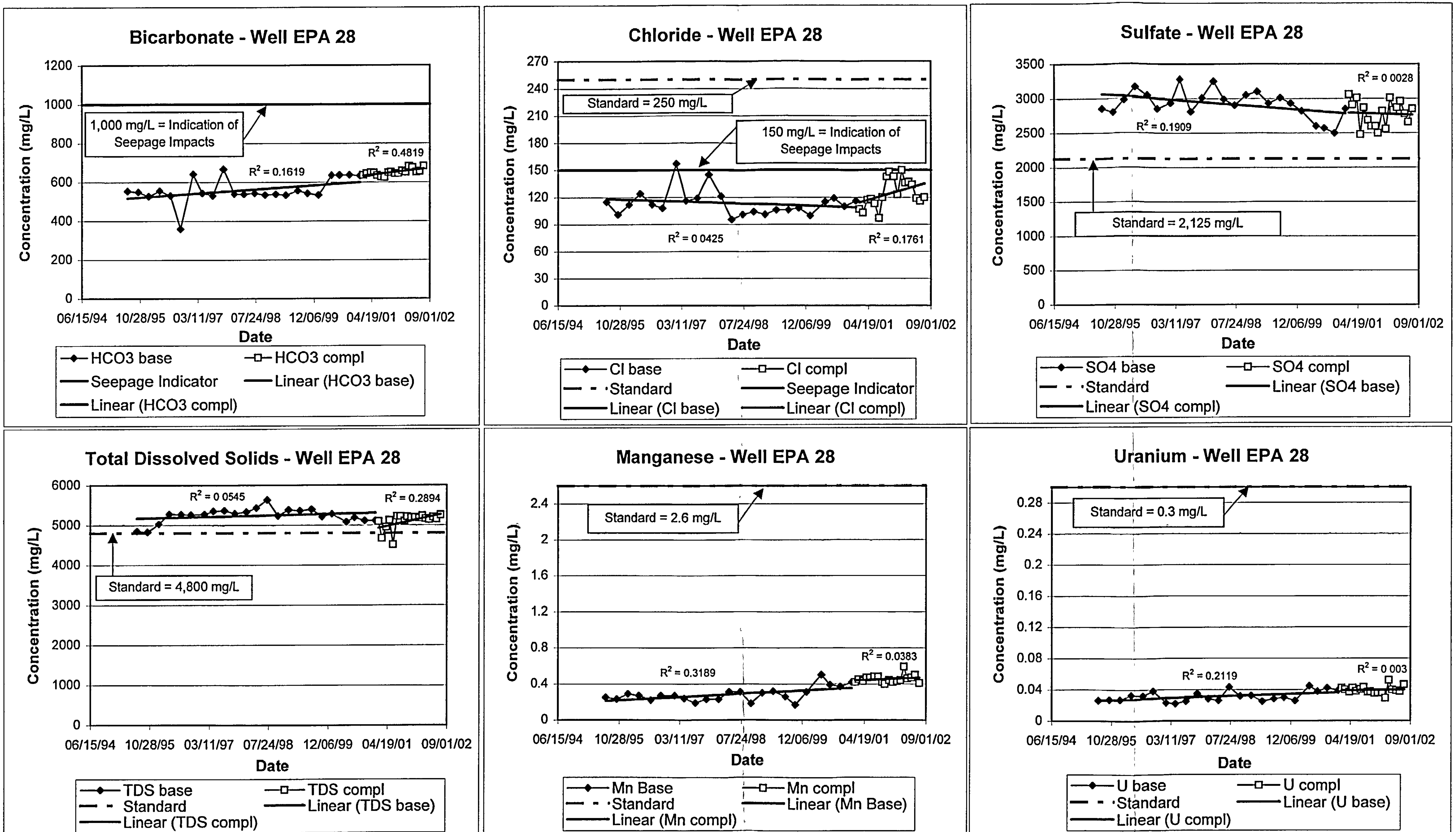


FIGURE A.12
TREND ANALYSIS COMPARING BACKGROUND AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

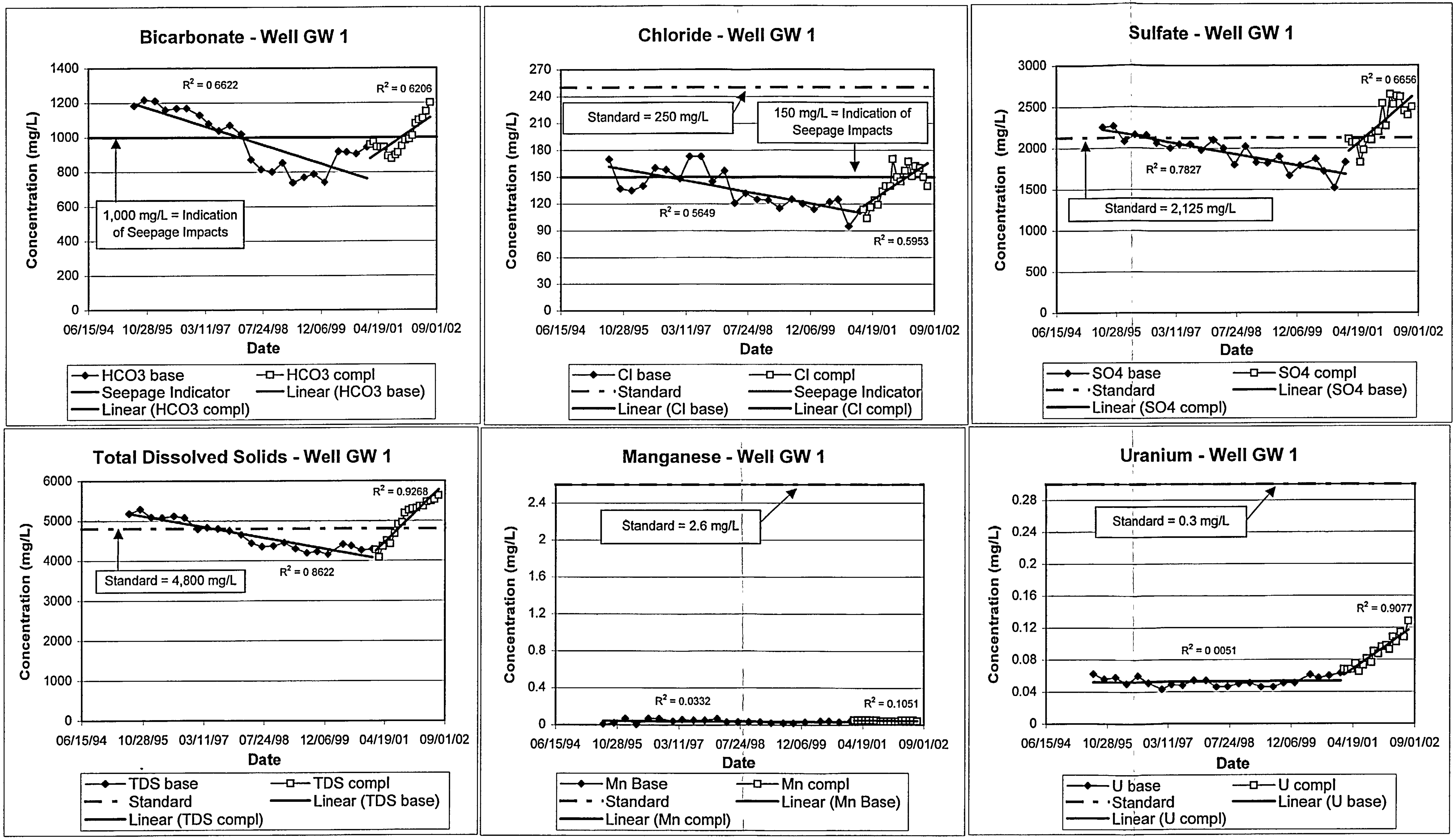


FIGURE A.13
TREND ANALYSIS COMPARING BACKGROUND AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION

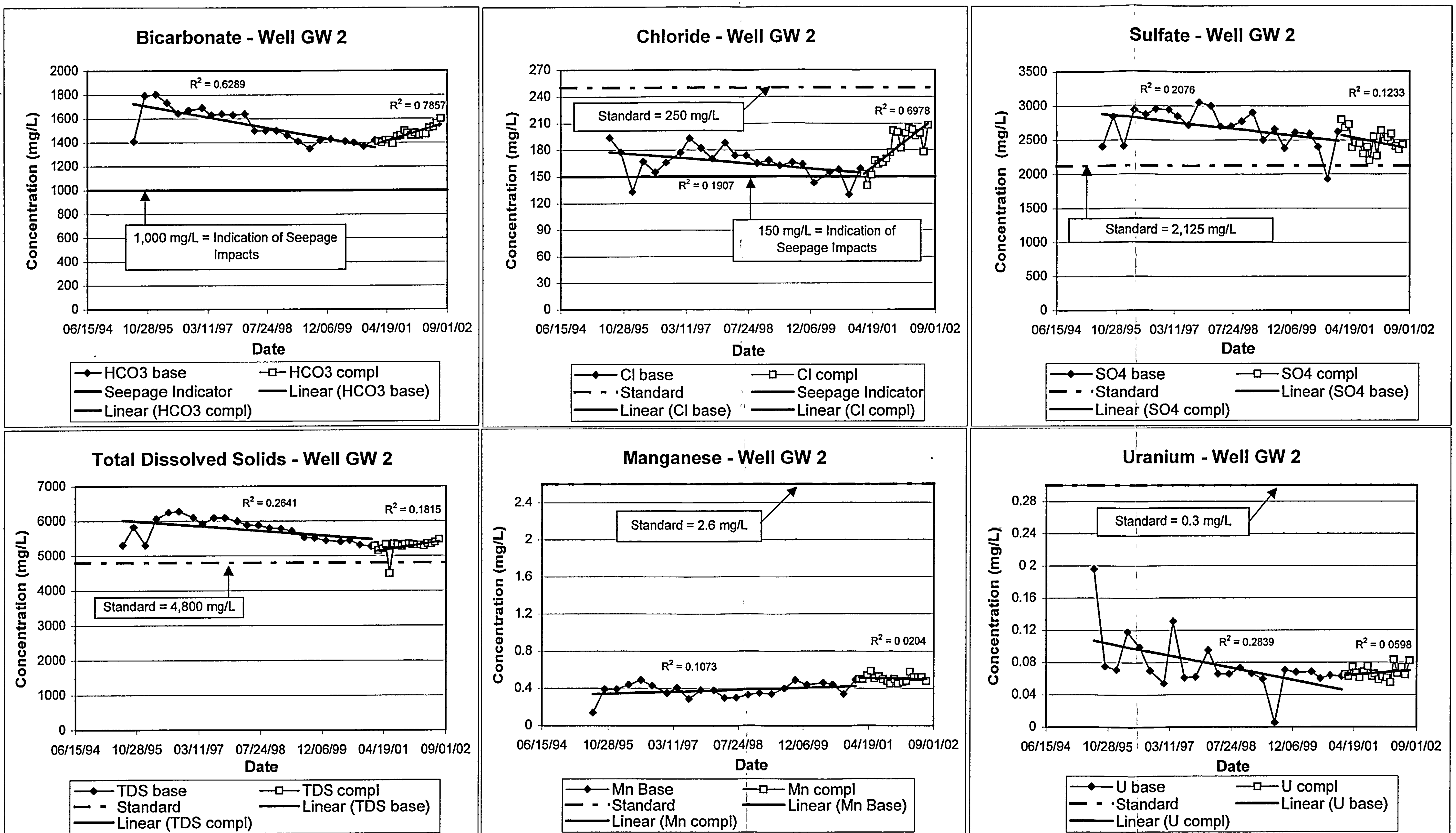


FIGURE A.14
TREND ANALYSIS COMPARING BACKGROUND AND TEST DATA
SOUTHWEST ALLUVIUM NATURAL ATTENUATION TEST
FINAL REPORT AND TI EVALUATION